

## Thinking Like a Trout Stream

**Julie Dunlap**, University of Maryland Global Campus  
Julie.dunlap@faculty.umgc.edu

**Abstract:** Aldo Leopold’s classic essay, “Thinking Like a Mountain,” has been a touchstone of environmental ethics and sustainability education for over seventy years and continues to challenge and inspire wildlife ecology undergraduate students, and many more. But has it lost some power in the face of mounting evidence of accelerating damage and growing threats to the natural world, threatening biodiversity and human society on a global scale? Students and others now need another Leopold story, one that encapsulates an environmental ethic with a call for urgent action, a metaphor that urges not just change, but rapid transformation.

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*Julie Dunlap, PhD, teaches wildlife ecology for the University of Maryland Global Campus and serves on the board of Audubon Maryland-DC. She is co-editor of *Coming of Age at the End of Nature: A Generation Faces Living on a Changed Planet* (Trinity University Press), and writes often about biodiversity loss and coping with the climate crisis. [Julie.dunlap@faculty.umgc.edu](mailto:Julie.dunlap@faculty.umgc.edu)*

*Resources for teaching about Aldo Leopold’s land ethic are available online from the Aldo Leopold Foundation: <https://www.aldoleopold.org/teach-learn/digital-resources/>*

Many grandparents of my wildlife ecology students were not yet born in 1947, when Aldo Leopold wrote a eulogy for an extinct bird. Semester after semester, my class samples Leopold's eloquence in "On a Monument to the Pigeon," as he revives in words not simply an avian species but the "onrushing phalanx of victorious birds" that once roared across North America's trackless skies.<sup>1</sup> But today's undergraduates, mostly members of Generation Z, have been reared to accept such losses, beginning with the plush triceratops they once toted along to preschool. They seem to regret the quelling of a "biological storm" but are rarely catalyzed to action.<sup>2</sup> They are touched by the silenced voices, perhaps aggrieved, but not transformed.

If I assign instead another piece from *A Sand County Almanac*, the reaction contrast is palpable. "A deep chesty bawl echoes from rimrock to rimrock," and what seeking undergraduate, however overscheduled and underslept, could resist following that sound to its wild origins?<sup>3</sup> In less than 900 words, Leopold lures us into "Thinking Like a Mountain" with friendship (shared lunch above a river), mystery (what is that creature "breast awash in white water"?), and adventure (rapid-fire shots down a steep ravine in Arizona Territory, 1909).<sup>4</sup> For my students, generations beyond a culture of farmers defensive of their stock, or hunters incensed by game depredations, surprise at encountering a wolf family quickly turns to shock, when a tail-wagging melee of cubs becomes the target. Then tragedy turns to redemption, as the dying mother wolf's green eyes share a message with one hunter. From her, Leopold learns there is more to a forest than today's men and deer, so much more "that only a mountain has lived long enough to listen objectively to the howl of a wolf."<sup>5</sup>

Part of the essay's appeal lies in the epiphany itself. What sufferer through lectures in carrying capacity and trophic cascades has not yearned for an insight that supplants darkness with light? That someone with ecological knowledge and experience as rich as Leopold's could make such a leap amplifies his rhetorical magic, sparking hope that self and others, many others, can change too. In a book replete with human-driven loss—vanished pigeons, worn-out soils, diked and drained marshes, prairies supplanted by cheatgrass—the mountain's story offers more than solace for the consequences of our flaws. If we expand our understanding, learn to encompass a time-deep view of place and community, there is a better trail ahead. "It gives me hope," wrote a student last fall, "that maybe we're not doomed."

Yet the mountain metaphor is not working for this professor like it used to. As evidence mounts of the pace of loss besetting the Anthropocene, a granite peak feels a bit stolid and unresponsive. Especially in the midst of a pandemic, with origins entangled in the wildlife trade, Leopold's mountain conjures for me a pre-Darwinian concept of wild nature in dynamic harmony, eternal if walled off from human interference. Leopold, of course, knew better, from childhood lessons afield with his father, and in classrooms at Yale's Sheffield School of Science.<sup>6</sup> Professors at the Yale Forest School taught young foresters to apply evolutionary theory to interpret complex physical and biological interconnections within woodlands that include *Homo sapiens*, emphasizing the eons required to develop those relationships, and the many influences, including human, that could spark change over geological time. Decades more of observation

and insight matured Leopold's grasp of the ecological, energetic, and moral implications of human-nature interdependencies forged through deep history. Writing nearly a century after *On the Origin of Species* appeared, Leopold grieved not just for vanished birds but for human blindness to the relationship costs of their accelerating despoilations. "This new knowledge should have given us, by this time, a sense of kinship with fellow-creatures; a wish to live and let live; a sense of wonder over the magnitude and duration of the biotic enterprise."<sup>7</sup> It is not just the wolf that Leopold laments, but the loss of all that heard, or could ever hear, her cry.

A typical college semester can hardly replicate the process of Leopold's lifelong ecological education, still less instill full comprehension of his mountain-wolf-human allegory. Besides, slow change over time is a classic stumbling block for biology students. Whose mind isn't boggled by the gradual emergence of cells, organs, and species through long, long ages of natural selection? Timelines help, interlaced with fossil evidence of life's endless inventiveness, and belie the myths of biological constancy or linear progress. With more time to learn geology, perhaps, my wildlife students could fathom our vulnerabilities in those rocks.

But such static specimens strain to animate the rapidity of biological unraveling. Raised in acquiescence that trilobites and megasharks persist only in museums, many students unsurprisingly dismiss concerns over poison dart frogs, Piping Plovers, and Indiana Bats. "Extinction is natural," is a frequent discussion opine. My announcement that climate change has eradicated its first mammal, an island-dwelling Australian rodent, earned not one post in our online forum.

In recent course sessions, I have sought to distinguish natural extinctions (e.g., *Tyrannosaurus rex*) from human-forced (e.g., *Chelonoidis abingdonii*). Increasingly, my task is to vivify not just human culpability, as climate change drivers, invasive species purveyors, and more, but especially the calamity's accelerating rate, over 1,000 times background compared with fossil records.<sup>8</sup> Sometimes called a "twin crisis" with global warming, biodiversity destruction to E.O. Wilson is "the folly our descendants are least likely to forgive us."<sup>9</sup> Assigning readings from Kolbert's *The Sixth Extinction* helps; the threat at least has a name. Beginning in spring 2020, graphs of Covid-19 cases against time dramatized exponential growth with a personal twist. But accelerating biodiversity loss still lacks a transformative tale or image as piercing as the old wolf's eyes.

So I cast about for tales from other environmental leaders. John Muir's favorite after-dinner yarn told of a cross-glacier trek in Alaska, 1880, with a bothersome little dog. Stickeen's joy at surviving one perilous crevasse matched Muir's own, and an essay in his honor became an abiding reminder that all creatures love life and deserve their share of it.<sup>10</sup> But are undergraduates today open to Muir's finer thoughts, when recent revelations of his anti-Black and Native American writings have led to self-recriminations at the Sierra Club? Co-founded by Muir for middle- and upper-class mountaineers, the club's origins in white privilege fostered an ethos that wild nature is unwelcoming to communities of color, and that Indigenous people no longer belong in their ancestral homelands.<sup>11</sup>

Muir's more pragmatic contemporary, Gifford Pinchot, had no such romantic vision of pristine wilderness, too sacred for human touch. As the first chief of the US Forest Service, Pinchot advocated multiple uses of the nation's vast forested domain, from corporate timbering and mining, to cattle ranching and simple homesteading. Though silent on Native American rights or access, Pinchot insisted national forest boundaries never locked out users, but assured fair natural resource distribution across classes, with policies favoring poor settlers over wealthy special interests. In a national forest, Pinchot insisted, "the small man with a home. . . always gets the first chance."<sup>12</sup> Despite his clarifying federal priorities, tangled factions great and small continued to battle over Western lumber, grass, minerals, and water resources. In February 1907 Pinchot rode horseback across Washington, D.C.'s Rock Creek Park, grappling for a workable solution. At last, an epiphany: all natural resources interconnect, and must be managed conjointly to fulfill our responsibilities to coming generations. As Pinchot put it to his boss, Theodore Roosevelt, resource decisions must seek "the greatest good, for the greatest number, for the longest run."<sup>13</sup>

Note that Pinchot's conservation ethic measures "greatest good" for present and future generations in terms of human utility; his foresters were charged with protecting game animals only, as food and recreational resources of no intrinsic value, now or ever. Speciesism, like racism or classism, traps us within paradigms that encourage exploitation, a surprising legacy of much traditional environmental work.<sup>14</sup> To escape exclusionary implications of old ideas, my students need a philosophy that is both non-hierarchical, and non-human centric. Another conservation icon came to mind, Rachel Carson, whose eloquence managed to reject anthropocentric ethics while retaining human duties to the natural world. Her revelation came in 1958, from a friend's letter about songbirds dying after aerial pesticide spraying. Setting aside a planned children's book and more time knee-deep in Maine's teeming tide pools, Carson bent over her typewriter for five years, between chemotherapy treatments, racing to complete *Silent Spring*. When a friend gently urged giving up to prolong her life, she explained, "Knowing what I do, there would be no future peace for me if I kept silent."<sup>15</sup>

I've tried Carson's story, too, with my students. Maybe for them it lacks adventure, or perhaps too many hours hunched over keyboards, walled off from sun and salt air, blunt their compassion for her loving sacrifice. Still, Carson's eco-centrism and devotion, Muir's expanding circle of compassion, and Pinchot's extension of ethics to our posterity each include elements of this ecology professor's *desideratum*. Their views' best aspects, though, taken together do not quite sate my quest for an indelible modern myth, a transformational call to arms, declaring extinction today is not a faint flickering out, but a human-triggered avalanche racing toward darkness.

In quieter moments, I ask myself: Is onrushing darkness the lesson to bequeath aspiring ecologists? A literature review in *Biological Conservation* warns that an entire class of organisms—the Insecta—may be collapsing.<sup>16</sup> The most abundant animals on Earth, insect species are disappearing faster than vertebrates by a factor of two. Over half of all butterfly and moth

species, 50% of grasshoppers and crickets, and 40% of bees face extinction. The authors' conclusion is dire: "It is evident that we are witnessing the largest extinction event on Earth since the late Permian and Cretaceous periods." Yet even their startling statistics underplay the reality, for they report an average insect biomass decline in linear terms, of 2.5% per year over 40 years. In fact, the pace of change is accelerating. Naturalists in Germany find that local nature reserves are missing 75% of their insect fauna, and entomologist Bradford Lister, studying ground insects in a Puerto Rican rainforest, reports 98% are gone. Decimation of these abundant and ubiquitous animals—beetles, flies, skippers, lightning bugs, ants, termites, and more—threatens the entire food web, and bespeaks a tightening spiral of destruction that could tug down birds, reptiles, fish—all life, including us. "We are engineering our own devastation," says David Wallace-Wells, author of *The Uninhabitable Earth*, "I would like people to be scared by what is possible because I am scared."<sup>17</sup>

To counter his despair, Aldo Leopold planted pines till they grew "rank upon rank," guarding his Sand County farm into a future he would not live to see.<sup>18</sup> I turned back to his *Almanac* for a literary bulwark, for myself and my students. Rarely writing directly about insects, Leopold was a poet about one of their voracious predators, trout. Reared to learn the ways of wild things, he knew the best places to find his favored fish, whether for catching or observing: fast, cold streams, with bounteous bugs. A childhood photo shows young Aldo hoisting a loaded stringer with a zeal that would propel him to Wisconsin's backcountry with friends, to the Boundary Waters with his own sons, and back to the wild Southwest.

In 1936, twin passions for deer and turkey hunting drew Leopold to Mexico's Sierra Madre Occidental. In those mountains, he discovered land and rivers in aboriginal health, with "roistering flocks" of Thick-billed Parrots, reminiscent of Passenger Pigeons in exuberance if not in number.<sup>19</sup> The integrity of the biota was evident in predator-prey relationships thriving before and after Apache families sojourned there, and the stability revealed in the clean, rapid waters and 300-year-old pines. Beauty was everywhere, in the whispering golden grasses, the whistling quail and raucous Guacamaja, and the wolf's echoing howl. Collectively, to Leopold, the wild voices of the river comprised its song. For those who take time to hear it, he said, a wild river's music is "—a vast pulsing harmony—its score inscribed on a thousand hills, its notes the lives and deaths of plants and animals, its rhythms spanning the seconds and the centuries."<sup>20</sup>

Leopold had heard other rivers with lesser songs, depleted by absent voices and jarred by intrusive ones. But on the Gavilan, where the human tread over centuries had been light, the trout still rose after stoneflies, and otter still chased after trout. All the instruments in the orchestra were present, and playing in tune. The ecstatic portrayal of that water music reveals an epiphany on the Rio Gavilan as meaningful to Leopold as the wolf's eyes in the White Mountains. My students, I think, would resonate with his soundscape if I assigned that essay, and compare it with the cacophony from the clogged and sluggish creek nearest home. In most settings, not just single instruments will be missing, but whole sections of players. Surely that arthymic disharmony is not the future we seek.

Yet is the aboriginal Rio Gavilan the precise analogy for today's young adults? Reared as indoor children, in fact scions of indoor families, their outside adventures encompassed manicured yards and overtaxed parks, bisected by more streets than streams. More time with the *Almanac* re-introduced me next to a less acclaimed chapter, a muted portrait of a small, brushy creek in cut-over, farmed-out Wisconsin. "Alder Fork" begins in disappointment. A road-wearied summer fishing party confronts a low, still, and tepid creek, yielding not trout but chub. Like all fly-fishers since Izaak Walton, the friends knew their favored quarry "feeds clean and purely, in the swiftest streams, and on the hardest gravel."<sup>21</sup> Such awareness moved some in Leopold's party to pack up their tackle and repair to their cars.

But Leopold could imagine a better place, where silver fins yet glinted near spring-fed headwaters, bubbly and cold on a steaming hot day. He knew not just the primordial integrity of the Gavilan, but the resilience of an erosion-choked brook to flush itself over time, or a seemingly trout-less rivulet to conceal a haven or two. Sometimes, trout streams need to retreat, to their fertile origins to tumble and frolic, to dig deeper into the gravel. Other times, they need to turn, even twist, and carve a new, shadier path—maybe with the help of a few tree-planting human neighbors. "What would a self-respecting trout do in such weather?" Leopold asked, then answered. "Just what we did: go up."<sup>22</sup> There he found more of what we need to cope with a rushing onslaught of unacceptable change. Where the stream still tumbled and hurried were deep, alder-shaded pools where trout, mayflies—and wildness—persisted.

In Leopold's time, before the last western black rhinoceros perished from this Earth and the IPCC allotted twelve (now nine) years for climate action to prevent catastrophe, ecologists could nod like contented bait fishermen at one measured definition of conservation: "the slow and laborious unfolding of a new relationship between people and the land."<sup>23</sup> In 1909, a hunter sought safety for his deer by shooting out the wolves, and only the mountain saw his error. Today, only a so-called radical few, a writer here and there, some New Age homesteaders, a teenaged Swedish activist, and a growing Extinction Rebellion, demonstrate conviction commensurate with the emergency roaring down upon us. The rest of us too often study and analyze, teach and preach. "If the professor is able to classify each instrument before it is broken, he is well content," Leopold critiqued my profession in the 1930s, for "the construction of instruments is the domain of science, while the detection of harmony is the domain of poets."<sup>24</sup> As such, we ignore the trout stream, surging from the ground, cooled and filtered by the Earth, as it objectively observes the folly of our ponderous pace.

"No important change in ethics was ever accomplished," wrote Leopold, "without an internal change in our intellectual emphasis, loyalties, affections, and convictions."<sup>25</sup> Integrity, stability, and beauty endure as keystones in our environmental ethics, but we need a profound, internal transformation, free of hierarchies and exclusionary limitations, to propel the urgent action that is commensurate with our plight. My students and I will read "Alder Fork" in coming semesters, and act on Leopold's life story, tramping upstream where each of us lives. Masked and separated, we will travel as far as it takes, to seek out—then restore and sustain—the wild cold pools that remain. Along the way, the tune we hear will sweeten, then intertwine. Most

important, the tempo will hasten. For me, that's the indelible message in a trout stream's song: hurry.



<sup>1</sup> Leopold, Aldo. 1987. *A Sand County Almanac*. Oxford University Press, p. 109.

<sup>2</sup> ASCA, p. 111.

<sup>3</sup> ASCA, p. 129.

<sup>4</sup> ASCA, p. 130.

<sup>5</sup> ASCA, p. 129.

<sup>6</sup> Meine, Curt. 1988. *Aldo Leopold: His Life and Work*. University of Wisconsin Press, pp. 380-382.

<sup>7</sup> ASCA, p. 109.

<sup>8</sup> Kolbert, Elizabeth. 2014. *The Sixth Extinction: An Unnatural History*. Henry Holt.

<sup>9</sup> Wilson, Edward O. 1984. *Biophilia*. Harvard University Press, p. 121.

<sup>10</sup> Muir, John. 1997. *Nature Writings*. Library of America, p. 267.

<sup>11</sup> Brune, Michael. 2020. *Pulling Down Our Monuments*. Sierra Club, July 22. <https://www.sierraclub.org/michael-brune/2020/07/john-muir-early-history-sierra-club>

<sup>12</sup> Pinchot, Gifford. 1907. *The Use of the National Forests*. US Department of Agriculture, p. 13.

<sup>13</sup> Miller, Char. 2001 *Gifford Pinchot and the Making of Modern Environmentalism*. Island Press, p. 155.

<sup>14</sup> Kashwen, Prakash. 2020. American environmentalism's racist roots have shaped global thinking about conservation. *The Conversation*. <https://theconversation.com/american-environmentalisms-racist-roots-have-shaped-global-thinking-about-conservation-143783>

**15** Carson, Rachel. 1997. *Always, Rachel: The Letters of Rachel Carson and Dorothy Freeman, 1952-1964*. Beacon Press, p. 259.

**16** Francisco Sanchez-Bavo and Kris A. G. Wyckhuys. 2019. Worldwide decline of the entomofauna: A review of its drivers *Biological Conservation* Volume 232: 8-27. <https://doi.org/10.1016/j.biocon.2019.01.020>

<sup>17</sup> Watts, Jonathan. 2019. David Wallace-Wells on Climate. *The Guardian*. February 3.

<sup>18</sup> ASCA, p. 87.

<sup>19</sup> ASCA, p. 138.

<sup>20</sup> ASCA, p. 149.

<sup>21</sup> Walton, Izaak. 2003. *The Complete Angler*. Renaissance Editions University of Oregon, p. 56.

<sup>22</sup> ASCA, p. 37.

<sup>23</sup> Leopold, Aldo. "Wisconsin Wildlife Chronology," *Wisconsin Conservation Bulletin* 5, no. 11 (1940): 6.

<sup>24</sup> ASCA, p. 153.

<sup>25</sup> ASCA, pp. 209-210.