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# Water Current

## DIRECTOR'S MEMO

January/February 1982

### Phase II of Plan Completed

The second phase of our three-step process to update the center's water research and information programs is over, thanks to the tremendous effort of the scientific community at the University of Nebraska.

If you recall, the first phase was completed last fall when the Water Resources Center invited about 50 water-wise citizens to a workshop in Lincoln. The group was asked to list and rank by priority water problems in the state that they felt needed more research for solving. Ninety-four problems were identified, and 13 received a top priority ranking.

Those 13 problems were the focus of a second workshop held February 16-17, 1982. For this gathering, however, only water researchers were invited, and they accomplished two tasks. First, they told us what information already exists about each problem, but needs to get off the shelf and into the hands of water users. Then they listed 47 research needs for acquiring information that will alleviate, or possibly solve, the 13 problems.

These 47 needs will be developed into research programs, which will outline objectives, and estimate required personnel as well as financial support. The list is too long to publish in *Water Current*, but copies are available from the Water Resources Center. A proceedings of this second workshop will be published shortly. The proceedings of the first workshop are presently available for those who would like to review the 94 problems that were identified.

Phase three of the planning is devoted to finding funding sources to support portions, or all, of the research programs. We will start this phase immediately after the programs are developed.

—William L. Powers  
Director  
Water Resources Center

### Powers Chairs Sandhills Task Force

Dr. William L. Powers, Director of the Nebraska Water Resources Center, will serve as chairman of a recently established IANR Sandhills Task Force.

Powers said the task force has been given four assignments by IANR interim vice-chancellor Howard Ottoson. They include: 1) determining present and future information needs for answering questions associated with irrigation development in the Sandhills; 2) determining what information is presently available, and how it can be presented to the public; 3) determining what information about the Sandhills needs to be acquired, and what research is necessary to attain it; and 4) determining what facilities are needed in the Sandhills for research and extension activities.

Powers stressed that the task force was formed to establish internal IANR research and informational policies for the Sandhills, and will not act as a research team conducting projects in this region of Nebraska. The report of the task force will be used to establish IANR research and information programs for the next few years, he said.

Other task force members include: Blaine L. Blad, associate professor, Center for Agricultural Climatology and Meteorology, Lincoln; Charles R. Fenster, extension crops specialist, Scottsbluff; Paul H. Gessaman, extension agricultural economist, Lincoln; James W. Goeke, assistant professor and research hydrologist, Conservation and Survey Division, North Platte; DeLynn S. Hay, extension specialist, agricultural engineering, Lincoln; Gary L. Hergenrader, professor of forestry, fisheries and wildlife, Lincoln; Gary W. Hergert, associate professor of agronomy, North Platte; William Miller, professor of agricultural economics, Lincoln; James T. Nichols, extension range and forage management specialist, North Platte; M.-L. Quinn, assistant professor, Water Resources Center, Lincoln; George W. Rehm, extension soils specialist, Concord; and Darrell G. Watts, professor of agricultural engineering, Lincoln.





## Platte River Conference Topic

"The Changing Platte" is the theme of the 1982 Nebraska Water Conference scheduled for March 16-17 at the Nebraska Center for Continuing Education in Lincoln.

The Upper Platte River Management Study will be examined during the afternoon session of the first day. U.S. Geological Survey and U.S. Fish and Wildlife Service representatives will provide details of the study.

"Sharing the Platte" will be the highlight of the second day. Topics that will be discussed include stream flow and water rights, instream uses, water for power and industry, water for municipalities, storage and water supply, Platte River operations today, and Missouri River water management.

The conference begins at 9 a.m. on March 16 by featuring three concurrent sections devoted to water studies in the state. Participants will be able to choose between sections on the recently completed instream flow or groundwater management policy issue studies that were coordinated by the state's Natural Resources Commission, or the Ogallala Aquifer Study that is still underway.

After the sessions, Charles Thone, Governor of Nebraska, will make remarks.

William Gianelli, Assistant Secretary of the Army (Civil Works) will be the luncheon speaker on the first day, and Norman Krivosha, Chief Justice of the Nebraska Supreme Court, will speak during lunch of the second day. He will talk about the role of courts in society.

A banquet and awards ceremony will be held at the Villager Motel, 5200 "O" St. at the end of the first day's session.

For more information and registration forms, contact the Water Resources Center.

## Conference Secretary Named

William L. Powers, Director of the Water Resources Center, has succeeded Leslie F. Sheffield as secretary of the Nebraska Water Conference Council. Dr. Howard Ottoson, IANR interim vice chancellor announced Jan. 8.

The council sponsors the annual Nebraska Water Conference, held each spring at the UNL Nebraska Center for Continuing Education in Lincoln, and an annual irrigation tour in summer.

Sheffield, an assistant to the vice-chancellor's office and an extension farm management specialist, has served as secretary of the Nebraska Water Conference Council since it was formed in 1972. He will continue to coordinate the annual summer irrigation tour.

The Nebraska Water Conference Council, which has approximately 90 members, serves as a forum and sounding board, providing opportunities for its diverse membership to understand vital water issues. The vice-chancellor of the NU Institute of Agriculture

and Natural Resources appoints members, who represent private business and industry, agriculture, water and natural resources groups, state and federal agencies, various associations, irrigation and reclamation districts, and the University of Nebraska.

## BN Backs Water Use Project

The Burlington Northern Foundation has announced a \$251,810 grant to the University of Nebraska Foundation to support a five-year program designed to help Nebraska farmers use groundwater wisely.

The program, under the direction of IANR extension irrigation specialist Paul Fischbach, will educate and train irrigators to use the least water in maximizing crop yields.

Wayne Arntzen of Denver, Burlington Northern Inc. vice president, said irrigation represents the largest energy use in Nebraska agriculture. A strong state economy depends to a large degree upon efficient production and use of agricultural commodities, he added.

Howard W. Ottoson, IANR interim vice chancellor, said the grant will allow the Nebraska Cooperative Extension Service to expand programs in irrigation scheduling.

## \$75 Million for Nebraska Water

President Reagan's fiscal year 1983 budget proposal includes more than \$75 million for water development in Nebraska and along the Missouri River. U.S. Bureau of Reclamation funds earmarked for Nebraska projects include:

- \$38.9 million for construction on the North Loup reclamation project.
- \$2.2 million for continued rehabilitation and improvement of the existing irrigation distribution system of the Central Nebraska Public Power and
- \$1.1 million for continued construction of subsurface drains on the Farwell reclamation project.
- \$700,000 for the O'Neill-Norden reclamation project, including design work on the Norden Dam and preconstruction work on the pumping plant, various canals, laterals and other operating facilities.
- \$529,000 for continued replacement of open ditch laterals in the Frenchman-Cambridge irrigation projects.
- \$150,000 for a feasibility study of the proposed Prairie Bend reclamation project with the study planned for completion in 1986.
- \$267,000 for a Republican River Basin water management study affecting Nebraska, Kansas and Colorado, with completion of the study scheduled for 1984.

The Army Corps of Engineers budget for 1983 calls for spending nearly \$30 million in Nebraska and along the Missouri River, mostly for operation and maintenance of existing facilities.



## Notes From the Water Planner High Plains Research Released

A report summarizing the results of Nebraska's research for the "High Plains Ogallala Aquifer Study" was recently released by the Nebraska Natural Resources Commission. The Nebraska study is part of a larger, six-state effort authorized by the U.S. Congress to find solutions to impending problems of the High Plains area, which heavily depends upon the aquifer's water supplies.

The study's objectives, as identified by the Federal legislation (P.L. 94587), were:

- To assure adequate water supplies to the area;
- To assure an adequate supply of food to the Nation;
- To promote economic vitality of the High Plains region;
- To develop plans to increase water supplies in the region.

Six alternate development strategies were developed by researchers. The strategies were designed to cover a range of potential policies and actions that could fulfill the study's objectives, and include:

— Continuation of current local, state and national trends and policies; no new state or federal programs ("Baseline")

- Voluntary water demand management
- Mandatory water demand management
- Local water supply augmentation
- In-state interbasin water transfers
- Interstate interbasin water transfers
- Non-agricultural alternative (development and use of available resources for purposes other than agricultural production). This alternative was identified for regional study and hence was not included in the state research.

Briefly, the Nebraska research indicated that even though restriction of groundwater use would extend Nebraska's water supplies longer than the baseline strategy through the year 2020, such restrictions would yield smaller "returns to land and management" than those projected under the baseline scenario.

UNL faculty/staff participating in the research were Raymond Supalla, Bruce Johnson, Arlen Leholm, Glen Schaible, Duane Jewell, F. Charles Lamphear, Donald G. Hanway, Albert D. Flowerday, David Lewis, Richard Waldren, James R. Gilley, Darrell G. Watts, Derrel Martin, James Schmidt, John Ballard, and staff of the Conservation and Survey Division

The General Contractor (Camp, Dresser and McKee, Inc.) is scheduled to complete the regional study by March 31, 1982. The regional study is an assimilation of research conducted by the individual states.

Final recommendations will be formulated by the High Plains Study Council, which is comprised of

Governors of each state and their delegations and the U.S. Department of Commerce. The Council's recommendations will be sent to the Congress later this year.

Single copies of the summary of Nebraska research are available, at no charge, by contacting the Nebraska Natural Resources Commission, P.O. Box 94876, 301 Centennial Mall South, Lincoln, Nebraska 68509, Phone: 402-471-2081. There may be a charge for additional copies (contact the NRC for the price schedule).

—Robert E. Burns  
Water Resources Planner

## RESEARCH REVIEW

### PROJECT TITLE: THE BIOLOGICAL REGULATION OF BLOOM-CAUSING BLUE-GREEN ALGAE: A FEASIBLE ALTERNATIVE

**PRINCIPAL INVESTIGATOR:** Eugene L. Martin, Assoc. Professor, School of Life Sciences, University of Nebraska-Lincoln

Over the last twenty years a large number of flood control lakes have been constructed throughout the Great Plains states. Frequently, these lakes receive large amounts of nutrients from runoff waters containing agricultural materials. This often results in an increase in water productivity exemplified by tremendous algal proliferation (e.g. blue-green algal blooms). The basic objective of this project was the development of procedures to regulate algal growth through the use of bacterial and viral control agents.

The predominant types of bloom-causing algae isolated over the course of the project were *Aphanizomenon flos-aquae*, *Anabaena flos-aquae*, *Microcystis aeruginosa* and an *Oscillatoria* sp. Several types of bacteria and a virus have shown promise as biological control agents of blue-green algae. These microbial control agents have been characterized, and some effort has been made in the laboratory to elucidate how they destroy the blue-green algae.

Detailed analyses of physical and chemical parameters were run for Pawnee and Twin lakes in the Salt Valley watershed. Using this data as a basis, studies were first conducted on the effects of the various lytic agents on simulated blue-green algal blooms in laboratory microcosms. This was then extended to actual field trials of the bacterial and viral agents in both Pawnee and Twin lakes. The outcome of these studies will be described.



## Tillage Conference Starts March 2

Soil eroded from Nebraska farmland at the rate of eight tons per acre per year in 1980 and 1981 and the trend is expected to continue. In the entire Corn Belt region, 37 percent of cropland eroded at annual rates higher than the Soil Conservation Service's tolerance level of five tons per acre.

These figures from the SCS and the U.S. Department of Agriculture point to the need for conservation measures, one of the topics to be highlighted March 23 at the "Conservation Tillage for Row Crop Production" conference to be held at the Nebraska Center in Lincoln.

"The major purpose of the conference is to provide farmers with practical information on how to use conservation tillage successfully. In addition, current research pertaining to several aspects of conservation tillage will be discussed," said Elbert Dickey, conference chairman and an IANR extension agricultural engineer.

The program on March 2 will examine various tillage systems, including advantages and disadvantages of each. Fuel and labor requirements, erosion control potential and use of these systems with irrigation also will be highlighted. Weed, insect and disease control problems, as well as accurate and safe pesticide application also will be discussed. A panel of researchers will explain current research in conservation tillage.

Planter performance and conservation tillage economics will be presented March 3. A look at SCS programs will be part of the conference, along with soil compaction, fertility and soybean production research. Members of a farmer panel will discuss their successes in developing conservation tillage programs.

Registration is \$35. Interested persons should contact their extension agent or Dickey, 250 Ag Engineering, University of Nebraska, Lincoln, Neb. 68583-0726.

## Water Reuse Proceedings

The proceedings of the second Water Reuse Symposium will be available as a three-volume set in March 1982. This symposium, held in Washington, D.C., August 23-28, 1981, addressed the major issues confronting the water supply industry regarding water reuse and recycling. Renovation of municipal, industrial and agricultural wastewater for reuse was covered from the engineering, scientific, economic and legal viewpoints.

The three-volume set can be ordered for \$30 from AWWA Research Foundation, 6666 West Quincy Avenue, Denver, Colorado 80235. Telephone: (303) 94-7711 ext. 212. Make checks payable to AWWA Research Foundation. Cost includes UPS forwarding in U.S. and surface mailing overseas.

## OWRT Funded for FY 1982

A U.S. Department of Interior appropriations bill (P.L. 9788) recently signed by President Reagan includes an appropriation for the Office of Water Research and Technology (OWRT) for fiscal year 1982. After FY 1982, however, OWRT will be dissolved with its functions transferred to other Interior bureaus and agencies.

This bill also includes an appropriation to fund the new Office of Water Policy. Organizational planning for the new office is underway, and Assistant Secretary for Land and Water Resources, Garrey Caruthers, is seeking a qualified candidate to head this new agency.

## OWRT Research Program for 1982

The following seven research projects will receive funding from the Office of Water Research and Technology in fiscal year 1982 under the Annual Cooperative Program. Four continuing projects and three new projects have been funded and will be administered by the Water Resources Center.

- Reduction in Development of Blooming-Forming Blue-Green Algae by Nutrient Enrichment to Maintain Desirable Pre-Bloom Dominants, James Rosowski, Life Science.
  - Enhancement of water quality in Nebraska Farm Ponds by Control of Eutrophication Through Biomani-pulation, Gary Hergenrader, Forestry, Fisheries and Wildlife.
  - Parasite Communities as Indicator Systems for Predicting the Effects of Surface Water Management Options on the Biota of Prairie Rivers, John Janovy, Jr. Life Sciences.
  - Increased Water Conservation and Percolation Through Improved Tillage Practices, Howard Wittmuss, Ag. Engineering.
  - Analysis of Tax Incentives for Intensive Irrigation Development in the Nebraska Sandhills, Maurice Baker, Ag. Economics.
  - Mathematical Modeling of Ground Water Systems, Jerald P. Dauer, Mathematics & Statistics.
  - Investigation of Surface Water for Contamination with Pseudorabies Virus in Runoff from Pseudorabies Quarantined Nebraska Swine Production Areas, Clayton Kelling, Veterinary Science.
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## Reduced Tillage Not For All

A finding from an ongoing reduced tillage study supported in part by the Water Resources Center offers furrow irrigators either good or bad news depending on the type of soil they farm.

NU extension irrigation specialists Dean Eisenhower and Paul Fischbach, and NU extension agricultural engineer Elbert Dickey, found that reduced tillage techniques increase the rate that water can absorb, or infiltrate, into soil.

Increased infiltration will benefit some furrow irrigators, Eisenhower said.

"For example, if an irrigator has soils with low infiltration rates, and has trouble getting enough water in without excessive runoff, then reduced tillage may be a good method for increasing water intake," he explained.

On furrow irrigated soils that readily accept water, however, reduced tillage may not be beneficial. Irrigation efficiency may be decreased because the higher infiltration rates move water out of a crop's root zone more rapidly. More irrigation water may be required, Eisenhower cautioned.

"Before changing tillage practices, farmers should decide if a change in infiltration rate is desirable with their present soil and slope conditions," he recommended.

The extension specialists are comparing three reduced tillage methods (rotary till, slot plant and till plant) with conventional tillage techniques. The study is being conducted on furrow-irrigated corn plots at the university's South Central station in Clay Center. The research project will end in 1983.

Eisenhower said they have already concluded that increased crop residues on the soil surface from reduced tillage contributed to the increased infiltration rates. Residues covered 20 percent of the surface, compared to 6 percent for conventionally tilled plots.

He explained that residues protect the inter-connecting network of pores in the soil, which route water into the root zone. Residues also roughen the surface of furrows, slowing the advance of water and allowing more time for infiltration.

Research data from 1977 and 1978 showed that the infiltration rate on both conventionally tilled and reduced tilled plots was about 1.9 inches per irrigation. Data from 1981, however, revealed that the rate on reduced till plots had increased to 3.9 inches per irrigation.

"These results suggest that when tillage practices are changed, the effects on the physical and hydraulic properties of the soil and furrows may not be noticeable until several years later," Eisenhower said.

## Job Opportunities

Director, Water Resources Research Institute of The University of North Carolina, located at N. C. State University in Raleigh. Applications invited to fill vacancy August 1, 1982, or as soon as possible thereafter. Earned doctorate in engineering, life sciences, or social sciences and a record of significant accomplishment and professional stature in water resources research, education, planning, or management. For a complete job description, contact Professor David H. Howells, 124 Riddick Bldg., N. C. State University, Raleigh, N. C. 27650-5999.

## Call for Conference Papers

The American Water Resources Association will hold its 18th Annual Water Resources Conference in San Francisco on October 10-14, 1982. The conference theme is "Water—Are We Running Out?"

Both contributed and invited papers will be presented at conference. Topics include: availability of water; adequacy of data collection, storage and retrieval of water-related information; water rights, issues and problems; politics and public water policy; the changing roles of federal, state, local water agencies; increasing demands for water by agriculture, industry, energy, etc.; more efficient use of water; geographic distribution of water; and increasing costs of water.

Abstracts of 200 words or less must be submitted by March 15. Three copies should be sent, including a separate page with complete addresses and telephone numbers for each author.

Send abstracts to: Technical Program Committee Chairman, Dr. Kenneth Schmidt, Groundwater Quality Consultant, 1111 Fulton Mall, Suite 306, Fresno, California 93721.

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## WATER CURRENT

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