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ABSTRACT

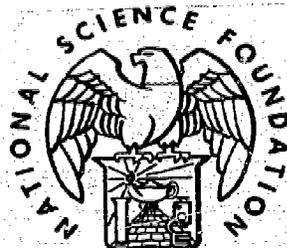
This is a list of curriculum projects supported by the National Science Foundation (NSF) which include materials with environmental implications even though the titles may not necessarily indicate that this is the case. Other NSF programs listed are: The Summer Institutes in Environmental Sciences for Secondary School Teachers; Summer Conferences and In-Service Institutes in Environmental Sciences; Secondary School Student Science Training Program; Undergraduate Curriculum Activities; Undergraduate Instructional Personnel Development Program; and, projects funded for student originated and directed research in environmental problems.

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# ***NATIONAL SCIENCE FOUNDATION***

*Programs for Improving Education  
in the*

**Environmental Sciences**

**1971**

● **ELEMENTARY SCHOOL**

● **SECONDARY SCHOOL**

● **COLLEGE AND UNIVERSITY**

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## Preface

Improvement in science education is one of the major tasks of the National Science Foundation which supports projects for elementary and secondary schools and colleges and universities in mathematics and the sciences, including social sciences.

Activities of the Division of Pre-College Education in Science fall into four categories: (1) development of educational materials through the Course Content Improvement Program, (2) implementation activities through Resource Personnel Workshops in the Course Content Improvement Program and through the Cooperative College-School Science Program, (3) instructional personnel development through the institute programs (Summer, In-Service, and Academic Year) and conferences, and (4) student development through the Student Science Training Program.

Activities of the Division of Undergraduate Education in Science include: (1) development of educational material through the College Science Curriculum Improvement Program, (2) instructional personnel development through the Program of Summer Institutes and Short Courses, (3) and student development through the Student Originated Studies Program and the Undergraduate Research Participation Program.

A list of projects which deal to some degree with environmental sciences and which are supported under these programs has been drawn together for presentation in this report.

Projects listed here were supported by the Foundation in fiscal year 1971. With the exception of development of curriculum materials, individual projects change from year to year, but the programs continue. The time schedule for submitting proposals for NSF Programs for Education in the Sciences may be obtained by addressing requests to Central Processing Section, National Science Foundation, Washington, D.C. 20550. Directories listing institutes to be offered in 1972 may be requested from the Foundation; they will be mailed when they become available.

## PRE-COLLEGE CURRICULUM ACTIVITIES

The National Science Foundation has supported, over the years, curriculum projects which include materials with environmental implications even though the titles may not necessarily indicate that this is the case. Some of the current projects deal primarily with environmental education, as their titles indicate.

### Elementary School Environmental Science

1. American Association for the Advancement of Science (AAAS), Commission of Science Education, 1515 Massachusetts Avenue NW., Washington, D.C. 20005. *Science-A Process Approach* published by Xerox Corporation, 600 Madison Avenue, New York, N.Y. 10022.
2. Elementary Science Study (ESS), Education Development Center (EDC), 55 Chapel Street, Newton, Massachusetts 02160. *Elementary Science Study* published by Webster Division of McGraw-Hill Book Company, Manchester, Missouri 63011.
3. Science Curriculum Improvement Study (SCIS), University of California, Berkeley, California 94720. *Science Curriculum Improvement Study* published by Rand McNally & Company, P. O. Box 7600, Chicago, Illinois 60680.
4. Minnesota School Mathematics and Science Teaching Project (MINNEMAST), University of Minnesota, Minneapolis, Minnesota 55455.

### Secondary School Environmental Science

5. Earth Science Curriculum Project (ESCP), P. O. Box 1559, Boulder, Colorado 80302. *Investigating the Earth* published by Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02107.
6. American Meteorological Society (AMS), 45 Beacon Street, Boston, Massachusetts 02108. "Education Films in Meteorology," Dr. Kenneth C. Spengler.
7. Intermediate Science Curriculum Study (ISCS), Florida State University, Tallahassee, Florida 32306. *Probing the Natural World* published by Silver Burdett Company, Morristown, New Jersey 07960.
8. High School Geography Project (HSGP), Association of American Geographers, 1710 Sixteenth Street NW., Washington, D.C. 20009. *Geography in an Urban Age* published by Macmillan Company, 866 Third Avenue, New York, N.Y. 10022.
9. Biological Science Curriculum Study (BSCS), P. O. Box 930, University of Colorado, Boulder, Colorado 80302. *High School Biology-BSCS Green Version* published by Rand McNally & Company, P. O. Box 7600, Chicago, Illinois 60680.
10. Engineering Concepts Curriculum Project (ECCP), 333 Jay Street, Brooklyn, New York 11201. *The Man Made World* published by McGraw-Hill Book Company, Incorporated, 330 W. 42nd Street, New York, N.Y. 10036.

### General

American Association for the Advancement of Science, Commission on Science Education, 1515 Massachusetts Avenue NW., Washington, D.C. 20005. "Science for Society: A Bibliography."

There are several projects currently under way. In some cases, no materials are available as yet. Further information is available from the projects.

1. *A Workshop to Prepare a Study Guide on Problems of Air Pollution*, Robert G. Nurnberger, 1400 Washington Avenue, Albany, New York 12003.
2. *Environmental Studies for Urban Youth*, William Romey, Earth Science Curriculum Project (ESCP), P. O. Box 1559, Boulder Colorado 80302.
3. *Ecological Film Project*, Martin Sacks and Dr. John Lee, City College of New York, Convent Avenue and 139th Street, New York, N.Y. 10031.
4. *Environmental Experiments Program*, Courtland S. Randall, Oak Ridge Associated Universities, Incorporated, P. O. Box 117, Oak Ridge, Tennessee 37830.
5. *Social Biology Films*, L. Eugene Cronin, Natural Resources Institute, University of Maryland, Solomons, Maryland 20688.
6. *Oak Ridge National Laboratory Project: "The Environment and Technology Assessment,"* Cooperative Science Education Center, Peter Cohan, 156 Adams Lane, Oak Ridge, Tennessee 37830.

## PRE-COLLEGE IMPLEMENTATION ACTIVITIES

### Resource Personnel Workshops

The workshops provide leadership training for the introduction of new course materials in science and mathematics for elementary and secondary schools; the participants include teachers, principals, science or mathematics supervisors, personnel from state departments of education, and college faculty or combinations of these formed into educational teams.

Workshop activities include teaching new materials to students, developing educational teams to introduce the new course materials, instructing teachers, and designing and conducting workshop activities for school personnel in their local regions. Summer workshops typically last 3 to 4 weeks. In addition to the summer training, the workshop staffs may provide support activities during the school year for the training of additional teachers.

#### Resource Personnel Workshops in Environmental Sciences—Summer 1971

##### Engineering Concepts Curriculum Project

University of Denver, Denver, Colorado 80210; Ruth I. Hoffman, Department of Mathematics  
University of South Florida, Tampa, Florida 33620; E. W. Kopp, College of Engineering  
Polytechnic Institute of Brooklyn, Brooklyn, New York 11201; John G. Truxal, Provost  
North Carolina State University, Raleigh, North Carolina 27607; Herbert E. Speece,  
Department of Science and Mathematics  
University of Wisconsin, Madison, Wisconsin; W. Robert Marshall, Jr., Engineering Experiment  
Station

##### High School Geography Project

Western Michigan University, Kalamazoo, Michigan 49001; George Vuicich, Department of  
Geography

##### Intermediate Science Curriculum Study

Florida State University, Tallahassee, Florida 32306; Paul Westmeyer, Department of Science  
Education  
Michigan State University, East Lansing, Michigan 48823; Richard J. McLeod, Science and  
Mathematics Teaching Center  
University of Texas, Austin, Texas 78712; David R. Stronck, Science Education Center  
Wisconsin State University, Whitewater, Wisconsin 53190; Frank D. Stekel, Department of  
Physics

##### Science Curriculum Improvement Study

San Francisco State College, San Francisco, California 94132; Leonard Meshover, Department  
of Elementary Education  
Kansas State Teachers College, Emporia, Kansas 66801; Glenn H. Crumb, Research and Grants  
Center  
Michigan State University, East Lansing, Michigan 48823; Glenn D. Berkheimer, Science and  
Mathematics Teaching Center  
Temple University, Philadelphia, Pennsylvania 19122; Chester E. Raun, Department of  
Elementary Education, and Sylvester Webb

## **Time, Space, and Matter**

University of Missouri, Columbia, Missouri 65201; John B. Leake, Department of Education

### **Cooperative College-School Science Program**

This program provides opportunities for colleges, universities, and similar institutions to work with school systems in improving elementary and secondary school science and mathematics programs. Projects are addressed to practical problems of the school science program which are of sufficient substance and complexity to warrant a cooperative approach. Many projects have as their purpose the introduction into school classrooms of one of the instructional programs which have been developed in the last few years by teams of scientists and educators. For the most part both summer training of 4 to 8 weeks and followup activities during the succeeding academic year is provided.

#### **Cooperative College-School Science Projects in Environmental Sciences—1971-72**

California State College, Bakersfield, California 93304; Interdisciplinary Science (Environmental Science); Dr. John R. Coash, School of Natural Sciences and Mathematics

Florida Technological University, Orlando, Florida 32816; Biology (Fresh Water Biology); Dr. George E. Allen, Department of Biological Sciences

Springfield College, Springfield, Massachusetts 01109; Elementary Science (Environmental Science and Elementary Science Study materials); Mr. Edgar N. Johnson, Department of Chemistry

Wayne State University, Detroit, Michigan 48202; Environmental Science, Dr. Henry O. Hooper, Department of Physics

Northeast Missouri State College, Kirksville, Missouri 63501; Environmental Science (Environmental Studies for Urban Youth materials); Dr. Dean A. Rosebery, Division of Science

Glassboro State College, Glassboro, New Jersey 08028; Environmental Science; Dr. V. Eugene Vivian, Department of Science

University of Pittsburgh, Pittsburgh, Pennsylvania 15213; Earth Science; Dr. Norman K. Flint, Department of Earth and Planetary Sciences

## PRE-COLLEGE INSTRUCTIONAL PERSONNEL DEVELOPMENT

### Summer Institutes

The Summer Institutes Program of the National Science Foundation was created in recognition of the important role of teachers in developing the Nation's scientific manpower potential. The institutes are designed to strengthen the subject-matter competence of science and mathematics teachers and to increase the effectiveness of their teaching. Duration varies between 6 and 8 weeks.

#### Summer Institutes in Environmental Sciences for Secondary School Teachers—1971

- Kansas State Teachers College, Emporia, Kansas 66801; Environmental Biology; Human Ecology; Harold Durst, Department of Biology
- University of Michigan, Dearborn Campus, 4901 Evergreen Road, Dearborn, Michigan 48128; Environmental Science; Orin G. Gelderloos, Department of Experimental Biology
- Mount Marty College, Yankton, South Dakota 57078; Environmental Biology in Field and Laboratory; Sr. Veronica Fasbender, Department of Biology
- Northeast Missouri State College, Kirksville, Missouri 63501; Ecological Core Program; Dean A. Roseberry, Division of Science
- University of Northern Colorado, Greeley, Colorado 80631; The Biology of Populations, Environmental Pollution, Ecosystem Modification, Seminar—Social Implications of Biology; Ivo E. Lindauer, Department of Biological Science
- Northern Illinois University, DeKalb, Illinois 60115; Environmental Biology; Robert A. Bullington, Department of Biological Sciences
- Western Michigan University, Kalamazoo, Michigan 49001; Physiological Responses to Change, Human Ecology, Human Adaptation; Clarence J. Goodnight, Department of Biology
- Edinboro State College, Edinboro, Pennsylvania 16412; Earth Science Environment and Resources Study, ESCP-ESP; M. C. Schneider, Department of Earth Sciences
- Slippery Rock State College, Slippery Rock, Pennsylvania 16057; Earth's Resources and Man's Environment; Kent Bushnell, Department of Geology
- Claflin College, Orangeburg, South Carolina 29115; Earth Science (ESCP), Environmental Conservation, Seminar; Hampton D. Smith, Sr., Division of Science and Mathematics
- Radford College, Radford, Virginia 24141; General Ecology; David J. Moore, Department of Biology
- The University of Iowa, Iowa City 52240; Contemporary Problems of Society, Ecological Studies, Pollution Problems, Seminar in Interdisciplinary Environmental Studies; Robert E. Yager, Science Education Center
- Kansas State Teachers College, Emporia, Kansas 66801; Earth and Environmental Science, Course and Curriculum Development in Environmental Science, Earth Science Field Experience; Thomas E. Bridge, Department of Physical Science (Geology)
- The Ohio State University, Columbus, Ohio 43210; Environmental Sciences (Ecology, Geomorphology, Hydrogeology), Environmental Management, Field Research; Victor J. Mayer, Faculty of Science and Mathematics Education, 250 Arps Hall, 1945 N. High Street, Columbus, Ohio 43210
- Saint Joseph College, West Hartford, Connecticut 06117; Environmental Studies, Research, Sr. M. Clare Markham, Department of Chemistry

Texas A&M University, College Station, Texas 77843; Environment-Resources-Population: An Ecological Evaluation; Richard J. Baldauf, Department of Wildlife Science

Wisconsin State Universities, Madison, Wisconsin 53701; at Chippewa Lake Field Station, Clam Lake, Wisconsin; Environmental Assessment; Roy E. Heath, Board of Regents of State Universities, Box 912, Madison, Wisconsin 53701

Wisconsin State University—Superior, Superior, Wisconsin 54880; Environmental Science; Rudy G. Koch, Department of Biology

Massachusetts Institute of Technology, Cambridge, Massachusetts 02139; Course and Curriculum Development in Science(s) (including Environmental Science and Interdisciplinary Topics); for teams of science teachers from single schools (Director: J. R. Zacharias, Massachusetts Institute of Technology); write: Berol L. Robinson, Education Research Center, Room 20C-228, Cambridge, Massachusetts 02139

Foresta Institute for Ocean & Mountain Studies, Carson City, Nevada 89701; Environmental Sciences—Ecology, primarily for science and social studies teachers from Washoe County, Nevada, and neighboring areas; Richard G. Miller, Director of Foresta Institute, Box 620, Rt. 1, Carson City, Nevada 89701

New England Association of Chemistry Teachers (at Fairfield University, Fairfield, Connecticut); Air as a Natural Resource, for chemistry teachers in the northeastern states; Russell Meinhold, Rhode Island College, 600 Mt. Pleasant Avenue, Providence, Rhode Island 02908

Salem State College, Salem, Massachusetts 01970; Sulfur and the Water Environment, for New England area biology and chemistry teachers and science supervisors; Clair M. Paine, Department of Biology

Shorter College, Rome, Georgia 30161; Natural Resource Use; Philip Greear, Box 2, Shorter College

Tilton School, Tilton, New Hampshire 03276 (at Quincy, Massachusetts, and Philadelphia, Pennsylvania); Water Pollution and Environmental Activities, for teachers of environmental studies, primarily from the Boston and Philadelphia areas; Joseph H. Chadbourne, Headmaster, Tilton School

Valdosta State College, Valdosta, Georgia 31601; Natural Resource Use; Clyde E. Connell, Department of Biology

### Summer Conferences

A small program of Conferences for Secondary School Teachers; Supervisors, and other School Administrators, was supported by the National Science Foundation in 1971. These instructional conferences are shorter (4 weeks or less) and usually more specialized than Summer Institutes.

#### Summer Conferences in Environmental Sciences—1971

##### Engineering Concepts Curriculum Project

University of Illinois, Chicago, Illinois 60680; Henry A. Setton, Department of Engineering

##### High School Geography Project

National Council for Geographic Education, 111 West Washington Street, Chicago, Illinois 60602; Paul F. Griffin

### **In-Service Institutes**

This Program provides participants with opportunities to obtain supplemental instruction in science and mathematics at times which permits them to carry on their regular teaching duties.

#### **In-Service Institutes in Environmental Sciences—1971-72**

University of Alaska, Anchorage, Alaska 99503; Biological Sciences/Special Emphasis to Conservation-Research; Roland F. Stickney, Department of Education

Alaska Methodist University, Anchorage, Alaska 99504; Environmental Studies; William A. Lewis, Department of Education

University of Arizona, Tucson, Arizona 85721; Integrated Biology, Inorganic Chemistry, Field Studies in Environmental Science; Robert W. Hoshaw, Department of Biological Sciences

California State College at Fullerton, Fullerton, California 92631; Human Ecology; George C. Turner, Department of Science and Mathematics Education

San Francisco State College, San Francisco, California 94132; Urban Environmental Approach to Earth Science (ESTPP); Raymond Pestrong, Department of Geology

Colorado School of Mines, Golden, Colorado 80401; Introductory Physics, Applied Physical Measurements, Introduction to Environmental Science; Jerrold J. Burnett, Department of Physics

Saint Joseph College, West Hartford, Connecticut 06117; Biochemistry, Environmental Studies; Sr. M. Clare Markham, Department of Chemistry

Northeastern Illinois State College, Chicago, Illinois 60625; Earth Science With an Emphasis on Environment (ESCP); Musa Qutub, Department of Earth Science

Kansas State Teachers College, Emporia, Kansas 66801; Earth and Environmental Science (ESCP, IPS, TSM); Thomas E. Bridge, Physical Science Department

Eastern Nazarene College, Wollaston, Massachusetts 02170; History of Mathematics, Linear Algebra, Principles of Chemistry, History of Physical Science, Environmental Biology; Gerald E. Lashley, Department of Mathematics

College of the Holy Cross, Worcester, Massachusetts 01610; Environmental Biology; Rev. John W. Flavin, S.J., Department of Biology

Western Michigan University, Kalamazoo, Michigan 49001; Biological Constituents, Evolution, Human Ecology, Invertebrate Zoology; Clarence J. Goodnight, Department of Biology

Bemidji State College, Bemidji, Minnesota 56601; Introductory Physical Science, Intermediate Science Curriculum Study—ISCS, Chemistry II (CHEMS), Analytical Instrumentation, Biology of Aquatic Plants and Animals in Northern Minnesota, Human Ecology, Introduction to Number Theory, Computer Programming for Secondary Teachers; Gerald J. Smith, Department of Mathematics

St. Cloud State College, St. Cloud, Minnesota 56301; Environmental Science, Physiology of Bacteria; Harold Hopkins, Department of Biology

Foresta Institute for Ocean and Mountain Studies, Carson City, Nevada 89701; Environmental Sciences-Ecology; Richard Gordon Miller, Director, Box 620

State University of New York at Binghamton, Binghamton, New York 13901; Environmental Science; Donald R. Coates, Department of Geology

State University College at Buffalo, Buffalo, New York 14222; Population and Environmental Problems; William C. Scheffler, Department of Biology

Union College, Schenectady, New York 12308; Environmental Biology, General Geology, Curricular Materials in Mathematics; Edwin F. Gillette, Department of Mathematics

Miami University, Oxford, Ohio 45056; Biology and Environmental Science-BSCS; Charles M. Vaughn, Department of Zoology and Physiology

The Ohio State University, Columbus, Ohio 43210; Environmental Geology; Victor J. Mayer, Department of Geology

Ohio University, Athens, Ohio 45701; Environmental Studies-Earth Science (ESTPP); Ray Skinner, Jr., Department of Secondary Education

Millersville State College, Millersville, Pennsylvania 17551; Environmental Chemistry, Biological Techniques, Problems in Earth Science; William B. McIlwaine, Department of Earth and Space Science

University of Scranton, Scranton, Pennsylvania 18510; Environmental Biology, Chemical Education Material and Systems, Introduction to Computers and their Application, Introduction to Electronics and Electronic Instruments; Harry B. Strickland, Dean, Graduate School

University of South Carolina, Columbia, South Carolina 29208 (Classes to be held in Greenville); Environmental Earth Science; Tudor T. Davies, Department of Geology

Fort Wright College, Spokane, Washington 99204; Environmental Biology, Experimental Ecology, Modern Topics in Chemistry, Biochemistry, Urban Geography, Mineralogy; Sr. Ione Gautereaux, Department of Science

## PRE-COLLEGE STUDENT DEVELOPMENT

### Secondary School Student Science Training Program

Opportunities are provided by the National Science Foundation for academically outstanding secondary school students to obtain intensive experience in science and mathematics during the summer. By giving science-oriented high school students an experience with college-level instruction and research, the Foundation seeks to stimulate their scholarly development and to encourage the further development of similar programs with other sources of support. Duration of activities ranges between 5 and 8 weeks.

#### Student Science Training Programs in Environmental Sciences—1971

Michigan Technological University, Houghton, Michigan 49931 (to be held on Summer Island, Lake Michigan); Ecology and Forestry (Research); Kenneth J. Kraft, Department of Biological Science

University of Montana, Missoula, Montana 59801 (to be held at the Lubrecht Experimental Forest); Ecology, Conservation, and Environment; Thomas J. Nimlos, School of Forestry

Nebraska Wesleyan University, Lincoln, Nebraska 68504; Environmental Science (includes research); Paul H. Laursen, Department of Chemistry

Foresta Institute for Ocean and Mountain Studies, Carson City, Nevada 89701; Field Ecology and Environmental Studies (Includes Research); Richard Gordon Miller, Box 620, R. R. 1, Carson City

Polytechnic Institute of Brooklyn, Brooklyn, New York 11201; Environmental Studies; P. B. Lederman, Department of Chemical Engineering, 333 Jay Street

State University College, Fredonia, New York 14063; Environmental Science—Water Quality; Roy A. Keller, Lake Erie Environmental Studies

Tager Institute for Environmental Studies (a consortium); Environmental Quality; Jack R. Pierce, Department of Biology, Austin College, Box 128, Sherman, Texas 75090

## UNDERGRADUATE CURRICULUM ACTIVITIES

### Environmental Sciences

1. An Introduction to the Implications of Technology, University of Utah, Salt Lake City, Utah 84112. *Technology for the Non-Technologist* published by Addison Wesley, Reading, Massachusetts 01867.
2. Film Series: The Promise of the Life Sciences, Graduate School, U.S. Department of Agriculture, Washington, D.C. 20250.
3. Films for Evolution and Population Biology (filmed in the Galapagos Archipelego Islands) George A. Bartholomew, University of California, Los Angeles, California 90024.

There are a number of projects currently under way. In some cases, no materials are available yet. Further information is available from the projects.

1. Urban Operational Simulation Curriculum Development Project, Robert A. Pickett, Environetics, Incorporated, 1100 17th Street NW., Washington, D.C. 20036.
2. Interdisciplinary Curriculum in Environmental Studies, James F. Hornig, Dartmouth College, Hanover, New Hampshire 03755.
3. Commission on College Geography Publications, a number of which bear on environmental sciences, Association of American Geographers, 1146 16th Street NW., Washington, D.C. 20036.
4. Council on Education in the Geological Sciences Publications, a number of which bear on environmental sciences, American Geological Institute, 2201 M Street NW., Washington, D.C. 20037.
5. Curriculum Innovation in the Area of Science, Technology, and Society, F. A. Long and R. Bowers, Cornell University, Ithaca, New York 14850.
6. Environmental Science Teacher Preparation Program. (Grades 7-12). A component of The Center for Teachers, Melburn R. Mayfield, director, Austin Peay State University, Clarksville, Tennessee 37040—The first students are being enrolled in September 1971.

## UNDERGRADUATE INSTRUCTIONAL PERSONNEL DEVELOPMENT

### Summer Institutes in Environmental Sciences for College Teachers—1971

Arizona State University, Tempe, Arizona 85281; Desert Biology; A study of the biota of deserts and factors affecting it; Gordan L. Bender, Department of Zoology

Arizona State University, Tempe, Arizona 85281; Bacterial Ecology; Systematic Bacteriology and the physiological role of bacteria in soil, water, and higher organisms; Roy M. Johnson, Department of Botany and Microbiology

University of Houston, Houston, Texas 77004; Population Biology; David L. Jameson, Department of Biology

University of Puerto Rico, Rio Piedras, Puerto Rico 00931; Marine Biology and Tropical Ecology; physiographic factors affecting tropical marine fauna and flora; effect of physiographic and physiological factors on the distribution of living organisms; Herminio Lugo Lugo, Department of Biology

Stanford University, Pacific Grove, California 93950; Marine Biology; John H. Phillips, Jr., Hopkins Marine Station

Colorado State University, Fort Collins, Colorado 80521; Field Biology; an approach to Botany, Zoology, Ecology, and Geology which integrates these fields through study of their interrelationships occurring in the natural state; J. Forbes McClellan, Department of Zoology

University of Oklahoma, Norman, Oklahoma 73069; Systems Ecology; Systems modeling in ecology, operations research methodology, and computer-aided experimentation in aquatic and terrestrial ecosystems; Paul G. Risser, Department of Botany and Loren G. Hill, Department of Zoology

Stanford University, Stanford, California 94305; Urban Economics; Urban economic growth and structure, human resources in urban economies, and the public sector of urban economies; Henry Levin, Department of Economics

### Short Courses in Environmental Sciences for College Teachers—Summer 1971

Oak Ridge Associated Universities, Oak Ridge, Tennessee 37830; Applied Ecology; for chemistry teachers (supported jointly with the Atomic Energy Commission); L. K. Akers, Special Training Division

University of Delaware, Newark, Delaware 19711; Energy and Moisture Balance Climatology; Energy and mass exchanges at the earth's surface; evaluation of radiation and water balances, turbulent diffusion, heat and momentum fluxes; and application of energy and mass budget information to practical problems of the man-environment relationship; John R. Mather, Department of Geography

Ohio State University, Columbus, Ohio 43210; Models of Urban Spatial Structure and Ecology; Models of urban structure with emphasis on mathematical and statistical models of the spatial form and ecological patterns of the city and the related dynamics; Kent P. Schwirian, Department of Sociology

## **UNDERGRADUATE STUDENT DEVELOPMENT**

### **Undergraduate Research Participation**

This program is designed to provide undergraduate students with research or independent study opportunities under the guidance of competent research directors, principally for full-time (usually summer) projects, also for some part-time (academic year) projects. The institution receiving the award selects the participants. A fair number of these awards deal with environmental sciences.

### **Student-Originated Studies**

Through this program, the Foundation provides support for student-originated and student-directed research in environmental problems. The program seeks to encourage serious students in science to express in productive ways their growing interest for the environmental well-being of the Nation; also to provide support for groups of college and university students who can demonstrate their readiness to assume increasing responsibility for their own educational development.

Student-Originated Studies—Summer 1971

INSTITUTION CITY, STATE, ZIP	STUDENT PROJECT DIRECTOR ADDRESS	PROJECT TITLE
<b>ALABAMA</b>		
Auburn University Auburn, Alabama 36830	Mr. Andrew C. Rucks c/o Dr. Hal B. Pickle School of Business	Air and Water Pollution Control by the Textile Industry in the Southeast
<b>ALASKA</b>		
University of Alaska College, Alaska 99701	Mr. Bryan MacLean c/o Dr. Robert B. Weeden Department of Wildlife Management	Resource Utilization and Environmental Contamination in a Rapidly Changing Alaskan Eskimo Village
<b>ARIZONA</b>		
University of Arizona Tucson, Arizona 85721	Mr. Garry R. Allen c/o Dr. William Gensler Department of Electrical Engineering	Atmospheric Dispersion of Sulfur Dioxide from Copper Smelters
<b>CALIFORNIA</b>		
California State Polytechnic College San Luis Obispo, Calif. 93401	Mr. John H. Robinson c/o Mr. S. Ernest Swickard School of Architecture	Socio-Economic Impact of the Palmdale Intercontinental Airport on a Desert Region of Los Angeles County
San Diego State College San Diego, California 92115	Mr. Philip J. Riggan c/o Dr. Paul H. Zedler Department of Biology	Physical, Biological, and Sociological Effects of Chaparral Fires in Southern California
San Jose State College San Jose, California 95114	Mr. Mark Tigan c/o Dr. Donald W. Aitken Department of Environmental Studies	Relationship of Environmental Quality to Human Health and the "Quality of life"
Sonoma State College Rohnert Park, California 94928	Miss Sharron L. Mee c/o Dr. James B. Gale Department of Physical Education	Physiological Effects of Exercising in a Polluted Atmosphere
Harvey Mudd College Claremont, California 91711	Mr. Charles W. Horton c/o Dr. J. Richard Phillips Department of Engineering	Mathematical Models and Computer Simulation of Smog Production in the Pomona Valley of California
Stanford University Stanford, California 94305	Mr. Mark R. Shelley c/o Dr. Welton L. Lee Department of Biology	Effects of Sewage Discharge on Monterey Bay
University of California Berkeley, California 94720	Miss Lynne Diane Houck c/o Dr. Patrick J. Pagni Department of Mechanical Engineering	Forest Fire Research: Control, Data Acquisition, and Modeling
University of California Berkeley, California 94720	Mr. Robert Dale Kelso c/o Dr. Herbert G. Baker Department of Botany	Grazing Pressure and Successional Changes in the Biotic Communities of the Point Reyes National Seashore
University of California Riverside, California 92502	Mr. Richard W. Carey c/o Dr. Robert W. Gill Department of Life Sciences	Development of Environmental Curriculum Resource Material for Grades 4 through 12.

COLORADO

Colorado State University  
Fort Collins, Colorado 80521

Mr. James R. Zuboy  
c/o Dr. Howard Alden  
Department of Outdoor Recreation

Development of a Multiple Use Plan for  
the Colorado State Forest

University of Denver  
Denver, Colorado 80210

Mr. Eloy Soza  
c/o Dr. Ralph E. Williams  
Department of Mechanical Sciences  
and Environmental Engineering

Design of a Migrant and Rural Farm  
Worker Housing Community

CONNECTICUT

Wesleyan University  
Middletown, Connecticut 06457

Mr. Glenn R. Harris  
c/o Dr. Jelle de Boer  
Department of Geology

Feasibility Study of Quarries as  
Dumping Sites for Disposal of Solid  
Wastes

DELAWARE

University of Delaware  
Newark, Delaware 19711

Mr. Mark Graustein  
c/o Dr. Norman F. Collins  
Department of Agricultural  
Engineering

The Role of Insects in Animal and  
Processing Plant Waste Breakdown

DISTRICT OF COLUMBIA

The Catholic University  
of America  
Washington, D. C. 20017

Mr. Kenneth Strom  
c/o Dr. Leopold May  
Department of Chemistry

Some Ecological Effects of Sanitary  
Landfills

FLORIDA

Jacksonville University  
Jacksonville, Florida 32211

Mr. Sam S. Hill, III  
c/o Dr. J. Richard Warren  
Director, Continuing Education

Design of an Urban Transportation  
System for Jacksonville, Florida

New College  
Sarasota, Florida 33578

Mr. Paul Carlson  
c/o Dr. John B. Morrill  
Chairman, Department of  
Natural Sciences

Ecological Effects of Spoil Islands  
Created by Dredging in Estuaries  
along the West Coast of Florida

University of South Florida  
Tampa, Florida 33620

Mr. Peter M. Hahn  
c/o Dr. M. W. Anderson  
Department of Structures,  
Materials, Fluids

Characteristics, Potential Uses, and  
Control of the Water Hyacinth

University of Miami  
Coral Gables, Florida 33124

Mr. Patrick H. Neale  
c/o Dr. Carl H. Snyder  
Department of Chemistry

Chemical and Biological Relationships  
in Deep Water Areas of the Everglades

GEORGIA

Georgia Institute of  
Technology  
Atlanta, Georgia 30332

Mr. J. Douglass Mullins  
c/o Dr. Joseph J. Talavage  
School of Industrial and  
Systems Engineering

Relationships between the Proposed  
Rapid Transit System, the Environment,  
and Sociological Factors in Atlanta

HAWAII

University of Hawaii  
Honolulu, Hawaii 96822

Mr. Steven L. Montgomery  
c/o Dr. D. Elmo Hardy  
Department of Entomology

Ecology of the Hawaiian Drylands

University of Hawaii,  
College  
Hawaii 96720

Mr. Michael Osato  
c/o Dr. John G. Chan  
Department of Biology

Biological, Chemical, and Sociological  
Consequences of Pollution in Hilo Bay,  
Hawaii

IDAHO

University of Idaho  
Moscow, Idaho 83843

Mr. David Maxfield  
c/o Dr. Chien M. Wai  
Department of Chemistry

Heavy Metal Pollution in Sediments of  
the Coeur d'Alene River Delta

ILLINOIS

Northeastern Illinois State  
College  
Chicago, Illinois 60625

Mr. Ivan Ruiz  
c/o Dr. Maria Moraites  
Film Director-Producer  
Learning Services

A Film Documenting Problems Faced by  
Puerto Ricans Who Move to Large  
Mainland Cities

Northern Illinois University  
DeKalb, Illinois 60115

Mr. Richard C. Stupka  
c/o Dr. James E. Brower  
Department of Biological Sciences

Lead Pollution Effects on Terrestrial  
and Aquatic Ecosystems of the Great  
Lakes Region

Northwestern University  
Evanston, Illinois 60201

Mr. Daniel L. Eberhardt  
c/o Dr. Claude A. Lucchesi  
Director of Analytical Services

Chemical, Biological, and Economic  
Studies of Municipal Garbage Composting

University of Chicago  
Chicago, Illinois 60637

Miss Christine Lehto  
c/o Dr. Sol Tax  
Department of Anthropology

Migration of Rural Indians to Urban  
Centers

University of Illinois  
Urbana, Illinois 61801

Mr. Richard C. Frederick or  
Mr. Dale R. Jurich  
c/o Dr. William Randolph Boggess  
Department of Forestry

Effects on Society and the Environment  
of Alternative Methods of Packaging Goods  
for Household Consumption

INDIANA

Purdue University  
Lafayette, Indiana 47907

Mr. Hector J. Rosquete  
c/o Dr. John E. Christian  
Institute for Environmental Health

Air Pollution, Water Pollution, and Solid  
Waste Disposal Problems in the Greater  
Lafayette Area, Indiana

IOWA

Grinnell College  
Grinnell, Iowa 50112

Mr. Anthony J. Wheeler  
c/o Dr. Kenneth A. Christiansen  
Department of Biology

Biological and Chemical Levels of  
Pollution in Rock Creek Lake, Iowa

KANSAS

St. Benedict's College  
Atchison, Kansas 66002

Mr. Edwin J. Spicka  
c/o Dr. Ronald W. Turner  
Department of Biology

Air and Water Pollution in the Atchison,  
Kansas, Area

Wichita State University  
Wichita, Kansas 67208

Mr. Douglas K. Nelson  
c/o Dr. Walter Bernhart  
Department of Aeronautical Engineering

Determination of Levels and Distribution  
of Noise in Wichita, Kansas

KENTUCKY

Western Kentucky University  
Bowling Green, Kentucky  
42101

Mr. Gary Harlow  
c/o Dr. Donald Rowe  
Department of Engineering  
Technology

Water Quality of Barren River,  
Kentucky

LOUISIANA

Grambling College  
Grambling, Louisiana 71245

Mr. Welton C. Washington  
c/o Dr. Franklin D. Hill  
Department of Chemistry

Blood Levels of DDT as a Function  
of Race, Habitat, and Socio-economic  
Status

Tulane University  
Breaux, Louisiana 70118

Mr. Michael R. Howard  
c/o Dr. John W. Rock  
Department of Architecture

Links Between Life Style and  
Environmental Expression in  
Building, Past and Present

MAINE

Bowdoin College  
Brunswick, Maine 04011

Mr. Richard Alan Cohen  
c/o Dr. Dana W. Mayo  
Department of Chemistry

Detection and Estimation of Natural  
Regeneration Processes in the Upper  
Androscoggin River, Maine

University of Maine at Orono  
Orono, Maine 04473

Mr. Joseph M. Wunderle, Jr.  
c/o Dr. Ronald B. Davis  
Department of Botany and Geology

Physical, Ecological, Economic and  
Sociological Effects of Residence  
Patterns of Recreationists on Four  
Maine Lakes

MARYLAND

Goucher College  
Towson, Maryland 21204

Miss Virginia L. Richards  
c/o Dr. John W. Foerster  
Department of Biological Sciences

Analysis of Degradation of Lake Roland,  
Baltimore

University of Maryland  
College Park, Maryland 20742

Mr. Gary C. Stanton  
c/o Dr. Zigfridas Vaituzis  
Department of Microbiology

Extent and Sources of Pollution  
in Rock Creek, Maryland and the  
District of Columbia

MASSACHUSETTS

Amherst College  
Amherst, Massachusetts 01002

Mr. Bruce Pollock Thompson  
c/o Dr. Stuart Fisher  
Department of Biology

Quantification of the Relationships  
between Land Use and Water Quality  
in the Fort River, Massachusetts

Boston College  
Chestnut Hill, Massachusetts  
02167

Mr. Stephen P. Gormican  
c/o Reverend James W. Skehan, S.J.  
Director, Environmental Center

Scientific, Legal, Sociological and  
Psychological aspects of Pollution  
of Lake Cochituate, Massachusetts

Massachusetts Institute of  
Technology  
Cambridge, Massachusetts 02139

Mr. Earl Strayhorn  
c/o Dr. J. C. Edozien  
Department of Nutrition &  
Food Science

Nutrition as Related to General Health  
Status of a Segment of the Greater  
Boston Community

Massachusetts Institute of  
Technology  
Cambridge, Massachusetts 02139

Mr. Noah Bass  
c/o Dr. Rainer A. Weiss  
Department of Physics

Atmospheric Pollution Due to Gases  
of Simple Molecular Structure

MICHIGAN

Northern Michigan University  
Marquette, Michigan 49855

Mr. John Thomas  
c/o Dr. Ronald A. Parejko  
Department of Biology

Feasibility of Producing and Marketing  
a Soil-Like Product from Municipal  
Wastes and Mine Tailings

Oakland University  
Rochester, Michigan 48063

Mr. Roger D. Brooks  
c/o Dr. Keith R. Kleckner  
Department of Engineering

Power Train Design for an Electrically-  
Powered Automobile

University of Detroit  
Detroit, Michigan 48221

Miss Barbara J. Pickens  
c/o Dr. John Loss  
School of Architecture

Relationship between Changes in  
Physical Dwelling Unit Environment  
and Social Environment

University of Michigan  
Ann Arbor, Michigan 48104

Miss Suzanne C. Pick  
c/o Dr. Howard Schuman  
Department of Sociology

Attitudes of Working Mothers toward  
Child Care Centers

University of Michigan  
Ann Arbor, Michigan 48104

Mr. Sander H. Orent  
c/o Dr. Steven Hubbell  
Department of Zoology

Biological and Economic Aspects of  
Predator (Coyote) Control

MINNESOTA

Carleton College  
Northfield, Minnesota 55057

Mr. Michael R. Cunningham  
c/o Dr. Arthur L. Buikema, Jr.  
Department of Biology  
St. Olaf College  
Northfield, Minnesota 55057

Behavior and Attitudes of Vacationers  
in Wilderness Areas of Superior National  
Forest and Boundary Waters Canoe Area,  
Minnesota

University of Minnesota  
Minneapolis, Minnesota 55455

Mr. Gregg Shadduck  
c/o Dr. Alan H. Humphreys  
Department of Elementary Education

Development of Environmental Studies  
Blocks for High School Students

MISSISSIPPI

Mississippi College  
Clinton, Mississippi 39056

Mr. Burke West  
c/o Dr. John W. Legg  
Department of Chemistry

Lead and Gaseous Pollutants along Newly-  
Built and Old Highways

MISSOURI

University of Missouri  
Columbia, Missouri 65201

Mr. David Slusher  
c/o Dr. Stanley E. Manahan  
Department of Chemistry

Possible Heavy Metal Ion Transport  
by Trisodium Nitritoacetate (NTA) in  
Waste Treatment Plants and Aquatic  
Ecosystems

NEBRASKA

University of Nebraska  
Lincoln, Nebraska 68508

Mr. Mark Young  
c/o Dr. P. J. Reilly  
Department of Chemical Engineering

Preparation of Salable By-Products  
through Aerobic Fermentation of Paunch  
Liquors

NEW HAMPSHIRE

Dartmouth College  
Hanover, New Hampshire 03755

Mr. Jeffrey W. Bock  
c/o Dr. Charles L. Braun  
Department of Chemistry

A study of Biological, Chemical, and  
Sociological Aspects of Pollution of  
Mascoma Lake, New Hampshire

New Hampshire College  
Manchester, New Hampshire 03101

Mr. James A. Philbrook  
c/o Dr. William A. Hunziker  
Department of Management Information  
Systems

Evaluation of Project Head Start in  
Contrasting Urban and Rural Areas of  
New Hampshire

NEW JERSEY

Princeton University  
Princeton, New Jersey 08504

Mr. Thomas J. Givnish  
c/o Dr. David J. J. Kinsman  
Department of Geology &  
Geophysical Sciences

Impact of Proposed Watershed Changes  
on Ecology of New Jersey Pine Barrens

NEW MEXICO

New Mexico Institute of Mining  
and Technology  
Socorro, New Mexico 87801

Mr. John Gragg  
c/o Dr. Roshan B. Bhappu  
Department of Metallurgy

Survey of Water Quality, Soils, and Crops  
along the Irrigation Canal near Socorro,  
New Mexico

NEW YORK

Cornell University  
Ithaca, New York 14850

Mr. Joseph E. Schwartz  
c/o Dr. L. Reissman  
Department of Sociology

Appropriateness of Current Designs of  
Low Income Housing

Hofstra University  
Hempstead, New York 11550

Miss Gloria Gardocki  
c/o Dr. Philip H. Ramsey  
Department of Psychology

The Social, Psychological, and  
Demographic Variables which Influence  
Family Size and Population Growth Rates

Polytechnic Institute of  
Brooklyn  
Brooklyn, New York 11201

Mr. George Panoussis  
c/o Dr. P. C. Wang  
Department of Civil Engineering

Engineering and Psychological Studies of  
Vibrations in New York

State University of New York-  
Stony Brook  
Stony Brook, New York 11790

Mr. Walter K. Muench  
Dr. J. L. McHugh  
Department of Marine Resources

An Environmental Study of Long Island's  
Mount Sinai Harbor

State University of New York-  
Brockport  
Brockport, New York 14420

Mr. Robert Bannister  
c/o Dr. Harold Kibby  
Department of Biological Sciences

Pollution Survey of the New York State  
Barge Canal

Syracuse University  
Syracuse, New York 13210

Mr. Paul Feldsher or  
Miss Susan B. Williams  
c/o Dr. William P. Mangin  
Department of Anthropology

Sociological Impact of Radical  
Environmental Change on a Group of Seneca  
Indians

University of Rochester  
Rochester, New York 14627

Mr. Gregory Keating Hearn  
c/o Dr. Edward M. Brody  
Institute of Optics

Use of Light Scattering Techniques to  
Detect and Measure Particulate Matter  
in Water

#### NORTH CAROLINA

East Carolina University  
Greenville, North Carolina  
27834

Mr. Stephen B. Benton  
c/o Mr. C. W. O'Rear  
Department of Biology

Pollution Studies of the Tar River  
Tributaries in North Carolina

Mars Hill College  
Mars Hill, North Carolina 28754

Miss Karen Cummings  
c/o Dr. Fred Holtkamp  
Department of Chemistry

Local Conditions and Practices  
Contributing to Environmental  
Degradation in a Rural Appalachian  
County in North Carolina

University of North Carolina-  
Asheville  
Asheville, North Carolina 28801

Mr. Thomas P. Graham  
c/o Dr. John C. Bernhardt, Jr.  
Department of Biology

Ecological Effects of Hot Water  
Discharged by a Electric Power  
Generating Plant

Wake Forest University  
Winston-Salem, North Carolina  
27109

Mrs. Adelaide Anne Williams  
c/o Dr. Peter D. Weigl  
Department of Biology

Residue Levels of Chlorinated  
Hydrocarbons in Mammals as a Function  
of Geographic Region and Land Use  
in North Carolina

#### NORTH DAKOTA

North Dakota State University  
Fargo, North Dakota 58102

Mr. Gregory L. Olson  
c/o Dr. Robert D. Koob  
Department of Chemistry

Study of Air Water Pollutants and  
their Relationships

#### OHIO

Cleveland State University  
Cleveland, Ohio 44115

Mr. Steven Bill  
c/o Dr. Robert G. Rolan  
Department of Biology

History of Eutrophication Cycles  
in Lake Erie Derived from Bottom  
Core Samples

Heidelberg College  
Tiffin, Ohio 44883

Mr. W. Gregory Lotz  
c/o Dr. Martin Reno  
Department of Physics

Pollution in the Sandusky River, Ohio

Kent State University  
Kent, Ohio 44240

Mr. John Barone  
c/o Dr. G. Dennis Cooke  
Department of Biological Sciences

Heavy Metal Pollutants in a Section  
of the Cuyahoga River Watershed

Ohio State University  
Columbus, Ohio 43210

Mr. Gregory S. Trutza  
c/o Dr. John D. Briggs  
College of Biological Sciences

Biological Controls for Protecting  
Sweet Corn from the Corn Earworm

University of Dayton  
Dayton, Ohio 45409

Mr. Mark MacNealy  
c/o Dr. Joseph D. Lauferweiler  
Department of Biology

Control of Ozone and Titanium Dioxide  
Pollution by the Use of Antioxidants

OKLAHOMA

University of Oklahoma  
Norman, Oklahoma 73069

Mr. W. Lawrence Harvey  
c/o Dr. Luis H. Summers  
Department of Architecture and  
Civil Engineering

The Effect of Urban Change on "The  
Square" of Courthouse Square Towns

OREGON

Reed College  
Portland, Oregon 97202

Mr. J. Peterson Myers  
c/o Dr. Jeffrey Kelly  
Department of Chemistry

Political, Sociological, Economic,  
and Biological Considerations Affecting  
a Predator Control Program in the Steens  
Mountains of Eastern Oregon

University of Oregon  
Eugene, Oregon 97403

Mr. Edward McConnaughey  
c/o Dr. Paul Rudy  
Director-Institute of Marine Biology

An Integrated Land and Water Use Plan  
for the Coos Bay Estuary

PENNSYLVANIA

Carnegie-Mellon University  
Pittsburgh, Pennsylvania 15213

Mr. Lawrence J. Young  
c/o Dr. John C. Purcupile  
Department of Mechanical Engineering

Production of Protein by Single-Celled  
Organisms Grown in Municipal Liquid  
Wastes

Dickinson College  
Carlisle, Pennsylvania 17013

Mr. Richard Blutstein  
c/o Dr. Robert E. Leyon  
Department of Chemistry

Effects of Municipal, Residential, and  
Industrial Sewage and Solid Wastes on  
Two Tributaries of the Susquehanna River

Franklin and Marshall College  
Lancaster, Pennsylvania 17604

Mr. Gary W. Jay  
c/o Dr. Kenneth H. Brookshire  
Department of Psychology

Effects of Mercury Compounds on the  
Central Nervous Systems of Fish

Pennsylvania State University  
University Park, Pennsylvania  
16802

Mr. Vaughn L. Glasgow  
c/o Dr. W. R. Weisman  
Department of Art History

A Socio-Historic Determination of  
Cast Iron Structures in the So-Ho  
District of New York City

Pennsylvania State University  
University Park, Pennsylvania  
16802

Mr. Marlin L. Hornberger  
c/o Dr. Edwin L. Cooper  
Department of Biology

Biological and Chemical Effects of  
Land Use on Little Pine Creek,  
Pennsylvania

Pennsylvania State University  
University Park, Pennsylvania  
16802

Mr. Keith G. Kirk  
c/o Dr. A. L. Guber  
College of Earth and Mineral  
Sciences

The Effectiveness of Backfilling in  
Controlling Acid Mine Drainage in the  
Allegheny Plateau of Pennsylvania

RHODE ISLAND

Brown University  
Providence, Rhode Island 02912

Mr. John H. Flaschen  
c/o Dr. John Imbrie  
Department of Geological Sciences

Water Quality Problems in the Pawtuxent  
River Basin, Rhode Island

SOUTH CAROLINA

Clemson University  
Clemson, South Carolina 29631

Mr. James E. McCoy  
c/o Dr. David E. Shulenburger  
Department of Economics

Physical Mobility of the Aged in a  
Southern City and its Effects on their  
Socio-Economic Environment

SOUTH DAKOTA

Mount Marty College  
Yankton, South Dakota 57078

Mr. Jesse Wolf  
c/o Sister Kieran Diggins  
Department of Biology

Benthic Organisms in Natural and  
Channelized Portions of the Missouri  
River

TENNESSEE

Carson-Newman College  
Jefferson City, Tennessee  
37760

Mr. Douglas S. Shafer  
c/o Dr. Joe A. Chapman  
Department of Biology

Level of Pollutants and Bacteria  
in the Underground Waters of East  
Tennessee

Southwestern at Memphis  
Memphis, Tennessee 38112

Mr. Allen Warner Phelps  
c/o Dr. Bobby R. Jones  
Department of Biology

Pathways by Which Mercury is Introduced  
into an Ecosystem

TEXAS

William Marsh Rice University  
Houston, Texas 77001

Mr. Donald Robert Quartel, Jr.  
c/o Dr. Brien Ralph Hammond  
Department of Biology

Mercury Concentrations in Gulf Coast  
Mullet and the Mullet Food Chain

Texas Tech University  
Lubbock, Texas 79409

Mr. Alex F. Sears  
c/o Dr. George O. Elle  
Department of Agronomy

Quality of Source Water for Proposed  
Recreational Lakes in Yellowhouse  
Canyon near Lubbock, Texas

UTAH

University of Utah  
Salt Lake City, Utah 84112

Mr. Harvey P. Cahoon  
c/o Dr. Ivan B. Cutler  
Department of Material Science &  
Engineering

Feasibility of Making Insulation Material  
by Foaming Waste Glass

University of Utah  
Salt Lake City, Utah 84112

Mr. Clinton Kay Carter  
c/o Dr. Kimball T. Harper  
Department of Biology

Ecology of Antelope Island and Farmington  
Bay Area of Great Salt Lake

Utah State University  
Logan, Utah 84321

Mr. Richard H. Fuller  
c/o Dr. Raymond L. Kerns, Jr.  
Department of Geology

The Extent of Pollution and its Control  
in the Bear Lake Basin

VERMONT

University of Vermont  
Burlington, Vermont 05401

Mr. Wayne Timura  
c/o Dr. William J. Jewell  
Department of Civil Engineering

Analysis of Transportation and Environ-  
mental Resources of the Waterfront in  
Burlington, Vermont

VIRGINIA

Old Dominion University  
Norfolk, Virginia 23508

Mr. John r. Batkins  
c/o Dr. Robert L. Ake  
Department of Chemistry

Land Use Planning in Virginia Beach

Randolph-Macon Woman's College  
Lynchburg, Virginia 24504

Miss Anne H. Lindsey  
c/o Dr. Franklin F. Flint  
Department of Biology

Ecological Study of Blackwater Creek  
Basin, Preliminary to its Development  
as a Park in Lynchburg, Virginia

WASHINGTON

University of Washington  
Seattle, Washington 98105

Mr. John G. Comig  
c/o Dr. E. B. Welch  
Department of Civil Engineering  
Water and Air Resources

Water Quality Study of Swamp and Coal  
Creeks, King County, Washington

WEST VIRGINIA

West Virginia University  
Morgantown, West Virginia 26506

Mr. Roger D. Rader  
c/o Dr. James R. Stafford  
Department of Theoretical and  
Applied Mechanics

Noise Abatement in Dormitories

WISCONSIN

Carroll College  
Waukesha, Wisconsin 53186

Mr. David Radloff  
c/o Dr. Richard E. Bayer  
Department of Chemistry

Measurement and Control of Feed Lot  
Pollution

University of Wisconsin  
Madison, Wisconsin 53706

Mr. Jacob J. Emmerick  
c/o Dr. Robert E. Bowman  
Department of Psychology

Effects of Overcrowding on the Behavior  
and Biochemistry of Primate Groups

WYOMING

University of Wyoming  
Laramie, Wyoming 82070

Mr. Paul Lewis  
c/o Dr. Dennis H. Knight  
Department of Botany

Commercial Clear-Cutting in High Altitude  
Forests of Wyoming

### College Science Improvement Program

These are comprehensive grants available to predominantly undergraduate institutions and cover the full range of science education activities. Grants listed here are those with an environmental science component.

Occidental College, Los Angeles, California 90041. An oceanographic vessel was outfitted for use in research and teaching by a consortium of five institutions. John S. Stephens, Jr., Department of Mathematics

Monmouth College, Monmouth, Illinois 61462. Equipment for a field station, faculty research salaries and student research stipends were supported. Frank S. McKenna, Dean of the College

Wabash College, Crawfordsville, Indiana 47933. Renovation of a field laboratory in the Allee Woods, site of several long term field projects. Edward Haensch, Science Division

Antioch College, Yellow Springs, Ohio 45387. Support was provided to create an Institute of Undergraduate Studies in Science that offers a program of research and studies in the environment, the experimental sciences and mathematics, emphasizing interdisciplinary problems. Thomas C. Holyoke, Science Institute

Wilkes College, Wilkes Barre, Pennsylvania 18703. A new environmental sciences program has been established. Consultants aided the faculty in designing the courses. Laboratory space was renovated and equipped. Ralph B. Rozelle, Division of Natural Sciences and Mathematics

Southwestern at Memphis, Memphis, Tennessee 38112. Purchase of renovation of a mobile field laboratory for use in environmental studies to complement existing programs and to initiate a summer field studies program. Robert L. Amy, Department of Biology

Old Dominion University, Norfolk, Virginia 23508. An environmental laboratory was outfitted for the use of nine undergraduate biology courses. Undergraduate research will also take advantage of the natural environment for observation and collection. Melvin A. Pittman, School of Sciences

Sweet Briar College, Sweet Briar, Virginia 24595. An ecology center has been established. Long-range ecology and behavioral science-environmental studies will utilize the 3,400 acre campus. Courses are being developed by faculty, visiting lectures, guest professors and consultants. Jane C. Belcher, Department of Biology

## GRADUATE EDUCATION ACTIVITIES

### Environmental Sciences

- University of Wisconsin, Green Bay, Wisconsin; Course in Field Biometeorological Techniques; C. Tanner
- American Geological Institute, Washington, D.C.; Publication of a Prototype Geological Highway Guide; F. D. Holland
- Organization for Tropical Studies, Inc., South Miami, Florida; A Continuing Program of Graduate Education in Tropical Studies
- Cornell University, Ithaca, New York; Pest Population Ecology: An Inter-University Training Program; D. Pimentel
- Oregon State University, Corvallis, Oregon; Pest Population Ecology: An Inter-University Training Program; P. Oman
- University of California, Berkeley, California; Pest Population Ecology: An Inter-University Training Program; C. B. Huffaker
- North Carolina State University, Raleigh, North Carolina; Pest Population Ecology: An Inter-University Training Program; D. E. Davis
- Yale University, New Haven, Connecticut; Field-Based Doctoral Dissertation Projects; K. M. Waage
- Washington University, St. Louis, Missouri; A Graduate Education Program in Building Technology: Building Environmental Systems; E. C. Hoelscher
- University of Hawaii, Honolulu, Hawaii; Interdisciplinary Program in Human Ecology; R. W. Armstrong
- University of Massachusetts, Amherst, Massachusetts; Development of New Courses in Ocean Engineering; W. A. Nash
- Colorado State University, Fort Collins, Colorado; The Technology and Application of Remote Sensing of Natural Resources; L. D. Miller
- University of Tennessee, Knoxville, Tennessee; Ecology for Planners and Engineers; J. T. Tanner
- The Western Montana Scientists' Committee for Public Information, Missoula, Montana; A Project To Inform the Citizens of Montana of the Scientific Aspects of Environmental Pollution; C. C. Gordon
- University of California, Los Angeles, California; Doctoral Program in Environmental Science and Engineering: An Experiment in Education; W. F. Libby
- University of California, Berkeley, California; Development of Graduate Training in Methods of Architectural Behavior Research; R. L. Meier
- University of Nevada, Reno, Nevada; Preparation of an Instructional Film: Across the Sierra—Genesis of a Geosyncline; E. R. Larson
- Wayne State University, Detroit, Michigan; Development of an Environmental Engineering Curriculum; R. H. Kummier
- University of Oregon, Eugene, Oregon; Interdisciplinary Student-Originated Research Training: Study of the Development of the Galapagos Archipelago; F. J. Swanson
- University of California, Riverside, California; Pest Population Ecology: An Inter-University Training Program; P. DeBach

**Pennsylvania State University, University Park, Pennsylvania; Inter-University Program in Applied Ecology Related to Ecological Impact of Mine-Acid Drainage and Waste-Water Spray Irrigation; E. D. Bellis**

**North Carolina State University, Raleigh, North Carolina; Master's Training in Insect Pest Management; R. L. Rabb**

**Rutgers, the State University, New Brunswick, New Jersey; Inter-University Program in Applied Ecology Related to Air Pollution and Pesticide Problems; P. G. Pearson**

**University of South Dakota, Vermillion, South Dakota; Reorientation of Autecology Course To Emphasize the Biophysics of Energy Exchange; G. R. Hoffman**

**Stanford University, Stanford, California; Study on Mass Media Coverage of Environmental Problems; D. M. Rubin, D. P. Sachs, J. R. Krupp**

**Woods Hole Oceanographic Institution, Woods Hole, Massachusetts; Postdoctoral Research Training Program in Oceanography; A. Maxwell**

**University of Washington, Seattle, Washington; Training Program in Marine Sciences at Friday Harbor Laboratories; R. Fernald**

**Pennsylvania State University, University Park, Pennsylvania; Advanced Institute on Statistical Ecology in the United States; G. Patil**

