BIOLOGY/ECOLOGY/COMPLEXITY STUDIES

How do we explain the remarkably abrupt changes that sometimes occur in nature and society—and can we predict why and when they happen? This book offers a comprehensive introduction to critical transitions in complex systems—the radical changes that happen at tipping points when thresholds are passed.

Marten Scheffer accessibly describes the dynamical systems theory behind critical transitions, covering catastrophe theory, bifurcations, chaos, and more. He gives examples of critical transitions in lakes, oceans, terrestrial ecosystems, climate, evolution, and human societies. And he demonstrates how to deal with these transitions, offering practical guidance on how to predict tipping points, how to prevent "bad" transitions, and how to promote critical transitions that work for us and not against us. Scheffer shows the time is ripe for understanding and managing critical transitions in the vast and complex systems in which we live. This book can also serve as a textbook and includes a detailed appendix with equations.

- Provides an accessible introduction to dynamical systems theory
- Covers critical transitions in lakes, oceans, terrestrial ecosystems, the climate, evolution, and human societies
- Explains how to predict tipping points
- Offers strategies for preventing "bad" transitions and triggering "good" ones
- Features an appendix with equations

PRINCETON STUDIES IN COMPLEXITY
Simon A. Levin and Steven H. Strogatz, Series Editors

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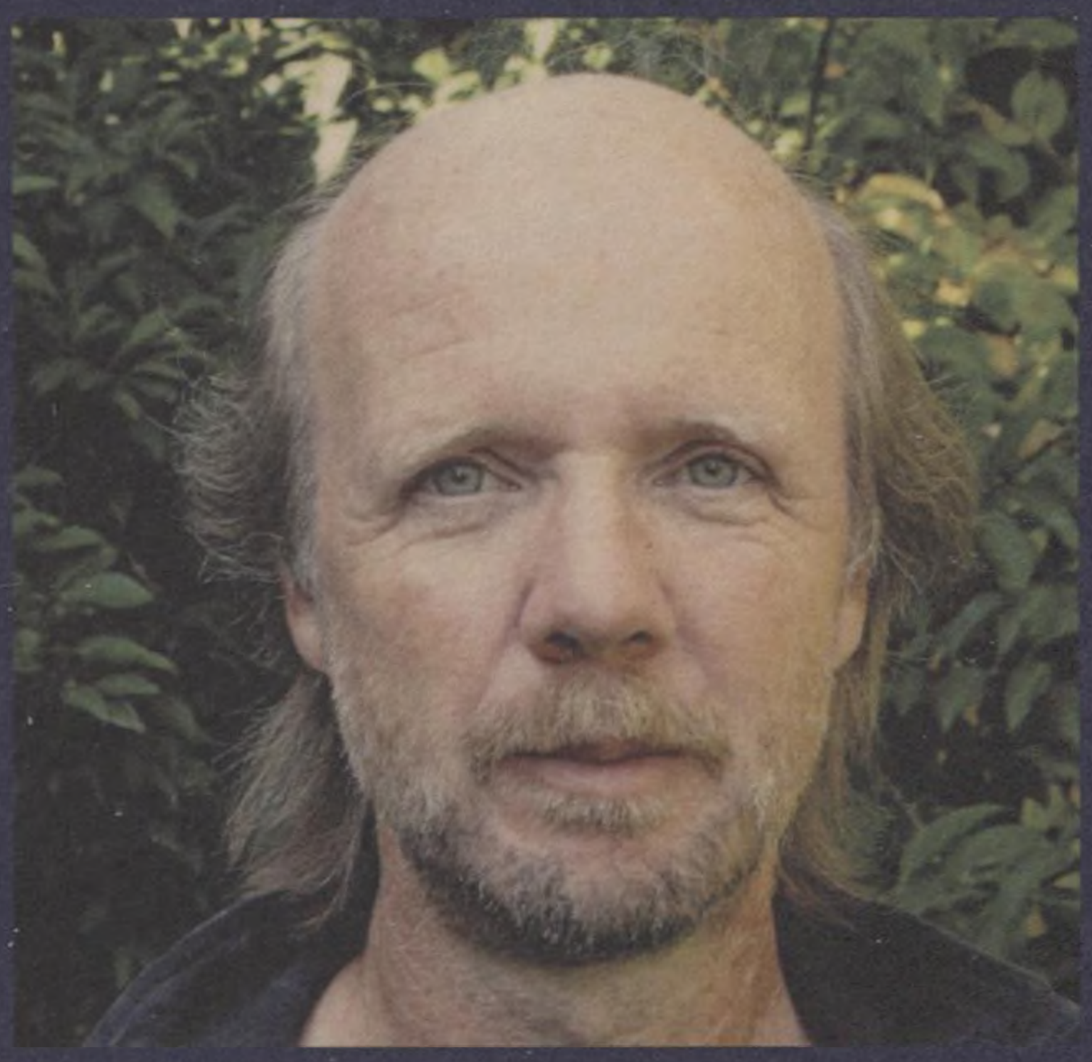

MARTEN SCHEFFER is professor of environmental sciences at Wageningen University in the Netherlands. He is the author of *Ecology of Shallow Lakes.*

"This is an important book. Critical transitions and resilience are powerful explanatory tools in ecology today, and it is significant that Scheffer, the leading expert in the applications of critical transitions in ecology, has written a monograph in this area. Scheffer is an excellent writer, and a very good expositor of theoretical concepts in ecology. The ideas in this book should be part of every educated person's mental framework."
—Donald L. DeAngelis, *University of Miami*

"This is a timely book that will have considerable impact on multiple disciplines, including ecology, the social sciences, and economics. It focuses on the theory, examples, and implications of complex systems, particularly critical transitions resulting from positive feedbacks. Scheffer has always been a master at presenting complex issues in a simple way, and this book is no exception. This is a rare gem."
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Part I
THEORY OF CRITICAL TRANSITIONS

Part III
DEALING WITH CRITICAL TRANSITIONS