

Contributing Authors

George Kling, the lead author of this report, is a professor of biology in the Department of Ecology and Evolutionary Biology at the University of Michigan. His areas of specialization include limnology (the study of lakes and streams), climate change, biogeochemistry, and ecosystem science. He has research programs that study the functioning of aquatic ecosystems in the Arctic, the tropics, and the temperate zone. Dr. Kling received a National Academy of Sciences Research Investigator award and a United Nations Sasakawa Certificate of Merit, and he is a National Science Foundation Presidential Faculty Fellow and a fellow of the AAAS. He has participated in over 30 international panels, review boards, and conferences held by NSF, NRC, and UNESCO, many of which involved issues of global change. Dr. Kling received his Ph.D. in 1988 from Duke University.

Katharine Hayhoe is an independent research consultant specializing in the science-policy interface. Her areas of expertise include the impact of human activities on climate, greenhouse gas emissions and control policies, and numerical modeling of the earth-atmosphere system. Ms. Hayhoe received her M.S. in Atmospheric Sciences from the University of Illinois at Urbana-Champaign. Her clients and collaborators span a wide range of government and private agencies on both sides of the border, including Environment Canada, the Environmental Protection Agency, the National Round Table on Energy & the Environment, the Ontario Ministry of Energy & the Environment, and the Department of Energy. Recently, she has been funded by the Illinois-Indiana Sea Grant through the University of Illinois to evaluate projections of climate change for the Great Lakes area. She provided the analyses of historical climate data and future model projections used as the basis of impact assessments throughout the report.

Lucinda Johnson is the Associate Director of the Center for Water and the Environment, Natural Resources Research Institute, University of Minnesota, Duluth. Her research focuses on quantifying the effects of land use and geology on habitat and biota in wetlands and streams. Another research emphasis includes the development of indicators of stream and wetland ecosystem conditions, using amphibians, invertebrates and fish as focal species. As a landscape and aquatic ecologist, she has been involved in research and discussions about the causal factors of frog malformations over the past five years. The majority of her work has taken place

in the Midwestern United States and in the Great Lakes Basin, with a particular emphasis on agricultural landscapes. In this report, she contributed to sections about land use patterns and confounding effects of human disturbances on ecosystems affected by climate change, as well as sections on the ecological impacts on rivers, wetlands, and amphibians. Dr. Johnson received her Ph.D. from Michigan State University and has worked in her current position at the Natural Resources Research Institute since 1991.

Richard Lindroth is Professor of Ecology in the Department of Entomology at the University of Wisconsin-Madison. His research interests include the impacts of global environmental change (e.g., elevated carbon dioxide, tropospheric ozone, and UV radiation) on plants and plant-feeding insects. Dr. Lindroth received his Ph.D. in ecology from the University of Illinois-Urbana, followed by an NSF Postdoctoral Fellowship at the University of Wisconsin. In 1997 he received a Fulbright Senior Research Scholar award to study the impacts of enhanced UV radiation in New Zealand. Dr. Lindroth has served on the editorial boards of several journals in ecology, and on grant review panels for the National Science Foundation and US Department of Agriculture. In this report, he contributed to sections dealing with insect responses to climate change.

John J. Magnuson is an Emeritus Professor of Zoology and past Director of the Center for Limnology at the University of Wisconsin-Madison. His research interests are in long-term regional ecology, fish and fisheries ecology, and the effects of climate change and variability on inland waters, biodiversity, and invasions. He played a lead role in the lakes and streams portions of the 1995 and 2001 Assessments by Intergovernmental Panel on Climate Change. He has served on the Science Advisory Boards of the International Joint Commission on Water Quality and the Great Lakes Fisheries Commission. He served on the Ocean Studies Board of the National Research Council and has chaired several Committees for NRC. Dr. Magnuson has authored more than 350 publications and five books and was Principal Investigator of the North Temperate Lakes Long-Term Ecological Research Site. He earned his Ph.D. from University of British Columbia, Canada, in zoology with a minor in oceanography. In this report he contributed to sections on lakes, ice, wetlands, fisheries, and solution strategies.

Susanne Moser is staff scientist for climate change at the Union of Concerned Scientists. Her current work focuses on providing sound scientific information to support policy-making on climate change. Her research interests include climate change impacts on coastal areas, environmental hazards, the human dimensions of global change, and the interaction between science and policy. Dr. Moser received her Ph.D. in Geography from Clark University, Worcester, Mass., and completed a two-year post-doctoral research fellowship at Harvard's Kennedy School of Government before joining UCS. Over the last 10 years, she has participated in reviews of EPA's Global Change Programs, the US Global Change Research Program and its successor, the Climate Change Science Program, as well as of various chapters of IPCC and US National Assessment reports. In this report she contributed to sections dealing with climate change impacts on urban areas, human health, and solutions strategies.

Stephen Polasky holds the Fesler-Lampert Chair in Ecological/Environmental Economics at the University of Minnesota. He is a faculty member of the Department of Applied Economics and of the Department of Ecology, Evolution and Behavior, and is also co-director of Graduate Studies for the Conservation Biology Program. He received his Ph.D. in economics from the University of Michigan in 1986. He is currently serving as a member of the Environmental Economics Advisory Committee of US EPA's Science Advisory Board, as a member on a National Research Council Committee on Assessing and Valuing Services of Aquatic and Related Terrestrial Ecosystems, and as Co-Chair for Core Project 3: Developing the Science of Conservation and Sustainable Use of Biodiversity for DIVERSITAS. His research interests include biodiversity conservation and endangered species policy, integrating ecological and economic analysis, game theory applications to natural resource use, common property resources, and environmental regulation. He recently edited a book entitled *The Economics of Biodiversity Conservation*. In this report he contributed to sections on the economic impacts of climate change and climate change solutions.

Scott Robinson is a professor in the Department of Animal Biology at the University of Illinois. His research interests include the effects of forest fragmentation on migratory birds, especially during the breeding season. Most of his recent work has been in the Midwestern United States, but he has also worked extensively in the Neotropics and in North American grasslands and scrublands. His students also work on effects of global climate change on the timing of migration and on the effects of hydrology on birds of floodplain forests. Dr. Robinson has also been involved in developing management

plans for grassland and forest reserves. Dr. Robinson received his Ph.D. from Princeton University. As of May 2003, he will be moving to the Florida Museum of Natural History (University of Florida), where he will be the Katherine Ordway Chair of Ecosystem Conservation. In this report, he contributed to sections on the effects of global climate change on wildlife.

Brian Shuter is a research scientist with the Ontario Ministry of Natural Resources and adjunct professor in the Department of Zoology, University of Toronto. His research has focused on the population dynamics of freshwater fish, and particularly on the role of weather in generating short-term variation in abundance and the role of climate in shaping boundaries of species' distributions. He has worked on populations of smallmouth bass, walleye, and lake trout in the Great Lakes and in the smaller lakes of Algonquin Park. He has authored over 50 papers in the peer reviewed scientific literature, and is a member of the Board of Technical Experts of the Great Lakes Fisheries Commission. Dr. Shuter worked on the limnology and fisheries sections of this report.

Michelle Wander is an associate professor in the University of Illinois' Department of Natural Resources and Environmental Sciences, where she teaches about soil ecology, composition, and processes and advises both graduate and undergraduate students. She has served as the Chair of the North Central Region Committee on Soil Organic Matter and Biochemistry, on USDA-NRI Review Panels for Soil Biology and Biochemistry and Managed Ecosystems, and has participated as an expert on teams evaluating long-term agricultural studies. She is an Associate Editor for the Soil Science Society of America (SSSA) Journal and now serves on the committee for the Special Publication *Soil Carbon Management Guide* as well as the Ad Hoc Committee on Global Enhancement of Soil Organic Matter. Dr. Wander received her Ph.D. in 1992 in Agronomy/Soil Science from the Ohio State University. In this report, she contributed sections on agricultural response to climate change and potential mitigation and adaptation strategies.

Mark Wilson is currently Director of the Global Health Program and Associate Professor of Epidemiology at the University of Michigan, where his research and teaching cover the broad area of ecology and epidemiology of infectious diseases. After earning his doctoral degree from Harvard University in 1985, he worked at the Pasteur Institute in Dakar Senegal (1986–90), was on the faculty at the Yale University School of Medicine (1991–96), and then joined the University of Michigan. Dr. Wilson's research addresses the environ-

mental determinants of zoonotic and arthropod-borne diseases, the evolution of vector-host-parasite systems, and the analysis of transmission dynamics. He is an author of more than 100 journal articles, book chapters, and research reports, and has served on numerous governmental advisory groups concerned with environmental change and infectious disease epidemiology. He recently served as a member of the NRC panel on Climate, Ecosystems, Infectious Diseases and Human Health and the IOM panel on Emerging Microbial Threats in the 21st Century. He contributed to the health impacts sections and solutions in this report.

Donald Wuebbles is Head of the Department of Atmospheric Sciences at the University of Illinois and Professor in that department, as well as in the Department of Electrical and Computer Engineering. His research has emphasized the development and use of mathematical models of the atmosphere to study the chemical and physical processes that determine its structure. He is the author of over 300 scientific articles and directs a number of research projects to improve our understanding of the impacts that human-made and natural trace gases may be having on the Earth's climate, atmospheric chemistry, and ozone. He developed the concept of Ozone Depletion Potentials—used in most policy-making to protect the ozone layer (e.g., the Montreal Protocol and its amendments)—and is co-author of an analogous concept, Global Warming Potentials, currently

used to describe greenhouse gases and their potential effects on climate. Dr. Wuebbles has led the development of several new research centers at the University of Illinois, including a center on the regional impacts of climate change on the Midwest. He is a lead author on a number of international assessments related to stratospheric ozone and climate change. Dr. Wuebbles led the analysis of regional effects of climate change for this report.

Donald Zak is a professor in the School of Natural Resources and Environment at the University of Michigan. His research focuses on the function of soil microbial communities in the biogeochemical cycling of carbon and nitrogen in terrestrial ecosystems. He and several colleagues have established large-scale, field experiments to investigate the influences of rising atmospheric CO₂ and O₃ on forests in the upper Great Lakes. They also have initiated long-term experiments to study the influence of atmospheric nitrogen deposition on forest in the region. Dr. Zak serves on the editorial boards of *Ecology*, *Ecological Monographs*, and *Soil Science Society of America*. He received his Ph.D. degree from Michigan State University, conducted post-doctoral research at the University of Minnesota, and has been a Professor at the University of Michigan since 1988. Dr. Zak contributed to sections on forest and forestry impacts as well as impacts on other terrestrial ecosystems in this report.

Steering Committee

A national steering committee provided guidance and oversight to ensure the scientific review and integrity of the report. The Steering Committee members were

Dr. Louis F. Pitelka (*Chair*), Appalachian Laboratory, University of Maryland Center for Environmental Science, Frostburg, Md.

Dr. Mary Barber, Ecological Society of America, Washington, D.C.

Dr. Christopher Field, Carnegie Institution of Washington, Department of Plant Biology, Stanford, Calif.

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