

# Chapter 14

## Aldo Leopold: Connecting Conservation Science, Ethics, Policy, and Practice

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**Abstract** Creative interdisciplinary thinkers in the history of both ecology and ethics have ventured beyond their disciplinary boundaries and into the zone where they overlap. Prominent among these was Aldo Leopold. While serving as president of the Ecological Society of America in 1947, Leopold called for a “land ethic” that integrated insights from ecology, history, ethics, and aesthetics. Prompted especially by developments in science and technology following World War II, Leopold was part of a broader community of contemporaries concerned with these portentous changes. In retrospect, we can see Leopold’s special contribution as a defining moment in the discourse connecting conservation science, ethics, policy, and practice. That discourse continues, especially in emerging interdisciplinary fields, even as our critical environmental concerns renders the need for integrated thinking ever more apparent and immediate.

**Keywords** Aldo Leopold • Ecological Society of America • Conservation • Policy • Ethics

### 14.1 Aldo Leopold, Ecology, and Ethics: 1947

At its annual meeting in December 1946, the Ecological Society of America (ESA) elected Aldo Leopold president. He was a somewhat surprising pick. Over the years Leopold had devoted a greater share of his professional energies to other scientific, professional, and conservation organizations. Although he had been

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elected vice-president of the ESA the previous year, he had contributed only occasionally to its conferences and publications. Leopold himself was among those most surprised. "I am astonished by my election," he wrote to the ESA Secretary, William Dreyer of the University of Cincinnati. "I had supposed... that any nominee failing to show up at the meeting would automatically be out of the running. I feel deeply the responsibility implied in being elected despite this failure on my part."<sup>1</sup>

Although distressed at the time by a struggle with trigeminal neuralgia, Leopold stepped into the role. His term began in January 1947. As the Society's flow of paperwork was partially diverted to Leopold's office at the University of Wisconsin in Madison, he did his best to catch up on official matters involving the ESA's committees, finances, and journals. He corresponded with members and editors, and made plans to attend the Society's annual meeting the following December in Chicago. Despite having to undergo a worrisome operation at the Mayo Clinic in September, he was able to organize and chair at the meeting a round-table discussion on bird and mammal population mechanisms.

Leopold completed his term in office, but had one more official duty. He was due to deliver the past president's address at the next ESA meeting. However, Leopold died on April 21, 1948, suffering a heart attack while fighting a grass fire on a neighbor's property in Wisconsin (Meine 2010).

We are left to speculate on what Leopold might have offered to his fellow ecologists. He left no prepared manuscript or notes to suggest the trend of his thoughts. There are, however, tantalizing hints and clues as to where he would have taken his audience. On such occasions Leopold tended to highlight interesting work at the cutting edge of contemporary research, but then to focus on broader concerns, emphasize professional responsibilities, and encourage his listeners to push against their own disciplinary boundaries. His 1940 presidential address to The Wildlife Society, for example, was notable for the directness with which Leopold challenged his own professional progeny to become more than trained technicians. "Our job is to harmonize the increasing kit of scientific tools and the increasing recklessness in using them with the shrinking biotas to which they are applied. In the nature of things we are mediators and moderators, and unless we can help rewrite the objectives of science we are predestined to failure" (Leopold 1991b: 277–277).

He himself had taken up that "job" with increasing urgency. Even before the eruption of World War II he was alert to the accelerating impact of modern science and technology on humanistic values and natural systems. In a 1938 lecture he stated: "We end, I think, at what might be called the standard paradox of the twentieth century: our tools are better than we are, and grow better faster than we do. They suffice to crack the atom, to command the tides. But they do not suffice for the oldest task in human history: to live on a piece of land without spoiling it" (Leopold

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<sup>1</sup>All correspondence quoted here can be found in the Ecological Society of America files in the Aldo Leopold Papers of the University of Wisconsin Archives. The Leopold Papers are available on-line at <http://digioll.library.wisc.edu/AldoLeopold>. Portions of this essay were originally presented in *Minding Nature* (2009), the on-line journal of the Center for Humans and Nature, at [http://www.humansandnature.org/august-2009---vol-2--num-2-minding\\_nature-7.php](http://www.humansandnature.org/august-2009---vol-2--num-2-minding_nature-7.php)

1991a: 254). During the war, he voiced his concerns regularly in published and unpublished texts. In a manuscript prepared at the end of 1944, he wrote:

What will happen to wild values after the war when the fruits of military strategy and military engineering fall into the eager lap of modern man? DDT, capable of eradicating everything from mosquitoes up and down? Family airplanes, ready to eradicate solitude from the face of the map? Power machinery capable of rebuilding the earth on a scale almost comparable to the ice-age? If such tools are to fall short of achieving our ecological suicide, it is the time for us to learn caution and restraint in our power to eradicate wild things. (<http://digital.library.wisc.edu/1711.dl/AldoLeopold.ALTypeCop>, 1030)

The theme would only intensify in his writings in the few years he had remaining after World War II. As Leopold had feared, the technologies developed during the war were quickly turned toward the post-war marketplace. The major funding and research institutions adapted their agendas, bringing into being the modern scientific establishment. Leopold became increasingly critical of what he took to calling “power science.” In a draft essay from 1946 he wrote:

Time was when the aim of science was to understand the world, and to learn how man may live in harmony with it. If I read Darwin aright, he was more concerned with understanding than with power. But science, as now decanted for public consumption, is mainly a race for power. Science has no respect for the land as a community of organisms, no concept of man as a fellow-passenger in the odyssey of evolution. Science has developed a kind of cosmic arrogance which in turn determines the content and direction of scientific endeavor. (<http://digital.library.wisc.edu/1711.dl/AldoLeopold.ALMiscManPub>, 760–762)

Leopold was hardly one to harbor a romantic disdain for science or reason. Trained in the scientific method, a disciplined observer and recorder of natural phenomena, an innovative thinker in several fields of natural science, and mentor to a vanguard of young ecologists, Leopold was a staunch defender of science in the many institutions, organizations, and public fora in which he participated. “Science,” he once wrote, “contributes moral as well as material blessings to the world. Its great moral contribution is objectivity, or the scientific point-of-view. This means doubting everything except facts; it means hewing to the facts, let the chips fall where they may” (Leopold 1949: 153–154). But especially in the aftermath of the war, Leopold saw fundamental changes occurring in the conduct of science, the role of scientific institutions, and the application of science’s findings.

Other trends were also redirecting Leopold’s field of vision. The war had, among its manifold effects, globalized conservation concerns. Leading thinkers dating back to Alexander von Humboldt and George Perkins Marsh had appreciated the global scale of human environmental impacts, but the war had grounded these considerations in new and more immediate ways, and had focused attention—for some at least—on their ethical implications. While Leopold was serving as ESA president, he was in communication with two colleagues who would produce important early statements on the global conservation dilemma. Fairfield Osborn’s *Our Plundered Planet* and William Vogt’s *Road to Survival* would both be published in 1948 (Robertson 2012). Meanwhile, national and international institutions and organizations were mobilizing in response in unprecedented ways.

Leopold himself was invited to serve as advisor to the United Nations' International Scientific Conference on the Conservation and Utilization of Natural Resources, scheduled to convene in 1949.

These trends and concerns were also playing out within the Ecological Society of America. In particular, the Society was experiencing the latest expression of a tension long latent in its ranks. Since its founding in 1915 the ESA had included members who wanted the Society to advocate more actively on behalf of the conservation of species, ecological communities, and natural areas. An ESA Committee for the Preservation of Natural Areas was founded and chaired by Victor Shelford, ESA's first president, in 1917. Other ESA members saw such forthright advocacy as inappropriate for a scientific organization. In March 1946 the conservation forces formed the Ecologist's Union (predecessor to The Nature Conservancy) to channel and organize their conservation activity (Gross 2001; Callicott 2008). Leopold was not directly involved at first, and was only vaguely aware of the growing movement within the ESA. As the newly installed president, he was soon brought up to speed. Although he was initially hesitant about the Ecologist's Union's strategy, he expressed support for its aims. In March 1947 he wrote to Dreyer, "We simply cannot call ourselves ecologists and be indifferent to the slaughter of the biota now becoming world wide." Later that year he joined the Ecologist's Union as a dues-paying member.

During his year of service as ESA president, Leopold returned to his work on the evolving collection of essays that would become *A Sand County Almanac*, but that he was then calling "Great Possessions" (Meine 1999). The manuscript had already been rejected three times by prospective publishers. In the summer of 1947 he drafted a foreword, reorganized the volume's contents, and compiled its capstone essay "The Land Ethic." His post-war misgivings about the course of science and industry came to the foreground as he reworked the manuscript. In "The Land Ethic" he drew a sharp distinction between "man the conqueror *versus* man the biotic citizen; science the sharpener of his sword *versus* science the search-light on his universe; land the slave and servant *versus* land the collective organism" (Leopold 1949: 223). In the draft foreword he reiterated the point: "Science is, or should be, much more than a lever for easier livings. Scientific discovery is nutriment for our sense of wonder, a much more important matter than thicker steaks or bigger bathtubs" (Leopold 1987: 281–282). And he gave memorable expression to the conscientious ecologist's dilemma—an echo, quite likely, of the contemporaneous tensions within the ESA:

One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be the doctor who sees the marks of death in a community that believes itself well and does not want to be told otherwise. (Leopold 1987: 286)

On September 13, having completed his summer's work on the book manuscript, and just before traveling to the Mayo Clinic for his surgical procedure, Leopold wrote to Dreyer, "Is anything expected of me in the way of a presidential address? If so,

I have several chapters in my book which might be suitable.” Clearly Leopold saw his address as an important opportunity to air his thoughts, and he made a direct connection to his literary work-in-progress. Immediately after the December meeting in Chicago he wrote again to Dreyer, “I have already started work on my presidential address because I can see very clearly from the Chicago sessions the need for emphasizing certain ideas.”

What those ideas were, he did not specify. However, we may presume that he would have addressed the issues that were roiling the broader conservation community, that were rousing dissent and discussion within the ESA, and that were surfacing in his recent writing and speeches: the accelerating assaults on land health and biotic diversity; the emerging global conversation on development and conservation; the changing role, priorities, and system of scientific research; the moral and civic responsibilities of the scientist, especially ecologists; the growing estrangement of science and ethics; and the harnessing of science to heedless economic expansion.

In another key statement from this period, “The Ecological Conscience,” delivered on June 27, 1947 to the Conservation Committee of the Garden Club of America, Leopold spoke to an audience outside his professional scientific circle. On this occasion he emphasized the ethical aspect of his converging concerns:

No important change in human conduct is ever accomplished without an internal change in our intellectual emphases, our loyalties, our affections, and our convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that philosophy, ethics, and religion have not yet heard of it.

I need a short name for what is lacking; I call it the ecological conscience. Ecology is the science of communities, and the ecological conscience is therefore the ethics of community life. (Leopold 1991c: 339–340)

“The Ecological Conscience” set the stage for Leopold’s composition of “The Land Ethic” in the crucial weeks that followed. He incorporated significant portions of the former into the latter. For more than a quarter century Leopold had explored—recurrently, if sporadically—the connections between ethics and ecology, policy and action. In “The Land Ethic” he achieved his most complete and, as fate would have it, his final synthesis. One week before Leopold’s death on April 21, 1948, Oxford University Press accepted his book manuscript. *A Sand County Almanac* was on its way to publication.

Left hanging in the air was the question of Leopold’s intended ESA address. Joseph Hickey, Leopold’s close colleague (and former graduate student) at the University of Wisconsin, recommended to the ESA “a superb manuscript which would lend itself wonderfully to use as the past president’s address.” That manuscript was “The Land Ethic.” Hickey wrote: “In content this paper is a searching examination of the conservation movement both past and present. The approach is historical, the outlook ecological, the findings philosophical. It is my conviction that as an address, it will more than satisfy Professor Leopold’s obligation to the Society.” The new ESA secretary, William Castle, replied, “From your description I believe it will serve admirably for the occasion.” Leopold’s successor as ESA president, his friend Paul Sears, read the “The Land Ethic” in his stead (Burgess 2010).

## 14.2 Post-war Voices: “Thoughtful people are trying to understand our place in Nature...”

Aldo Leopold was not alone in seeing the need to connect science, ethics, aesthetics, economy, public policy, and conservation practice. At least some of his contemporaries saw the same need, and voiced similar sentiments. The books by Vogt and Osborn became bestsellers. Other ecologists tested the deeper ethical waters. Paul Errington (1947: 267) stated that “I probably would not want to remain in the profession... [i]f I did not feel that I might be working for something more important than my own or any other person’s selfish advantage.” Sears (1950: 94) suggested, “It may be that we shall presently begin to use science in a new and worthier way, to give us our bearings, to help us understand the ecology of our own species. To this end we must weave together all that we know of ourselves and of the physical world.” A few years later, Olaus Murie (1954: 289) remarked, “Thoughtful people are trying to understand our place in Nature, trying to build a proper social fabric, groping for a code of ethics toward each other and toward nature. The current controversies in the diverse field of conservation are an expression of this ethical struggle.” Although conservation tended to attract students fascinated by the non-human living world, those in the field found it increasingly necessary to address the reality of human social dilemmas.

Beyond ecology and the sciences, contemporary ethicists, writers, and cultural critics were circling around the same point of convergence. Out of the war experience, Hannah Arendt and Hans Jonas would examine the cultural forces of dehumanization and alienation from nature for insights into the rise of twentieth century totalitarianism (Whiteside 1998; Donnelley 1995). In the years after the war, thinkers as diverse as John Dewey, Albert Schweitzer, Jacques Ellul, Joseph Wood Krutch, Loren Eiseley, and Thomas Merton wrestled with the broad ethical and theological issues involving nature, science, technology, and the human condition. The advent of nuclear weaponry and technology in particular raised ultimate questions about the fate of nature and humanity in a world where science was unmoored from ethics.

Of all the multidisciplinary voices of this period, Lewis Mumford stands out for the breadth and coherence of his integrated analysis of ethics, culture, and ecological insight. Best known for his work as a literary and architectural critic, he turned increasingly in the post-war years toward wide-ranging studies of intellectual history and human cultural development. In *The Conduct of Life* (1951: 12), he wrote, “So habitually have our minds been committed to the specialized, the fragmentary, the particular, and so uncommon is the habit of viewing life as a dynamic inter-related system, that we cannot on our own premises recognize when civilization as a whole is in danger; nor can we readily accept the notion that no part of it will be safe or sound until the whole is reorganized.”

Mumford was an insightful scholar of early conservation thought, and attuned as well to the most current findings ecology and evolutionary biology. He was thus uniquely qualified to help lead the landmark 1955 international symposium, *Man’s Role in Changing the Face of the Earth*—an ambitious high point in the post-war

merging of disciplinary knowledge and perspectives. The symposium brought together (in Princeton, New Jersey) seventy five of the leading natural and social scientists of the day to examine the role of “Man, the ecological dominant on the planet” and “to understand what has happened and is happening to the earth under man’s impress” (Thomas 1956: xxxvii).

In his summary remarks at the symposium, Mumford found himself at the same end-point that Leopold had come to in *A Sand County Almanac*: the elaboration of an ecologically informed ethic. Mumford’s was a very different voice, but he was delivering much the same message:

As the dominant biological species, man now has a special responsibility to his fellow creatures as well as to himself. Will he turn the cosmic energies at his disposal to higher ends, or will he, willfully and carelessly, exterminate life and bring his own existence to a premature end? ...Not power but power directed by love into the forms of beauty and truth is what we need for our further development. Only when love takes the lead will the earth, and life on earth, be safe again. And not until then. (Thomas 1956: 1146, 1152)

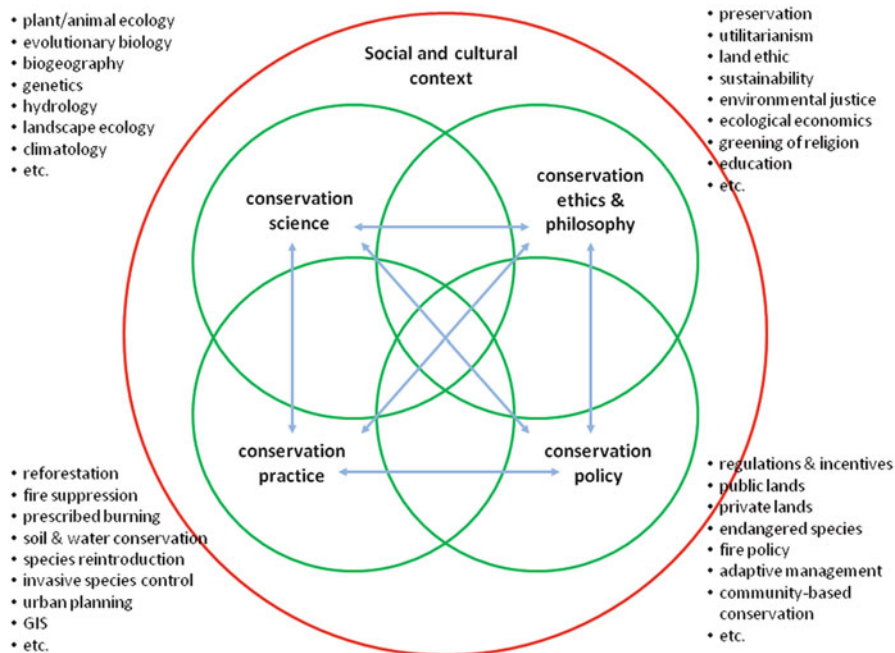
In retrospect, we can see Mumford’s statement, and the entire symposium (and published volume) that it concluded, as a consummate expression of the times. The post-war decade was a critical period of cross-disciplinary ferment, an almost desperate response to the disorientation and anxiety over the human prospect in the long shadow of World War II. The great irony is that, even as the moment was flowering, the ecological science that helped to nurture it was itself becoming more specialized, more theoretical and mathematical, more systems-oriented and model-driven. The apparent connections to other fields were becoming less distinct and less urgent as post-war affluence and consumerism transformed the cultural context of the interdisciplinary conversation.

### 14.3 Framing the Narrative of Conservation History

The stories that I have just told are pertinent in and of themselves to the themes of this volume; but they also serve to illustrate a broader approach to understanding the ever-evolving relationship between ecology and ethics. This post-World War II moment was critical in the development of that relationship. But how can we understand it in its entire historical context? How can we fully appreciate that moment as part of a larger narrative?

We could turn to our history books, but so far even the best of those can only partially orient us. We have a number of indispensable histories of ecology and environmental ethics (e.g., McIntosh 1986; Nash 1989; Worster 1994; Egerton 2012). Yet there is no single book that one can read to learn the entire, complex story of the co-evolution of ecology, conservation, and environmental thought, from ancient origins to the present, from the local to the global scale. To tell that story fully, one would need to know and integrate multiple fields of knowledge, and vast realms of detail within them. It is a large and complex task, and no single scholar has yet comprehended it.





**Fig. 14.1** A framework for understanding conservation history. The *green circles* represent four major and overlapping spheres of conservation “content”: science, philosophy, policy, and practice (examples of concepts and topics falling within these spheres are provided in the corners). *Blue arrows* indicate the dynamic and continuing flow of interactions and influences among them. All are situated within, and influenced by, the continually changing social and cultural context. All, in turn, are embedded within a still broader context of commingled human and natural systems

Lacking such a complete account, we can at least frame the narrative in a way that suggests the challenge of the task and helps to guide us in our interdisciplinary discussions. Figure 14.1 attempts to show, in simplified form, one way of understanding the dynamism of ecology and conservation history. There is no single point of entry into that complex narrative. For present purposes, let us begin in the upper left, in the realm of conservation science. (I use the term *conservation* here. Other terms might be effectively substituted here, e.g. *environmental science*, or perhaps *sustainability science*.)

Consider the many scientific disciplines relevant to conservation, from geology and hydrology to ecology and climatology. Each of the disciplines listed here—and many others besides (including the social sciences)—obviously has its own rich intellectual history. Thanks to our colleagues in the history of science and environmental history, we have an ever-expanding bookshelf on the history of the sciences, and our understanding of their development continues to evolve.

But conservation (or sustainability, or environmental stewardship) is not a matter of science alone. Conservation *science* intersects with conservation *practice*: the application of that knowledge in ecosystems, landscapes, and communities. In the



realm of conservation practice, we can identify a multitude of particular activities, techniques, and technologies—everything from historic reforestation efforts to invasive species control, from soil conservation methods to hydraulic engineering, from maps to the most recent advances in GIS technology. These tools and practices have their own rich histories, their complex pathways of origin, development, deployment, and adaptation.

But conservation is not only a matter of science and practice. It includes as well a rich narrative thread of conservation *ethics* and *philosophy*, of shifting concepts, competing schools of thought, and new areas of convergence. This humanistic dimension of conservation is also dauntingly varied, including fields ranging from literature to theology to environmental history and environmental ethics. And each of these, too, has a complex history of emergence and acceptance, innovation and experimentation, retrenchment and revolution.

But conservation is not only a matter of science, practice, and philosophy. The sphere of conservation *policy* includes all the varied ways in which we seek to govern ourselves in our interactions with one another and the natural world. Within the realm of policy we might include, for example, such endeavors as wildlife law, economics, and land use policy—all of which, again, have their own rich histories.

These spheres—what we *know* from science, what we *do* in practice, what we *value* and *believe* though our philosophies, and how we *govern* ourselves—are meant to be illustrative, not exclusive; we could and no doubt should add other circles to this schema. What is most interesting, and difficult, in grasping the large story of conservation history is the complex and dynamic interaction of these realms. The ultimate, comprehensive hypertext of conservation history would somehow need to examine all the complex connections, synergies, influences, and feedback loops at work over time. A new piece of scientific information, for example, may suggest a new ethical insight... which inspires a new management practice on the ground... which might require or suggest a change in policy... which might in turn lead to a new ethical insight... which might suggest a new research question... which might challenge an existing policy... etc...etc... *in perpetuum*. Change in conservation ricochets around and around and around as history unfolds. All of this occurs, of course, within a complex and ever-changing social and cultural context. And all of that occurs within the phenomenal world itself, the ever-changing and commingled natural and social reality that includes all of the above.

Aldo Leopold stands out in our history as one who worked effectively in all these realms, made innovations within them, made connections between them, and constantly evolved intellectually and emotionally in the process. One can track him moving fluidly among these circles, always in a critical and creative manner. Leopold thus provides a unique transect across the history of twentieth century conservation science, policy, philosophy, and practice. Within this framework, we can appreciate more fully the significance of Leopold's composition of "The Land Ethic" in 1947, and its posthumous presentation to the Ecological Society of America in 1948. Drawing upon his interdisciplinary knowledge and years of field observation and professional endeavor, he was attempting to fuse large spheres in human knowledge, in the human experience, and in the changing relationship of humans and nature.

## 14.4 Seeking Systemic Solutions to Systems Problems

The relationship between ecological science and environmental philosophy and ethics has developed considerably since Leopold advanced the dialogue in 1947. Certainly there are scientists who devote little time to considering the philosophical and ethical implications of their research; few are trained to do so, and it seems that few are encouraged or rewarded for doing so. And certainly there are philosophers and ethicists unaware of (and perhaps uninterested in) the fine details of the history of ecology or findings from the current cutting edge of research. However, in the environmental arena, the exclusively disciplinary scholar is becoming an ever more elusive creature. Work across the disciplinary frontiers is no longer rare, surprising, or suspect. Emerging interdisciplinary fields—conservation biology, restoration ecology, landscape ecology, agroecology, ecological economics, conservation psychology, evolutionary psychology—are aware of, if not explicit in recognizing, their inherent ethical dimensions. Conversely, over the last generation environmental historians, ethicists, and philosophers have absorbed the concepts, vocabulary, methodologies, and organizing principles of ecology, evolutionary biology, and the earth sciences. Scientists and ethicists alike regularly consider and critique the lessons from—and the implications for—environmental policy and conservation practice. The flow of influence among and between these interacting spheres of knowledge and experience is robust.

As the cross-flow of ideas and information has increased and intensified since 1947 (or, more expansively, since publication of Marsh's *Man and Nature* in 1864, or Darwin's *On the Origin of Species* in 1859, or von Humboldt's *Cosmos* in 1845), the stakes have increased socially, politically, and environmentally. In the decades since Leopold promulgated "The Land Ethic," the pace of anthropogenic environmental change has quickened, the scope broadened, the scale expanded. Biodiversity loss, pollution and overexploitation of soils and fresh waters, ocean degradation, and climate disruption are pervasive forces. It is precisely because these forces are no longer avoidable that the conversation between ecology and ethics has intensified—as has the willful discounting, denying, and opposing of its implications. Interdisciplinary discussion almost by definition challenges the status quo, and it is always easier (and generally more lucrative) to keep the conversation narrow, and to stay within the comfortable confines of one's special area of expertise. However, as Leopold and others have recognized, there is no refuge behind fortified disciplinary boundaries. "Too much safety," as Leopold wrote in another context, "seems to yield only danger in the long run" (Leopold 1949: 133).

We live, now in an Age of Consequences, when the varied social, economic, and environmental challenges we face are cumulative, convergent, and synergistic. Our local issues are invariably tied to global realities; our short-term concerns reflect long-term trends reaching back into the distant past and forward into a distant future. Our array of particular problems cannot be dealt with piecemeal; they are systemic, and thus require systemic solutions. If we are to avoid the worst-case social and environmental scenarios, solutions to one problem must simultaneously contribute to the

solution of other problems. The demands of problem-solving in the Age of Consequences require that ecology and ethics be in close and constant communication—with each other, and with any and all other fields deemed relevant to the issue at hand.

Nisbet et al. (2010: 331) come to much the same conclusion when they write, “Preventing the worst effects of current environmental threats may well require the greatest exercise of the human imagination the world has ever seen. We challenge readers to put their minds together to bridge the great wellsprings of human understanding—including the natural and social sciences, philosophy, religion, and the creative arts—to, re-imagine, how we live on Earth.” Leopold, Sears, Errington, Murie, Vogt, Arendt, Jonas, Mumford, and many others besides, remind us that we are not the first to take up this exercise; that we build upon the creative efforts of others who were compelled, and inspired, to bridge disciplines and forge connections.

**Acknowledgments** For their helpful insights and suggestions on this essay, I thank my colleagues J. Baird Callicott, Bruce Jennings, Estella Leopold, and Stan Temple, as well as the many attendees at the 2011 Cary Institute Conference, and the support provided by the National Science Foundation (SES-1058163, DEB -1057538) and the Institute of Ecology and Biodiversity ( ICM-P05, and CONICYT-FB 023).

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