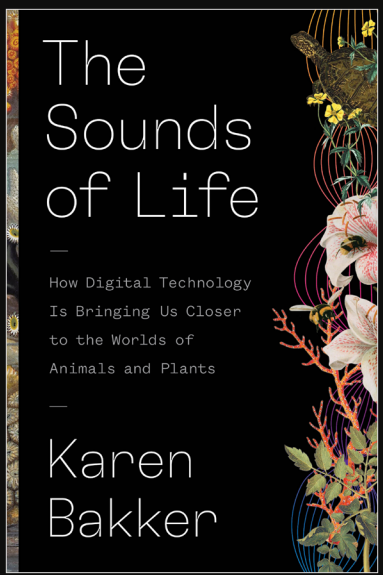
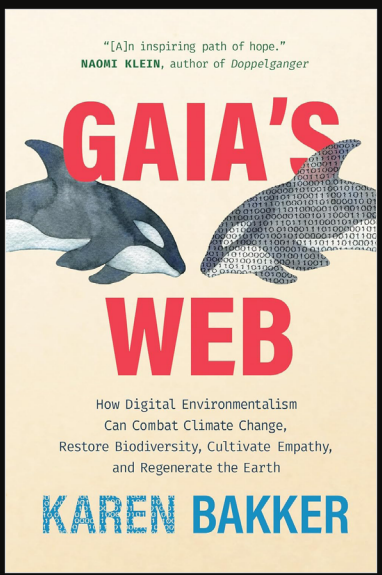
REVIEW ARTICLE

The Webs of Life

Ben De Bruyn





Review of:

Karen Bakker, *The Sounds of Life: How Digital Technology Is Bringing Us Closer to the Worlds of Animals and Plants*. Princeton, NJ: Princeton University Press, 2022. 368 pp. $33.00 (hb).

and

Karen Bakker, *Gaia's Web: How Digital Environmentalism Can Combat Climate Change, Restore Biodiversity, Cultivate Empathy, and Regenerate the Earth*. Cambridge, MA: MIT Press, 2024. vii + 288 pp. $29.95 (hb)

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Before her untimely death in 2023, the Canadian researcher Karen Bakker completed two insightful and accessible books that articulate valuable lessons for readers interested in multispecies studies and digital technology: *The Sounds of Life* (2022) and *Gaia's Web* (2024). Focusing mainly on the first book, this review contextualizes Bakker's cautiously optimistic overview of recent developments in biology, technology, and conservation. It subsequently zooms in on some of its complications and scrutinizes its treatment of Indigenous practices, eco-surveillance, and environmental hope.

As Bakker mentions at the start, *The Sounds of Life* reviews a wide range of recent scientific findings that support three claims: "many more nonhumans can make and sense sound than scientists had previously realized; many species have richer, more complex communication and social behaviors than previously understood; and these findings create new possibilities for both environmental conservation and interspecies communication" (6). By sharing observations from the fields of bio- and eco-acoustics with a wider audience, the book joins forces with publications such as Bernie Krause's *The Great Animal Orchestra* (2012) and David George Haskell's *Sounds Wild and Broken* (2022). Bakker's reflections further hint at the history of scientific playback experiments and related debates about animal music and language, as mapped in studies such as Gregory Radick's *The Simian Tongue* (2007) and Rachel Mundy's *Animal Musicalities* (2018). As a result, some of Bakker's observations may be familiar to readers with an established interest in these debates, who are likely to have encountered earlier accounts of the research of Karl von Frisch, the impactful reception of *Songs of the Humpback Whale*, or the discovery that insect vocalizations reveal temperature variations.

Yet Bakker smartly foregrounds "species previously thought to be mute or species that vocalize beyond human hearing range" (*Sounds of Life*, 216) and provides useful updates related to familiar cases by describing honeybee robots, acoustic deterrents aimed at elephants, and the overlooked whispers of whale mother–calf pairs. What is

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more, *The Sounds of Life* introduces lesser-known facts about the overlooked sonic skills of turtles, the intricate vocabulary of bats, and the recognizable sound signatures of healthy reefs—not to mention remarks about the acoustic capabilities of plants and animals without ears, like tiny coral larvae. Across the nonhuman realm, the appearance of silence turns out to be misleading, and so humans should become better listeners on this "resonant earth" (4), with the help of cutting-edge technology as well as the "deep listening" skills perfected by Indigenous communities (7). While a sceptical reader might argue that the book's sonic focus implies a bias towards creatures who vocalize, recent research on marine plant life makes a compelling case for the claim that "noise pollution is not a species-specific issue but rather an ecosystem issue" (195). In the early twenty-first century, environmentalists should hence foster a planetary form of eco-acoustic justice.

The Sounds of Life will not just appeal to scholars interested in sound, however. Bakker's argument also aligns with ongoing research on biodiversity anxiety and the importance of multispecies interactions, as articulated in books such as Robin Wall Kimmerer's *Braiding Sweetgrass* (2013) and Ursula Heise's *Imagining Extinction* (2016). Bakker underlines the value of a multispecies perspective by drawing attention to the fact that certain "plants that are pollinated by bats have developed flowers and leaves that act as echo reflectors, serving as beacons [. . .] to attract bats" (112), or that certain humans and birds have learned to cooperate and communicate when searching for honey and beeswax (151–3). While she mainly sounds a hopeful note, moreover, Bakker does not shy away from the brutal realities of climate change, habitat fragmentation, and environmental noise—all of which negatively impact biodiversity. Seeing that the exponential growth of industrial noise has a proven devastating impact on humans and nonhumans alike, even on marine creatures without ears and marine plants such as seagrass, she stresses that we must take action now. The advantage is that noise "is one of the few types of pollution we can easily mitigate" (197), as commentators such as Ed Yong have also noted.

Yet the most distinct feature of *The Sounds of Life* is not its interest in sound, biodiversity, and multispecies knots, but its refreshingly upbeat embrace of digital recording technologies and AI algorithms that are able to harvest and analyse vast quantities of acoustic data rapidly. These technologies can help us to monitor sensitive sites and endangered species in real time and also to develop forms of acoustic deterrence and acoustic enrichment that promise to defuse conflicts between human farmers and wild elephants or lure aquatic creatures back to degraded coral reefs, for example. This form of "computational sustainability" (52) is discussed more fully in *Gaia's Web*, where Bakker contends "that carefully regulated digital technologies can and should be used to advance environmentalism" (105)—enlisting a nascent "digital environmentalism" to combat the "Digital Anthropocene" (104) or "biodigital Anthropocene" (212). As the planet is rapidly changing, and creatures are forced to adapt, Bakker believes that "bioacoustics-powered conservation [. . .] offers one of the best means available to protect biodiversity" (*Sounds of Life*, 189) by helping us notice and reduce human noise, prevent poaching and unsustainable fishing, and make sure animals and humans avoid fatal encounters. *The Sounds of Life* does not only show that sound is present and meaningful in multispecies worlds, in other words, but that sound can be turned into a crucial tool for convivial coexistence with the aid of new digital tools and related devices like drones, robots, and satellites. Many environmental thinkers are critical of technology, but Bakker's work encourages us to recognize its conservation potential, not unlike Adam Fish's similarly hopeful account of drone conservation in *Oceaning* (2024).

While her plea for acoustic conviviality and digital environmentalism is helpful, certain aspects of *The Sounds of Life* raise questions. First, Bakker cites Bernie Krause's "acoustic niche hypothesis," which states that "in any given ecosystem, different species evolve to occupy unique acoustic niches" (*Sounds of Life*, 111). However, while there is some evidence for this hypothesis, the use of different frequencies by neighbouring animals might simply be the result of their divergent body sizes, as David George Haskell has observed in *Sounds Wild and Broken*. What is more, because of the need

for mutually shared communication channels among competitors, some animal soundscapes actually exhibit "sonic grouping" instead.[1] While I agree that sound deserves closer attention, and might be particularly productive in reimagining human–animal coexistence with the help of large-scale monitoring projects, Ed Yong is surely right in underlining the importance of a multisensorial perspective in *An Immense World* (2022). As humans, we need to become better listeners, but we should also learn to recognize the other needs of highly sensitive creatures impacted by assorted forms of sensory pollution. Bakker briefly hints at such complications, admittedly, most explicitly when referring to the field of "biotremology," which studies vibrations communicated via the ground or plant surfaces rather than airborne sound waves (*Sounds of Life*, 217). As such phenomena reveal, we should bear in mind various sensory stimuli when thinking about multispecies cohabitation.

An additional complication is that *The Sounds of Life* articulates both a speculative and a down-to-earth account of interspecies communication. On several occasions, the text raises the possibility that a true dialogue between humans and other creatures looms on the horizon: "humanity may be on the brink of inventing a zoological version of Google Translate" (6); "bioacoustics devices thus function like a digital translation device" (41); "although humans may never be able to think like a bat, our artificial intelligence algorithms may be able to do so" (136); "our digital devices have brought us to the brink of a new era in digitally mediated interspecies communication" (201); "if whale sounds have meanings that can be decoded, perhaps they have a form of language that can be translated; perhaps, more speculatively, their songs express oral histories that we could eventually learn from" (162). Yet as Bakker herself admits in passages that nuance maximalist claims about cross-species dictionaries eagerly promoted by tech enthusiasts, this precise form of interspecies translation is unlikely to become a reality soon, if ever. This bait-and-switch technique is unfortunate, also because she herself indicates that such fantasies are neither realistic nor particularly urgent. "It is

1 David George Haskell, *Sounds Wild and Broken: Sonic Marvels, Evolution's Creativity, and the Crisis of Sensory Extinction* (New York: Viking, 2022), 108.

important," she writes, "not to overstate the potential of digital listening" (75); we do not know "whether bats [and other creatures] even recognize us as entities to communicate with" (132). Further, "skeptics [. . .] argue that we have more immediate concerns given current catastrophic rates of biodiversity loss: by the time we figure out whether we can communicate with nonhuman species, many of them may have vanished from the Earth" (179). As the fate of the Elephant Listening Project illustrates, the real task for bioacoustics research right now might be less to construct an "elephant dictionary" and more to harness the power of sound for practical conservation purposes (51).

While these parts of her argument are thought-provoking, I am likewise sceptical about Bakker's frequent turn to Indigenous insights and hopeful embrace of AI and digital technology. We can surely agree that the time-honoured practices of Indigenous communities hold crucial lessons for scientists and citizens who have become disconnected from their physical environments. In addition, Bakker rightly notes that both scientists and conservationists have treated disadvantaged groups poorly in the past and cautions us that we "should avoid recolonizing and appropriating Indigenous knowledge" (201). She further stresses that scientific projects should collaborate with traditional ecological communities, which help us grasp that sonic data is inextricably linked to particular places, that other creatures might also have a right to data privacy, and that we should try to establish a form of reciprocity between human auditors and their nonhuman relatives—fleshing out a form of "kinship acoustics" (174). Yet *The Sounds of Life* does not say much about how we can avoid instrumentalizing other knowledge traditions, nor does it systematically ponder the obvious "tension" (9) between the "deep listening" of local groups and the "distant listening" of expert outsiders, or the growing threats to these groups by forces that eagerly embrace the extractivist possibilities offered by large-scale monitoring projects.

Bearing in mind the work of commentators including Kate Crawford and Peter Dauvergne, readers might additionally be more doubtful

than *The Sounds of Life* about the regenerative, pro-planet potential of energy-hungry digital technologies that are tied to dubious ideologies and relentlessly map every part of the planet. While recounting invigorating stories of quirky scientists combatting anthropocentric prejudices, Bakker depicts acoustic interventions as benign and quasi-medical procedures: "ecoacousticians listen to landscapes like a radiologist might look at an MRI scan, discerning the subtlest signs of health and disease" (5). This is not untrue, but we should not lose sight of the violence associated with human activities, or the fact that "digital technologies can be misused and abused" (203) — as the book suggests in brief and scattered passages. Sound and science may nurture multispecies flourishing, but let us not forget that close attention to whale songs culminated in a massive haul of baleen by whalers in the past (13); that acoustic deterrents may enable "peaceful human-elephant coexistence" but probably also facilitate the spread of human farming (57); that the study of bee decision-making is being monetized by the cloud computer industry and internet hosting centres (147); that the military is eagerly experimenting with the conversion of bees "into disposable, militarized sensing devices" (157) and with a "bionic Morse code" based on whale vocalization patterns (161); and that interactive digital devices for nonhuman animals are not just used to advance "interspecies understanding" but to grease the gears of "industrial meat production facilities" (174). While Bakker chooses optimism and states that Indigenous traditions model useful "guideposts" for ecodigital projects (7, 174), it remains an open question whether recent scientific and technological developments strengthen convivial forms of entanglement or permit an even more brutal and fine-grained entrapment of other Earthlings.

This precarious balancing act between optimism and pessimism is even more conspicuous in *Gaia's Web* and so I conclude with a brief look at Bakker's final publication. Reorienting her focus from bioacoustic science to biodigital technology more broadly, this second recent book asserts that the Earth is becoming "simultaneously natural and technological, ecological and digital, human and nonhuman: a merging of the Web of Life and the World Wide Web" (*Gaia's*

Web, 230–1). As she explains in her two-part argument, digital monitoring projects are presently helping to combat challenges such as global heating alongside biodiversity loss, and the introduction of actors like organic robots and biological batteries is ushering in a form of "biodigital convergence" (106). In navigating these developments, Bakker maintains, we are faced with the choice between an ominous "Green Panopticon" (14) on the one hand and a promising "digital biocentrism" (16, 212) on the other, in which technological innovation does not lead to eco-surveillance capitalism but to multispecies flourishing. As in *The Sounds of Life*, Bakker comes down on the side of "cautious optimism," though she admits that "safeguards" are necessary—yet often missing at the moment—and that hope may well constitute a dangerous "trap" (232).

Bakker's summary of the possibilities and pitfalls appears even-handed, though it favours optimism and occasionally approaches bothsidesism. At one moment she enthusiastically explains that eco-surveillance operations can stop illegal fishing; at another she notes more critically that it can be abused "to track illegal migrants" (27). She observes that "precision farming" might reduce "herbicide and pesticide use" (94), but also that it is currently "being used primarily to further intensify industrial agriculture" (95). Ambivalent claims crop up elsewhere too: "digital technologies might create a virtuous cycle […] but they might also create a vicious cycle" (105). Additionally, "it is not yet clear whether blockchain offers a progressive or a regressive pathway for nonhuman agency" (146), or if biobots are "[a] useful form of green technology or a form of [nonhuman] torture" (205). Readers are excitedly told that "virtual reality experiences that cultivate a sense of 'self as other' result in changes in environmental attitudes" (159) but later hear that "increased empathy as a result of immersive technology experiences is often at best a transient phenomenon, and at worst a mirage" (177). Digital whale protection systems establish "whale lanes" and thereby illustrate "how digital technologies could enable whales (and other nonhumans) to collaborate with humans in managing the environment" (116). However, we should "not overstate the degree of cooperation […] in a world in which [whales] have so little control" (116–7).

I agree with Bakker that these developments are inherently ambiguous and offer tantalizing glimpses of a utopian planetary future. Yet we should be clear-eyed about the obvious downsides as well as wary of perverse side effects. Will whale lanes and precision farms mainly result in saving cetacean lives and reducing pesticides, one might ask, or will they just squeeze even more value out of the land and sea? Does the right path forward really involve turning forests and other nonhumans into digital "economic actor[s]" (144)? Should we not be developing more radical strategies, which challenge the status quo via digital monitoring systems for abattoirs, for example, that immediately detect animal welfare abuses and automatically fine the owners or notify the relevant authorities? As humans and other creatures currently find themselves in digital and ecological webs simultaneously, we should surely not forget, as Bakker notes in passing, that a "spider and a fly both encounter the spider's web, but the outcome is very different for the latter" (153).