

# Preface

The world is undergoing unprecedented changes in many of the factors that determine its fundamental properties and their influence on society. These changes include climate; the chemical composition of the atmosphere; the demands of a growing human population for food and fiber; and the mobility of organisms, industrial products, cultural perspectives, and information flows. The magnitude and widespread nature of these changes pose serious challenges in managing the ecosystem services on which society depends. Moreover, many of these changes are strongly influenced by human activities, so future patterns of change will continue to be influenced by society's choices and governance.

The purpose of this book is to provide a new framework for natural resource management—a framework based on stewardship of ecosystems for human well-being in a world dominated by uncertainty and change. The goal of ecosystem stewardship is to respond to and shape change in social-ecological systems in order to sustain the supply and opportunities for use of ecosystem services by society. The book links recent advances in the theory of resilience, sustainability, and vulnerability with practical issues of ecosystem management and governance. The book is aimed at advanced undergraduates and beginning graduate students of natural resource management as well as professional managers, community leaders, and policy makers with backgrounds in a wide array of disciplines, including ecology, policy studies, economics, sociology, and anthropology.

The first part of the book presents a conceptual framework for understanding the fundamental interactions and processes in social-ecological systems—systems in which people interact with their physical and biological environment. We explain how these systems respond to variability and change and discuss many of the ecological, economic, cultural, and institutional processes that contribute to these dynamics, enabling society to respond to and shape change. In the second section we apply this theory to specific types of social-ecological systems, showing how people adaptively

manage resources and ecosystem services throughout the world. Finally we synthesize the lessons learned about resilience-based ecosystem stewardship as a strategy for responding to and shaping change in a rapidly changing world. Change brings both challenges and opportunities for managers, resource users, and policy makers to make informed decisions that enhance sustainability of our planet.

We owe a huge debt of gratitude to Buzz Holling who originated many of the central concepts that link resilience to ecosystem stewardship, as well as to several national and international programs that have developed these ideas and applied them to education and to the real-world issues faced by a rapidly changing planet. These include the Resilience Network, the Resilience Alliance, the International Geosphere-Biosphere Programme, the Millennium Ecosystem Assessment, Assessment, Association for the Study of the Commons, the Stockholm Resilience Centre, the Beijer Institute, and the Resilience and Adaptation Program of the University of Alaska Fairbanks. Primary funding for the book came from the US National Science Foundation and the Swedish Research Council FORMAS program. In addition, many individuals contributed to the development of this book. We particularly thank our families, whose patience made the book possible, and our students, from whom we learned many of the concepts and applications presented in this book. In addition, we thank the following people for their constructively critical review of chapters in this book: Marty Anderies, Erik Anderson, Archana Bali, David Battisti, Harry Biggs, Oonsie Biggs, Shauna BurnSilver, Steve Carpenter, Melissa Chapin, Johann Colding, Graeme Cumming, Bill Dietrich, Logan Egan, Thomas Elmqvist, Walter Falcon, Victor Galaz, Ted Gragson, Nancy Grimm, Lance Gunderson, Susan Herman, Buzz Holling, Jordan Lewis, Chanda Meek, Joanna Nelson, Evelyn Pinkerton, Ciara Raudsepp-Hearne, Marten Scheffer, Emily Springer, Samantha Staley, Will Steffen, Fred Swanson, Brian Walker, Karen Wang, and Oran Young. We particularly thank Steve Carpenter for his thoughtful comments on most of the chapters in this book.

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