"The Once and Future Land Ethic"

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The Once and Future Land Ethic

I have purposefully presented the land ethic as a product of social evolution because nothing so important as an ethic is ever "written."

—ALDO LEOPOLD (1949)

THIS SENTENCE, appearing near the end of "The Land Ethic," is arguably the most important Aldo Leopold ever wrote. With these words he acknowledged the limits of his own efforts to frame a large and complex idea. He understood that such an ethic could form and evolve only "in the minds of a thinking community."[1] The author of the essay "The Land Ethic" did not, and could not, "write" the land ethic. No one person could. And *everyone* could.

Which is not to say that Leopold did not pour himself into "The Land Ethic." His essay distilled a lifetime of observing, reading, writing, thinking, experimenting, blundering, and always asking the next question about the very meaning of conservation.[2] In it Leopold sought nothing less than to redirect the conservation movement by blending knowledge and insights from the natural sciences, history, literature, ethics, economics, aesthetics, and public policy. It was the culminating expression of Leopold's intellectual, professional, and spiritual growth.

Yet Leopold recognized the contingent nature of the land ethic—perhaps because the idea evolved continually in his own thinking, in varied landscapes. In any case, by explicitly framing his idea as the "tentative" expression of one member of a thinking community, Leopold opened wide the discussion. The land ethic might have gone down in history as the idiosyncratic expression of a mid-twentieth century naturalist, scientist, and

writer. Instead, with his self-abnegating assertion, Leopold liberated the land ethic. He gave his readers a stake in the idea, and a responsibility to develop it. He invited other voices to join the conversation, thus ensuring that it would remain vigorous. Each of us as individuals, as members of different communities, and as participants in a broader culture, may help to "write" the land ethic.

What forces will shape the land ethic in the future? How must the concept of a land ethic evolve in order to thrive and provide guidance to conservation in the twenty-first century? There are, of course, innumerable answers to these questions. It is possible, however, to identify at least some overarching challenges a land ethic will need to meet to remain vital.

The land ethic will need to embrace, and be embraced by, new constituencies. How can the land ethic be nurtured within diverse and constantly changing human communities, with different traditions and relationships to land? Aldo Leopold's land ethic reflected the social realities of his time and place. Looking ahead, it is not difficult to predict that as our societies, economies, and demographics change, so will our environmental concerns. This will redefine what conservation is and how we pursue it. It will call for a blending of varied cultural traditions and values, with priorities that do not always mesh, and that may well be in conflict.

Fortunately, such openness and inclusiveness is in greater evidence now than perhaps at any time since Leopold's day. Conservation crosses cultural divides in a way it did not in Leopold's generation, with increasing appreciation of the complicated connections between healthy landscapes, communities, and identity.[3] Community-based approaches to conservation require that people be invested with responsibilities for decisions that affect the quality and sustainability of their home landscapes. Educational programs and new technologies provide access to information in ways that did not exist even a few years ago. Faith communities throughout the world have looked to their traditions for affirmation of environmental values. The environmental justice movement has opened opportunities for honest conversations on shared concerns—in much the same manner that Leopold tried to do in "The Land Ethic."

As these trends continue, the effort must involve more than merely communicating *the* land ethic *to* new constituencies. Rather, it will require

expanding the "thinking community" and encouraging people to understand themselves and their stories through their relationships to land. To neglect such diverse voices is to leave, in Lauret Savoy's words, a "strength . . . only partially realized." By contrast, when voices join, new worlds are made possible: "Perhaps then we might fully imagine and comprehend who and what we are with respect to each other and with respect to this land. What is defined by some as an edge of separation between nature and culture, people and place, is where common ground is possible."[4]

The land ethic will need to respond to emerging scientific insights and shifting scientific foundations. How will the land ethic adapt to the insights that flow from the natural sciences? Leopold's land ethic rested upon a solid foundation of interdisciplinary science, but that foundation is itself subject to continuous intellectual evolution. Over the last half of the twentieth century revolutions occurred in every field of natural science, including geology (especially plate tectonic theory), climatology, oceanography, marine biology, hydrology, limnology, paleontology, biogeography, systematics, genetics, wildlife biology, forestry, and the agricultural sciences. These revolutions have rumbled on beneath the surface of the land ethic. If it is to stand, the land ethic must be supple and flexible.

In particular, the land ethic will need to reflect advances in the fields of evolutionary biology, biogeography, environmental history, and ecology. Over the last several decades, evolutionary biology and paleontology have recast our understanding of ancient, "deep time" extinctions. We have a much clearer picture of the impact of the human diaspora out of Africa on the world's landscapes and biotas over the last hundred thousand years, including the period of Pleistocene extinctions that "set the stage" for today's living world.[5] Island biogeography and environmental history have revealed the broad patterns of change that have shaped biotas, landscapes, ecosystems, and cultures over more recent centuries and decades.[6] In ecology, emphasis has shifted away from the classic "balance of nature" idea to a better-informed "flux of nature" paradigm that accounts for the dynamic nature of ecosystems.[7]

In response to these changes, and others yet to come, conservationists will need to incorporate the lessons of environmental history and sort out the biological impacts of human activities at various scales of time and

space. This has already been happening in conservation biology, restoration ecology, and other fields. But the land ethic is not just for scientists. Conservation-minded citizens must also become familiar with these scientific advances to critically understand such issues, for example, as species invasions, fire management, aquifer depletion, and emerging diseases.

The land ethic will need to extend across, and recognize connections within, the entire landscape. How can the land ethic help to revive and strengthen bonds of common interest within the landscape and within conservation? Leopold's work focused on the health of wild, semiwild, and rural lands. His ethic spanned a broad range of conservation interests. But changes in society, the economy, and the landscape itself have undermined that fragile unity. Conservation's constituency has fragmented, as evidenced especially in increased polarization between urban and suburban environmentalists and rural people who own and work land. That fragmentation has been aided and abetted by those with special interests in particular parts of the landscape. Conservation, by contrast, is all about protecting the public interest in the beauty, diversity, and health of the landscape as a whole.

In his more expansive moments, Leopold tried to stretch his notion of a land ethic beyond those parts of the landscape he was especially interested in. In lecture notes from the 1940s he wrote,

> There must be some force behind conservation—more universal than profit, less awkward than government, less ephemeral than sport; something that reaches into all times and places, where men live on land, something that brackets everything from rivers to raindrops, from whales to hummingbirds, from land estates to window-boxes. I can see only one such force: a respect for land as an organism; a voluntary decency in land-use exercised by every citizen and every land-owner out of a sense of love for and obligation to that great biota we call America. This is the meaning of conservation, and this is the task of conservation education.[8]

Leopold was not alone in such expressions. In "The Land Ethic" he was indeed speaking on behalf of a community of conservation scientists, thinkers, and advocates who found common cause, and assumed a common responsibility.

There was no past golden age when conservation united people across social, economic, and political divides. However, there have been periods when the conservation consensus was unusually strong: the early years of the Progressive movement, the "dirty thirties," the Earth Day awakening of the early 1970s. Unfortunately, such consensus seems to emerge only in response to environmental crises—widespread deforestation and wildlife destruction, extensive soil erosion, unchecked environmental contamination and pollution, depletion of the earth's ozone layer. The question is: must it always be so? Or can conservation go on the offensive and provide a positive vision of the public good to be gained through environmental stewardship?

To do so, conservationists will have to assume many chores: linking concern for wild lands and the more developed parts of the landscape; forging a renewed movement for the conservation of private lands; recognizing, as Wes Jackson has noted, that "if we don't save agriculture, we won't save wilderness"[9]; bringing urban and suburban dwellers into conversations about conservation; taking seriously the connections between land, fresh water, and the marine environment. The land ethic cannot meaningfully endure if the fragmentation of interests prevails. It will flourish if it makes connections.

The land ethic will need to be extended to the aquatic and marine realms. How can the land ethic fully embrace water resources and aquatic ecosystems, and encourage an "ocean ethic"? We are terrestrial creatures with terrestrial biases. Only with time have even conservationists come to appreciate the essential connections between groundwater, surface waters, and atmospheric waters, and between water as a vital ecosystem component and a basic human need.

Leopold explicitly included water in his definition of "land" and devoted significant professional energies to understanding human impacts on watersheds and aquatic systems.[10] Aldo's son Luna, a renowned hydrologist and conservationist in his own right, defined the essential point: "Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land."[11] The headlines give regular notice of increasing pressures, locally and globally, on the quality, quantity, distribution, and uses of

water and the health of aquatic ecosystems. These pressures are sure to increase in the century ahead and will inevitably raise issues of access, equity, and justice. Understanding water connections and articulating an ethic to guide the protection and careful use of water are urgent tasks not only for conservationists, but society at large.[12]

Until recently, conservationists have lagged in their attention to the oceans. With the popularity of Rachel Carson's ocean books and Jacques Cousteau's films in the 1950s and 1960s, marine conservation began to enter public consciousness. Although cetaceans, sea turtles, and other groups of organisms focused concern on the oceans, only in the 1990s did conservationists begin to consider more systematically the status and needs of marine resources, biodiversity, and ecosystems. Once again, however, consensus has come only in the wake of acute disasters—depleted fisheries, highly disrupted marine food webs, expanding "dead zones," the global spread of aquatic invasive species, intensified coastline development, the widespread degradation of coral reefs, mangrove swamps, estuaries, and other sensitive marine communities.

The conservation of marine biodiversity and the need for an "ocean ethic" now appear to be gaining the attention they have long required. New organizations have formed to raise awareness of marine conservation issues. Conservation biology has entered the marine realm, helping to establish marine protected areas and develop (hopefully) more sustainable, ecosystem-based fishing regimes.[13] For communities whose economies, livelihoods, and cultural identity depend on marine resources, sustainability is no vague abstraction. As the song goes, "No more fish, no fishermen."[14]

In this century, we will either remain mere consumers of the seas' bounty or become true caretakers of marine communities. Marine biologist and conservationist Carl Safina writes, "People who think of themselves as conservationists carry a concern for wildlife, wild lands, habitat quality, and sustainable extraction as part of the collective ethic, their sense of right and wrong. It is high time to take these kinds of ideas below high tide, and a sea ethic is the perfect vessel in which to begin the voyage."[15] The vastness, complexity, and mystery of the oceans have allowed us to postpone that project. The longer we delay, the more difficult the voyage will be.

The land ethic will need to confront directly the challenges posed by human population growth, and contribute to the shaping of a parallel consumption ethic. How can the land ethic help to address the pressures arising from human population growth responsibly, respectfully, and effectively? Will we recognize and act upon the connections between ecosystem health and resource consumption? These have always been among the most politically and economically vexing issues in conservation. They are the eight-hundred-pound gorillas whose presence we would just as soon not acknowledge.

But with the human population now over six billion, the interrelated trends of continued population growth and intensified resource consumption cannot be avoided. For decades—indeed, since Thomas Malthus's day—warring ideological camps have debated the relationship between population growth, economic development, and environmental degradation. Because the issue involves fundamental assumptions of economic philosophy, and cuts so very close to the political bone, the moments of consensus have been rare and elusive. The rapid growth and movement of the human population over the last century has no precedent in human history, and our inherited ethical systems provide too little guidance in response.

If the land ethic has any special contribution to make, it may be to draw attention to the land itself; to steer the discussion away from raw ideology and toward careful consideration of the quality of life, human and otherwise, over the long run. If there is to be any consensus, it will have to grow out of the realization that population and consumption are necessarily connected: environmental change is a function of both our numbers and our ways of life. Neither factor in the equation can be ignored. At present we tend to ignore both.

In the 1920s, Aldo Leopold pointed out the need for honesty in addressing consumption patterns and choices. He wrote, "A public which lives in wooden houses should be careful about throwing stones at lumbermen, even wasteful ones, until it has learned how its own arbitrary demands as to kinds and qualities of lumber help cause the waste which it decries. . . . The long and short of the matter is that forest conservation depends in part on intelligent consumption, as well as intelligent produc-

tion of lumber."[16] His point extended beyond just forestry and wood products: conservation and consumption were, and are, connected. As forester Doug MacCleery has framed it, a land ethic that ignores those connections amounts to "half a loaf."[17] We need the whole loaf. "Intelligent consumption," were we to achieve it, would defy the assumptions of both modern hyperconsumer culture and of that brand of environmentalism that prefers to avert its eyes from the impacts of personal consumer choices.

The land ethic will need to help reform the traditional economic worldview to include conservation concerns in a meaningful way. Can the land ethic have deep and meaningful impact on the human economic enterprise? This is the 750-pound gorilla. For all the discussion of sustainability in recent decades, conservation has had a hard time gaining a full hearing within the dominant schools of neoclassical economics. Especially with rapid globalization and technological change driving economic development, conservation receives scant attention in the salons of high finance and international trade.

Is there room, in the long run, for true reconciliation of economic and ecological worldviews? Is there any safe way out of our current addiction to the quarterly earnings report to a sincere commitment to the seventh generation? Leopold worded his own views with extreme care: "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." Leopold thus held out the possibility of *loving and respectful use*. But he took no comfort in the early expressions of the post–World War II economic boom. He saw a society "so obsessed with its own economic health as to have lost the capacity to remain healthy."[18] He did not live long enough to see the obsession become the norm.

In framing the land ethic, Leopold joined a long line of economic dissenters in the conservation tradition, stretching from George Perkins Marsh to Henry George to E. F. Schumacher to Herman Daly. That line took a new turn beginning in the 1980s. Economists operating under the banners of ecological economics and sustainable development began to challenge economic orthodoxy.[19] Although they have not yet convinced their disciplinary colleagues of the need to see the human economy as a "wholly owned subsidiary" of the global ecosystem, they have forced the boundaries of the

conversation outward. They have explored new ways to value nature, redefine capital, and build conservation-based economies.[20] Many a battle yet to come will be framed reflexively according to shopworn jobs-versus-the-environment myths. But conservationists are gaining new tools with which they can not just wage the battle, but dispel the myth.

The land ethic will need to engage, and find acceptance within, diverse disciplines, vocations, and professions. How can serious consideration of the land ethic be encouraged beyond its core devotees in the natural sciences, environmental and conservation groups, and resource management professions? An effective land ethic will require commitment from a wide spectrum of fields and occupations. Architects, designers, engineers, planners, artists, builders, bankers, clergy, teachers, doctors, farmers, manufacturers, business owners: all have an impact on land and the way people regard land. All may benefit from the innovative thinking that arises when land is regarded as more than just raw material or scenery.

In one of his lesser-known classic articles, "The Role of Wildlife in a Liberal Education" (1942), Leopold included a simple graphic of food chains to illustrate the "lines of dependency . . . in an ordinary community" of Wisconsin. One chain extended, rather conventionally, from rock to soil to ragweed to mouse to fox. Another, however, linked rock to soil to alfalfa to cow to farmer . . . to grocer . . . to lawyer . . . to student; another branched off, going from cow to farmer . . . to implement maker . . . to mechanic . . . to union secretary. Leopold's point was that to think of "the wild community [as] one thing, the human community another" was erroneous.[21]

When human communities are reconceived along such lines, all members have a role—and an interest—in formulating a land ethic. And new connections are made. It becomes possible, for example, to think of ecologically informed design, sustainable architecture, and the "green infrastructure" of cities. It becomes important to think of the relationships between individual and public health, the environment, and biodiversity. It becomes prudent to plan and account for true costs, with the ecosystem in mind. It becomes exciting to teach, and learn, across disciplines. The land ethic becomes not just a rationale for protecting nature, but a means of enriching community life.

The land ethic will need to promote awareness and critical thinking among young people. How can the land ethic, in the face of rapid changes in education and in society, encourage curiosity and critical judgment among students? In "The Land Ethic" Leopold noted the dilemma educators face. "Despite nearly a century of propaganda," he noted, "progress [in conservation] still consists largely of letterhead pieties and convention oratory." He agreed that more education was needed. "No one will debate this, but "is it certain that only the *volume* of education needs stepping up? Is something lacking in the *content* as well?"[22]

Propaganda was not to be confused with education. The quality of conservation education depended, in part, on a positive understanding of land as a dynamic community, which in turn depended on "an understanding of ecology." But, Leopold lamented, "this is by no means co-extensive with 'education'; in fact, much education seems deliberately to avoid ecological concepts. An understanding of ecology does not necessarily originate in courses bearing ecological labels; it is quite as likely to be labeled geography, botany, agronomy, history, or economics."[23] At the heart of the matter: modern education divides the world into subjects, disciplines, and fields, while effective conservation education requires an appreciation of relationships. We need, in David Orr's words, to "connect thought, words, and deeds with our obligations as citizens of the land community."[24]

Environmental education has made great strides over the last quarter century. Has the effort succeeded merely in exposing students to "correct" attitudes, or has it given them the tools to think, feel, and act with clarity and independence? It is a tough but necessary question to ask. For the land ethic to endure, students (of all ages) will need to be emotionally and intellectually engaged in the world around them. In a world where distractions reign, they will need to acquire the wisdom of their places: the rocks and weathers, soils and waters, plants and animals, origins and histories, people and cultures. And it will need to be more than a chore; it has to be an unending adventure.

The land ethic will need to provide encouragement and guidance for expanded community-based conservation projects. How can the land ethic more effectively encourage local responsibility for land and stimulate cooperative measures to protect, restore, and sustain land health? "A land

ethic," Leopold wrote, "reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land."[25] As Leopold recognized, individuals can act upon that conviction in various ways: as landowners, consumers, voters, students, parents, employees. Community-based conservation provides one more avenue through which individuals may act: as neighbors sharing a place.

The conservation movement has seen an explosion of innovation and energy at the local level, at home and around the world. Nongovernmental, community-based organizations—conservancies, watershed groups, land trusts, neighborhood associations, and a wild array of alliances, co-ops, partnerships, coalitions, projects, and councils—have transformed the social landscape of conservation. While there are older precedents to these efforts, the rise of community-based conservation is a new and potentially powerful force for change on the land and in civil society. It does not replace either individual or governmental action; it supplements them, providing new opportunities to reclaim common ground and enhance the public interest.[26]

The magnitude of our conservation needs, and the limits of both individual and governmental action in meeting them, are such that community-based projects must continue to expand. But it will be no small challenge for these organizations to stay on course, sustain themselves, resist provincialism, and incorporate solid science in their work.[27] The community-based conservation movement is one of the most hopeful recent indicators that the land ethic is alive and well, and dispersing into new fields. In the decades to come, the health of that movement will be a gauge of our overall societal commitment to the land.

The land ethic will need to build upon its roots in the American experience while remaining adaptable in other settings. How can the land ethic continue to grow if it was, and is, the product of a specific time and place? The land ethic, as Leopold framed it, emerged in response to particular landscapes, cultural traditions, and historical circumstances. It is an achievement to be proud of, and defended with vigor. Just as the American people have struggled, so painfully, to free themselves, from the original sin of slavery, so have we at least begun to emancipate ourselves from what Donald Worster has described as our "fanatical drive against the earth."[28] Much damage, to

be sure, has been done—to the American land, and to ourselves in the process. We have much yet to do to redeem past losses, and to prevent new wounds. But in the last century we have also created a national ethic to provide guidance along the way.

Meanwhile, the land ethic has outgrown its American origins. It has done so in different ways. Over the last half century, especially, the land ethic has contributed to the emergence of a global environmental ethic (through, for example, the decade-long international effort to draft the Earth Charter).[29] It has crossed borders to influence the conservation policies of other nations. It has changed the way scientists, resource managers, policy makers, advocates, and business leaders are trained, regardless of location. But it has also inspired local conservation efforts in communities worldwide.

Still, the land ethic as conceived by Americans cannot be simply "transferred." Ethics cannot be exported, only evoked. Even within the United States, the land ethic continues to evolve in varied ecological, cultural, and historical contexts. It sets high goals—in Leopold's language, safeguarding "the capacity of the land for self-renewal" and protecting "the integrity, stability, and beauty of the biotic community"[30]—but no one prescribed path. To thrive, the land ethic will need to tell the stories, sing the songs, and dance the dances of people in their own home places.

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These needs (and no doubt others) will shape the land ethic in unpredictable ways in the century ahead. Other realities will surely influence our land ethic conversations. To name a few: climate change, continued international tensions and cultural conflicts, the transition beyond oil-based economies, global patterns of trade and development, and population growth and migration. But as members of the "thinking community," and citizens in a democracy that itself faces crucial challenges, we are obliged to continue "writing" the land ethic, not only with words but on the land. That process has a long history on this continent, and around the world. It began long before Aldo Leopold wrote his "tentative summary." It will continue as long as we care about people, land, and the connections between them.

Leopold's statement is from "The Land Ethic," in *A Sand County Almanac and Sketches Here and There* (New York: Oxford University Press, 1949), p. 225. It is among the parts of the essay that were newly written in the summer of 1947 as Leopold was completing the manuscript. Roderick Nash surveyed the evolution of conservation philosophy in *The Rights of Nature: A History of Environmental Ethics* (Madison: University of Wisconsin Press, 1989). A. Carl Leopold commented on his father's philosophy and the continuing "elaboration of ethical concepts in relation to biology and conservation" in "Living With the Land Ethic," *BioScience* 54, no. 2 (2004): pp. 149–154.

1. Leopold, *A Sand County Almanac*, p. 225.
2. See C. Meine, "Building 'The Land Ethic'," in *Companion to* A Sand County Almanac: *Interpretive and Critical Essays*, edited by J. B. Callicott (Madison: University of Wisconsin Press, 1987), pp. 172–185.
3. See chap. 2, n. 16.
4. A. H. Deming and L. E. Savoy, eds., *The Colors of Nature: Culture, Identity, and the Natural World* (Minneapolis, Minn.: Milkweed Editions, 2002), pp. 7, 11.
5. See P. S. Martin and R. G. Klein, *Quaternary Extinctions: A Prehistoric Revolution* (Tucson: University of Arizona Press, 1989); D. H. Raup, *Extinction: Bad Genes or Bad Luck?* (New York: W. W. Norton, 1991); N. Eldredge, *The Miner's Canary: Unraveling the Mysteries of Extinction* (New York: Prentice Hall Press, 1991); T. E. Flannery, *The Future Eaters: An Ecological History of the Australasian Lands and People* (Port Melbourne, Australia: Reed Books, 1994); C. Tudge, *The Time Before History: Five Million Years of Human Impact* (New York: Simon and Schuster, 1997); R. D. E. MacPhee, *Extinctions in Near Time: Contexts, Causes, and Consequences* (New York: Plenum Press, 1999); T. E. Flannery, *The Eternal Frontier: An Ecological History of North America and Its People* (New York: Grove Press, 2001); P. D. Ward, *Rivers in Time: The Search for Clues to Earth's Mass Extinctions* (New York: Columbia University Press, 2002). For an overview, see C. Meine, *Humans and Other Catastrophes: Perspectives on Extinction* (New York: Center for Biodiversity Conservation, American Museum of Natural History, 1999).
6. See W. Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (1983; reissued, New York: Hill and Wang, 2003); A. W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986); G. G. Whitney, *From Coastal Wilderness to Fruited Plain: A History of Environmental Change in Temperate North America from 1500 to the Present* (Cambridge: Cambridge University Press, 1994); D. Quammen, *The Song of the Dodo: Island Biogeography in an Age of Extinctions* (New York: Simon and Schuster, 1996); J. Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (New York: W. W. Norton, 1997).
7. See chap. 5, n. 42 and chap. 9, n. 4.
8. A. Leopold, "The Meaning of Conservation," unpublished lecture notes (Aldo Leopold Papers 6B16). Leopold probably gave the lecture in the last few years of his life. The manuscript indicates that it was delivered in Milwaukee on September 10, but the year is not noted.
9. W. Jackson, "Preparing for a Sustainable Agriculture," in C. Meine and R. L. Knight, eds., *The Essential Aldo Leopold: Quotations and Commentaries* (Madison: University of Wisconsin Press, 1999), p. 89. See also, in this context, K. K. Smith, *Wendell Berry and the Agrarian Tradition: A Common Grace* (Lawrence: University Press of Kansas, 2003); and E. T. Freyfogle, ed., *The New Agrarianism: Land, Culture, and the Community of Life* (Washington, D.C.: Island Press, 2001).
10. Leopold's early interest in watershed functions in the Southwest in the late 1910s and early 1920s is described in C. Meine, *Aldo Leopold: His Life and Work* (Madison: University of Wisconsin Press, 1988), pp. 175–228. His interest remained strong throughout his years in the Midwest. His most explicit article on the theme of aquatic ecosystems was "Lakes in Relation to Terrestrial Life Patterns," in *A Symposium on Hydrobiology*, edited by J. G. Needham, P. B. Sears, and A. Leopold (Madison: University of Wisconsin Press, 1941), pp. 17–22, which begins: "Mechanized man, having rebuilt the landscape, is now rebuilding the waters. The sober citizen who would never submit his watch or his motor to amateur tamperings freely submits his lakes to drainings, fillings, dredgings, pollutions, stabilizations, mosquito control, algae control, swimmer's itch control, and the planting of any fish able to swim. So also with rivers. We constrict them with levees and dams, and then . . . flush them with dredgings, channelizations, and the floods and silt of bad farming. . . . Thus men too wise to tolerate hasty tinkerings with our political constitution accept without a qualm the most radical amendments to our biotic constitu-

tion." See also M. Nelson, "Earth, Air, Water . . . Ethics," in C. Meine, ed., *Wisconsin's Waters: A Confluence of Perspectives, Transactions of the Wisconsion Academy of Sciences, Arts and Letters* 90 (2003): 163–172.

11. The original source of Luna's quotation is unclear. But see L. B. Leopold, "Ethos, Equity and the Water Resource," *Environment* 32, no. 2 (1990): 16–20, 37–42; and *A View of the River* (Cambridge, Mass.: Harvard University Press, 1994).
12. For surveys of current water information and issues, see P. Simon, *Tapped Out* (New York: Welcome Rain Publishers, 1998); M. De Villiers, *Water: The Fate of Our Most Precious Resource* (New York: Houghton Mifflin, 1999); M. Barlow and T. Clarke, *Blue Gold: The Fight to Stop Corporate Theft of the World's Water* (New York: New Press, 2002); P. Gleick, *The World's Water, 2002–2003: The Biennial Report on Freshwater Resources* (Washington, D.C.: Island Press, 2002); R. Glennon, *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters* (Washington, D.C.: Island Press, 2002); Wisconsin Academy of Sciences, Arts and Letters, *Waters of Wisconsin: The Future of Our Aquatic Ecosystems and Resources* (Madison: Wisconsin Academy of Sciences, Arts and Letters, 2003).
13. See E. A. Norse, "Uncharted Waters: Conserving Marine Biological Diversity," in G. K. Meffe, C. R. Carroll, and contributors, *Principles of Conservation Biology*, 2nd ed. (Sunderland, Mass.: Sinauer Associates, 1997), pp. 94–97; T. S. Agardy, *Marine Protected Areas and Ocean Conservation* (Washington, D.C.: Academic Press, 1997); National Marine Fisheries Service (NMFS), Ecosystem Principles Advisory Panel, "Ecosystem-based Fishery Management: A Report to Congress" (Washington, D.C.: NMFS, 1998); B. Thorne-Miller, *The Living Ocean: Understanding and Protecting Marine Biodiversity*, 2nd ed. (Washington, D.C.: Island Press, 1999); National Research Council, *Marine Protected Areas: Tools for Sustaining Ocean Ecosystems* (Washington, D.C.: National Academy Press, 2001).
14. The song was written by Sheldon Posen and John Goss, and recorded by Finest Kind, *Heart's Delight* (Ottawa, Ontario: Fallen Angel Music, 1999). For recent overviews of sustainable fisheries, see D. Pauly, V. Christensen, S. Guenette, T. J. Pitcher, U. R. Sumaila, C. J. Walters, R. Watson, and D. Zeller, "Towards Sustainability in World Fisheries," *Nature* 418, no. 6898 (2002): 689–695. See also: D. Dobbs, *The Great Gulf: Fishermen, Scientists, and the Struggle to Revive the World's Greatest Fishery* (Washington, D.C.: Island Press, 2000); and R. Ellis, *The Empty Ocean* (Washington, D.C.: Island Press, 2003).
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