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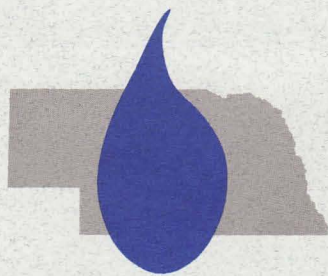
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Water Current

University of Nebraska Water Center/Environmental Programs

Vol. 26 No. 2
April 1994

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Kremer Lecture

Dreeszen stresses precipitation

by Bettina Heinz Hurst

"The pioneers knew what a lot of us seem to have forgotten: water depends on precipitation, and it varies accordingly," Vincent Dreeszen said Feb. 9 in the 1994 Maurice Kremer Lecture.

Dreeszen was director of the Conservation and Survey Division at the University of Nebraska-Lincoln 1967 to 1987.

His lecture, "Search and Discovery: The Groundwater Story Unfolds," traced the history of groundwater knowledge and use in Nebraska.

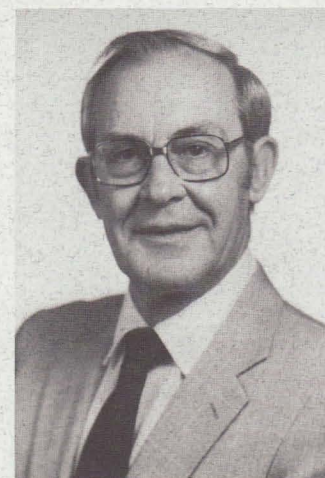
The first stage in the history of groundwater knowledge in Nebraska was the frontier/pioneer stage from 1850 to 1900 in which "almost nothing

kans need to understand, he said.

"We will not run out of water. Water is renewed annually through precipitation. It's probably the most renewable resource," he said.

Misunderstanding of complex processes operating within the hydrologic cycle and the role of evapotranspiration and oversimplified models of such processes have led to an incorrect perception of the effect of groundwater pumping in the state, Dreeszen said.

One problem hydrogeologists face in explaining complex concepts is the problem of scale. Reduction to models may give individuals a



Vincent Dreeszen

not handling that well right now," he said.

Researchers need to seek a better understanding of evapotranspiration and the different systems operating within the hydrologic cycle, he said.

In some areas of the state where researchers years ago were concerned about dropping groundwater levels due to irrigation pumping, groundwater levels did not decline as predicted.

Most of the water in the state is lost due to evapotranspiration, the process of changing soil water into vapor through the combination of soil evaporation

"I'm a strong believer in wise management, which includes regulation and control."

— Vincent Dreeszen

was known about groundwater," Dreeszen said.

This dependency, however, led the pioneers to appreciate the importance of precipitation, something today's Nebras-

false impression, he explained.

Dreeszen suggested areas for further emphasis in research. "Nebraska has a tremendous database on groundwater, but we're

**See Dreeszen,
Page 3.**

From the Director



Bob G. Volk

I thank all presenters and persons who helped plan and carry out this year's annual Water Conference "Conjunctive Use — Sharing a Resource".

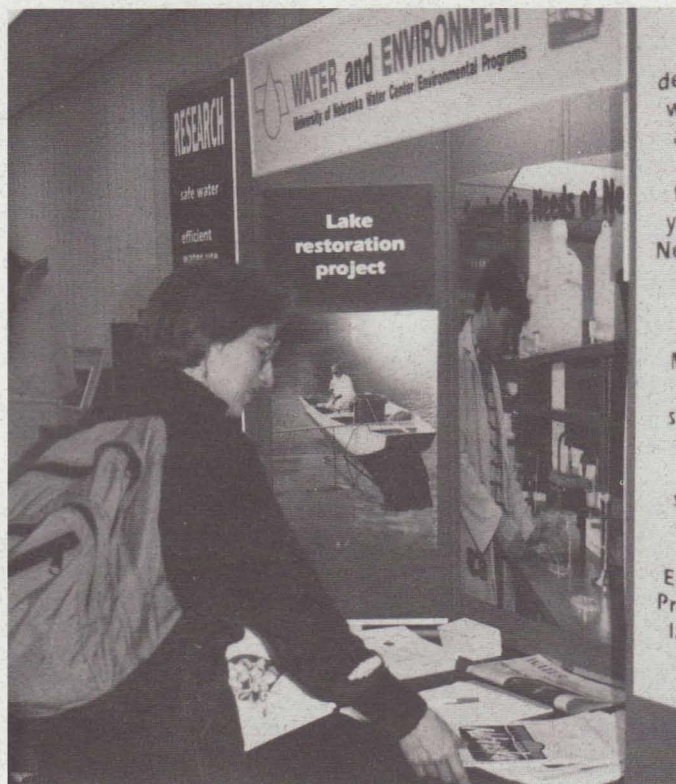
We continue to have record numbers of attendees. Many participants took extra time to express their appreciation. The topic of conjunctive use was controversial and generated much discussion especially in the small group discussions. One-page summaries of the discussion groups' results are available.

Next year's conference will be March 14-15 in Lincoln. The topic will be federal and state water-related organizations, laws and policies.

Many of you have received copies of the educational publication "Water — Sharing a Resource" inserted in a number of Nebraska newspapers March 12-16. We have had requests for additional copies, especially from science teachers. Extra copies were printed and are available. From the letters we have received, it is obvious that there are a number of concerns about Nebraska's water resources, especially drinking water quality.

Our annual Water Resources and Irrigation Tour is in the planning process. (See Page 7). Dayle Williamson and Les Sheffield, co-chairs of the tour, are considering travel along the Missouri River to St. Louis, Mo., with a return through Iowa. Effects of the flood are still evident, and recovery from the damage would be useful to observe.

Childrens' Groundwater Festival



A teacher picks up educational material from the Water Center/Environmental Programs booth in the Teachers' Resources Room at the Children's Groundwater Festival March 8 in Grand Island.

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Kremer Lecture honors state senator

Dreeszen.
From Page 1.

and plant water use, or transpiration.

Plants will use more water than they need, Dreeszen said, and plants are actually the biggest water users in the state.

Dreeszen emphasized the need to develop more storage capacity for times of excess precipitation.

However, the water supply does not allow unlimited irrigation, and integrated management needs to be explored.

"I'm a strong believer in wise management, which includes regulation and control," he said.

The Kremer Lecture is part of the Water Resources Seminar Series sponsored by the Water Center/Environmental Programs, UNL.

It is presented each year by a distinguished water expert in memory of the former state senator, farmer and water leader. He died in 1990 at the age of 82.

Kremer, a Hamilton County farmer who was

elected to the Nebraska Legislature in 1962 and served for 20 years, was known by his peers as "Mr. Water," Dreeszen said.

Kremer introduced more than 24 bills related to water in the Legislature, including the bill that created the Natural Resources Districts and the original Groundwater Management Act.

"Neither of them would have been possible without his perseverance," said Dreeszen, who worked with him over the years.

Water component of peace process

Water resources and their allocation have always been a subject of dispute in the Arab-Israeli peace process.

A new book looks at the relationship between water and peace and describes projects that might be included in regional water agreements in the Middle East.

"Water and Peace: Water Resources and the Arab-Israeli Peace Process," written by Elisha Kally with Gideon Fishelson was published in 1993 by Praeger Publishers, Westport, Conn.

The book was published in cooperation with the Armand Hammer Fund for Economic Cooperation in the Middle East, Tel Aviv University.

"Water and Peace" can be checked out at the C.Y. Thompson Library on the East Campus of the University of Nebraska-Lincoln.

Sell, MSEA team honored

Wesley C. Sell, manager of the Farmers Irrigation District at Scottsbluff, received the 1994 Pioneer Irrigation Award March 15 during the annual Nebraska Water Conference, Lincoln. The award recognizes longstanding service in irrigation.

Team leaders for the Management Systems Evaluation Area (MSEA) near Shelton received the 1994 Progress Award at the conference, which took place March 14-16 at the Cornhusker Hotel and Convention Center.

The awards were presented by the Nebraska Water Conference Council in cooperation with the University of Nebraska Institute of Agriculture and Natural Resources. The council and Water Center/Environmental

Programs, UNL, co-sponsor the annual water conference.

"Sell richly deserves this award for his many contributions to irrigated agriculture in Nebraska and especially in the North Platte Valley in western Nebraska," said Les Sheffield, secretary of the Water Conference Council.

The council was organized in 1972 by then-NU president D.B. "Woody" Varner. More than 100 members serve on the council, which is intended to bring together individuals from agriculture, industry, education and government.

Sell has worked for the Farmers Irrigation District in various positions for more than 44 years. He plans to retire in December.

James Schepers, Darrell Watts and Roy Spalding, all UNL faculty members received the organizational

award for their national leadership in research related to water quality and Best Management Practices (BMPs) for agriculture.

The MSEA site is one of five sites in the nation designated for water quality research.

In other business, the Nebraska Water Conference Council elected Jack Aschwege, Lincoln, as chair, and Everett Vogel as vice chair.

Aschwege has served as state statistician for the National Agricultural Statistics Service and the Nebraska Agricultural Statistics Service and as vice chair of the council.

Vogel is president of Stuart Fertilizer and Grain Inc. of Stuart. He is a member of the Nebraska Fertilizer and Ag-Chemical Institute.

CALENDAR

Portrait recognizes Daugherty

The Water Center/Environmental Programs unit, University of Nebraska-Lincoln, has received a portrait of Robert B. Daugherty, chair of the board of Valmont Industries Inc., Omaha.

The portrait, taken by Lou Charno, is part of the University of Nebraska Foundation project "Portraits of Nebraska."

Daugherty has supported Water Center/Environmental Programs activities over the years.

An Omaha native, Daugherty is a founder of Valley Manufacturing Co. (now Valmont Industries), Valley. In 1954, he purchased the manufacturing and sales rights to center pivot irrigation systems from the inventor, Frank Zybach, and his partner, A.E. Trowbridge.

Valmont Industries is the world's largest manufacturer of center pivot and linear move irrigation equipment.

April

- **April 20:** UNL Water Seminar Series "Future Uses and Controls of Nebraska Water" — Panel members Kent Wolgamott, Roy Frederick and John Janovy. 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln.

- **April 26:** Water Wonders, Mitchell.

- **April 26-27:** Gage, Jefferson, Saline Extension Programming Unit Festival, Camp Jefferson.

- **April 26-27:** Ft. Kearney Water Jamboree, South Central 4-H Center/Harlan County Reservoir, Alma.

- **April 27:** UNL Water Seminar Series "The Groundwater Guardian Program" — Robert D. Kuzelka, 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln.

- **April 27:** The Groundwater Foundation's Awards Reception; Kick-Off of Nebraska Groundwater Week

May

- **May 1-7:** National Drinking Water Week & Nebraska Groundwater Week

- **May 4:** League of Women Voters Education Fund National Town Meeting, "Groundwater Protection: Looking at Solutions," 12:30 p.m. to 4:30 p.m. CST. Cosponsored by U.S. E.P.A. and

Cooperative Extension. Video portion will be 1 p.m. to 3 p.m. live via satellite — C band. Cosponsored by Cooperative Extension and League of Women Voters. For Nebraska downlink sites, contact your local extension office.

- **May 4:** Spring Conservation Sensation, Prague.

- **May 4-5:** South Central Six Natural Resources Camp

- **May 10-11:** Eyes on Conservation: Water Works, Eastern Nebraska 4-H Center and Ak-Sar-Ben Aquarium.

- **May 11-13:** "Drought Management in a Changing West: New Directions for Water Policy," Portland, Ore. Sponsored by International Drought Information Center, UNL. Contact: IDIC, Department of Agricultural Meteorology, 246 Chase Hall, UNL, Lincoln, NE 68583-0728, (402) 472-3679.

- **May 23-26:** ASCE Water Resources Management and Planning Conference, Denver.

June

- **June 15-17:** Soil and Water Conservation Society, Nebraska Meeting, Seward.

- **June 19-22:** ASAE Summer Meeting in cooperation with ASCE Irrigation and Drainage Division, Kansas City.

July

- **July 17-22:** Second International Symposium on Artificial Recharge of Groundwater, Orlando, Fla. Organized by ASCE. Discussion of design, construction and operation of wells, spreading basins and other recharge facilities, and recharge with various qualities of potable water, surface water and reclaimed wastewater into consolidated, unconsolidated, confined and unconfined aquifers. Contact: Ivan Johnson, Arvada, CO, (303) 425-5610.

September

Sept. 10: Open House, University of Nebraska-Lincoln Horticulture Department. Theme: Water Quality. Agricultural Research & Development Center, Mead.

October

Oct. 16-18: 39th Annual Midwest Ground-Water Conference, Bismarck, N.D. Abstracts accepted until June 1. Sponsored by North Dakota State Water Commission, North Dakota State Geological Survey, University of North Dakota-Energy and Environmental Research Center, U.S. Geological Survey, Water Resources Division and North Dakota Water Resources Research Institute. For more information, contact Robert B. Shaver, 900 East Boulevard, Bismarck, N.D. 58505-0850, (701) 224-2754.

Forestry, Fisheries and Wildlife

Department members work on variety of water projects

by Bettina Heinz Hurst

A brown bag session on water-related research in the Department of Forestry, Fisheries and Wildlife drew 25 people this spring semester.

Eleven of the 13 members of the department engage in water-related research, said Kyle Hoagland, aquatic ecologist. In addition, 15 master's students, three Ph.D. students and three post-doctoral researchers in the department participate in water research.

"The diversity of interests is incredibly broad," Hoagland said.

Hoagland presented ongoing research efforts related to global warming, lake restoration, biofouling and pesticides.

Hoagland investigates the pesticides atrazine and alachlor and their effect on water quality.

"They are the No. 1 and No. 2 pesticides used in the United States," Hoagland said. Atrazine is also the most frequently used pesticide in Nebraska.

Researchers look at the effect of chemicals on stream communities and

Eleven of the 13 members of the department engage in water-related research.

experiment with pesticides in outdoor tanks at Cedar Point Biological Station and in the new wet streams lab at UNL.

In a related study, graduate student Marian Langan is investigating pesticide levels in streams after storm runoff events.

Together with Stephen Ernst, geneticist, Hoagland is continuing work on using algae as bioindicators of global warming.

Conservation biologist Julie Savidge talked about several wetlands projects she is involved in. One project compares biodiversity in wet meadows along the Platte River.

"Wet meadows have declined substantially over the last decades," Savidge said.

The wet meadows are important habitat for Sandhills cranes which forage in these meadows and also engage in pair bonding there. Savidge is also looking at the importance of wet meadows to other animal and plant species.

A second study concentrates on the Sandhills wetlands as habitat for migratory and breeding birds. Some experts maintain this region is the second most important area for breeding ducks in United States, Savidge said.

"There is a large number and great diversity of wetlands in the Sandhills, but very little research has

been done," Savidge said.

Terry Kayes, aquaculturist, gave a presentation on raising fish as a crop.

Aquaculture is the fastest growing segment of U.S. agriculture, Kayes said. The U.S. Department of Agriculture is interested in this industry because of the growing global demand for seafood, he said.

"Economics is driving the engine in aquaculture," Kayes said.

According to Kayes, Nebraska has the potential of being one of the nation's top four aquaculture states.

Ed Peters, associate professor of Forestry, Fisheries and Wildlife, presented research on the effects of water and water management on fish and aquatic invertebrates in the Platte River.

Michele Schoeneberger, a research soil scientist and project leader with the U.S. Forest Service, introduced the Center for Semiarid Agroforestry, which is located on the UNL East Campus with the U.S. Forest Service.

Schoeneberger advocated the concept of "working trees" and explained a proposal to implement a system of streamside buffer strips to help prevent pollution.

The brown bag session was part of a two-year series sponsored by Water Center/Environmental Programs, UNL.

A second study concentrates on the Sandhills wetlands as habitat for migratory and breeding birds.

Some experts maintain this region is the second most important area for breeding ducks in the United States.

Universities in three states work together on Platte River project

Researchers
try to develop
model to
assist basin
decision-
makers

by Deborah B. Derrick,
communication specialist,
Center for Infrastructure
Research, UNL

There may not be enough water for everyone.

Melting snow in the Colorado Rockies adds about 10 inches of runoff every year to the North and South Platte rivers. Annual rainfall, although highly variable, also contributes to river flows.

But demand, not supply, is the reason why water rights continues to be a controversial issue in the Platte River Basin states of Nebraska, Colorado and Wyoming.

As part of a larger research proposal, Rollin Hotchkiss, assistant professor of civil engineering, is working with research counterparts in

Colorado and Wyoming to develop models to help decision-makers assess the effects of their decisions on the entire river basin area of 34,900 square miles.

This project is funded in Nebraska by the Water Center/Environmental Programs and the Center for Infrastructure Research, UNL, through U.S.G.S. 104 funds.

Researchers involved emphasize the importance and novelty of a unified approach among Platte River Basin Water Center-based universities.

"The wisest use of Platte River resources can be made if the three states work together," Hotchkiss said.

Urban population growth in Denver; Fort Collins, Colo.; Cheyenne, Wyo.; Lincoln and other cities has created some of

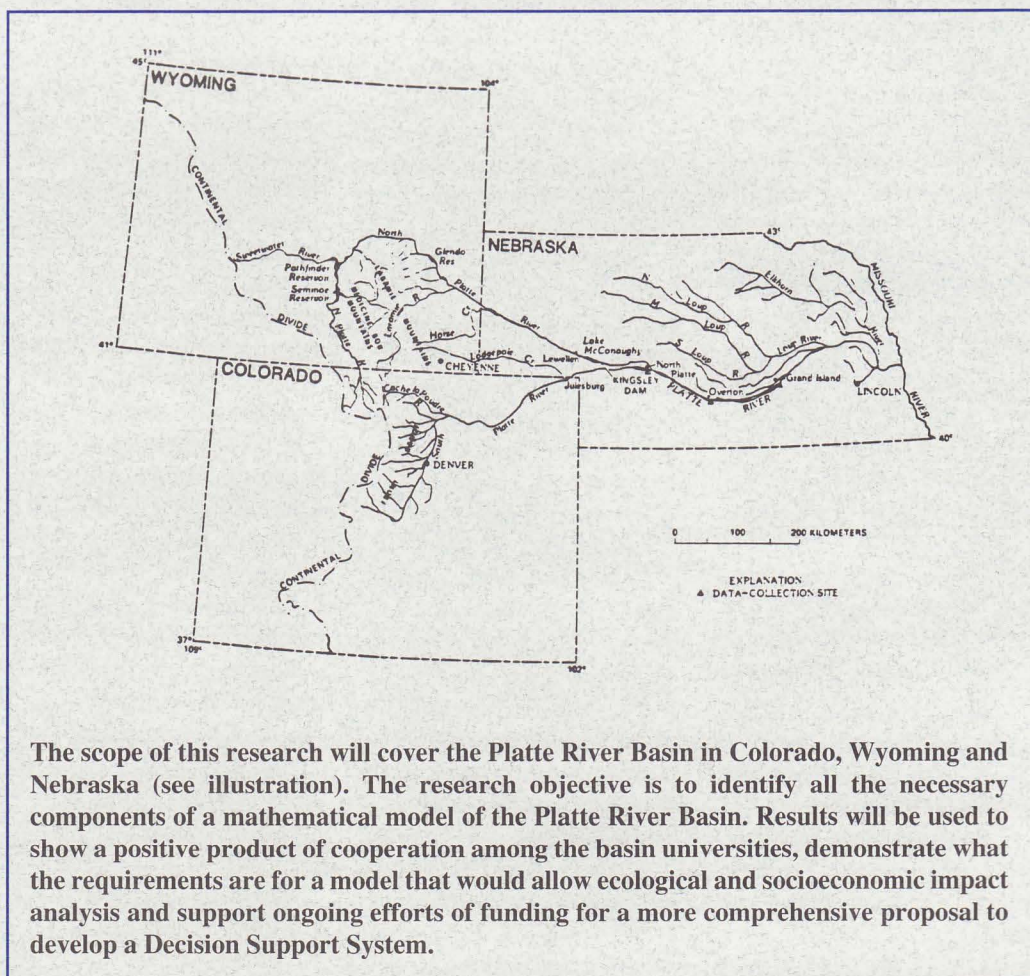
the additional demand for water. So has the decreasing availability of Ogallala Aquifer groundwater for irrigation and federal mandates to provide wildlife and wetlands protection.

Development and dam projects built in one state may affect flows and habitat downstream in another state. Issues involving Platte River water rights, such as the proposed Two Forks Dam for Denver, have prompted litigation between the three states.

So how are water resource decisions made, if not in court? Is there a better way to make these decisions?

Hotchkiss thinks there is. The key to developing a unified approach, he said,

Continued on Page 7.



The scope of this research will cover the Platte River Basin in Colorado, Wyoming and Nebraska (see illustration). The research objective is to identify all the necessary components of a mathematical model of the Platte River Basin. Results will be used to show a positive product of cooperation among the basin universities, demonstrate what the requirements are for a model that would allow ecological and socioeconomic impact analysis and support ongoing efforts of funding for a more comprehensive proposal to develop a Decision Support System.

Continued from Page 6.

is a decision support system. This system usually includes a database, a modelbase and a user dialogue or interface between users and the models.

"The lack of a basin-wide system means that decision-makers can usually look only at their own interests," Hotchkiss said. "That's the problem with most of the models in use now."

"There are lots of models out there," added Paul Gonzales, a graduate research assistant working on the project. "But some are so 'data-hungry' that they're not very useful."

UNL researchers plan to develop a new system one step at a time.

Currently funded research calls for the team to look at requirements for a mathematical flow model for the basin. And they are looking for input from potential users to help them construct the model.

"The focus of this

project is on user groups," Gonzales said. "We need to know what kind of information people need to make decisions on water use and allocation."

"The lack of a basin-wide system means that decision-makers can usually look only at their own interests."

— Rollin Hotchkiss,
UNL civil engineer

Gonzales said Nebraska users of this system include federal and state agencies such as the Game and Parks Commission, the Department of Water Resources, the Department of Roads and the Department of Environmental Quality. Natural Resources Districts and environmental interest groups are other potential users.

A questionnaire has already been sent to more than 60 officials in Nebraska. Researchers in Colorado and Wyoming are sending out the same survey in their states.

"We're asking people to tell us what kind of information they need and use to make decisions and who else might be interested in a project like this," Gonzales said.

Although researchers hope to have survey results back in April, it is not too late to respond, Hotchkiss said. He said any interested Nebraskan should contact him at the University of Nebraska-Lincoln at (402) 472-5501.

Darrell Fontane, associate professor of civil engineering at Colorado State University, is leading the Colorado research effort. The Wyoming project is headed by Victor Hasfurther, professor of civil engineering and associate director of the Wyoming Water Research Center at the University of Wyoming.

"The issues facing each state, and the entire basin area, are very complex," Hotchkiss said. "This kind of system will help all of us make better use of our water resources."

Annual water tour to feature Missouri River

The annual Water Resources Tour sponsored by the Water Center/Environmental Programs and the Water Conference Council, University of Nebraska-Lincoln, will take place the last week of July.

This year's tour will be a Missouri River tour and will include sites related to water construction activities, flood prevention construction and flood damage.

For more information, contact Les Sheffield, coordinator of outreach programs, Water Center/Environmental Programs, 304B Filley Hall, University of Nebraska, Lincoln, NE 68583-0922, (402) 472-1773.

Monograph deals with woodland expansion

Woodland expansion began in the South and North Platte rivers around 1900. By 1986, channel-to-woodland proportions were relatively uniform throughout the Platte River system.

"Woodland Expansion in the Platte River, Nebraska: Patterns and Causes," a journal article in the February 1994 article in *Ecological Monographs* (Vol. 64, No. 1), examines this topic.

The article was written by W. Carter Johnson of the Department of Horticulture, Forestry, Landscape and Parks at South Dakota State University, Brookings, S.D.

The research was conducted to identify the factors that have permitted *Populus-Salix* woodland to expand into the formerly active channels of the Platte River and its two major tributaries, the South and North Platte rivers.

The research included: pre-settlement vegetation reconstruction based on the General Land Office survey notes, a statistical comparison between historic rates of woodland expansion from aerial photographs and environmental variables and a field study of seedling demography to isolate the factors controlling recruitment and survival in the modern river.

Division issues report on water level changes

The area affected by groundwater declines decreased in the three groundwater control areas in effect in Nebraska during 1992, compared with the decline acreage

for the same areas during 1991. The decreases in the acreage of groundwater-level declines came in the Upper Big Blue, Lower Big Blue and Upper Republican groundwater control

areas.

These comparisons came from the 39th annual report on the state's groundwater levels, "Groundwater-level Changes in Nebraska,

1992," published recently by the Conservation & Survey Division, University of Nebraska-Lincoln.

Approximately 20,000 water-level measurements from nearly 4,000 observation wells in 1992 were added to a database of historical water-level records. The data indicates groundwater levels in several counties have declined 5 to 40 feet from predevelopment — before Nebraska's groundwater was significantly used for irrigation and municipal use.

Copies of the report can be purchased from Conservation & Survey Division, 113 Nebraska Hall, University of Nebraska, Lincoln, NE 68588-0517 for \$3.50. Add \$1.50 per book for postage and appropriate city and state sales tax.

Mailing List Update

We are updating our mailing list. If you have a change of title, name, and/or address, or would like to have your name added or removed from the Water Current mailing list, please complete this form. If you know of individuals who might be interested in receiving our publications, please submit their names.

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