# Preface

A few years after I arrived at Yale I was interviewed by a local newspaper reporter (the newsworthy event was the creation of the new Yale Department of Ecology and Evolutionary Biology) who asked me what I hoped to accomplish over my career. I can't recall exactly what long-winded answer I gave but it ended up being distilled in print as "Professor Schmitz has the lofty goal of figuring out how Nature works." There is dual meaning in the reporter's representation of what I said. You could take it to mean (somewhat cynically as the reporter did) that by the end of my career I'll be able to explain how Nature works. Or, you could take it to mean that over the course of my career I'll develop ways of looking at Nature that lead to insights about how it might work. The former is about reaching an end; the latter is about developing the means to reach an end. I meant the latter.

This book, audaciously titled *Resolving Ecosystem Complexity*, embodies the same duality of meaning. In writing the book, however, my intention is to deal with the second meaning, the enterprise of discovery rather than discovery itself. To me, the journey of discovery is the far more fascinating and rewarding because it means that as scientists we get to stay in a childlike state of wonder and curiosity for one's entire professional career—there is always something fresh and new to discover.

Don't get me wrong, though. There is nothing like a Eureka moment when you realize that you might fully understand a piece of a grand puzzle. And indeed, the process of scientific discovery is much like building an intricate jigsaw puzzle whose image emerges ever more clearly as the myriad pieces are set into their proper place.

But, we can complete that puzzle slowly by simply going through the mechanics of trying to fit each small piece with other pieces and thus assemble small subsections, marveling as the picture incrementally emerges. Or, we can devise ways to categorize the pieces according to a priori rules (say, identifying color patterns or identifying pieces that make corners vs. centers) and then put all the those pieces together with a mind's eye toward what we imagine the bigger emerging picture is going to be. The first approach emphasizes simple brute force trial and error experimentation. The second approach relies on devising an a priori [world]view of the structure of the grand puzzle and proceeds

to fill in the pieces according to this view. The first represents a tactical approach to resolving the puzzle; the second is more strategic. Both approaches are appropriate and relevant. My preference, however, is to engage in the latter.

The point of this book is to relate how I have gone about developing my conceptualization of the grand puzzle and how I have developed the rules for fitting the pieces of the puzzle together. The general theme of the book is to convey ideas and insights gained through detailed study of my own empirical system and show how they can be extended to explain the functioning of other systems. This is not to suggest that I have had, from the start, the correct conception of the big picture. It is an undeniable fact of science that we will find many holes in our simple conceptions; they are deficient because we have not resolved the mechanistic details needed to obtain a clear picture. So, we revise our conceptions by systematically adding more and more detail as we learn how it fits in. Such is the enterprise of discovery I was talking about above.

This book represents the culmination, thus far, of experience and insights gained through this enterprise over the last seventeen years. These insights were not developed in isolation, and I am grateful to the companionship of those who have helped with both the empirical discoveries and the development of the ideas presented in the book. To this end, I wish to expresses my deepest thanks to Peter Abrams, Brandon Barton, Andrew Beckerman, Michael Booth, Heinrich zu Dohna, Jason Grear, Peter Hambäck, Dror Hawlena, Holly Jones, Libby Jones, Liz Kalies, Kelsey Kidd, Vlastimil Krivan, Joohyoung Lee, Maya Leonard-Cahn, Charlie Liu, Barney Luttbeg, Marc Mangel, Mark McPeek, Kate O'Brien, Ofer Ovadia, Bobbi Peckarsky, David Post, Mary Power, Pete Raymond, Kris Rothley, Locke Rowe, Angie Rutherford, Dave Skelly, Lauge Sokol-Hessner, Blake Suttle, Geoff Trussell, Maria Uriarte, Günter Wagner, and Earl Werner. Several colleagues have also kindly read parts of or the entire book and offered very critical comments for its improvement. For this I wish to thank Fred Adler, Anurag Agrawal, Dan Gruner, Bob Holt, and Dean Pearson.

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