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The Challenges of Biodiversity Science

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How Biodiversity Researchers Could Make a Difference, and Why They Should

The Challenges of Biodiversity Science. Michel Loreau. International Ecology Institute, 2010. 120 pp., illus. $38.00 (ISSN 0932-2205 cloth).

The term "biodiversity" was catapulted into the public domain in the 1980s, largely a result of a surge in societal and scientific concern over biotic extinctions and homogenizations. This focus on biological diversity brought with it a suite of nascent and established scientific questions about the origin, persistence, loss, and importance of biodiversity. Yet today, more than two decades later, these varied aims of biodiversity science still have limited ability to influence public discourse and reduce the erosion of global biodiversity. How can the gap between science and impact be narrowed? Michel Loreau, of McGill University, in Canada, gamely tackles this question in his slim 120-page book *The Challenges of Biodiversity Science.*

In many ways, Loreau is the best person to write such a book, having experience in both academic and scientific policy arenas. Academically, his theoretical models show how the fundamental processes that shape ecological communities also determine the effects of biodiversity on entire ecosystems. These models brought clarity to an area of ecological research known as "biodiversity-ecosystem functioning research" by moving the discipline from patterns to processes. For this contribution, he was awarded the ECI (International Ecology Institute) Prize in 2002, which included a contract to write this volume. However, this is not a book about how biodiversity affects ecosystem functioning—he has written that book too, and it was published concurrently by Princeton in 2010. Rather, this is a book equally inspired by Loreau's experience at the science-policy interface, as a chair for seven years in the international biodiversity program DIVERSITAS.

The Challenges of Biodiversity Science seems to have two primary aims, and two audiences. The book's first aim is to provide an overview of biodiversity science to the uninitiated, so that all readers can appreciate its second aim: to outline how biodiversity science could (and should) drive biodiversity protection. The first four chapters introduce some of the key concepts and methods used by ecologists to study species diversity, such as how to quantify species diversity over spatial scales, the magnitude and causes of the current extinction crises, and the value of biodiversity. Although this material is covered in other texts (e.g., Magurran 1988, Wilson 1992, MA 2005), Loreau's interpretations of these familiar themes are clearly explained and offer a nice summary of the state of biodiversity research for new graduate students or curious policymakers. (Those already with a strong background in community ecology could skip to chapter five.) Particularly well written is his description of partitioning diversity among spatial scales.

The real intellectual heart of the book, however, is the last three chapters, in which Loreau—in his words—"veers off the beaten track." These chapters present a blueprint for what biodiversity science and scientists should do next in order to make biodiversity research matter beyond academia. Loreau presents this blueprint at three levels of abstraction. He first argues that predicting changes in biodiversity as well as the consequences of these changes is an interdisciplinary enterprise, involving not only ecological mechanisms but also economic and social contexts. He then makes the case for an international scientific assessment mechanism for biodiversity, arguing that having such a body is a key reason climate change and stratospheric ozone researchers have had more success in affecting policy in their fields. Loreau's summary of the tensions between science and policy and the bumpy road encountered by past attempts to formally integrate biodiversity science into international policy make for fascinating reading. Finally, he takes one further step back to put biodiversity policy in perspective as only part of a broader societal shift needed to save the world's biological capital. Although Loreau is certainly not the first to conclude that humans will conserve biodiversity only when they realize their connectedness with and dependence on nature, his final chapter is thoughtfully and elegantly written and—in its quick skip through mythology, philosophy, and environmental ethics—a joy to read.

It is easy to be discouraged by the state of the world's biodiversity, and the accompanying bleak predictions for future extinctions and ecological collapse. In *The Challenges of Biodiversity Science,* Loreau has managed to tackle the subject with cautious optimism and confidence, without trivializing the task ahead. He throws down the gauntlet to scientists studying biodiversity, arguing that they have a social responsibility to engage in the public discourse on biodiversity conservation. May we collectively manage to pick up his gauntlet.

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