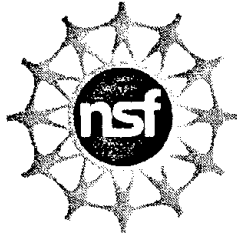


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Recent Awards: July-September 1977

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Introduction

This booklet presents an index of the projects recently funded by the National Science Foundation's Research Applied to National Needs program in Advanced Environmental Research and Technology (AENV). The goal of the Environment Division has been to enhance the Nation's capability to mitigate unacceptable environmental hazards and conditions, whether man-caused or natural. This research activity seeks to provide a scientific and technological base for managing these risks by preventing or reducing loss of life, property damage, and the disruption of vital community and ecological relationships.

The following report presents brief descriptions of awards for scientific research given by the Division of Advanced Environmental Research and Technology during the period July 1, 1977 through September 15, 1977. This booklet describes the total number of awards granted during the aforementioned time period. The data collected and contained in this report were derived from records of the Division of Advanced Environmental Research and Technology and at the time of its printing had not been reconciled with National Science Foundation's Management Information System reports.

Interested readers wishing further information pertaining to research in areas of science investigated by the Division are encouraged to complete and mail the attached post card. Additional information regarding proposal guidelines and proposal submissions is available upon request.

Definitions and Explanation of Format

Sample Statistical Summary:

Strip Mining and Its Effect on Environmental Health;* Walter G. Lewis; ² Lewis & Day, Inc., 6822 Westcott Drive, Richmond, Virginia, 22325;³ Grant #77-00017;⁴ New Award.⁵

1. Title of the Specific Grant

2. **Principal Investigator:** the chief scientist or administrator who is responsible for the research plan and fiscal expenditures as an NSF-sponsored awardee.

3. **Institution Conducting the Research:** any college, university, laboratory, industry, or other organization, whether operating on a profit or nonprofit basis, as well as State governments and Federal organizations.

4. Grant Number

5. Type of Grant:

- a) "New" refers to an award which has received no prior support from NSF, regardless of whether the principal investigator has received support on previous occasions;
- b) "Renewal" refers to follow-on support of a project which is currently supported; and
- c) "Supplemental" refers to the addition of funds to an existing NSF supported project without increasing the duration of NSF support.

Managing the Natural Environment

Provide economically and ecologically sound options to manage environmental risks created by human activity.



Chemical Threats to Man and Environment

Identify, understand, and reduce contamination arising from the manufacture, use, and disposal of chemical products.

1. A Water Pollution Monitoring Laser Optical System; Silverio Almeida; Department of Physics, Virginia Polytechnical Institute, Blacksburg, Virginia 24061; Grant #77-23233; Supplemental Award.

Develop a laser optical system that will automatically scan and select in a water sample the types and numbers of various diatoms which are indicators of water quality.

2. Hydrogen Sulfide and Reduced Forms of Sulfur in Air; Robert S. Braman; Department of Chemistry, University of South Florida, Tampa, Florida 33620; Grant #77-14875; Renewal Award.

Devise and validate new procedures of analytical chemistry to measure trace levels of hydrogen sulfide and other sulfur compounds in air, water, and sediments.

3. Identification of Mutagenic Organic Compounds in Environmental Samples; Barry Commoner; Center for the Biology of Natural Systems, Washington University, St. Louis, Missouri 63130; Grant #77-17734; Renewal Award.

Develop and demonstrate methods for the rapid detection and identification of carcinogens in environmental samples, including air, water, and soil, and determine human exposure to these agents.

4. Sources, Transformations, and Chemical Nature of Atmospheric Pollutants; Glen E. Gordon; Institute of Fluid Dynamics and Applied Mathematics, University of Maryland, College Park, Maryland 20742; Grant #76-80327; Renewal Award.

Characterize major air pollution sources as to the distribution of emitted contaminants in the gas phase and in aerosol particle-size ranges. Determine relationships between acid rain, rain chemistry, and power plant emissions.

5. Technology Transfer of Zeeman Atomic Absorption Technique for Environmental Trace Analysis; Tetsuo Hadeishi; Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720; Grant #77-11552; New Award.

Devise a rapid and sensitive instrumental method for measuring traces of chemical elements and compounds in a variety of environmental materials without resorting to prior chemical preparation of samples.

6. Sources of lead in Children; Paul B. Hammond; College of Medicine, University of Cincinnati,

Cincinnati, Ohio 45267; Grant #77-22186; Supplemental Award.

Develop methods for the determination of the environmental sources of lead responsible for elevated blood lead concentrations in children. Determine the body burden clearance rates in children relocated in low lead hazard homes from high lead hazard homes.

7. Fates of Industries Synthetic Organic Chemicals: A Case Study; Ronald A. Hites; Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139; Grant #77-12109; Renewal Award.

Study several organic chemical manufacturing plants in order to identify and quantify the organic compounds in their waste effluents. Determine the fates of released substances for two sites selected from those identified. Determine the principal organic substances of industrial origin in the water, sediments, and organisms in the industrialized sector of the Delaware River.

8. An Evaluation of Toxicological Information Relevant to Future Testing Requirements for Hazardous Chemical Substances and Mixtures; John C. Kolojeski; Clement Associates, Inc., 1055 Thomas Jefferson Street, N.W., Washington, D.C. 20007; Grant #77-15417; Renewal Award.

Assemble, analyze and determine the sufficiency of existing toxicological data on industrially-synthesized chemical substances and mixtures. Develop appropriate methods for the determination of the criticality of toxicological testing requirements for individual substances or mixtures. Assist the Interagency Advisory Committee for Priority Chemicals Testing in the identification of those chemical substances and mixtures which require immediate rule making for the purposes of further testing.

9. The Role of Primary Particulates in Urban Air Pollution; Tihomir Novakov; Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720; Grant #77-20076; New Award.

Assess the direct and indirect contributions of primary particulates, especially carbon (soot), to the total particulate loading in urban atmospheres. Evaluate the roles of primary particulates in the formation of secondary species.

10. Exploratory Study of Exposure of Migrant Workers to Pesticides and Pesticide Residues; Clarence B. Owens; Florida Agricultural and Mechanical University, Tallahassee, Florida 32307; Grant #77-12446; Supplemental Award.

Provide clinical and epidemiological evidence on the possible pesticide exposure of migrant farm workers. Determine the relationship between this clinical and epidemiological evidence and environmental factors including pesticide exposure. Provide information to

relevant user groups concerned with the health and well-being of migrant farm workers.

11. An Interdisciplinary Study of Environmental Pollution by Lead and Other Metals; Gary L. Rolfe; Institute for Environmental Studies, University of Illinois, Urbana, Illinois 61801; Grant #77-15085; Supplemental Award.

Determine and evaluate the effects of lead on productivity of both agricultural crops and urban vegetation resulting from the continued use of leaded gasoline. Determine the distribution of lead particulates in urban systems to which humans are subjected with possible associated health hazards. Test and evaluate a model which predicts the effects of lead induced stresses on the yield of crop systems.

12. Information Support Services for Chemical Threats to Man and the Environment Program; Robert H. Ross; Information Center Complex, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830; Grant #77-16872; Renewal Award.

Provide a range of information support services to the Chemical Threats Program which are designed to project the program output into the community of users of this information. Provide periodic literature overviews of the bioenvironmentally hazardous organohalides. Continue the bimonthly publications of the NSF-RANN Trace Contaminants Abstracts. Update and publish the annual Chemical Threats Program Director and provide response and referral services via the Environmental Response Center.



Regional Environmental Management

Develop management and analytic procedures for identify, exploring, and comparing alternatives for achieving environmental goals.

1. Conversion of Municipal Wastewater Treatment Plant Sludges Into Earthworm Castings for Use as

Topsoil; Jack E. Collier; Collier Worm Ranch, 2022 Cabrillo Court, Santa Clara, California 95051; Grant #77-16832; New Award.

Determine the feasibility of utilizing earthworms to accelerate the stabilization of municipal wastewater treatment plant sludges.

2. An Air Quality Model of Agricultural Field Burning in Oregon's Willamette Valley; Charles D. Craig; Air Resources Center, Oregon State University, Corvallis, Oregon 97331; Grant #77-20920; Renewal Award.

Test the utility of the Livermore Regional Air Quality (LIRAQ) model in the Willamette Valley for assessing probable air pollution effects resulting from the use of alternative smoke management strategies as applied to field burning practices.

3. Synthesis of a Municipal Wastewater Sludge Management System; Charles Finance; Media Four Productions, 6519 Fountain Avenue, Hollywood, California 90028; Grant #77-16739; Supplemental Award.

Produce a 27-minute film that will communicate the way in which separate processes are synthesized and combined into a system for managing municipal wastewater treatment plant sludges.

4. Evaluation and Testing of NSF-RANN Sponsored Land Use Modeling Projects with Ohio as a Test Case; Oscar Fisch; Department of City and Regional Planning, Ohio State University, Columbus, Ohio 432121; Grant #77-15020; New Award.

Transfer selected RANN environmental modeling tools to regional planning agencies in Ohio and provide on-line capacity for testing and using these tools.

5. Application of the Entropy Law to Evaluations of Pollution Control Alternatives; Richard Greeley; The Mitre Corporation, Metrek Division, 1820 Dolley Madison Boulevard, McLean, Virginia 22101; Grant #77-17101; New Award.

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Develop methods for measuring the effects of alternative pollution control technologies using a cross-cutting entropy measure.

6. Identifying, Evaluating and Managing Environmental Risks-Part I; Roger E. Kasperson; Clark University, 950 Main Street, Worcester, Massachusetts 01610; Grant #77-15334; New Award.

Structure the present understanding of risk and analyze alternative concepts of "acceptable" risk." Improve communication of facts regarding risks and map the hazard management process.

7. Disinfection of Enteric Viruses in Sludge by Use of Energized Electrons; Theodore G. Metcalf; Department of Microbiology, University of New Hampshire, Durham, New Hampshire 02824; Grant #77-14454; New Award.

Characterize the relationship between dose rate and virus inactivation for high energy electron irradiation of municipal wastewater and treatment plant residuals using the large-scale research unit at Deer Island (Boston). Evaluate the merits of aluminum and ferric iron ions to affect inactivation.

8. Collaborative Research on Assessment of Man's Activities in the Lake Powell Region; Robert C. Reynolds, Jr.; Department of Earth Sciences, Dartmouth College, Hanover, New Hampshire 03755; Grant #77-21281; Supplemental Award.

Provide an improved scientific basis for mediating among competing interests in the development of natural resources in the Lake Powell region.

9. Potential Health Risks Associated with Injection of Residual Domestic Wastewater Sludges into Soils; Bernard P. Sagik; College of Science and Mathematics, University of Texas, San Antonio, Texas 78285; Grant #77-10187; New Award.

Assess the potential risks to human health associated with virus-contamination of soils into which sludges from municipal wastewater treatment plants are injected.

10. Analysis of the Value of Time in Environmental Decision Processes: State I—The Development of a Conceptual Framework; Gunter Schramm; School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109; Grant #77-00351; New Award.

Develop an improved capability for determining the positive and negative aspects of time extensions in environmental decisionmaking.

11. Conference on Drought Research Needs: December 5-9, 1977; Vujica M. Yevjevich; Department of Civil Engineering, Colorado State University, Fort Collins, Colorado 80521; Grant #77-13905; New Award.

Define more adequately the most needed drought research subjects relevant to the future, especially from the point of view of general policy for drought control and drought alleviation measures. Identify those drought problems which are interrelated and which interact and exchange between urban and agricultural drought conditions.

Disasters and Natural Hazards

Seek methods and techniques that can provide more cost-effective protection for man and his works.



Earthquake Engineering

Develop economically feasible design and construction methods for building earthquake resistant structures; study procedures for integrating information on seismic risk with ongoing land use procedures; improve understanding of the social and economic consequences of individual and community decisions on earthquake issues.

1. Building Configuration and Seismic Design; Christopher Arnold; Building Systems Development, Inc., 120 Broadway, San Francisco, California 94111; Grant #76-81821; New Award.

Provide a systematic body of knowledge and a useful methodology that will enable a better understanding between architects and engineers with respect to the influence of building plan configuration on the seismic resistance of the building.

2. Implementation Planning for Seismic Design Provisions for Buildings; Charles Culver; National Bureau of Standards, Gaithersburg, Maryland 20234; Grant #77-15084; New Award.

Enlist the support and endorsement of the various organizations involved in construction to facilitate the adoption of comprehensive design provisions for buildings.

3. Building Futures Forum—The Importance of the Built Environment to the Quality of American Life; Robert M. Dillon; National Academy of Sciences, Washington, D.C. 20418; Grant #77-13297; New Award.

Assemble a group of persons to examine some aspects of the interaction between the man-built environment and individual and societal health. Identify forces that are causing and are likely to precipitate changes.

4. The United States-Japan Cooperative Research Program on Large-Scale Structural Tests: A Planning Study; Joseph Penzien; Department of Engineering, University of California, Berkeley, California 94720; Grant #76-80835; New Award.

Establish a task committee under the United States-Japan "Panel on Wind and Seismic Effects"

program to make detailed plans and recommendations for developing effective cooperative research programs on large-scale tests of structural systems.

5. Probability Distribution of Extreme Wind; Emil Simiu; National Bureau of Standards, Center for Building Technology, Washington, D.C. 20230; Grant #77-16113; New Award.

Improve the specification of basic design wind speeds using a probabilistic approach taking into account sampling errors, data errors, use of short-term data, and applicability of procedures to different types of wind climates.



Societal Response to Natural Hazards

Develop an understanding of the probable economic and social costs of natural hazards and design, develop, and test alternative approaches to enable society to prepare for, respond to, and recover from disastrous events.

1. A Longitudinal and Cross Cultural Study of the Post Impact Phases of a Major National Disaster; Frederick L. Bates; Department of Sociology, University of Georgia, Athens, Georgia 30602; Grant #77-12721; New Award.

Identify, describe and measure the impact of a major earthquake on a nation's socio-economic units and develop programs; analyze external (U.S.) disaster relief and rehabilitation delivery systems and their long and short term effects; and develop alternative approaches for programs.

2. Search and Rescue Missions in Natural Disasters and Remote Settings; Thomas E. Drabek; Department of Sociology, University of Denver, Denver, Colorado 80208; Grant #77-14162; New Award.

Determine the problems related to search and rescue in large natural disasters in remote areas and develop policy and procedural alternatives for dealing with them.

3. Community Response to Natural Hazard Warnings; Roert K. Leik; Department of Sociology, University of Minnesota, Minneapolis, Minnesota 55455; Grant #77-01452; New Award.

Identify and analyze by field and laboratory procedures the variables that influence the manner, speed, and appropriateness of the responses by families, organizations, and communities, to four major hazard warning systems. Develop alternative approaches as needed.



Weather Modification

Develop and test weather modification technologies which mitigate undesirable effects of weather, and identify problems and opportunities

arising from inadvertent modification of weather by human activity.

1. Inadvertent Weather Modification in the St. Louis Area; August H. Auer, Jr.; Department of Atmospheric Sciences, Laramie, Wyoming 82071; Grant #77-12552; New Award.

Determine the effects of urban-industrial areas on the local and downwind weather as a result of altered land use, heat, moisture and turbulent flux changes, wind changes, and radiation effects as a result of increased particulates and moisture.

2. Causes and Impacts of Urban Influences on Precipitation; Stanley A. Changnon, Jr.; Illinois State Water Survey, University of Illinois, Urbana, Illinois 61801; Grant #77-15375; New Award.

Clarify the causes and impacts of urban weather effects and expand the societal utilization of inadvertent weather modification research results.

3. A Field Experiment Design to Determine the Extended Area of Effect from Wintertime Cloud Seeding; Lewis O. Grant; Department of Atmospheric Sciences; Colorado State University, Fort Collins, Colorado 80521; Grant #76-83893; New Award.

Develop an experimental design to field test hypotheses of extended area effects from wintertime cloud seeding in mountainous terrain.

4. The Generation and Use of Cirrus Clouds as a Tool for Weather Modification; William M. Gray; Department of Atmospheric Sciences, Colorado State University, Fort Collins, Colorado 80521; Grant #77-10229; New Award.

Explore feasibility of artificially generating cirrus clouds and their effect on meso-scale weather.

5. Development of an Acoustic Sounder Network for Air Pollution and Land Use Applications; Philip B. Russell; Department of Atmospheric Physics, Stanford Research Institute, Menlo Park, California 94025; Grant #77-20660; Supplemental Award.

Develop and test the feasibility of an acoustic sounder network for monitoring mixing depths over urban areas for application to air pollution and land use planning. Evaluate results and transmit them to appropriate planning agencies and air quality modelers.

6. Study of Urban Boundary Layer Processes Using a Three Dimensional Hydrodynamical Model; Fred M. Vukovich; Research Triangle Institute, Research Triangle Park, North Carolina 27709; Grant #77-11663; New Award.

Adopt and test an existing urban boundary layer model against METROMEX (Metropolitan Meteorological Experiment) data to determine the role of the various urban surface influences on the atmosphere.

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RESEARCH APPLIED TO NATIONAL NEEDS

Any opinions, findings, conclusions
or recommendations expressed in this
publication are those of the author(s)
and do not necessarily reflect the views
of the National Science Foundation.

- 7. Hail Suppression Seeding Technology: An Assessment Based on Silver Content in Rain and Hail; Joseph A. Warburton; Desert Research Institute, University of Nevada, Reno, Nevada 89507; Grant #77-01600; New Award.

Determine the effectiveness of hail suppression seeding technology and develop a covariate for use as a predictor.

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