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Water Current

University of Nebraska Water Center/Environmental Programs

Vol. 25 No. 3
October 1993

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First Brown Bag Session features SCREC research

The first fall Brown Bag Session sponsored by the Water Center/Environmental Programs unit Sept. 10 attracted about 20 individuals.

Joel Cahoon, biological systems engineer, and Richard Ferguson, soils specialist, presented a slide show on water-related research at the South Central Research and Extension Center during the noon seminar at the Nebraska East Campus Union.

SCREC, located near Clay Center, is a 480-acre research complex. Seven research scientists work at the site, which is directed by Charles Stonecipher.

Water-related projects located in the center's district include the

Managment Systems Evaluation Area near Shelton, the Mid-Nebraska Water Quality

The next Brown Bag Session will feature water-related research in the UNL Department of Biometry from 11:30 a.m. to 1 p.m. on Oct. 8 in the East Campus Union.

Demonstration Project, the Elm Creek Project and the Platte Valley Demonstration Project. The majority of the state's federally assisted water

quality programs fall into the district, Cahoon said.

Cahoon talked about irrigation research examining the effects of tillage and crop rotation on furrow irrigation, blocked-end furrow irrigation and limited irrigation techniques for furrow irrigation.

"Our applied research responds to Nebraska's needs," Cahoon said.

Ferguson addressed fertilizer and agricultural management research projects such as tillage effects on agricultural movement, urea hydrolysis and nitrogen recommendations for Platte Valley soil nitrogen mineralization.

"Most of the center's work is water-related," Ferguson said.

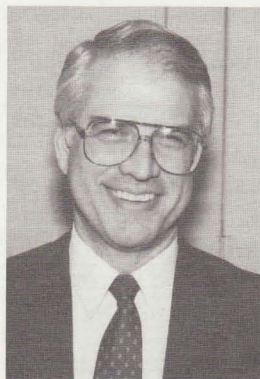
Clean Water Act awaits reauthorization

On June 15, 1993, Sens. Max Baucus, D-Mont., and John Chafee, R-Rhode Island, introduced S. 1114, the Water Pollution Prevention Control Act, a bill to amend and reauthorize the Federal Water Pollution Control Act of 1972 (the Clean Water Act). Hearings on the bill have begun, and it is expected

that the Clean Water Act will be reauthorized this year. Another related bill is pending.

On June 28, Rep. James Oberstar, D-Minn., introduced H.R. 2543, the Nonpoint Source Water Pollution Prevention Act of 1993. This bill seeks to improve provisions of section 319 of the Clean Water Act.

From the Director



Bob G. Volk

We are pleased to join the University of Nebraska-Lincoln academic community in welcoming Dr. Priscilla Grew as the new Vice Chancellor for Research.

Dr. Grew replaces Dr. William Splinter who retired earlier this year. Dr. Grew formerly was director of the Minnesota Geological Survey at the University of Minnesota and thus is familiar with research related to water resources. Research aimed at protecting the quantity and quality of Nebraska's vital water resources continues to be a priority, and we welcome the opportunity to work with Dr. Grew in this endeavor.

As vice chancellor Dr. Grew oversees the Nebraska Research Initiative (NRI) program. This program provides research funds to the Water Sciences Center and has enabled the University to attract top researchers and graduate students, purchase new equipment, and help establish new laboratories in the water sciences area.

This support for water research in Nebraska is paying off in that faculty are attracting grant dollars at a record pace. The September issue of Research Review, published by the Office of Sponsored Programs, listed recent grant awards, and I can account for approximately \$1.2 million in new grants that have come to the University that have a strong water research and education focus.

Without the NRI funds providing baseline support the new funds

attracted would have been a small fraction of that. Results from this new water related research will have an effect on Nebraskans and will be highlighted in future publications.

If you missed The Institute of Agriculture and Natural Resources (IANR) educational displays at Husker Harvest Days, you missed a wonderful opportunity to interact with faculty and staff.

The displays attracted a large number of visitors. Much time and effort goes into that program, and I thank Larry Schulze and Les Scheffield for coordination of the IANR exhibits.

We have a number of visitors from Nebraska and other states stop by and talk to us about our water and the research

and educational programs under development. Please feel free to contact us. We like to think that if you have a question about water research and education, we would be the first place you call.

If we cannot answer the question, we will put you in contact with the appropriate faculty or staff person.

Correction

The provisions of LB 553, which would allow a variance from water well construction standards if necessary when a well is replacing an existing well, were also in LB 131, which did pass in the last legislative session.

Incomplete information on LB 553 was given in the "Legislature passes water bills" article in Vol. 25, No. 2 of the Water Current.

Water Current

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Middle Platte watershed national case study site

by Bettina Heinz Hurst

The U.S. Environmental Protection Agency is taking a special interest in the Middle Platte watershed (Columbus to North Platte, Nebraska segment). The watershed will be the subject of a one-year ecological risk assessment study.

Donna Sefton, Platte Watershed Program coordinator with the EPA Region 7 in Kansas City, and Annette Huber, environmental engineer with EPA's Office of Water in Washington, D.C., are co-chairs for the study, which is part of EPA Region 7's Watershed Protection Program.

"We chose the Middle Platte because of its critical importance to the state of Nebraska and the

region," Sefton said. Rather than just looking at the quality of the Middle Platte River, the project takes into account the entire watershed, including environmental resources and the people who live in it.

"EPA is changing its way of doing business," Sefton said. "It's a much more holistic and complex approach."

The EPA is working with the Nebraska Department of Environmental Quality on this project. Once the data has been gathered and assessed, it will be fed into the DEQ's water quality plan for the Platte Basin.

Rather than gathering its own data, the EPA plans to conduct the

ecological risk assessment by combining existing data resources into one consistent risk assessment. With a budget of \$15,000, resources are limited and efficient methods are needed, Huber said.

The EPA plans to facilitate stakeholder groups in each subbasin of the watershed. These groups would be comprised of members of various interest groups.

"EPA's role is that of a facilitator. We will help existing state and local efforts to protect natural resources," Sefton said.

The results of the study could be of immediate, practical value to the watershed residents and decision-makers, she said.

Electronic database on water resources available

A listing of more than 6,500 publications produced by the National Institutes for Water Resources between 1984 and 1990 is now available on diskettes.

The publications are cross-referenced by state, author, type of publication and subject.

NIWR is comprised of the 54 institutes in the State Water Resources Research Institute Program. The University of Nebraska Water Center/Environmental Programs unit is one of these institutes.

The software and database are available for IBM-compatible PCs only.

To obtain a copy of the electronic database, contact University of Nebraska Water Center/Environmental Programs, 103 Natural Resources Hall, Lincoln, NE 68583-0844, (402) 472-3305.

Platte River Basin Ecosystem Symposium

Dec. 7-9, 1993

Interstate Holiday Inn
Grand Island, Neb.

Deadline for papers:
Oct. 25, 1993

For more information about the symposium, contact Donna Sefton, Water Management Division, EPA, 726 Minnesota Ave., Kansas City, KS 66101 (913) 551-7500, FAX 913-551-7765 or John G. Sidle, U.S. Fish and Wildlife Service, 203 W. Second St., Grand Island, NE, (308) 382-6468, FAX 308-384-8835.

Visiting professor water, waste expert

Tim Ward is a visiting professor in the department of civil engineering on the University of Nebraska-Omaha campus for the 1993-94 academic year.

In addition to teaching responsibilities, Ward will conduct research in hydrology, water resources and waste management. Since 1980, he has been on the faculty of New Mexico State University, Las Cruces, and previously taught and

conducted research at Colorado State University, where he obtained his Ph.D. in 1976.

Ward recently served as associate director of the Waste-Management Education and Research Consortium, in charge of Technology Development and Facilities. In that position, he was responsible for oversight of 30 to 40 research projects and four analytical laboratories.

CALENDAR

Well sampling for ag chemicals topic of paper

In irrigated areas of Nebraska where nonpoint contamination of shallow groundwater has resulted in elevated levels of agrichemicals, nitrate-nitrogen and atrazine concentrations in pumped groundwater from high capacity wells varied little with pumping time.

Four University of Nebraska-Lincoln researchers have coauthored a paper on well sampling for agrichemicals in high capacity systems.

Vitaly Zlotnik, Mark Burbach, Mary Exner and Roy Spalding examined the use of high capacity irrigation wells as a cost-effective means of determining an area of nonpoint-source contamination.

Variability of nitrate concentrations during pumping is important to both the regulator and the farmer because the nitrate in the irrigation water can meet some of the crop's fertilizer needs. The stability of the nitrate concentration is an important factor in an accurate nitrogen fertilizer budget, the authors say.

The paper has been accepted for publication by the Soil and Water Conservation Society.

Water Current

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October

- **Oct. 27-28:** "Seeking an Integrated Approach to Watershed Management in the South Platte Basin," University Park, Holiday Inn, Ft. Collins, Colo. Contact: Chuck GrandPre, (303) 291-7202.

November

- **Nov. 4-7:** The Future of America's Rivers. A Celebration of the 25th Anniversary of the National Wild and Scenic Rivers Act. Arlington, Va. Contact: Jennifer Paugh, (202) 833-3380.

- **Nov. 12:** Water Research Brown Bag Session by UNL School of Biological Sciences, 11:30 a.m. to 1 p.m. UNL, 224 Lyman Hall, Lincoln, Neb.

December

- **Dec. 7-9:** Platte River Ecosystem Symposium, Interstate Holiday Inn, Grand Island, Neb.

- **Dec. 10:** Water Research Brown Bag Session by West Central Research & Extension Center, 11:30 a.m. to 1 p.m. UNL, East Campus Union, Lincoln, Neb.

- **Dec. 11-15:** 55th Midwest Fish & Wildlife Conference — New Agendas in Fish and Wildlife Management: Approaching the Next Millennium, St. Louis, Mo. Contact: Wayne Porath, MO Dept. of Conservation, 1110 S. College Ave., Columbia, MO 65201. Phone (314) 882-9880.

January

- **Jan. 12:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb. Contact: Bob Kuzelka, (402) 472-3305.

- **Jan. 14, 1994:** Water Research Brown Bag Session, 11:30 a.m. to 1 p.m., UNL, Lincoln, Neb.

- **Jan. 19:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb. Contact: Bob Kuzelka, (402) 472-3305.

- **Jan. 26:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb. Contact: Bob Kuzelka, (402) 472-3305.

February

- **Feb. 2:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb.

- **Feb. 9:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb.

- **Feb. 11:** Water Research Brown Bag Session by Water Sciences Laboratory, 11:30 a.m. to 1 p.m. UNL, Lincoln, Neb.

- **Feb. 16:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb.

- **Feb. 23:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln, Neb.

March

- **March 2:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln.

- **March 9:** UNL Water Seminar Series "Flatwater: The History of Nebraska and Its Water," 3:30 p.m. to 4:30 p.m., East Campus Union, Lincoln.

- **March 11:** Water Research Brown Bag Session by UNL Department of Electrical Engineering, 11:30 a.m. to 1 p.m. UNL.

- **March 15-16:** Nebraska Water Conference, "Conjunctive Use — Sharing the Resource," Cornhusker Hotel, Lincoln, Neb. Contact: Les Sheffield, (402) 472-1773.

- **March 27-30:** Second International Conference on Groundwater Ecology, Atlanta, Ga. American Water Resources Association. For more information, contact John Simons, U.S. E.P.A., Groundwater Protection Division, (202) 260-7091.

Sediment

New old method may clean lakes

by Bettina Heinz Hurst

Rollin Hotchkiss likes to meddle in murky waters.

A civil engineer at the University of Nebraska-Lincoln, Hotchkiss is testing an environmentally sound way to remove sediment from reservoirs.

Sediment build-up is a problem in many Nebraska reservoirs, where it hinders recreational activities such as swimming or boating, ruins fishing and reduces benefits from hydroelectricity, irrigation and flood control.

This summer, Hotchkiss has been testing his theories at Atkinson Reservoir Area Lake in Holt County.

"We're trying to restore a better balance of sediment for the reservoir," Hotchkiss said.

The method he has devised is simple, cheap and requires no power to operate.

In June, researchers dropped a flexible pipe into the lake west of the dam in an area with heavy sediment build-up. The pipe leads over the top of the dam and empties into the Elkhorn River. Water is siphoned through the pipe, carrying with it the sediment which is deposited back into the river. A valve controls downstream flow. Civil engineering students siphoned sediment on a daily basis in June.

Sediment build-up upsets the ecological balance upstream and downstream, where lack of sediment leads to bank erosion.

Hotchkiss first tried this method of sediment removal at a fish farm in Ogallala two years ago.

One of the advantages of this method is cost efficiency.

"It's really cheap," Hotchkiss said.

Members of the Game & Parks Commission, the Lower Niobrara Natural Resources District and local residents all help by providing labor and material.

Xi Huang, a graduate student in civil engineering, spent much of June in Atkinson working on the experiment for his master's thesis.

"In China, sediment in rivers is a very serious problem," Huang said.

Although this method has been used by the Chinese and by the Algerians for decades, Hotchkiss wants to test the method as a permanent, unsupervised installation.

"It's kind of a rediscovery," Hotchkiss said. To his knowledge, the method has not been used in the United States.

One of the main reasons Hotchkiss is interested in this research is the active damming in developing countries. His method could be used to extend the life span of reservoirs there.

If this experiment is successful, Hotchkiss hopes to next try the method on Spencer dam on the Niobrara River.

Funding for the project is provided by the Nebraska Public Power District, the U.S. Geological Survey and the University of Nebraska Water Center/Environmental Programs and Center for Infrastructure.

Research projects flooded

Water-related research has been a victim of flooding in Nebraska.

Projects examining irrigation had to be delayed or may need to be extended to make up for the loss of one data season as little irrigation occurred in July in central and eastern Nebraska.

An experiment on sediment removal at Atkinson Reservoir was hampered as water flooded research equipment.

The platforms on top of microcosms used in UNL research on denitrification near Cental City were flooded and inaccessible to researchers for several weeks.

Most researchers, however, say they will be able to extend the time table for their research projects.



TEAM WORK — A team of students and volunteers installs a pipe across Atkinson Dam in June. Photo — Xi Huang.



Pesticide levels may make lakes expensive source of water

by Bettina Heinz Hurst

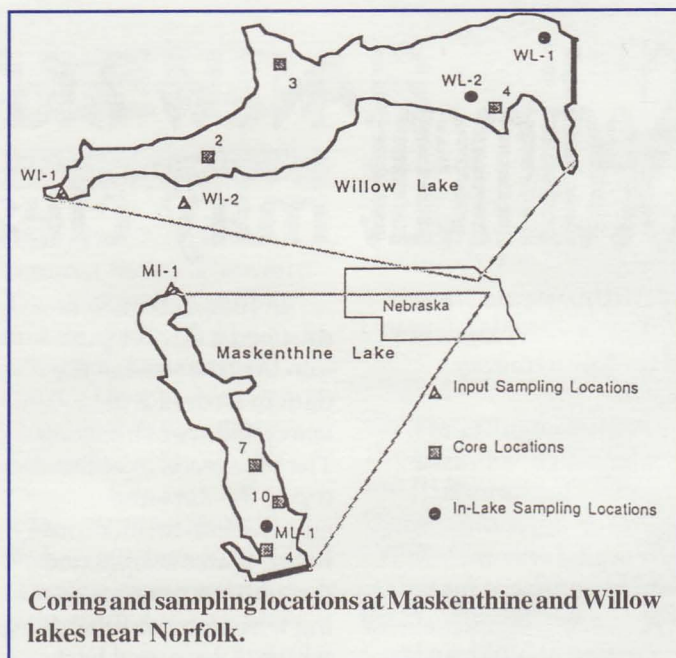
The search for drinking water has led several communities across the nation to impoundments. But clean water doesn't come cheap, and pesticide contamination of these lakes may need to be considered before they are selected as sources of drinking water.

Pesticide concentrations in Midwest impoundments exceeding maximum contaminant levels set by the U.S. Environmental Protection Agency are predicted to cause negative economic pressures on several communities in the region.

Evidence for this comes from a study completed last year by the Water Sciences Laboratory of the Water Center/Environmental Programs, a division of the Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln.

The research project was funded through the Clean Lakes Program of the U.S. EPA and the Lower Elkhorn NRD. UNL co-authors on the journal article summarizing results of this project were Roy Spalding, Daniel Snow, David Cassada and Mark Burbach.

The study investigated Maskenthine and Willow Lakes in north-eastern Nebraska. Maskenthine Lake, a small, 59-acre impoundment, is located eight miles east of Norfolk. Rain-induced runoff is the lake's only input. Willow Lake, a larger impoundment with 701 acres is fed by Willow Creek, a continuously



flowing stream. It is located 14 miles northwest of Norfolk.

The research focused on the diagnostic study of commonly used pesticides in the two lakes, while satisfying all requirements for monitoring other chemicals under the Clean Lakes Program of the EPA.

Previous studies have shown that some agrochemicals are transported to surface and groundwater and may be in streams and rivers after runoff events. Recent attention has focused on impoundments where higher pesticide levels could affect a water body for a relatively long period.

Recent reports from the Water Center/Environmental Programs indicate pesticides occur in spring and early summer runoff in Nebraska and suggest these pesticides may accumulate in some Nebraska lakes.

Agricultural chemicals may possibly affect a lake's ecosystem and, in extreme cases, human

health. Therefore, it is important to identify the chemicals most likely to be present in runoff, their ranges in concentration over time and their persistence.

Samples from the two lakes, which are less than 50 miles apart, differed significantly.

Researchers sampled the lakes 19 times between May 1990 and mid-June 1991 for dissolved pesticide concentrations. Samples from the two lakes, which are less than 50 miles apart, differed significantly. The number of detected pesticides, the frequency of their occurrence and their concentrations were considerably greater in Maskenthine Lake than in Willow Lake.

The impact assessment attributed these differences to Maskenthine watershed having greater slope and less infiltration due to a much finer soil texture. The smaller volume of

Maskenthine Lake for dilution may also be a factor.

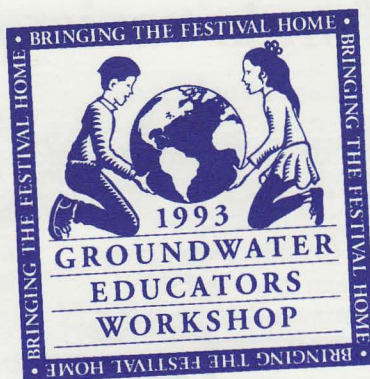
In both lakes, researchers detected atrazine in all in-lake samples regardless of depth. They frequently found the pesticides simazine (Princep®), cyanazine (Bladex®), metolachlor (Dual®) and alachlor (Lasso®) in the lakes.

Pesticide levels were highest following periods of overland runoff in May and June, but the level of atrazine in Maskenthine Lake remained above the maximum contaminant level for drinking water, three parts per billion (ppb), throughout the study.

The estimated lake half-lives of most pesticides investigated appeared to be longer than their published soil half-lives.

Half-life is the time required for a substance to lose one-half its original concentration. For a pesticide it is the time required for one-half of the pesticide in the soil to be converted to another compound or compounds.

First educators workshop successful



The first Groundwater Educators Workshop was designed to train educators about organizing festival-style activities and to provide an opportunity for natural resource and agricultural organizations to supply information about their programs.

The event was sponsored by the Nebraska Groundwater Foundation Aug. 10 in Kearney. It attracted about 90 individuals.

The Foundation sponsors the annual Children's Groundwater Festival. Approximately 8,000 children were on the waiting list for the 1993 festival, but only 3,000 could attend.

The University of Nebraska Water Center/Environmental Programs unit was one of many

agencies represented at the event.

Eugene Glock, state agriculture representative to Sen. Bob Kerrey, D-Neb., addressed the workshop briefly at lunch.

It is the opinion of Kerrey and other senators that the Clean Water Act will not be dealt with at length this year, Glock said. Kerrey and others expect reauthorization this year and more work on the legislation next year, he said.

"Nebraskans should be concerned about the nonpoint source pollution part of the Clean Water Act," Glock said.

Susan Seacrest, director of the Groundwater Foundation, said the workshop will become an annual event.

Foundation publishes festival manual

"Making Waves: How To Put On A Water Festival" is now available from the Nebraska Groundwater Foundation.

The 58-page manual was written by Amy Killham, director of the Children's Groundwater Festival.

Also available is a new Nebraska Children's Groundwater Festival Outreach Packet written by Paula Porter.

"Making Waves" offers ideas and direction for organizing a water festival.

The outreach packet consists of teacher materials, lesson plans, student worksheets and resources related to festival activities.

Both publications are available for \$12 each from the Nebraska Groundwater Foundation, P.O. Box 22558, Lincoln, NE 68542-2558.

For more information, contact the Foundation at (402) 434-2740 or 1-800-858-4844.

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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Section 104 funds variety of research projects

The Water Center/Environmental Programs unit receives an annual federal matching grant as authorized by section 104 of the Water Resources Research Act of 1984.

Between 1988 and 1992, 20 research projects associated with the Water Center/Environmental Programs unit received 104 funding.

Projects took place in the areas of biological sciences, climate and hydrologic processes, engineering, groundwater flow and transport, social sciences and water quality.

These research projects so far have resulted in 30 articles in refereed scientific journals, one book chapter, 12 dissertations, 30 articles in conference proceed-

ings and 24 other publications.

Section 104 projects of the last five years have included the following.

Chemist David Hage began investigating

chromatographic automation of immunoassays for environmental analysis in 1992.

Aquatic ecologist Kyle Hoagland started a research project examining the synergistic effects of agricultural pesticides on benthic algal communities.

Biological systems engineer Joel Cahoon has been investigating

blocked end furrow irrigation management techniques.

Entomologist Blair Siegfried has been investigating biochemical determinants of pyrethroid toxicity to selected aquatic insects.

Dean Yonts and Dean Eisenhower, biological system engineers, examined surge irrigation

and furrow packing for improving surface irrigation efficiency in 1989-90.

Norman Klocke, biological systems engineer, and Gary Hergert, agronomist, are continuing work on non-

weighing lysimeter techniques used to quantify year-around leaching losses in structured soil in 1989.

George Casale, pharmaceutical scientist, and Edward Vitzthum, coordinator of Environmental Programs, investigated the immunologic consequences of certain insecticides in groundwater in 1990-91.

These and the other section 104 projects are described in detail in the 1988-1992 Evaluation Report of the Water Center/Environmental Programs unit. For more information, contact the Water Center/Environmental Programs unit.

Current 104 projects will be featured in coming issues of the Water Current.



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