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Water Current

Nebraska Water Resources Center

March 1988

Changing World's Impacts on State's Water Issues Explored

Challenges Nebraska faces in the development and management of its water supplies in light of emerging world policies and production were examined at the 1988 Nebraska Water Conference, March 15 and 16.

Bill Powers, director of the Nebraska Water Resources Center at the University of Nebraska-Lincoln, said, "An international theme tying the world-wide agricultural picture into Nebraska's water issues is a change for this annual water conference."

He said that it's vital to study not only Nebraska's role in water issues as we have at past conferences, but to relate world problems to this role.

Program planning chairman Dale H. Vanderholm, Interim Dean of the Agricultural Research Division, UNL, announced the program at the two-day conference at the Nebraska Center for Continuing education:

"World and National Developments" at the first session featured Frank Zahn, professor in the College of Business, UNO, who spoke on "The Macroeconomics of Nebraska's Competitiveness;" "Production Situation in Other Countries," Jim Flanery and Phil Johnson, Omaha World-Herald; "U.S. Export Grain Outlook," Roger W. Wallace, director of Market Research at Data Transmission Network Corp., Omaha; and the

keynote address: "Nebraska's Agriculture in a Changing World," Roy Frederick, director of the Nebraska Department of Agriculture.

Luncheon speaker, Joe D. Hall, deputy commissioner of the U.S. Bureau of Reclamation, Denver, spoke about "The Bureau in Transition;" followed by "Risk Assessment and Water Policy," by Eugene Stakhiv, Institute for Water Resources, U.S. Army Corps of Engineers, Fort Belvoir, Va.

The afternoon featured three concurrent sessions. In section A on "Water Quality and Agriculture Production" an "Overview of Agricultural Chemical Issues" was explained by Mary Spalding, of the

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Tours Announced

Irrigation tours

are planned for:

July 14 and 15

Southeast Nebraska,

and

Sept. 10-17

Pacific Northwest.



Perry B. Wigley

Natural Resources Development in Depressed Areas Goal of CSD

Depressed areas in Nebraska where natural resources are untapped, but that could foster economic development have caught the eye of the director of the Conservation Survey Division at the University of Nebraska-Lincoln.

"Nebraska needs to develop more income from underdeveloped natural resources," Perry Wigley, director of the Conservation and Survey Division, said, "and a lot of these potential resources are in depressed areas."

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Director's Report

Center to Search for Funds

by Bill Powers

January was a busy month for the Water Resources Center. Three sets of research proposals were submitted to funding sources. Final decisions were made on proposals sent to the U.S.G.S. for funding under the provisions of Section 104 of the Water Resources Research Act of 1984. Three proposals were received and forwarded to the U.S.G.S. for funding under Section 105 of the Act. Research proposals for funding by the Burlington Northern Foundation Endowment Fund were selected for funding in February.

On January 21, the annual water resources research update was held at the East Campus Union. The purpose of this event is to enhance communications between research disciplines as well as to inform the public and state agency staff about the latest research results. The update was attended by private citizens, Natural Resources District Managers and state water agency staff. The contents of the update are highlighted in a separate article in this issue of *Water Current*.

Next year the Water Center will intensify its efforts to obtain more funding for water resources research and information programs in Nebraska. The first step in this process has been to identify faculty and staff at the University of Nebraska with waterrelated interests. Each department head was asked to update the list of water scientists in his or her respective departments. During the next few months we will be asking the faculty and staff at the University to update their entries in *Water Center Publication Number 6* entitled "University of Nebraska Faculty with Competence in Water

Resources". The next step will be to develop a list of potential funding sources including contact people, deadlines for applications and preferred research and information topics. The final step will be to assemble and encourage teams of faculty to apply for grants.

The transfer of the headquarters of the Universities Council on Water Resources has been completed with the closing of accounts at the University of Nebraska and the mailing of the final check to the new headquarters at Southern Illinois University - Carbondale. With this transfer completed the Nebraska Water Resources Center will be able to devote more time to fostering and administering water resources research at the University of Nebraska.

Sheffield Receives Award

The Four-State Irrigation Council presented its Ditch Rider award when it met Jan. 11-13 in Fort Collins, Colo., to a University of Nebraska-Lincoln agricultural economist.

Les Sheffield, Institute of Agriculture and Natural Resources Ag Economics Department, received the award for his irrigation economics research, his irrigation tours and service to the Council.

The Council that was organized in 1952, tours biannually to inspect irrigation projects. During the summer, 1987, the Council and the Nebraska Water Conference Council co-sponsored a tour of south-central Nebraska that Sheffield directed.

Henry Lang, Ord, received one of four Headgate Awards for his outstanding work with the Twin Loops project and other irrigation projects.

Calendar

April 6-9--The American Institute of Hydrology sponsors "The Application of Computer Models to Ground-Water Problems" short course, Vail, Colo. Call 612-379-1030 for more information.

June 19-23--USDA/International Science and Education will sponsor an International Symposium on Water Quality Modeling of Non-Point Agricultural Sources, Logan, Utah. Call 202-653-7860 for more information.

July 10-13--The 28th annual meeting of the Aquatic Plant Management Society at the Fairmont Hotel in New Orleans, La. This international conference is of interest to those who are concerned with the scientific and applied aspects of lake vegetation management. Write G. Douglas Pullman, 1014 N. Bridge St., P.O. Box 248, Linden, MI 48451 for more information.

Nov. 16-18--National/International Conference on "Advances in Ground-Water Hydrology," Tampa, Fla., sponsored by the American Institute of Hydrology. Call 612-379-1030 for more information.

March 1988

Nebraska Water Resources Center

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(Wigley from page 1)

Wigley, CSD director for about a year, said that tapping these resources is one of the high priorities in his CSD reorganization. An example of utilization of Nebraska's natural resources is ceramic materials that are in clay, shale and volcanic ash.

"We know these materials are located in Nebraska in abundant quantities as pinpointed on the CSD mineral resources map, but we don't have the data occurrences or ceramic engineering data to make exploitation possible," Wigley said.

Another priority in Wigley's reorganization is "to do everything that is possible to upgrade water quality studies." He stressed that these studies will be important to Nebraska's future.

"We have just ended the seventh year of a 'wet cycle' in the state. We need to continue our water studies as history shows us that dry periods are sure to come," he said. "Geologists look at long periods of time. We can't afford to have short memories."

Wigley said that it's important to better fulfill the geological, geographic and

water mission for the state that was set down in state statutes for the Conservation and Survey Division in 1921. "Actually, this reorganization doesn't change many internal activities within the division," he said. He cited the example of changing the title of program managers. "They are now 'branch chiefs' which is parallel to the U.S. Geological Survey's titles."

While looking ahead, Wigley envisions the CSD under one roof. "Now we're scattered through several locations and in order to function more productively, we need to come together which may be as soon as 1993," Wigley said.

Another goal is to increase the size of the water chemistry lab and the samples storage. The state statutes require that CSD is the repository for oil, gas, water, municipal well and soil sample storage. "We have just about reached capacity on this.

"In order to develop our natural resources in the best possible way for Nebraskans," Wigley, who became CSD director March 1, 1987, said, "CSD must provide more focus and direction in the location and exploration of Nebraska's natural resources."

Extension Water Group Broadens Base

In order to have a broader representation and to effectively manage Nebraska Extension Service water projects, a reorganizational meeting was held January 14.

Roger Gold, IANR Environmental Programs director, chair of the new Extension Water Coordinating Committee, explained that this former Extension Water Group will consider water-related topics. Extension reporting, public education, opportunities for education and program evaluation were among the topics that were discussed.

Gold announced the Cooperative Extension System National Initiatives Water Quality workshop later held at the National 4-H Center in Chevy Chase, Md. Attending besides Gold were: DeLynn Hay, Extension Specialist, Agricultural Engineering, UNL; Kay McKinzie, Extension Home Economist, Southeast District, Beatrice; Dick Wiese, Extension Soils Specialist, Agronomy; Darrell Watts, Ag Engineering; and Pat Larsen, Communications Associate, Conservation and Survey Division, UNL.

The 38-member Extension Water Coordinating Committee will meet again in late March.

Nebraska's Available Water Supply 'Same as Pioneer Days' -- Dreeszen

Nebraska's available water supply hasn't changed substantially since pioneer days. In fact, as a result of storage, Nebraska's water supply may have increased, according to one of the state's foremost water authorities.

Vince Dreeszen, former director of the Conservation and Survey Division at the University of Nebraska-Lincoln, said that Nebraska's biggest challenge for the

future is to balance this precious water supply from all sources for crops, plants, animals and humans.

In a water-supply inventory Dreeszen said that the main source of water in Nebraska, the most important and the most unpredictable, is rainfall. "This main source of water is also the supply that may be most easily and beneficially managed," Dreeszen added.

Rainfall increases across

the state an inch for every 24 miles with western Nebraska receiving about 16 inches annually and eastern Nebraska, about 34 inches annually. This gives Nebraska an average rainfall of 22.5 inches.

But Dreeszen pointed out that "it's either feast or famine, that is drought or flood" and that we seldom receive our average rainfall. Since 1981 most of the state has had precipitation substantially above average with the only comparable record period being 1900 to 1910.

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Conservation and Survey Division, UNL; "Conservation Tillage and Environmental Quality," Elbert C. Dickey, department of Ag Engineering, UNL; and "Low-Input Agriculture," Charles Francis, Department of Agronomy, UNL.

At section B on "Water Quality and Water Supplies" "Cost of Quality Assurance" was discussed by Lash Chaffin, utilities coordinator of the League of Municipalities, Lincoln; "Natural Resources District Water Quality Programs," Russ Edeal, President of the NARD, Loomis; and "Implications of Groundwater Legislation," Gale Hutton, Chief of the Water Quality Division of the Nebraska Department of Environmental Control.

Section C on "Water Quality and Federal Programs" heard from the U.S. Army Corps of Engineers, Richard Gorton, Chief of the Environmental Analysis Branch of the Planning Division, Omaha; Soil Conservation Service, Ron Hendricks, State Conservationist, USDA - SCS, Lincoln; U.S. Geological Survey, William Kastner, District Chief, U.S., Geological Survey, Lincoln;

and the U.S. Fish and Wildlife Service, Dennis Buechler, Field Supervisor, U.S. FWS, Grand Grand Island.

The March 16 session on "Current Nebraska Water Issues," featured "Assessing the Health Risks," Dennis Weisenburger, College of Medicine, University of Nebraska Medical College, Omaha; "Interstate Compacts and the Nebraska/Wyoming Law Suit," Michael Jess, Director of the Nebraska Department of Water Resources; and "Water Management Financing: What Other States are Doing," Dayle Williamson, Director of the Nebraska Natural Resources Commission.

Concluding the conference, "A New Mission for the Bureau of Reclamation" was explained by Bill E. Martin, Director of the Missouri Basin region of the Bureau of Reclamation at Billings, Mont.; and "The Role of Water in Nebraska's Future Economy: A summary," was moderated by Vanderholm with panelists: Grams, Jess, Leslie Sheffield, extension farm management specialist, UNL; Weisenburger, Perry Wigley, Director of the Conservation and Survey Division; and Williamson.

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However, in the droughts of the 1930s and 50s, there was "less water in the bank."

He cited other sources of water:

- Stream flows
- Groundwater
- Surface water reservoirs
- and Recharged groundwater.

"The largest annual use of water in Nebraska is for irrigation," Dreeszen reported. "One million cropland acres are irrigated annually from surface water and about six million acres, from groundwater." However, the largest discharge of water is through evapotranspiration where over 100 million acre feet a season are "lost."

An acre-foot of water is equal to 1 foot of water on an acre, or about 325,000 gallons of water. A single irrigation well may pump more than 100-acre feet in a season. The City of Lincoln uses 35,000 to 40,000 acre feet of water a year, he said. He reported the water inventory for the Wednesday Water Resources Seminar Series on Water Quality in Nebraska that about 2.5 million acre feet of water a year flow into the state largely from the North and South Platte Rivers in Colorado and Wyoming.

About 8 million acre feet of water leave the state annually through our rivers and streams and more than half of the flow is via the Platte River.

Nebraska's Water Research Reviewed at 'Update'

Water-related research projects in Nebraska were updated at an annual day-long meeting Jan. 21 at the University of Nebraska-Lincoln East Campus Union.

Topics included: irrigation, nitrogen management, groundwater recharge, control of surface runoff and precipitation probability modelling, according to Bill Powers, coordinator of the review.

Investigators reported on

the progress of the Burlington Northern Water Quality Project. Following an overview of the project, other aspects discussed included Nitrogen Management and Leaching, Herbicides, Irrigation and Tillage, Insectigation, the Pesticide Analytic Lab, Backflow Prevention and Well Excursion and Clean-Up.

Other research reported on included: Controlling Electric Power

Demands in Irrigated Agriculture, the Role of Crop Nutrient Status in Nitrogen Management Practices, Groundwater Contamination Control; Alternate Bacterial and Viral Indicators of Human Fecal Pollution of Surface Waters, Water Diversion and Impoundment: Effects on Black Flies in Nebraska Sandhills River Systems, Platte River Fisheries Study and Nebraska Water Law and Policy.

Executive Summary

Nebraska Water Resources Center Projects for 1988

Objectives of the 1988 research projects for the University of Nebraska Water Resources Center include:

"Development and Evaluation of Improved Methods of Measuring Chemical Leaching": Lysimeters will be developed that can be placed directly in agricultural fields to measure the loss of water and chemicals resulting from climatic conditions and agricultural practices.

"Reducing Nitrate-N Losses to Groundwater by Improving Field Sampling Accuracy of Nitrate-N" will develop an informational base on residual nitrogen variability within a field that will improve fertilizer recommendations.

"Retention of Toxic Organics as Related to Soil Series and Soil Mapping Unit"

will identify and quantify soil factors which influence the retention of a group of organics by soils and different mapping units.

"Application of Expert-Systems Technology to the DRASTIC Groundwater-Vulnerability Model" will develop methodologies to incorporate an expert-system concept into DRASTIC in order to automate the process of data collection and application.

"Groundwater Contamination Control: Monitoring and Design" will examine the use of the state-of-the-art geophysics combined with advanced geostatistics, water quality modeling and multicriterion decision-making for the purpose of evaluation and

design of observation networks and to select cost-effective remedial actions for groundwater pollution.

"Assessment of the Bacteroides fragilis Group and Their Bacteriophages as Indicators of Human Fecal Pollution of Surface Waters" will identify and evaluate the use of alternate indicators of fecal pollution which would unambiguously differentiate between human, animal and environmental sources of pollution.

"Development of a Decision Support System to Aid Decision Makers Evaluating Groundwater Transfer" will develop a computer model to serve as a decision support system for decision makers facing groundwater sales issues.

Health, Legal and Management Aspects of Water Examined

Leaking underground storage tanks, hazardous wastes and the use and movement of agricultural chemicals in water are a few of the topics explained at the annual Nebraska Water Resources Seminar Series.

The Nebraska Water Resources Center at the University of Nebraska-Lincoln annually offers this weekly seminar that began Jan. 13 when an "Inventory of Nebraska's Water: Availability and Occurrence" was presented.

Bill Powers, seminar coordinator, said that these presentations will provide students, water professionals and the public an opportunity to hear experts from state agencies address water quality topics.

"This spring's seminar will provide the latest information about different

aspects of Nebraska's water quality from experts," Powers, director of the Nebraska Water Resources Center, said. "We're pleased to be able to offer these informative and timely presentations."

Offered in 117 Bessey Hall, city campus, the seminar meets Wednesdays at 3:30 p.m., on the following dates:

Jan. 13 - "Inventory of Nebraska's Water: Availability and Occurrence," - Vince Dreeszen, former director of the Conservation and Survey Division, UNL;

Jan. 20 - "Basic Concepts of Groundwater Hydrology" - Darryll Pederson, research hydrogeologist, Conservation and Survey Division;

Jan. 27 - "Concepts of Solute Movement" - Roy Spalding, research hydrochemist, Conservation and Survey Division;

Feb. 3 - "The Nebraska Water Quality Situation" - Mary Spalding, research chemist, Conservation and Survey Division;

Feb. 10 - "Health Aspects of Water Quality" - Edward Bresnick, director of Eppley Research Institute for Research in Cancer and Allied Diseases;

Feb. 17 - "Hazardous Wastes: Their Identification and Classification" - Michael Steffensmeier, Nebraska Department of Environmental Control;

Feb. 24 - "Hazardous Wastes: Their Treatment and Remediation of Impacts" - Mohamed Dahab, assistant professor, UNL Civil Engineering;

March 2 - "Leaking Underground Storage Tanks" - John Gross, Nebraska Fire Marshall's office;

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March 9 - - Well
Construction; Rules and
Regulations - - Bill Lee,
Nebraska Department of Health;
March 16 - - Nebraska Water
Conference

March 23 - - UNL spring
break

March 30 - - Agricultural
chemicals: Their Use and
Movement to and in
Water - - Roger Gold, head,
Entomology Department, UNL;

April 6 - - Water Quality
Protection; Legislation and
Regulation - - Gale Hutton,
Nebraska Department of
Environmental Control;

April 13 - - Legal, Social
and Economic Impacts of Water
Quality Rules and
Regulations - - J. David Aiken,
water law specialist,
agricultural economics
department, UNL;

April 20 - - Case Histories:
Hitchcock County Oil
Brine - - Barry Hibbs, graduate
student, Conservation and
Survey Division; Long Pine
Creek Groundwater Quality
Program - - Byron Stolzenburg,
Brown, Rock and Keya Paha
County Extension;

April 27 - - Case Histories:
Waverly Water Supply
Contamination - - Mayor Mary
Applebee; Underground Storage
Tank Leaks - - Bob Todd, EA
Engineering Science and
Technology, Inc.



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