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# Water Current

Millard W. Hall, Director  
Volume 7 Number 7

Karen E. Stork, Editor  
September/October 1975

## FROM THE DESK OF THE DIRECTOR . . .

The Water Resources Research Institute, along with the Conservation and Survey Division and the Department of Agricultural Economics, is currently involved in one of ten Areas of Excellence programs--this one in Water Resources Management. The objectives of this program are: (1) to improve and expand the University's basic water resources data collection, storage and retrieval activities; (2) to enhance the quality and enlarge the quantity of the University's water resources training/educational effort; (3) to improve and expand the University's water-related research activities; and (4) to develop a strong, coordinated water resources information dissemination program.

To accomplish these objectives, the Nebraska legislature has provided the three divisions engaged in this program with additional funds. The funds have been used mainly to hire additional personnel to carry out the goals prescribed.

The need for a program in water resources management is self-evident. The major source of Nebraska's wealth is, and likely will continue to be, food production and processing. These, in turn, are dependent on water. Curiously, in spite of the importance of water to the health and well-being of Nebraskans, much of the state is water-deficient in terms of the adequacy of precipitation for supplying its many needs. Thus, the importance of good water management practices is magnified.

The Water Resources Management Program will deal with Nebraska's water problems in several ways: (1) efforts will be focused on the identification of water resources problems related to these and other areas of concern; (2) efforts will be made to structure programs which will utilize all of the University's potential in education, research and public service in developing approaches to solving these problems; and (3) the efforts cited above will be conducted in a coordinated manner to maximize their impact and effectiveness.

The principal feature of the University's Water Resources Management Program should be that it is directed and coordinated. There should be major focuses and objectives. Each individual effort should fit into an overall plan so that what results is not a collection of unrelated and uncoordinated activities, but a well-defined and comprehensive attack on important water-related societal problems. It is to this end that the new Area of Excellence Program in Water Resources Management will be directed.



ON THE HOMEFRONT

NEW STAFF MEMBERS FOR NWRRI

We are pleased to announce the hiring of a new staff member for the Water Resources Research Institute and the promotion of another. Dr. Gary L. Lewis, Associate Professor in the Department of Civil Engineering, has agreed to become Assistant Director effective October 1, 1975. Dr. Lewis will be devoting approximately two-thirds of his time to Institute duties with the remaining one-third devoted to teaching in Civil Engineering. He will be responsible for assisting in the planning, promoting, administering, coordinating, conducting and supervising research in surface water hydraulics and hydrology. He will also be responsible for assisting the Director in the dissemination of research results and the training of water resources specialists in the areas of planning, design, operation and management of surface water systems.

Dr. Lewis will continue to be housed in 129 Bancroft in the Civil Engineering Department, but will also maintain a desk in our Research Office at 212 Ag. Engineering Building. We are most happy to welcome Dr. Lewis back to participation in our water resources research program.

The promotion in Institute staff involves Carol Robinson who has been promoted from Research Analyst to Research Technologist also effective October 1. Carol has been with the Institute since September 1974 working on various research contracts involved in the development of watershed models. Carol has become an integral part of our research team, and we are happy to be able to reward her efforts.

MEETING OF INSTITUTE ADVISORY COMMITTEE

The Water Resources Research Institute Advisory Committee held its semi-annual meeting on September 26 at the Center for Continuing Education. The new Director, Millard W. Hall, was introduced to the committee and reviewed the Institute's research program for fiscal year 1976, the fiscal outlook and various Institute activities. Three new subcommittees were set up and began work as follows: Subcommittee on Research Needs (Paul Harley, Planning Officer of the Missouri River Basin Planning Office, chairman); Subcommittee on Research Implementation (Don Long, Public Relations Director of the Central Nebraska Public Power and Irrigation District, chairman); and Subcommittee on Research Coordination (Robert Wall, of the Water Pollution Control Division of the Department of Environmental Control, chairman). These subcommittees will meet more frequently with Institute personnel in the coming months to carry out their various functions.



### POSITION ANNOUNCEMENT

A Research Associate is being sought for a twelve-month appointment with the Water Resources Research Institute, University of Nebraska-Lincoln. The person selected for this position will assist the Director in all aspects of the Institute's research programs related to groundwater. Primary responsibility will include assistance in planning, promoting, administering, coordinating, conducting and supervising research in groundwater hydraulics and hydrology. Responsibility also includes assisting with the dissemination of research results and the training of water resources specialists in the areas of planning, design, operation and management of groundwater systems.

Qualified candidates must possess degrees in a field related to job responsibilities as well as extensive work experience related to groundwater systems. Work experience must include quantitative modeling and analysis of groundwater systems. This is a full-time, permanent, non-tenured position.

Salary is commensurate with qualifications but nationally competitive. University retirement, group life and health insurance plans available, as well as sick leave and vacation.

Interested candidates should send a resume to: Dr. Millard W. Hall, Director, Water Resources Research Institute, 310 Agricultural Hall, University of Nebraska, Lincoln, Nebraska 68583.

The University of Nebraska is an Equal Opportunity Employer.

### DEADLINE FOR RESEARCH PROPOSALS

Just another reminder--The deadline for filing annual allotment proposals for fiscal year 1977 with the Water Resources Research Institute is December 15, 1975. Prospective principal investigators should make an appointment to discuss their proposals with the Institute Director before they begin writing.

### REGIONAL NEWS

#### CORPS WATER PLAN RECEIVES MIXED REACTION

The new U.S. Army Corps of Engineers program to protect rivers, streams, lakes and wetlands encountered both a barrage of criticism and a wall of support at recent hearings in Omaha concerning the Corps "interim final" regulations on Section 404 of the Federal Water Pollution Control Act Amendments of 1972. Generally, business and agricultural interests and top state officials opposed the new regulations, while conservation, wildlife officials and private citizens favored them.



Section 404 of the Act provides authority for the Corps to establish regulations controlling discharge of dredged or fill material in the waters of the United States, including requirements that a permit be obtained for discharging. The Corps originally limited its jurisdiction to the historical definition of "navigable waters" used since 1899 which described such waters as those "which are or could be used for navigation or those which had been so used in the past." However, a decision by a U.S. District Court in Washington, D.C., overturned the Corps' original limited interpretation and required them to expand authority to all waters of the nation.

Under the current interpretation, a three-stage program has been established whereby permits have been required since July 25, 1975 for navigable waters as previously interpreted. After July 1, 1976, permits will be required for primary tributaries of those streams and lakes. After July 1, 1977, the regulations provide that permits will be required for all waters of the United States up the headwaters area.

A number of groups and states have become concerned that the revised regulations would substantially infringe upon private property rights and result in a new influx of paper work to the federal government. Others have questioned whether permits might have to be issued for such things as normal farming operations involving plowing, erosion control techniques and other minor normal activity. Corps' representatives at the Omaha hearings said the regulations specifically exempted normal farming operations from the permit requirement. However, some witnesses questioned whether that could later be changed by court or administrative action.

#### NONPOINT SOURCE POLLUTION STUDY

The Water Resources Research Institute, along with ten other local, state and federal agencies\*, has been studying the problem of pollution from nonpoint sources, specifically agricultural runoff.

It is generally understood that nonpoint sources contribute the greatest amount of pollution to our state waters but as yet little is known about its control.

To monitor the runoff, an agriculturally oriented watershed (Dee Creek) of about 8 square miles 15 miles northeast of Lincoln was chosen. This area was selected because of its uniform soil texture, high agricultural productivity, uniform cropping practices and a high percentage of adequate conservation practices. The area also has an average annual rainfall of approximately 28 inches.

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\*This project was originally funded in 1973 by the Platte Level B Study, DEC, U.S. Army Corps of Engineers, and now the Old West Regional Commission. Other participants include the Lower Platte South NRD, UN-L Departments of Agronomy, Agricultural Engineering and Civil Engineering, U.S. EPA, Soil Conservation Service, U.S. Department of Agriculture, and the watershed landowners.



In order to determine what effect agricultural runoff has on the water quality of Dee Creek, stream samples are taken at various intervals during runoff events and at baseflow. Each year the 37 farmers whose operations comprise the watershed are questioned as to the amount and kind of pesticides and fertilizers they apply to their land, cropping practices employed, crop production yields, the number of livestock raised and the amount of pastureland maintained.

Precipitation is measured by 8 rain gauges located throughout the watershed. Runoff is measured continuously by a waterstage recorder correlated with the velocity measurements at a controlled channel cross-section.

At the control structure the stream flow is monitored continuously for temperature, dissolved oxygen and pH. Samples are taken on the rise, peak and recession stage of the runoff hydrograph. The sediment portion of the runoff is separated, quantified and saved for chemical analyses. Project personnel service the sampling equipment and manually collect other samples for soil loss during runoff events. Precipitation is analyzed to assess the relationship of the nitrogen in the precipitation to the surface runoff and baseflow.

Runoff and selected baseflow samples are analyzed weekly for COD, conductivity, inorganic phosphorus, nitrogen (ammonia, kjeldahl and nitrate), potassium, solids (dissolved, suspended and total) and sodium. Samples are analyzed on an ad hoc basis for alkalinity, BOD, chloride, coliform bacteria (fecal and strep), hardness, sulfate, volatile solids (suspended and total), turbidity and pesticides.

The field data collected on cropping practices, pesticides, fertilizers and existing soil survey data will be used to facilitate a surface soil sampling program to determine the nutrient levels and sediment nutrients potentials. In this way the enrichment ratios of the sediment will be determined.

All of the data generated by this study will be used to determine the validity of streamflow and water quality simulation models for this type of watershed and for making desired modifications to these models.

#### CORPS BEGINS STUDY OF BEATRICE FLOOD PROBLEMS

The Kansas City District, Army Corps of Engineers, has begun a study of the flood problems of Beatrice, Nebraska, in response to a request by the city after the flood in October 1973. The study will be limited to flooding and related water resource problems in Beatrice.

A flood control plan for Beatrice was authorized in the Flood Control Act of 1954, but that plan is outdated and no longer economically feasible. Funds for the new study have been appropriated by Congress, and the necessary office studies have been started.

The study will include the reevaluation of levees on both sides of the Big Blue River and Indian Creek, as well as other structural and nonstructural alternatives.



The citizens of Beatrice and any other interested persons are invited and encouraged to participate in this study by providing information and opinions regarding flood problems and possible solutions.

Several alternatives have been suggested and will be evaluated during the study. They include evacuation of the flood plain, doing nothing, zoning to inhibit development in the flood plain, flood proofing of existing development, channel modifications and levees. Using flood insurance to spread the cost of flood damages over a period of years to minimize economic shock will also be considered.

Those interested in providing opinions, suggestions and concerns should contact the District Engineer, Army Corps of Engineers, ATTN: MRKED-BA, 700 Federal Building, Kansas City, MO 64106.

#### UNTAPPED COAL TO BE EVALUATED

Four grants and one contract totaling about \$450,000 have been awarded to agencies and universities in several Western States by the U.S. Geological Survey, to help evaluate unleased coal deposits on Federal lands and to assess environmental impacts of their development.

The grants and contract, part of the Survey's program of investigations to increase our knowledge of the nation's reserves of energy-related fuels on Federal land, will supplement field and laboratory studies in known coal-leasing areas and in areas that have not been intensively investigated but show promise for coal production.

The following is a summary listing of the coal exploration awards:

- \* Colorado School of Mines Research Institute: a contract to provide sufficient subsurface and analytical data to evaluate coals underlying unexplored Federal lands in the Yampa and Danforth Hills area of northwestern Colorado.
- \* Montana Bureau of Mines and Geology: a grant to evaluate the low-sulfur subbituminous and lignite coal reserves of the Fort Union Formation of eastern Montana and northeastern Wyoming.
- \* North Dakota Geological Survey: a grant to evaluate the reserves and to assess the environmental impact of lignite development in the Fort Union Formation throughout the western half of North Dakota.
- \* Utah State Geological and Mineralogical Survey: a grant to evaluate low-sulfur bituminous coal beds of the Wasatch Plateau region of central Utah.
- \* Wyoming State Geological Survey: a grant to provide information on the stratigraphy of the coal-bearing section, the overburden of the coal beds, and reclamation potential in the Hanna and Carbon Basins of southeastern Wyoming. This coring program will include trace element analyses for use in reclamation plans.



## CONFERENCES

### 30th ANNUAL MIDWESTERN FLOOD CONTROL AND WATER RESOURCES CONFERENCE

The 30th Annual Midwestern Flood Control and Water Resources Conference is scheduled for November 13-14, 1975 at the Wisconsin Center, 702 Langdon Street, in Madison Wisconsin.

The following topics will be presented: a panel on flood proofing; federal flood insurance after 1975; a panel on water research; a discussion on the changing role of the Corps of Engineers; a panel of attorneys on flood plain management; flood control and water resources reports from 14 Midwestern states; and others.

A block of rooms has been reserved at the Center's Lowell Hall in Madison. For reservations write or call before November 5: Wisconsin Center, 702 Langdon Street, Madison, Wisconsin 53706 (telephone 608-256-2621). For further information on this conference, call 608-262-1122.

### SYMPOSIUM ON SOLUTE TRANSPORT IN SUBSURFACE WATER

A Symposium on Solute Transport in Subsurface Water will be held December 8-12, 1975 as part of the Fall Annual Meeting of the American Geophysical Union. Sponsored by the Committees on Groundwater, Soil Water, and Water Quality of the AGU Section of Hydrology, the meeting is scheduled for the Jack Tar Hotel in San Francisco, California.

Consisting of invited and offered papers on both the saturated and unsaturated zones, the symposium will have two half-day papers sessions and an evening panel discussion on practical aspects of solute-transport modeling. Papers may be offered on any aspect of the Symposium's subject, including those dealing with theoretical, laboratory, or field studies. Presentations dealing with solutes affected by chemical reactions or biological processes especially are encouraged.

### AEEP WORKSHOP ON STATISTICS IN ENVIRONMENTAL ENGINEERING

The Association of Environmental Engineering Professors (AEEP) announces a Workshop on Statistics in Environmental Engineering to be presented December 15-19, 1975 on a Miami to Nassau Cruise. The first day of the program will be devoted to statistical methods, the second day to statistical models and the third day to specific applications of statistics in environmental engineering.

Registration is \$30 for AEEP members and \$50 for non-members. Room and board will be \$175 per person for four nights and 14 meals on board ship. For further information or reservations contact: Thomas M. Keinath, Clemson University, Clemson, South Carolina 29631.



### WATER REUSE CONFERENCE PLANNED

The third Conference on Water Reuse is being planned for June 27-30, 1976. A call for papers has gone out for the conference which will emphasize more effective utilization of our resources and the wastes that can be recovered. Details on papers for the conference may be obtained from Lawrence K. Cecil, Consulting Chemical Engineer, 418 Lincoln Building, 44 Main Street, Champaign, Illinois 61820. Telephone (217) 356-8258.

### PUBLICATIONS

#### NEW NATIONAL WATER QUALITY MONITORING NETWORK

A new water-quality monitoring network designed to provide a balanced yearly picture of water quality in U.S. streams on a national and regional scale is now in operation according to the U.S. Geological Survey, Department of the Interior.

Known as the National Stream Quality Accounting Network (NASQAN), the network consists of 345 stations that measure 46 physical, chemical, and biological water-quality characteristics, including temperature, specific conductance, and a variety of bacteria, dissolved minerals, trace elements, nutrients, and organic, and biological constituents. Measurements are made either continuously, daily, monthly, or quarterly, and the network will be expanded to 525 stations by October 1976.

The USGS-designed network measures a broad range of physical, chemical, and biological characteristics that were selected in response to the information needs of groups involved in water planning and management on a national or regional scale.

NASQAN data will be published in three forms: (1) annual Geological Survey basic-data reports on a State-by-State basis, (2) an annual summary report depicting the Nation's surface-water quality, and (3) a series of reports, published every three to five years, that will deal with long-term changes (or lack thereof) in water quality.

NASQAN is more fully described in a new report, "The National Stream Quality Accounting Network (NASQAN)--Some Questions and Answers," by John F. Ficke and Richard O. Hawkinson, published as U.S. Geological Survey Circular 719. Copies of the report are free upon request to the Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202.



## RESEARCH REVIEW

Project Title: Detection of a Potential Health Hazard in Recreational and Other Surface Waters

Principal Investigator: William D. O'Dell, Assistant Professor  
Department of Biology  
University of Nebraska-Omaha

Human primary amebic meningoencephalitis, an infection of the brain, is a fulminating fatal disease process which is generally associated with bathing and swimming activities of susceptible individuals in waters that harbor virulent amebas of the genera Naegleria and Acanthamoeba. In Virginia, where multiple cases have been recognized, the evidence for swimming associated infection has been so strong as to result in the closing and filling-in of recreational lakes and ponds.

Naegleria and Acanthamoeba are ubiquitous in their distribution, occurring in moist soils and waters ranging from sewage effluent through lakes, rivers, and including swimming pools. Several different techniques for the isolation of these organisms have been used in the past. These, however, are not generally satisfactory for the quantification of wild populations of either the pathogenic or nonpathogenic amebas.

The objectives of this project are to: (1) develop and test a simple, rapid, and reproducible technique for the detection, quantification, and identification of both pathogenic and nonpathogenic species of amebas; and (2) apply these techniques to an ecological study of these organisms. Development of reliable, routine techniques will be invaluable in the identification of potential health hazards in recreational waters.

A glucose-salts medium with an overlay of agar has been selected as an isolation and quantification medium. This has been used in sampling and ecological studies at Papio Dam Site 16 in Douglas County, Nebraska. Preliminary data indicate that ameba populations range as high as 250 cells/gram of bottom sample. Further work will be necessary for identification of the species isolated. To facilitate identification, fluorescent antibody techniques are being investigated.

## QUESTIONS AND INQUIRIES

Newsletter items and inquiries should be sent to: Editor, Nebraska Water Resources Research Institute, 310 Ag. Hall-East Campus, University of Nebraska, Lincoln, Nebraska 68583; or phone (402) 472-3307.

## NEWSLETTER ITEMS SOLICITED

The Water Current Newsletter will publish, without charge, announcements, programs for up-coming conferences, employment opportunities or other newsworthy items on hydrology, water resources or related topics.