Preface

I think that by retaining one's childhood love of such things as trees, fishes, butterflies and . . . toads, one makes a peaceful and decent future a little more probable.
—George Orwell, 1946

It was in Irkutsk, just down the Angara River from Siberia's Lake Baikal, that I got religion on ancient lakes. The year was 2002, and I had already read many scientific papers about the exotic faunas of Baikal, Tanganyika, Titicaca, and others, and had been conducting my own work on Sulawesi's Lake Matano. But seeing Baikal and attending my first Speciation in Ancient Lakes conference, hosted in Irkutsk, switched a light on and made material the striking differences between ancient lakes and other freshwater systems (figure P.1 shows ancient lakes based on a relatively inclusive definition; for more on definitions of *ancient*, see chapter 1). Baikal, whose age is measured in the tens of millions of years, was sublime, with multicolored shrimplike amphipods teeming in the shallows and candelabra-shaped sponges abundant just a little deeper. The lake seemed endless as we explored a small corner of it on a cruise after the

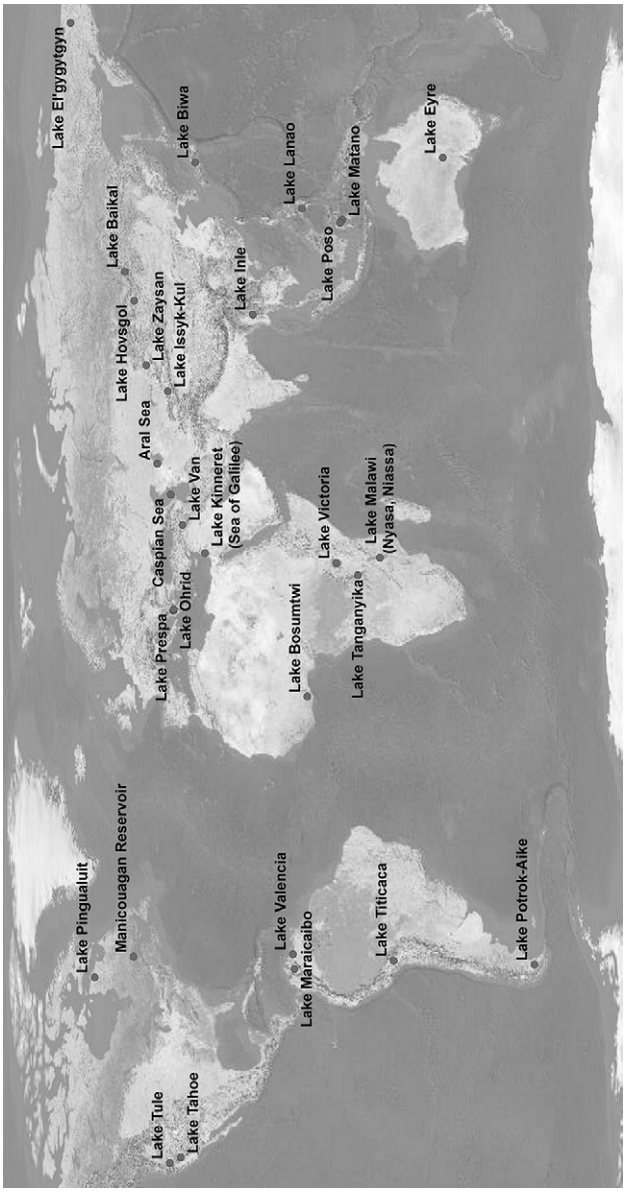

Figure P.1

Locations of ancient lakes as characterized by Stephanie Hampton and colleagues. *Source:* Slightly modified from Hampton et al., "Recent Ecological Change in Ancient Lakes," *Limnology and Oceanography* 63 (2018). Published under a Creative Commons CC BY-NC 3.0 license (https://creativecommons.org/licenses/by-nc/3.0).

Figure P.2
Attendees at the 2022 Species in Ancient Lakes conference in Kigoma, Tanzania, on the shores of Lake Tanganyika. *Source:* Photo by Mupape Mukuli.

conference, in a vessel I would have guessed came from the North Pacific had I seen it in a photo. At the conference, I had heard mesmerizing reports from a community of researchers who were looking at the wildly diverse denizens of these, our planet's oldest bodies of freshwater.

I have since attended several ancient lake conferences (the participants at the last conference before I completed this book are shown in figure P.2) and have always come away inspired. Yet when I get home and talk about the wonders of the lakes with nonconference colleagues, including experts in ecology and evolution who work in marine or terrestrial systems, I am often met with blank stares. Frequently my peers are familiar with the cichlid fishes of Africa's Lake Victoria and their extinction crisis, or have some vague notion that Lake Baikal is old and contains an awful lot of fresh water. But they seldom know what is meant by the term *ancient lake*, or why such lakes matter.

As time passed, my professional frustrations evolved into a deeper concern for the lakes and their often-perilous circumstances. These frustrations and worries came to a head during fieldwork in Sulawesi in the 2000s as I saw development exploding around Lake Matano. I can still hear my old friend Peter Hehanussa, a senior Indonesian scientist, as he pleaded with the management of the nickel mine that dominated the area not to build a road around the lake, so sure was he that it would accelerate the degradation of Matano and its fauna. Hectare after hectare of forest was being cleared, and houses were popping up like mushrooms after a spring rain. I was also hearing of ever more nonnative fishes becoming established—new ones most every year—and knew that the situation was the same or worse in other lakes. It seemed time to attempt something beyond basic research and an occasional outreach effort. I thought that a book might draw more attention to the lakes and communicate their importance, especially if it was not too full of jargon or despair. I resolved to get started on a manuscript.

So how is it that the publication date on this volume is 2023? A job change, move, and new administrative responsibilities came up before I was able to make meaningful progress on my book plan. The manuscript ended up on hold for over a decade until I stepped away from administrative duties. When I finally returned to the project, I quickly found myself of two minds. I was pleased to find that the book I had imagined seemed yet to be needed. But I was also a little sad that ancient lakes were still not broadly appreciated, despite the efforts of my conference colleagues, and that the lot of most lakes seemed to be worse.

WHO IS THIS BOOK FOR?

I wrote this book with the goal of reaching a broad readership, particularly people who are interested in natural history or lakes but are not professional scientists, or at least not specialists in ecology or evolution. This seems to me an important audience. When some precious patch of nature is about to be lost through human action—for example, if an old-growth forest is about to be logged—the brave individuals who sacrifice careers and livelihoods to protect it frequently have no specialized training. Sometimes a powerful personal commitment can be every bit as crucial as an advanced degree. Other nonspecialists make essential contributions by giving up meat, voting with nature in mind, or making donations to the conservation organizations that are working hard to keep more green in the world. And of course, it is nonscientists in positions of power who often make the most critical decisions about the future of nature.

More broadly, I hope I have written for anyone who is simply curious to learn a little more about the diversity of life. For myself, that reader is personified by my (late) father-in-law, Al Hodgins. Al was a high school English teacher who had long enjoyed a hike or a day of fly-fishing, but who only became an enthusiast of science and natural history writing when I started giving him works by Stephen Jay Gould. I still miss our conversations about those books. In a similar vein, one reviewer suggested that his parents would enjoy the chapter I asked him to read from this volume. I hope he is right, even if I have no expectation of rivaling Gould or Ed Yong. And I will be delighted if my efforts lead a few folks living along the shores of an ancient lake to feel more pride in their aquatic treasure.

I have also had in mind readers who are not quite professional scientists but not exactly laypeople either—that is, students. Really, it is younger versions of myself that I am thinking of. Accessible writing about nature and science was tremendously important to me during my childhood and youth, and I continue to enjoy such writing today. I still have copies of Herbert S. Zim's *Zoology* and similar Golden Guides from my childhood, and have lost track of how many times I have read Gerald Durrell's *My Family and Other Animals*. As a young adolescent I reveled in memoirs of field biologists like Eugenie Clark, dreaming of someday doing such work. Even as a university student majoring in zoology, I learned a great deal from the semipopular writings of E. O. Wilson, Gould, Dawkins, and others. I also found inspiration in their words, which may have been just as significant as any knowledge they transmitted. I hope a few nascent scientists, teachers, naturalists, and activists can find something they value in these pages.

My expert colleagues are an audience I cannot help but imagine looking over my shoulder as I write and revise, since they are the readers I know best and the ones most likely to catch a slip. Their imagined gaze can be especially intimidating when I am trying to synthesize and communicate topics on which I do not work directly, which is often the case in a book this broad. I have tried hard to be accurate, but also to resist getting bogged down in the qualifications and details that are sirens for scientists. Hopefully the balance I have struck seems sensible and any errors are minor.

There are enough lakes and intriguing studies that writing a truly comprehensive book would almost certainly mean writing a very long, repetitive one, so I have had to pick and choose

which examples to present. I apologize sincerely to the authors of the many superb investigations that I could not fit into these pages, and acknowledge the biases that are inevitable given the limits of one person's knowledge. As well, I should note that I have not attempted to write a comprehensive review of how living things diversify or any other conceptual topic. Instead, my goal has been to convey the contributions being made by research in ancient lakes.

READING THIS BOOK

This volume was written pretty much as I imagined it would be read, from chapter 1 through 9. Still, I have tried to avoid having the later chapters rely too much on earlier material. Thus, the reader in a rush could likely skip a few stretches without getting hopelessly confused. The glossary might help too. Some chapters could potentially be read on their own, especially chapter 5 on some of the ways variation is maintained within populations, and chapter 8 on Baikal. But, of course, I hope most readers will find the whole book of interest.

I have provided a brief summary at the end of each chapter because I find these handy when I am the reader. Particularly if one's time with a book is often interrupted, it can be helpful to be reminded at the end of a chapter about its beginning, which one may have read a good while earlier. A brief summary can also ease the transition to the following chapter during reading.

Rather than scatter citations throughout the text, I have gone with the less formal arrangement of providing citations and suggestions for further reading at the end, organized by chapter and then topic. My intention is thereby to minimize

interruptions; distractions are a bane of modern life, and few of us wish more. It is a somewhat informal, less academic format, but that seems all right.

CONSERVATION, CELEBRATION

When I started graduate school, most students of ecology and evolutionary biology received a training in basic research and expected to pursue such work throughout their careers, with the exception of those who chose applied areas like fisheries or forestry. Conservation biology was an emerging field that was still becoming established. Today the situation is different. Conservation-related questions and considerations play a role in the work of most researchers who conduct field studies or analyze data from natural systems. For many, investigating how natural populations and systems are responding to human-caused environmental changes is the central task.

One could easily devote a whole volume to the dangers facing ancient lakes and the ways in which they are already degraded. Indeed, it is tremendously important that we allocate much more time and resources to these problems. I devote the final chapter of this volume exclusively to those issues, and they come up elsewhere in the book as well. But my main goal is to celebrate the lakes and their life, for themselves, the wonder they inspire, and what they are teaching us about nature's fundamental processes. We need to better care for the marvelous living things uniquely present on our singularly green planet, but it is good to simply delight in them too.

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A Natural History

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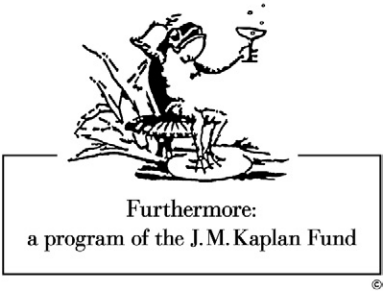

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