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Water Current

July/August 1985

DIRECTOR'S REPORT

For the first time in the past few years, there seems to be some promise of additional funding for water resources research.

One possibility is an increase in appropriations for the competitive (matching) grant category (Section 105 of P.L. 98-242). This year there was only \$2,250,000 appropriated. The new figure suggested is between \$10 and \$15 million for FY 1986. This year the U.S. Geological Survey received proposals requesting a total of about \$33 million to be funded under Section 105. Only one in 15 proposals could be funded. Hearings on the mark-up of Section 105 will be held on September 13 before the Senate Subcommittee on Appropriations for Interior and Related Agencies.

Another bill, S.904, would authorize \$300 million for water resources research and education which would be administered through a National Foundation for Water Resources. The foundation would be composed of a National Water Resources Research Center responsible for funding research, and an Information Clearinghouse responsible for technology transfer activities. This bill is still in committee yet to be marked up.

Closer to home would be the impact of S.532 now incorporated into Title III of S.366. This bill has gone through the mark-up procedure in the Senate and authorizes \$9.5 million for research and education on problems associated with the depletion of the Ogallala Aquifer. Title III of S.366 specifically amends P.L. 98-242 so that research and education would be accomplished at Institutions of Higher Education. Support for technology transfer, agricultural research and farm demonstrations are specifically mentioned.

This renewed legislative activity at the federal level is an encouraging sign of increased interest in a national water resources research program and we hope it continues.

William L. Powers
Director



NEBRASKA WATER RESOURCES CENTER

RESEARCH PROPOSALS DUE

Federal funds for water resources research will again be available to the Water Resources Center for FY 1986. The program is being administered by the U.S. Geological Survey, and the deadline for receipt of state applications in Washington will be December 31, 1985.

Research proposals for consideration under the FY 1986 program are due at the Water Resources Center no later than October 15, 1985. Fifteen copies of the proposal must be submitted, and funding should be in the range of \$10,000 to \$20,000 per year. Funding requirements state that at least one non-federal dollar must be matched for each federal dollar requested. These non-federal funds usually consist of principal investigator's time and indirect costs. These proposals will be reviewed by the Water Center's Technical Review Committee and selections will be made by November 30, 1985.

As was the case last year, the research topics outlined in the "Research Framework for Citizen Advisory Priorities" will receive priority consideration for funding. However, researchers are free to submit proposals that address a significant state or regional water problem.

Specific proposal guidelines are not yet available, but a copy of the guidelines used for FY 1985 are available from the Water Resources Center.

RAINWATER BASIN TOUR

A tour of Nebraska's Rainwater Basin is being planned during October by the Nebraska Water Resources Center. The purposes of the tour are: (1) to share knowledge and develop a common understanding of the Rainwater Basin area among researchers, policy makers and resource managers; (2) to determine what data is already available and what data still needs to be collected in order to make wise resource decisions in the area; and (3) to brainstorm about potential management alternatives and possible impacts of the alternatives.

The bus tour will include UNL researchers from the Conservation and Survey Division, Departments of Forestry, Fisheries and Wildlife, Geology, Agricultural Economics, Agronomy and Biological Sciences. Also involved will be representatives from regulating, policy development and management agencies including the U.S. Army Corps of Engineers, State Department of Environmental Control, Natural Resources Commission, Game and Parks Commission, and the U.S. Fish and Wildlife Service.

The Rainwater Basin area of Nebraska, located in south central Nebraska around Hastings and Holdrege, is valued for both its crop production capabilities and its wetland habitat for wildlife. The area, located as it is on the central flyway, is important as a resting and feeding area for migratory waterfowl. In recent years, the number of acres of wetlands has decreased, resulting in higher densities of waterfowl on the remaining basins and higher incidences of fowl cholera and other avian diseases.

Although there has been some drainage of wetlands in the area, it is not clear that this is the only reason for the disappearance of the wetlands. Nor is it clear why some drainage projects have failed to produce the expected additional cropland. The development of efficient management plans for those basins set aside as wetlands for wildlife has been difficult due to a lack of understanding about the hydrologic and ecologic systems in the basins as well as the wide diversity found among the rainbasins. Hopefully, this tour will encourage the development of management strategies based on a thorough comprehension of the systems operating in the Rainwater Basin area.

NEBRASKA WATER LEVELS RISE FOR FOURTH YEAR

For the fourth year in a row, water levels rose in more than half of Nebraska's observation wells, according to a state-federal report "Groundwater Levels in Nebraska, 1984."

Higher water levels in 1984 are a continuation of a general statewide trend since 1980-81, according to the report's authors, Darryll T. Pederson, Conservation and Survey Division, UNL, and Michael J. Ellis, U.S. Geological Survey. Compared to 1983, most water levels were less than 3 feet higher in wells, but were 4 to more than 10 feet higher in some, according to the report.

"The greatest water-level rises were in the east central and northeastern parts of the state where precipitation was above normal," the report said.

The maximum long-term decline of slightly more than 55 feet has been measured 3 miles north of Alliance in Box Butte County. "Levels mostly declined in the southwest parts of the Panhandle reflecting large irrigation withdrawals and below or near normal precipitation," according to the report.

The 31st annual Nebraska Groundwater Level report explained that declines in these areas mostly were less than 2 feet except in Box Butte, Chase, Cheyenne and Perkins counties where declines of more than 3 feet were measured.

In 1984, the number of irrigation wells installed in Nebraska (533) was about the same as in 1983, far less than the average annual number of 1,270 installed in the last five years. Seventy-four of Nebraska's 93 counties had new irrigation wells installed, and more wells were installed during 1984 than in 1983 in 30 counties. The authors said that the decrease in the number of irrigation wells installed during the 1980-1984 period compared to the mid-1970's can be explained in part by a combination of economic and climatic factors.

"Low prices for farm products coupled with the increasing costs of installing operating irrigation systems discouraged farmers from investing in new well construction," Pederson said. Normal to above-normal precipitation for Nebraska in 1978, 1979 and 1982-1984 further reduced the need for additional irrigation development.

There were 70,701 irrigation wells registered at the end of 1984 in Nebraska compared to 70,087 registered wells in 1983. These wells are the source of water used in irrigating almost 85 percent of the 7.3 million acres of irrigated land in Nebraska.

Data for the water-level measurement program were collected from observation well networks operated by 33 federal, state and local agencies and municipalities. A statewide water-level measurement program was begun in 1930 as part of a cooperative groundwater program of the U.S. Geological Survey and the UNL Conservation and Survey Division.

Copies of the new report, WSP-59, are available for \$2 from the Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska, Lincoln, NE 68588-0517. Nebraskans should add sales tax.

Pat Larsen
Public Information Specialist

ESTIMATED COSTS VARY FOR 1985 IRRIGATION

Costs will vary widely for the 1985 irrigation season according to which of the four kinds of energy is used for center-pivot or gated pipe irrigation, a UNL extension farm management specialist announced, but natural gas is the cheapest form of energy. Leslie F. Sheffield, associate professor of agricultural economics, reported there is considerable variation for estimated costs of irrigation pumping in eastern, central and western Nebraska.

For the June 1985 sample across the state, Sheffield found that for the average of 750 hours of gated pipe irrigation pumping in eastern Nebraska, the lowest cost form of energy is natural gas with an average cost of \$14.54 per acre, and the next lowest cost is for irrigators who buy diesel fuel for \$.90 per gallon with an average cost of \$19.91 per acre. Electricity at \$.07 per kilowatt-hour with an average cost of \$21.88 per acre follows in third place for irrigation costs. The fourth, or highest cost in this estimated example, is for irrigators who use propane gas at a price of \$.65 per gallon with an average cost of \$26.04 per acre.

Sheffield obtained fuel costs from various geographic locations and cited the price variation for electricity based upon the irrigation rate schedules of the 32 REA districts in Nebraska. Each REA district establishes its own rate schedule, and the rate structure for different blocks of electricity used for irrigation as well as the annual hook-up fee, or standby horsepower charge, varies from one district to another.

"Irrigators who have irrigation well and pump installations which are from 5 to 10 years old, or older, and haven't been tested for efficiency, could benefit considerably by having a pumping plant efficiency test run," Sheffield concluded. "In many cases, changes in the pumping plant or power unit may be needed to achieve an efficient pumping plant or provide the desired volume of water at the lowest possible cost."

Pat Larsen
Public Information Specialist

RESEARCH REVIEW

Project Title: *Irrigation Scheduling Procedures with Limited Water for Improved Water Use Efficiency for Corn and Soybeans*

Principal Investigator: *George E. Meyer, Assoc. Professor, Department of Agricultural Engineering, UNL*

Irrigation is absolutely essential to the growth of crops in arid and semi-arid regions such as Nebraska. Irrigation scheduling considers the various components of soil-plant-atmosphere water balance and provides a method for efficiently applying water. Particular emphasis is placed on soil water availability and plant water use rates at various times during the growing season. The process of scheduling irrigations can become a very important factor in the irrigation management process.

This project involved a 3-year irrigation scheduling study using computer control, computer simulation and field and growth chamber studies. Microprocessor hardware and software aided both field irrigation scheduling and growth chamber studies of corn and soybeans using simulated weather sequences to mimic field conditions.

Corn yields of 11,000 Kg/ha (170 bu/ac) were grown with only 22 cm of supplemental irrigation during a dry summer of 1984 with frequent well-timed irrigation events on relatively poorly drained soil at Mead, Nebraska. Irrigation scheduling of field soybeans did not significantly improve yields (3,000 Kg/ha) in any of the years, although results in plant growth chambers indicated that soybeans are very sensitive to moisture stress.

From simulation studies using physiological plant growth models, it was concluded that crop performance levels in the fields may be only at 30 to 40 percent of their physiological potential using current production systems.

JOB'S AVAILABLE

The Department of Land, Air and Water Resources at the University of California, Davis has an opening for an Assistant or Associate Professor and Assistant or Associate Hydrologist. This is an eleven-month (plus one month paid vacation) tenure track position in the College of Agriculture and Environmental Sciences (30% teaching and 70% research).

The appointee will be expected to develop a research program with emphasis on the scientific aspects of surface water hydrology; soil and water management; climatic variability; risk assessment and management; and physical, chemical and biological processes. The appointee will be required to participate in teaching undergraduate and graduate courses in surface water hydrology and computer applications in hydrology as well as assist in some team teaching in other water science courses. Supervision of graduate students, participation in university service and student advising are expected.

Qualifications include a Ph.D. in a scientific or engineering discipline applicable to quantitative analyses in hydrology and its applications. A strong background in statistics and/or computational methods is desirable. Salary is commensurate with experience within the Assistant or Associate Professor ranks at the University of California. Applications will be reviewed with the expectation that the person selected will be available for service on or before January 1, 1986.

Applicants should submit curriculum vitae; statements of interest and background in research and teaching; official undergraduate and graduate transcripts; copies of publications, reports, items in press and items submitted for publication; a summary or abstract of the Ph.D. dissertation; and names, addresses and telephone numbers of at least three references. Application deadline is SEPTEMBER 15, 1985. Applications and inquiries should be directed to: V. H. Scott, Chair, Hydrologist Search Committee, Department of Land, Air and Water Resources, Veihmeyer Hall, University of California, Davis, CA 95616. Telephone: (916) 752-0690/0453.

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CALL FOR PAPERS

The 8th Annual Rocky Mountain Regional Meeting to be held June 8-12, 1986 is soliciting papers for a Symposium on Chemical Quality of Water and the Hydrologic Cycle. The symposium will focus on the chemistry of natural waters with an emphasis on how the chemical composition/concentration is altered or modified by chemical and biological processes as water passes through the hydrologic cycle.

The deadline for receipt of proposed titles is November 1, 1985 with the deadline for abstracts, December 31, 1985. Abstract forms and information may be obtained from Robert C. Averett, Research Hydrologist, U.S. Geological Survey, Water Resources Division, Denver Federal Center, MS 418, Denver, CO 80225. Telephone: (303) 236-5021.

MEETINGS AND CONFERENCES

- September 23-25, 1985 15th Biennial Conference on Ground Water will be held in San Diego, CA. The conference theme is "Issues of Today/Strategies for Tomorrow." Preregistration fee for 3 days is \$90 and is on a first come-first served basis. For additional information, contact Water Resources Center, University of California, Davis, CA 95616. Telephone: (916) 752-1544.
- September 23-25, 1985 Annual Conference of Nebraska Association of Resources Districts to be held in Norfolk, NE. Advance registration is \$83 which includes materials, all sessions, luncheons and banquet. For additional information, contact NARD, 134 South 13th St., Suite 907, Lincoln, NE 68508.
- October 7-8, 1985 Technology Transfer Exchange Forum to be held at Michigan State University. Registration fee is \$50 plus meals. For additional information, contact Lois Wolfson, Institute of Water Research, Michigan State University, East Lansing, MI 48824. Telephone: (517) 353-3742.
- October 23-25, 1985 30th Annual Midwest Ground Water Conference to be held in St. Paul, MN. Advance registration fee is \$40. For additional information, contact Sarah P. Tuford, Midwest Ground Water Conference, Minnesota Department of Natural Resources, 500 Lafayette, Rd., St. Paul, MN 55146.
- October 29-31, 1985 Symposium on Causes and Consequences of the Transition to Dryland Agriculture to be held in Denver, CO. Registration fee is \$40. For additional information, contact the Water Resources Center, 310 Agricultural Hall, University of Nebraska, Lincoln, NE 68583.
- November 14-15, 1985 American Institute of Hydrology Workshop on "Education and Professional Development in Hydrology and Hydrogeology: Needs and Opportunities" will be held in Las Vegas, NV. For additional information, contact the Program Coordinator, American Institute of Hydrology, P.O. Box 14251, St. Paul, MN 55114. Telephone: (612) 379-1030.
- December 16-17, 1985 National Conference on Advances in Evapotranspiration, and Fifth International Symposium on Agricultural Wastes will be held in Chicago, IL. Both sponsored by the American Society of Agricultural Engineers. For additional information, contact Loretta Dibble, ASAE, 2950 Niles Road, St. Joseph, MI 40985-9659.

PUBLICATIONS

The following publications have been received 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) *Bank Stabilization, McClellan-Kerr River Navigation System*, Research Report 80-Rc, the U.S. Army Engineer Division, Southwestern, Dallas, TX, March 1980.
- (2) *Estimating Economic Development Impacts: An Alternative Approach*, Contract Report 80-C3, The Institute for Urban and Regional Studies, Washington University, August 1980.
- (3) *Economic Impact of Recreation Businesses In Counties Along The McClellan-Kerr Arkansas River Navigation System*, D. D. Badger and S. G. Cabiness, Department of Ag. Economics, Oklahoma State University, Stillwater, Oklahoma, June 1980.

WATER CURRENT

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William L. Powers Director

Karen E. Stork Editor

Address all correspondence or requests to NWRC at 310 Agricultural Hall, University of Nebraska, Lincoln, NE 68583-0710. Telephone: (402) 472-3305.

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 - (2) Estimating Economic Development Impacts: An Alternative Approach, Contract Report 80-C-3, The Institute for Urban and Regional Studies, Washington University, August 1980.
 - (3) Economic Impact of Recreation Businesses in Counties Along the McCloud-River, Arkansas River Navigation System, D. D. Sadger and S. O. Cabbiness, Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma, June 1980.