



reporter

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THE ALL-UNIVERSITY COUNCIL ON ENVIRONMENTAL QUALITY

Environmental Quality

ENVIRONMENTAL QUALITY

This issue of the CURA Reporter focuses on the ALL-UNIVERSITY COUNCIL ON ENVIRONMENTAL QUALITY, a project funded by CURA since its formation in 1971. The Council prepared its first "Annual Report" (covering 1971-1974) in the fall of 1974. This issue of the Reporter provides a summary of that Annual Report and describes the formation of the Council, its operation, and some of its major activities. The complete All-University Council on Environmental Quality Annual Report for 1971-1974 is available upon request. The Council also publishes a Bulletin. The most recent edition includes complete descriptions of the planning and urban studies programs at the several campuses of the University of Minnesota. The 1975-1977 University of Minnesota Bulletin, Courses and Programs in the Environment, Urban Problems, and Planning is also available upon request. The Council welcomes any comments, or questions, about its current activities and suggestions for new directions in which it might appropriately expand its program.

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COUNCIL FORMATION

Prior to the formation of the All-University Council on Environmental Quality, a need for a university activity directly addressing environmental quality was recognized. Several environmentally oriented activities, including teaching, research and public service were underway, but there had been no formal attempt to coordinate programs, assemble information on existing programs, or explore possible new programs.

In the fall of 1969, Vice President William Shepherd appointed the *ad hoc* Intercollegiate Committee on Environmental Studies (InCESt). This committee was directed to examine existing programs in the University of Minnesota, to explore needs, and to suggest possible new or revised programs at the all-university level relating to the environment.

InCESt, consisting of faculty members from various units of the Minneapolis and St. Paul campuses and chaired by John Borchert, Director of the Center for Urban and Regional Affairs, met during the 1969-70 academic year and in June 1970 submitted its report recommending the formation of a Council on Environmental Quality.

In October 1971, the InCESt recommendations were acted on and the All-University Council on Environmental Quality was established. Dean E. Abrahamson, Professor of Public Affairs, was appointed Chairman of the Council and twelve faculty members from various units of the Minneapolis and St. Paul campuses were appointed for staggered terms to the Council. In 1972 the Council membership was expanded to 18 members. Most major academic units from the Minneapolis-St. Paul campus as well as the Duluth, Crookston, Morris and Waseca campuses are represented on the Council. Student members will be added

in early 1975.

The Council is administratively associated with the Center for Urban and Regional Affairs and basic financial support is provided by CURA. The Council also receives grants and contracts for activities supported by organizations outside the University. For example, during academic year 1973-74 the Council received grants or contracts from the Minnesota State Planning Agency, the Johnson Foundation, and the Minnesota Academy of Sciences.

The Council has concentrated its efforts on new activities and on activities whose success requires coordination between existing units of the University. This includes reviewing requests for support of environmental efforts from any and all units of the University. The general objectives of the Council are: to serve as a source of information for faculty and students on courses, counseling and research proposals; to facilitate educational opportunities in environmental sciences; to develop public service programs; and to provide assistance in administration of, fiscal support for, and arrangement of credit and evaluation of programs, courses, and research relating to the environment.

More specifically, the Council's objectives are focused in the following areas:

Information — To compile and update information on environmental courses and programs. **Instruction** — To promote, develop and fund multi-disciplinary environmental seminars and new approaches to environmental studies. **Research** — To promote and fund research on environmental issues influencing governmental policy, particularly those affecting Minnesota. **Public Service** — To develop and fund continuing education and work-study programs involving public and private organizations.

THE COUNCIL'S OPERATION

The work of the Council is carried out by Council members, faculty, students, and the Council's staff. The Chairman of the Council has a half-time appointment as a project coordinator in the Center for Urban and Regional Affairs. In addition, the Council has had a full or part-time secretarial position and one full-time staff member.

Council members, other than the chairman, do not have appointments with the Council or with CURA. They are appointed by the Vice President for Academic Affairs and serve on the Council as they would on other all-university committees. Although Council members are appointed as individuals, and are not considered to formally represent their Colleges, an effort is made to have broad representation on the Council.

Much of the Council's work is done through grants to faculty members or students. These grants fall into three sometimes overlapping categories: research, teaching, and public service. During the first year, 1971-72, the Council had a very limited budget and could support only modest activities. During the second year, 1972-73, the Council worked to develop criteria and guidelines for its granting activities. Several grants, both for teaching and for research, were made during 1972-73 although the final guidelines and criteria had not yet been established. From the outset there was agreement that the Council would focus its grants for teaching on those courses that cut across traditional disciplinary lines and that the research grants, because of the Council's objectives and level of funding, would be "seed" grants enabling an activity to begin or to indicate the feasibility of a project which would hopefully be able to attract more substantial funding once underway.

NEW COURSES

Because of funding limitations, the Council cannot support many courses. It is hoped that at least one or two new courses or other instructional activities per year can be supported by the Council. It should also be emphasized that instructional grants are intended for operational support of instructional activities. Support for the development of new instructional programs will, it is hoped, continue to be available from the All-University Council on Liberal Education through its educational development small-grants programs.

Courses that have been funded by the Council are:

Experimental Course in General College, Minneapolis campus (February 1973, Professor Allen Johnson)

Funds were requested for the implementation of a 16-credit Environmental Package in the General College. The Council approved partial funding of the course. The package was designed to implement new approaches in interdisciplinary learning. The primary objective of the package was the integration of two major types of curricular approaches focusing on environmental issues. One approach or component centered upon the more formalized study of the ecological and social aspects of the environment. The second component of the package focused upon student fieldwork and problem-oriented study of actual environmental problems in the Twin Cities area. The Spring 1973 offering of the package, a regional approach, was implemented with emphasis on studies of the politics, economics, and ecology of environmental problems in the St. Croix River Valley.

University of Minnesota-Duluth Course (February 1973; Spring 1974, Professor Roy Hoover and Professor Fred Witzig)

Two UMD faculty members sought funding for their course IS 3-100, "Man's Environment: His Future" (3 cr.). The faculty for this course was drawn from across the campus and included representatives from the natural and social sciences who lectured on topics appropriate to the basic theme of the course. The lecture part of the course covered selected topics within the spectrum of man's environment. Students were also required to participate in a group research study project.

During the spring quarter, 1974, the course focused on the subject of the environment of recreation. The course material was divided into two parts: one consisting of an invitation to representatives from various components of the recreational environment to meet with the class, the second composed of class visits to several of the recreational facilities in northern Minnesota and Wisconsin.

ENVIRONMENTAL COURSE BULLETIN

One of the first Council activities was the writing and publication of a University bulletin which included all known environmentally related courses and pro-

grams at the University and also some non-university activities and services commonly used by students. This bulletin, which includes courses and programs from virtually all units of the University, is the first bulletin not organized along administrative lines; it is topically arranged and includes environmental activities regardless of their administrative home. The Bulletin, now in its third edition has, from all indications, been well received and used by students and faculty alike.

There were some administrative difficulties with the publication of this bulletin. Being the first, and to date the only, University bulletin not given to describing courses and programs in a single college, special procedures had to be used for its approval.

The objective of the Bulletin is to bring together, in a form most useful to students, faculty, and others, a concise description of environmental services and activities both at the University and in the Twin Cities. All units of the University, including the coordinate campuses, are involved in reviewing their courses and programs so that those with primary environmental emphasis are identified in the Bulletin. Some units are involved in developing new courses and programs. Those public agencies maintaining libraries with environmental holdings are also included. The Bulletin makes available a complete listing of environmental courses and programs, enabling those both in and outside of the University to find out about these programs in a systematic manner and it has also provided an impetus for revision and initiation of courses and programs.

The third edition of the Bulletin is scheduled to be published in November 1974 and will emphasize not only environmentally related courses and programs but also those relating to planning and to urban studies. The Council has joined with the Planning Program of the School of Public Affairs and the Urban Studies Program in publishing the third edition of the Bulletin.

Copies of the University of Minnesota Bulletin: Courses and Programs in *The Environment, Urban Problems, and Planning* are available from the Bulletin Room, Morrill Hall, University of Minnesota, Minneapolis, Minn. 55455 or from the All-University Council on Environmental Quality.

RESEARCH PROJECTS

The Council makes small grants for research as well as receiving research grants and contracts from outside sources. During the first year of Council operations the first of these small grants were made on an *ad hoc* basis. When, in the fall of 1972, the Council again received several requests for support, it was obvious that a set of priorities was needed to guide the funding of small research proposals.

During academic year 1972-73 the Council met several times to discuss research priorities. By the spring of 1973 the following broad topics had been selected as high priority for council support: Growth Policy, Land Use, Water Resources, Energy Policy, and Environmental Education.

In March 1973 workshops in each of these broad issue areas were established, under the chairmanship of Council members, and charged to consider for each broad area: (1) the nature of the problem, (2) the alternative solutions to the problem, and (3) the research needs implied by the various alternatives.

These workshops and their leaders were: Growth Policy, Professor Robert Holloway, Department of Marketing and Business Law; Land Use, Professor Lowell Hanson, Soil Sciences, Professor John Borchert, CURA, and Professor Dan Svedarsky, Department of Agriculture (Crookston); Energy Policy, Professor Dean Abrahamson, School of Public Affairs, Professor Richard Skaggs, Geography; Environmental Education, Professor Roger Johnson, Elementary Education.

In November 1973 the first general notice of the small-grant program for research relating to environmental quality was circulated throughout the University, and proposals were solicited. The Council also established a standing research committee to evaluate proposals and make recommendations to the Council Chairman. Current committee members are Professor Thomas Straw (Chairman), Division of Science and Mathematics (Morris); Professor Richard Bond, School of Public Health; Professor John Waelti, Agriculture and Applied Economics; Professor Dean Abrahamson, School of Public Affairs (ex officio).

The Council requires essentially the same proposal format and content as the Graduate School Grant-In-Aid small grant program. High priority is given to research which has direct bearing on Minnesota's environmental policy issues.

The Council solicits research grant requests from time to time. Faculty members and students can, however, submit requests for support at any time. The Council chairman should be contacted directly for details on these proposals.

COPPER-NICKEL STUDIES

For the three years that the Council has been in existence, it has supported various studies on the impact and technological aspects of possible copper-nickel mining in Minnesota:

Assessment of Potential Impact of a Copper-Nickel Industry in Minnesota (1971-72). The objective of this assessment was to initiate and carry out a comprehensive review of the total impact of a cu-ni industry in Minnesota and to join the resources of the University with those of responsible state agencies. Over 50 faculty members from various departments, students, and agency staff took part in discussions. Participating agencies included the Minnesota Pollution Control Agency, the Minnesota State Planning Agency and the Minnesota Department of Natural Resources.

Environmental Inventory of the Area of Potential Copper-Nickel Mining in Northeastern Minnesota (1972-73, Professors H.E. Wright and E.J. Cushing). This study proposed to prepare an inventory of the landscape features of the area near the base of the Duluth Gabbro Complex along the South Kawishiwi River including land forms, soils, vegetation, and water bodies. Fieldwork was undertaken and the data analyzed. It is to serve as a model for environmental impact studies in other forested areas. In addition to the field mapping and data analysis, a seminar on vegetation mapping was held during the winter quarter, 1973.

Copper-Nickel Studies (Professor H.M. Tsuchiya, July 1973). Professor Tsuchiya has been working for some time on a new process (biometallurgical) for copper-nickel extraction. In July 1973 the Council approved a grant for supplies in Professor Tsuchiya's ongoing study.

Copper-Nickel Study in Conjunction with the Minnesota State Planning Agency and the Minnesota Department of Natural Resources (1973-75, grant from the Minne-

sota State Planning Agency). At its fall quarter 1973 meeting, the Council established a task force (John Green, chairman; Perry Blackshear; John Borchert and Alan Robinette) to undertake the implementation of a grant to the Council from the Minnesota State Planning Agency to study copper-nickel mining in Minnesota. The Minnesota Resources Commission appropriated \$100,000 to the State Planning Agency to fund an investigation of the impact of copper-nickel mining in Minnesota and the money was to be divided equally between the State Planning Agency, the Department of Natural Resources and the University. The University was asked to undertake a study of technology assessment of copper-nickel mining.

The Council's task force, in consultation with Dr. Arnold Silverman, Professor at the University of Montana, reviewed several proposals which had been solicited by them and approved funding from the State Planning Agency's grant of the following:

Socioeconomic Impacts of Copper-Nickel Mining Via System Dynamics: (Professors P. Starr and H. Hickman). The objective is to develop a System Dynamics model able to trace regional socioeconomic changes in response to the introduction of cu-ni mining in the Arrowhead region of Minnesota. Special focus will be placed on identifying impacts requiring attention from the government and upon system "pressure points". While it cannot predict the future, the model can serve the decision maker by investigating the general behavioral characteristics of alternative policies making clear the relative merits and possible consequences of each.

Study of the Vegetation Effects of Air Pollutants Associated with Copper-Nickel Mining and Smelting Operations: (Professor John Kotar, UMD). The study will examine patterns of diameter and height growth of several coniferous tree species in the vicinity of the White Pine Smelter in Michigan. In addition to growth studies, a technique of using infrared photography for detection of physiological disorders in forest trees will be used.

Technical, Economic, and Environmental Impact Study of Modern Pyrometallurgical Processes for Treating Bulk Sulfide Flotation Concentrates from Minnesota Copper-Nickel Deposits: (Professors James Lawver and Paul Queneau). Mineralogical studies were undertaken and bulk sulfide

flotation tests performed after obtaining a small portion of the ten-ton sample of Minnesota ore taken from the Inco pit for pilot plant testing. The data are being used to model a typical modern pyrometallurgical process so that input-output data which could be used for environmental impact statements, as well as an economic analysis, can be provided.

OTHER PROJECTS

Lakeshore Development Study (Fall 1973, Professors L. Maki and D. Olsen). The purpose of the project was to bring up to date and expand the 1967 Minnesota Lakeshore Study for the counties in the Arrowhead Development Region. The earlier study was a CURA project and provided the impetus for the Shoreland Control legislation.

Study of the Heron and Egret Rookeries of Pig's Eye Lake as a Measure of Environmental Quality (1974, Professor D. Warner). This is a continuing study of these rookeries to establish their response to man's encroachment physically or by noise or chemical pollution and to establish their value both intrinsically and as indicators of environmental quality. The study will give basic and critically needed information on: levels of pesticide residues on egg shell formation and reproductive success; response of the herons and egrets to current food resource; response of the birds to noise pollution and response of the birds to direct intervention by humans.

Study of Effects of Timber Cutting on Lake-Water Quality in Northern Minnesota (1974-75, Professor H.E. Wright). The study will include a stratigraphic analysis of lake sediment cores to correlate the occurrence of pollen, diatoms, and other fossils with historical records of timber cutting, especially clear-cutting. The project is intended to study directly the comparative effects of fire logging on the forests of northern Minnesota and will have practical significance in the Boundary Waters Canoe Area because of its implications for management.

Trace Metals and Water Quality (1974, Professor D. Gerhart). The study involves the influence of trace elements on phytoplankton growth and succession. A need exists for studies of phytoplankton successions in continuous culture and in large *in situ* enclosures to help elucidate the role of these minor elements in regulating natural communities of phytoplankton. The research for this project

may then suggest new possibilities for controlling eutrophication and manipulating lake ecosystems to human advantage.

Revegetation and Nutrient Cycling Studies of Taconite Tailings (1974-75, Professor J. McColl). This project is intended to tie together available information and further refine treatment schedules of fertilization and specie mixes for a permanent vegetation and also define changes occurring over time, both of species and nutrients. The work will be divided into two phases: (1) statistically-based greenhouse studies in order to further refine current fertilization practices and minimize leaching losses, and (2) examination and analysis of a time-series of previous plantings in the field to determine changes which have occurred through time, such as shifts in species composition, fate of fertilizer materials, and increases in N levels due to leguminous nitrogen fixation.

State Rivers Preservation Programs: Planning, Law and Politics (1974, Professor D. Bryden, Mr. M. Priesnitz). The purpose of the project is to publish a study which will enable conservationists, both public and private, to cope effectively with the enormous variety of problems involved in creating a workable state program to preserve outstanding rivers. On a national level the project will furnish a thorough guide to the political, legal and practical "thickets" for use by conservationists throughout the country; on the state level it will provide useful information for the Minnesota Department of Natural Resources. The Council approved funding to enable completion of this project which was basically supported with other funds.

MINNESOTA ENERGY PROJECT

In August 1973 the Minnesota State Planning Agency appropriated nearly \$60,000 to the Council to undertake energy studies directed by Professor Dean Abrahamson, relating to the State of Minnesota. This study began in September 1973 and will be completed by December 1974. The several tasks which constitute the study include:

1. A study of energy supply and demand in Minnesota: The objective is to provide a working knowledge of the sources, transportation, distribution and storage system for fuels and other energy forms in the State of Minnesota and to provide available information on end uses of fuel and other energy forms in the State.

2. Writing a primer on energy supply and demand in Minnesota: The objective of this task is to prepare a report which will aid in increasing the understanding of the Governor, the Legislature, and the public, about energy issues facing the State of Minnesota. The report includes summaries, selected to illuminate policy questions, of energy flows into the state, of the energy transportation, distribution and storage systems, and of end uses of energy.
3. Fuel and power requirements of essential public services: The project identifies the fuel and power requirements for the delivery of essential public services, including public safety, prisons, hospitals, schools, and the municipal treatment of drinking water and sewage.
4. Fuel requirements for agricultural production: The study is a collection and integration of pertinent information on the current, and insofar as possible, on the anticipated utilization of energy for agriculture in Minnesota. It is restricted to agricultural production and does not include processing of agricultural products except that processing, for example crop drying, which is ordinarily done on the farm or done in connection with the sale by the producer of the raw products.
5. Technology and energy use and supply: The project will collect available information on current or likely developments in fuel and power technology, including supply and demand, and to identify their potential impact on energy supply and demand in Minnesota. This will include technical changes, or employment of known technologies, which will enable a more efficient use of energy.

6. Forecasting future energy requirements: This study summarizes forecasts of energy demand and describes the various methods and assumptions used in making these forecasts.

A list of the published reports of the Minnesota Energy Project and information concerning their availability is available from: Minnesota Energy Project, 967 Social Science Bldg., University of Minnesota, Mpls., Mn. 55455 or from the Minnesota State Planning Agency, Capitol Square Bldg., St. Paul, Mn. 55101, c Mr. E. Hunter.

with energy production including solar power, experimental housing using solar power, nuclear power, proliferation of nuclear material, and energy from solid waste. Several weeks were devoted to the Boundary Waters Canoe Area (BWCA) in northern Minnesota. A series was recorded on the BWCA and possible copper-nickel mining, and BWCA and logging. During the spring a series of programs was recorded on energy and agriculture, fertilizers, pesticides, and world food supply problems.

In September 1974 the Council was awarded a grant from the Minnesota Humanities Commission for partial funding of "Common Ground". Many of the programs during the first year dealt with discussions of environmental quality, growth, natural resource limitations and equity considerations, exploring mostly technical, political, and to a limited extent, legal implications of these issues. This year these kinds of considerations will be explored again but will also include a humanistic perspective. Guests will be drawn not only from technical and scientific disciplines but also from the humanities. Programs have been recorded recently on: a philosophical approach to the environment, energy forecasting, the no-growth theory, urban design and social effects. Other topics covered in programs this fall have been: noise pollution, the effects of sulfur dioxide, problems associated with ground water and waste disposal, and citizen involvement in a Minnesota transmission line controversy.

For further information on the Common Ground series contact Mary Trigg, 967 Social Science Bldg., U of M, Mpls., Mn. 55455.



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CONFERENCES

Energy Conservation: Implications for Building Design and Operation, Conference Held in Minneapolis (May 1973). The conference was sponsored jointly by the University (School of Public Affairs, C.U.R.A., School of Architecture, Dept. of Conferences, Center for Studies of the Physical Environment in the Institute of Technology, and All-University Council on Environmental Quality), the Upper Midwest Council and the Minnesota Society of Architects. Kenneth Saulter, Staff Economist with the Ford Foundation's Energy Policy Project, discussed energy supply and demand commenting on future availability and prices of energy. Charles Lawrence, Public Utilities Specialist in New York City's Mayor's Office, described results of a study of energy consumption in existing commercial buildings in NYC and means of affecting energy use in existing buildings. Paul Achenbach, Chief of the National Bureau of Standards' Building Environment Division, discussed several projects involving energy use and building design and operation currently underway in the Bureau. Gerald Rauenhorst, Rauenhorst Corp., explained how he evaluates energy use implications of decisions faced by developers. Richard G. Stein, Richard G. Stein & Associates, outlined options available to architects to influence energy use and Fred Dubin, Dubin-Mindell-Bloome Associates, presented the options for engineers. Conference proceedings were published by the Council and the School of Public Affairs.

Industry-Education Conference, Onamia, Minnesota (May 1974). The Minnesota Academy of Science and the Science Museum of Minnesota sponsored an Industry-Education Conference which was held in Onamia on May 12-14, 1974. The major focus of the program was on environmental impact, including the impact of governmental and industrial activity on the physical environment of Minnesota as well as on various social and human systems. The conference was directed toward the "probable" future environment of Minnesota based on present trends and in addition emphasized the role of education as the primary instrument for creating a desirable future environment for the State. Dr. Abrahamson prepared and presented a report at the conference which drew considerably on the Council's energy research being done in connection with the Minnesota Energy Project.

Conference to Review Energy Policy Project Report, Racine, Wisconsin (May 1974) Professor D. Abrahamson). The Johnson Foundation in Racine, Wisconsin provided funding for, and co-sponsored with the Council, a meeting at the Foundation to evaluate the draft of a final report of the Ford Foundation's Energy Policy Project. Sixteen people from various universities and agencies met for a two-day conference in Racine on May 15 and 16, 1974. Dr. Abrahamson subsequently presented the group's recommendations to the Project's Advisory Board. The Project, which is funded by the Ford Foundation and began two years ago, published a final report this fall.

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