

# FOREWORD

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Environmental foresight is insight into future environmental challenges and opportunities, and the ability to apply that insight to prepare wisely for a sustainable future. Successful environmental planning, management, and policy require the development and continual updating of foresight. U.S. Environmental Protection Agency (EPA) Administrator Stephen Johnson has stated: “Failure to look beyond present conditions only ensures that emerging problems will be more difficult to address and that opportunities may be missed” (U.S. EPA 2005: 1). The soundness and acuity of our environmental foresight are key determinants of success in addressing critical environmental issues.

Rapid technological, socio-cultural, and economic changes with the potential for sweeping environmental effects have greatly increased the need for environmental foresight. In addition to the increasing pace of change, some who study social-ecological systems believe that “surprise” is pervasive and increasing along with the expanding scale of human impacts (Gunderson and Folke 2008, Kates and Clark 1996). Examples of environmental surprise range from sudden disasters like the collapse of fisheries to more gradual events such as unexpected effects of climate change. Surprise greatly complicates the challenge of developing environmental foresight. The prevalence of surprise in social-ecological systems implies that some important uncertainties are irreducible and that traditional scientific tools are blunt instruments for developing environmental foresight. New approaches are needed.

Although no one can predict the future of complex social-ecological systems, the authors of the papers in this compilation believe that it is both possible and urgent to develop useful insights into emerging environmental problems and needs, and to apply these insights to help achieve a sustainable future. The authors explore the potential of futures research, a transdisciplinary field of inquiry that has been developing for more than 50 years, to address this important challenge. The papers were presented in two sessions at the International Symposium on Society and Resource Management, held

in Madison, WI, on June 6, 2011. Speakers in these sessions included academic and professional futurists, as well as environmental researchers who have applied futures methods in their work.

The first four papers introduce futures research as a broad approach to developing environmental foresight and highlight some fundamental principles of futures thinking. In the opening paper I provide an overview of futures research. The goal of futures research is to explore possible, plausible, and preferable futures in order to anticipate and prepare for those futures. I briefly trace the development of futures research from its beginnings in the post-World War II era, to a mature transdisciplinary field with a considerable body of literature, many specialized journals, professional organizations, and distinct methods. The paper concludes with a call for environmental futures research to help develop the foresight needed for a sustainable future.

In an insightful paper, Peter Bishop, professor and director of the graduate program in Futures Studies at the University of Houston, identifies some fundamental perspectives for thinking about and approaching the study of the future. He begins with a consideration of change because, as he states, “the study of the future is the study of change.” After describing the four main attributes of change, Professor Bishop addresses an approach to forecasting that takes uncertainty seriously. He concludes by identifying three broad drivers of the future and how each driver can be thought of as creating a different type of future: the baseline future, a range of alternative futures, and the preferred future.

Futurist and economist Kay Strong of Baldwin-Wallace College—and a graduate of and former instructor in the Futures Studies program at the University of Houston—describes a framework for developing foresight that has been used to prepare professional futurists at the University of Houston. Framework forecasting is an organizing technique for gathering and sorting information about the topic of interest when conducting futures research. Professor Strong also briefly describes

the process of scenario development, a core method of futures research that can use the information from framework forecasting.

George Kubik of the Anticipatory Futures Group, LLC and the University of Minnesota discusses “global mega forces,” defined as major emerging trends with the potential for high-impact outcomes in the future. He first identifies seven broad categories of global mega forces and briefly discusses their implications for natural resource futures. Kubik then examines two technological mega forces in detail: networked sensor-actuator technologies and electronic performanceware systems. These two developments are highlighted because of their potential to significantly affect the future of society and natural resources.

The next four papers provide examples of futures research methods and approaches applied to natural resource issues. Stephen Carpenter and Adena Rissman of the University of Wisconsin discuss scenario planning, which they describe as a method for thinking creatively and systematically about plausible futures. The sets of plausible stories produced by scenario planning explore how the future might develop from current conditions under a range of alternative human choices and the effects of uncontrollable drivers. Carpenter and Rissman describe examples of global (Millennium Ecosystem Assessment) and regional (Yahara Watershed, Madison, WI) scenario planning. They conclude that scenarios can help address some fundamental challenges in sustainability science.

The Northern Forest Futures Program (NFFP) is described by Keith Moser and Stephen Shifley, scientists with the U.S. Forest Service, Northern Research Station. The NFFP is a cooperative effort involving the Northern Research Station, the Northeastern Area Association of State Foresters, and academic scientists. Using data from existing assessments and inventories, a scoping of trends and issues, and scenarios from the Intergovernmental Panel on Climate Change (IPCC) linked with selected global circulation models, the NFFP is a “window on tomorrow’s forests” for the Northeast and Midwest.

A long-standing and prominent futures assessment of renewable natural resources is discussed by Linda Langner, National Program Leader for the Resources Planning Act Assessment, U.S. Forest Service Research and Development, and Peter Ince, a research forester with the U.S. Forest Service, Forest Products Laboratory. As required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, the periodic RPA Assessments project resource conditions and trends 50 years into the future. The 2010 RPA Assessment included scenarios linked to global scenarios developed by the IPCC. Ince and Langner discuss the development of quantitative linkages with the IPCC scenarios and methodological challenges that were faced in disaggregating the IPCC data.

Finally, Robert Olson, Senior Fellow at the Institute for Alternative Futures, describes the futures research carried out by the U.S. EPA dating back to the 1970s. More than any other environmental or natural resource agency in the United States, the EPA has pursued futures research, albeit with varying levels of commitment over time, in an effort to anticipate emerging environmental issues, threats, and opportunities rather than simply react to them after the fact. Olson was involved in much of this work first-hand as a consultant to the agency. He reviews past and current efforts to develop a capacity for environmental foresight within the EPA, and discusses important lessons for other agencies and institutions concerned with our environmental future.

Given the pace and complexity of change today, the need to anticipate emerging environmental issues, threats, and opportunities is great. Attempting to “look beyond the headlights,” anticipate change, and prepare for a range of alternative futures is vital in environmental affairs. The problem is that we are often ineffective, not systematic, or just plain naïve in our attempts to anticipate change. This collection of papers suggests that the methods and perspectives of futures research offer a promising set of approaches to develop the foresight needed to successfully address the environmental challenges of tomorrow.

## LITERATURE CITED

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