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Water Current

Millard W. Hall, Director
Volume 9 Number 2

Karen E. Stork, Editor
March/April 1977



"We stocked this ranch with flyin' fishes—figured they'd have a better chance when the creek dries up!"

"Reprinted with permission of artist"



NEBRASKA WATER RESOURCES RESEARCH INSTITUTE

ON THE HOMEFRONT

NWRC RESEARCH OVERVIEW

Once again the Nebraska Water Resources Center will sponsor a seminar on "Nebraska Water Research -- An Overview." This year two seminars will be held -- Thursday, April 21 at the North Platte Station, and Thursday, April 28 in the Beatrice Room of the Nebraska Center. The Overview being held at North Platte will present project reviews of particular interest to people in that area of Nebraska.

The objective of the Research Overviews is to present a brief review of the current water-related research program of the Institute of Agriculture and Natural Resources. Researchers will make presentations on studies in progress, including accomplishments to date and future research plans.

The seminars are open to the general public, state and federal agency representatives, university faculty and students and other interested persons. There is no fee.

For further information, contact: Nebraska Water Resources Center, 310 Ag. Hall, University of Nebraska, Lincoln, Nebraska 68583. Telephone (402) 472-3305.

WATER RESOURCES IN NEBRASKA

EXON CREATES DROUGHT TASK FORCE

The possibility of Nebraska's protracted drought continuing and deepening has prompted Governor J. James Exon to create a drought task force. At a recent Denver meeting of governors to discuss the drought, Exon suggested that each state develop such a task force "to lend all assistance possible to those most afflicted."

Members of the Nebraska drought task force are: Lt. Governor Gerald Whelan, chairman; Dayle Williamson, Natural Resources Commission, vice chairman; State Senator Maurice Kremer of Aurora; State Agriculture Director, Glenn Kreuscher; State Tax Commissioner William E. Peters; Harold Rademaker of the Agricultural Stabilization and Conservation Service; and Benny Martin, Soil Conservation Service. Faculty members from the University of Nebraska on the drought task force are: James G. Kendrick, agricultural economist; Norman J. Rosenberg, agricultural climatologist; Rollin D. Schneider, extension safety specialist and chairman of the IANR Drought Committee; and Millard W. Hall, Director of the Water Resources Center.

At the first meeting of the state drought task force, it was decided that county emergency boards should be put on "red alert" and instructed to keep updated information on drought conditions and effects. Rollin Schneider was instructed to put together a guide of services and problems for drought-plagued farmers and ranchers. This project would entail putting together a booklet or fact sheet for farmers, ranchers, bankers and others telling those faced with drought-related problems such as a hay shortage or dry well, who to call in government to find out what, if anything, might be done to help.

Millard Hall suggested, and the task force agreed, that all Nebraskans should avoid wasting water, but that major concerns should be directed at major uses, such as conservation in irrigation whenever possible.

KREMER SUGGESTS COMPREHENSIVE WATER CODE

State Senator Maurice Kremer has suggested that the Legislature postpone action this year on proposed changes or additions to Nebraska's water laws. Instead of attacking Nebraska's water problems in piecemeal fashion with many bills, the Senator feels that an interim study committee should be established to draft a water code for consideration by the 1978 Legislature.

Kremer noted that "the time is here to take a good look at all facets of Nebraska's water needs and plan for the future." He feels that a year should be adequate time to draft a water code that would be the initial step toward comprehensive management of Nebraska water. The type of water code that Kremer suggests is one that maps water strategy for 25 to 40 years into the future.

During recent Public Works Committee hearings on various water bills, Kremer noted that there is not a clear consensus on what new laws should be adopted and many conflicting views have been expressed. A major area of confusion is ground-water use and ownership. Three different bills have been introduced on this subject, and strong opposition has been expressed toward each bill. Kremer said that earlier hearings on bills relating to definition of beneficial uses of water and priority of water users revealed a similar lack of consensus.

The many complexities of water use point up the need for addressing water problems through a comprehensive water code, Kremer noted. The key is management of Nebraska's water supplies to stabilize water resources and help make Nebraska a productive state.

FEDERAL HIGHLIGHTS

DEPARTMENT OF INTERIOR APPOINTEES

The Carter administration is slowly filling its top jobs, hampered by White House investigations, and, in one case, by ill feeling in the Senate caused by the water projects controversy.

Guy R. Martin, 34, Commissioner of Natural Resources in Alaska, has been proposed as Assistant Interior Secretary of Land and Water Resources. However, his confirmation has been stalled in the Senate Energy and Natural Resources Committee, as committee members are asking for his opinion about several water projects which have been halted by the Carter administration.

Other Interior nominees who have been confirmed or recommended for confirmation by the committee include: James Joseph, 41, of Columbus, Indiana, to be Under Secretary of the Interior; and Robert L. Herbst, 41, Commissioner of Natural Resources in Minnesota, to be Assistant Secretary for Fish and Wildlife and Parks.

Douglas Costle, 37, formerly head of natural resources matters at the Congressional Budget Office, and Georgian Barbara Blum, 37, have been confirmed as Administrator and Deputy Administrator of the Environmental Protection Agency. Charles Warren, 49, a California assemblyman, has been confirmed as Chairman of the Council on Environmental Quality.

REVIEW OF WATER RESOURCES PROJECTS INITIATED

A complete administrative review of all on-going federal water resources development projects is underway at the direction of President Carter. In a recent announcement, the President noted that he was deleting funding requests for 19 water resources development projects from his fiscal year 1978 budget request. However, since that time 18 of these projects have been reinstated by Congress.

The President ordered agency reviews of all "current projects" to reassess their safety and environmental impacts and to re-evaluate their economic justification under the current discount rate of 6-3/8 percent. A total of 320 Corps and Bureau of Reclamation projects -- including major flood control, navigation, hydropower, irrigation and water supply projects -- are involved, along with some 1,100 small watershed projects of the Department of Agriculture and three Tennessee Valley Authority projects.

These 320 current projects have already been subjected to an initial screening under criteria established jointly by the Council on Environmental Quality, Office of Management and Budget, Departments of the Interior, Army and Agriculture, and the Tennessee Valley Authority.

A key White House adviser on water resources matters, Ms. Kathy Fletcher of the Domestic Policy Staff, recently said that President Carter is as interested in the new water resources development criteria which emerge from the current review as he is in the outcome with respect to pending projects.

The deadline for project reviews for the Corps, Bureau of Reclamation and TVA is mid-April, while reviews on SCS projects must be completed by July 15.

OWRT URGES RESTORATION OF WATER RESEARCH MONEY

During the Department of Interior's fiscal year 1978 budget hearing before the Senate Appropriations Subcommittee on Interior, James S. Burton, Acting Director of the Office of Water Research and Technology, urged that legislation be enacted to resume saline water research and technology development and water resources research. The budget request of \$21.1 million "assumes enactment of legislation to continue saline water programs and to resume additional water resources research," Burton said.

The legislation would restore part of the 1964 Water Resources Research Act (Title II) that expired after ten years of successful accomplishment.

NORTHERN PLAINS GROUNDWATER TESTS ENCOURAGING

According to a U.S. Geological Survey report, the first testing of a 4,341-foot well tapping the Madison Limestone and associated rock units in northeastern Wyoming was encouraging in terms of groundwater potential.

The deep test well was drilled by the USGS in cooperation with the states of Wyoming, Montana, North Dakota, and South Dakota. The study will evaluate the Madison Limestone and associated aquifers (subsurface water-bearing rock units) as sources to help meet future water needs in a 188,000-square-mile region that includes the coal-rich area of the Northern Great Plains.

Elliott Cushing, USGS hydrologist, Denver, Colorado, and chief of the project, emphasized that the results were preliminary and additional tests will be conducted this spring.

"In terms of yield," Cushing said, "our preliminary tests indicate that under free-flowing conditions, the well could yield without pumping about 650 to 700 gallons of water per minute. Pumping would, of course, increase the yield tremendously. If future tests bear out our preliminary results, a properly developed well might yield as much as 1,600 gallons per minute from a pumping level about 300 feet below the land surface."

Additional geophysical logs and hydrologic tests will be made this spring to determine exactly how much water the well will yield under various conditions of flow and pumping. A second, deeper (about 10,000 feet) test hole in southeastern Montana will be completed and tested in April.

Cushing noted that the overall study will require several years of data collection and analysis. "But it is the only way to provide the region's planners with a basic understanding of how major groundwater pumping will affect other users and uses of water," he concluded.

AUTOMATION HELPS WATER CHEMISTS KEEP UP WITH NEW POLLUTANTS

Automation, centralization, and computerized data handling have helped water chemists with the U.S. Geological Survey, Department of the Interior, to triple their production of chemical analyses in the last five years, but the number of new pollutants and water-quality parameters of concern to water-resources investigators seem to be increasing just as fast.

During the last year, analysts in the USGS Central Laboratories System made over two million determinations of physical, chemical, and biological characteristics in more than 140,000 samples. Although this represents more than a threefold increase over the 37,000 water samples analyzed just five years ago, USGS scientists are anticipating a flood of more than 200,000 water samples per year by 1978.

Dr. R. J. Pickering, chief of the Quality of Water Branch, USGS National Center, Reston, Virginia, noted, "There has been a tremendous increase in recent years, not only in the number of samples submitted for analysis, but also in the range of measurements requested. During the past year alone, for example, we have had to develop standard methods for measuring at least a dozen of the newer pesticides. At the same time, there has been a great increase in the demand for biological measurements and for determinations of toxic trace metals and organic chemicals. Our sample containers commonly hold not just water, but suspended and bottom sediments from rivers and lakes as well, and occasionally such exotic materials as clams, gases, or radioactive wastes. Much of this increased demand is no doubt the result of efforts that comply with environmental monitoring regulations contained in recently enacted environmental protection laws. The laws themselves represent the product of public awareness and concern for the water pollution problems that face our nation."

USGS is the nation's largest water resources data agency, and operates, in cooperation with other federal, state, and local agencies, more than 40,000 monitoring stations around the nation to assess the quality and quantity of the country's surface and groundwater resources.

Among the new devices that have been added to the USGS laboratory operations are automated sample changers, equipment for automatically mixing and combining chemicals with samples, instruments that record their own readings, and mini-computers that can compute results instantly and examine them for possible errors. Analytical results are transmitted directly from the laboratories via computer terminal to any of more than 50 USGS field offices, as well as to a computerized data bank in Reston, Virginia.

CONFERENCES

IRRIGATION RETURN FLOW QUALITY MANAGEMENT

Colorado State University and the U.S. EPA are sponsoring a national conference on "Irrigation Return Flow Quality Management," at Colorado State University, Fort Collins, Colorado on May 16-19, 1977. The conference will begin at 1:30 p.m. on the 16th and adjourn at 12:30 p.m. on the 19th.

The program will begin with the latest technical developments in irrigation return flow pollution and move on to a presentation of case studies of the Rio Grande Valley, San Joaquin Valley, Wellton-Mohawk Irrigation District, and Grand Valley. A banquet speaker from EPA will discuss the latest thinking in regard to non-point pollution sources and the P.L. 92-500, Section 208 Water Quality Management Planning activities and their role in irrigation return flow quality management. The last day of the program will deal with implementation.

The general objectives of the conference will be to present the combined results of EPA's research program, to integrate recent research results into an interdisciplinary approach, and to provide a forum for presenting and discussing the alternatives for implementing a national program of irrigation return flow quality management.

Further information may be obtained from: The Agricultural Engineering Department, Colorado State University, Fort Collins, Colorado 80523. Telephone: (303) 491-9367.

HIERARCHICAL APPROACH IN WATER RESOURCES PLANNING AND MANAGEMENT

A one-week course is being offered by the Case Institute of Technology--Case Western Reserve University from May 16-20, 1977. This year's theme is "Multiple Objective Decision Making for Natural Resources Programs."

The fee of \$275 includes one set of notes and one copy of the book, "Multi-Objective Optimization in Water Resources System: The Surrogate Worth Trade-Off Method."

For reservations or further information contact: Yacov Y. Haimes, Short Course Director, Systems Engineering Department, Case Western Reserve University, Cleveland, Ohio 44106. Telephone: (216) 368-4076.

WATER SUPPLY ENGINEERING: QUALITY, TREATMENT, MANAGEMENT

The University of North Carolina at Chapel Hill is offering a short course on "Water Supply Engineering: Quality, Treatment, Management," to be held on May 23-25, 1977.

Recent concern about the quality of our drinking water has led to passage, at the federal level, of Public Law 93-523, the Safe Drinking Water Act, and has instilled in water supply professionals a renewed awareness of their responsibilities in providing the public with a safe and adequate supply of water. This intensive three-day course in water supply engineering has been developed to provide an overview of the most current information in the field. The course is divided into three components dealing with water quality, water treatment, water supply planning and management considerations. The course material will be presented from a state-of-the-art standpoint and is directed at consulting engineers, water utility managers, and governmental health and regulatory agency personnel. Previous education and experience in the water supply field is a pre-requisite for the course.

The registration fee of \$100 covers lecture notes, supplies, banquet, cocktail hour and refreshment breaks. Graduate students from environmental sciences and engineering programs from other institutions are entitled to attend the lectures free of charge. Pre-registration is requested by May 9. Enrollment will be limited to 125.

For further information, contact: Dr. Philip C. Singer, Department of Environmental Sciences and Engineering, The University of North Carolina, School of Public Health, 201 H, Chapel Hill, North Carolina 27504. Telephone: (919) 966-1052.

STORM SEWER DESIGN

A workshop on "Storm Sewer System Design" will be held May 23-25, 1977, at the University of Illinois at Urbana-Champaign. The major purpose is to acquaint participants with the latest methods for design of storm sewers. Any engineer with interest in urban storm water drainage planning, management or design is welcome. Emphasis will be on the methods and procedures for designing the size, slope, and layout of sewers. The registration fee is \$225 and covers all session costs, lecture notes, user's manual for computer programs and computer time for design example.

For more information, contact: Dr. Ben C. Yen, Workshop Coordinator, Department of Civil Engineering, University of Illinois, Urbana, Illinois 61801. Telephone: (217) 333-4934 or for enrollment, call (217) 333-2884.

INDUSTRIAL WASTEWATER CONTROL COURSE

A short course on "The Engineering Control of Industrial Wastewaters," is being sponsored by the Department of Environmental Engineering faculty at the Cornell University College of Engineering on June 13-14, 1977.

The main objective of the course is to help engineers understand the severe limitations that federal and state regulatory agencies are imposing on all wastewaters discharged to natural waters and to sewers, and to improve their ability to produce effluents that will meet the new standards and limitations.

Topics will include water pollution control legislation, regulations and standards; effluent monitoring industrial wastewater disposal alternatives; effluent reclamation; biological and physical-chemical treatment process theory and applications; solids disposal; cost effectiveness of wastewater processes.

For further information, contact: Professor R. H. Lance, Associate Dean, College of Engineering, Carpenter Hall, Cornell University, Ithaca, New York 14853.

A NATIONAL SPECIALTY CONFERENCE

The American Society of Civil Engineering is presenting a National Specialty Conference on "Energy, Environment and Wild Rivers in Water Resources Planning and Management," on July 6-8, 1977.

The program includes the following subjects: water resources planning; operations and management; impact analyses; education and training; water resource systems; social and environmental objectives; water law; research and information.

The conference will be held in the Student Union Building, University of Idaho, Moscow, Idaho.

For registration information contact: Florence Jamison or William H. Knight, Engineering Extension Service, Washington State University, Pullman, Washington 99164. Telephone: (509) 335-4677.

For meeting arrangements contact: Professor C. C. Warnick, Committee on Arrangements, Civil Engineering Department, Moscow, Idaho 83843. Telephone: (208) 885-6429.

PUBLICATIONS

TETON DAM REPORT: SPECIAL PANEL FAULTS DESIGN

The Panel established by the U.S. Department of the Interior and the state of Idaho has published its findings on the July collapse of the Teton Dam.

Conclusions reached are: (1) the dam failed due to internal erosion, or piping, of the core deep in the right foundation key trench, with eroded soil finding exits through channels in and along the interface of the dam with the highly pervious abutment rock and talus to point at the right groin of the dam; (2) the exit avenues were destroyed by the outrush of water; (3) openings existed through inadequately sealed rock joints and may have developed through cracks in one core zone in the key trench; (4) once started, piping progressed rapidly and led to complete failure; (5) the design of the dam did not adequately take into account the foundations and characteristics of the soil used for filling the key trench; and (6) construction activities conformed to the design in all significant aspects except scheduling.

The complete report can be obtained by writing to the U.S. Department of the Interior, Bureau of Reclamation, Office of Design and Construction, Engineering and Research Center, P. O. Box 25007, Building 67, Denver Federal Center, Denver, Colorado 80225. Approximate cost is \$25.

USGS ANNUAL REPORT AVAILABLE

An annual report providing a comprehensive description of the activities of the U.S. Geological Survey, Department of the Interior, during fiscal year 1976 is available for purchase by the public.

The report summarizes progress of the federal government's largest earth science agency in identifying the nation's land, water, energy, and mineral resources; in classifying the federally owned mineral lands; in supervising the exploration and development of energy and mineral resources on federal lands; and in research aimed at developing a prediction capability for geologic hazards, including earthquakes and volcanic eruptions.

Copies of "United States Geological Survey Annual Report Fiscal Year 1976" may be purchased from the USGS Branch of Distribution, 1200 South Eads St., Arlington, Virginia 22202, for \$3.60 per copy (prepaid: checks or money orders payable to the U.S. Geological Survey). A supplementary report, "Geological Survey Research 1976," published as USGS Professional Paper 1000, summarizing technical results of the Survey's research programs, is also available from the Branch of Distribution, at \$5.50 per copy.

1976 MRBC PROGRAM REVIEW AVAILABLE

The 1976 combined federal and state program review in the Missouri River Basin is available for public distribution on a limited basis. The report is entitled "Missouri River Basin State and Federal Water and Related Land Resources Programs -- Fiscal Years 1977-1981."

It presents a description of the various state and federal water and related land resources planning, development and management activities both present and planned within the Missouri River Basin, and indicates field estimate funding required for each activity listed for five fiscal years.

The report is intended to serve as a guide to better enable the basin states, federal agencies and MRBC chairman to coordinate water and related land resources planning and construction activities within the Missouri River Basin.

More than 1,000 planning, research and construction programs were identified by MRBC state and federal member agencies as well as by several local and special purpose organizations.

The funding for these programs totals nearly \$678 million in fiscal year 1977. Of the total, \$617 million or 91 percent is federal funding, \$60 million or 8.8 percent is state or local funding, and \$1 million or .2 percent is MRBC funding.

NEW BOOK ON WASTEWATER RENOVATION AND REUSE AVAILABLE

A new book, entitled "Wastewater Renovation and Reuse," edited by Dr. Frank M. D'Itri, Institute of Water Research, Michigan State University, has just been published. The book covers significant contemporary research and technology relating to the problem of wastewater renovation and reuse. Contributors to the volume describe in detail the methods of wastewater renovation and nutrient recycling techniques for growing land and aquatic plants as well as for fish and animal food chains. Current analytical techniques for measuring virus and pathogenic organisms are evaluated, and suggestions are offered for achieving more accurate results. Unintentional wastewater recycling and its effects are surveyed, and fish are proposed as test organisms to determine the impact of this process on human health.

"Wastewater Renovation and Reuse" is of interest to scientists, government and municipal officials and engineers who are concerned with the conservation of scarce energy resources. The volume is also a valuable source of information for officials in federal, state, and local government environmental regulatory agencies.

The book is available from Marcel Dekker, Inc., 270 Madison Avenue, New York, New York 10016 and the price is \$39.50.

MID-AMERICAN DESIGN CONFERENCE PROCEEDINGS

The proceedings of the first Mid-America Design Conference, "Energy Conservation in the Design of Water Quality Control Facilities" held at Kansas City, Missouri on May 24-25, 1976 are now available for distribution.

The proceedings can be obtained at \$12.00 per copy by writing: Department of Civil Engineering, University of Missouri, Columbia, Missouri 65201.

POSITIONS AVAILABLE

GRADUATE STUDY IN WATER RESOURCES

Opportunities for graduate training and research in water resources are available in the College of Engineering at the University of Colorado. A program has been developed by the Department of Civil, Environmental, and Architectural Engineering to provide in-depth training in water quality control and management and broad-based studies in water management and engineering.

Applicants interested in these programs may apply to: Dr. G. G. Goble, Chairman, Department of Civil, Environmental, and Architectural Engineering, Engineering Center, OT 4-34, University of Colorado, Boulder, Colorado 80309.

CIVIL ENGINEERING RESEARCH ASSISTANTSHIPS

The Department of Civil Engineering at the State University of New York at Buffalo invites applications for graduate study and research in Water Resources and Environmental Engineering leading to M.S. and Ph.D. degrees. Several research assistantships are available beginning in September 1977. Annual research stipends vary from \$2,600 to \$4,850 and usually include tuition waivers.

For details and applications, write to: Dr. Dale D. Meredith, Program Coordinator, Water Resources and Environmental Engineering, Department of Civil Engineering, State University of New York at Buffalo, 4232 Ridge Lea, Buffalo, New York 14226.

SUNY/Buffalo is an Equal Opportunity/Affirmative Action Employer.

CIVIL ENGINEERING FACULTY POSITIONS

The Department of Civil Engineering, SUNY/Buffalo, announces openings for three faculty positions beginning September 1977 as follows: (1) Hydraulic Engineering with background in hydraulic dispersion processes; (2) Environmental Engineering specializing in physical-chemical treatment processes and/or disposal of waste on land; and (3) Geotechnical Engineering with specialization in foundation mechanics and design.

Duties include teaching and student advisement at the undergraduate and graduate level, and initiating and carrying out one's own research program. Salary and rank commensurate with qualifications, with a junior-level appointment preferred. Doctoral degree required.

Please direct inquiries to: George C. Lee, Chairman, Department of Civil Engineering, State University of New York at Buffalo, Buffalo, New York 14214.

SUNY/Buffalo is an Equal Opportunity/Affirmative Action Employer.

TENURED POSITION AVAILABLE

A tenured position is available in the Department of Civil and Mineral Engineering at the University of Minnesota beginning preferably September 16, 1977, in the area of water supply and pollution control engineering, emphasizing water and wastewater treatment.

Duties will include teaching at the undergraduate and graduate levels. A strong commitment to research is expected.

Applicants with a B.S. degree in Engineering and Ph.D. in Environmental Engineering (Water Resources) are preferred. Please submit letter of application, resume and names of three professional references to: Professor C. Fairhurst, Head, Department of Civil and Mineral Engineering, 112 Mines and Metallurgy Building, Minneapolis, Minnesota 55455.

The University of Minnesota is an Equal Opportunity and Affirmative Action Employer.

OPENING IN SEDIMENTATION ENGINEERING

The University of Minnesota is offering a position in Sedimentation and Hydraulic Engineering to be filled at the Assistant or Associate Professor level for Fall, 1977.

Qualifications include teaching ability and ability to attract research support. A strong interest in teaching and a commitment to fundamentals as well as applied research in sedimentation is expected.

Applications, including names of at least three professional references, should be sent to: Dr. Charles Fairhurst, Head, Department of Civil and Mineral Engineering, 112 Mines and Metallurgy Building, University of Minnesota, Minneapolis, Minnesota 55455.

The University of Minnesota is an Equal Opportunity/Affirmative Action Employer.

FACULTY POSITION IN ENVIRONMENTAL ENGINEERING

The Department of Civil Engineering at the University of Virginia is adding a new faculty position in the area of environmental engineering beginning September 1, 1977. The position is at the assistant professor level requiring an undergraduate degree in Civil Engineering along with a Ph.D. in a related field. Duties will include research and teaching at both graduate and undergraduate levels.

The new faculty member's area of interest should include water resource and water quality management with a specialty in quantitative methods, modeling, hydrology, and hydraulics.

The University of Virginia is an Equal Opportunity/Affirmative Action Employer.

FACULTY POSITION IN ENVIRONMENTAL ENGINEERING

Cornell University has a faculty position opening for a Ph.D. at the assistant (or associate) professor level in environmental engineering. Candidates should have a strong background in sanitary, hydraulic or transportation engineering and have demonstrated competence in the development and application of economic theory and mathematical modeling methods to environmental management problems.

Duties will include development of an active research program and teaching and advising both undergraduate and graduate students.

Applicants should forward their letter of application, curriculum vitae, and names of three or more references as soon as possible to: J. A. Liggett, Chairman, Search Committee, Department of Environmental Engineering, Hollister Hall, Cornell University, Ithaca, New York 14853.

Cornell University is an Equal Opportunity Employer.

M.I.T. JOB OPENING

The Civil Engineering Department of the Massachusetts Institute of Technology is seeking candidates for a faculty position in the general area of water resources systems analysis and planning, starting with the 1977/1978 academic year.

Candidates should have academic training and preferably several years experience in environmental planning of water resources systems. The candidate will be expected to attract research funding and pursue research activities in one or more fields of water-related planning.

Candidates will be required to teach graduate and undergraduate courses in water resources planning and systems analysis. Applicants should possess a Ph.D. degree. Faculty rank is at the assistant or associate professor level, commensurate with the applicant's qualifications.

Interested persons should send a resume to: Professor Frank E. Perkins, Head, Department of Civil Engineering, M.I.T., Room 1-290, Cambridge, Massachusetts 02139.

M.I.T. is an Equal Opportunity Employer.

FACULTY POSITION

The Civil Engineering Department of the Massachusetts Institute of Technology is seeking an economist interested in problems of water resources development and environmental management at the assistant or associate professor level. The successful applicant will teach divisional and departmental courses in water resource economics, management and planning for graduates and undergraduates; will supervise Master's and Ph.D. theses; will participate in interdisciplinary water resources and environmental management projects in the Department and more widely at M.I.T.; and will be responsible for obtaining and managing research funding on a regular basis. Opportunities exist for professional development in related areas such as energy and land use management, and for joint appointment with other departments or programs at M.I.T.

For further information, contact: Professor Frank E. Perkins, Head, Department of Civil Engineering, M.I.T., Room 1-290, Cambridge, Massachusetts 02139.

M.I.T. is an Equal Opportunity Employer.

RESEARCH REVIEW

Project Title: "Herbicide Transport in Soil Under Center Pivot Irrigation System."

Principal Investigator: Terry L. Lavy
Department of Agronomy
University of Nebraska - Lincoln

The rapid increase in the number of irrigated acres in Nebraska has nearly been paralleled by the increased usage of herbicides. Knowledge regarding the fate of herbicides applied to irrigated sandy soil is minimal. The objectives of this project are to define and control the soil-moisture aspects governing herbicide mobility in sandy soil.

Soils in many of the newly irrigated regions are relatively sandy, containing low amounts of clay and organic matter. Good weed control is a prerequisite for maximizing crop yields. Water soluble herbicides are commonly employed to assist in this task. The lack of organic matter and clay (which effectively absorb herbicides) in these soils enhances the possibility of herbicide leaching. If herbicides leach out of the top few centimeters of soil they are less effective in controlling germinating weed seedlings. If they leach below the top 15 centimeters they enter a portion of the soil profile where breakdown occurs more slowly. Little information is available regarding the percolation of herbicides through the soil profile.

Atrazine is commonly used for weed control in irrigated corn. Under dryland farming conditions atrazine sometimes carries over to the following season as shown by atrazine sensitive crops grown in the rotation. To study the persistence and mobility of atrazine in a highly productive, center pivot irrigated, corn field atrazine was applied on May 23 at farmer use rates and rates ten higher. The higher rates used at this Holt County location to facilitate observation of the leaching process did not cause appreciable damage to the corn. Soil samples, taken at six inch intervals down to a depth of three feet were analyzed in the greenhouse at monthly intervals using soybeans to indicate the presence of atrazine. The soybean bioassay of samples collected in July, detected a) no atrazine residue at any farmer use rate treatment, and b) leaching as deep as 12 inches in soil treated with the high rate. The only residual atrazine detected on the September 15 sampling date was in the top six inch layer of the high treatment. Porous ceramic cups attached to polyvinyl three inch diameter tubes were inserted at one, two three and four foot depths into the irrigated, sandy, atrazine-treated soil. By applying vacuum to the system, water samples were collected at each depth, brought to the laboratory and analyzed using gas chromatography for atrazine content. Only the high treatment rate contained detectable atrazine levels throughout the season. A maximum of 1.9 ppm was shown at the one foot depth on July 15. As shown by the soybean bioassay this level of atrazine was not toxic to soybeans grown in the soil.

Atrazine percolation studies at the Sandhills Agricultural Laboratory were conducted by collecting water percolating through a three foot layer of soil which had received a 30 lb/A surface application of atrazine. In general, the water collected in the retaining troughs contained only low concentrations of atrazine as detected by the gas chromatograph. Although the highest concentration detected was 31 ppb, these levels passing through the soil were detected late in the growing season.

Planting soybeans at weekly intervals throughout the growing season revealed that phytotoxic levels of a 10 lb/A atrazine treatment applied in May had dissipated in the irrigated sandy soil by August of the same year.

Progress is being made, however considerably more dissipation studies are necessary before we will be able to state quantitatively what happens to herbicides applied to sandy irrigated soils.

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. We will be happy to help advertise any water-related job openings in this newsletter. Please send any job openings you would like to have published to the editor, and we will see that they are advertised.

QUESTIONS AND INQUIRIES

Newsletter items and inquiries should be sent to: Editor, Nebraska Water Resources Center, 310 Ag. Hall - East Campus, University of Nebraska, Lincoln, Nebraska 68583; or phone (402) 472-3305.

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Nebraska Water Resources Center
310 Agricultural Hall
University of Nebraska - Lincoln
East Campus
Lincoln, Nebraska 68583

QUESTIONS AND INQUIRIES

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