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Water Current

July/August 1984

DIRECTOR'S REPORT

As recently announced by IANR Vice Chancellor Roy G. Arnold, effective July 1, 1984, the Nebraska Water Resources Center at the University of Nebraska was merged with the Conservation and Survey Division. This move was made in order to strengthen and improve coordination of water programs at the University and provide a better focus for public information activities.

Professor Vincent H. Dreeszen has assumed the duties as administrator of the consolidated division. A decision on the unit name and the title of the administrator of the division will require approval of the University Board of Regents. I will continue as Director of the Water Resources Center.

The Water Resources Center will continue as an intact, integral unit in the new division and will continue its mission of coordinating research on water problems of Nebraska, providing water-related education and training opportunities, and disseminating water-related information to the public. The Water Center looks forward to this opportunity of better serving the citizens of Nebraska with regard to water issues.

William L. Powers
Director



NEBRASKA WATER RESOURCES CENTER

SUMMARY OF UCOWR ANNUAL MEETING

The Universities Council on Water Resources (UCOWR) recently held its annual meeting at Louisiana State University in Baton Rouge. The theme for this year's meeting was "Water Resources Management — Educational Prerequisite." The meeting was hosted by LSU because of its proximity to the 1984 World's Fair in New Orleans, the theme of which was "World of Rivers."

The UCOWR meeting focused on recent reports on secondary education. Implications of the quality of secondary education on water resources research and teaching in the university community were discussed. One point of considerable debate was the need for teaching water resources topics in the public schools and how involved the university community could be in developing educational materials for the secondary schools. It was felt that perhaps some tie with national educational organizations would be beneficial to both groups.

Proceedings of the presentations at the annual meeting are currently in preparation and will be available within the next few months.

SYMPOSIUM ON MULTIOBJECTIVE OPTIMIZATION

— technical

A Symposium on MultiObjective Optimization will be presented October 10-12, 1984 at the University of Nebraska. The symposium is sponsored by the Nebraska Water Resources Center, Department of Mathematics and Statistics, and the Department of Industrial and Management Systems Engineering. Nationally recognized leaders in the field of multiobjective optimization and decision making techniques will present a survey of these techniques and discuss examples of applications to engineering, business and natural resources management. Contributed papers are being accepted for presentation on the third day of the symposium.

Speakers and topics at the symposium will include:

Yacov Haimes, Case Western Reserve University

- Overview of Multiobjective Decision Making Techniques
- Surrogate Worth Tradeoff Technique
- Multiobjective Multistage Impact Analysis Method

Jared L. Cohon, Johns Hopkins University

- Survey of Techniques
- Nuclear Waste Management

Ravi Ravindran, University of Oklahoma

- Multi-criteria Models in Quality Control
- Goal Programming Models in Machine Capability Data Optimization
- Cardiovascular Disease Control in U.S. Air Force

Wolfram Stadler, San Francisco State University

- History of Multiobjective Decision Making Techniques
- MODM in Sciences and Engineering

Ambrose Goicochea, George Washington University

- Application to Resource Management

Po-Lung Yu, University of Kansas

- Dominance Concepts in Random Outcomes

Raymond Supalla, et al., University of Nebraska

- Multiobjective Optimization of Water Development Alternatives for the Platte River in Nebraska

Registration fee for the conference is \$25. For additional information, contact Dr. Ann Bleed, Water Resources Center, 310 Agricultural Hall, University of Nebraska, Lincoln, NE 68583-0710. Telephone: (402) 472-3305.

*release
get together
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Closed?
workshop?*

GROUNDWATER RESEARCH POSSIBILITIES EXPLORED

Nebraska Governor Bob Kerrey told state, university and federal officials July 23 that the University of Nebraska could help solve groundwater problems in Nebraska. "The University could provide timely and accurate information that would help steer public policy through pitfalls that could come from competing water interests," he told a luncheon audience at the University.

The workshop to begin designing future groundwater pollution research was initiated by Bill Kerrey, the governor's natural resources adviser. Representatives of the Environmental Protection Agency, the University of Nebraska Institute of Agriculture and Natural Resources, Nebraska natural resources districts, the Nebraska Department of Environmental Control, the Department of Health and farm groups were invited.

Gov. Kerrey stressed the importance of maintaining water quality as water resources are developed in Nebraska. "The cost involved with doing it right the second time is an awful lot more than if you do it right the first time," Kerrey said.

He said he didn't want to have to tell the next generation that he was so eager to solve other government problems that he failed to provide for the high quality water supply needed in the 21st century. "I intend to tell Nebraskans that, as we rush headlong into the '80s and the '90s, we dare not forget that this water has a quality that we have an obligation to maintain," he said.

The Governor said that fast and accurate information could help avoid conflicts based on misinformation or ignorance. "I think the potential for us today is to avoid conflicts more often than we have in the past," he said.

"It's possible for us with intelligence, with cooperation and an awful lot of effort to figure out a way to preserve water quality and still preserve the freedom that people want to use the water," he said.

He spoke about the possibility of obtaining a federal grant from the EPA to research water quality. State DEC Director Dennis Grams said that about \$1 million is available from EPA for groundwater research.

DEC representatives explained Nebraska's groundwater problems, and about a dozen university researchers explained their expertise at the morning session, followed by EPA representatives who discussed federal programs.

A research agenda for the future was outlined by Roger Gold, director of IANR environmental programs. A discussion on planning for research development was steered by Bill Powers, director of the Water Resources Center, and Norman Rosenberg, director of the Center for Agricultural Meteorology and Climatology and Office of Vice Chancellor for Research.

Pat Larsen
Public Information Specialist

NEBRASKA WATER CONFERENCE COUNCIL FALL MEETING

The fall meeting of the Nebraska Water Conference Council will be held Saturday, September 15 at 7:30 a.m. in the East Campus Union Building.

The Executive Council will consider the renaming of the annual August irrigation tour and present suggestions at the fall meeting. The names of the two awards presented at the March annual Water Conference will also be discussed. According to Fred Bement, chairman of the Nominations and Awards Committee, there is concern that the present names do not specifically describe the nature of the awards.

The 1985 annual Nebraska Water Conference will be held March 19 and 20; the 1986 meeting will be March 18 and 19.

RESEARCH REVIEW

Project Title: *Tillage Practice Effects on Water Conservation and the Efficiency and Management of Surface Irrigation Systems*

Principal Investigator: *Dean E. Eisenhauer, Assoc. Professor of Agricultural Engineering, University of Nebraska, South Central Station*

The overall purpose of this project was to evaluate the potential of applying conservation tillage practices on furrow irrigated lands. The specific objectives were: (1) to determine the effect of corn tillage systems on water distribution and application efficiencies of furrow irrigation systems; (2) to determine soil losses caused by water erosion during irrigation runoff as affected by tillage systems; and (3) to evaluate the effect of tillage practices on conserving precipitation as a method to increase groundwater recharge and reduce irrigation water requirements.

The field plots used in this study were established in 1976. Six tillage systems, three conventional systems and three reduced tillage systems were evaluated in 1981, 1982 and 1983. The reduced tillage practices evaluated were slot plant, till plant and rotary till plant—all being one-trip planting operations. The study was conducted on a Hastings silt loam soil with a 0.5 percent slope. The 18.3 meter wide and 366 meter long plots were furrow irrigated. The experimental design was a randomized complete block with three replications. Measurements taken during irrigation events included infiltration, advance and recession rates, and furrow erosion. In addition, runoff from 16 rainstorms was measured.

In general, it took longer for water to advance across the field, and infiltration was higher, for the reduced tillage systems than for the conventional systems. This resulted in poorer water distribution and lower application efficiency with the reduced tillage practices. Net infiltration (inflow minus outflow) was as high as 178 mm (millimeters) for the slot plant system during the first irrigation of the season, while the desired amount was 75 mm or less. It was concluded that slot plant is not compatible with furrow irrigation. However, the other two reduced tillage systems proved to be more compatible, especially when good management practices were followed such as irrigating every other furrow. While the irrigation efficiency was reduced slightly with the till plant and rotary till plant systems, the farm energy requirements would be slightly lower by using these systems due to fewer tillage operations.

Soil losses due to erosion during irrigation tended to be higher from the conventional tillage systems than from the reduced tillage systems. The chisel system had the highest loss, averaging almost 200 kg/ha per irrigation, and the slot plant system had the lowest, averaging 22 kg/ha, for a 89 percent reduction. Nutrient losses were very low, averaging 0.82 kg/ha nitrogen and 0.02 kg/ha phosphorus for the first irrigation. The highest loss of 1.65 kg/ha nitrogen and 0.03 kg/ha phosphorus was from the disk system. The rotary till and slot plant treatments had the lowest nutrient losses.

Rainfall runoff was lower from the reduced tillage systems than from the conventional systems. The average SCS Runoff Curve Number was 78 for conventional tillage and 73 for reduced tillage. This results in average annual runoff being reduced by 7.6 mm with conservation tillage. In addition, there would be the benefit of reduced evaporation with these systems.

In summary it was found that under the field conditions of this study, residues on the soil surface with reduced tillage practices will: increase infiltration, reduce irrigation efficiency, reduce furrow erosion, and conserve precipitation. Considering the energy savings, reduced soil erosion and rainfall conservation, the till plant and rotary till plant systems appear to be feasible systems for the furrow irrigated conditions of this study even though irrigation efficiency will be slightly reduced.

NARD ANNUAL MEETING

The annual conference of the Nebraska Association of Resources Districts (NARD) will be held September 17-18, 1984 in North Platte, Nebraska. The theme of the meeting will be "Focusing on Directions."

The advance registration fee is \$94 which includes registration materials, admittance to all sessions, luncheons and banquet. Registration at the door will be \$105. For additional information and registration material, contact NARD, P.O. Box 81310, Lincoln, NE 68501.

CALL FOR PAPERS

AWRA Annual Conference and Symposium

The American Water Resources Association (AWRA) will hold its 21st annual water resources conference in Tucson, Arizona on August 11-16, 1985. The theme of the conference is "Water Demand—Sharing a Limited Resource."

Papers are invited to discuss, evaluate, and present new and emerging technologies for, and approaches to, the management of water resources in light of the scarcity and limited availability of usable water in sections of the U.S. and many other parts of the world. Papers may relate to general application or to case studies in specific geographic areas. Conference sessions will address the following topics: strategic planning contributions to water resources problems; identification, development and management of new sources of water; optimization of water allocation; water rights impact on water use; conjunctive use of surface and groundwater—agricultural, domestic and industrial; costsharing policy—impact on development and use of water resources; and economic aspects of water utilization.

The deadline for submission of abstracts is NOVEMBER 15, 1984. Authors should submit three copies of the abstract which should not exceed 200 words and must include the paper's title, all author(s) name(s) and affiliation(s). On a separate page the submitting author must include the selected conference category for the paper, the full mailing address (including position, firm or institution, department, city, state and zip code), and a telephone number for all authors. Abstracts should be submitted to Dr. Yoram Gordon, Conference Technical Program Committee Chairman, c/o Greenhorse & O'Mara, Inc., 9001 Edmonston Road, Greenbelt, Maryland 20770. Telephone: (301) 982-2846.

North American Riparian Conference

A North American Riparian Conference entitled "Riparian Ecosystems and Their Management: Reconciling Conflicting Uses" will be held in Tucson, Arizona on April 16-18, 1985.

Papers are being solicited on all topics relating to riparian ecosystems including physical characteristics; hydrology and water resources; riparian ecology and terminology; livestock use; associated agriculture; recreation, fisheries and wildlife; economics; perception and planning; and legal and institutional needs. These should be presentations of syntheses or new research data gathered by the authors themselves.

Deadline for submission of 200-word abstracts is OCTOBER 30, 1984. Abstracts should contain the following information: title of paper; name, affiliation, and address of author(s), and in case of multiple authors, underline the name of the person who will present the paper; and an abstract of the paper in 200 words or less. The abstract should be typed on a clean, single sheet with a 1-1/4 inch margin left and a 1 inch margin right with IBM Prestige Elite type (or as close to this type as possible) using a black typewriter carbon ribbon.

For additional information or to submit abstracts, contact Dr. R. Roy Johnson, National Park Service, #125 Bio Sciences East, University of Arizona, Tucson, Arizona 85721.

MEETINGS AND CONFERENCES

- Sept. 17-20 25th Annual Meeting of the Interstate Conference on Water Problems (ICWP) with the theme "25 Years of Solutions" will be held in Pittsburgh, PA. For additional information, contact R.T. Weston, Chairman of the Program Committee, c/o Dept. of Environmental Resources, Office of Resources Management, P.O. Box 1467, Harrisburg, PA 17120. Telephone: (717) 783-5338.
- Sept. 19-21 1984 Annual Meeting, National Waterways Conference at Nashville, Tennessee. Theme: "Spotlight on Survival: Restoring River Valley Economies, Reviving America's Waterways." For additional information, contact National Waterways Conference, Inc., 1130 17th Street, N.W., Washington, D. C. 22036.
- Sept. 26-28 Seventh National Ground Water Quality Symposium, Las Vegas, Nevada. Theme: "Developing and Implementing Innovative Means of Dealing with Potential Sources of Ground Water Contamination." Contact David Nielsen, NWWA, 500 W. Wilson Bridge Road, Worthington, OH 43085.
- October 1-4 Water Pollution Control Federation Conference, New Orleans, LA. Contact WPCF, 2626 Pennsylvania Avenue, N.W., Washington, D. C. 20037.

- Oct. 16-19 International Symposium on Lake and Watershed Management at McAfee, New Jersey. For additional information, contact North American Lake Management Society, P.O. Box 217, Merrifield, VA 22116.
- Oct. 29-31 Conference on "Groundwater — The Unseen Crisis" at San Antonio, Texas. For additional information, contact College of Engineering, University of Texas at Austin, Austin, TX 78712.

JOBS AVAILABLE

Director, Water Resources Research Center

Applications are invited for the position of Director of the Arizona Water Resources Research Center. Candidates should possess an earned Ph.D. in an appropriate discipline, an established research and administrative record, and familiarity with the role and operations of a state water resources research center. The successful applicant must meet qualifications for a tenured professorial position in an appropriate academic department.

Applicants should submit curriculum vitae and the names of three references to: Dr. Paul H. King, Chairman, Search Committee, Department of Civil Engineering and Engineering Mechanics, University of Arizona, Tucson, Arizona 85721. The closing date for applications is November 1, 1984.

Hydrology and Water Resources Faculty Position

The Department of Hydrology and Water Resources at the University of Arizona is seeking applications for a faculty position as assistant, associate or full professor. The position is in a tenure track with academic year appointment and will involve teaching and research in water resources management, policy and administration.

Candidates must show high potential as a teacher and researcher and must have extensive course work and/or professional experience in the fields of policy analysis and water resources management. Preference will be given to candidates who can help develop courses and a research program in water quality planning and policy and who are willing to develop and teach courses at all levels. A Ph.D. degree is required prior to date of appointment.

Applicants should submit (1) a letter indicating clearly an interest in the position and a statement of the general types of courses which the candidate would be interested in teaching and a list of specific areas of research which the candidate hopes to develop; (2) transcripts of all university-level work (both undergraduate and graduate); (3) a resume of professional and educational background; and (4) names and addresses of at least three individuals from whom letters of recommendation may be requested. Applications should be submitted to: Dr. Daniel D. Evans, Chairman, Search Committee, Dept. of Hydrology and Water Resources, University of Arizona, Tucson, Arizona 85721. The deadline for applications is October 31, 1984.

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

PUBLICATIONS

The following publications have been received by the Water Resources Center during July and August 1984. They have been forwarded to C.Y. Thompson Library on UNL's East Campus for cataloging. Persons on campus may obtain the publications through UNL's library system. Others are encouraged to request copies they desire from the organization issuing the publication.

- (1) *Populations Dynamics of Wild Trout and Associated Sport Fisheries in Two Northern Wisconsin Streams*, 1983, Technical Bulletin 141, Department of Natural Resources, Madison, WI.
- (2) *The Effect of Various Hydrologic Parameters on the Quality of Stormwater Runoff from a West Lafayette, Indiana Urban Watershed*, January 1984, Water Resources Research Center, Purdue University, West Lafayette, IN 47907.
- (3) *Streamflow and Velocity as Determinants of Aquatic Insects Distribution and Benthic Community Structure in Illinois*, December 1983, Dept. of Civil Engineering, University of Illinois at Urbana-Champaign, Urbana, IL 61801.
- (4) *Proceedings of the 14th Biennial Conference on Ground Water*, November 1983, California Water Resources Center, University of California, Davis, CA 95616.
- (5) *Isotopic Studies of the Natural Sources of Radium in Groundwater in Illinois*, April 1984, Water Resources Center, University of Illinois at Urbana-Champaign.
- (6) *Water Management on Claypan Soils in the Midwest*, April 1984, Water Resources Center, University of Illinois at Urbana-Champaign.
- (7) *A Study of Radium-226 and Radon-222 Concentrations in Ground Water near a Phosphate Mining and Manufacturing Facility with Emphasis on the Hydrogeologic Characteristics of the Area*, March 1984, Dept. of Environmental Sciences and Engineering, University of North Carolina.
- (8) *Benthic Nutrient Cycling in the Pamlico River*, March 1984, Dept. of Environmental Sciences and Engineering, University of North Carolina.

WATER CURRENT

Water Current is published by the Nebraska Water Resources Center (NWRC), which is a division of the Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln.

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Karen E. Stork Editor

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