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# Water Current

Conservation & Survey  
Division

JUL 12 1983

University of Nebraska  
May/June 1983

## DIRECTOR'S REPORT

Diminishing quantities of water and their management continue to be a problem for Nebraska. In addition to this, there is concern for solutions to our water quality problems. These high priority problems and research needed to solve them were developed during a series of workshops in 1981 and 1982. The results from these workshops were used to develop a document entitled "Research Framework for Citizen Advisory Priorities" which contains programs designed to obtain research information helpful in alleviating Nebraska's water problems. The Nebraska Water Resources Center's FY 1983 annual cooperative research program, now funded at a level of \$115,000 by the Office of Water Policy in the U.S. Department of the Interior, contains eight research projects related to the Water Quantity and Management and Water Quality programs outlined in the "Research Framework."

### Water Quantity and Management

Declining groundwater tables are common to many of the Great Plains states. Several areas of Nebraska are also experiencing serious declines. Management systems have been suggested for the diminishing groundwater supplies. However, effective groundwater management requires technology that can aid in the analysis of various systems. The project entitled "Mathematical Modeling of Groundwater Systems" (Jerald Dauer) should provide a mechanism for comparing management alternatives and should generate new control policies and determine optimal system structures for specific management goals or objectives.

Conservation of water supplies seems to be the best alternative to stretch water supplies as far as possible into the future. Management of evapotranspiration (ET) from irrigated crops has been an area of promise in conserving water. As a first step in managing ET, the components must be quantified in the field. The project entitled "Field Measurement of Evaporation and Transpiration for Corn, Sorghum and Soybeans" (D. Martin and N. L. Klocke) plans to do this. This research is unique in that the proposed equipment employs a simple device that can be used in several locations in a field at the same time.

An important part of any conservation program is maximum crop yields with lesser amounts of water. Two projects entitled "Scheduling Irrigation with A High Speed Center Pivot to Reduce Heat and Moisture Stress in Corn" (B. Blad and J. Norman) and "Maximizing Water Use Efficiency of Limited Irrigation Plus Natural Precipitation Using Conservation Cropping Systems" (N. Klocke) are designed to maximize the effectiveness of limited amounts of water for irrigation.

### Water Quality

Runoff water from agricultural enterprises continues to be a concern in some areas of Nebraska. Eutrophication of area lakes and reservoirs in eastern Nebraska is not uncommon. In an effort to control algae populations in lakes and reservoirs, a project entitled "Enhancement of Water Quality in Nebraska Farm Ponds by Control of Eutrophication Through Biomanipulation" (G. Hergenrader) will be completed. Another water problem is runoff from feedlots. Of considerable concern in Nebraska is the transmission of pseudorabies virus in runoff from swine production areas. A project by C. Kelling and M. Frey will examine surface runoff as a potential vehicle for transmitting this virus.



NEBRASKA WATER RESOURCES CENTER



With a major portion of Nebraska's groundwater reserves under sandy soils, irrigation on sandy soils is becoming common. In recent years, the nitrate concentration has been increasing in many wells below sandy soils. To protect groundwater from further increases in nitrate, water and nitrogen management are a must. Part of any nitrogen management program is a knowledge of the movement of nitrates below the root zone to the aquifer and then the mixing of nitrates within an aquifer. A project entitled "Changes in Distribution of Mineral Nitrogen Under Native Range and Cultivated Fields at the Nebraska Sandhills Ag. Laboratory" (G. Hergert) proposes to improve estimates of nitrate movement in sandy soils. To quantify the mixing and movement of nitrate-nitrogen within an aquifer, a project entitled "Implications of Temporal Variations and Vertical Stratification of Groundwater Nitrate-Nitrogen in the Hall County Special Use Area" (M. Spalding) will examine the feasibility of developing a mixing model using information on changing concentrations in an aquifer that has been under study for the past two years.

## **1983 NEBRASKA IRRIGATION TOUR**

Participants in the 1983 Nebraska Irrigation Tour will embark on a four-day excursion through southwest Nebraska and northeast Colorado. Scheduled this year for August 17-20, the popular annual tour is co-sponsored by the Nebraska Water Conference Council and the University of Nebraska Institute of Agriculture and Natural Resources.

The 1983 tour will feature visits to a wide variety of rural, municipal and state water development projects in both states. Highlighting this year's tour will be an extensive survey of the Denver Metropolitan Water System, which is charged with the task of providing water to the estimated 1.7 million inhabitants of the greater Denver metropolitan area.

Although nearly 75 percent of Colorado's population resides on the eastern slope of the Rocky Mountain range, almost all of the state's water reserves are on the western side, and the tour will travel over Berthoud Pass to view the Granby Lake pumping plant, a U.S. Bureau of Reclamation project on the western slope. Headquartering in Greeley, CO, the tour will also include visits with Bureau of Reclamation officials, U.S. Forest Rangers in Rocky Mountain National Park, and a presentation on the Colorado Water Court and the state's referee system for handling water disputes.

Other scheduled stops include visits to water development projects near Ft. Collins and Ft. Morgan, a visit to the Monfort Feedlots at Kersey, CO, and stops at several farming operations in eastern Colorado and southwestern Nebraska, including an experimental, fully computerized, 15-pivot irrigation system.

For additional information on the 1983 Irrigation Tour, contact: Tour Coordinator, Les F. Sheffield, 223 Filley Hall, University of Nebraska, Lincoln, NE 68583-0922.

## **GOVERNOR APPOINTS WATER COMMITTEE**

Nebraska Governor Robert Kerrey has appointed 32 Nebraskans to serve on the new Nebraska Water Independence Congress. The four goals outlined for the Water Congress by the Governor are: (1) to look at existing water studies, legislation, and existing and potential water projects; (2) to look at the water resources that Nebraska shares with other states and identify what must and can be done to jointly develop these resources; (3) to recommend a water policy to the Governor which takes into consideration a sufficient quantity and quality of water in the future for expanded agricultural production, industrial uses, domestic needs, power production, recreation and wildlife; and (4) to recommend a funding strategy to be used by the Governor and Legislature in implementing the chosen water policy.

In appointing this group, Kerrey noted that "the economic and social progress of the State of Nebraska is linked to the development, utilization and conservation of our water resources. The future success and advancement of our economy, and our state, will depend upon our ability to continue the wise and efficient use of those water resources."

Appointed as co-chairmen of the Water Congress are Bob Daugherty, President of Valmont Industries, and former Congressman John Cavanaugh, who is also a member of the Board of Directors of the Platte River Whooping Crane Habitat Maintenance Trust. Other members of the group include individuals from public and private life who have been involved in water issues and who represent a broad spectrum of different geographical areas of the state as well as differing philosophical views about water. The Water Congress will convene by July 1 and must develop before December 31, 1983, a report on water issues in the state.



## CHINA TOUR

Drs. Norman J. Rosenberg and Donald A. Wilhite, Center for Agricultural Meteorology and Climatology, recently returned from a three-week visit to the People's Republic of China (PRC). They were part of a seven-member scientific delegation to further plan a comparative study of the climates and agricultures of the North China Plain and the North American Great Plains. Drs. Rosenberg and Wilhite are serving as U. S. Program Coordinators for this study. Other members of the delegation were Harold Dregne (Texas Tech University), Norten Strommen (USDA), Augustine Yao (NOAA), Robert Reginato (USDA/ARS), and Gordon McKay (Environment Canada).

The idea for the comparative study originated about two years ago during Dr. Rosenberg's first visit to the PRC. In June of 1982 a Chinese scientific delegation attended a planning meeting for the comparative study at UNL. The product of this meeting was the identification of five research topics of mutual interest. The purpose of the May 1983 meeting in Beijing, PRC was to discuss with Chinese scientists the research proposals which had been prepared since the 1982 meeting, coordinate research methodologies, and tour agricultural research sites. The U.S. delegation visited research facilities and experimental sites at Yucheng in Shandong province, Zhengzhou in Hunan province, and Quzhou in Hebei province.

A final research proposal encompassing all five projects will be prepared during June and July for submittal to the National Science Foundation. Other agencies expected to participate in funding are USDA, NOAA, Department of Energy and Environment Canada. The five-year research program is expected to begin in January 1984. The Chinese research program has already been authorized for a period of two years by the PRC government.

## SEMINAR PROCEEDINGS AVAILABLE SOON

During each spring semester, the Nebraska Water Resources Center sponsors a Water Resources Seminar Series at the University of Nebraska-Lincoln. The 1983 seminar series was entitled "Water Law and Policy in the Great Plains — Implications for Nebraska."

From the recent publicity on the sale of Missouri River water for use in a coal slurry pipeline, it is obvious that Nebraska's water resources are not immune from the policies of adjacent states, and its water management plans and laws are often influenced by the practices of other states. The 1983 seminar series presented some of the water resources issues, laws and problems facing states such as Colorado, Wyoming, Kansas, and even Arizona, which has adopted some new and innovative laws with regard to their groundwater resources.

The proceedings from this seminar series is currently being compiled and will be published shortly. Copies will be made available to water-related University faculty. Anyone else desiring a copy at no charge should contact the Nebraska Water Resources Center.

## CALLS FOR CONFERENCE PAPERS

The National Water Well Association is sponsoring two regional Conferences on Groundwater Management — the Western Conference to be held October 25-26, 1983 in San Diego, CA, and the Eastern Conference to be held November 1-2, 1983 in Orlando, FL. Interested persons are invited to submit abstracts for papers to be considered for presentation at one or both conferences.

Papers are being solicited on the following topics: (1) Ground water management strategies; (2) Conjunctive use of ground water and surface water; (3) Artificial ground water recharge practices; (4) Ground water law and regulations; (5) Problems resulting from ground water mismanagement; (6) The use of modeling in ground water management; (7) Water conservation practices in irrigation; (8) Developing ground water management organizations; (9) Ground water quality Management; and (10) Well field management.

Abstracts of 300 words or less must be submitted to the conference coordinator before the deadline of JUNE 24, 1983. Abstracts should include the paper's title, all authors' names and their affiliation(s). Biographical sketches for all authors of 100 words or less in paragraph form must accompany abstracts. (No resumes will be accepted.) Full mailing addresses and telephone numbers should be included with the sketches.

For additional information on the conference or to submit an abstract, contact: David M. Nielsen, Conference Coordinator, National Water Well Association, 500 West Wilson Bridge Road, Worthington, OH 43085. Telephone: (614) 846-9355.



Another conference which has issued a call for papers is the Fifth International Conference on Finite Elements in Water Resources to be held June 18-22, 1984 at the University of Vermont.

Since finite element methods have been shown to be a powerful means for analyzing water resource problems, the principal objectives of this 5th conference are to provide an exchange of experiences in practical applications and to establish a forum for discussions about accuracy, economy and the improvement and limitations of the method. New developments in numerical and computational techniques, basic mathematical formulations and software and hardware aspects are also considered to be important topics for an exchange of ideas between theoretically and practically oriented researchers.

A long list of conference topics has been developed for which papers are being solicited. The abstracts should not exceed 300 words in length and the deadline for submittal is September 1, 1983. For additional information on conference topics, contact: Dr. J. P. Laible, Finite Element Conference, Dept. of Civil and Mechanical Engineering, University of Vermont, Burlington, VT 05405.

## CONFERENCES AND MEETINGS

- July 6-8, 1983      1983 National Conference on Environmental Engineering, a technical program sponsored by the Environmental Engineering Division of the American Society of Civil Engineers. For additional information, contact: Dr. Allen J. Medine, Civil and Environmental Engineering, Univ. of Colorado, Boulder CO 80309. (303) 492-6069.
- July 24-27, 1983      Universities Council on Water Resources (UCOWR) 1983 Annual Meeting, Ohio State University, Columbus, OH. Meeting theme: University's Role in the Change from Water Development to Water Management. Registration fee \$85. For additional information, contact: UCOWR Executive Secretary, c/o Nebraska Water Resources Center, 310 Ag. Hall, Univ. of Nebraska, Lincoln, NE 68583.
- Sept. 18-21, 1983      Waterpower '83, International Conference on Hydro Power, Hyatt Regency Hotel, Knoxville, TN. Includes concurrent sessions, tours and exhibitions. Registration fee \$185. For additional information, contact: University of Tennessee, Department of Conferences and Non-Credit Programs, 2016 Lake Ave., Knoxville, TN 37996-3515.
- Sept. 30-Oct. 2, 1983      Great Plains Limnology Group meeting, Lake of the Ozarks State Park. Registration fee approximately \$25. For additional information, contact: John R. Jones, School of Forestry, Fisheries & Wildlife, 112 Stephens Hall, Univ. of Missouri, Columbia, MO 65211.
- Oct. 2-6, 1983      Water Pollution Control Federation 56th Annual Conference, Georgia World Congress Center, Atlanta, GA. Includes concurrent sessions, exhibitions and tours. Advance registration fee \$175 for members and \$225 for non-members. For additional information contact: Water Pollution Control Federation, Conference Dept., 2626 Pennsylvania Avenue, N.W., Washington, D. C. 20037.
- Oct. 5-6, 1983      Ground Water Seminar on the Fundamentals of Ground Water Quality Protection, Stouffer's National Center Hotel, Washington, D. C. and Oct. 18-19, Ground Water Seminar on the Fundamentals of Ground Water Quality Protection, Stouffer's Denver Inn, Denver, CO. For additional information on either meeting, contact: Richard M. Miller, President, American Ecology Services, Inc., 127 East 59th St., New York, NY 10022. Telephone: (212) 371-1620.
- Oct. 9-13, 1983      19th Annual American Water Resources Association Conference and Symposium, Hyatt Regency on the River, San Antonio, Texas. Conference topic: Analysis and Management of Land Drainage and Flood Waters. Symposium topic: Regional and State Water Resources Planning. A preliminary program and registration information may be obtained by contacting Kenneth D. Reid, Executive Director, AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, Maryland 20814.

## POSITIONS AVAILABLE

### CIMIS Project Manager

The University of California-Davis is seeking a Project Manager for the California Irrigation Management Information System (CIMIS). Responsibilities of this position will include coordination of research activities of CIMIS, assisting principal investigators in completion of the project's objectives and supervising CIMIS staff located throughout the state. Part of these duties will be to insure that field data are being collected properly and that field evaluations are completed on schedule.



Qualifications for this position include M.S. or Ph.D. in Soil or Water Science or comparable field with educational training in soil physics, irrigation, plant-water requirements, or drainage and water quality. Experience or training in project administration and demonstrated ability in the leadership of research and educational programs is desirable.

Starting salary will depend on level of appointment in the Academic Administration series. Current salary for beginning level is \$21,012 per year but is negotiable. The position will last for two years and becomes available on July 1, 1983. The appointee is expected to begin service no later than September 1, 1983. Closing date for receipt of applications is June 15, 1983.

Applicants should submit resume, transcripts, copies of publications if available, and names, addresses and telephone numbers of at least three references to: Richard L. Snyder, Extension Biometeorologist, Dept. of Land, Air and Water Resources, University of California, Davis, CA 95616. Telephone: (916) 752-1130.

#### Agricultural Drainage Engineer

The University of California is also seeking applications for an Agricultural Drainage Engineer. This is an assistant professor, tenure track position in the Departments of Land, Air and Water Resources and Agricultural Engineering, consisting of 35% teaching and 65% research. Teaching responsibilities include advising, instructing undergraduate level course descriptive of soil water flow, solute transport and agricultural drainage systems, and another in drainage system design. At the graduate level, a course in groundwater flow is required. Research in the detailed processes occurring in shallow groundwater is expected to provide management alternatives and drainage design criteria for cropped areas and for drain water reuse.

Qualifications include a Ph.D. in soil physics, agricultural engineering or related field with one degree in engineering with a strong background in flow and solute-water interactions in porous media, mathematical and computer simulation modeling skills, and competence in design and evaluation of agricultural drainage systems.

Applicants should submit curriculum vita, transcripts, statement of research and teaching interests and background in each, copies of publications and manuscripts and the names and addresses of at least three references to: Prof. D. R. Nielsen, Chair, Search Committee, Dept. of Land, Air and Water Resources, 121 Veihmeyer Hall, University of California, Davis, CA 95616 by July 15, 1983.

The University of California is an Equal Opportunity, Affirmative Action employer and invites applications from all qualified individuals.

## RESEARCH REVIEW

Project Title: *Conservation of Soil, Water and Energy Through Reduced Tillage Systems*

Principal Investigator: *Elbert C. Dickey, Ass't Professor, Dept. of Agricultural Engineering, UNL*

Soil erosion and sedimentation have been identified as major water quality problems in Nebraska. This project was initiated in 1980 to evaluate and demonstrate the influence of selected tillage systems on soil erosion, water runoff, nutrient loss, crop yield, fuel and energy use, and labor inputs.

Tillage plots were established at two sites having different soil types and field slopes. Simulated rainfall, applied at the rate of 2.5 inches per hour, showed that soil erosion increased as the amount of residue remaining on the soil surface decreased. No-till planting, which left the highest percentage of soil surface covered with residue, resulted in the least amount of erosion, whereas the moldboard plow system had the most erosion. As little as a 20% residue cover reduced erosion by 50% of that which occurred from cleanly-tilled, residue-free soil conditions.

Reducing or eliminating field operations also decreased fuel use and labor requirements for tillage and planting. No-till had fuel and labor requirements 75% and 50% lower, respectively, than the moldboard plow system. When cultural energy inputs were considered, no-till still used 10% less total energy than the moldboard plow system, even though pesticide use was higher with no-till.

Simulated rainfall was effective for demonstrating differences in soil erosion from various tillage systems. These demonstrations, in conjunction with other educational programs, were effective in developing an increased awareness and adoption of conservation tillage in Nebraska.



## PUBLICATIONS RECEIVED BY NWRC

The following publications have been received by the Water Resources Center during April and May. 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 from the organization issuing the publication.

- (1) *A Study of the Bed-Load Yield from a Watershed*, Project A-050-SC, Report No. 100, March 1983, Water Resources Research Institute, Clemson Univ., Clemson, SC 29631.
- (2) *Hydrologic and Water Quality Modeling for Instream Flow Strategies*, M.A. Medina, Jr., Report No. 183, December 1982, Water Resources Research Institute, North Carolina State Univ., 124 Riddick Bldg., Raleigh, NC 27650.
- (3) *Guidelines for Determining Flood Flow Frequency*, Bull. #17B, March 1982, Office of Water Data Coordination, U.S. Geological Survey, Reston, VA 22092.
- (4) *Landsat Detection of Irrigation Salinity*, L.J. Northrop, Occasional Papers Series No. 4, 1982, Dept. of National Development and Energy, Australian Water Resources Council, Australian Gov't Publishing Service, Canberra.
- (5) *A Spatial Model for the Prediction of Losses on Small Rural Catchments*, Technical Paper No. 75, 1982, Australian Gov't Publishing Service, Canberra.
- (6) *A Guide for the Planning, Design and Implementation of a Water Reclamation Scheme*, PGJ Meiring & Partners, 1982, Water Research Commission, P. O. Box 824, Pretoria 0001, Australia.
- (7) *Management of Existing Reservoir Systems by Interactive Optimization*, Technical Report #149, March 1983, Water Resources Research Center, Purdue Univ., West LaFayette, IN 47907.
- (8) *Quality Assurance Practices for the Chemical and Biological Analyses of Water and Fluvial Sediments*, Book 5, Chapter A6, L.C. Friedman and D.E. Erdmann, available from the U.S. Geological Survey, 604 South Pickett St., Alexandria, VA 22304.
- (9) *Institute of Water Research, Michigan State University*, Annual Report, 1982, Institute of Water Research, Michigan State Univ., 334 Natural Resources Bldg., East Lansing, MI 48824-1222.
- (10) *Factors Controlling Blue-Green Algae Dominance in a Southwestern Reservoir*, D. Toetz, Project A-106-OKLA Technical Completion Report, March 1983, Oklahoma Water Resources Research Institute, Oklahoma State Univ., Stillwater, OK 74078.
- (11) *Computer Simulation of Local Destratification in Reservoirs*, Project A-098-OKLA Technical Completion Report, May 1983, Oklahoma Water Resources Research Institute, Oklahoma State University.
- (12) *Estimation of the Economic Worth of Water for Release Decisions*, R. Sharda, Project A-101-OKLA Technical Completion Report, April 1983, Oklahoma Water Resources Research Institute, Oklahoma State University.
- (13) *Irrigation Water Management for Wide-Spaced Furrow Irrigation*, Project A-090-OKLA Technical Completion Report, March 1983, Oklahoma Water Resources Research Institute, Oklahoma State University.
- (14) *Sediment Transport in Alluvial Channels: Rates for Erosion and Deposition of Cohesive Sediments, Literature Review and Experimental Design*, Project A-094-OKLA Technical Completion Report, March 1983, Oklahoma Water Resources Research Institute, Oklahoma State University.
- (15) *Water Management and Salinity Control in Irrigated Swelling and Shrinking Soils*, Project B-053-OKLA Technical Completion Report, March 1983, Oklahoma Water Resources Research Institute, Oklahoma State University.
- (16) *Analysis of Irrigation Pumping and Application Efficiency in the Central Ogallala Formation*, H.P. Mapp, Jr., Project B-048-OKLA Technical Completion Report, January 1983, Oklahoma Water Resources Research Institute, Oklahoma State University.



3. *Policies and Procedures for Land Treatment of Wastewater*, Report No. 1, Land Treatment Series, Project No. B-123-NC, Water Resources Research Institute of The University of North Carolina, 124 Riddick Building, North Carolina State Univ., Raleigh, N.C. 27650, August 1983.
4. *General Guidelines for Land Treatment of Wastewater*, Report No. 2, Land Treatment Series, Project No. B-123-NC, Water Resources Research Inst. of The University of North Carolina, 124 Riddick Bldg., North Carolina State Univ., Raleigh, N.C. 27650, August 1983.
5. *General Guidelines for Land Treatment of Sludge*, Report No. 3, Land Treatment Series, Project No. B-123-NC, Water Resources Research Inst. of The University of North Carolina, 124 Riddick Bldg., North Carolina State Univ., Raleigh, N.C. 27650, August 1983.
6. *General Guidelines for Subsurface Treatment of Wastewater*, Report No. 4, Land Treatment Series, Project No. B-123-NC, Water Resources Research Inst. of the University of North Carolina, 124 Riddick Bldg., North Carolina State Univ., Raleigh, N.C. 27650, August 1983.
7. *Application of Wastewater to Wetlands*, Report No. 5, Land Treatment Series, Project No. B-123-NC, Water Resources Research Inst. of The University of North Carolina, 124 Riddick Bldg., North Carolina State Univ., Raleigh, N.C., 27650, August 1983.
8. *An Integrated Methodology For Instream Flow Strategies*, Project No. A-130-NC, Dept. of Civil and Environmental Engineering, School of Engineering, Duke University, Water Resources Research Institute of The Univ. of North Carolina, Raleigh, N.C. 27695-7912, September 1984.
9. *Institutional Framework for Rural Water Supply in North Carolina, and Virginia*, Bulletin 142, Virginia Water Resources Research Center, Virginia Polytechnic Institute and State University, Blacksburg, VA 24060.
10. *Effect of Length of Fallow Period on Water Storage and Drainage*, The Kansas Water Resources Research Institute, Kansas State University, Manhattan, Kansas 66506, August 1983.
11. *Quantity and Quality Considerations for Water Use Efficiency in Irrigation*, Department of Plant and Soil Sciences, Texas Tech University, Lubbock, TX, August, 1977.
12. *Problem Oriented Evaluation of Institutional Decision Making and Improvement of Models Used in Regional Urban Runoff Management Application to Indiana*, Water Resources Research Center, Purdue University, West Lafayette, IN, May 1984.
13. *Measured Evaporation in High Rainfall Areas*, Technical Report No. 156, Water Resources Research Center, University of Hawaii-Manoa, October 1983.
14. *Response of Algal Populations To Changes in Stream Water Quality*, Center for Coastal and Environmental Studies, Division of Water Resources, Rutgers - The State University, New Brunswick, N.J. 08903, February 1984.
15. *Floodplain Management: The TVA Experience*, December, 1983, Tennessee Valley Authority, Division of Economic and Community Development, Knoxville, Tennessee.
16. *Developing the Resource Potential of a Shallow Water Table*, Water Resources Center, University of California, 2102 Wickson Hall, Davis, CA 95616, August 1984.
17. *Environmental Effects of Land Use and Intensive Range Management: A Northern California Example*, Water Resources Center, University of California, Davis, CA 95616, July 1984.



## WATER CURRENT

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