Foreword

It was inevitable that my path would lead to Costa Rica and its dazzling array of ecosystems. For decades the main entry point for North American students to tropical biology was through the Organization for Tropical Studies (OTS) and its field stations, most especially La Selva. I was a major exception in that I did my dissertation in the Brazilian Amazon, but I almost immediately (1971) made a pilgrimage to Central America to broaden my perspective. Just to get to La Selva involved a lengthy trip from San José: along the Cordillera, then up through the cloud forest and over a pass, and then down into the lowlands with the last leg of the journey up the Sarapiqui River by boat. It was a splendid partial introduction to Costa Rica's ecosystems.

In a sense I knew them already, but only in the abstract. The logical framework of Leslie R. Holdridge's Life Zone System was fundamental for every tropical biology student, with its elegant simplicity constructed from gradients of temperature, moisture, and altitude. As important as that construct was and is, it paled in contrast with the biological reality of the ecosystems in question.

Rich as the scientific knowledge of Costa Rica's ecosystems was 40 years ago it is dwarfed by that of today. That stems from important scientific institutions in addition to the Organization for Tropical Studies: among others, the Tropical Science Center (TSC) of Holdridge and Joseph Tosi in San Pedro, the Tropical Agricultural Research and Higher Education Center (CATIE) at Turrialba, the epicenter of tropical dry forest ecology at Santa Rosa in Guanacaste, continually sparked by Dan Janzen, and the visionary Instituto Nacional de Biodiversidad (INBio). As a consequence this book on Costa Rica's ecosystems—really the first for any tropical country—is long overdue but has a lot to build from. There have been extremely significant works on individual ecosystems (La Selva's rainforests, Monteverde's cloud forests, and the tropical alpine treeless *páramos*), but no comprehensive overview—other than the visitor experience on the grounds at INBioparque.

In the same four decades Costa Rica has gone from being the Central American country with the most national parks to being the self-styled "Green Republic"—one that is often globally in the forefront as a major innovator in environment and sustainability. At the Earth Summit in Rio de Janeiro in 1992 Costa Rica was very much the showcase country in both biodiversity science and in conservation. Costa Rica wasn't perfect, though. Much needed to be done in protecting marine and freshwater ecosystems, but Costa Rica was in every sense the leading nation in the tropics and to a major extent globally.

Now with Rio+20 behind us—the United Nations Conference on Sustainable Development held in Rio de Janeiro, Brazil, on June 20–22, 2012—and as the nations of the planet struggle with defining Sustainable Development Goals (SDGs), the environmental horizon is very dark indeed. The Stockholm Environment Institute's diagnosis of Planetary Boundaries shows three major transgressions: in the carbon cycle (climate change), the nitrogen cycle (and proliferating dead zones in coastal waters), and, above all, in biodiversity.

What is needed is a transition to planetary management, where this planet that we call "home" is managed as the biophysical system that it actually is. That, in turn, means conservation, management, Sustainable Development Goals that explicitly incorporate ecosystems and biodiversity, *and*, indeed, restoration of ecosystems at scale. That is the only way in which humanity can avoid a train wreck with climate change and the distorted nitrogen cycle with consequent staggering additional loss of biodiversity. It is also the only way that Latin America and the Caribbean can realize their potential as what the United Nations Development Program (UNDP) terms the Biodiversity Superpower.

So, the book *Costa Rican Ecosystems*, edited by Dr. Maarten Kappelle, comes at an extraordinarily opportune time. The culmination of decades of scientific achievement and experience, it provides an intellectual template upon which sustainability can be built for Costa Rica. It also

serves as a model for an ecosystems overview that all nations should aspire to and emulate. When—not if—global sustainability is achieved, it will be recognized that one of the places that it started was in this remarkable country and with this equally remarkable book.

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