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DIRECTOR'S SUMMARY

1983 NEBRASKA WATER CONFERENCE

The preliminary program for the 1983 Nebraska Water Conference has been completed and announcements are in the mail. The conference will be held at the Nebraska Center for Continuing Education on March 8-9, 1983, with the theme *Moving Forward With Water Management.*

The program is divided into four main sessions: (1) concurrent water activity sections on legislation, ground water and agency water programs; (2) a plenary session on the Pick-Sloan Program (upper Missouri River water); (3) a futuristic look at water use efficiency and management (technology and policy); and (4) a discussion of Nebraska water issues by Senator Loran Schmit, chairman of the Public Works Committee; Senator Rex Haberman, chairman of the Agriculture and Environment Committee; and Senator Martin Kahle, a member of the Appropriations Committee. At the Tuesday luncheon, Robert Raun, Director of the State Department of Agriculture, will discuss the Ag. 2001 Program. Governor Bob Kerrey will speak at the conference luncheon on Wednesday, March 9.

The interest in the Pick-Sloan Program resulted from the 1982 Irrigation Tour into South Dakota where Governor Janklow discussed parts of the program of particular interest to his state. Dr. Garrey Carruthers, Assistant Secretary for Land and Water Resources in the U.S. Department of Interior, will be the conference keynote speaker discussing national water policy as it relates to the Pick-Sloan Program. This presentation will be followed by speakers discussing the U.S. Corps of Engineers' perspective, the Bureau of Reclamation's perspective and the upper basin states' perspective of the program.

The second plenary session of the conference will include an overview of the Institute of Agriculture and Natural Resources (IANR) water-related programs by the Vice Chancellor. This will be followed by a futuristic look at alternate crops, cropping systems and improved management practices; irrigation scheduling and on-farm distribution systems; and economic incentives for increased efficiency and management. Conjunctive use of surface and ground water as well as the state water planning policy issue study on water use efficiency will also be covered.

The conference pre-registration fee is $50, with a registration fee of $55 on the day of the conference. The public is invited to attend.

For additional information on the conference program contact the Nebraska Water Resources Center. To register for the conference, contact Mr. Curt Brandhorst, Dept. of Conferences and Institutes, 205 Nebraska Center, University of Nebraska, Lincoln, NE 68583-0900.

KREMER LECTURE SERIES

The Institute of Agriculture and Natural Resources (IANR) of the University of Nebraska-Lincoln has instituted the Maurice A. Kremer Lecture Series on Water Resources. This campus lecture series will involve two sessions each year—one in the spring and one in the fall—on current or future water resources issues affecting the State of Nebraska.

As an inaugural function, January 26, 1983 was designated as the first in this lecture series and featured Senator Maurice A. Kremer at a press conference, noon luncheon, and lecture to the public on the topic "An Overview of Nebraska Water Laws and Issues." Senator Kremer discussed some of the water problems in the state such as increasing demand for Nebraska's water supply, conflicts between the western states for water, money for water development, water for energy, and groundwater depletions in certain areas of the state. He noted that:

> *"the irrigator or any user of water has somewhat eased his conscience in his refusal to adhere to water conservation by a myth which has too long existed—the myth of an inexhaustible supply, a belief that ground water in our state flowed underground from distant sources or from a giant river flowing beneath us and could not be exhausted by excessive use...Many Nebraskans are having a hard time facing up to the fact that there is a rather critical need for some practical and perhaps some drastic water conservation measures."*

Senator Kremer went on to discuss previous water legislation in Nebraska, i.e., Nebraska Water Milestones. He then listed the following water issues which need to be addressed by the legislature and state agencies: (1) In-stream Flow: recognition and preservation of flows for ground water recharge, fish and wildlife enhancement, recreation, instream uses; (2) Ground Water Reservoir Management: recognition of the hydrologic connection between ground and surface water, issues related to funding, ownership and use of artificial recharge, preservation of wet meadows, and high water tables in the face of rapid irrigation development in the Sandhills area; (3) Surface Water Storage: need for ambitious funding mechanism on the state level, fair and equitable reimbursement for those affected by the building of water storage facilities; (4) Interstate Water Uses and Conflicts: compacts between states, strengthening the interstate ground water transfer statute; and (5) Water Use Efficiency: agriculture and irrigation, municipal and industrial, and elecrical generation.

The purpose of the Kremer Lecture Series is to provide a forum to increase awareness of current and future water issues and for discussion of alternatives aimed at the wise management of one of Nebraska's most valuable resources. Future lectures will feature well-known state and national water resources experts, and the exact format of the lecture series day-long agenda will be tailored to the experience and interests of the featured speaker.

A committee of not more than seven will coordinate the lecture series activities. The committee will consist of: (1) undergraduate student representing Alpha Zeta; (2) graduate student representing Gamma Sigma Delta; (3) Dean, College of Agriculture; (4) Director, Conservation & Survey Division, IANR; and (5) Director, Water Resources Center, IANR. The remaining two chairs will be filled by faculty invited by the Vice Chancellor of IANR to serve two-year terms. Senator Kremer will serve in an advisory capacity to the committee.

The title of the lecture series was selected to honor a Nebraska leader in water resources conservation and management. Often called *Mr. Water* of Nebraska, Senator Kremer for many years has been in the forefront of water resources planning for Nebraska. Elected to the State Legislature in 1962, he served as Chairman of the Legislature's Public Works Committee from 1973 until his retirement in 1982. Senator Kremer was instrumental in initiating the water planning process in Nebraska, the Groundwater Management Act, LB 577, and in the creation of the Natural Resources Districts. His long-standing support of education is evidenced by his key role in promoting the bills which created the Area Community Colleges and the Institute of Agriculture and Natural Resources.

HAMON SPEAKS AT SEMINAR

Carroll Hamon, Executive Director of the Missouri Basin States Association (MBSA) spoke at the first in a series of Water Resources Seminars scheduled for Wednesday afternoons at 3:00 p.m. at the UNL East Campus Union. The theme for the seminar series is *Water Law and Policy in the Great Plains—Implications for Nebraska.*

Hamon provided an overview on the hydrology of the Missouri River Basin and discussed some projects of the MBSA. In discussing interstate conflicts over the allocation of Missouri River water, he noted that Missouri Congressman Robert Young had recently introduced a bill in Congress which would create a Missouri River Interstate Compact Commission to develop comprehensive policies on release, storage and diversion of water in the Missouri basin. Hamon said that in its present form, MBSA is not set up to allocate or oversee the distribution of allocated Missouri River water.

The Association is currently involved in a study of out-of-basin water transfers under three possible different combinations: (1) transfer of water from one basin to another intrastate (within the same state); (2) transfer of water from one state to another but within the same basin; and (3) transfer of water from one basin to another and also from one state to another. Preliminary findings indicate that there is no evidence of water being transferred from one basin to another and from one state to another (interbasin, interstate). Hamon noted that information collected by the study would be presented to the MBSA Board of Directors shortly. He hopes that this might lead to development of a basin-wide policy on proposals for interbasin interstate transfer of water.

For information on future water resources seminar topics and speakers, contact the Nebraska Water Resources Center.

WATER BILLS INTRODUCED

Of the 600 bills introduced in the Nebraska Legislature this year, several, as expected, focus on water resources development and conservation. Although some are considered to be "housekeeping" matters, others could have far-reaching ramifications. For example, Legislative Bill (LB) 198 would recognize the replenishment of Nebraska's underground water supplies as a beneficial use of surface water, and would also allow irrigation and reclamation districts to charge for water that seeped into the ground from surface water projects. The bill would also allow underground water recharge to be counted as an economic benefit to the state. As reported by the *Omaha World Herald*, Senator Loran Schmit, co-introducer of LB 198, said that the proposed legislation "could be a very major water bill this session."

A few bills are directed toward improving water quality. Provisions in LB 458 would set minimum standards for irrigation, domestic and industrial wells to protect water quality. This bill was based on Natural Resources Commission recommendations from a State Water Planning and Review Process report on water quality published in 1980. Another bill, LB 426, was introduced to tighten control over nitrate pollution and would require the Nebraska Department of Environmental Control to take action to halt pollution in areas where nitrate levels equal or exceed 14 parts per million.

Other bills focus on conserving Nebraska's groundwater supply. Under LB 431, Natural Resources Districts (NRD's) would be allowed to adopt underground allocations for family farm and ranch corporations that differ from those adopted for other types of corporations. In LB 379, NRD's would be required to establish underground water allocations not greater than those required by "best management practices", if water levels in any underground water reservoir in a control area declined by at least 2.5 percent of the saturated thickness in the past five years. The bill would define "best management practices" to include those agricultural methods allowing crops to be raised with the least amount of underground water practicable, varying with the crop, weather conditions and geographic area.

As in previous years, the Nebraska Water Resources Center maintains a file of all bills dealing with water resources and related issues. The file includes a "first reading" copy of each bill, pertinent newspaper articles, and newsletters, including those prepared by the Legislative Research Council, Nebraska Natural Resources Commission, and J. David Aiken, UNL Water Law Specialist. The status of each bill (i.e., stage in the legislative process) is monitored weekly. In addition, "slip law" copies of bills that are passed into law are obtained and filed.

This file of water-related bills is located in the Water Center's main office (310 Ag Hall, UNL, East Campus) and is available during regular business hours. In the past, UNL students, faculty and staff have made extensive use of this file. We welcome suggestions on how we can improve its accessibility.

Robert E. Burns, Water Resources Planner

MISSOURI BASIN PLANNING SEMINAR

Representatives from the Nebraska Water Resources Center and the Natural Resources Commission recently attended a two-day seminar in Denver January 20-21. The informal meeting sponsored by the Missouri Basin States Association (MBSA) was designed as a sharing and learning experience to bring together individuals involved in water resources planning in each of the ten Missouri River basin states. Representatives from eight of the ten states were in attendence for presentations and discussions of the various states' water planning activities.

Well-known water resources planner and consulting engineer, Harvey Banks presented the opening address entitled *Evolution of Water Resources Planning in the U.S.* A presentation by each state was followed by a question and answer session enabling the planners to share ideas, experiences and successes or difficulties encountered in the planning process. Staff members of the Missouri Basin States Association provided an up-date on information and data available in their files for use by the states. Presentations will be compiled into a published summary of seminar proceedings.

ENERGY CONSERVATION IN IRRIGATION

Reduced low-pressure center-pivot irrigation systems can use one-third less energy than their high-pressure counterparts, but may also increase irrigation water runoff and soil erosion unless they are properly sited and managed, NWRC researchers have concluded in a four-year study.

Reduced low-pressure center-pivots increase the rate that irrigation water is applied to the soil, explained James R. Gilley, the UNL Agricultural Engineering professor in charge of the study. The greater application rate increases the potential for irrigation runoff and the erosion it causes. Also participating in the NWRC research project were Lloyd Mielke and Wallace Wilhelm of the U.S. Department of Agriculture. They are stationed with the USDA's Agricultural Research Service at UNL.

A center-pivot operated at a pressure of 40 pounds per square inch (psi), compared to 80 psi for a high-pressure system can save about one gallon of diesel fuel for each acre-inch of water supplied to the crop, the scientists said. With the same pressure reduction, savings of 11.7 kilowatt hours for electric pumps, 1.5 gallons for propane powered pumps and 160 cubic feet for pumps using natural gas could be realized for each acre-inch of water pumped. The figures assume that irrigation efficiency has not been reduced in switching from a high-pressure to low-pressure system.

An acre-inch of water is enough to cover an acre one inch deep. In Nebraska, corn requires between 8 and 16 inches of irrigation water each growing season, depending upon climatic variability and location in the state.

Although reduced pressure center-pivots offer substantial energy savings, the potential increase in irrigation runoff may pose an erosion hazard, especially on fine-textured soils with large slopes, the scientists noted in a NWRC project report. Increasing amounts of runoff could lower irrigation efficiency to the point where energy savings from a low-pressure system are nullified, they cautioned. The amount of runoff from a low-pressure center-pivot depends on many factors, including the infiltration characteristics of the soil, application rate of the pivot system and tillage practices.

In their research on three percent slopes at UNL's field laboratory near Mead, NE, the scientists found that more runoff generally occurred on plots of corn irrigated by a low-pressure center-pivot equipped with spray nozzles. A low-pressure system with impact sprinklers and a high-pressure system with impact sprinklers were also evaluated.

The scientists also observed that more sediment-laden runoff occurred from plots that had been disced twice before planting and irrigated by the low-pressure pivot with spray nozzles. In one trial, 29 percent of the irrigation water became runoff, but most other measurements were less than 10 percent. The greatest sediment loss from these plots was 130 pounds per acre, which was not excessive, the scientists said. The largest loss of nitrogen from the plots was less then one pound per acre.

Runoff of two percent or less was measured from plots that were chiseled after planting to increase infiltration of irrigation from the low-pressure system with spray nozzles. Runoff rates of between 3 and 12 percent of the irrigation water were observed on plots that had been till-planted, an increasingly popular conservation tillage technique.

In another part of the study, the scientists developed charts to help irrigators select appropriate sites for low-pressure center pivots. The charts take into account soil intake rates, pumping lifts, operating pressures and percent slope.

Copies of the scientists' final report entitled *Water and Energy Conservation Using Center-Pivot Irrigation and Reduced Tillage Systems* are available from the Nebraska Water Resources Center.

Dan Himsworth
Former NWRC Information Specialist

WATER AND SOIL CONSERVATION NEEDED

In a recently released report the U.S. Soil Conservation Service (SCS) estimated that 55 percent (about 27.4 million acres) of Nebraska's 49.5 million acres of land still need soil and water conservation treatment to conserve underground water and rainfall and to decrease erosion.

An estimated 206.9 million tons of soil is eroded annually from all land uses in Nebraska, the report noted. If this soil depletion continues at the same rate, the loss of value of production would be $138.9 million. It is estimated that $861 million would be needed for "total on-farm conservation treatment." An annual investment of $43 million is necessary to treat only 75 percent of that land over the next 20 years.

Governor Bob Kerrey will recommend $1.4 million in the FY 1984 annual budget for the Nebraska Soil and Water Conservation Fund. This represents a $400,000 increase over the current year, but is still far less than what the Governor acknowledges is needed.

Kerrey noted that landowners contribute half the cost of land treatment. This means that federal, state and local sources would have to come up with $21.5 million a year. These sources currently contribute about $7.5 million annually. Therefore an additional $14 million annually is needed.

The report said that 6.7 million acres of cropland need soil moisture conservation practices, including residue management or channel terraces. The major resource problems mentioned by the report are cropland erosion, rangeland conservation, irrigation water conservation and soil moisture conservation.

FEDERAL WATER RESEARCH FUNDS

Congress recently approved an appropriations bill for the U.S. Department of Interior (P.L. 97-394) which includes $6.35 million for "expenses necessary in carrying out the provisions of the Water Research Development Act of 1978...for continued operation of state water resources research institutes."

Dr. Thomas G. Bahr, Director of the Office of Water Policy in the Interior Department, noted that his office is currently involved in an in-depth assessment of the water research program (formerly called the Annual Cooperative Program in the now defunct Office of Water Research and Technology) in order to improve its overall effectiveness. Bahr said that the state institutes would receive further information on these funds probably within the next month.

In addition, a $5 million research program was approved to be administered by the Bureau of Reclamation which would include both saline water research and a research program similar to the old "focused" research program of OWRT. The Bureau is currently working to put together a plan for the expenditure of these funds. Application for these funds can be made through the NWRC when they become available.

PUBLICATIONS RECEIVED BY NWRC

As a new feature of *Water Current,* each issue will contain a listing of new publications received by the Nebraska Water Resources Center. These publications received by the Center are forwarded to C.Y. Thompson Library on UNL's East Campus for cataloging and placing in the University library system. 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) *Hydrilla Management in North Carolina,* Proceedings of a Workshop, edited by A. Witzig, J. Heimerman and B. Partington, May 4, 1982, Water Resources Research Inst., North Carolina State Univ., 124 Riddick Bldg., Raleigh, NC 27607.

(2) *Water Quality Monitoring Strategy for the Ohio River and Lower Reaches of Major Tributaries,* Ohio River Valley Water Sanitation Commission, June 1982.

(3) *Montana State University Report on Research 1981,* Montana State University, Joint Water Resources Research Center, 207 Bozeman Hall, Bozeman, MT 59717.

(4) *Evaporation Atlas for the Contiguous 48 United States,* R.K. Farnsworth, E.S. Thompson and E.L. Peck, NOAA Technical Report NWS 33, June 1982, Office of Hydrology, National Weather Service, Washington, D.C.

(5) *Water Research in Australia: New Directions,* Dept. of National Development & Energy, Water Mgmt. Series No. 1, Australian Water Resources Council.

(6) *Guidelines for the Use of Reclaimed Water for Aquifer Recharge,* Dept. of National Development & Energy, Water Mgmt. Series No. 2, Australian Water Resources Council.

(7) *Proceedings of the Floodplain Management Conference,* Conference Series No. 4, Australian Water Resources Council.

(8) *Proceedings of the Workshop on Spillway Design,* Conference Series No. 6, Australian Water Resources Council.

(9) *Eighteenth Annual Report, Water Resources Research Center,* University of Minnesota, 866 Biological Sciences Center, St. Paul, MN 55108.

(10) *Water Research Publications at Oklahoma State University,* Oklahoma Water Resources Research Inst., Oklahoma State Univ., 203 Whitehurst Hall, Stillwater, OK 74078.

(11) *Eighteenth Annual Report for Fiscal Year 1982,* Purdue Univ. Water Resources Research Center, West Lafayette, IN 47907.

(12) *Cluster Model for Flood Peak Analysis: Application to Lower Ohio River Basin,* J.E. Cervantes, M.L. Kavvas, J.W. Delleur, December 1982, Water Resources Research Center, Purdue Univ., West Lafayette, IN 47907.

(13) *Optimal Real-time Reservoir Systems Operation: Innovative Objectives and Implementation Problems,* E.K. Can, M.H. Houck, G.H. Toebes, November 1982, Water Resources Research Center, Purdue Univ., West Lafayette, IN 47907.

(14) *The Development of Phytoplankton Populations and Nutrients in a Tidal River Under Drought Conditions,* M. Foote and R.E. Loveland, Dept. of Zoology, September 1982, Center for Coastal and Environmental Studies, Rutgers-the State Univ., Doolittle Hall, Busch Campus, New Brunswick, NJ 08903.

(15) *The Role of Water Resources in the Location of South Carolina Industry,* Project A-039-SC Completion Report, B.L. Dillman and J.S. Lytle, Dept. of Agricultural Economics and Rural Sociology, Clemson University, Clemson, SC 29631.

(16) *Terraced Pasture for Disposal of Dairy Yard Runoff,* Project A-045-SC Completion Report, R.O. Hegg, C.L. Barth, V.L. Quisenberry and W.H. Livingston, Dept. of Agricultural Engineering, Clemson University, Clemson, SC 29631.

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