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# Water Current

Water Center

University of Nebraska

July 1989

## Calumus Dam and Sandhills Ranches on Annual Tour

The 1989 annual Nebraska Water Resources and Irrigation Tour promises to be one of the most diversified, educational and unique tours, according to the planning committee. Seeing Calumus Dam and Reservoir and potato production and storage facilities are included in the 3-day trip to the Sandhills.

For canoe enthusiasts, an option for a Niobrara River Canoe trip with box lunch will be featured.

"The first day of the tour, Aug. 2 through 4, will include visits to the Upper Big Blue Natural Resources District (NRD) at York and a groundwater recharge site," Les Sheffield, tour director, said. Sheffield, University of Nebraska extension farm management specialist, said that a groundwater recharge study and nitrogen management demonstration will also be explained in this area.

Central Platte NRD officials will explain the proposed Prairie Bend Project and north of Shelton an irrigation and nitrogen management study will be explained by Jim Schepers, UNL agronomist. Before visiting a quarter horse ranch and Calumus Dam and Reservoir, the Davis Creek Dam, now under construction, will be a stop.

Long Pine State Park will be the site of a noon luncheon on the second day and a representative of the Nebraska Game and Parks Commission, Bassett, will explain its application for a water right on Long Pine Creek.

After a visit to Fort Niobrara National Wildlife Refuge, a stop at the Line Trout Farm will show fish-farming operations. Rainbow trout are marketed to the Denver area from this farm, Sheffield said.

A discussion about range management and wet meadows for

haying will be featured at a Brownlee ranch. The role of irrigation to provide additional grazing will be discussed as will alfalfa for winter protein supplement.

A brief drive through Nebraska National Forest with a lunch stop at the Nebraska State 4-H Camp at Halsey concludes the tour.

Sheffield said that tour participants will be picked up at Lincoln, York, Grand Island and Aurora by air-conditioned buses.

"Annual irrigation tours usually fill up fast," Sheffield said, "and this year's probably will, too, with the Sandhills featured." Call Sheffield at 402-472-1773 for more information.

Tours are co-sponsored by the Nebraska Water Conference Council, Vincent Dreeszen, chair; and the UNL Institute of Agriculture and Natural Resources. The Water Conference Council is composed of about 90 groups interested in Nebraska water.

*(Continued on page 4)*



**Calumus Reservoir and recreation area**

*(Nebraska Game and Parks Commission photos.)*



## Congress Passes bill For Centers' Reauthorization

By a roll call vote of 336 to 74 June 6, 1989, the U.S. House of Representatives passed HR 1101 to extend authorization of the Water Resources Research Act of 1984 through the end of fiscal year 1993. The bill is now in the Senate Environment and Public Works Committee.

Roger Gold, Nebraska Water Center director, said this important legislation will continue the work of the 54 water research institutes and centers in the U.S.

*'Research in the centers has dealt*

*(Continued on page 4)*

## S.P.A.s

**See page 4 article on  
Special Protection Areas  
that calls for management  
plans.**



## Aquifer Preservation Goal of Council

Over five million acres of agricultural land would revert to dryland production by 2020 unless current policies concerning Ogallala aquifer use are changed, according to a Nebraska representative to the High Plains Study Council.

Ray Supalla, University of Nebraska agricultural economist, said although PL 99-662 was passed by Congress in 1986 for the Ogallala Aquifer Research and Demonstration Program, the program was allocated no funds for the eight-state research program. States are Nebraska, New Mexico, Texas, Oklahoma, Kansas, Colorado, Wyoming and South Dakota.

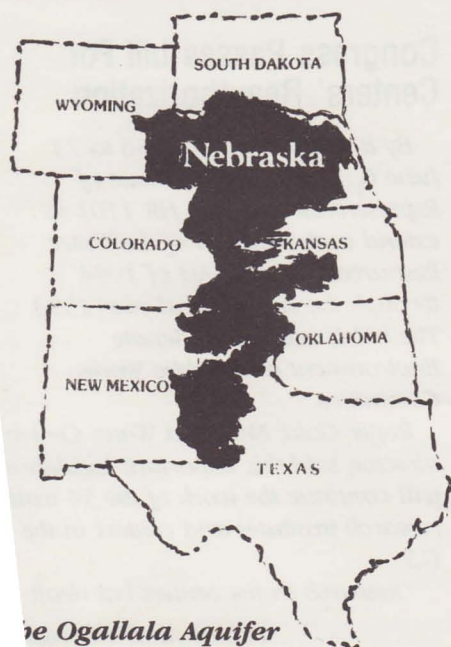
This research program provides that each of the eight states overlying the aquifer would receive funds for research and demonstration projects to extend the life of the aquifer.

"The Ogallala is being mined at about 21 million acre-feet per year," Supalla said, "this is much more than can be sustained over a long period of time."

During drought, the High Plains region provides over 15 percent of the nation's wheat, corn, sorghum and cotton and 38 percent of the nation's livestock.

Some of Nebraska's plans for Research and Demonstration Programs if this proposal is funded include:

*1. Sponsor research and demonstration programs to encourage optimal irrigation management under water limiting conditions.*



*2. Develop new irrigation technologies for improved irrigation efficiency and water quality protection.*

*3. Develop water conserving crop varieties.*

*4. Analyze economic and environmental impact from water policy alternatives.*

*5. Evaluate aquifer recharge programs.*

*6. Develop improved drought management programs.*

*7. Improve the data base needed for effective groundwater management.*

"The Ogallala-High Plains Region is a major buffer during drought because of its large irrigated acreage," Supalla said, "this region has over 14 million irrigated acres with water supplied by over 70,000 irrigation wells."

## Water Policy Forum To Be Oct. 3

A day-long University Water Policy Forum will be held Oct. 3 at the Ak-Sar-Ben Aquarium, south of Gretna on the Platte River.

Roger Gold, Water Center director, said the program will consist of brief oral and written presentations by University of Nebraska departments on their water-related activities—research, teaching and extension.

Small group discussions will be held at the noon lunch to propose future University water-related activities.

"This will be an excellent opportunity to learn and express opinions about how the University is involved, and should be involved, in water-related activities," Gold said.

Particularly beneficial, Gold said, will be proceedings of the Policy Forum.

Registration forms will be distributed in August. However, departments were urged to return their presentation commitment forms to the Water Center by July 1.

## Research Funds Available in 10-State Consortium

Proposals are due Aug. 15 at the Hazardous Substance Research Center at Kansas State University for research to begin Feb. 22, 1990. The Center is conducting hazardous substance research in support of agriculture, including forestry, mining mineral processing and "activities that support these industries."

The Center serves a 10-state area in Environmental Protection Agency (EPA) Regions 7 and 8. The states in the area include Nebraska, Colorado, Iowa, Kansas, Missouri, Montana, North and South Dakota, Utah and Wyoming.

The three-year budget is \$5,362,358 with \$3 million from EPA. Ninety percent of the funds will support projects at consortium member institutions.

Second year's project funding will be used for continuation of projects began in 1989 with some new projects funded.

In EPA Regions 7 and 8, research to solve the following problems is listed by priority:

1. Soil and water contamination by heavy metals such as cadmium, chromium, copper, lead and zinc associated with mining wastes and other industrial activities.
2. Groundwater contamination from the following sources:  
—Wood preservatives including pentachlorophenol and creosote

*(Continued on page 5)*

**July 1989**

### Water Center

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# Nebraska Rainwater Basins Targeted For Plan

Rainwater Basins in south central Nebraska provide a significant contribution to continental waterfowl populations. Their inclusion in the North American Waterfowl Management Plan (NAWMP) established by a Rainwater Basin Joint Venture would help develop strategies to meet conservation objectives, according to the director of the Nebraska Game and Parks Commission.

"In accord with that recognition, the U.S. Fish and Wildlife Service, Ducks Unlimited and the Nebraska Game and Parks Commission are developing a Concept Plan for Nebraska's Rainwater Basins under guidelines of NAWMP," Rex Amack, director of the Commission, said.

He said this is the first step for including the Rainwater Basins as a formal joint venture within the concept plan. NAWMP is a cooperative initiative by the U.S. and Canada to restore waterfowl populations. It is the first international effort that identifies objectives for this purpose, Amack said.

"Our goal is to submit the concept

plan to NAWMP in February, 1990, for official Rainwater Basin Joint Venture status," Amack said.

He said that the NAWMP can be the beginning of a conservation success story if the plans of the U.S. and Canadian wildlife biologists are carried out and if everyone who cares about waterfowl "pitches in to make the plan work."

The NAWMP provides a framework for waterfowl management and conservation through the year 2000 and:

- Sets goals for duck, goose and swan populations;
- Identifies habitat conservation needs in specific regions; and
- Recommends measures for resolving problems of international concern.

"Loss of habitat is the most serious threat facing North America's waterfowl," Amack said. Each year, nearly half a million acres of wetlands are destroyed that provide breeding, migrating and wintering areas for waterfowl." The NAWMP would ensure preservation of this habitat, he said.

## Concluding and New Research Funded

From June 1, 1988 to May 31, 1989, the following research was funded at the Water Center through the Water Resources Research Act of 1984 (USGS 104):

*Groundwater Contamination Control: Monitoring and Design*, by Istvan Bogardi;

*The Bacteroides fragilis Group and Their Bacteriophages as Alternate Indicators of Human Fecal Pollution of Surface Waters*, by S. James Booth;

*Application of Expert-Systems Technology to the DRASTIC Groundwater-Vulnerability Model*, by Donald C. Rundquist;

*Development of a Decision Support System to Aid Decision Makers Evaluation Groundwater Transfer*, by Istvan Bogardi;

*Reducing Nitrate-N Losses to Groundwater by Improving Field Sampling Accuracy of Nitrate-N*, by Gary W. Hergert;

*Retention of Toxic Organics as Related to Soil Series and Soil*

*Mapping Unit*, by Dennis L. McCallister;

*Development and Evaluation of Improved Methods of Measuring Chemical Leaching*, by Derrel L. Martin and James R. Gilley.

Funding for June 1, 1989 to May 31, 1990 is for the following projects:

*Groundwater Contamination Control: Monitoring and Design*, by Istvan Bogardi, (continuation);

*The Relation of Pore Size Distribution to the Redistribution of Agrichemicals in the Soil Profile*, by William L. Powers;

*A Non-Weighing Lysimeter Technique for Quantifying Year-Around Leaching Losses in Structured Soil*, by Norman Klocke and Gary Hergert;

*Laboratory Evaluation of In-situ Bio-Denitrification for Nitrate Reduction*, by Mohamed Dahab; and *Surge Irrigation and Furrow Packing for Improving Surface Irrigation Efficiency*, by C. Dean Yonts and Dean Eisenhauer.

## Calendar

- July 30- Aug. 2** *Making Conservation Happen Together: 44th Annual Meeting, Edmonton, Alberta, Canada. Sponsored by the Soil and Water Conservation Society, Ankeny, IA. Phone: 515-289-2331.*
- Aug. 2-4** *Annual Nebraska Water Resources and Irrigation Tour to the Sandhills. Phone: 402-472-1773.*
- Aug. 4-5** *Water Resources Management seminar, Salt Lake City, Utah, sponsored by the Honor Society of Phi Kappa Phi. Phone: 517-355-4649.*
- Aug. 8-11** *Facing the Water Problems of the Nineties, Universities Council on Water Resources, at University of Minnesota, St. Paul. Phone: 612-624-9282.*
- Aug. 14-18** *The Princeton Course: Groundwater Pollution and Hydrology, Princeton, N.J. Phone: 609-243-9399.*
- Aug. 15-16** *Leaking Underground Storage Tank Workshop: Corrective Action Alternatives, Atlanta, Ga., Georgia Institute of Technology. Phone: 404-894-2400.*
- Sept. 12-14** *Fourth Annual Hazardous Waste and Hazardous Materials Conference. Cincinnati Convention Center, Cincinnati, Ohio. Sponsored by Institute for International Research, Bellevue, WA. Phone: 206-746-4173.*
- Oct. 3** *University of Nebraska Water-Related Faculty Water Policy Forum. Phone: 402-472-3305.*
- Nov. 1** *Abstracts due for consideration for Colorado Groundwater Engineering and Management Conference, Denver, Feb. 26-27. Phone: 303-491-6308.*



# DEC Holds Two Special Protection Area Hearings

J. David Aiken  
UNL Water & Agricultural  
Law Specialist

Nitrate is the most widespread known ground water contaminant in Nebraska. Sixty five rural community water systems are near or have exceeded the 10 part per million (ppm) drinking water limit for nitrate, nearly 10 percent of all Nebraska communities. Special ground water quality protection area (SPA) legislation, enacted in 1986, gives natural resources districts (NRDs) authority to manage agricultural fertilizer and pesticide use to control and/or prevent ground water pollution.

SPAs may be designated by the Nebraska Department of Environmental Control (DEC) to prevent or control "nonpoint" ground water pollution from agrichemical use. If DEC designates an SPA, the local NRD must prepare an action plan to manage pesticide and/or fertilizer use to control or prevent pollution. Management plans may include requiring agrichemical-use best management practices to minimize agrichemical use and ground water pollution.

The first step in the SPA designation process is a DEC study to determine whether ground water supplies are polluted or likely to become polluted, and to determine the pollution source. The source could be a point source, a nonpoint source or both. Point sources of ground water pollution include:

- feedlot or animal wastes,
- septic tanks and leaky sewer lines,
- leaky fertilizer or pesticide tanks, and
- fertilizer or pesticide spills.

Nonpoint pollution sources include pesticide and fertilizer use. If the pollution source is a point source, DEC may pursue ground water cleanup. If the pollution source is nonpoint, DEC may designate an SPA after a public hearing if DEC concludes that SPA designation is warranted.

In March 1989 DEC issued its first three SPA studies, in which DEC recommended two SPA designations.

The study areas are:

- the Fremont area in southern Dodge County,
- the Superior area in southern Nuckolls County, and
- the DeWitt area in southeast Saline, northwest Jefferson and northeast Gage Counties.

The Beatrice wellfield is located within the DeWitt study area.

The three SPA studies found nitrate contamination in all three areas, but concluded that significant nonpoint pollution occurred only in the Superior and DeWitt areas. High nitrate levels found in the Fremont area were assumed (but not demonstrated) to be the result of point sources of pollution (animal wastes, fertilizer leaks or spills, etc.), rather than nonpoint pollution (fertilizer use). However, specific point pollution sources causing the high nitrate readings were not identified in the report. The studies recommended SPA designation for portions of the DeWitt and Superior areas, but not for the Fremont area. The Superior SPA designation hearing was held July 11 and the DeWitt SPA designation hearing held July 13.

If DEC designates an SPA, the local NRD will have 180 days to prepare an action plan to reduce ground water pollution. Elements of a SPA management plan may include:

- training programs in proper agrichemical use;
- voluntary irrigation and agrichemical scheduling to insure that irrigation water and chemicals are applied only when needed and only in the amounts needed;
- requiring that nitrate already available in soil and irrigation water be recognized in making fertilizer application decisions;
- prohibiting fall fertilization for spring-planted crops;
- requiring the use of nitrogen inhibitors;
- establishing mandatory agrichemical BMPs, such as irrigation and agrichemical application scheduling; and
- limiting the amount of specific fertilizers and pesticides applied.

## Calumus Dam (Continued from page 1)

Other tour planners include J. Michael Jess, tour chairman, Ann Bleed, Nebraska Department of Water Resources, and Sheffield.

## Congress (Continued from page 1)

*with a wide variety of water-related issues in the past 25 years," Gold said, "and the centers also provide assistance to train scientists and engineers who enter water resources research and management." Since 1964 about 40,000 students nationally have received aid from institutes. This has increased the number of qualified persons in water-related professions, he said.*

*However, Gold pointed out that Congress's passage of HR 1101 was for reauthorization of the water centers and not an appropriation bill. Besides, the Senate must pass the bill also.*

*Current authorization for water institutes/centers expires September, 1989.*

An NRD **cannot** prohibit fertilizer or pesticide use in an SPA.

The only fertilizer-use restrictions in Nebraska are in the Central Platte ground water management area, where fall application of fertilizer on sandy soils is prohibited. In the high-nitrate areas of the management area, preplant fertilizer must be applied with an approved inhibitor if more than half the fertilizer is applied preplant.

Fertilizer may be applied after Nov. 1 on heavy soils only with an approved inhibitor. Farmers in high-nitrate areas must receive irrigation scheduling and fertilizer scheduling training, must test irrigation water and soil for nitrogen content and are encouraged to take nitrogen already available in irrigation water and in the soil in making fertilizer management decisions.

These fertilizer-use BMPs reduce leaching and save irrigators money on fertilizer.



## Survey Shows Nebraska In Lower Ranking

Nebraska's investment in water resource projects shows that it is in the bottom five percent of 28 states surveyed, according to Dayle Williamson, Nebraska natural resources director.

This 28-state survey for fiscal years 1985, 1986 and 1987 was conducted by the Interstate Conference of Water Policy (ICWP) in 1988 to determine state funding for agricultural water, hydropower, dam safety, flood control, industrial water supply, streambank protection, urban drainage and water quality projects.

During those three years, Nebraska spent \$2.1 million compared with Ohio that spent \$309 million. Williamson, Nebraska's ICWP representative, and chairman of the ICWP Groundwater Task Force, reported expenditures per state for water resource projects construction in the 3 years was \$73.8 million and the combined 28-state expenditure

was \$2.07 billion in state funds.

Water quality projects investment was \$1.2 billion and \$857 million was allotted to water quantity projects. However, the local government funding, particularly by NRD's, was not included, nor did the survey request identification of the amount of federal funds allotted by project type.

States identified the amount of state funds for projects that also used federal funding and projects with only state funds in this survey.

Respondents felt that stronger federal legislation is needed in specific areas such as technical assistance, research and development and funding assistance for existing programs. Some states, however, want less federal legislation, feeling that individual states should legislate.

"This presents somewhat of a dilemma for Congress if the states that should be doing it don't," Williamson said.

## U.S. Geological Survey Celebrates 100th Anniversary

*The 100th anniversary of the U.S. Geological Survey's program of measuring flows of the nation's rivers and streams is celebrated this year. Measurement began at Embudo, N. M., a small community on the Rio Grande River.*

*The USGS has established a national network of more than 50,000 monitoring stations to monitor the quality and quantity of the nation's surface and ground water since Embudo.*

*Embudo was chosen as the first gauging station because of concern about downstream water needs for irrigation and because it had access to a railroad. The first engineers there began the station and were hydrologists-in-training. These trainees learned the basics of stream gauging and established stations at other sites.*

*"For the nation," U.S. Interior Secretary Manuel Lujan, Jr., said, "the establishment of the Embudo station marked the beginning of a century of dedicated efforts to monitor water resources. The work that began there was a giant step forward for the USGS and for the United States in developing the earth-science research and data-collection programs.*

*Water data collected by the USGS are available to all interested parties—from decision makers at the state, local and federal levels to concerned citizens who want to know more about the water resources of their areas. Public interest groups, universities, consultants, students and water-management groups use USGS water data.*

## Research

*(Continued from page 2)*

—Polynuclear aromatic hydrocarbons

—Carbon tetrachloride

—Trichloroethylene

—Vinyl chloride and other chlorinated aliphatic hydrocarbons

—Polychlorinated biphenyls (PCBs) and

—Dioxin

Also included are numerous pesticides.

3. Development of incineration, biodegradation and immobilization technology.

4. Development of improved methods for analysis of contaminated soil.

5. Hazardous waste minimization.

6. Hazardous substance release to the atmosphere at waste sites.

7. Determination of the safe concentration levels of hazardous substances in soils and water.

Interested water-related faculty should call the Water Center, 402-472-3305, for more information, or write Larry E. Erickson, Department of Chemical Engineering, Kansas State University, Durland Hall, Manhattan, KS 66506, phone 913-532-5584.

### **Clean Lakes Program Grant to Lower Elkhorn Natural Resources District**

The water quality of Willow Creek Reservoir and Maskenthine Reservoir will be studied through a \$83,000 grant approved by the Environmental Protection Agency. This grant was awarded the Lower Elkhorn Natural Resources District through the National Clean Lakes Program which is concerned with surface water quality problems.

The two-year grant and one received by the Lower Platte South NRD are the first to be awarded in Nebraska through the Clean Lakes Program.

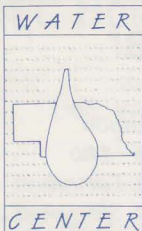
Silt, ag chemicals and livestock contamination will be the major focus of the study. These contamination sources may result in high turbidity.

Twenty-five interested citizens belong to an advisory group that guides the study and will make recommendations to improve the water quality at both lakes when the study is completed.

A search for professionals to conduct the study is underway, according to the Lower Elkhorn NRD.

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