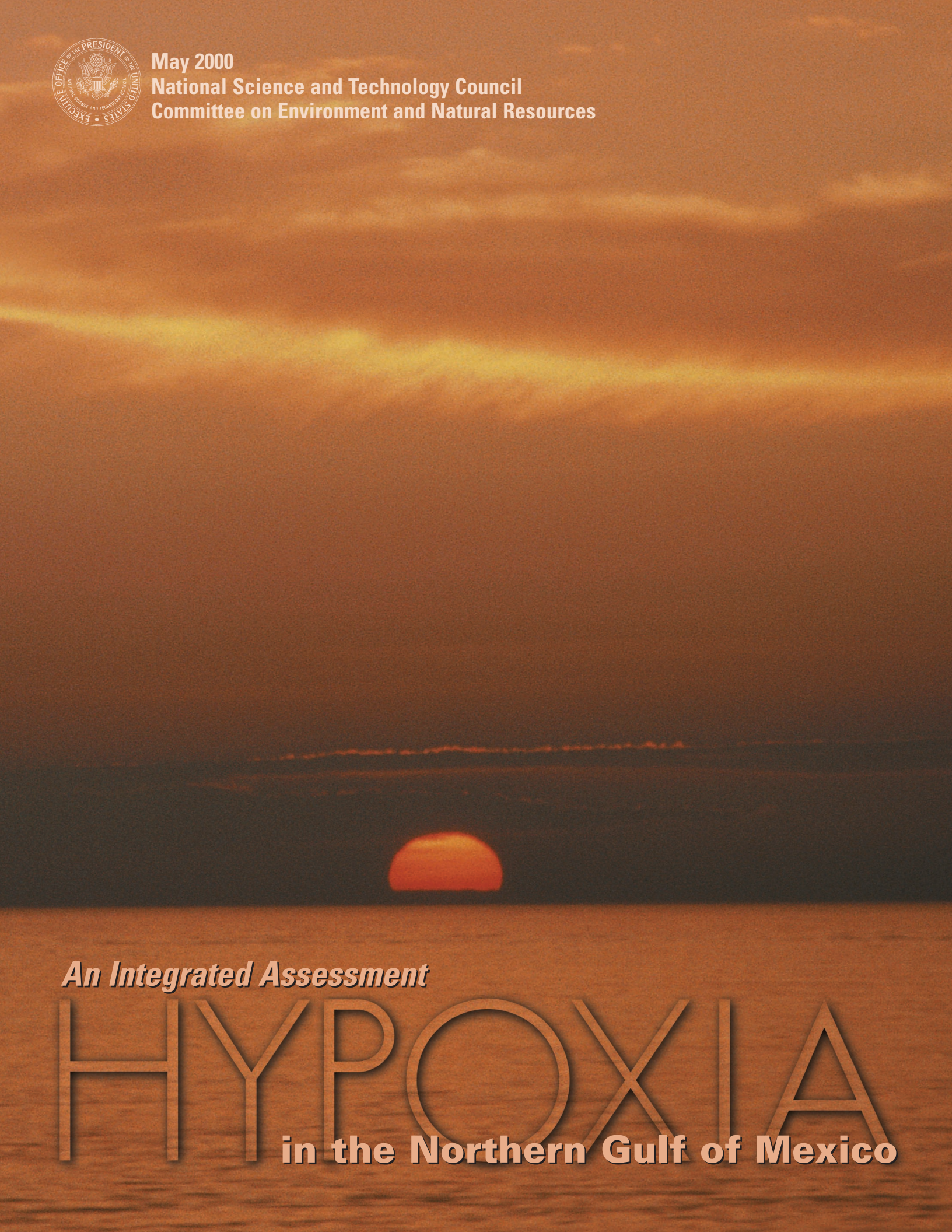

May 2000
National Science and Technology Council
Committee on Environment and Natural Resources

An Integrated Assessment

HYPOXIA

in the Northern Gulf of Mexico

The National Science and Technology Council

President Clinton established the National Science and Technology Council (NSTC) by Executive Order on November 13, 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. Membership consists of the Vice President, the Assistant to the President for Science and Technology, cabinet secretaries, agency heads with significant science and technology responsibilities, and other 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 technologies, environment and natural resources, 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 strategy that is aimed at accomplishing multiple national goals.

To obtain additional information regarding the NSTC, contact the NSTC Executive Secretariat at (202) 456-6100.

The Committee on Environment and Natural Resources

The Committee on Environment and Natural Resources (CENR) is one of five committees under the NSTC. It 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 regarding the CENR, contact the CENR Executive Secretariat at (202) 482-5916.

Integrated Assessment of Hypoxia in the Northern Gulf of Mexico

MAY 2000

National Science and Technology Council
Committee on Environment and Natural Resources

Committee on Environment and Natural Resources

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Acknowledgments

Hundreds of scientists, from a wide array of different fields, contributed over the years to the extensive knowledge base on which this assessment depends. An intensive collaborative effort over the past two years has assembled and reviewed available information. Special thanks are due to all who participated, particularly the many peer reviewers and the Editorial Board, whose efforts have sharpened thinking and clarified presentation.

Hypoxia Assessment Reports

As a foundation for the assessment, six interrelated reports that examine various aspects of the hypoxia issue were developed by six teams with experts from within and outside of government. The research teams were established not to conduct new research, but rather to analyze existing data and to apply existing models of the watershed-Gulf system. *This integrated assessment draws heavily from the results in these six reports.*

Each of the reports underwent extensive peer review by independent experts guided by an editorial board. Editorial Board members were Dr. Donald Boesch from the University of Maryland, Dr. Jerry Hatfield from the U.S. Department of Agriculture, Dr. George Hallberg from the Cadmus Group, Dr. Fred Bryan from Louisiana State University, Dr. Sandra Batie from Michigan State University, and Dr. Rodney Foil from Mississippi State University.

Topic 1. Characterization of Hypoxia. Describes the seasonal, interannual, and long-term variation of hypoxia in the northern Gulf of Mexico, and its relationship to nutrient loading. It also documents the relative roles of natural and human-induced factors in determining the size and duration of the hypoxic zone.

Nancy N. Rabalais, *Louisiana Universities Marine Consortium—Lead*
R. Eugene Turner, *Louisiana State University*
Dubravko Justić, *Louisiana State University*
Quay Dortch, *Louisiana Universities Marine Consortium*
William J. Wiseman, Jr., *Louisiana State University*

Topic 2. Ecological and Economic Consequences of Hypoxia. Presents an evaluation of the ecological and economic consequences of nutrient loading, including impacts on Gulf of Mexico fisheries and the regional and national economies.

Robert J. Diaz, *Virginia Institute of Marine Science—Ecological co-lead*
Andrew Solow, *Woods Hole Oceanographic Institution—Economics co-lead,*
with the assistance of many others

Topic 3. Flux and Sources of Nutrients in the Mississippi–Atchafalaya River Basin. Identifies the sources of nutrients within the Mississippi–Atchafalaya system and within the Gulf of Mexico, estimating both their location and the relative importance of specific human activities in contributing to these loads.

Donald A. Goolsby, *U.S. Geological Survey—Lead*
William A. Battaglin, *U.S. Geological Survey*
Gregory B. Lawrence, *U.S. Geological Survey*
Richard S. Artz, *National Oceanic and Atmospheric Administration*
Brent T. Aulenbach, *U.S. Geological Survey*
Richard P. Hooper, *U.S. Geological Survey*
Dennis R. Keeney, *Leopold Center for Sustainable Agriculture*
Gary J. Stensland, *Illinois State Water Survey*

Topic 4. Effects of Reducing Nutrient Loads to Surface Waters within the Mississippi River Basin and Gulf of Mexico. Estimates the effects of nutrient source reductions in the Mississippi–Atchafalaya Basin on water quality in these waters and on primary productivity and hypoxia in the Gulf.

Patrick L. Brezonik, *University of Minnesota—Upper watershed co-lead*
Victor J. Bierman, Jr., *Limno-Tech, Inc.—Gulf of Mexico co-lead*
Richard Alexander, *U.S. Geological Survey*
James Anderson, *University of Minnesota*
John Barko, *Waterways Experiment Station, U.S. Army Corps of Engineers*
Mark Dortch, *Waterways Experiment Station, U.S. Army Corps of Engineers*

Lorin Hatch, *University of Minnesota*
Gary L. Hitchcock, *University of Miami*
Dennis Keeney, *Iowa State University*
David Mulla, *University of Minnesota*
Val Smith, *University of Kansas*
Clive Walker, *Blackland Research Center*
Terry Whitledge, *University of Alaska*
William J. Wiseman, Jr., *Louisiana State University*

Topic 5. Reducing Nutrient Loads, Especially Nitrate–Nitrogen, to Surface Water, Ground Water, and the Gulf of Mexico. Identifies and evaluates methods to reduce nutrient loads to surface water, ground water, and the Gulf of Mexico.

William J. Mitsch, *The Ohio State University—Lead*
John W. Day, Jr., *Louisiana State University*
J. Wendall Gilliam, *North Carolina State University*
Peter M. Groffman, *Institute of Ecosystem Studies*
Donald L. Hey, *The Wetlands Initiative*
Gyles W. Randall, *University of Minnesota*
Naiming Wang, *The Ohio State University*

Topic 6. Evaluation of Economic Costs and Benefits of Methods for Reducing Nutrient Loads to the Gulf of Mexico. Evaluates the social and economic costs and benefits of the methods identified in Topic 5 for reducing nutrient loads, and assesses various incentive programs and any anticipated fiscal benefits generated for those attempting to reduce sources.

Otto C. Doering, *Purdue University—Lead*
Francisco Diaz-Hermelo, *Purdue University*
Crystal Howard, *Purdue University*
Ralph Heimlich, *Economic Research Service, U.S. Department of Agriculture*
Fred Hitzhusen, *The Ohio State University*
Richard Kazmierczak, *Louisiana State University*
John Lee, *Purdue University*
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