



Thinking like a mountain in the age of AI

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Front Ecol Environ 2026; 24(3): e70036, doi:[10.1002/fee.70036](https://doi.org/10.1002/fee.70036)

Generative artificial intelligence (GenAI) has nearly completed its infiltration within the tech spaces in our lives. Nowadays, you can seldom find an app on your smartphone or a piece of software on your computer that is not “AI-enabled”, offering shortcuts and summaries to save us time. Save me time, you say? Sign me up! As modern scientists, we find our time burdened with many tasks we’d like to avoid, which perhaps AI could take off our plates. That overdue annual report? Check. That cover letter to the Editor? Sure. Throughout history, advances in technology have created efficiencies in science. Why should GenAI be any different? After all, I’d wager that no one still ventures on foot into the stacks of our respective university libraries to find hard copies of a journal to check out or photocopy. Just type keywords into your browser’s search bar and (with the proper access) have a digital version of the desired article saved to your computer in seconds. Technology tends to make our lives easier and our work more efficient.

GenAI is different because it mimics one of our most deeply human characteristics: our ability to think about complex ideas. Until recently, any journal article you read would represent the outcome of months or years of deep, challenging thought by the humans on the other side of the page, painstakingly transcribed into coherent prose for your consumption. No more. Now, any prospective author can enter a prompt in one of the many commercial large language models (LLMs) such as OpenAI’s ChatGPT, yielding a series of words and paragraphs that resemble what used to only be possible with substantial human intellectual labor. At this point some readers might push back, arguing “sure, but the models’ ideas and writing are not actually good”. I agree, but I also expect these models will improve, while our ability to detect GenAI’s digital fingerprints will diminish, over time. A day will come when there are no longer obvious “tells” that something has been written with GenAI.

What do we lose by outsourcing our writing to GenAI? Tragically, much. I found writing to be one of the most frustrating and difficult parts of my graduate training at the University of Wisconsin-Madison. I remember vividly the first round of written feedback I received from my graduate advisor—pages upon pages almost entirely marked in red tracked changes. And it was well-deserved: my writing was bad! But over many months and years, I kept writing, and I learned not only how to write better, but also how to think. I’ve realized that now, writing is how I think best: often, my thoughts only crystallize once I try to put words on the page and then revise those words repeatedly. My own struggles to write effectively provided the necessary

friction to rewire the way I thought about ecological concepts, about how to present arguments logically, and about how to draw connections between disparate ideas or fields—all of which have enriched my intellectual life as well as helped me establish myself as a scientist in the field. Giving away that opportunity—to think, reflect, and grow as a scientist—to GenAI is, to me, unconscionable. It is relinquishing our most human gift.

Yet many ecologists I know have embraced the GenAI revolution to circumvent the inefficiency and frustration of scientific writing, and I understand why. Early career scientists in particular face immense pressure to demonstrate productivity and may be tempted to sacrifice the gift of friction to bolster their CVs in the short run. In fact, early career scientists who don’t use GenAI in this way might find themselves “falling behind” others in their cohort who do. However, similar to how cheating on a test might help raise your score, GenAI use in scientific writing might help boost your metrics on Google Scholar, but at the expense of your ability to think about, distill, and convey complex ideas. There will be long-term consequences to the richness of our discipline and our ability to make important advances if we—especially those in the next generation of ecologists—accept this AI-enabled shortcut, which encourages quantity over quality.

Aldo Leopold contemplated unintended consequences and long-term thinking in his 1949 essay “Thinking Like a Mountain”, from *A Sand County almanac, and sketches here and there* (New York, NY: Oxford University Press). Reflecting on his killing of a wolf he wrote, “I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters’ paradise”. Rather than a hunter’s paradise, no wolves meant more deer, and more deer meant over-browsing and ecosystem collapse. The publish-or-perish model gives us a different form of trigger-itch, thinking that more papers will mean more science, and that less time spent agonizing over the writing process itself will be a scientist’s paradise. But like the young Leopold, we would be sorely mistaken. While science may become increasingly AI-enabled, we must guard ourselves against the ways its adoption could blunt our ability to think deeply, and lead to a shallower, and less human, scientific literature.

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