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GUEST EDITORIAL

CONSERVATION AND THE NATION'S WATER POLICY

by

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President Carter's water policy message implied that conservation was to be the cornerstone of the National Water Policy. Few would argue with an intensified focus on water conservation, but a move in this direction for conservation's sake could be both costly and counterproductive. Conservation will not solve all of this nation's water problems, and it should be recognized that there will continue to be a need for development of new water sources.

In the future, new water developments will likely take advantage of more efficient water use practices, and this may reduce incrementally, but not eliminate, tomorrow's anticipated water supply needs. Pressures for expansion will continue but may be lessened by a combination of state-of-the-art new facilities and renovation of existing systems to higher levels of efficiency, providing this is economic and practical. "Illusions" of what conservation might do should not be permitted to rule out or delay the planning and construction of needed new water projects.

California weathered its 1977 drought without massive economic losses because there was room to conserve. In the future, this approach might not work. The problem is that if normal operating procedures produce little excess capacity in water supply systems, then in periods of extreme water shortages there will be no margin of safety. Risks associated with the conservation approach to water management should be carefully assessed so that development of new water sources will not be foregone when that option would clearly be in the best public interest.

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* Views expressed are those of the author and do not necessarily represent those of the Library of Congress or the Nebraska Water Resources Center.

This is expecially important, since long lead times are required to plan and construct water supply facilities.

The preliminary reports of several federal task forces on water conservation have outlined aggressive conservation programs, but they have given little thought to cost. Water conservation should not be an end in itself, that is, being justified only when economic efficiency and environmental objectives are achieved.

Encouragement of conservation practices beyond the limits shown to be economically and environmentally feasible should be questioned. If costs of inefficient water use exceed the costs of remedial action, then good management would support implementation of water-saving practices. Otherwise, expansion of facilities might be the most economic option. New systems can easily be designed and built for maximum water use efficiency but modernization of old systems might not be cost-effective or accommodated without considerable hardship on system owners.

Recent studies by the Bureau of Reclamation have provided some useful data on the economics of conservation. Information already obtained indicates that while many water conservation opportunities exist on irrigation projects, implementing them on about two-thirds of these would cost more than the estimated economic benefits. In addition, adverse environmental and energy disadvantages or difficult institutional problems seem likely in some cases. In the East, mixed evaluations also characterize potential water savings through leakage reduction, reuse of water, interconnections, and improved private and industrial water use.

A good conservation policy might include integrated water supply and demand management so that net economic and environmental benefits are positive. Traditional water supply development could thus be augmented by viable water-saving practices.

I strongly endorse national consideration of conservation in federally supported water resources planning and development programs. However, a flag should be raised--legislative and executive actions should be carefully designed to assure that conservation is considered in context with other alternatives in water resources planning and is not used as a mechanism to delay or discourage the use of structural or other approaches to solving water problems, especially when such use has been demonstrated to be the most efficient.

The federal government should support conservation conceptually by explicit treatment in the Principles and Standards, through assistance programs to state and local governments, and through special federal programs for demonstration, research, technology transfer and information dissemination. Specification of national or regional technical standards should be avoided, however, and left to the discretion of water authorities who can determine the appropriateness of actions in their normal water resources planning processes.

Conservation should be considered as an option in water supply planning, and used where effective, but the generalization that it will eliminate the need for development of additional water sources is false.

ON THE HOMEFRONT

SEARCH COMMITTEE FOR NWRC DIRECTOR

A search committee was recently named by Martin Massengale, Vice Chancellor for Agriculture and Natural Resources, to select a new Director for the Water Resources Center. Although the committee has not yet officially met, a job description for the position has been drafted, and it is expected that the committee will convene shortly. The official job announcement should be available within the next month.

Those interested in learning more about this position should contact Dr. Howard Ottoson, Assistant Vice Chancellor, Institute of Agriculture and Natural Resources, 211 Ag. Hall, University of Nebraska, Lincoln, Nebraska 68583.

NWRC RESEARCH PROGRAM

October 1 begins a new federal fiscal year. The Water Resources Center is involved in a variety of new water research projects as well as a continuation of many on-going efforts. The following is a listing of the Center's current water research program for fiscal year 1980.

Annual Allotment Program - OWRT

Project Title	Principal Investigator
Analysis of Legal and Institutional Arrangements Affecting Water Allocation and Use in Nebraska	J. David Aiken Ag. Economics
Ferrate Ion: Potential Uses in Advanced Wastewater Treatment	James D. Carr Chemistry
Variability in Crop Physiological and Morphological Characteristics Controlling Water Use Efficiency and Grain Yield	Jerry D. Eastin C.Y. Sullivan C.A. Francis Agronomy
The Biological Regulation of Bloom-Causing Blue-Green Algae	Eugene L. Martin Life Sciences
Improvement of Irrigation Scheduling Techniques for Corn with Variable Corn Maturity Range, Plant Population and Water Supply Availability	Darrell G. Watts Ag. Engineering

Public Attitudes of Nebraskans Toward Water Policy	Susan Welch Political Science
* Distribution of Mineral Nitrogen Under Native Range and Cultivated Fields in the Nebraska Sandhills	Gary W. Hergert North Platte Station
* Herbicide Loss from Treated Fields in Water and Sediment Runoff as Affected by Center Pivot Irrigation Pre-Bloom Dominants	J. Robert Leavitt Life Sciences
* Automation of a Sprinkler Irrigation System by the Utilization of Real Time Weather Information	Albert Weiss Panhandle Station
* Measurement of Actual Transpiration of Native Grass Stands as a Component of Nebraska Sandhills Groundwater Hydrology	A. Ty Harrison Life Sciences

Matching Grant Program - OWRT

Project Title	Principal Investigator
Remotely Sensed Crop Temperature for Water Resources Management	Blaine L. Blad CAMaC
Economic Evaluation of Groundwater Policy Alternatives in the Northern Great Plains	Raymond J. Supalla Ag. Economics
Water and Energy Conservation Using Center Pivot Irrigation and Reduced Tillage Systems	James R. Gilley Ag. Engineering
* Model Quantification of Streamflow-Groundwater Interaction for Complex Aquifer Geometry	Marvin V. Damm NWRC
* Water Conservation Through Limited Irrigation of Corn and Grain Sorghum in the Great Plains	Darrell G. Watts Ag. Engineering

Other Grants and Contracts

Evaluation of Hydrologic Effects of mplementing Various Levels of Control on Irrigation Activities - LB 577 (Policy Research Office)	Marvin V. Damm NWRC
Evaluation of the Silt Run From Guernsey Reservoir (Three Irrigation Districts)	Gary L. Lewis NWRC
Evaluation of Legal and Institutional Arrangements Associated with Groundwater Allocation in Missouri River Basin States (Office of Water Research & Technology)	J. David Aiken Raymond J. Supalla Ag. Economics
Water Quality Study of Runoff from Agricultural Lands - Dee Creek (EPA)	Marvin V. Damm NWRC
* State Water Planning - Policy Issue Analysis (Natural Resources Commission)	Gary L. Lewis NWRC

* New Grants and Contracts

For further information on any of these projects, contact either the Nebraska Water Resources Center or the principal investigator.

PROPOSAL DEADLINES

Although no firm deadlines have yet been established by the Office of Water Research and Technology (OWRT) for proposal submittal, it is assumed that they will remain approximately the same as last year. Therefore, matching grant proposals in final form should be received by the Water Resources Center by January 15, 1980, but perferably before the end of the year. These proposals must be submitted to OWRT probably by February 1, 1980, and the Water Center needs time to prepare final budgets and get all the necessary signatures. Annual allotment proposals will be due on February 1, 1980 for review by the Water Resources Center Executive Committee and submission to OWRT by approximately May 1, 1980.

Researchers are asked to first submit a pre-proposal with initial budgetary and time needs to the Director of the Water Resources Center for his review and comments. Researchers will then be contacted regarding the preparation of a final proposal.

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

DEE CREEK CONTINUATION APPROVED

The Water Resources Center has been informed by the Nebraska Natural Resources Commission that the U.S. Environmental Protection Agency has approved a request of $145,875 for the continuation of the Dee Creek Water Quality Study from September 1, 1979 to September 30, 1981. The principal investigator for this study is Dr. Marvin Damm. This study is primarily an investigation of the influence of nonpoint agricultural pollution sources on the quality of receiving streams.

Collection of data for the Dee Creek watershed will be continued under this extension. New collection sites within the watershed have been established. Monitoring at these new sites includes continuous records of streamflow; collection of water samples and analyses of these samples for quality determination; and measurement of weekly soil moisture conditions. Data to be collected on land use and management practices will include information on fertilizer, pesticide and herbicide applications. An effort will also be made to establish a temporary cooperative solar radiation-wind speed station near the Dee Creek watershed. The inventory of alternative water quality models for possible use in Nebraska will be completed, as well as review of various cause-effect relationships for the purpose of developing a relatively simple method of estimating "ball park" runoff quality values.

It is anticipated that the results of this study will be primarily useful to state water planners in the development of state water quality guidelines and regulations.

NEWS CLIPPING SERVICE

The Water Resources Center has updated and reclassified its news clipping service articles. Newspaper clippings on water-related topics are available for public viewing during regular working hours in Room 212 Ag. Engineering Building. The Center has maintained the clipping service since early 1977.

Articles are categorized in major topic areas such as Water Quantity and Water Quality. Some of the subcategories under these headings include groundwater, streamflow, drought, floods, and 208 water quality planning. There are also files on Irrigation, Natural Resources Districts, Water Projects, and Legal and Legislative Actions. Articles on the State Water Planning and Review Process are found in the management/policy section of this category.

The Water Resources Center is initiating a mailing of selected clippings of interest to various groups. Copies of pertinent clippings will be sent to those interested in receiving several pages of selected water news each month. If you are interested in being on this mailing list, please call and indicate your topical interest to Karen Stork, Water Resources Center, 310 Ag. Hall, University of Nebraska, Lincoln, Nebraska. Telephone: (402) 472-3305.

RESEARCH ASSISTANTSHIPS AVAILABLE

The Water Resources Center of the University of Nebraska has several graduate assistant positions available for students wishing to enroll in masters or doctoral degree programs at the University of Nebraska-Lincoln beginning in the fall 1979 or spring 1980 semester.

The selected candidates will be expected to work 1/3 to 1/2 time during the academic year and 1/2 to full time during the summer months. These positions will require persons who have taken one or more courses in Hydrology.

Two or three of the positions will be involved in a research project focusing on determining the suitability of simplified stream-aquifer-configuration equations for use with realistic stream-aquifer conditions. One of these positions will require an individual with a background in geology. Duties will consist of defining geologic cross-sections for several locations and aiding in estimating detailed aquifer properties at those locations. One or two other assistantships with this project will involve development and use of finite element and viscous flow (Hele-Shaw) groundwater models. One of these positions will require a person with a good applied mathematics background and a working knowledge of FORTRAN programming. The other will require a background in engineering or other physical science.

Another assistantship is available with a research project focused on evaluating various computer models that have been developed for use in simulating the quantity and quality of runoff from agricultural watersheds. Included in the list of models for that evaluation is an early version of HSPF --a model being developed by Hydrocomp, Inc. for the U.S. Environmental Protection Agency. Nebraska is one of the first states to have this model available for student research. Help in modification of one of these models or development of a new model to fit Nebraska conditions may also be necessary. Applicants for this assistantship should have had one or more courses in Hydrology, one or more courses related to Water Chemistry, and should be very familiar with chemical processes. In addition, familiarity with computer programming techniques and ability to use computer facilities is necessary.

Salary for these assistantships is dependent on qualifications, including immediate degree objective, and whether appointment is for 1/3 to 1/2 time. Stipends for 1/2 time service start at $475 per month. In addition, graduate assistants are eligible for a partial remission of resident tuition. Nonresident graduate assistants are eligible for waiver of nonresident tuition as well as a partial remission of resident tuition.

Additional information may be obtained from Dr. Marvin Damm, Nebraska Water Resources Center, 212 Ag. Engineering Building, University of Nebraska, Lincoln, Nebraska 68583. Telephone: (402) 472-3305. Applications for the assistantships should include a resume of applicable work experience, names of references and a transcript(s) of college and university coursework. Also, an indication of research interests and probable course emphasis should be included with the application. Graduate school applications may be obtained from the University of Nebraska Graduate College Office.

All qualified applicants will receive consideration for the positions without regard to age, race, creed, color, sex, or national origin.

WATER RESOURCES IN NEBRASKA

CONSERVATION AND SURVEY DIVISION

A new publication is available from the Conservation and Survey Division of the University of Nebraska-Lincoln. Entitled "Availability and Use of Water in Nebraska, 1975," this report is the third of a series, the earlier two reports describing the availability and use of water in Nebraska in 1965 and 1970. Data collection for each of the three reports was prompted in large measure by the need to supply information on Nebraska's water use to the U.S. Geological Survey for assessments of nationwide water use in 1965, 1970 and 1975. This and the other two earlier reports on Nebraska alone contain not only more detailed water-use information than could be presented in the nationwide reports but, in addition, summarize the concurrent availability of water in the state.

To obtain a copy of Nebraska Water Survey Paper #48, contact the Conservation and Survey Divison, University of Nebraska, 113 Nebraska Hall, Lincoln, Nebraska 68588.

FEDERAL HIGHLIGHTS

PRESIDENT ISSUES 2ND ENVIRONMENTAL MESSAGE

President Carter issued his second Message on the Environment on August 2, 1979. The President's Message reaffirms fundamental policies that have guided his Administration and sets out the Administration's environmental priorities for the 96th Congress. The statement also announces new initiatives in twelve areas as follows:

Land and Resource Management

(1) National Coastal Protection

(2) Public Land Resources

(3) Wildlife Law Enforcement

(4) Wild and Scenic Rivers

(5) National Trails

Agricultural Conservation

(6) Soil Conservation Incentives

(7) Integrated Pest Management

Urban Quality

(8) Transportation Policy

(9) Economic Assistance Program

(10) Urban Noise Program

Global Environment

(11) World Forests

(12) Acid Rain

Regarding water resources policy, the President noted the following:

"I remain firmly committed to the water resources policy reforms I announced in my Message to Congress one year ago. The revised criteria used by the Administration in reviewing proposed water projects have already shown their worth. They are producing environmental benefits and reducing wasteful government spending. In 1979, for the first time in four years, the Executive branch proposed funding new water projects, using the more systematic and objective evaluation procedures I have instituted. With the help of Congress and State and local governments, the Administration has prepared legislation to make further reforms in water resources management, including cost-sharing and assistance to states for comprehensive water resources planning. I look forward to cooperation with the 96th Congress in this area."

GUY MARTIN ADDRESSES UCOWR MEETING

Guy Martin, Assistant Secretary of Interior for Land and Water Resources, candidly addressed the shortcomings of the university water research community during the 1979 annual meeting of the Universities Council on Water Resources. His theme was that "we still have a painfully far way to go." He noted that every budget item is being scrutinized and the trust held by Congress in the past does not exist today. He added that we are at the end of an era when funding for science has been high.

The point was made that the Administration has worked hard and will continue to do so in supporting water research and education programs. Martin noted the President's interest in this matter, evidenced in part by the length of Mr. Carter's letter supporting the Water Research and Development Act of 1978.

The Assistant Secretary described his concern with the failures of researchers in convincing Congress of the relevance of the Office of Water Research and Technology's program. He feels that Congress is not yet "up" on the OWRT program and the breakdown is attributed to a missing rapport between researchers and policy makers. Program successes haven't been adequately communicated nor have substantive reasons for increased funding been conveyed. Martin also stated that state institutes haven't taken advantage of the new law and haven't joined together in setting priorities effectively.

To improve the situation, Martin proposed: (1) that the institutes build support by outreach within their states; (2) that institutes encourage relevant and refuse irrevelant research; (3) that researchers devote more time to tell him and others of the potentials for using the research results; (4) that researchers need to make themselves available to the Administration; and (5) that interested persons write to him on ideas for improving communications between researchers and administrative and congressional policy makers.

Martin closed by stating that when addressing congressional staff, no advocate is more effective than someone who actually used the results of research, and no advocate is less effective than himself or the researcher. His closing recommendation was that the state institutes must take the lead in setting program priorities and establishing relevance, and that the program should not be run by the Administration.

CONFERENCES

NWRA CONVENTION

The National Water Resources Association (NWRA) will hold its 48th Annual Convention November 4-8, 1979 in Denver, Colorado. The conference theme is "Face to Face with the 1980's." Speakers will discuss various issues of importance to NWRA members. Issues of current interest include: legislation

to modernize the 1902 Reclamation Act, an emerging new federal water policy, cost sharing, Principles and Standards, legislation to create a new independent Water Resources Council, water for energy, small hydropower development, public works authorizations and appropriations and rural clean water.

For a complete program or additional information, contact the Colorado Water Congress, 1111 South Colorado Boulevard #401, Denver, Colorado 80222. Telephone: (303) 759-9805.

CALL FOR PAPERS

The United States Environmental Protection Agency and The University of Texas at Dallas are seeking contributors for their conference on "Combined Municipal-Industrial Wastewater Treatment" to be held at The University of Texas at Dallas, Dallas, Texas, March 25-27, 1980.

The emphasis at the conference will be on the research, design, and operation of combined industrial and municipal wastewater treatment. Topics to be covered include pretreatment, biological and physical-chemical treatment, sludge handling and disposal, and water reuse and recycling.

Abstracts, of not more than 250 words, or requests for further information, should be forwarded to: Professor Aharon Netzer, The University of Texas at Dallas, P.O. Box 688, Mail Station BE 22, Richardson, Texas 75080.

NATIONAL SPECIALTY CONFERENCE ON SURFACE WATER IMPOUNDMENTS

A National Specialty Conference on Surface Water Impoundments will be held June 2-4, 1980 in Minneapolis, Minnesota. The conference is sponsored by the Department of Conferences, University of Minnesota; American Geophysical Union; American Society of Civil Engineering, Hydraulics Division, Committee on Research; and American Water Resources Association.

The conference is designed to appeal on a national basis to persons and organizations who are planning, designing, managing or researching man-made surface water reservoirs for any single or any combination of the following purposes: recreation, cooling, navigation, storm water detention and flood control, erosion control, wastewater management, water supply irrigation, tailings disposal, etc. Session topics will cover four major areas: (1) processes and problems; (2) planning and design; (3) management and use; and (4) regulatory overview.

Papers for the conference are being requested. For additional information, contact John S. Vollum, 222 Nolte Center, 315 Pillsbury Drive, S.E., University of Minnesota, Minneapolis, Minnesota 55455. Telephone: (612) 373-3157.

CALL FOR PAPERS

A "National Symposium on Urban Stormwater Management in Coastal Areas" sponsored by the Hydraulics Division, American Society of Civil Engineers, will be

held June 19-20, 1980 at Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

The symposium will deal with problems associated with the design and operation of any type of drainage system or management scheme including hydraulic, hydrologic, water quality, sociological, legal and economic problems. Presentations on case studies are encouraged. Suggested topical areas are:

(1) Joint probability of tide and rainfall event.

(2) Practicality of detention basin in coastal area.

(3) Trade-off between open channel and pipe system.

(4) Tidal hydraulics computation in the design of canal or canal system.

(5) Mathematical storm runoff quantity and quality models applied to the coastal area.

(6) Alternative management scheme related to social, economic and legal problems.

(7) Coastal flooding due to hurricanes.

Following are deadlines for submittal of papers for the conference:

November 1, 1979: Deadline to submit five copies of 250-word abstract.
December 15, 1979: Notification of paper acceptance.
March 15, 1980: Deadline to submit eight-page paper for proceedings.

For information and abstract submission, contact: Dr. Chin Y. Kuo, Virginia Polytechnic Institute & State University, Blacksburg, Virginia 24061.

PUBLICATIONS

REPORT ON IRRIGATION WATER USE

Improvement of irrigation water management in the U.S. at a cost of up to $5 billion could result in some two to five million acre-feet of water being made available for other uses according to the report, "Irrigation Water Use and Management," recently released by the Carter Administration.

Recognizing that state and local entities are the key to implementing water conservation measures, the Interagency Task Force on Irrigation Efficiencies recommends that governors of the individual states take the leadership in initiating and maintaining a cooperative program through federal, state, local and private entities to bring about improvement in irrigation water use and management and achieve water conservation. Federal agencies would act in a service capacity to assist the states.

There is a growing concern throughout the nation that our water resources are not being protected sufficiently and that the supply of good quality water cannot keep up with the increasing demands. Because irrigated agriculture accounts for about 80 percent of all water consumed and nearly 50 percent of the total water diverted or withdrawn in the United States, attention has been focused on this use of water as a source for possible conservation initiatives.

The primary objectives of this report are to: (1) clarify and present uses of water in irrigated agriculture; (2) address issues raised concerning efficiency of on-farm water use and irrigation water delivery; (3) provide information on irrigation objectives, policies and programs; and (4) unite interest groups, irrigators and the general public in support of a clear-cut and effective national program of water conservation for irrigated agriculture.

The studies leading to the report were conducted under the direction of the Interagency Task Force comprised of representatives of the Departments of Interior and Agriculture and the Environmental Protection Agency. An extensive public involvement program was conducted and substantive technical and conceptual policy support was provided by the National Governors Conference acting through the Water Management Subcommittee, Committee on Natural Resources and Environmental Management.

Copies of the report (stock #024-003-00133-3) may be purchased for $4.50 each from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402; and the Bureau of Reclamation, Engineering and Research Center, Attention: D-922, Denver Federal Center, P.O. Box 25007, Denver, Colorado 80225.

IWRA PUBLICATIONS

The International Water Resources Association is offering a number of books at great savings for a limited time only. The following books are available at the prices listed:

(1)	Proceedings of the First World Congress on Water Resources, WATER FOR HUMAN ENVIRONMENT, Vol. 1 - Congress Reports	$7.00
(2)	WATER FOR HUMAN ENVIRONMENT, Vol. 2 - Country Reports	7.00
(3)	WATER FOR HUMAN ENVIRONMENT, Vol. 3 - Technical Sessions	7.00
(4)	Proceedings of the Second World Congress on Water Resources, WATER FOR HUMAN NEEDS, Vol. 1 - Energy and Food	7.00
(5)	WATER FOR HUMAN NEEDS, Vol. 2 - Health and Planning	7.00
(6)	WATER FOR HUMAN NEEDS, Vol. 3 - Development & Meteorology	7.00
(7)	WATER FOR HUMAN NEEDS, Vol. 4 - Management & Education	7.00

(8)	WATER FOR HUMAN NEEDS, Vol. 5 - Technology & Ecology	7.00
(9)	Selected Works in Water Resources	10.00
(10)	Water Resources Education - Hardbound	12.00
(11)	Water Resources Education - Softbound	10.00

All orders must be received by December 31, 1979. To order any of the above books, contact: Business Manager, IWRA, P.O. Box 34434, Washington, D.C. 20034.

POSITIONS AVAILABLE

PLANNING CHIEF SOUGHT

The Nebraska Natural Resources Commission is accepting applications for the position of Chief of the Planning Division. The position is a highly responsible technical position and will be required to supervise a staff of 28, including 17 professionals. A key responsibility of this position is to effectively work with federal, state and local governmental agencies, various interest groups and the public in resolving resource issues and problems. An ability to communicate technical matters to decision makers and the public is necessary.

The Chief of the Commission's Planning Division is responsible for three programs: Natural Resources Data Bank, Water Quality Planning, and the State Water Planning and Review Process. Applicants must have demonstrated ability in oral communications, technical aspects of planning, report writing and administration. Ten years experience in natural resources planning or a closely related field is desirable, and supervisory experience is essential.

Qualified applicants should submit a letter of application and resume to Dayle E. Williamson, Executive Secretary, Natural Resources Commission, P.O. Box 94876, Lincoln, Nebraska 68509.

ASSISTANT PROFESSOR IN CIVIL ENGINEERING

Iowa State University is looking for candidates to fill a new tenure-track position as Assistant Professor in Civil Engineering. This is a split appointment involving approximately 65 percent teaching, 35 percent research during the 9-month academic year, with the possibility for two-month summer research support.

The position will involve teaching undergraduate and graduate courses in hydrology and water resources engineering such as hydrology, engineering hydrology, design of water and sewer systems, applied hydraulic design, surface water hydrology, water resources, etc. It will also involve the development of a research program in some area related to quantity aspects of water resources.

Qualifications for the position include a Ph.D. in civil, sanitary, hydraulic or water resources engineering with a strong program in quantity-quality aspects of water resources. Candidates with a major in quantity aspects of water resources, with related training in water resources systems, hydraulics and modeling are preferred. The position will be available September 1, 1980. Salary to $20,000 depending on qualifications and experience.

Interested applicants should send resumes to C.E. Ekberg, Head, Department of Civil Engineering, Iowa State University, Ames, Iowa 50011.

GROUNDWATER GEOLOGY POSITIONS--TEXAS A&M

The Department of Geology, Texas A&M University invites applications for a faculty position in Groundwater Geology. Appointment will be at the Assistant Professor or Associate Professor level, depending on qualifications. The applicant must possess a Ph.D. degree. The appointee will be expected to teach at the undergraduate level and develop a graduate program of research and teaching in the Engineering Geosciences Research Program.

Texas A&M University is a state University with enrollment of about 32,000. The geology department within the College of Geosciences has a faculty of 20 and enrollment of 300 undergraduates and 90 graduate students. It offers programs leading to the B.S, M.S., and Ph.D. degrees.

Applicants should send resume, names of three references and description of teaching and research interests to Dr. Robert J. Stanton, Head, Department of Geology, Texas A&M University, College Station, Texas 77843. Texas A&M University is an Equal Opportunity-Affirmative Action Employer.

FACULTY POSITION IN HYDROMECHANICS AND WATER RESOURCES

The University of Minnesota has an opening for a faculty position in hydromechanics and water resources. Candidates must have a strong interest in teaching and research in one of the following areas: sedimentation, river mechanics, coastal engineering, energy systems, turbulence, water resources and hydrology. Excellent research facilities are avaiable at the St. Anthony Falls Hydraulic Laboratory.

Desirable qualifications include teaching ability and ability to attract research support. Rank and salary are negotiable.

Applications should include at least three professional references and a statement on how the candidate would contribute to the current research program and the academic requirements of both the undergraduate and graduate program in the Department of Civil and Mineral Engineering. Interested applicants should submit resumes to Dr. Charles Fairhurst, Head, Department of Civil and Mineral Engineering, 221 Church Street, S.E., University of Minnesota, Minneapolis, Minnesota 55455.

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

FACULTY POSITION ANNOUNCEMENT

Pennsylvania State University is seeking an Assistant or Associate Professor of Entomology. This is a tenure track, 12-month research and teaching appointment. The major responsibility will be to develop a research program in the area of pest management and crop protection, but teaching will be an integral part of the responsibilities. The exact make-up of teaching and research will depend on the interests of the candidate selected. Supervision of graduate students and development of an advanced course in population modeling will be expected.

Applicants must have demonstrated competence in statistics and modeling in relation to integrated pest management. Ph.D is required, with entomological background preferred. Candidates should be capable of cooperating with crop specialist in team efforts.

The position is open immediately. Salary is commensurate with training and experience. Closing date for applications is November 16, 1979 or until a suitable applicant is found.

Applications should include curriculum vita, transcripts of academic training, list of publications with reprints, names and addresses of three references and any other information which would indicate competence. Inquiries and applications should be directed to: C.W. Pitts, Head, Department of Entomology, 106 Patterson Building, The Pennsylvania State University, University Park, Pennsylvania 16802.

The Pennsylvania State University is an Equal Opportunity/Affirmative Action Employer.

DEAN, COLLEGE OF AGRICULUTRE

The University of Missouri--Columbia is seeking a Dean for the College of Agriculture. The Dean is the principal administrative officer in the College of Agriculture, and is responsible to the Provost for the operation of the College of Agriculture, the School of Forestry, Fisheries and Wildlife, the Missouri Agricultural Experiment Station, and Agriculture Extension. The Dean is responsible for and provides leadership in: (1) the maintenance and enhancement of quality undergraduate and graduate instruction programs; (2) the support of research, the fostering of quality research, and the evaluation of research performance; (3) the continuation and augmentation of effective agricultural extension programs; (4) the development and support of quality programs in international research, teaching and extension programs; and (5) the development and maintenance of effective relationships with other segments of the University and with local, state, regional, national and international organizations and agencies.

Qualifications include (1) an earned Ph.D. or equivalent degree; (2) meaningful administrative experience; and (3) demonstrated competence in direction of personnel, fiscal responsibility and budget management. Salary will be commensurate with experience and qualifications.

Nominations and applications for this position should be submitted to: Raymond A. Schroeder, Chairman, Search Committee, Dean of the College of Agriculture, Office of the Chancellor, 106 Jesse Hall, University of Missouri -- Columbia, Columbia, Missouri 65211.

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

PROFESSOR SEEKING EMPLOYMENT

Dr. Ambrose Goicoechea is seeking permanent employment in water resources planning and management in either departments of civil engineering or water resources research institutes. Dr. Goicoechea received his Ph.D. in Systems Engineering from the University of Arizona in 1977. He is currently with the School of Industrial Engineering and Management, Water Resources Planning, at Oklahoma State University.

Dr. Goicoechea's major areas of interest include modeling and simulation of large scale systems in water resources, water-energy trade offs, environmental impact studies, and decision making models or multi-objective analysis in renewable natural resources.

For additional information, contact Dr. Goicoechea directly at the School of Industrial Engineering and Management, Water Resources Planning, Oklahoma State University, Stillwater, Oklahoma 74074. Telephone: (405) 624-6055.

RESEARCH REVIEW

PROJECT TITLE: Mechanics and Potentials of Artificial Groundwater Recharge

PRINCIPAL INVESTIGATOR: William F. Lichtler, U.S. Geological Survey

Excessive groundwater withdrawal over natural recharge will eventually result in declining well yields and a return to dryland farming in some areas of Nebraska. The objectives of the project are to investigate methods and techniques of artificial recharge and to evaluate their potential usefulness to augment natural groundwater recharge.

Since the beginning of this project (1976) approximately one-half billion gallons of water have been withdrawn from a well near the Platte River in Hamilton County, Nebraska. The well is developed in an aquifer that has a good hydrologic connection with the Platte River. The chemical quality of the well water is nearly identical to the quality of the river water. The

water was pumped through a 3-mile-long buried pipeline to a recharge well in the Big Blue River basin where it was injected into the principal aquifer by gravity flow. Groundwater levels in the vicinity of the recharge well have been progressively declining due to large withdrawals; whereas, water levels in the vicinity of the withdrawal well are maintained by recharge from the river.

Buildup of the water level in the recharge well during a 6-month recharge experiment in 1977-78 was 19.3 ft. at an injection rate of 1 million gallons per day. This limited water-level buildup would indicate that recharge operations could continue for several years before any redevelopment of the recharge well would be necessary.

During an 8-month experiment in 1978-79, the water-level buildup was 71.4 ft. at approximately 1 million gallons per day, the same rate of injection used in the first experiment. The rate of buildup was only slightly greater in the first 7 months of the second experiment than during the first experiment; however, during the last month, the buildup increased rapidly to the 71.4-foot level. The rapid rise in the water-level buildup in the recharge well was due to plugging of the well caused by a sudden increase in the sediment content of the recharge water.

Down-hole television surveys of the recharge and withdrawal wells showed coarse sand and gravel coating the inside of the recharge well and a hole in the steel casing of the withdrawal well. It is not known at this time how the hole occurred. The hole allowed sand and gravel to enter the casing and contaminate the recharge water which rapidly plugged the recharge well. This illustrates the importance of using low-sediment water for successful recharge through wells.

Analysis of a pumping test made after the second recharge period showed that the aquifer 10 feet from the recharge well had not been adversely affected and that plugging had occurred only in the immediate vicinity of the recharge well. The specific capacity of the recharge well was reduced 38 percent; however, this loss could probably be restored by standard redevelopment procedures.

A surface-recharge facility consisting of a 24-foot diameter open-bottom tank was installed near the well-recharge facility in Hamilton County. Infiltration rates were about 0.6 ft/d after 8 days and declined slightly during the next 16 days in a test in October-November 1977. Water-level measurements in a piezometer installed in a perched zone of saturation indicate that a silty zone of low permeability exists at a depth of 38 ft. below the surface or about 55 ft. above the regional water table. The perched zone of saturation was discovered during initial test drilling. The permeability of this silty zone may be the limiting factor controlling recharge rates for large-scale surface-spreading operations.

A similar surface-spreading experiment conducted at the Sand Hills Agricultural Laboratory in McPhearson County, Nebraska, indicated infiltration rates of 9.6 ft/d after 52 days. At this site, the permeability of the materials above the water table was much higher than at the Hamilton County site; however, slightly less pearmeable zones did cause lateral movement of recharge water.

NEWSLETTER ITEMS SOLICITED

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QUESTIONS AND INQUIRIES

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