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You Can't Negotiate with a Beetle: Environmental Law for a New Ecological Age

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"You Can't Negotiate with a Beetle"[1]: Environmental Law for a New Ecological Age

ABSTRACT

Environmental law has failed in its most basic purpose: to keep human activities in compliance with nature's requirements. Ecological systems are collapsing across the globe, and climate crisis threatens the continued viability of human civilization as we know it. Across the United States, agencies at all jurisdictional levels use discretion provided in their governing statutes to allow continuing damage to the atmosphere and other natural resources. Government officials routinely approach environmental protection as a matter of political discretion—and private, singular interests usually win the day over the long-term public good. This article suggests infusing public trust principles into government institutions to hold officials accountable, as trustees, for protecting crucial natural resources. It offers a modern version of the ancient public trust doctrine that is holistic, organic, and uniform across all environmental agencies. This article is adapted from the introductory chapter that will appear in Professor Wood's book, Nature's Trust, *forthcoming by Cambridge University Press in 2011.*

INTRODUCTION

"*You can't negotiate with a beetle. You are now dealing with natural law. And if you don't understand natural law, you will soon.*"[2]

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1. Oren Lyons, *The Ice Is Melting*, *in* TWENTY-FOURTH ANNUAL E.F. SCHUMACHER LECTURES, OCT. 2004, STOCKBRIDGE, MASS. (Hildegarde Hannum ed., 2004), *available at* http://smallisbeautiful.org/publications/lyons_04.html (last visited July 31, 2010).

2. *Id.*

This was the statement of Oren Lyons, referring in a lecture to 4 million acres of spruce trees across Alaska wiped out by beetles, because rising winter temperatures associated with global warming have made more optimal conditions in which the insects can thrive.[3] Lyons is not one to be easily dismissed. A member of the Onondaga Nation Council of Chiefs of the Six Nations of the Iroquois Confederacy, former Professor of American Studies at the State University of New York at Buffalo, and co-editor of a book on early constitutional history, Lyons has a knack for stripping environmental problems down to their core.[4] Foremost in his talks is the concept of "natural law," a principle that has guided the traditional indigenous approach to ecological management for thousands of years. In a magazine interview, Lyons tells a story about the time he was asked to give a speech at the World Economic Forum in Switzerland, an elite gathering of business leaders from around the world. He told the forum organizers that he would address the group on one condition: The business people would have to go to the top of the Alps in the freezing cold and stay there for 24 hours before they could hear his words. As recounted in the interview, he explained to the dumbfounded organizer: "They're insulated—heavily insulated—they don't deal with reality. They deal with business. . . . [I]f you put them up there and just let them freeze for 24 hours, they would get an inkling of another power, of another authority."[5]
As Lyons told the interviewer:

> [T]heir reality is Wall Street. . . . It is real, but it doesn't deal with the forces of nature. . . . The thing that you have to understand about nature and natural law is, there's no mercy. . . . There's only law. And if you don't understand that law and you don't abide by that law, you will suffer the consequence. Whether you agree with it, understand it, comprehend it, it doesn't make any difference. You're going to

3. *Id*. For background on the beetle kill, see Timothy Egan, *On Hot Trail of Tiny Killer in Alaska*, N.Y. TIMES, June 25, 2002, *available at* http://www.nytimes.com/2002/06/25/science/on-hot-trail-of-tiny-killer-in-alaska.html?pagewanted=1 (last visited July 31, 2010).

4. Interview by Tim Knauss with Oren Lyons, *Onondaga Faithkeeper Oren Lyons Speaks Out on the Environment:* '*Business As Usual Is Over*,' *in* PROGRESS, Feb. 8, 2008 (introduction by Bart Pollack) *available at* http://www.syracuse.com/progress/index.ssf/2008/02/onondaga_faithkeeper_oren_lyon.html (last visited July 31, 2010); *see also* Interview by Barry Lopez with Oren Lyons, *The Leadership Imperative: An Interview with Oren Lyons*, *in* ORION, Jan./Feb. 2007, *available at* http://www.orionmagazine.org/index.php/articles/article/94 (last visited July 31, 2010).

5. Interview by Tim Knauss with Oren Lyons, *supra* note 4.

> suffer the consequence, and that's right where we're headed right now.[6]

I. THE NEW ECOLOGICAL AGE

At Midway Atoll, halfway between North America and Japan, the corpses of 200,000 albatross chicks speckle the rookery. Their little gullets are filled with plastic Legos, bottle caps, and Styrofoam balls that their parents plucked from a floating garbage island twice the size of Texas.[7] In Moreton Bay, Australia, toxic fireweed spreads across the bottom of the sea at a rate covering the size of a football field every hour. When fishermen touch it, their skin breaks out into blistering welts, and their eyes burn and swell shut.[8] Thousands of miles away on the Florida Gulf Coast, a dreaded red tide shows up once a year and persists for months.[9] When it lands on the beaches, ocean breezes pick up the toxic wafts and bring them inland to waterfront communities, sending victims to the hospitals with pneumonia, asthma, and bronchitis.[10] Off the coast of Oregon, a dead ocean zone stretches over 1,000 square miles.[11] Thousands of crab skeletons drift in the lifeless waters in a scene that resembles an underwater graveyard.[12] In New England, families that have fished for generations retire their boats and their livelihoods. Oyster fisheries there, once supporting catches of millions of pounds a year, have collapsed, and globally, 85 percent of the oyster reefs are gone.[13] In 2008, in another ocean, the Pacific salmon fishery collapsed. A sweeping commercial ban by the Pacific Fishery Management Council extending from northern Or-

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6. *Id.*

7. Kenneth R. Weiss, *Plague of Plastic Chokes the Seas*, L.A. TIMES, Aug. 2, 2006, *available at* http://www.latimes.com/news/printedition/la-me-ocean2aug02,0,5594900.story (last visited July 31, 2010).

8. Kenneth R. Weiss, *A Primeval Tide of Toxins*, L.A. TIMES, July 30, 2006 [hereinafter Weiss, *A Primeval Tide of Toxins*], *available at* http://www.latimes.com/news/printedition/la-me-ocean30jul30,0,2100795.story (last visited July 31, 2010).

9. *Id.*

10. Kenneth R. Weiss, *Dark Tides, Ill Winds*, L.A. TIMES, Aug. 1, 2006, *available at* http://www.latimes.com/news/printedition/la-me-ocean1aug01,0,4291232,full.story?coll=la-home-headlines (last visited July 31, 2010).

11. Francis Chan, *Emergence of Anoxia in the California Current Large Marine Ecosystem*, 319 SCI. 920, 920 (2008), *available at* http://www.sciencemag.org/cgi/reprint/319/5865/920.pdf; *see generally* Kenneth R. Weiss, *Dead Zones Off Oregon and Washington Likely Tied to Global Warming, Study Says*, L.A. TIMES, Feb. 15, 2008 [hereinafter Weiss, *Dead Zones*], *available at* http://www.latimes.com/news/local/la-me-deadzone15feb15,0,6082397,full.story (last visited July 31, 2010).

12. Weiss, *Dead Zones*, *supra* note 11.

13. MICHAEL W. BECK ET AL., SHELLFISH REEFS AT RISK: A GLOBAL ANALYSIS OF PROBLEMS AND SOLUTIONS 11, 14 (2009), *available at* http://www.oyster-restoration.org/reports/Shellfish%20Reefs%20at%20Risk-single%20pages.pdf.

egon to the Mexican border sent 1,000 commercial fishing vessels into bay for the season.[14]

All over the world, nitrogen and phosphorous compounds from septic tanks, farms, and sewers gush into the oceans. Every day, ocean water absorbs millions of tons of carbon dioxide emitted from industrial chimneys, coal-fired power plants, and cars. Along the seashores of planet Earth, fragile wetlands are chewed up by bulldozers and paved over to create high-priced destination resorts and beachfront subdivisions—about 2,000 homes a day.[15] Far out at sea, ocean fishing trawlers scrape the bottom of the sea floor in half-acre swaths, hauling in catches indiscriminately, as if the marine life were inexhaustible.[16]

Over time, these human assaults have transformed the chemistry of the seas, creating what *Los Angeles Times* reporter Kenneth Weiss describes as "a virulent pox on the world's oceans."[17] The infusion of nutrients and other pollution into the ocean waters, combined with the overharvest of major predator fish species and destruction of shorelines, have toppled the ocean balance, allowing ancient forms of bacteria to thrive and proliferate as if the seas were returning to a primeval state. In the words of one scientist, the world's oceans are quickly succumbing to "the rise of slime," regressing back to "a half-billion years ago when the oceans were ruled by jellyfish and bacteria."[18] Marine biologists look at the freefall of ocean fisheries and project the complete loss of wild seafood just four decades from now.[19] That would be the end of an entire food group humans have relied on since time immemorial. As Oren Lyons would point out, you can't negotiate with slime.

No one ever guaranteed that a lifestyle of colossal waste and resource consumption could continue indefinitely without consequences to our own species. But somehow the relative stability the United States and many other industrialized nations have enjoyed since the end of World War II has lulled people into thinking that there is good collateral

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14. ROBERT GLENNON, UNQUENCHABLE: AMERICA'S WATER CRISIS AND WHAT TO DO ABOUT IT 315 (2009).

15. Weiss, *A Primeval Tide of Toxins*, *supra* note 8.

16. Oceana, More on Bottom Trawling Gear, http://na.oceana.org/en/our-work/promote-responsible-fishing/bottom-trawling/learn-act/more-on-bottom-trawling-gear (last visited Sept. 9, 2009).

17. Weiss, *A Primeval Tide of Toxins*, *supra* note 8.

18. *Id.*

19. Boris Worm et al., *Impacts of Biodiversity Loss on Ocean Ecosystem Services*, 314 SCI. 787, 790 (2006) (projecting "the global collapse of all taxa currently fished by the mid-21st century" based on current trends); Richard Black, "*Only 50 Years Left*" *for Sea Fish*, BBC NEWS ON-LINE, Nov. 2, 2006, http://news.bbc.co.uk/2/hi/science/nature/6108414.stm (last visited July 31, 2010) ("There will be virtually nothing left to fish from the seas by the middle of the century if current trends continue. . . ." (paraphrasing study)).

behind the mounting ecological debt we accrue every day. As a society, we are mesmerized by a naïve belief that, somehow, nature is so resilient, it cannot unravel before our very eyes. And, even if it did unravel, industrial society will manage to come up with the technology to take care of our survival. Modern commercialization has so detached people from food production, water collection, and shelter provision that a good many people, perhaps even the majority, are oblivious to the basic connection between their own survival and natural resources. Neon indicators of environmental collapse attract little notice in mainstream society. As Thomas Friedman observes in his book, *Hot, Flat, and Crowded: Why We Need a Green Revolution—and How It Can Renew America,* most transformative eras in the history of humankind have crept up on society without people being aware—that is, until the change was rapid and irreversible.[20] For decades, even marine biologists failed to see the big picture of ocean health, focusing instead on isolated outbreaks of toxic tides, dead zones, and species decline. They, too, had abiding faith in the resilience of nature, assuming the oceans would spring back to life again. As one leading scientist now laments late in his career, "Why did I get it wrong?"[21]

Now there is an entire body of "collapse" scholarship emerging from leading thinkers.[22] These writers and academics no longer concern themselves with isolated problems—a polluted river here, a threatened species there, a threat of a toxic release on the horizon. Instead, they are focusing on the big picture, the reality-changing kind. Humanity is exhausting life-sustaining natural resources at a pace that threatens the survival, comfort, and economic prosperity of individuals, and indeed, the future of civilization itself. James Gustave Speth, former Dean of the School of Forestry and Environmental Studies at Yale University, inventories accumulating evidence of natural collapse from deforestation, destruction of wetlands, toxic pollution, over-appropriation of water, disappearance of coral reefs, and extinction of species in his book, *The Bridge at the Edge of the World*.[23] He surmises that societies now face envi-

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20. THOMAS L. FRIEDMAN, HOT, FLAT, AND CROWDED: WHY WE NEED A GREEN REVOLUTION —AND HOW IT CAN RENEW AMERICA 27 (2008).

21. Weiss, *A Primeval Tide of Toxins*, *supra* note 8.

22. This genre of literature was first identified in JAMES GUSTAVE SPETH, THE BRIDGE AT THE EDGE OF THE WORLD: CAPITALISM, THE ENVIRONMENT, AND CROSSING FROM CRISIS TO SUSTAINABILITY 5 (2008). For a sampling of literature, see LESTER R. BROWN, PLAN B 3.0: MOBILIZING TO SAVE CIVILIZATION (2008); JAMES LOVELOCK, THE REVENGE OF GAIA: WHY THE EARTH IS FIGHTING BACK—AND HOW WE CAN STILL SAVE HUMANITY (2006); MARK LYNAS, SIX DEGREES: OUR FUTURE ON A HOTTER PLANET (American ed. 2008) (2007); DAVID SPRATT & PHILIP SUTTON, CLIMATE CODE RED: THE CASE FOR EMERGENCY ACTION (2008).

23. SPETH, *supra* note 22, at 1–2.

ronmental threats of unprecedented magnitude and scope, portending a future of "catastrophes, breakdowns, and collapses."[24] In Speth's words, "We're headed toward a ruined planet."[25] Jared Diamond makes a similar point in his book, *Collapse: How Societies Choose to Fail or Succeed*. He points out that the United States faces no fewer than a dozen environmental time bombs with short fuses—crises relating to water, soil, toxics, over-population, deforestation, habitat destruction, overhunting, overfishing, introduction of non-native species, human-caused climate change, energy shortages, and Earth's photosynthetic capacity.[26] He notes: "If we solved 11 of the problems, but not the 12th, we would still be in trouble, whichever was the problem that remained unsolved. We have to solve them all."[27] As the mounting natural losses and catastrophic threats of our time reveal, this generation has already set foot in an altogether new ecological era.

Presses are running at full speed to disseminate new ideas and transformative models to restructure society in a way that will allow humans to survive in the years ahead. It is a massive task. As Paul Hawken says in the film, *The 11th Hour*, "There isn't one single thing that we make that doesn't require a complete re-make. . . . This generation gets to essentially completely change this world."[28] One would think that environmental law would be at the forefront of such visionary reform. For the most part, however, law is a withering wallflower amidst the flurry of innovation. Environmental lawyers and regulators are still doing things very much the same way they did things 30 years ago. If the natural devastation allowed by environmental law over the past 30 years is any indication, it is a system doomed to failure. The purpose of this article is to bring environmental law face to face with the new ecological age that is now unquestionably upon us. It presents a transformative framework, Nature's Trust, to redirect government's environmental management from the present course of legalizing colossal damage to a new course of mammoth ecological restoration.

II. THE LEGAL MEMBRANE

Throughout most of civilization, human societies have governed their relationship with the environment through a series of codes or rules. Even back in Justinian times, the Roman Empire had legal rules about the taking of fish, ownership of eroded soil, and the cultivation of

24. *Id.* at 8.
25. *Id.* at 237.
26. JARED DIAMOND, COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED 6–7 (2005).
27. *Id.* at 498.
28. THE 11TH HOUR (Warner Brothers 2007).

bees.[29] In North America, tribal societies had rules and cultural norms restricting the harvest of species to certain times of the year and prohibiting waste and the soiling of waterways.[30] No matter how simple or complex, all societies create a legal membrane through which individuals act in relation to nature. That membrane is environmental law. The efficacy of environmental law should be of utmost concern to citizens, for any government that fails to protect its natural resources sentences its citizens to misery and perhaps even death.

In *Collapse,* Diamond studies the factors that caused notably successful societies throughout history to collapse precipitously. While each society had its own complexities, one factor typically stands out: the mismatch between the society's consumption and available resources. When human societies grossly exceed nature's limits, they risk collapse. What is less obvious is why the governing structure of society sometimes allows the mismatch to reach disastrous proportions. In a series of case studies, Diamond attributes the lack of adequate governmental response in part to a conflict of interest between the short-term interests of the decision-making elite and the long-term interests of the society as a whole.[31] It is not uncommon for the ruling elite to pursue goals that are "good for themselves but bad for the rest of the group,"[32] leading society on an unsustainable track that is doomed for collapse. Among the Greenland Norse, for example, the controlling chiefs sought more power, so they undertook actions to gain more sheep in order to out-compete their neighboring chiefs. Their short-term self-interest led to overgrazing and depletion of the land, diminishing its capacity to sustain the people over time.[33] This, combined with other self-interested decisions, made the chiefs more powerful in the short run, but contributed to their society's collapse in the long run.[34]

Throughout the world today, the decision-making elite consists not of ruling chiefs with sheep herds, but of thousands of environmental agencies and legislatures armed with hundreds of thousands of pages of statutes and regulations that collectively govern Earth's natural resources. Their realm of decision-making is terribly important in deter-

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29. CAESAR FLAVIUS JUSTINIAN, THE INSTITUTES OF JUSTINIAN WITH ENGLISH INTRODUCTION, TRANSLATION, AND NOTES (Thomas Collett Sandars trans., William S. Hein & Co. 1st Am. ed. 1984) (1876).

30. *See* Mary Christina Wood, *The Tribal Property Right to Wildlife Capital (Part II): Asserting a Sovereign Servitude to Protect Habitat of Imperiled Species*, 25 VT. L. REV. 355, 370–71 (2001).

31. DIAMOND, *supra* note 26, at 430.

32. *Id.* at 23, 430.

33. *Id.* at 275–76.

34. *Id.* The factors contributing to that society's demise were multifold. *Id.*

mining whether society will endure or collapse. Though most lawyers think of environmental law as just one of several dozen specialties in the law, it is actually a different breed, for one simple reason. Environmental law is accountable to a supreme set of laws—the laws of nature, or natural law, as Oren Lyons and indigenous leaders worldwide call it.

The most important function of environmental law is to assure humanity's compliance with nature's laws, all of which ultimately determine whether citizens will survive and prosper, or suffer and perish. If environmental law becomes too detached from nature's laws, or ineffective in assuring humanity's adherence to such laws, society risks collapse—and environmental law, no matter how seemingly complex or sophisticated, will have been irrelevant. If the hundreds of thousands of bureaucrats and legislators sitting in offices throughout today's world make decisions to promote their own short-term interests rather than the long-term good of the citizens they serve—as in the ruined societies that Diamond inventories—our collective future is in dangerous hands. The decision-making process of the modern environmental bureaucracy is of crucial importance to the survival of humanity.

The United States has the most elaborate set of environmental laws in the world. It is a convoluted morass of statutes, regulations, court decisions, and a myriad of other legal instruments created at the local, state, and federal levels. Though basic U.S. environmental law principles have been around since the formation of this country, they morphed into a new form as a result of statutes Congress passed in the 1970s, at the height of the environmental era. These statutes include the Clean Water Act, the Clean Air Act, the Endangered Species Act (ESA), the National Environmental Policy Act, the Toxic Substances Control Act, the National Forest Management Act, and a handful of others.[35] Even more pollution and natural resource statutes have been passed at the federal, state, and local levels since that time. Each statute spawned a cottage industry of lawyers and environmental consultants. What is broadly referred to as "environmental law" is actually now a fractured field consisting of multiple sub-disciplines, including natural resources law, hazardous waste law, water law, wildlife law, wetlands law, ocean and coastal law, land-use law, public lands law, mining law, agricultural law, oil and gas law, international environmental law, and others.

Though directed at different problems, nearly all environmental statutes have one thing in common: They rely on agencies to carry out their mandates. Nature, in its entirety, has been conceptually split up and partitioned among various bureaucracies, many hundreds in all,

35. For a compilation of many federal environmental statutes, see SELECTED ENVIRONMENTAL LAW STATUTES (2008).

spanning federal, state, and local levels. Vast authority is vested in these agencies to control or manage discrete parts of the environment. For example, state environmental agencies generally handle air and water pollution. Wetlands protection falls in the lap of the U.S. Army Corps of Engineers. Federal forests are the responsibility of the U.S. Forest Service. Endangered species are handled by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. Water rights are the province of the state water agencies. Toxics and pesticides fall to the U.S. Environmental Protection Agency (EPA). Land-use matters go to the local agencies. And so on. The jurisdictional webs have different reaches and regulatory strands, but they all amount to one thing: Agencies have tremendous control over nature.

The common denominator of environmental and natural resource statutes is a permit provision. With few exceptions, statutes authorize agencies to issue permits or approvals to damage nature. The bulk of the agencies' work today is deciding whether to permit pollution or destruction of natural resources like air, water, soils, forests, grasslands, wetlands, riparian areas, and species. In making these decisions, agencies have tremendous discretion. They are assumed to be expert bodies, vested with scientific and technical expertise. Agencies are assumed to exercise their judgment in an objective manner, for the good of the public and in accordance with the statutes' protective goals. This agency discretion is the crux of all modern environmental law. Its role in the modern demise of nature cannot be overstated.

Over the last four decades, since the first modern environmental laws were passed, hundreds of thousands of environmental professionals have worked within this system, assuming its functionality. Many other nations have adopted the same administrative construct to regulate their own environmental resources. But, frankly, the entire environmental administrative state is an experiment. The time has long since come to ask whether the system actually works to protect the environment. As a former executive director of the U.N. Environment Program observes:

> The field of law has, in many ways, been the poor relation in the world-wide effort to deliver a cleaner, healthier and ultimately fairer world. We have over 500 international and regional agreements, treaties and deals covering everything from the protection of the ozone layer to the conservation of the oceans and seas. Almost all, if not all, countries have national environmental laws too. But unless these are complied

> with, unless they are enforced, then they are little more than symbols, tokens, paper tigers.[36]

We are at a crucial junction in the evolution of humanity, literally engineering our own demise. Our raging destruction of nature threatens to create what scientists call a fundamentally "different planet," one much less hospitable to human life than the planet to which we have grown accustomed over the course of civilization.[37] The ancient membrane of law that functions as a system of community restraint is pitted with holes. It is time to rise above the complexity of the thousands of individual statutes sprawled across the federal, state, and local levels and ask two basic questions of the field as a whole. First, is environmental law working, that is, is it keeping humanity's actions in compliance with nature's own laws? Second, is it likely to be effective in facing the ecological challenges looming before us? These questions are of crucial importance for the United States, but they are also relevant for environmental regimes of other nations that now confront ravenous pressure to industrialize. If the answer to either question is no, legal scholars must urgently set their sights on a transformative legal paradigm.

A good number of environmental litigators, scholars, and decision-makers will say yes, the statutes are working. They point to isolated successes in every statutory context. The rivers are not catching fire any more. Lead has been taken out of gasoline. CFCs (chlorinated fluorocarbons) are banned. The pesticide DDT no longer poisons eagles. Influenced by these perceptions of success, when new problems come along, lawyers tend to turn to the old way of doing things. For example, an initial response to global warming was filing a petition under the Clean Air Act to regulate carbon dioxide, an effort that presumes a high level of statutory efficacy in the face of the greatest threat the planet has ever encountered.[38] Ten years after the Clean Air Act petition was filed, the federal government had still not acted to control greenhouse gas pollu-

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36. Climate Justice, Enforcing Climate Change Law, http://www.climatelaw.org (last visited Jan. 25, 2009) (quoting Klaus Töpfer, executive director of the U.N. Environment Program on the adoption of the Judges' Johannesburg Principles on the Role of Law and Sustainable Development, Aug. 2002).

37. James Hansen, *Why We Can't Wait*, THE NATION, May 7, 2007 ("If we do follow that [business as usual] path, *even for another ten years*, it guarantees that we will have dramatic climate changes that produce what I would call a different planet. . . ."); James Hansen et al., *Climate Change and Trace Gases*, 365 PHIL. TRANSACTIONS ROYAL SOC'Y A: MATHEMATICAL, PHYSICAL & ENGINEERING SCI. 1925, 1939 (2007) [hereinafter Hansen, et al. *Climate Change and Trace Gases*], *available at* http://www.planetwork.net/climate/Hansen2007.pdf.

38. *See* Massachusetts v. EPA, 549 U.S. 497, 510 (2007) (describing petition, filed Oct. 20, 1999).

tion, even though the scientists clearly warned that delay could cause runaway planetary heating.

Despite broad assumptions that environmental law is effective, the proof must lie in the health of the ecosystems themselves. The data and trends are impossible to dismiss. Humanity is violating nature's laws not only at the level of individual species and ecosystems, but at the level of atmospheric functioning and ocean health—a truly global level.

III. ECOLOGICAL BANKRUPTCY

The ecological hazards of today are in a different league than the problems to which the environmental statutes were designed to respond. For example, when the ESA was passed, extinctions were still quite rare. Historic threats of over-hunting and poaching still dominated the legal landscape. Throughout the three decades since, wildlife has been hammered with pollution, habitat loss, and now, climate change. Imperiled species are showing up ubiquitously, in nearly every kind of habitat system.[39] Today, one would be hard-pressed to find any public land without some threatened species habitat. Moreover, where there is one threatened species, there are undoubtedly others, because they rely on the same ecology. When the old growth forests were razed by the timber industry in the Pacific Northwest, it was not just the spotted owl that plummeted toward extinction—it was also the lungless salamander, the marbled murrelet, the salmon, the Pacific yew, the Oregon red tree vole, the Columbia oregonium snail, the cryptic paw lichen, dozens of fungi, and many others.[40] When an ecosystem starts unraveling, it takes almost everything with it.

The old threats of over-hunting that the traditional wildlife laws were designed to address have been eclipsed by unprecedented, human-triggered ecological threats—threats to the web of life that supports the species. The major challenges of wildlife law from just two decades ago now seem like child's play. Today, major wildlife reports do not talk about the Fender's blue butterfly or the pampas deer or the Stellar sea lion. Instead, they talk about entire classes of life on Earth threatened.

The International Union for Conservation of Nature (IUCN) compiles data and research on the world's threatened species. Of the species

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39. *See generally* REED F. NOSS ET AL., ENDANGERED ECOSYSTEMS OF THE UNITED STATES: A PRELIMINARY ASSESSMENT OF LOSS AND DEGRADATION app. A (1995), *available at* http://biology.usgs.gov/pubs/ecosys.htm (last visited July 31, 2010).

40. D. NOAH GREENWALD & R. SCOTT GREACEN, SAVING ALL THE PARTS: PROTECTING SPECIES OF NORTHWEST OLD GROWTH FORESTS, 3, 8, 17–18 (2004), *available at* http://www.endangeredearth.org/library/nwfp-saving-the-pieces.pdf.

evaluated in 2010, 36 percent are threatened with extinction.[41] Broken down by category, of the surveyed species, 21 percent of mammals, 30 percent of amphibians, 12 percent of bird species, 32 percent of fish species, and 28 percent of reptile species are threatened.[42] Interpreting such statistics is not a matter of seeing a glass a third empty or two-thirds full. The possibility that a significant number of all species on Earth are threatened does not mean that the rest are secure. Nature, unfortunately, does not work that way. Because all of ecology is connected, the percentage of currently threatened species is likely a harbinger of accelerating loss. As James Speth reports, "The planet has not seen such a spasm of extinction in 65 million years, since the dinosaurs disappeared."[43] Leading conservation biologists conclude that humanity has triggered the sixth mass extinction in the planet's history.[44] The only hope of slowing or reversing the mass extinctions on the planet is through mammoth ecological repair and recovery.

At the current rate of destruction, humanity would need two planets by 2030 to support its modern, industrialized lifestyle.[45] Half of the world's original forest is now gone, and another 30 percent is degraded or fragmented.[46] The sheer pace of destruction is mind-boggling. In the tropics, rainforest falls to axes and chainsaws at a rate of one acre

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41. *See* IUCN, 2010 IUCN RED LIST OF THREATENED SPECIES tbl.1 (2010), *available at* http://www.iucnredlist.org/documents/summarystatistics/2010_1RL_Stats_Table_1.pdf. This percentage was derived from 47,978 species assessed. *Id.*

42. *Id.* at tbl.1. The IUCN notes, however, that statistics for some categories of species are skewed because of "biases in the assessment process toward assessing species that are thought to be threatened." *Id.* at n.4. The statistics reflect a trajectory of decline rather than concrete figures. *See* Craig Hilton-Taylor et al., *State of the World's Species*, *in* WILDLIFE IN A CHANGING WORLD: AN ANALYSIS OF THE 2008 IUCN RED LIST OF THREATENED SPECIES 15, 17 tbl.1 (Jean-Christophe Vie et al. eds., 2008) ("Although only a very small proportion (2.7%; Table 1) of the world's described species have been assessed so far, the IUCN Red List provides a useful snapshot of what is happening to species around the world today and highlights the urgent need for conservation action. . . ."). E.O. Wilson, the renowned Harvard biologist, has estimated that the world is losing 27,000 species per year (three per hour). E.O. WILSON, THE DIVERSITY OF LIFE 280 (W.W. Norton & Co. 1993) (1992).

43. SPETH, *supra* note 22, at 1 (noting extinction rates are now 1,000 times faster than normal).

44. John Boitnott, *Berkeley Scientists: World in* '*Mass Extinction Spasm*,' *Scientists: Humans to Blame*, Aug. 12, 2008, *available at* http://www.infowars.com/scientists-world-in-mass-extinction-spasm/ (last visited July 31, 2010).

45. World Wildlife Fund, LIVING PLANET REPORT 2008 3 (2008), *available at* http://assets.panda.org/downloads/living_planet_report_2008.pdf. The American lifestyle would need five planets to sustain its comfort of living. *See* EDUARDO GONÇALVES, THE WWF POCKET GUIDE TO A ONE PLANET LIFESTYLE 11 (2008), *available at* http://assets.panda.org/downloads/one_planet_living_booklet.pdf.

46. WORLDWATCH INST., VITAL SIGNS 2002, 104 (2002) (relying on estimates from the World Resources Institute).

every second.[47] Thirty million acres of rainforest vanish every year.[48] About half of the world's wetlands are destroyed, and a third of the mangroves are gone.[49] There are now 400 "dead zones" in the world's oceans, collectively spanning tens of thousands of square miles, and the count is doubling every decade.[50] The oceans are becoming acidic due to high levels of absorbed carbon dioxide, and some sea water is now so corrosive that it dissolves the shells of sea creatures, posing "potentially catastrophic consequences for marine life."[51] Twenty percent of the coral reefs—the biodiversity treasure chest of the ocean—have disappeared,[52] and 27 percent of all reef-building coral species are now threatened.[53] Leading marine scientists project that, at this rate of destruction, 60 percent of the coral reefs could die by 2030.[54] Nearly one-third of the sea fisheries have already collapsed, and big fish populations have fallen 90 percent over the last 50 years.[55]

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47. SPETH, *supra* note 22, at 1. The Amazon rainforest is being cut at a rate of about four football fields a minute. *See generally* Alexander Lees, *Deforestation Causes "Boom-and-Bust" Development in the Amazon*, EARTH & CLIMATE, June 11, 2009, *available at* http://esciencenews.com/articles/2009/06/11/deforestation.causes.boom.and.bust.development.amazon (last visited July 31, 2010).

48. Editorial, *Forests and the Planet*, N.Y. TIMES, May 29, 2009, at A24.

49. SPETH, *supra* note 22, at 1.

50. NAT'L SCI. FOUND., SPECIAL REPORT: DEAD ZONES, *available at* http://www.nsf.gov/news/special_reports/deadzones/climatechange.pdf. *See also* Randolph E. Schmid, *Ocean Dead Zones Become a Worldwide Problem*, ASSOCIATED PRESS, Aug. 14, 2008, *available at* http://www.usatoday.com/tech/science/2008-08-14-3253832470_x.htm (last visited July 31, 2010) (stating that dead zones are as far-flung as Africa, South America, China, New Zealand, North America, Norway, Spain, and Taiwan). For more information on the rapid expansion of "dead zones," see Anne Minard, "*Dead Zones*" *Multiplying Fast, Coastal Water Study Says*, NAT'L GEOGRAPHIC NEWS, Aug. 14, 2008, *available at* http://news.nationalgeographic.com/news/2008/08/080814-dead-zones.html (last visited July 31, 2010) (citing a recent study that states dead zones are now "the key stressor on marine ecosystems" and "rank with overfishing, habitat loss, and harmful algal blooms as global environmental problems").

51. Roger Highfield, *Oceans Turning Acidic Decades Earlier*, LONDON TELEGRAPH, May 22, 2008, *available at* http://www.telegraph.co.uk/scienceandtechnology/science/sciencenews/3342688/Oceans-turning-acidic-decades-earlier.html (last visited July 31, 2010); *New Study Finds Increasing Acidification of Pacific Ocean's Continental Shelf*, PHYSORG.COM, May 22, 2008, http://www.physorg.com/news130693309.html (last visited July 31, 2010) (stating that "[t]he water that will upwell off the coast in future years already is making its undersea trek toward us, with ever-increasing levels of carbon dioxide and acidity.").

52. SPETH, *supra* note 22, at 1.

53. Beth A. Polidoro et al., *Status of the World's Marine Species*, *in* WILDLIFE IN A CHANGING WORLD: AN ANALYSIS OF THE 2008 IUCN RED LIST OF THREATENED SPECIES 55, 60 (Jean-Christophe Vié et al. eds., 2008), *available at* http://data.iucn.org/dbtw-wpd/edocs/RL-2009-001.pdf.

54. Charlotte Amalie, *Time Bomb Ticking for Coral Reefs?*, ASSOCIATED PRESS, Oct. 27, 2006, *available at* http://www.msnbc.msn.com/id/15412865 (last visited July 31, 2010).

55. Weiss, *A Primeval Tide of Toxins*, *supra* note 8.

On a worldwide basis, there is a staggering loss in ecosystem services provided to humans. The Millennium Ecosystem Assessment, conducted by over 1,300 experts from 95 countries, concludes: "[A]pproximately 60% (15 out of 24) of the ecosystem services examined . . . are being degraded or used unsustainably."[56] Such ecosystem services include capture fisheries, water supply, waste treatment and detoxification, water purification, natural hazard protection, regulation of air quality, regulation of regional and local climate, and regulation of erosion.[57]

Just a few statistics speak volumes about the damage manifested in the United States and North America. According to the Council on Environmental Quality, at least 9,000 plant and animal species are at risk of extinction in the United States.[58] Nearly 40 percent of fish species in North American streams, rivers, and lakes are in jeopardy, representing a 92 percent increase since 1989.[59] In the United States, 40 percent of all surface waters are unfit for bathing or fishing, and nearly half of all lakes are eutrophied.[60] Sixty-nine percent of U.S. freshwater mussels are either already extinct or at risk of extinction.[61] The Audubon Society reports that the 20 most common bird species in the United States have declined by 68 percent on average.[62] The United States has destroyed over 53 percent of its wetlands[63] and 90 percent of its old growth forests.[64] California

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56. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS 1 (2005), *available at* http://www.millenniumassessment.org/documents/document.356.aspx.pdf.

57. *Id.* at 7.

58. *See* COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY: 21ST ANNUAL REPORT 137 (1990), *available at* http://www.slideshare.net/whitehouse/august-1990-the-21st-annual-report-of-the-council-on-environmental-quality ("The problem is national in scope, with every region of the country reporting losses of native species. More than species are being lost. Whole plant and animal communities—integrated, resilient systems—are threatened") (citation omitted).

59. Howard L. Jelks et al., *Conservation Status of Imperiled North American Freshwater and Diadromous Fishes*, 33 FISHERIES 368, 372 (2008), *available at* http://www.fisheries.org/afs/docs/fisheries/fisheries_3308.pdf.

60. Don Hinrichsen et al., *The Pollution Problem, in Solutions for a Water-short World*, 26 POPULATION REPORTS ch. 4.1 (1998), *available at* http://info.k4health.org/pr/m14/m14chap4_1.shtml (last visited July 31, 2010) (citing EPA, THE QUALITY OF OUR NATION'S WATER: 1994, at 209 (1995) and WORLD HEALTH ORG., HEALTH AND ENVIRONMENT IN SUSTAINABLE DEVELOPMENT FIVE YEARS AFTER THE EARTH SUMMIT, 19–133 (1997)).

61. WORLDWATCH INST., *supra* note 46, at 106.

62. Verlyn Klinkenborg, Editorial, *Millions of Missing Birds, Vanishing in Plain Sight*, N.Y. TIMES, June 19, 2007, *available at* http://www.nytimes.com/2007/06/19/opinion/19tue4.html (last visited July 31, 2010).

63. William B. Meyer, *Past and Present Land Use and Land Cover in the U.S.A.*, CONSEQUENCES, Spring 1995, *available at* http://www.gcrio.org/CONSEQUENCES/spring95/Land.html (last visited July 31, 2010); *see also* NOSS ET AL., *supra* note 39, app. at A.

has lost 99 percent of its native grassland.[65] One million hectares of farmland are paved or built over every year.[66]

The tide of toxins produced by American industry is astounding. There are as many as 100,000 synthetic chemicals in the industrial commerce stream today.[67] Industrial sources in the United States release over 4 billion pounds of toxic chemicals a year.[68] These end up in the waters, air, and soils.[69] Fish advisories for toxic contamination are in effect for 24 percent of all rivers, 35 percent of all lakes, and 71 percent of all coastal estuaries, as well as 100 percent of the Great Lakes.[70] Beluga whales swimming in the polluted St. Lawrence River have such elevated levels of polychlorinated biphenyls (PCB) in their blubber that they qualify as toxic waste dumps under Canadian law.[71] In the Great Lakes, 100 percent of the coho salmon and lake trout are contaminated with PCBs, and 91 percent of the coho salmon are so contaminated with mercury that humans are advised to limit consumption.[72] A 2009 federal survey found that virtually every fish sampled in 291 streams around the nation had mercury contamination, and, of those, a quarter contained mercury levels that are unsafe for human consumption.[73] In the realm of air pollution, according to the EPA, 95 percent of all Americans now have an increased risk of lung cancer, just from breathing toxins in outdoor air.[74]

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64. NOSS ET AL., *supra* note 39, app. at A.

65. *Id.*

66. WORLDWATCH INST., *supra* note 46, at 152.

67. ANNE PLATT MCGINN, WORLDWATCH PAPER #153: WHY POISON OURSELVES? A PRECAUTIONARY APPROACH TO SYNTHETIC CHEMICALS 7 (2000), *available at* http://www.worldwatch.org/node/837 (last visited July 31, 2010); Gay Daly, *Bad Chemistry*, ONEARTH, Winter 2006, *available at* http://www.nrdc.org/onearth/06win/chem1.asp (last visited July 31, 2010); *see also* THEO COLBORN, DIANNE DUMANOSKI & JOHN PETERSON MEYERS, OUR STOLEN FUTURE (1997).

68. EPA, U.S. EPA TOXICS RELEASE INVENTORY REPORTING YEAR 2007 PUBLIC DATA RELEASE: SUMMARY OF KEY FINDINGS 1 (2007), *available at* http://www.epa.gov/TRI/tridata/tri07/pdr/key_findings_v12a.pdf.

69. *Id.*

70. *See* Mary Christina Wood, *EPA's Protection of Tribal Harvests: Braiding the Agency's Mission*, 34 ECOLOGY L.Q. 175, 190 (2007), *available at* http://www.law.uoregon.edu/faculty/mwood/docs/epas.pdf.

71. Hinrichsen et al., *supra* note 60, ch. 4.1.

72. EPA, RESULTS OF LAKE MICHIGAN MASS BALANCE STUDY: MERCURY DATA REPORT (2004), *available at* http://epa.gov/glnpo/lmmb/results/mercury/index.html (last visited July 31, 2010).

73. *See* Matthew Preusch, *DEQ to Help Polluter Seek Federal Break on Mercury Emission*, THE OREGONIAN, Aug. 19, 2009, *available at* http://www.oregonlive.com/environment/index.ssf/2009/08/oregons_top_environmental_agen.html (last visited July 31, 2010).

74. U.S. GOV'T ACCOUNTABILITY OFF., CLEAN AIR ACT: EPA SHOULD IMPROVE THE MANAGEMENT OF ITS AIR TOXICS PROGRAM 1 (2006), *available at* http://www.gao.gov/new.items/d06669.pdf.

One in four Americans lives within four miles of a toxic waste dump.[75] Babies in the United States are now born polluted, their blood hosting a cocktail of toxins even before they take their first breath of life.[76]

This colossal damage to Earth had its genesis in the Industrial Revolution, but the real acceleration took place between 1970 and present—ironically, during the modern era of environmental law. Overall, Earth's natural ecosystems have declined by 33 percent during the last 30 years, according to a comprehensive report issued in 2000 by the World Wildlife Fund (WWF).[77] Looking at it a slightly different way, in just the last three decades, one-third of the planet's natural resources has been consumed, all since the modern environmental laws were passed.[78]

The environmental laws were designed to prevent virtually all forms of ecological disaster and loss that afflict the nation today. The United States has laws to prevent toxic exposure, air pollution, water pollution, wetlands destruction, forest destruction, over-fishing, species extinction, and the full suite of other damaging actions. Across the board, they have failed. To be sure, there are small successes in each case, but the successes are in the nature of one step forward, one hundred steps back. The sheer pace of industrial activity has outraced the ability of environmental law to protect resources.

For example, while the Clean Air Act has been partly successful in controlling six common air pollutants known as "criteria pollutants" that have been regulated since the Act's inception, it is losing the race in protecting citizens against the tens of thousands of airborne toxins that impose cancer and other health risks on society.[79] The EPA regulates only

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75. Carol M. Browner, administrator, U.S. Environmental Protection Agency, Speech to National Conference of Black Mayors (Apr. 25, 1997), *available at* http://yosemite.epa.gov/opa/admpress.nsf/12a744ff56dbff8585257590004750b6/2aabb5c6c3776d2a8525701a0052e3bf!OpenDocument (last visited July 31, 2010). This affected population includes 10 million children. *Id.*

76. *See* Douglas Fischer, *Womb Fails to Shield Babies from Pollution*, OAKLAND TRIB., July 15, 2005, *available at* http://www.insidebayarea.com/ci_2864589 (last visited July 31, 2010).

77. WWF, LIVING PLANET REPORT 2000 1 (Jonathan Loh ed., 2000), *available at* http://assets.panda.org/downloads/lpr2000.pdf (also concluding that "the ecological pressure of humanity on the Earth has increased by about 50 percent over the same [thirty-year] period").

78. PAUL HAWKEN ET AL., NATURAL CAPITALISM: CREATING THE NEXT INDUSTRIAL REVOLUTION 4 (1999).

79. *See* Jeannie Kever, *UH Scientist Tackles Toxins, Houston's Heat*, HOUSTON CHRON., Aug. 31, 2009, *available at* http://www.chron.com/disp/story.mpl/metropolitan/6592826.html (top researcher noting, "[t]he environment is overloaded with chemicals, about 80,000 or so, which have at least a potential toxicity that today we know very little about."). EPA provides charts demonstrating national improvement in air quality for the six common pollutants. *See* EPA, Air Trends, http://www.epa.gov/airtrends/ (follow links for individual pollutants listed under "Basic Information") (last visited May 17, 2010).

187 air toxins.[80] Similarly, while the Clean Water Act is somewhat effective at reducing pollution from point sources, it remains ineffective at preventing a whole host of toxins coming from diffused sources.[81] And while the ESA has led to the recovery of 21 species, approximately 1,900 listed species languish on regulatory deathbeds, and thousands more remain without any ESA protection at all.[82]

In short, while there are isolated successes, industrial society wreaks massive damage on nature. As political scientist Richard Andrews says, "Even after more than three decades of the modern 'environmental era,' [U.S. environmental policies] have only selectively, modestly, and temporarily held back the larger national and global forces of human population growth, landscape transformation, natural resource use, and waste generation."[83] Has environmental law been effective? If the health of the planet is any indicator, the answer is clearly no. As currently administered, environmental law is the cane on which humanity leans as it walks the plank toward its own destruction.

IV. CLIMATE EMERGENCY AND THE BIG ADAPTATION

Even putting aside past failures, we should ask whether this body of law is sufficiently strong, versatile, and forward-looking enough to confront the ecological challenges that lie ahead. With new machinery, chemicals, and pollutants, humanity has jumped from a white belt to a black belt in its earth-destroying capability, and doubts are legitimate as

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80. EPA, Technology Transfer Network, Air Toxics Web Site, The Clean Air Act Amendments of 1990 List of Hazardous Air Pollutants, http://www.epa.gov/ttn/atw/orig189.html (last visited May 17, 2010); *see also* EPA, Technology Transfer Network, Air Toxics Web Site, Pollutants & Sources, http://www.epa.gov/ttn/atw/pollsour.html (last visited May 17, 2010).

81. William L. Andreen, *Water Quality Today: Has the Clean Water Act Been a Success?*, 55 ALA. L. REV. 537, 564 (2004).

82. U.S. Fish & Wildlife Serv., Species Reports, Summary of Listed Species, Listed Populations, and Recovery Plans, http://ecos.fws.gov/tess_public/TESSBoxscore (last visited Sept. 3, 2009); NOAA Fisheries, Office of Protected Resources, Endangered Species Act, http://www.nmfs.noaa.gov/pr/laws/esa/ (last visited Sept. 3, 2009); U.S. Fish & Wildlife Serv., Species Reports, Delisting Report, http://ecos.fws.gov/tess_public/DelistingReport.do (last visited Sept. 3, 2009) (Twenty-one species have been delisted as a result of recovery, and nine delisted due to extinction); COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY: 25TH ANNIVERSARY REPORT (1994–95) 149–50, *available at* http://ceq.hss.doe.gov/nepa/reports/1994-95/chap08.pdf (citing Nature Conservancy inventory of species that concluded nearly one-third of 20,481 U.S. species were in danger). In his comprehensive assessment of ESA implementation, Robert Fischman concludes: "The experience of the past three decades highlights persistent shortcomings that hinder progress toward species recovery."). Robert L. Fischman, *Predictions and Prescriptions for the Endangered Species Act*, 34 ENVTL. L. 451, 471 (2004).

83. SPETH, *supra* note 22, at 78.

to whether environmental law provides a capable check on this new level of annihilation. Just two decades ago, CFCs were used commonly in refrigerators and aerosol sprays until scientists discovered that they degraded the ozone layer, which shields Earth's surface from harmful effects of ultraviolet radiation.[84] Scientists had to scramble to get the word out to world leaders in order for them to enact CFC bans in time to avert global catastrophe.[85] One can only hope that the scientists will identify such monster eco-threats emerging from a fast-paced industrialized society, but even if they do, environmental law has proved a sluggish rescuer.

The crisis that eclipses all others today is climate change, a situation that creates enormous stakes for virtually every human being on Earth. In June 2007, a team of leading climate scientists warned that carbon dioxide and other greenhouse gas emissions have put Earth in "imminent peril"—literally on the verge of runaway climate heating that would impose catastrophic conditions on generations to come.[86] Runaway heating threatens to melt the polar ice sheets and Greenland, kill the coral reefs, and turn the Amazon rainforest into savannah.[87] It would bring floods, hurricanes, killer heat waves, fires, disease, crop losses, food shortages, and droughts of a caliber that is unimaginable to many.[88] If unchecked, it will cause rising sea levels and inundation of coastal areas worldwide.[89] Biologists warn that climate change could wipe out 40 percent to 70 percent of the world's species,[90] triggering the kind of mass extinction that has not occurred on Earth for 55 million years.[91] In

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84. EPA, Ozone Science: The Facts Behind the Phaseout, http://www.epa.gov/ozone/science/sc_fact.html (last visited Feb. 14, 2009).

85. *See generally* National Academy of Sciences, Beyond Discovery, The Ozone Depletion Phenomenon, http://www.beyonddiscovery.org/content/view.article.asp?a=73 (last visited May 17, 2010).

86. Hansen et al., *Climate Change and Trace Gases*, *supra* note 37, at 1949; *see also* Steve Connor, *The Earth Today Stands in Imminent Peril*, THE INDEPENDENT, June 19, 2007, *available at* http://environment.independent.co.uk/climate_change/article2675747.ece (last visited July 31, 2010).

87. *See* SPRATT & SUTTON, *supra* note 22, at 87–88, 90.

88. *See generally* U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES (2009), *available at* http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts.

89. *Id.* at 18; James Hansen, *Huge Sea Level Rises Are Coming—Unless We Act Now*, NEW SCIENTIST, July 25, 2007, *available at* http://www.newscientist.com/article/mg19526141.600-huge-sea-level-rises-are-coming—unless-we-act-now.html?full=true.

90. Geoffrey Lean, *A World Dying, But Can We Unite to Save It?*, THE INDEPENDENT, Nov. 18, 2007, *available at* http://www.independent.co.uk/environment/climate-change/a-world-dying-but-can-we-unite-to-save-it-400847.html.

91. Hansen et al., *Climate Change and Trace Gases*, *supra* note 37, at 1946.

the words of NASA Goddard Institute for Space Studies director, Jim Hansen, our continued carbon pollution will "transform the planet."[92]

The implications for humanity, and the world's children, are unthinkable. If runaway heating comes to pass, it could mean death for millions or even billions of Earth's citizens. Even under the present heating scenarios, the United Nations estimates that the numbers of environmental refugees will climb to 50 million by 2010, and then to 1 billion by 2050.[93] Desperate mass human migrations will pose unending threats to world security.[94] Legal institutions that collapse under such stress will no longer provide stability, and many predict that a much hotter world would trigger the breakdown of civilization as we know it.[95]

The global warming crisis has mind-blowing urgency, because of what scientists call the "tipping point."[96] This is a climate tripwire, so to speak, a point at which humanity's carbon pollution kicks in dangerous natural feedback loops that could unravel the planet's climate system, despite any subsequent carbon reductions achieved by humanity.[97] Due

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92. Jim Hansen, *The Threat to the Planet*, N.Y. REV. OF BOOKS, July 13, 2006, *available at* http://www.nybooks.com/articles/archives/2006/jul/13/the-threat-to-the-planet/ (last visited July 11, 2010).

93. *Urgent Support Needed for Environmental Refugees*, UPDATE.UNU.EDU (United Nations Univ.) Nov. 2005–Feb. 2006, *available at* http://update.unu.edu/archive/issue40_7.htm. *See* Nigel Morris, *Climate Change Could Force 1 Billion from Their Homes by 2050*, THE INDEPENDENT, Apr. 29, 2008, *available at* http://www.independent.co.uk/environment/climate-change/climate-change-could-force-1-billion-from-their-homes-by-2050-817223.html.

94. KURT M. CAMPBELL ET AL., THE AGE OF CONSEQUENCES: THE FOREIGN POLICY AND NATIONAL SECURITY IMPLICATIONS OF GLOBAL CLIMATE CHANGE 10 (2007), *available at* http://csis.org/files/media/csis/pubs/071105_ageofconsequences.pdf; *see also* LYNAS, *supra* note 22, at 180–81; SPETH, *supra* note 22, at 25; SPRATT & SUTTON, *supra* note 22, at 61–62, 101–02; Ross Gelbspan, *Two Paths for the Planet*, AM. PROSPECT, July–Aug. 2007, at 45, *available at* http://www.prospect.org/cs/articles?article=two_paths_for_the_planet (last visited July 31, 2010).

95. Ross Gelbspan, *Beyond the Point of No Return*, GRIST, Dec. 11, 2007, *available at* http://gristmill.grist.org/story/2007/12/10/165845/92 (last visited July 31, 2010); CAMPBELL ET AL., *supra* note 94, at 7, 105 (describing the scenario of a 2.6 C° average increase in global temperature by 2040: "[M]assive nonlinear events in the global environment give rise to massive nonlinear societal events. . . . [N]ations around the world will be overwhelmed by the scale of change. . . . The social consequences range from increased religious fervor to outright chaos."); LOVELOCK, *supra* note 22, at 65; SPRATT & SUTTON, *supra* note 22, at 250.

96. *See* FRED PEARCE, WITH SPEED AND VIOLENCE: WHY SCIENTISTS FEAR TIPPING POINTS IN CLIMATE CHANGE 238–39 (2007). The tipping point concept has been recognized by the Ninth Circuit in a climate case. *See* Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin., 508 F.3d 508, 523 (9th Cir. 2008) ("Several studies also show that climate change may be non-linear, meaning that there are positive feedback mechanisms that may push global warming past a dangerous threshold (the 'tipping point').").

97. *See Dangerous Human-Made Interference with Climate: Hearing Before the Select Committee on Energy Independence and Global Warming of the U.S. House of Representatives*,110th

to carbon in the atmosphere from past releases, Earth is now precariously close to triggering these lethal feedbacks that would threaten civilization as we know it.[98]

Some feedbacks are already underway. First, vast areas of permafrost are now melting, releasing carbon and methane.[99] Scientists fear that such melting permafrost could release a billion tons of carbon dioxide a year to the atmosphere, creating what one science writer calls an "atmospheric tsunami."[100] Second, as the polar ice caps melt, they, in turn, cause more planetary heating, because the ice, which reflects heat, turns to water, which absorbs heat—a phenomenon known as the "albedo flip."[101] Third, the natural "sinks," such as oceans and forests, that have historically absorbed society's carbon pollution, have reached their limits and are now failing.[102] Vast swaths of forest are dying and burning, both releasing carbon and eliminating carbon absorption capacity.[103] Even the Amazon rainforest—the lungs of the planet—is now a significant source of carbon pollution.[104] Finally, the oceans are so saturated with carbon that they are acidifying, creating conditions that are lethal to shellfish.[105] These and other alarming feedbacks caused scientists to warn in 2007: "Recent greenhouse gas (GHG) emissions place the Earth peril-

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Cong. 5 (2007) (statement of James E. Hansen, Dir., NASA Goddard Institute for Space Studies) [hereinafter Hansen Testimony], *available at* http://globalwarming.house.gov/tools/assets/files/0292.pdf ("In the past few years it has become clear that the Earth is close to dangerous climate change, to tipping points of the system with the potential for irreversible deleterious effects.").

98. *See* PEARCE, *supra* note 96, at 235–36; Hansen Testimony, *supra* note 97, at 2305–06 (discussing feedbacks).

99. For explanation, see PEARCE, *supra* note 96, ch. 14. *See also Greenhouse Gas Bubbling from Melting Permafrost Feeds Climate Warming*, SCIENCE DAILY, Sept. 7, 2006, *available at* http://www.sciencedaily.com/releases/2006/09/060907102808.htm (last visited July 31, 2010).

100. PEARCE, *supra* note 96, at 78.

101. *See* Hansen et al., *Climate Change and Trace Gases*, *supra* note 37, at 1 ("One feedback, the 'albedo flip' property of ice/water, provides a powerful trigger mechanism. A climate forcing that 'flips' the albedo of a sufficient portion of an ice sheet can spark a cataclysm."); *see also* Connor, *supra* note 86.

102. *See* Hansen Testimony, *supra* note 97, at 2306; *First-Ever State of the Carbon Cycle Report Finds Troubling Imbalance*, TERRA DAILY, Nov. 16, 2007, *available at* http://www.terradaily.com/reports/First_Ever_State_Of_The_Carbon_Cycle_Report_Finds_Troubling_Imbalance_999.html (last visited July 31, 2010) ("Carbon 'sinks' such as growing forests may remove up to half [of the two billion tons of carbon released by North American sources], but these current sinks may turn into new sources as climate changes.").

103. *See* PEARCE, *supra* note 96, ch. 11–13.

104. *See id.* at 65.

105. *See* U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 88, at 17.

ously close to dramatic climate change that could run out of our control, with great dangers for humans and other creatures."[106]

The world has only a narrow window of time to slash global emissions of carbon before the planet passes the tipping point.[107] While just two years ago scientists believed the tipping point would be triggered at 450 parts per million of carbon in the atmosphere, some now believe the tipping point is below 350 parts per million.[108] Present levels are at 387 parts per million.[109] Analysts now repeatedly warn in the clearest terms possible that Earth is in a danger zone—*a state of planetary emergency*.[110] Yet, following an aimless "business as usual" course, humanity continues to emit enormous amounts of carbon dioxide.[111] Until the economic collapse of 2008, the yearly average increase in emissions was between 2 and 3 percent.[112] As James Speth concludes, "[If we] keep doing exactly what we are doing today, [even] with no growth in the human population or the world economy . . . the world in the latter part of this century won't be fit to live in."[113]

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106. Hansen et al., *Climate Change and Trace Gases*, *supra* note 37, at 1949. *See also* Connor, *supra* note 86.

107. *See* PEARCE, *supra* note 96, at 238–39.

108. James Hansen et al., *Target Atmospheric CO2: Where Should Humanity Aim?*, 2 OPEN ATMOSPHERIC SCI. J. 217, 217 (2008) [hereinafter Hansen et al., *Target Atmospheric CO2*], *available at* http://www.bentham-open.org/pages/content.php?TOASCJ/2008/00000002/00000001/217TOASCJ.SGM (last visited July 31, 2010); *see also* Bill McKibben, *Remember This: 350 Parts Per Million*, WASH. POST, Dec. 28, 2007, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2007/12/27/AR2007122701942.html (last visited July 31, 2010).

109. *See* David Adam, *World Carbon Dioxide Levels Highest for 650,000 Years, Says U.S. Report*, THE GUARDIAN, May 13, 2008, *available at* http://www.guardian.co.uk/environment/2008/may/13/carbonemissions.climatechange (last visited July 31, 2010).

110. *See* SPRATT & SUTTON, *supra* note 22, at 222–33; BROWN, *supra* note 22, at 5 ("We are in a race between tipping points in the earth's natural systems and those in the world's political systems."); SPETH, *supra* note 22, at 27 (quoting NASA's James Hansen: "The crystallizing scientific story reveals an imminent planetary emergency. We are at a planetary tipping point.").

111. Hansen has warned: "[I]gnoring the climate problem at this time, for even another decade, would serve to lock in future catastrophic climatic change and impacts that will unfold during the remainder of this century and beyond. . . ." Hansen Testimony, *supra* note 97, at 2312.

112. *See* Hansen et al., *Climate Change and Trace Gases*, *supra* note 37, at 1938; Geoffrey Lean, *Global Warming 'Is Three Times Faster Than Worst Predictions,'* THE INDEPENDENT, June 3, 2007, *available at* http://www.independent.co.uk/environment/climate-change/global-warming-is-three-times-faster-than-worst-predictions-451529.html (last visited July 31, 2010) (reporting on a study performed by the U.S. National Academy of Sciences showing that carbon dioxide emissions have been increasing over the last eight years at the rate of about 3 percent per year, as opposed to 1.1 percent per year during the 1990s).

113. *See* SPETH, *supra* note 22, at x; *see also* Mark Lynas, *Why We Must Ration the Future*, NEW STATESMAN, Oct. 23, 2006, *available at* http://www.newstatesman.com/200610230015

Even if humanity manages to prevent runaway heating, the natural world is already locked into extreme change. Due to the persistence of carbon already in the atmosphere, the world is projected to heat, at the very least, approximately 2.6 degrees Fahrenheit further.[114] This is known as the heating "in the pipeline."[115] In other words, this heating will occur despite cuts in GHG pollution. Projected effects from such irrevocable heating include increased storm intensity, a rise in sea levels, between 20 and 30 percent species loss, forest die-offs, drought, fire, crop loss, and a myriad of other harmful or deadly consequences.[116]

The climate challenge boils down to two Herculean tasks, both of which put environmental law at the forefront of humanity's response. In climate circles, these tasks are tagged by the rather uninspiring terms "mitigation" and "adaptation." The first, "mitigation," means that humanity has to slash carbon emissions enough to prevent runaway heating. This is a huge challenge, since fossil fuels are the engine of modern industrial society and support virtually every aspect of human activity, including transportation, construction, food systems, and electricity use. The second term, "adaptation," means that humanity must figure out how to survive the heating that it can no longer avoid. No one really knows what the additional 2.6 degrees Fahrenheit will mean for daily living conditions, but it is certain to create radical change, given that the 1.6 degree Fahrenheit average temperature increase experienced so far is enough to prompt scientific predictions that the summer ice caps at the poles will vanish by 2012.[117] The dual necessity of mitigation and adaptation is perhaps best captured by Thomas Friedman when he says: "Avoid the unmanageable and manage the unavoidable."[118]

Mitigation and adaptation, together, create an imperative to protect natural resources immediately, across the board, for two basic reasons. First, doing so is the only means of avoiding the climate tipping point. Scientists make clear that we need to take urgent measures to

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(last visited July 31, 2010) ("[I]f we go on emitting greenhouse gases at anything like the current rate, most of the surface of the globe will be rendered uninhabitable within the lifetimes of most readers of this article.").

114. *See* Hansen et al., *Target Atmospheric CO2*, *supra* note 108, at 221 (describing irrevocable heating "in the pipeline" that will bring temperature increase of about 2.6 degrees Fahrenheit above preindustrial levels).

115. *See id*.

116. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT 31–33, 48–53 (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf; U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 88.

117. *See Scientists: 'Arctic Is Screaming,' Global Warming May Have Passed Tipping Point*, FOXNEWS.COM, Dec. 12, 2007, *available at* http://www.foxnews.com/story/0,2933,316501,00.html (last visited July 31, 2010).

118. FRIEDMAN, *supra* note 20, at 44.

draw down carbon pollution from currently dangerous levels.[119] This not only means steep pollution reduction from obvious sources such as coal-fired power plants and cars, but also measures to preserve and enhance natural sinks such as forests[120] and soils that can absorb carbon.[121] In policy terms, this means a halt to much extractive old growth logging, wetland destruction, virgin land development, and industrial farming that damages soils.

Second, it is vital to protect the natural resources we still have in order to adapt to the irrevocable climate heating already underway and thereby maximize human survival. The Global Humanitarian Forum estimates that 300 million people—about 5 percent of the world's population—are already seriously impacted by climate change. Humanity now has to look at virtually all of its natural infrastructure in a different light, because many systems will fail, and as they do, natural resources will become ever more scarce. The reality is that humanity simply will not have all of the water, species, productive soils, and forests that it inherited from past generations. In the new world of climate heating, all remaining natural assets carry a premium for human survival and welfare.

For example, recent data show that the major rivers of the world are losing significant water due to climate change.[122] Rivers across the United States are already over-appropriated, and 35 states in this country are engaged in water conflicts with their neighbors.[123] In other parts of the world, such conflicts lead to war. As the glaciers melt due to global warming, the stable input into rivers disappears, and water sources collapse.[124] Cities and farms in need of water will turn to other sources,

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119. Hansen et al., *Target Atmospheric CO2, supra* note 108, at 217 ("If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at most 350 ppm. . . . If the present overshoot of this target CO_2 is not brief, there is a possibility of seeding irreversible catastrophic effects.").

120. For discussion of the importance of natural forests as carbon sinks and the danger of carbon releases through deforestation, see *Scientists Warn Forest Clearing More Harmful than Thought*, AGENCE FRANCE-PRESSE, Aug. 5, 2008, *available at* http://afp.google.com/article/ALeqM5got-Y-VKudluUk-uj72SFKoo2VJw (last visited July 31, 2010) ("From a scientific perspective, green carbon accounting and protection of the natural forests in all nations should become part of a comprehensive approach to solving the climate change problem.").

121. Hansen et al., *Target Atmospheric CO2, supra* note 108, at 217 ("An initial 350 ppm CO_2 target may be achievable by phasing out coal use except where CO_2 is captured and adopting agricultural and forestry practices that sequester carbon.").

122. *Water Levels Dropping in Some Major Rivers as Global Climate Changes*, NAT'L CTR. FOR ATMOSPHERIC RES., Apr. 21, 2009, *available at* http://www.ucar.edu/news/releases/2009/flow.jsp (last visited July 31, 2010).

123. GLENNON, *supra* note 14, at 18.

124. U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 88, at 41–52.

including underground aquifers. But those sources may be contaminated due to pollution permitted under law by environmental agencies. Already in the United States, more than 700 chemicals have been detected in drinking water, and 129 of those are highly toxic.[125] Any remaining uncontaminated water carries a premium of value to society.

Climate change also brings floods, pests, and temperature extremes, all of which are a blow to agricultural production. With global warming, food shortages are manifestly on the horizon. Already, 45 million people are chronically hungry due to climate change.[126] According to the United Nations, by 2030 food prices will rise 20 percent and 75 percent of the world's population will be hungry.[127] In just the past few years, Australia's extended drought has caused an 89 percent decline in rice production.[128] The prospect of climate damage makes all of the remaining agricultural soils that much more valuable. But the valuable virgin soils are still gouged and paved over for strip malls, destination resorts, and subdivisions, all permitted under law by local land-use agencies.

Forests are part of the vital ecology of Earth. They provide vegetative cover for countless species and support the headwaters for major rivers and streams. The city of New York, for example, relies heavily on forests in the Catskills Mountains for its water supply.[129] Portland, Oregon, and other cities in the Willamette Valley depend on the Bull Run watershed, which is encased by century-old trees.[130] But due to climate heating, forests are dying at twice their normal rates,[131] and mega-wild-

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125. THE EARTH REPORT: MONITORING THE BATTLE FOR OUR ENVIRONMENT 79–88 (E. Goldsmith & N. Hildyard eds., 1988). For a current report on U.S. drinking water, see Charles Duhigg, *Clean Water Laws Are Neglected, at a Cost in Suffering*, N.Y. TIMES, Sept. 12, 2009, at A1, *available at* http://www.nytimes.com/2009/09/13/us/13water.html?_r=1&scp=1&sq=clean%20water%20laws&st=cse (last visited July 31, 2010).

126. GLOBAL HUMANITARIAN FORUM-GENEVA, HUMAN IMPACT REPORT: CLIMATE CHANGE—THE ANATOMY OF A SILENT CRISIS 24 (2009), *available at* http://ghfgeneva.org/Portals/0/pdfs/human_impact_report.pdf.

127. *Id.* at 24.

128. *Drought Still Having Major Impact on Crop Production*, HERALD SUN, May 23, 2009, *available at* http://www.news.com.au/business/drought-still-having-major-impact-on-crop-production/story-e6frfm1i-1225715018969 (last visited July 31, 2010).

129. NYC.gov, What Is Watershed Protection?, http://nyc.gov/html/dep/html/watershed_protection/what.shtml (last visited Mar. 3, 2010).

130. City of Portland, Or., Portland Water Bureau, Forest Cover Types in the Bull Run Watershed, http://www.portlandonline.com/water/index.cfm?c=44944&a=161569 (last visited May 17, 2010).

131. Phillip J. van Mantgam et al, *Widespread Increase of Tree Mortality Rates in the Western United States*, 323 SCI. 521 (2009).

fires are devouring forestlands with unprecedented speed.[132] Seemingly oblivious to the change, the U.S. Forest Service and state land agencies continue to allow harvests that shred the vegetative fabric supporting many crucial water sources.

One assumption seems solid: The more natural resources that are kept intact and functional, the more natural stock humans will be able to draw upon in the future, and the better odds humans will have to adapt to potentially devastating ecological change. Environmental management must incorporate a precautionary approach that places a premium on all remaining nature, for overlooked resources will undoubtedly host attributes that are crucial to future generations. The environmental law of the past was tailor-made for the transnational industrial age. Environmental law must be remade for what can be termed the "New Ecological Age." Agencies must significantly amplify the protection of vital resources, which means that they must strengthen their resistance to proposals for private profit that cause ecological damage.

Unfortunately, the dismal record of environmental law gives no basis for confidence that the approach of the past is suitable for the challenges ahead. Instead, a look at how environmental law operates reveals systemic dysfunction that permeates the entire structure. Operating with this dysfunction, agencies continue to authorize damage as if nature had unlimited abundance and capacity to heal—as if the end were not already in sight.

V. THE ILLUSION OF ENVIRONMENTAL LAW

All of the environmental statutes were passed with the overriding goal of protecting the environment. As noted, however, the modern environmental administrative state is geared almost entirely to the legalization of natural resource damage. Rather than using their delegated authority to protect crucial resources, nearly all agencies use their permit authority to affirmatively sanction destruction of resources by private interests. For example, two-thirds of the greenhouse gas pollution in this country is emitted pursuant to government-issued permits.[133] Under the Clean Air Act alone, there are nearly 15,000 permits pending or in effect for major stationary sources to emit pollution.[134] The pollution of rivers,

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132. *See The Age of Megafires*, 60 MINUTES, Sept. 6, 2009, http://www.cbsnews.com/stories/2007/10/18/60minutes/main3380176.shtml (last visited July 31, 2010).

133. Laura H. Kosloff & Mark C. Trexler, *Consideration of Climate Change in Facility Permitting*, *in* GLOBAL CLIMATE CHANGE 259, 259 (Michael B. Gerrard ed., 2007).

134. E-mails from Jeff Herring, Operating Permits Group, U.S. Environmental Protection Agency, to Author (Sept. 15, 2009 and Sept. 28, 2009) (on file with author) (providing total operating permits data).

the killing of threatened species, and the destruction of wetlands and coastal zones are all carried out pursuant to permit or blanket regulation under various environmental laws. Environmental law, for the most part, also legalizes the poisoning of the United States. According to data reported under the Toxic Reporting Inventory, in the seven years covering 2001–2007, industries released 31.7 billion pounds of toxins into the environment, most pursuant to pollution permits. This includes releases of 1.652 billion pounds of toxins into the water, and 10.69 billion pounds into the air.[135] Permits usually have mitigating conditions that lessen the damage that would otherwise occur, but the cumulative effect is one of mounting loss.[136] While it is certainly true that some agencies are loyal guardians of the public's natural assets, the overarching bureaucratic mindset of most agencies is that permits are there to be granted.

Bureaucratic discretion has become an open invitation for agency heads to politicize decisions for their short-term interests. As Jared Diamond warns in his inventory of collapsed societies, we should be wary of the decision-making elite who make decisions to further their own short-term interest rather than the long-term interest of society as a whole.[137] The pursuit of self interest by some agency heads would surely rival that of the Norse sheep lords in *Collapse*. Agencies tend to be heavily lobbied by the entities that they regulate, often making decisions to serve the industry, not the public.[138] Political appointees in the agencies often exert pressure on staff to issue permits that will benefit the indus-

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135. These figures were gained by adding up the figures from Toxics Release Inventory data over the relevant years. The TRI reports are available on the EPA website. *See* EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2007), *available at* http://www.epa.gov/TRI/tridata/tri07/pdr/key_findings_v12a.pdf; EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2006), *available at* http://www.epa.gov/TRI/tridata/tri06/pdr/key_findings_v12a.pdf; EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2005), *available at* http://www.epa.gov/TRI/tridata/tri05/pdr/Key_Findings.pdf; EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2004), *available at* http://www.epa.gov/TRI/tridata/tri04/ereport/KeyFind.pdf; EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2003), *available at* http://www.epa.gov/TRI/tridata/tri03/pdr/KeyFind03.pdf; EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2002), *available at* http://www.epa.gov/TRI/tridata/tri02/key%20findings/TRI_2002_Key_Findings.pdf; EPA, TOXICS RELEASE INVENTORY, SUMMARY OF KEY FINDINGS (2001), *available at* http://www.epa.gov/TRI/tridata/tri01/pdr/execsummary.pdf.

136. *See* SPETH, *supra* note 22, at 84.

137. DIAMOND, *supra* note 26, at 430.

138. This is the subject of Chapter 3 of *Nature's Trust*. For additional discussion, see ROBERT F. KENNEDY, JR., CRIMES AGAINST NATURE 32–33 (2004); DAVID SCHOENBROD, POWER WITHOUT RESPONSIBILITY: HOW CONGRESS ABUSES THE PEOPLE THROUGH DELEGATION (1993); DAVID MICHAELS, DOUBT IS THEIR PRODUCT: HOW INDUSTRY'S ASSAULT ON SCIENCE THREATENS YOUR HEALTH (2008).

tries with which they are allied.[139] Bureaucrats who seek later employment in the private sector may issue permits to avoid being blacklisted by potential future employers. The bottom line is that agency discretion is regularly hijacked to serve purposes at odds with the environmental protection goals of the statutes that agencies administer. These internal drivers of permit decisions are rarely exposed to the public. Most often they are concealed behind a thick morass of complexity created by the agencies themselves. Untangling corruption or other misuse of office is notoriously difficult and happens only in rare instances.

To make matters worse, the judiciary has lost its potency as a check on the administrative branch in the environmental realm. This is primarily due to the tendency of courts to invoke the administrative deference doctrine, which allows courts to give undue weight to agency decisions.[140] At the heart of the deference doctrine is an abiding faith in nonbiased administrative expertise.[141] Operating on a fairly simplistic assumption that expert agencies are neutral decision-makers faithfully implementing the statutes, judges endorse agency decisions, particularly technical ones, based on a presumption of validity.[142] The deference doctrine insulates most agency decisions from rigorous judicial examination of political motivations or conflicts of interest that may have inappropriately shaped the agencies' scientific conclusions.[143] This judicial role provides a legal prop for an administrative façade behind which political influence, bias, and outright corruption all operate to subvert environmental statutes.

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139. *See generally* KENNEDY, JR., *supra* note 138, and sources therein. *See also Endangered Species Act Implementation: Science or Politics: Oversight Hearing Before the House Natural Resources Committee, U.S. House of Representatives*, 110th Cong. (2007) (statement of Jeff Ruch, executive director, Public Employees for Environmental Responsibility), *available at* http://www.peer.org/docs/doi/07_9_5_peer_testimony.pdf.

140. *See, e.g.*, Marsh v. Or. Natural Res. Council, 490 U.S. 360, 378 (1989) ("When specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if, as an original matter, a court might find contrary views more persuasive."); Chevron U.S.A., Inc. v. Natural Res. Def. Council, 467 U.S. 837 (1984) (explaining that where a statute is silent or ambiguous, a court must defer to the agency's construction of the statute, as long as it is reasonable).

141. *See, e.g.*, Mt. Graham Red Squirrel v. Espy, 986 F.2d 1568, 1576 (9th Cir. 1993) (noting judgments as to adequacy of squirrel monitoring program "require technical expertise the courts do not possess"); *see also* RONALD A. CASS ET AL., ADMINISTRATIVE LAW: CASES AND MATERIALS 216–17 (2d ed. 1994).

142. *See, e.g.*, *Marsh*, 490 U.S. at 378; Balt. Gas & Elec. Co. v. Natural Res. Def. Council, Inc., 462 U.S. 87, 103 (1983) ("When examining [an agency's] scientific determination, as opposed to simple findings of fact, a reviewing court must generally be at its most deferential.").

143. *See* Mary Christina Wood, *Reclaiming the Natural Rivers*, 40 ARIZ. L. REV. 197, 255–68 (1998).

For the most part, environmental law scholarship has not confronted this systemic problem. Scholars have surely identified aspects of it innumerable times, but usually in the context of one statute's failure, or one program's failure. The problem is far deeper and broader than that. The dysfunction permeates the entire structure of the administrative environmental state, which puts nature under the dominion of agencies. The problem also infects other nations' environmental law systems that are modeled after the U.S. system.

A legal autopsy of current environmental law is a necessary predicate to reform, as humanity has no more time to waste in efforts that fail to address the systemic causes of environmental damage. Government actors and the public must honestly confront the corruptive influences on agencies, the politicization of science, the role of agency discretion in allowing damage to the environment, the failure of public process, and the shriveled role of the judicial branch in reviewing agency decisions.

The task is urgent. Legal dysfunction would not threaten billions of lives and civilization itself if we still lived in a world of abundant resources. But the world is under siege from ecological collapse. As Speth concludes: "[W]e now approach the fork ahead. . . . Beyond the fork, down either path, is the end of the world as we have known it. One path beyond the fork continues us on our current trajectory . . . the abyss. But there is the other path, and it leads to a bridge across the abyss."[144] Rather than building a bridge across the abyss, as Speth urges, the environmental and land-use agencies continue business as usual, doling out permits for environmental damage as if the world still had seemingly unlimited natural wealth. Environmental law and bureaucracy is detached—dangerously detached—from reality. Without devising an across-the-board solution that re-channels agency resources and expertise toward ecological recovery, there is little hope that environmental law will harmonize with natural law to sustain ecology and, therefore, civilization.

VI. REALISM AND THE INEVITABILITY OF TRANSFORMATIONAL CHANGE

The severity and pervasiveness of administrative dysfunction means that there is no simple fix to the problem. All solutions will entail fresh dilemmas, complexities, and trade-offs. But that cannot distract from the urgent task of envisioning a different paradigm. Speth rightly

144. SPETH, *supra* note 22, at 236–37; *see also* Gelbspan, *supra* note 95, at 45 (stating that humanity is at a crossroads, with one path leading to a peaceful future, and the other leading to chaos and destruction).

argues that we need a "fresh conceptualization[,]. . . . a new way of thinking."[145] While institutions are often resistant to change, making prospects for reform seem impossible, it must be remembered that the status quo—business as usual—is driving the world's societies into radical change. The reality underlying any transformative proposal is that change of a dramatic sort is inevitable no matter what path humanity chooses. If humanity is to salvage a future with any measure of comfort and security, it must reverse course to halt the destruction of remaining natural resources and rebuild natural wealth through bold restoration initiatives. The challenge for the United States, then, is immediately reorienting its entire administrative system on the federal, state, and local levels, toward that end.

Of course, envisioning very different systems under such a time crunch is, to say the least, daunting. Perhaps Alex Steffen, author of *Worldchanging: A User's Guide for the 21st Century*, states it best: "We find ourselves facing two futures, one unthinkable and the other currently unimaginable."[146] Many proposals merely tinker around the edges of the same business as usual that is driving the planet to catastrophe. Steffen observes:

> The magnitude of the crises we face, the speed with which they are unfolding . . . mean that the solutions we need to embrace are not going to be the same sort of solutions we're used to thinking of now. . . . Faced with the need to reinvent the material basis of our civilization, we argue paper or plastic. . . . [We need to] go way out beyond what the conventional wisdom thinks is possible. . . . Our ideas of what's normal, or even what's possible, will not outlast the next decade."[147]

Steffen stresses new "operating principles" of our society—concepts such as "zero energy, zero emissions, zero waste, closed loops . . . [and] green infrastructure" to change our conventional wisdom and create a new reality.[148] Some disciplines show innovative, model-shifting thinking in this direction. Leading analysts in the fields of economics and business, for example, foresee the end of industrial capi-

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145. SPETH, *supra* note 22, at xiv.

146. Worldchanging, Our Team, Alex Steffen, http://www.worldchanging.com/bios/alex.html (last visited Nov. 19, 2008).

147. Alex Steffen, *The Real Green Heretics*, WORLDCHANGING, May 28, 2008, *available at* http://www.worldchanging.com/archives/008064.html (last visited July 31, 2010).

148. *Id.*

talism as we know it, and the beginning of natural capitalism,[149] essentially a model by which private businesses produce goods without any waste or pollution and in conformance with Earth's replenishing capacity. Some, like James Speth, envision new models of corporate responsibility in which a charter is readily revoked if the corporation no longer serves the public.[150]

While the law is, at best, a clumsy institution to effectuate massive social change, it should at least not impede change across the other sectors. At this time when visionaries are urging ideas to remake society to conform with ecological reality, environmental regulation still perpetuates a system of legalized pollution that will inevitably corrode these civilization-saving efforts. We cannot expect businesses to eliminate all pollution and waste in conformance with natural capitalism while they are given permits to freely pollute. The law must engage reality and join the great societal transformation underway.

In his book, *Unquenchable*, Robert Glennon examines the looming water crisis in the United States. He urges an entirely new direction for water law, which has, in the past, largely ignored the waste associated with water use and the mounting scarcity of water supplies. Glennon insists that trying to "engineer" away the problem by building dams and drilling wells will not solve the crisis.[151] As he puts it, "Business as usual just won't cut it," in light of the magnitude of the crisis.[152] He offers a sweeping proposal for a regulated water market, an approach that could take hold in all water agencies in all 50 states across America, and provide a model for other countries.[153] While his solution will no doubt be debated, the proposal is an example of millennium-scale thinking, calibrated to the magnitude of the problem and the pace of change. But, for the most part, the legal realm lacks such revolutionary ideas. Environmental law has been the subject of only modest proposals for reform—a new regulation here, a new statute there. Tweaking the system incrementally holds no more promise for thwarting environmental collapse than throwing a rescue rope that is too short. It will fail for two reasons.

First, isolated legal reform will not address the systemic causes of failure. Developing necessary solutions first requires an analysis of where the institutional decay lies. In this regard, the major source of administrative rot is agency discretion—and the way in which it is used, or

149. *See* PAUL HAWKEN ET AL., *supra* note 78; *see generally* SPETH, *supra* note 22; PETER BARNES, CAPITALISM 3.0: A GUIDE TO RECLAIMING THE COMMONS (2007).

150. SPETH, *supra* note 22, at 178–79.

151. GLENNON, *supra* note 14, at 18–19.

152. *Id.* at 18.

153. *Id.* at 316–17.

abused, to serve private, corporate, and bureaucratic interests. As long as the frame of decision-making presumes political discretion to allow damage, it matters little what new laws are passed. If new standards are placed over the same old discretionary structure of agency decision-making, they will fall into the same bureaucratic sinkholes as the old standards, which were seemingly adequate on their faces as well. Legal reform, if it is to do any good at all, must reach beneath the individual statutes and regulations down to the level of dysfunction that affects all agency decision-making.

Second, the scale of environmental bureaucracy is far too great to invest energy into specific laws and agencies with any hope of reform adequate to meet the environmental challenges of today. The assault on nature—and the bureaucratic machine that allows it—is too massive and pervasive to address through isolated legal measures. What many fail to realize is that the legal machine keeps churning out colossal damage on a daily basis by issuing and reissuing permits for damage on the local, state, and federal levels. To give an idea, a perusal of public notice opportunities on state environmental agency websites revealed approximately 2,632 air and water pollution permits up for issuance or renewal in just 39 states during the months of June and July of 2009 alone.[154] This

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154. The 39 states were the only ones, out of 50 states, with relevant data posted on their websites at the time of the survey. Their websites indicated there were 1,443 air permits pending and 1,189 water permits pending. These included those open for notice and comment. The states and their websites were: Alabama, http://www.adem.state.al.us/PublicNotice/PublicNotice.htm; Alaska, http://www.dec.state.ak.us/public_notices.htm; Arizona, http://www.azdeq.gov/; Arkansas, http://www.adeq.state.ar.us/poa/pa/default.htm; Colorado, http://www.cdphe.state.co.us/; Connecticut, http://www.ct.gov/dep/cwp/browse.asp?a=2586&depNav_GID=1511; Delaware, http://www.dnrec.delaware.gov/Pages/default.aspx; Georgia, http://www.georgiaepd.org/Documents/events_notices.html; Hawaii, http://www.co.honolulu.hi.us/env/usefuli.htm; Idaho, http://www.deq.state.id.us/; Illinois, http://www.epa.state.il.us/public-notices/; Indiana, http://www.in.gov/idem/; Iowa, http://www.iowadnr.gov/index.html; Kansas, http://www.kdheks.gov/environment/; Kentucky, http://www.dep.ky.gov/; Louisiana, http://www.deq.louisiana.gov/portal/Default.aspx?tabid=3024 (air); http://www.deq.louisiana.gov/portal/LinkClick.aspx?fileticket=IVmKhOAWZ9I%3d&tabid=2921 (water); Maine, http://www.maine.gov/dep/permits.htm; Maryland, http://www.mde.state.md.us/AboutMDE/calendar/; Massachusetts, http://www.mass.gov/dep/public/publiche.htm; Michigan, http://www.michigan.gov/documents/deq/deq-p2ca-calendar-dq072009_286069_7.pdf; Minnesota, http://www.pca.state.mn.us/news/data/index.cfm?PN=1; Missouri, http://www.dnr.mo.gov/pubs/communications.htm; Montana, http://www.deq.state.mt.us/pubcom.asp; Nebraska, http://www.deq.state.ne.us/; Nevada, http://ndep.nv.gov/admin/public.htm#air_p; New Jersey, http://www.nj.gov/dep/aqpp/publicnotices.htm (air); New Mexico, http://www.nmenv.state.nm.us/; New York, http://www.dec.ny.gov/enb/50280.html; North Carolina, http://www.enr.state.nc.us/html/permitslicenses.html; North Dakota, http://www.ndhealth.gov/EHS/; Rhode Island, http://www.dem.ri.gov/topics/permits.htm; South Carolina, http://www.

review did not include species habitat permits, wetlands permits, coastal zone permits, land-use permits, mining, forestry, or grazing permits, water appropriation permits, or a myriad of other permit types. It did not address the local level of government. And, it only represented a two-month period. Moreover, it did not capture the hundreds of thousands of small pollution activities that fall into loopholes or exemptions.

Legal reform takes enormous amounts of money, time, and citizen energy. There are millions of leaks in the membrane of environmental law, which spans the federal code as well as the laws of 50 different states and hundreds of different local jurisdictions. To fix them, even a few of them, is a terribly complex endeavor. To fix enough in time to prevent runaway climate heating or massive ecological collapse is a pipedream. Even protecting just the forests and soils of this country—resources that scientists increasingly rely on as crucial sinks for drawing down existing carbon pollution in the atmosphere—entails changing the practices of land-use laws in nearly all 50 states. An incremental approach might make sense if we had another three decades to accomplish it. Policymakers could see what worked in one setting and then adopt it in another, operating in a progressive-style policy fashion. But the luxury of time is no longer on humanity's side. Tinkering around the edges of a system in high failure mode is useless given the urgency of the climate crisis and other disasters gathering on our horizon. As several leading scientists said in a press release issued in 2007: "Business as usual cannot continue yet one more day."[155] What is needed instead of incremental reform is a transformative paradigm shift that will reinforce the membrane of law by articulating holistic, organic, uniform principles of conservation to infuse all agency decision-making across the board. Anything less than a transformative approach at this point is fighting a raging wildfire with a squirt gun.

The problem is this: Government tends to be adverse to transformative change, for several reasons. First, environmental officials rarely see the big picture of ecological collapse. Because the field is

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scdhec.gov/environment/admin/htm/eqpubnot.htm; South Dakota, http://denr.sd.gov/tech.aspx; Tennessee, http://tn.gov/environment/ppo/; Utah, http://www.deq.utah.gov/; Vermont, http://www.anr.state.vt.us/dec/enb/cfm/viewenb.cfm; Virginia, http://www.deq.state.va.us/info/permittracking.html; Wisconsin, http://www.dnr.state.wi.us/org/caer/cs/licenses.htm; Wyoming, http://deq.state.wy.us (last visited July 31, 2010). A chart summarizing this information is on file with the author. Some of the websites listed above do not have archived information, but show current permit applications.

155. AN URGENT CALL TO ACTION: SCIENTISTS AND EVANGELICALS UNITE TO PROTECT CREATION, National Press Club, Washington, D.C., Jan. 17, 2007 *available at* http://www.creationcareforpastors.com/PDF_files/creationcarestatement (last visited July 31, 2010).

highly fragmented, and agencies operate within restricted jurisdictional realms, bureaucrats work in "regulatory silos." Not working on a transformative scale, they naturally tend to approach problems in a narrow fashion. Second, the sheer complexity of environmental law draws officials into so much detail that they tend to miss the big cross-cutting patterns showing need for transformative change—missing the proverbial forest for the trees. Third, because court-made law, or common law, is fundamentally based on precedent, agency lawyers usually advise their clients to eschew approaches that push beyond the status quo. As a result, environmental professionals across the vast field of environmental law continue to burrow deeper and deeper into a malfunctioning system.

Perhaps the greatest barrier to any transformational principle is the widespread perception among government officials that the politics are not there to support it. Law springs from the political will of the people, and environmental issues are not often high on the scale of public priorities. But to follow the politics is to walk a dead-end road. As Speth and others explain, the political status quo is based on industrial paradigms that are fast approaching expiration. If left alone, the status quo will bring on runaway heating and ecological collapse that will stress governments beyond their limits and erode the legal systems of society.[156] With the breakdown of legal institutions will come the rapid demise of the paradigms from which they are built. In that sense, the status quo is an illusion. To those who say a paradigm shift is unrealistic, it must be pointed out that a paradigm shift is inevitable. As Jared Diamond points out, "Our world society is presently on a non-sustainable course,"[157] and a resolution to our problems will appear, one way or another, within decades.[158] Diamond observes: "The only question is whether [the problems] will become resolved in pleasant ways of our own choice, or in unpleasant ways not of our choice, such as warfare, genocide, starvation, disease epidemics, and collapses of societies."[159]

If society is to retain the current bureaucratic structure of environmental management, the task ahead is to locate a reservoir of legal obligation to steer agency discretion in a way that effectuates government's true purpose—protecting the interests of the citizenry by rebuilding natural abundance. The Earth defense effort must involve virtually every agency that has a role in managing natural resources. The challenge is to

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156. *See* Ross Gelbspan, *supra* note 95 (noting that the current trajectory of the status quo leads to the fall of democracy worldwide); *see also supra* note 95 and accompanying text (discussing impacts to world security from climate change).

157. DIAMOND, *supra* note 26, at 498.

158. *Id.*

159. *Id.*

create a new governmental instruction that is so compelling for society across all realms—legal, economic, social, and moral—that it will be adopted simultaneously by governments worldwide. This article introduces a transformative framework called Nature's Trust for the new ecological age.

VII. NATURE'S TRUST

The Nature's Trust paradigm draws upon an ancient and enduring principle known as the public trust doctrine. The doctrine springs from an early civic and judicial understanding that some natural resources are so vital to public welfare and human survival that they cannot be exclusively exploited through private property ownership and control. The public has a lasting ownership interest, called a beneficial interest, in such crucial natural resources—a right so fundamental that it has been described by some scholars as a God-given right or a natural right.[160] The government is vested with trustee duties over these assets, giving rise to a strict fiduciary obligation to manage and protect them for their perpetual abundance in service to society.[161] Fashioned from the common law of property, the public trust doctrine is the original legal mechanism used to ensure that government safeguards the natural resources necessary for public welfare and survival. The roots and reasoning of the public trust put it on par with the highest liberties of citizens living in a free society.

The lodestar public trust opinion is *Illinois Central Railroad Co. v. Illinois* (*Illinois Central*), where the U.S. Supreme Court announced that the shoreline of Lake Michigan was held in public trust by the State of Michigan and could not be transferred out of public ownership to a pri-

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160. JOHN CRONIN & ROBERT F. KENNEDY, JR., THE RIVERKEEPERS 141 (1999) ("[P]ublic trust rights are said to derive from 'natural' or God-given law. They cannot be extinguished.").

161. *See infra* note 166 and accompanying text; *see also* Ohio v. City of Bowling Green, 313 N.E.2d 409, 411 (Ohio 1974) ("[W]here the state is deemed to be the trustee of property for the benefit of the public it has the obligation to bring suit. . . . to protect the corpus of the trust property. . . ."). The duty of protection is engrained in the trustee role. *See* GEORGE G. BOGERT & GEORGE T. BOGERT, THE LAW OF TRUSTS AND TRUSTEES § 582 (rev. 2d ed. 1980) ("The trustee has a duty to protect the trust property against damage or destruction. He is obligated to the beneficiary to do all acts necessary for the preservation of the trust res which would be performed by a reasonably prudent man employing his own like property for purposes similar to those of the trust."); RESTATEMENT (SECOND) OF TRUSTS § 176 (1959) ("The trustee is under a duty to the beneficiary to use reasonable care and skill to preserve the trust property.").

vate railroad corporation.[162] In broad language encompassing the citizens' fundamental right to natural resources, the Court stated:

> [T]he decisions are numerous which declare that such property is held by the state, by virtue of its sovereignty, in trust for the public. The ownership of the navigable waters of the harbor, and of the lands under them, is a subject of public concern to the whole people of the state. The trust with which they are held, therefore, is governmental, and cannot be alienated . . . [163]

The beneficiaries of the public trust are present and future generations of citizens.[164] The public trust is perpetual, designed by courts to secure natural resources through time. The concern for future citizens is the *raison d'être* for the trust. As the Supreme Court said in *Geer v. Connecticut*, "[I]t is the duty of the legislature to enact such laws as will best preserve the subject of the trust, and secure its beneficial use in the future to the people of the state."[165]

The essence of the doctrine requires trust management for public benefit rather than for private exploit or political advantage. Simply stated, government trustees may not allocate rights to destroy what the people rightly own for themselves and for their posterity. Thus properly understood, the trust is a fundamental limitation on governmental power. As the *Geer* Court stated:

> [T]he power or control lodged in the state, resulting from this common ownership, is to be exercised, like all other powers of government, as a trust for the benefit of the people, and not as a prerogative for the advantage of the government as distinct from the people, or for the benefit of private individuals as distinguished from the public good.[166]

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162. Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 452, 464 (1892). For a discussion of the *Illinois Central* holding, see Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 489–91 (1970).

163. *Illinois Central*, 146 U.S. at 455 (noting, however, that parcels can be alienated "when parcels can be disposed of without detriment to the public interest in the lands and waters remaining . . .").

164. *See, e.g.*, Ariz. Ctr. for Law in the Pub. Interest v. Hassell, 837 P.2d 158, 169 (Ariz. Ct. App. 1991) ("The beneficiaries of the public trust are not just present generations but those to come.").

165. Geer v. Connecticut, 161 U.S. 519, 534 (1896).

166. *Id.* at 529. *See also* Lake Mich. Fed'n v. U.S. Army Corps of Eng'rs, 742 F. Supp. 441, 445 (N.D. Ill. 1990) ("[T]he public trust is violated when the primary purpose of a legislative grant is to benefit a private interest.").

Though the public trust doctrine is embedded in scores of judicial decisions over the past century, it has been all but lost in the administrative jungle that has choked the field of environmental law over the last three decades. Modern-day bureaucrats and politicians no longer see themselves as trustees of public property and resources. They view their roles as political decision-makers, vested with statutory discretion to allow damage to natural assets belonging to the public. Indeed, the vast body of statutes and regulations essentially gives government at all levels the power to privatize ecology by handing out permits to destroy and exploit natural resources. The present legal system fails to impose a corresponding duty adequate to temper this enormous power.

Revived to apply to modern bureaucracy, public trust principles would introduce an old-but-new limitation on government acting through modern statutory law. The trust interjects a fiduciary duty into every government action involving the environment. A trust construct recognizes that strict, enforceable standards of performance are necessary to secure the implicit confidence reposed in the trustee, who exercises power over vital assets. Trustees are bound by exacting fiduciary obligations to protect the assets of the trust (called the *res*, or *corpus*) and manage them prudently. They must restore assets that have been damaged. The trustee must act in good faith and out of absolute loyalty to the beneficiaries. While the environmental statutes give agencies authority to allocate rights to pollute and destroy resources, the trust would act as, and be enforced as, a fundamental check on this authority. Using agency discretion to allow damage that impairs society's life-sustaining systems amounts to a clear breach of trust.

From this established public trust foundation, the Nature's Trust paradigm has the potential to create an organizing framework responsive to the new ecological era. But to do so, it must push beyond the current boundaries of the public trust doctrine. The doctrine has been the subject of considerable legal scholarship beginning with a landmark work by Joseph Sax in 1970,[167] but, perhaps focusing too much on the existing cases rather than on the inherent potential of the doctrine, it has never been articulated as a cohesive paradigm for managing natural resources. Courts have repeatedly invited expansion of the doctrine by emphasizing its flexibility to accommodate emerging societal needs.[168]

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167. *See* Sax, *supra* note 162.

168. *See* Matthews v. Bay Head Improvement Ass'n, 471 A.2d 355, 365 (N.J. 1984) ("[W]e perceive the public trust doctrine not to be 'fixed or static,' but one to be 'molded and extended to meet changing conditions and needs of the public it was created to benefit.'") (citation omitted).

Nature's Trust invites a re-conceptualization of the public trust doctrine in at least nine different respects.

First, the public trust doctrine is assumed to be primarily applicable to states, probably because most of the historic cases have involved state action. But the taproot of the public trust lies in sovereign understandings that are equally applicable to the federal government and local governments—both of which play key roles in environmental management. The Nature's Trust approach defines government's duty in natural resources management as obligatory and organic to governmental power. It suggests a trust limitation as an attribute of government itself. Properly cast as intrinsic to government, and reaching back to fundamental understandings that are part of sovereign duty, the Nature's Trust framework logically applies to any local, state, regional, or national government. All forms of government are either sovereign themselves or agents of a sovereign. They are thus either trustees themselves or agents of the trustees. Broadening the jurisdictional reach of the doctrine is essential to arrest the hemorrhage of nature's destruction currently taking place through the instrument of environmental law at all levels of government.

Second, the traditional public trust scholarship has never fully illuminated the constitutional basis of the public trust doctrine. Cast as a constitutional doctrine, the courts have significant authority to rein in legislative abuses of the trust. In a careful analysis of the *Illinois Central* opinion, Professor Douglas Grant ties Justice Field's holding and rationale to the reserved power doctrine, a constitutional doctrine that was particularly prominent in Contract Clause cases at the time.[169] In an early body of jurisprudence geared toward defining basic duties of government, the Supreme Court made clear that essential sovereign powers are implicitly reserved to the legislature in perpetuity and are inalienable such that they "can neither be abdicated nor bargained away . . . even by express grant."[170] In other words, any one legislature could not act to compromise a future legislature's ability to exercise sovereignty on behalf of the people. Because of the crucial nature of submerged lands, Jus-

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169. Douglas L. Grant, *Underpinnings of the Public Trust Doctrine: Lessons from* Illinois Central Railroad, 33 ARIZ. ST. L.J. 849, 856 (2001). The Contract Clause provides: "No State shall . . . pass any . . . Law impairing the Obligation of Contracts." U.S. CONST. art. 1, § 10.

170. Grant, *supra* note 169, at 856 (citing Atl. Coast Line R.R. Co. v. City of Goldsboro, 232 U.S. 548, 558 (1914)). Grant cites case law stating "'the reservation of essential attributes of sovereign power is . . . read into [a legislature's] contracts as a postulate of the legal order,'" allowing the legislature immunity from violating the Contract Clause when it repudiates contracts that would alienate essential sovereign powers. *Id.* at 856–57 (citing Home Bldg. & Loan Ass'n v. Blaisdell, 290 U.S. 398, 434–35 (1934)).

tice Field determined they were a "subject of concern to the whole people"[171] and, as such, were clothed with sovereign interests. The lakebed at issue in *Illinois Central*, along with other navigable waterways, thus served such paramount public interests that the Supreme Court classified them as reserved assets of the people's sovereignty that could not be conveyed away by any one legislature.[172] Just as the police power is an inherent attribute of sovereignty that cannot be abridged or surrendered by any legislature,[173] the *Illinois Central* Court swept the public trust into the same class of sovereign attributes when it declared:

> The state can no more abdicate its trust over property in which the whole people are interested . . . than it can abdicate its police powers in the administration of government and the preservation of the peace. . . . Every legislature must, at the time of its existence, exercise the power of the state in the execution of the trust devolved upon it.[174]

Third, the public trust doctrine has not been folded into the modern context of environmental bureaucracy. Indeed, Sax's landmark delineation of the doctrine pre-dated most of the major environmental statutes. For the trust duty to be of use in contemporary contexts, much work remains to be done to import the fiduciary principles into the statu-

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171. Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 455 (1892).

172. *Id.* at 459–60.

173. *See* City of New Orleans v. Bd. of Comm'rs of Orleans Levee Dist., 640 So.2d 237, 249 (La. 1994) ("The principle of constitutional law that a state cannot surrender, abdicate, or abridge its police power has been recognized without exception by the state and federal courts. Because the police power is inherent in the sovereignty of each state, that power is not dependent for its existence or inalienability upon the written constitution or the positive law.") (citations omitted); Reesman v. State, 445 P.2d 1004, 1007 (Wash. 1968) ("[The] police power is an attribute of sovereignty, an essential element of the power to govern, and a function that cannot be surrendered. It exists without express declaration, and the only limitation upon it is that it must reasonably tend to correct some evil or promote some interest of the state, and not violate any direct or positive mandate of the constitution." (quoting Shea v. Olson, 53 P.2d 615, 619 (1936)); State *ex rel.* City of Minot v. Gronna, 59 N.W.2d 514, 531–32 (N.D. 1953) ("The police power is an attribute of sovereignty inherent in the states of the American union, and exists without any reservation in the constitution, being founded on the duty of the state to protect its citizens and provide for the safety and good order of society. The constitution supposes the pre-existence of the police power, and must be construed with reference to that fact.") (citation and internal quotations omitted); Hickenbottom v. McCain, 181 S.W.2d 226, 229 (Ark. 1944), *cert. denied*, 323 U.S. 777 (1944) ("The police power which resides in the State as a sovereign, exists without express constitutional grant, and may be used in any manner not prohibited."); Borden v. La. State Bd. of Educ., 123 So. 655, 661 (La. 1929) ("In fact, the Constitution presupposes the existence of the police power and is to be construed with reference to that fact.").

174. *Illinois Central*, 146 U.S. at 453, 460.

tory and administrative framework. Within this framework, Nature's Trust is aimed directly at agency discretion, which is the magnet for political influence across nearly all agencies and the major source of dysfunction in the field of environmental law. To this end, the trust obligation is best thought of as an interstitial legal duty that finds expression through the statutory procedural edifice of current environmental law.

Two facets of the doctrine are key to curbing agency discretion. The first is agencies' substantive fiduciary obligation to protect natural resources. Fiduciary standards can be applied to rivers, species, forests, or even to broad ecological assets, including the atmosphere. They can be expressed as species recovery targets, sustainable logging rates, instream flows, carbon pollution reduction goals, and so forth, all calibrated toward replenishing nature's assets. Yardsticks of fiduciary performance and asset health must draw from nature's own laws and, as such, are best offered by scientists that operate outside the spheres of political influence. Second, a duty of loyalty toward public beneficiaries—and not toward singular private interests—must bridle agency actors in their decisions regarding public ecological resources. A robust set of safeguards must be developed to ensure that such a duty of loyalty is carried out. By imposing a duty of protection and loyalty on the administrative discretion that is generic to nearly all agencies, the Nature's Trust approach is intended to create a holistic and uniform principle that is transformative across the modern environmental bureaucracy.

As a fourth matter, the historic interpretation of the public trust has unduly limited its geographic reach to streambeds and water-related areas. This limitation is superficial and at odds with the overriding truth of nature that all ecological resources are interconnected and interdependent. While the public trust has been characterized as a doctrine primarily related to water and wildlife, the core rationale for the trust clearly extends to all vital natural resources needed by society. The essential doctrinal purposes underlying the public trust doctrine would extend government's fiduciary duty of protection in a holistic manner to all natural assets, including air, atmosphere, forests, wildlife, wetlands, aquifers, and soils. Indeed, the Nature's Trust framework would extend fiduciary protection to the full ecological *res* needed by the citizenry.

Fifth, the public trust has characteristically been portrayed as a creature of U.S. law, though a few have attempted to explore its iterations in other countries. In fact, trust principles are manifest in many other legal systems of the world including, for example, India and the

Philippines.[175] As Charles Wilkinson has put it: "The real headwaters of the public trust doctrine . . . arise in rivulets from all reaches of the basin that holds the societies of the world."[176] If the basic premise of the doctrine—the duty to protect vital natural resources for all generations of citizens—is cast as an inherent attribute of sovereignty, the doctrine holds tremendous potential to protect citizens of other nations against government abuse or corruption in natural resources management. A framework that draws upon basic understandings between citizens and their government has potential to empower activists in different reaches of the globe and generate synergy among far-flung efforts that would otherwise be disconnected.

Sixth, the public trust doctrine is most often cast as a one-dimensional doctrinal tool, used to constrain the actions of one single sovereign, usually a state government or agency. It has far greater potential as a medium in which to allocate inter-sovereign rights to shared resources. Because trust principles are grounded in property law, they suggest trans-border responsibilities for shared resources such as major waterways, oceans, wildlife, and the atmosphere. The trust ownership of such shared natural resources can be expressed as co-tenancies in which each nation or state serves as a co-trustee. As co-tenant trustees, each has the duty to not waste, or destroy, the common asset. The duty against waste arises both from the trust doctrine and ancient rules pertaining to co-tenancy. For example, the atmosphere can be characterized as a global trust asset managed by all nations of the world as co-tenant sovereign trustees. As such, all bear a fiduciary obligation to protect the atmospheric trust for future generations. Imparting a trust obligation to international climate talks would change the frame of negotiation. Current negotiations present a bargaining table in which national leaders, at their sole political discretion, offer their inclinations to reduce carbon dioxide in their country. By invoking the broader property edifice within which the trust is lodged, Nature's Trust offers a diplomatic framework in which to not only conceptualize the vexing global ecological problems of our time, but to impose firm global obligations for planetary resources such as the oceans and atmosphere. It may change the international climate conversation from politics to duty.

A seventh area in which the public trust doctrine still falls short is at the interface between public property rights and private property

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175. *See, e.g.*, Oposa v. Factoran, G.R. No. 101083 (S.C. July 30, 1993) (Phil.), *reprinted in* LAITOS, ZELLMER, WOOD & COLE, NAT. RESOURCES L. 443–44 (2006); M.C. Mehta v. Kamal Nath, 34 (1997 1 S.C.C. 388), WP 182/1996 (India 2000).

176. Charles F. Wilkinson, *The Headwaters of the Public Trust: Some Thoughts on the Source and Scope of the Traditional Doctrine*, 19 ENVTL. L. 425, 431 (1989).

ownership. The fact is that much of the ecology needing paramount protection—such as forests and soils—exists on private land. Courts have yet to explain how private property ownership must adjust to a new era of natural scarcity and uncertainty. A handful of cases relating to streambeds and shorelines recognize the ecological obligations of landowners by presenting the trust as a public encumbrance on title that thwarts Fifth Amendment takings claims.[177] In this corner of public trust jurisprudence, courts have created a structure of accommodation by defining a *jus publicum/jus privatum* interface in the title to land.[178] This concept should stretch to a far broader realm of land and resources in order to fully reconcile the doctrine with private property ownership. To be effective at protecting vital resources on private lands, a Nature's Trust paradigm must acknowledge an encumbrance on private title that has never been extinguished, an antecedent servitude that must awaken from a long state of dormancy to preserve all crucial natural infrastructure.

An eighth limitation is that the public trust scholarship has, for the most part, failed to create judicial enforcement mechanisms that are adequate for the multi-sovereign, procedurally complex situations that arise time and time again. To be effective, a Nature's Trust framework must construct a robust role for the judiciary, one that does not fall easily to traditional defenses. Defenses related to standing, the political question doctrine, and preemption all present a different twist when viewed through a trust frame (as opposed to a statutory frame), yet these have not been fully explored in the trust scholarship. A related challenge is creating tangible ways in which to equip the judicial branch with the power to enforce the people's trust. While past eras saw active judicial innovation of common law remedies, these are rare in the modern statutory era, as judges typically remand matters to the agency for further proceedings. Many existing hybrid judicial/administrative tools offer mechanisms for enforcing common law public rights but few have been explored in the public trust context.

Finally, because the public trust has always been thought of as a creature of the law, scholarship has never tapped the broader potential of the doctrine to galvanize a political, social, and economic transformation—one that would reinforce legal initiatives. To be at all effective, any legal crusade must be part of an overall cultural and economic movement that spans many levels and human institutions. Legal principles

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177. *See, e.g.*, Esplanade Properties, LLC v. City of Seattle, 307 F.3d 978 (9th Cir. 2002); Stevens v. City of Cannon Beach, 854 P.2d 449 (Or. 1993); Matthews v. Bay Head Improvement Ass'n, 471 A.2d 355 (N.J. 1984).

178. *See Esplanade Properties*, 307 F.3d at 985.

that do not resonate with culturally and spiritually rooted human values will be short-lived and destructive. Over the course of four decades, U.S. environmental law became unmoored from the deeply shared ethic reflecting the sanctity of human survival, local economic security, and natural abundance.[179] The passionate calls for environmental democracy heard in the 1970s are now muffled by thousands of acronyms and garbled techno-jargon, deafening the legal system to core environmental values. Not surprisingly, the law now fails to inspire broad environmental protection, and some have announced the death of environmentalism as we know it.[180]

Trust principles, however, tap the deep inclination of human beings to secure natural abundance for children and society at large. These principles harness powerful concepts of intergenerational equity. They harmonize with many religious and spiritual understandings that view humans as Earth's stewards, and thereby dovetail with worldwide religious movements toward sustainability.[181] Furthermore, a trust approach has extraordinary synergy with economic proposals of natural capitalism that have potential to jumpstart a sagging economy with green jobs.[182] The prohibition against waste of public resources can help kindle a business revolution and spur cradle-to-cradle design of all products to eliminate environmental hazards.[183] In short, the trust has deeply inspiring applications when viewed as a political concept, an ethical mooring, and

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179. *See generally* Mary Christina Wood, *Nature's Trust: Reclaiming an Environmental Discourse*, 25 VA. ENVTL. L.J. 243 (2007). For example, pollution laws place governmental officials in the morbid position of deciding how much death from toxic exposure is appropriate. *See id.* at 255–56.

180. *See* MICHAEL SHELLENBERGER & TED NORDHAUS, THE DEATH OF ENVIRONMENTALISM: GLOBAL WARMING POLITICS IN A POST-ENVIRONMENTAL WORLD 6–8 (2004), *available at* http://www.thebreakthrough.org/images/Death_of_Environmentalism.pdf ("Today environmentalism is just another special interest."); SPETH, *supra* note 22, at 69 (noting that "today's environmentalism . . . is more comfortable proposing innovative policy solutions than framing inspirational messages.").

181. Leaders of the world's major religions have declared a spiritual duty to protect nature. *See* Carrie McGourty, *Prayer to End Climate Change*, ABC NEWS, Sept. 7, 2007, *available at* http://abcnews.go.com/WN/GlobalWarming/Story?id=3572327&page=1 (last visited July 31, 2010).

182. *See* ROBERT POLLIN ET AL., GREEN RECOVERY: A PROGRAM TO CREATE GOOD JOBS AND START BUILDING A LOW-CARBON ECONOMY (2008), *available at* http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf; Keith Schneider, *Majoring in Renewable Energy*, N.Y. TIMES, Mar. 26, 2008, *available at* http://www.nytimes.com/2008/03/26/business/businessspecial2/26degree.html?ex=1364270400&en=7d2f042c3f84400f&ei=5124&partner=permalink&exprod=permalink (last visited July 31, 2010); FRIEDMAN, *supra* note 20.

183. *See* WILLIAM MCDONOUGH & MICHAEL BRAUNGART, CRADLE TO CRADLE: REMAKING THE WAY WE MAKE THINGS (2002).

an economic principle as well. By reflecting many of the fundamental civic expectations in a democratic society, the Nature's Trust discourse could greatly strengthen legal initiatives toward environmental restoration.

CONCLUSION

In sum, agency discretion has been largely commandeered to serve industry and bureaucratic interests that operate at cross-purposes to the protective goals of the statutes that authorize such discretion. At best, environmental law today is used to hospice a dying planet. The monumental challenge facing modern environmental law is to steer agency discretion across nearly all contexts of environmental management, redirecting bureaucratic energy toward the epic task of rebuilding the bankrupted assets in Nature's Trust. But transforming local, state, and federal agencies requires a new way of thinking, a new set of operating principles, a fresh characterization of normative workday values, and a complete set of legal footholds by which citizens can hold their government officials accountable.

While no legal approach is a panacea for the broad ills facing humanity today, the trust approach carries great potential for both invigorating environmental law and reinforcing the many promising visions offered by leading thinkers for a sustainable future. The Nature's Trust paradigm builds upon the public trust foundation to create a full, transformative legal shift—one that gives law a firm handshake with reality in meeting the new ecological age. What anchors the model is a broad characterization of government's duty in natural resources management as obligatory, holistic, and organic to sovereignty itself. Cast in that way, the trust is an encompassing fiduciary limitation on the powers of government that extends from the local to state to national levels, infusing existing environmental law and bureaucracy with a protective purpose that rises to the level of modern ecological challenges. When joined with co-tenancy principles, the trust becomes a diplomatic framework in which to force international obligations to protect the Earth endowment for all generations of humanity.

Ultimately, Nature's Trust and the primordial rights that infuse it are part of a populist manifesto that surfaces at epic times through the generations of humanity, perhaps no less revolutionary for our time and our crises than the forcing of the Magna Carta on the English monarchy

in 1215,[184] or Mahatma Ghandi's great Salt March to the sea in 1930.[185] In this vein, and perhaps most importantly, Nature's Trust can be a catalyzing legal principle for citizen environmental democracy and human rights throughout the world. As the nations on Earth confront global ecological crisis, Nature's Trust can offer a paradigm that transcends cultures and national borders. By drawing on principles basic to sovereignty and rooted in ancient law, manifest in both indigenous and industrialized nations across the world, Nature's Trust can empower citizens worldwide in their valiant struggles to hold government accountable for protecting a vanishing global natural heritage.

184. The Magna Carta is often cited as a source of the public trust doctrine, as it forced the monarchy to open access to resources such as navigable waterways. For discussion, see CRONIN & KENNEDY, *supra* note 160, at 139–42 (1999).

185. The British imposed a heavy tax on salt and exercised a monopoly over its production and sale. The common people were forbidden from collecting salt, which was vital for preservation and other needs. Cast in public trust terms, the British government fully alienated an element of the public trust corpus to corporate interests. Ghandi rejected the British position forbidding the people from harvesting a natural resource and consequently led a nonviolent march to the sea for the purpose of collecting salt. So many people were arrested that the jails overflowed and the British had to change the law and accept the people's right to collect salt. For a summary of this event, see MANAS, History/Politics, Dandi: Salt March, http://www.sscnet.ucla.edu/southasia/History/Gandhi/Dandi.html (last visited Sept. 26, 2009).