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Water Current

March/April 1985

DIRECTOR'S REPORT

The 1985 Nebraska Water Conference with the theme "Water Management Implementation" was held March 19-20 in Lincoln. Attended by over 150 farmers, legislators, state and federal agency representatives and other interest groups, the conference provided a forum for discussing the wise use and management of this important resource. This year's conference included sessions on implementing legislation and plans, economics and financing of water projects and implementing groundwater protection.

The keynote address was presented by Warren Viessman, Jr., Chairman of the Department of Environmental Engineering Sciences at the University of Florida and former director of the Nebraska Water Resources Center. Viessman noted that the threat of the U.S. running out of water is "mostly false," but that widespread shortages may arise. Water shortages may result from mismanagement, poor decision making, unwillingness to pay for needed programs and political constraints. He noted that water planning must be objective and planners must monitor shifts in public attitude if they expect to gain approval for building projects. Planners have all the technical knowledge they need to solve water problems but remain "at the elementary level in finding human solutions." Viessman praised Nebraska as one of only two states that have a statewide network (natural resources districts) to study water problems. Florida has a network of water management districts.

A luncheon address was given by Nebraska Governor Robert Kerrey who encouraged participants to invest in the future with optimistic determination.

At the conference banquet the annual Pioneer Irrigation Award was presented to Robert B. Daugherty for his 35 years of work in mechanized irrigation, his pioneering role in the development of the center-pivot irrigation system into a key agricultural management tool and his leadership of Valmont Industries. Two Progress Awards were presented to the Nebraska Farmer and the Agricultural Institute of Nebraska, a non-profit corporation of the Grand Island Area Chamber of Commerce, for their sponsorship of the annual Husker Harvest Days in Grand Island.

Wes Furrer, President of the Nebraska Chapter of the American Society of Farm Managers, was elected as new president of the Nebraska Water Conference Council, a sponsor of the Nebraska Water Conference. Lee Orton, Secretary of Nebraska Well Drillers Association, was elected vice president.

The Nebraska Water Resources Center is developing a tabloid review of the 1985 Nebraska Water Conference which will contain articles on all presentations.



NEBRASKA WATER RESOURCES CENTER

CORRECTION

On page 3 of the January/February 1985 issue of WATER CURRENT, in the story entitled "Aiken Reviews 1985 Water Bills" by Pat Larson, the sixth paragraph should have read:

"Perhaps the most important proposed change to LB 1106 is the modification of instream flow appropriation procedures," Aiken said. It would authorize the instream flow appropriations from the Nebraska Department of Water Resources at the request of a natural resources district or the Nebraska Game and Parks Commission.

KREITLER TO LECTURE

Charles Kreitler, Birsoll Lecturer in the Department of Geology at the University of Texas, will speak at the Water Resources Seminar on Wednesday, April 17 at 3:30 p.m. in the East Campus Union. His topic will be "Research and Information Needs for Groundwater Protection."

Dr. Kreitler will also present a lecture in the Geology Department at 10:30 a.m. on April 17 in room 430 Morrill Hall. The topic of this presentation is "Hydrologic Characteristics of a Sedimentary Basin: The Palo Duro Basin as an Example."

Kreitler is a prominent hydrogeologist in the water quality area. He is this year's Birsoll Lecturer for the hydrogeology division of the Geological Society of America. A distinguished researcher is annually chosen for this honor by the division to present results of his research at selected universities.

KREMER LECTURE SERIES

The spring 1985 speaker for the Kremer Lecture Series on Water Resources was Warren Viessman, Jr., Chairman of the Department of Environmental Engineering Sciences at the University of Florida and former director of the Nebraska Water Resources Center. His lecture was presented in conjunction with his keynote presentation at the 1985 Nebraska Water Conference. A recap of Dr. Viessman's lecture is featured under the "Director's Report" in this issue.

In addition to his presentation to the Water Conference, Dr. Viessman spoke to a Civil Engineering class at the University of Nebraska at Omaha and to a class of graduate students in the Department of Community and Regional Planning.

The Kremer Lecture Series was established in 1983 to honor former State Senator Maurice A. Kremer who for many years was in the forefront of water resources planning for Nebraska. The series involves two sessions each year—one in the spring and another in the fall—on current or future water resources issues affecting Nebraska. Prominent state and national water resources experts are invited to present the lectures.

CALIFORNIA IRRIGATION TOUR

The second most heavily irrigated state in the nation, Nebraska, will be compared to the first, California, during the 1985 Nebraska Irrigation Tour to California. Nebraska has about 8 million irrigated acres and California has about 10 million.

Les Sheffield, tour coordinator, has announced the itinerary for the September 8-13 trip. Sheffield, extension farm management specialist at the University of Nebraska-Lincoln, said there will be a visit to the Salad Bowl of the Nation and specialized farms and ranches.

Sheffield said there will be no Nebraska irrigation tour this year, but that one is planned for August, 1986. Alliance, Chadron, Crawford and Douglas, Wyoming will be included on the 1986 itinerary.

The California tour, co-sponsored by the Nebraska Water Conference Council and the UNL Institute of Agriculture and Natural Resources, departs from Omaha, Kearney, North Platte and Scottsbluff by air. Eppley Express vans will provide transportation to Omaha from Lincoln, Kearney and Grand Island. Or it's a possibility that some participants will drive to California and join the bus tour at any location.

San Francisco is the point of departure by bus for the Central Valley trip after a day of individual sight-seeing. Stops will include the U.S. Army Corps of Engineers Bay Area Model, luncheon at the University of California-Davis with a program on California water resources and irrigation by the Department of Water Resources, Sacramento. Maurice Peterson, a UNL alumnus and retired dean of the ag college at the University of California-Davis, will highlight the nearly 200 crops that are irrigated in California.

"We'll cross several islands, see farms on peat soils and visit a farm in the delta area where farmland is below surrounding water level and protected by earthen dikes," Sheffield explained.

Representatives of the U.S. Bureau of Reclamation and the California Department of Water Resources will explain the pumping operations for the California Aqueduct. There will be a visit to the second oldest irrigation district in California that was established in 1887.

Besides visits to farms where crops include rice, tomatoes, English walnuts, almonds, grapes, corn, asparagus and cotton, there will be stops at wineries. The Stockton Elevator, the deep water port for loading grain on ocean-going ships, will be visited, and at California State University at Fresno there will be a presentation on irrigation technology research, teaching and extension programs.

At Zim Irrigation in Fresno, Bernard Zimmerer will compare California irrigation with Nebraska methods. And in the Salinas Valley, where 70 percent of all the vegetables in the U.S. are grown, the group will tour vegetable crop production.

Land values, cash rental rates for prime farm land in the Salinas Valley, the Salad Bowl of America, and costs of crop production will be discussed by Tom Bengard in Salinas. On the last day of the tour, a computer firm will be visited in the Silicon Valley with stops in Palo Alto and Redwood City planned. Tour participants will arrive back in Nebraska on Friday night.

The Irrigation Tour planning committee includes Mike Jess, director of the Nebraska Department of Water Resources, chairman; Vince Dreeszen, director of the Conservation and Survey Division, UNL; Richard Hahn, manager, Metropolitan Life Insurance Company, Grand Island; and Deon Axthelm, UNL professor emeritus.

Cost of the tour varies according to departure point and room accommodations, Sheffield pointed out. Deadline for registration is July 1. However, he suggests that a deposit by May 1 will ensure flight reservations and reduced fares. For additional information, contact Les Sheffield, 223 Filley Hall, University of Nebraska, Lincoln, NE 68583-0922, or call (402) 472-1772.

Pat Larsen
Public Information Specialist

CHEMIGATION CONFERENCE

A Chemigation Safety Conference will be held April 17-18, 1985 at the Nebraska Center for Continuing Education in Lincoln. The conference is sponsored by the Cooperative Extension Service, University of Nebraska-Lincoln. The purpose of the conference is to address the safety and environmental hazards associated with chemigation. The conference will discuss potential contamination of groundwater and other environmental considerations.

The registration fee is \$50 which includes all sessions, a luncheon, refreshment breaks and the conference proceedings.

For additional information, contact: DeLynn R. Hay, Department of Agricultural Engineering, University of Nebraska, Lincoln, NE 68583-0726. Telephone: (402) 472-1625.

RESEARCH PROJECTS FUNDED

The Water Resources Center is pleased to announce the funding of three research projects from the Agriculture and Water Research Fund established in the University of Nebraska Foundation. This fund is supported with donations by the Nebraska irrigation industry.

The following projects were chosen by the Agriculture and Water Research Fund advisory committee which is composed of representatives of the donors to the fund:

- (1) A Comparison of the Water Use Efficiency of Sprinkler and Surface Irrigation Systems; James Gilley and Dean Eisenhauer, Department of Agricultural Engineering.
- (2) Comparison of Management Strategies and Grass Species for Conservation of Irrigation Water and Fertilizer for Improved Economic Return of Irrigated Pasture; James Nichols, Agronomy; Don Clanton and Gene Deutscher, Animal Science; George Pfeiffer, Agricultural Economics.
- (3) Excursion and Clean-Up From Chemigation Backflow; Roy Spalding, Conservation and Survey Division.

PUBLICATION #10 AVAILABLE

The Nebraska Water Resources Center announces the availability of Publication No. 10 entitled "Water Resources Research in Nebraska." This is the seventh edition of the publication which briefly describes the nature of water-related research in progress in Nebraska. It is hoped that the report will be helpful in facilitating and stimulating the exchange of information and thereby fostering a cooperative spirit of research with minimal duplication of effort.

Copies of this publication are available free of charge from the Nebraska Water Resources Center.

RESEARCH REVIEW

Project Title: *Implication of Temporal Variations and Vertical Stratification of Groundwater Nitrate-Nitrogen in the Hall County Special Use Area*

Principal Investigator: *Mary E. Spalding, Associate Professor, Conservation and Survey Division, UNL*

The objective of this project was to analyze monthly water level and nitrate-nitrogen data to see if a nitrogen transport model could be used to describe the mixing and movement of nitrate-nitrogen in an aquifer. Vertical distribution and temporal variations in nitrate-nitrogen concentrations and water level measurements during 1980 and 1981 were examined to determine if a solute transport model could simulate nitrate movement between the study area (which is underlain by a large zone of nitrate-nitrogen contaminated groundwater) and Grand Island.

The study area comprises approximately 75 square miles of the central Platte valley in Hall County Nebraska. Since the early 1940's irrigation has been vital to this area, which is one of the most intensively groundwater irrigated areas in the world. The groundwater in the area is contaminated with nitrate-nitrogen and other solutes. Deterioration of groundwater quality increases as the groundwater flows under increasing numbers of uninterrupted cropped and irrigated fields and moves farther from the Platte River, the line source of good quality groundwater. This nitrogen-contaminated groundwater is moving to the east-northeast, and if the nitrogen is conservatively transported (not removed from the water) it would reach the city of Grand Island.

Documentation of the fate of nitrate-nitrogen in groundwater is important since concentrations in excess of 10 mg/L in drinking water exceed the maximum contaminant level set by the Safe Drinking Water Act. Presently, there is no economical way to remove nitrate from drinking water. The knowledge of vertical stratification and temporal changes in nitrate-nitrogen concentrations is necessary if irrigators are to make efficient use of groundwater nitrate as fertilizer.

Data from the study area indicated that nitrate-nitrogen concentrations in shallow groundwater downgradient from irrigated fields were high and reflected management practices. The large temporal variations and their unpredictability are caused by the influx of nitrate-nitrogen carried by infiltrating precipitation and irrigation water. There is a decrease in nitrate-nitrogen levels with depth in the aquifer with the sharpest decrease occurring in the upper half. Concentrations at mid-depth and near the bottom of the aquifer are much lower and less variable than in the shallow groundwater. This homogeneity in lower levels of the aquifer results from slow vertical movement.

Near the eastern edge of the study area, there is a sharp decline in the areal concentration of nitrate-nitrogen and a markedly different vertical profile. These changes coincide with the location of a recently delineated front where nitrate is being actively lost from the groundwater. Consequently, classical solute transport models, which assume no loss of nitrate from the groundwater, cannot be used to predict nitrate movement from the area of nitrate-contaminated groundwater to Grand Island, as has been proposed by U.S. Geological Survey personnel. In order for a solute transport model to have practical applications, not only would the kinetics of denitrification in this frontal area have to be determined, but also the presence or absence of other redox fronts would have to be established.

JOBS AVAILABLE

The University of Wyoming is seeking applications for the position of Assistant Professor, Fluvial Geomorphologist. This is a tenure track or one to three-year appointment with possibility of conversion to tenure track. This is a joint appointment between the Department of Geography/Recreation and the Wyoming Water Research Center. In addition to teaching/research and duties in the Water Center, candidate will participate in developing an interdisciplinary master's program in water research and an undergraduate and master's program in interrelationships between human and natural resources in the Rocky Mountain/Great Plains region.

Qualifications include a Ph.D. and strong commitment to research. Candidates must exhibit interest in basic fluvial geomorphology with application to water development and quality issues facing the Rocky Mountain/Great Plains states.

Interested applicants should send vitae, transcripts, evidence of teaching/research, and addresses and phone numbers of three references to: Job Position C, Richard G. Reider, Chair, Department of Geography and Recreation, University of Wyoming, Laramie, Wyoming 82071. Telephone: (307) 766-3311.

The University of Wyoming is an Equal Opportunity, Affirmative Action Employer.

CALL FOR PAPERS

Papers are being solicited for the 30th Annual Midwest Groundwater Conference to be held October 23-25, 1985 in St. Paul, Minnesota. General topics include groundwater quality and contamination, regional groundwater assessments, groundwater resource management, geophysical and geotechnical aspects, recharge and groundwater flow, and legal and policy aspects.

Abstracts of papers should be limited to 400 words and should be typed and double-spaced. Final date for receipt of abstracts is May 17, 1985. Authors will be informed concerning acceptance by June 21, 1985. Abstracts should be sent to: Tom Clark, Hydrologist, Minnesota Pollution Control Agency, 1935 West County Road B-2, Roseville, Minnesota 55113. Telephone: (612) 296-7791.

MEETINGS AND CONFERENCES

May 2-3, 1985

Second Symposium on Artificial Recharge in Arizona to be held in Tempe, AZ. Pre-registration fee is \$50. For additional information, contact Floyd L. Marsh, Water Resources Research Center, 103 Douglass, University of Arizona, Tucson, AZ 85721. Telephone: (602) 621-1009.

May 16-17, 1985

Workshop on "A National Survey: Selected Problems and Solutions in Applied Hydrology and Hydrogeology" will be held at Minneapolis, MN. For additional information, contact Program Coordinator, American Institute of Hydrology, P. O. Box 14251, St. Paul, MN 55114. Telephone: (612) 379-1030.

June 17-21, 1985

Second Annual Groundwater Course entitled "Local Groundwater Management: Aquifer Contamination, Protection, and Community Response" to be held at Cornell University. For additional information contact Diane Banfield, Programs in Professional Education, Cornell University, Box 731, B12 Ives Hall, Ithaca, NY 14853. Telephone: (607)256-7259.

July 28-31, 1985

Annual Meeting of Universities Council on Water Resources with the theme "University Partnerships in Water Resources: Industry, State and Local Government, Citizens" will be held at the University of Massachusetts in Amherst. Registration fee is \$95. For additional information, contact: William L. Powers, Executive Secretary, Nebraska Water Resources Center, 310 Agricultural Hall, University of Nebraska, Lincoln, NE 68583-0711.

PUBLICATIONS

The following publications have been received recently by the Water Resources Center. 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) *University of California Saline Water Conversion Research*, Progress Report, July 1983 - June 1984, Water Thermal and Chemical Technology Center, University of California-Berkeley, Richmond, CA 94804.
- (2) *Annual Report - Resources for the Future*, Year ending September 1984, Resources for the Future, Inc., 1616 P St., N.W., Washington, D.C. 20036.
- (3) *Agricultural Use of Sewage Sludge: A Literature Review*, Project A-097-VA, December 1984, Water Resources Research Center, Virginia Polytechnic Inst. and State University, Blacksburg, VA 24060-3397.
- (4) *California Water Resources Center Annual Report*, Report No. 61, July 1983 - September 1984, Water Resources Center, University of California, 2102 Wickson Hall, Davis, CA 95616.
- (5) *Distribution and Relative Abundance of Fishes in Wisconsin*, Technical Bulletin No. 147, 1984, Department of Natural Resources, Box 7921, Madison, WI 53707.
- (6) *Use of Estimation Techniques for Flood Forecasting*, Contribution No. 192, February 1985, Water Resources Center, University of California, 2102 Wickson Hall, Davis, CA 95616.

WATER CURRENT

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

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