

ACKNOWLEDGMENTS

About the National Science and Technology Council

President Clinton established the National Science and Technology Council (NSTC) by Executive Order on November 23, 1993. This cabinet-level council is the principal means for the President to coordinate science, space, and technology policies across the Federal Government. The NSTC acts as a "virtual" agency for science and technology to coordinate the diverse parts of the Federal research and development enterprise. The NSTC is chaired by the President. Membership consists of the Vice President, the Assistant to the President for Science and Technology, Cabinet Secretaries and Agency Heads with significant science and technology responsibilities, and other senior White House officials.

An important objective of the NSTC is the establishment of clear national goals for Federal science and technology investments in areas ranging from information technology and health research, to improving transportation systems and strengthening fundamental research. The Council prepares research and development strategies that are coordinated across Federal agencies to form an investment package that is aimed at accomplishing multiple national goals. To obtain additional information regarding the NSTC, contact the NSTC Executive Secretariat at 202-456-6100 (voice).

About the Office of Science and Technology Policy

The Office of Science and Technology Policy (OSTP) was established by the National Science and Technology Policy, Organization, and Priorities Act of 1976. OSTP's responsibilities include advising the President on pol-

icy formulation and budget development on all questions in which science and technology are important elements; articulating the President's science and technology policies and programs; and fostering strong partnerships among Federal, State, and local governments, and the scientific communities in industry and academia. To obtain additional information regarding the OSTP, contact the OSTP Administrative Office at 202-456-6004 (voice).

The Committee on Environment and Natural Resources (CENR) is one of five committees under the NSTC.

D. James Baker, Co-Chair
National Oceanic and Atmospheric Administration

Rosina Bierbaum, Co-Chair
White House Office of Science and Technology Policy

Ghassem Arsar
National Aeronautics and Space Administration

James Decker
Department of Energy

Roland Droitsch
Department of Labor

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Department of Transportation

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Department of Defense

Terrance Flannery
Central Intelligence Agency

George Frampton
Council on Environmental Quality

Kelley Brix
Department of Veteran's Affairs

Charles Groat
Department of the Interior

Len Hirsch
Smithsonian Institution

Kathryn Jackson
Tennessee Valley Authority

Eileen Kennedy
Department of Agriculture

Margaret Leinen
National Science Foundation

Paul Leonard
Housing and Urban Development

About the Committee on Environment and Natural Resources

The CENR is charged with improving coordination among Federal agencies involved in environmental and natural resources research and development, establishing a strong link between science and policy, and developing a Federal environment and natural resources research and development strategy that responds to national and international issues. To obtain additional information about the CENR, contact the CENR Executive Secretary at 202-482-5917 (voice).

Norine Noonan
Environmental Protection Agency

Kenneth Olden
Department of Health and Human Services

David Sandalow
Department of State

Wesley Warren
Office of Management and Budget

Craig Wingo
Federal Emergency Management Agency

Samuel Williamson
Office of the Federal Coordinator for Meteorology

SUBCOMMITTEES

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Dan Albritton (NOAA), Chair
Bob Perciasepe (EPA), Vice Chair

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Mary Clutter (NSF), Co-Chair
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D. James Baker (NOAA), Chair
Ghassem Arsar (NASA), Vice Chair
Margaret Leinen (NSF), Vice Chair

Natural Disaster Reduction

Mike Armstrong (FEMA), Chair
John Filson (USGS), Vice Chair
Jaime Hawkins (NOAA), Vice Chair

Toxics and Risk

Norine Noonan (EPA), Chair
Bob Foster (DOD), Vice Chair
Kenneth Olden (HHS), Vice Chair

About the Subcommittee on Global Change Research

The Subcommittee on Global Change Research (SGCR) is one of five subcommittees under the Committee on Environment and Natural Resources (CENR). The SGCR is charged with improving coordination among Federal agencies participating in the U. S. Global Change Research Program (USGCRP), which was established by Congress in 1990 "to provide for development and coordination of a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." The NAST is grateful for the SGCR establishing the NAST and providing oversight for its activities. To obtain additional information regarding the SGCR, contact the Office of the USGCRP at 202-488-8630 (voice) or see <http://www.usgcrp.gov>.

D. James Baker, Chair
(from January 2000)
National Oceanographic and Atmospheric Administration
Department of Commerce

Robert W. Corell, Chair (through December, 1999)
National Science Foundation

Ghassem Asrar, Vice Chair
National Aeronautics and Space Administration

Margaret Leinen, Vice Chair
National Science Foundation

William Sommers
U. S. Forest Service
Department of Agriculture

Mary Gant
National Institute of Environmental Health Sciences, Department of Health and Human Services

Charles (Chip) Groat
Department of the Interior

J. Michael Hall
National Oceanic and Atmospheric Administration, Department of Commerce

Patrick Neale
Smithsonian Institution

Mark Mazur
Department of Energy

Margot Anderson
Department of Energy

Jeff Miotke
Department of State

Aristides A. Patrinos (SGCR liaison to the NAST)
Department of Energy

Fred Saalfeld
Department of Defense

Michael Slimak
Environmental Protection Agency

Executive Office Liaisons

Rosina Bierbaum
Office of Science and Technology Policy

Peter Backlund
Office of Science and Technology Policy

Steven Isakowitz
Office of Management and Budget

Sarah G. Horrigan
Office of Management and Budget

Ian Bowles
Council on Environmental Quality

The National Assessment Working Group is charged by the SGCR with overseeing and facilitating the coordination and preparation of national-scale assessments to document the current state of knowledge of the consequences of global change and their implications for policy and management decisions for the Nation. As such, they were the organizers and sponsors of the regional and sectoral assessments.

Paul Dresler
(through December 1999), Chair
Department of the Interior

Joel Scheraga, Vice Chair
Environmental Protection Agency

Richard Ball (through November 1999),
Vice Chair
Department of Energy

Department of Agriculture
Margot Anderson (through March 2000)
Jeff Graham (through Sept. 1999)
Robert House
Fred Kaiser

Department of Defense and US Army
Corps of Engineers
Thomas Nelson
Eugene Stakhiv

Department of Energy
Mitchell Baer (from November, 1999)
Jerry Elwood

Department of the Interior
Dave Kirtland
Ben Ramey

Environmental Protection Agency
Janet Gamble

National Aeronautics and Space Administration
Anne Carlson (from Jan. 2000)
Nancy Maynard (through Jan. 2000)
William Turner (from April 2000)
Louis Whitsett (through Dec. 2000)

National Institute of Environmental Health Sciences
Mary Gant

National Oceanic and Atmospheric Administration
Claudia Nierenberg
Roger Pulwarty
Caitlin Simpson

National Science Foundation
Thomas Spence

Office of Science and Technology Policy
Peter Backlund

ACKNOWLEDGMENTS

Lead Organizers of and Contributors to Regional and Sectoral Workshops and/or Assessments:

The information underpinning the National Assessment was generated through a series of workshops and assessments conducted by a distributed set of regional and sectoral teams. These teams were organized under the auspices of and sponsored by the USGCRP agencies. The sponsored workshops and assessments were conducted in an open manner and their findings were subjected to peer review by technical experts, interested stakeholders, other regional and sectoral teams, and the USGCRP agencies. Final responsibility for their findings rests with the individual teams. Information was channeled to the National Assessment Synthesis Team through a NAST liaison to the teams. Asterisks indicate the chair/co-chairs of the assessment teams. The NAST is particularly grateful for the extensive efforts of the regional and sectoral teams. Information on the regional and sectoral teams and their activities is available at <http://www.nacc.usgcrp.gov>. [Note: Sectoral workshops are not listed as many were held in conjunction with other meetings.]

REGIONAL WORKSHOP AND ASSESSMENT TEAMS

NORTHEAST MEGAREGION

Eric Barron, NAST liaison

Metropolitan East Coast

Workshop and Assessment Teams

Cynthia Rosenzweig*, National Aeronautics and Space Administration, Goddard Institute for Space Studies, and Columbia University

William Solecki*, Montclair State University

Carli Paine, Columbia University

Peter Eisenberger, Columbia University Earth Institute

Lewis Gilbert, Columbia University Earth Institute

Vivien Gornitz, Columbia University Center for Climate Systems Research

Ellen K. Hartig, Columbia University Center for Climate Systems Research

Douglas Hill, State University of New York, Stony Brook

Klaus Jacob, Lamont-Doherty Earth Observatory of Columbia University

Patrick Kinney, Columbia University Joseph A. Mailman School of Public Health

David Major, Columbia University Center for Climate Systems Research

Roberta Balstad Miller, Center for International Earth Science

Information Network (CIESIN)

Rae Zimmerman, New York University Institute for Civil Infrastructure Systems, Wagner School

Mid-Atlantic

(Workshop September 9-11, 1997)

Ann Fisher*, Pennsylvania State University

David Able, Pennsylvania State University

Eric J. Barron, Pennsylvania State University

Richard Bord, Pennsylvania State University

Robert Crane, Pennsylvania State University

David DeWalle, Pennsylvania State University

C. Gregory Knight, Pennsylvania State University

Ray Najjar, Pennsylvania State University

Egide Nizeyimana, Pennsylvania State University

Robert O'Connor, Pennsylvania State University

Adam Rose, Pennsylvania State University

James Shortle, Pennsylvania State University

Brent Yarnal, Pennsylvania State University

New England and Upstate New York (Workshop September 3-5, 1997)

Barry Rock*, University of New Hampshire

Berrien Moore III*, University of New Hampshire

David Bartlett, University of New Hampshire

Paul Epstein, Harvard School of Public Health

Steve Hale, University of New Hampshire

George Hurtt, University of New Hampshire

Lloyd Irland, Irland Group, Maine

Barry Keim, New Hampshire State climatologist

Clara Kustra, University of New Hampshire

Greg Norris, Sylvatica Inc., Maine

Ben Sherman, University of New Hampshire

Shannon Spencer, University of New Hampshire

Hal Walker, EPA, Atlantic Ecology

Division, Rhode Island

SOUTHEAST MEGAREGION

Virginia Burkett, NAST liaison

Central and Southern Appalachians

(Workshop May 26-29, 1998)

William T. Peterjohn (PI), West Virginia University

Richard Birdsey, USDA Forest Service

Amy Glasmeier, Pennsylvania State University

Steve McNulty, USDA Forest Service

Trina Karolchik Waffle, West Virginia University

Gulf Coast

(Workshop February 25-27, 1998)

Zhu Hua Ning*, Southern University and A & M College

Kamran Abdollahi*, Southern University and A & M College

Virginia Burkett, USGS National Wetlands Research Center

James Chamber, Louisiana State University

David Sailor, Tulane University

Jay Grymes, Southern Regional Climate Center

Paul Epstein, Harvard University

Michael Slimak, US Environmental Protection Agency

Southeast

(Workshop June 25-27, 1997)

Ron Ritschard*, University of Alabama - Huntsville

James Cruise*, University of Alabama - Huntsville

James O'Brien*, Florida State University

Robert Abt, North Carolina State University

Upton Hatch, Auburn University

Shrikant Jagtop, University of Florida

James Jones, University of Florida

Steve McNulty, USDA Forest Service

MIDWEST MEGAREGION

Tom Karl and David Easterling,
NAST liaisons

Eastern Midwest

(Workshop June 29-30,1998)

J. C.Randolph,Indiana University

Otto Doering,Purdue University

Mike Mazzocco,University of Illinois,
Urbana - Champaign

Becky Snedegar, Indiana University

Great Lakes

(Workshop May 4-7,1998)

Peter J. Sousounis*,University of
Michigan

Jeanne Bisanz*,University of Michigan

Gopal Alagarwamy, Michigan State
University

George M.Albercook,University of
Michigan

J. David Allan,University of Michigan

Jeffrey A.Andresen,Michigan State
University

Raymond A.Assel,Great Lakes
Environmental Research Laboratory

Arthur S.Brooks,University of
Wisconsin-Milwaukee

Michael Barlage,University of Michigan

Daniel G.Brown,Michigan State
University

H.H.Cheng,University of Minnesota

Anne H.Clites,Great Lakes
Environmental Research Laboratory

Thomas E.Croley II,Great Lakes
Environmental Research Laboratory

Margaret Davis,University of Minnesota

Anthony J. Eberhardt,Buffalo District,
Army Corps of Engineers

Emily K.Grover, University of Michigan

Galina Guentchev, Michigan State
University

Vilan Hung,University of Michigan

Kenneth E. Kunkel,Illinois State Water
Survey

David A.R.Kirstovich,Illinois State
Water Survey

John T. Lehman,University of Michigan

John D. Lindeberg,Center for
Environmental Studies,Economics &
Science

Brent M.Lofgren,Great Lakes

Environmental Research Laboratory

James R.Nicholas,USGS,Lansing,
Michigan

Jamie A.Picardy, Michigan State
University

Jeff Price,American Bird Conservancy

Frank H.Quinn,Great Lakes

Environmental Research Laboratory

Paul Richards,University of Michigan

Joe Ritchie,Michigan State University

Terry Root,University of Michigan

William B.Sea,University of Minnesota

David Stead,Center for Environmental
Studies,Economics & Science

Shinya Sugita,University of Minnesota

Karen Walker, University of Minnesota

Eleanor A.Waller, Michigan State
University

Nancy E. Westcott,Illinois State Water
Survey

Mark Wilson,University of Michigan

Julie A.Winkler, Michigan State
University

John Zastrow, University of Wisconsin

Additional Contributors

Stanley Changnon,Illinois State Water
Survey

GREAT PLAINS MEGAREGION

Linda Joyce, NAST liaison

Central Great Plains

(Workshop May 27-29,1997)

Dennis Ojima*,Colorado State
University

Jill Lackett*,Colorado State University

Dennis Child,Colorado State University

Alan Covich,Colorado State University

Celine Donofrio,Colorado State
University

William Easterling, Pennsylvania State
University

Kathy Galvin,Colorado State University

Luis Garcia,Colorado State University

Tom Hobbs,Colorado State
University/State of Colorado Division
of Wildlife

Martin Kleinschmit,Center for Rural
Affairs

Kathleen Miller, National Center for
Atmospheric Research

Jack Morgan,USDA Agricultural
Research Service

Bill Parton,Colorado State University

Keith Paustian,Colorado State
University

Gary Peterson,Colorado State
University

Rob Ravenscroft, rancher,Nebraska

Lee Sommers,Colorado State University

Northern Great Plains

(Workshop November 5-7,1997)

George Seielstad*,University of North
Dakota

Leigh Welling*,University of North
Dakota

Kevin Dalsted,South Dakota State
University

Jim Foreman,Ten Sleep, Wyoming

Robert Gough,Intertribal Council On
Utility Policy

Janice Mattson,Precision Agriculture
Research Association

James Rattling Leaf, Sinte Gleska
University

Patricia McClurg,University of
Wyoming

Gerald Nielsen,Montana State
University

Gary Wagner, Climax,Minnesota

Pat Zimmerman,South Dakota School
of Mines and Technology

Southern Great Plains

(Workshop May 24-25,1999)

Robert Harriss*,Texas A&M University
(currently National Center for
Atmospheric Research)

Tina Davies,Houston Advanced
Research Center

David Hitchcock,Houston Advanced
Research Center

Gerald North,Texas A&M University

Southwest-Rio Grande River Basin

(Workshop March 2-4,1998)

Charles Groat,University of Texas-El
Paso (currently US Geological
Survey)

Honorable Silvestre Reyes,US House of
Representatives,Texas

WEST MEGAREGION

Rich Richels, Barbara Miller and Joel
Smith, NAST liaisons

California

(Workshop March 9-11,1998)

Robert Wilkinson,* University of
California,Santa Barbara

Jeff Dozier*,University of California,
Santa Barbara

Richard Berk,University of California,
Los Angeles

Dan Cayan,Scripps Institution of
Oceanography, University of
California,San Diego

Keith Clarke,University of California,
Santa Barbara

Frank Davis,University of California,
Santa Barbara

James Dehlsen,Dehlsen Associates

Peter H.Gleick, Pacific Institute for
Studies in Development,
Environment,and Security

Michael Goodchild,University of
California,Santa Barbara

Nicholas Graham,Scripps Institution of
Oceanography / University of

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- California, San Diego
William J. Keese, California Energy Commission
Charles Kolstad, University of California, Santa Barbara
Michael MacCracken, USGCRP and Lawrence Livermore National Laboratory
Jim McWilliams, University of California, Los Angeles
John Melack, University of California, Santa Barbara
Norman L. Miller, Lawrence Berkeley National Laboratory / University of California, Berkeley
Harold A. Mooney, Stanford University
Peter Moyle, University of California, Davis
Walter C. Oechel, San Diego State University
Larry Papay, Bechtel Group
Claude Poncelet, Pacific Gas and Electric Company
Thomas Suchanek, NIGEC / University of California, Davis
Henry Vaux, University of California Office of the President
James R. Young, Southern California Edison
- Rocky Mountain/Great Basin
(Workshop February 16-18, 1998)
Frederic Wagner*, Utah State University
Thomas Stohlgren*, US Geological Survey
Connely Baldwin, Utah State University
Jill Baron, US Geological Survey, Fort Collins, CO
Hope Bragg, Utah State University
Barbara Curti, Nevada Farm Bureau, Reno, NV
Martha Hahn, U.S. Bureau of Land Management, Boise, ID
Sherm Janke, Sierra Club, Bozeman, MT
Upmanu Lall, Utah State University
Linda Mearns, National Center for Atmospheric Research, Boulder, CO
Hardy Redd, Private Rancher, Lasal, UT
Gray Reynolds, Sinclair Corporation, Salt Lake City, UT
David Roberts, Utah State University
Lisa Schell, Colorado State University
Susan Selby, Las Vegas Valley Water District
Carol Simmons, Colorado State University
Dale Towell, Idaho Dept. of Fish and Game, Boise, ID
- Booth Wallentine, Utah Farm Bureau Federation, Salt Lake City, UT
Todd Wilkinson, Journalist, Bozeman, MT
- Southwest-Colorado River Basin
(Workshop September 3-5, 1997)
William A. Sprigg*, University of Arizona
Todd Hinkley*, US Geological Survey
Diane Austin, University of Arizona
Roger C. Bales, University of Arizona
David Brookshire, University of New Mexico
Stephen P. Brown, Federal Reserve Bank of Dallas
Janie Chermak, University of New Mexico
Andrew Comrie, University of Arizona
Prabhu Dayal, Tucson Electric Power Company
Hallie Eakin, University of Arizona
David C. Goodrich, US Department of Agriculture
Howard P. Hanson, Los Alamos National Laboratory
Laura Huenneke, New Mexico State University
William Karsell, WAPA
Korine Kolivras, University of Arizona
Diana Liverman, University of Arizona
Rachel A. Loehman, Sandia National Laboratories
Jan Matusak, Metropolitan Water District of Southern California
Linda Mearns, National Center for Atmospheric Research
Robert Merideth, University of Arizona
Kathleen Miller, National Center for Atmospheric Research
David R. Minke, ASARCO
Barbara Morehouse, University of Arizona
Dan Muhs, US Geological Survey
Wilson Orr, Prescott College
Thomas Pagano, University of Arizona
Mark Patterson, University of Arizona
Kelly T. Redmond, Desert Research Institute
Paul R. Sheppard, University of Arizona
Verna Teller, Isleta Pueblo
James R. Young, Southern California Edison
- NORTHWEST
Edward A. Parson, NAST liaison
(Workshop July 14-16, 1997)
Philip Mote*, University of Washington
- Douglas Canning, Department of Ecology, State of Washington
David Fluharty, University of Washington
Robert Francis, University of Washington
Jerry Franklin, University of Washington
Alan Hamlet, University of Washington
Blair Henry, The Northwest Council on Climate Change
Marc Hershman, University of Washington
Kristyn Gray Ideker, Ross and Associates
William Keeton, University of Washington
Dennis Lettenmaier, University of Washington
Ruby Leung, Pacific Northwest National Laboratory
Nathan Mantua, University of Washington
Edward Miles, University of Washington
Ben Noble, Battelle Memorial Institute
Hossein Parandvash, Portland Bureau of Water Works
David W. Peterson, US Geological Survey
Amy Snover, University of Washington
Sean Willard, University of Washington
- ALASKA
Edward A. Parson, NAST liaison
(Workshops June 3-6, 1997 and October 29-30, 1998)
Gunter Weller*, University of Alaska Fairbanks
Patricia Anderson*, University of Alaska Fairbanks
Bronwen Wang*, US Geological Survey
Matthew Berman, University of Alaska Anchorage
Don Callaway, National Park Service
Henry Cole, Hydro Solutions & Purification LLC
Keith Criddle, Utah State University
Merritt Helfferich, Innovating Consulting Inc.
Glenn Juday, University of Alaska Fairbanks
Gunnar Knapp, University of Alaska Anchorage
Rosa Meehan, U. S. Fish and Wildlife Service
Thomas Osterkamp, University of Alaska Fairbanks

COASTAL AND ISLANDS MEGAREGION

Lynne Carter (from April 2000) and
Melissa Taylor (through March 2000),
NAST liaison

Pacific Islands

(Workshop March 3-6, 1998)

Eileen Shea*, East-West Center

Michael Hamnett*, University of Hawaii

Cheryl Anderson, University of Hawaii

Anthony Barnston, NOAA, National

Centers for Environmental Prediction

Joseph Blanco, Office of the Governor
(State of Hawaii)

Kelvin Char, Office of the Governor
(State of Hawaii) and NOAA National
Marine Fisheries Service, Pacific
Islands Area Office

Delores Clark, NOAA National Weather
Service, Pacific Region Office

Scott Clawson, Hawaii Hurricane Relief
Fund

Tony Costa, Pacific Ocean Producers

Margaret Cummisky, Office of the
Honorable Daniel K. Inouye, United
States Senate

Tom Giambelluca, University of Hawaii

Chip Guard, University of Guam

Richard Hagemeyer, NOAA National
Weather Service, Pacific Region
Office

Alan Hilton, NOAA Pacific ENSO
Applications Center

David Kennard, FEMA Region IX, Pacific
Area Office

Roger Lukas, University of Hawaii

Fred Mackenzie, University of Hawaii

Clyde Mark, Outrigger Hotels and
Resorts-Hawaii

Gerald Meehl, National Center for
Atmospheric Research

Jerry Norris, Pacific Basin Development
Council

David Penn, University of Hawaii

Jeff Polovina, NOAA National Marine
Fisheries Service

Roy Price, Hawaii State Civil Defense
(retired)

Barry Raleigh, University of Hawaii

Kitty Simonds, Western Pacific Regional
Fishery Management Council

Peter Vitousek, Stanford University

Diane Zachary, Maui Pacific Center

South Atlantic Coast and Caribbean
(Workshop July 21-23, 1998)

Ricardo Alvarez, International Hurricane
Center

Krishnan Dandapani, Florida

International University

Shahid Hamid, Florida International
University

Stephen Leatherman, International
Hurricane Center

Richard Olson, International Hurricane
Center

Walter Peacock, International Hurricane
Center/Laboratory for Social and
Behavioral Research

Paul Trimble, South Florida Water
Management District

NATIVE PEOPLES/NATIVE HOMELANDS

Michael MacCracken, NAST liaison

(Workshop October 28-November 1,
1998)

Verna Teller, Isleta Pueblo

Robert Gough, Intertribal Council on
Utility Policy

Schuyler Houser, American Indian
Higher Education Consortium

Nancy Maynard, NASA

Fidel Moreno, Yaqui/Huichol

Lynn Mortensen, US Global Change
Research Program

Patrick Spears, Lakota

Valerie Taliman, Navajo

Janice Whitney, HETF Fiduciary

Native Peoples/Native Homelands—
Southwest

Stan Morain*, University of New Mexico

Rick Watson*, San Juan College

Diane Austin, University of Arizona

Mark Bauer, Diné College

Karl Benedict, University of New
Mexico

Jennifer Bondick, University of New
Mexico

Amy Budge, University of New Mexico

Linda Colon, University of New Mexico

Laura Gleasner, University of New
Mexico

Jhon Goes In Center, Oglala Lakota
Nation

Todd Hinckley, US Geological Survey

Doug Isely, Diné College

Bryan Marozas, DOI Bureau of Indian
Affairs

Lynn Mortensen, US Global Change
Research Program

Verna Teller, Isleta Pueblo

Carmelita Topaha, Navajo

Ray Williamson, George Washington
University

Additional contributors

Patricia Anderson, University of Alaska

Lynne Carter, National Assessment

Coordination Office

Schuyler Houser, American Indian

Higher Education Consortium

Susan Marcus, US Geological Survey

Jeff Price, American Bird Conservancy

James Rattling Leaf, Sinte Gleska

University

George Seielstad, University of North
Dakota

Eileen Shea, East-West Center, Hawaii

Tony Socci, US Global Change Research
Program

Leigh Welling, University of North
Dakota

SECTOR ASSESSMENT TEAMS

AGRICULTURE

Jerry Melillo, NAST liaison

John Reilly*, Massachusetts Institute of
Technology

James Hrubovcak* (from October
1999), US Department of Agriculture

Jeff Graham*, US Department of
Agriculture (through Sept. 1999)

David G. Abler, Pennsylvania State
University

Robert Brown, Battelle-Pacific
Northwest National Laboratory

Roy Darwin, US Department of
Agriculture

Steven Hollinger, University of Illinois

Cesar Izaurralde, Battelle-Pacific
Northwest National Laboratory

Shrikant Jagtap, University of Florida-
Gainesville

James Jones, University of Florida-
Gainesville

John Kimble, US Department of
Agriculture

Bruce McCarl, Texas A&M University

Linda Mearns, National Center for
Atmospheric Research

Dennis Ojima, Colorado State University

Eldor A. Paul, Michigan State University

Keith Paustian, Colorado State
University

Susan Riha, Cornell University

Norman Rosenberg, Battelle-Pacific
Northwest National Laboratory

Cynthia Rosenzweig, NASA-Goddard
Institute for Space Studies

Francesco Tubiello, NASA-Goddard
Institute for Space Studies

ACKNOWLEDGMENTS

COASTAL AREAS AND MARINE RESOURCES

Virginia Burkett, NAST liaison

Donald Boesch*, University of Maryland

Donald Scavia*, National Oceanic and Atmospheric Administration

John Field (project director), University of Washington

Robert Buddemeier, University of Kansas

Virginia Burkett, U. S. Geological Survey

Daniel Cayan, Scripps Institute of Oceanography

Michael Fogarty, University of Maryland

Mark A. Harwell, University of Miami

Robert Howarth, Cornell University

Curt Mason, National Oceanic and Atmospheric Administration

Richard A. Park, Eco-Modeling

Leonard J. Pietrafesa, North Carolina State University

Denise Reed, University of New Orleans

Thomas Royer, Old Dominion University

Asbury Sallenger, US Geological Survey

Michael Spranger, University of Washington

James Titus, Environmental Protection Agency

FORESTS

Linda Joyce, NAST liaison

Darius Adams, Oregon State University

John Aber*, University of New Hampshire

Steven McNulty*, US Department of Agriculture; Forest Service

Ralph Alig, US Department of Agriculture, Forest Service

Matthew P. Ayres, Dartmouth College

Dominique Bachelet, Oregon State University

Patrick Bartlein, University of Oregon

Carter J. Betz, US Department of Agriculture, Forest Service

Chi-Chung Chen, Texas A&M University

Rosamonde Cook, Colorado State University

David J. Currie, University of Ottawa, Canada

Virginia Dale, Oak Ridge National Laboratory

Raymond Drapek, Oregon State University

Michael D. Flannigan, Canadian Forest

Service

Curt Flather, US Department of

Agriculture, Forest Service

Andy Hansen, Montana State University

Paul J. Hanson, Oak Ridge National Laboratory

Mark Hutchins, Sno-Engineering, Inc

Louis Iverson, US Department of

Agriculture, Forest Service

Lloyd Irland, The Irland Group

Linda Joyce, US Department of

Agriculture, Forest Service

James Lenihan, Oregon State University

María Lombardero, Universidad de Santiago, Lugo, Spain

Ariel E. Lugo, US Department of

Agriculture, Forest Service

Bruce McCarl, Texas A&M University

Ron Neilson, US Department of

Agriculture, Forest Service

Chris J. Peterson, University of Georgia

Sarah Shafer, University of Oregon

Daniel Simberloff, University of Tennessee

Ken Skog, US Department of

Agriculture, Forest Service

Brent L. Sohngen, Ohio State University

Brian J. Stocks, Canadian Forest Service

Frederick J. Swanson, US Department of Agriculture, Forest Service

Jake F. Weltzin, University of

Tennessee

B. Michael Wotton, Canadian Forest

Service

HUMAN HEALTH

Tom Cecich, NAST liaison

Michael A. McGeehin*, US Centers for Disease Control and Prevention

Jonathan A. Patz*, Johns Hopkins University School of Hygiene and Public Health

Susan M. Bernard (project director), Johns Hopkins University School of Hygiene and Public Health

Kristie L. Ebi, EPRI

Paul Epstein, Harvard Medical School

Anne Grambsch, US Environmental Protection Agency

Duane J. Gubler, US Centers for Disease Control and Prevention

Paul Reiter, US Centers for Disease Control and Prevention

Isabelle Romieu, US Centers for Disease Control and Prevention

Joan B. Rose, University of South Florida

Jonathan M. Samet, Johns Hopkins University School of Hygiene and Public Health

Juli Trtanj, National Oceanic and Atmospheric Administration

WATER RESOURCES

Katharine Jacobs, NAST liaison

D. Briane Adams*, US Geological Survey

Peter Gleick*, Pacific Institute for Studies in Development,

Environment, and Security

Thomas O. Barnwell, US Environmental Protection Agency

Beth Chalecki, Pacific Institute for Studies in Development,

Environment, and Security

Joseph Dellapenna, Villanova University

Ted Engman, NASA Goddard Space Flight Center

Kenneth D. Frederick, Resources for the Future

Aris P. Georgakakos, Georgia Institute of Technology

Donald R. Glaser, Water consultant

Gerald Hansler, Delaware River Basin Commission (retired)

Lauren Hay, US Geological Survey

Bruce P. Hayden, University of Virginia

Blair Henry, The Northwest Council on Climate Change

Steven Hostetler, US Geological Survey

Katharine Jacobs, Arizona Department of Water Resources

Sheldon Kamieniecki, University of Southern California

Debra S. Knopman, Center for Environmental Economics,

Progressive Policy Foundation

Robert D. Kuzelka, University of Nebraska-Lincoln

Dennis Lettenmaier, University of Washington

Gregory McCabe, US Geological Survey

Judy Meyer, University of Georgia

Timothy Miller, US Geological Survey

Paul C. "Chris" Milly, US Geological Survey, Geophysical Fluid Dynamics Laboratory

Norman Rosenberg, Battelle-Pacific Northwest National Laboratory

Michael J. Sale, Oak Ridge National Laboratory

Gregory E. Schwarz, US Geological Survey

John Schaake, National Oceanic and Atmospheric Administration
Susan S. Seacrest, The Groundwater Foundation
Davis S. Shriner, US Forest Service
Eugene Z. Stakhiv, US Army Corps of Engineers
David M. Wolock, US Geological Survey

Scenario Development Teams:

As a basis for exploring the potential consequences of climate variability and change, information concerning climate, ecosystems, and socioeconomic factors was assembled to assist the regional and sectoral teams. As context for examining potential changes, information was assembled that documented conditions in the 20th century. To provide self-consistent estimates of how conditions might change in the future, simulations using state-of-the-art computer models were used to construct plausible scenarios of the types of conditions that might evolve during the 21st century. Asterisks indicate team leaders. Information on the various scenarios is available at <http://www.nacc.usgcrp.gov>.

CLIMATE VARIABILITY AND CHANGE

Eric Barron*, Pennsylvania State University
David Easterling*, NOAA National Climate Data Center
Benjamin Felzer*, National Center for Atmospheric Research
Tom Karl*, NOAA National Climate Data Center
Michael MacCracken*, USGCRP/National Assessment Coordination Office
Richard Ball, Department of Energy (retired)
Tony Barnston, NOAA, NCEP, Climate Prediction Center
Denise Blaha, University of New Hampshire
George Boer, Canadian Centre for Climate Modelling and Analysis, Victoria, BC
Ruth Carnell, Hadley Centre, Meteorological Office, Bracknell, UK
Aiguo Dai, National Center for Atmospheric Research
Christopher Daly, Oregon State University
Hank Fisher, National Center for Atmospheric Research
Greg Flato, Canadian Centre for Climate Modelling and Analysis, Victoria, BC

Byron Gleason, National Climatic Data Center
Jonathan Gregory, Hadley Centre, Meteorological Office, Bracknell, UK
Yuxiang He, NOAA, NCEP, Climate Prediction Center
Preston Heard, Indiana University - Bloomington
Roy Jenne, National Center for Atmospheric Research
Dennis Joseph, National Center for Atmospheric Research
Tim Kittel, National Center for Atmospheric Research
Richard Knight, NOAA National Climate Data Center
Steven Lambert, Canadian Centre for Climate Modelling and Analysis, Victoria, BC
Linda Mearns, National Center for Atmospheric Research
John Mitchell, Hadley Centre, Meteorological Office, Bracknell, UK
James Risbey, Carnegie Mellon University
Nan Rosenbloom, National Center for Atmospheric Research
J. Andy Royle, US Fish and Wildlife Service, Laurel MD
Annette Schloss, University of New Hampshire
Joel B. Smith, Stratus Consulting
Steve Smith, Pacific Northwest National Laboratory
Peter Sousounis, University of Michigan
David Viner, Climatic Research Unit, Norwich, UK
Warren Washington, National Center for Atmospheric Research
Tom Wigley, National Center for Atmospheric Research
Francis Zwiers, Canadian Centre for Climate Modelling and Analysis, Victoria, BC

ECOSYSTEMS

Timothy G. F. Kittel*, National Center for Atmospheric Research
Jerry Melillo*, Woods Hole Marine Biological Laboratory
David S. Schimel*, Max-Planck-Institute for Biogeochemistry, Jena, Germany
Steve Aulenbach, National Center for Atmospheric Research
Dominique Bachelet, Oregon State University
Sharon Cowling, Lund University, Sweden
Christopher Daly, Oregon State University
Ray Drapek, Oregon State University

Hank H. Fisher, National Center for Atmospheric Research
Melannie Hartman, Colorado State University
Kathy Hibbard, University of New Hampshire
Thomas Hickler, Lund University, Sweden
Cristina Kaufman, National Center for Atmospheric Research
Robin Kelly, Colorado State University
David Kicklighter, Marine Biological Laboratory
Jim Lenihan, Oregon State University
David McGuire, U.S. Geological Survey and University of Alaska, Fairbanks, AK
Ron Neilson, USDA Forest Service
Dennis S. Ojima, Colorado State University
Shufen Pan, Marine Biological Laboratory
William J. Parton, Colorado State University
Louis F. Pitelka, University of Maryland Appalachian Laboratory
Colin Prentice, Max-Planck-Institute for Biogeochemistry, Jena, Germany
Brian Rizzo, University of Virginia
Nan A. Rosenbloom, National Center for Atmospheric Research
J. Andy Royle, U. S. Department of the Interior
Steven W. Running, University of Montana
Stephen Sitch, Potsdam Institute for Climate Impact Research, Germany
Ben Smith, Lund University, Sweden
Thomas M. Smith, University of Virginia
Martin T. Sykes, Lund University, Sweden
Hanqin Tian, Marine Biological Laboratory
Justin Travis, Lund University, Sweden
Peter E. Thornton, University of Montana
E Ian Woodward, University of Sheffield, UK

SOCIO-ECONOMIC CONDITIONS

Edward A. Parson*, Harvard University
Jae Edmonds, Pacific Northwest National Laboratory
Ann Fisher, Pennsylvania State University
Linda Joyce, US Forest Service, Department of Agriculture
Barbara Miller, World Bank
M. Granger Morgan, Carnegie Mellon University
Richard Richels, EPRI
Nestor Terlickij, NPA Data Associates

David Vogt, Oak Ridge National Laboratory
Tom Wilbanks, Oak Ridge National Laboratory
Sherry Wright, Oak Ridge National Laboratory

Planning and Development Workshops and Activities:
To develop the plans for the assessment and ensure coordination among the various teams, a series of planning and development and other coordination activities were held.

ASPEN GLOBAL CHANGE INSTITUTE
(Aspen, CO, July 29 through August 7, 1997)

Michael MacCracken, Office of the US Global Change Research Program
William Easterling, Pennsylvania State University
Paul Dresler, Department of the Interior
John Katzenberger, Aspen Global Change Institute
Melissa Taylor, US Global Change Research Program

INTERREGIONAL FORUM

Tom Wilbanks, Oak Ridge National Laboratory, chair
Co-chairs from all of the regions
Lynne Carter, liaison from National Assessment Coordination Office
Paul Dresler, liaison from National Assessment Working Group
Joel Scheraga, liaison from National Assessment Working Group

STAKEHOLDER GUIDELINES

Tom Wilbanks, Oak Ridge National Laboratory and National Center for Environmental Decision-making Research (NCEDR)
David Cash, Harvard University
Nichole Kerchner, University of Tennessee
Robb Turner, Joint Institute for Energy and Environment
Amy Wolfe, Oak Ridge National Laboratory

US CLIMATE FORUM

(Washington DC, November 12-13, 1997)
Richard Ball, Department of Energy
Susan Bassow, Office of Science and Technology Policy
Rosina Bierbaum, Office of Science and Technology Policy

Robert Corell, National Science Foundation
Paul Dresler, Department of Interior
Ann Fisher, Pennsylvania State University
David Goodrich, National Academy of Sciences
Susan Gordon, Department of State
Blair Henry, Northwest Council on Climate Change
Michael MacCracken, National Assessment Coordination Office
Jerry Melillo, Marine Biological Laboratory
Wil Orr, City of Scottsdale, Arizona
Aristides Patrinos, Department of Energy
Joel Scheraga, Environmental Protection Agency
George Seielstad, University of North Dakota
Robert Shepard, Science and Engineering Alliance
Melissa Taylor, National Assessment Coordination Office

US NATIONAL ASSESSMENT 1998 WORKSHOP

(Monterey CA, July 27-31, 1998)
Michael MacCracken, National Assessment Coordination Office
Melissa Taylor, National Assessment Coordination Office
Paul Dresler, Department of the Interior

US NATIONAL ASSESSMENT 1999 WORKSHOP

(Atlanta GA, April 12-15, 1999)
Tom Wilbanks, Oak Ridge National Laboratory
Paul Dresler, Department of the Interior
Joel Scheraga, Environmental Protection Agency
Melissa Taylor, National Assessment Coordination Office

National Assessment Coordination Team:

To facilitate overall coordination among the NAST, the USGCRP agencies, and the regional and sectoral teams, the Subcommittee on Global Change Research established the National Assessment Coordination Office (NACO) and enlisted the assistance of others drawn from various organizations. The National Assessment Synthesis Team expresses its appreciation for their contributions. Information about NACO is available at <http://www.nacc.usgcrp.gov>.

National Assessment Coordination Office
Michael MacCracken, Lawrence Livermore National Laboratory, executive director
Melissa Taylor, University Corporation for Atmospheric Research, executive secretary of NAST (through March 2000)
Lynne Carter, University Corporation for Atmospheric Research, regional liaison
Robert Cherry, University Corporation for Atmospheric Research, administrative assistant (through March 2000)
Nakia Dawkins, AA Temps (from November, 1999)
LaShaunda Malone, University Corporation for Atmospheric Research, research associate and, from Sept. 1999, sectoral liaison
Katherin Slimak, University Corporation for Atmospheric Research, research assistant (summers of 1998, 1999)
Justin Wettstein, University Corporation for Atmospheric Research, sectoral liaison (through Aug. 1999)

Assistance from Other Organizations

Joy Colucci, TerraComm, newsletter editor for Acclimations
Benjamin Felzer, National Center for Atmospheric Research, coordinator for climate scenarios
Susan Henson, National Science Foundation, NAST travel and SGC administrative support
Forrest Hoffman, Oak Ridge National Laboratory, Web support
Lynn Mortensen, University Corporation for Atmospheric Research, education and outreach specialist
Mary Ann Seifert, Marine Biological Laboratory, administrator for the NAST co-chair

Technical and Expert Reviewers:

The NAST is particularly grateful for the over 300 individuals who provided very thorough reviews and provided many helpful comments.

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Oak Ridge National Laboratory

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Agricultural and Biological

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State University, Department of

Forestry;Research Triangle Institute

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Scientific Writing and Editing:

Susan J. Hassol

Design, Layout and Production:

Grabhorn Studio

GLOSSARY

CO₂ Fertilization Effect

Increase in rate of plant growth due to increasing carbon dioxide concentration in the atmosphere; occurs because plants use the carbon in CO₂ to build their tissues, as long as sufficient water and nutrients are present

El Niño

Periodic warming of surface ocean water in the eastern equatorial Pacific that affects weather patterns around the world

El Niño - Southern Oscillation (ENSO)

The phenomenon of periodic changes in sea surface temperature in the equatorial Pacific made up of the warm El Niño phase and the cool La Niña phase

Eutrophication

Over-nourishing of algae in lakes (due to agricultural and urban runoff and other sources of nutrients) that depletes the water of oxygen to the detriment of other living things

La Niña

Periodic cooling of surface ocean water in the eastern equatorial Pacific that affects weather patterns around the world

Managed Ecosystems

Ecosystems that are maintained by substantial human inputs of energy and materials (such as fertilizer and water); examples include agriculture, forest plantations, and fish farms

Net Primary Productivity (NPP)

The net amount of carbon fixed by green plants through the process of photosynthesis

Pacific Decadal Oscillation (PDO)

Recently-discovered pattern of climate variation that changes phase every few decades and affects weather patterns in the Pacific Northwest, Alaska, and Pacific Islands

Subsidence

Sinking of land surface caused by natural factors such as tectonic shifts or by human activities such as groundwater withdrawals or oil and gas extraction

Tundra

Treeless plains in the arctic and subarctic regions in which the ground below the surface is frozen year-round

Taiga

Swampy, coniferous subarctic evergreen forest extending south from the tundra

Tropical Storms and Cyclones

Tropical storms originate over tropical oceans and have sustained winds between 30 and 73 miles per hour. If their sustained winds exceed 73 miles per hour, they become tropical cyclones. Tropical cyclones are known as hurricanes if they are in the North Atlantic Ocean, Caribbean Sea, Gulf of Mexico, or in the Eastern North Pacific (east of the date-line); they are known as typhoons if they are outside of these areas (west of the dateline).

Vector

An organism, such as a mosquito or tick, that directly transmits a disease such as malaria, dengue, or Lyme disease

Abbreviations

GtC: Gigatonnes of carbon (billions of metric tons)

SST: Sea surface temperature

Models

CGCM1: version 1 of the Canadian Global Coupled Model from the Canadian Centre for Climate Modelling and Analysis. In this report, the results from this model are referred to as the Canadian model scenario.

DOE PCM: Department of Energy Parallel Climate Model

ECHAM4/OPYC3: Developed by Max-Planck-Institut für Meteorologie (MPI) and Deutsches Klimarechenzentrum (DKRZ, translated as German Climate Computing Center), the name ECHAM comes from the first two letters of ECMWF (European Centre for Medium-Range Weather Forecasts) and the first three letters of Hamburg. The name OPYC is short for Ocean and isoPYCnal coordinates.

GFDL: Geophysical Fluid Dynamics Laboratory

HadCM2: version 2 of the Hadley Centre Coupled Model from the Hadley Centre for Climate Prediction and Research of the United Kingdom Meteorological Office. In this report, the results from this model are referred to as the Hadley model scenario.

MAPSS: Mapped Atmosphere-Plant-Soil System

NCAR CSM: National Center for Atmospheric Research Climate System Model

PnET: Photosynthesis and evapotranspiration model

TEM: Terrestrial Ecosystem Model

VEMAP: Vegetation/Ecosystem Modeling and Analysis Project