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WATER CURRENT

Vol. 35, No. 2 UNL Water Center April 2003

Researchers Honing Methods to Sample Field Run-off Water

by Steve Ress

The effectiveness of riparian buffer strips to control sediment and chemical runoff from cropland is well recognized, but ways to quantify it under real world conditions in the Great Plains have been elusive.

Researchers and graduate students at the University of Nebraska-Lincoln have developed and are refining a buffer strip sampling device that can accurately measure in-field sediment runoff from farm fields much more precisely, however.

"The idea was to create a sampler that could catch a very small fraction of the runoff flowing into and out of a buffer bordering cropland near a stream or creek," said hydrologic engineer Dean Eisenhauer of UNL's Department of Biological Systems Engineering.

"Knowing how much sediment flows through a buffer strip and into a stream is important since many fertilizers and pesticides are designed to adhere to soil molecules. So if water and sediment flow are reduced, fertilizers and pesticides leaving a field should also be reduced," he said.

Most methods to evaluate buffer strips are expensive and labor-intensive and only work under controlled conditions. Measuring water flow into and out of an actual buffer can be quite different, particularly when those flows amount to thousands of gallons of water.

For the past three years, Eisenhauer; U.S. Department of Agriculture National Agroforestry Center riparian ecologist Mike Dosskey; UNL surface water management specialist Tom Franti; and UNL graduate students Matt Helmers and Jason Brothers have designed and tested buffer strip samplers on fields along Clear Creek in Polk County and Camp Creek near Waverly in Lancaster County.

The device they're evaluating catches, collects and holds only one part of water for every 2,180 parts of water flowing through the buffer so the amount of water to be analyzed for chemical and sediment runoff can be managed by the researchers. These samples are compared to water samples taken from where the run-off water first leaves the edge of the field.

Current drought conditions have somewhat limited rainwater flow through the buffers, but occasional heavy spring rains, and irrigation runoff from the Clear Creek site have helped.

"The need to evaluate buffer strip performance is particularly important due to the USDA's Conservation Filter Strip Initiative, which will

Paulo Luchiari and Lisa Stahr work on one of Dean Eisenhauer's in-field riparian buffer samplers (photo courtesy of Dean Eisenhauer).

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Pursing Sources of Funding; Law College Appointment; Summer Tour Planning

from the DIRECTOR

J. Michael Jess

by J. Michael Jess

Like more than 50 others across the nation, the Nebraska Water Center was organized following passage of federal legislation in 1964. Initial allocations of federal funds from the U.S. Geological Survey to each water center (properly referred to as water resources research institutes in some states) amounted to $100,000. Since then federal appropriations have slowly dropped and nearly 40 years of inflation have further substantially diminished the purchasing power of this annual allocation.

Reasons for the lack of federal funds to support campus water resources research and training of scientists and engineers vary. Some fault U.S. Department of Interior officials; others point to the Office of Management and Budget. One thing is certain. Members of Congress have been supportive. Unfortunately, federal support for continued research and training through activities of the nations' water centers/institutes has become a routine budget conflict between the legislative and executive branches in Washington D.C.

At the annual meeting of water center/institute directors last month, Kyle Hoagland and I urged an association lobbying effort aimed at increasing the amount of federal funds to be channeled to each state and territory. As with many things political, compromise resulted in not totally achieving our objective. Those attending the annual meeting agreed to pursue a $125,000 annual allocation target for each of the nation's 56 water centers/institutes.

Kyle Hoagland is currently helping to craft plans for a new university water resources research initiative with help from NU Vice Chancellor for Research Prem Paul. A variety of activities for initiative funds are envisioned. One of them will soon be underway.

Professor Sandra A Zellmer recently obtained a one-year leave of absence from the University of Toledo, in order to accept an academic appointment at the UNL College of Law. Her plans call for arrival on campus this coming summer. Besides teaching and research at the NU Law School, Sandi is making tentative plans for a second semester water and natural resources conference that will be open to students, faculty and working professionals. This will likely occur in early to mid-spring of 2004. The Water Center will provide assistance for this event. Watch for details sometime this coming autumn.

Also, detail planning is continuing for July's water and natural resources tour, in conjunction with the Four States Irrigation Council, to the Republican River basin. We have visited the area and have a long list of tentative stops and speakers. We are now in the process of working through those lists to come-up with an agenda. What we've found, as is normally the case in planning these tours, is that there are simply more things to see and more people eager to talk to our group than we will possibly have time for. The good news is that this dilemma will ensure us of a very educational and fun tour. Registration mailings will be forthcoming once the details are worked-out.

WATER CURRENT

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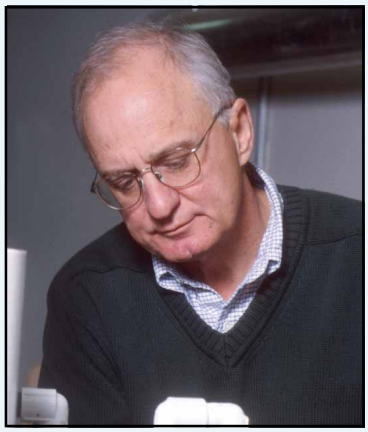
Meet the Faculty

Dr. Dean E. Eisenhauer

Hydrologic and Irrigation Engineer and Professor, Biological Systems Engineering, University of Nebraska-Lincoln. Courtesy appointment in UNL's School of Natural Resource Sciences. At UNL since 1976. Registered Professional Engineer.



Dean Eisenhauer

Education:

Ph.D. in Agricultural Engineering, Colorado State University, 1984.
M.S. in Agricultural Engineering, Kansas State University, 1973.
B.S. in Agricultural Engineering, Kansas State University, 1971.

Current Research/Extension Programs:

— Research interests include engineering of vegetative buffers for riparian and upland ecosystems; water measurement techniques in shallow streams and irrigation pipelines; systems for irrigation; measurement and control of surface irrigation infiltration variability; spatial variability of infiltration in hydrology and irrigation; field measurement of green-AMPT infiltration parameters; and hydrologic impacts of land and water use practices in irrigated agricultural regions.

Examples of Current Projects:

— Infiltration in vegetative buffer systems, USDA Forest Service, D. Eisenhauer, T. Franti, M. Dosskey.
— Control of agricultural loading to streams using grassed buffers in great plains watersheds. USDA CSREES. D. Eisenhauer, R. Spalding, T. Franti, D. Snow, and M. Dosskey.
— Middle Missouri River biomonitoring and assessment. Missouri River Natural Resources Committee. D. Marx, K. Hoagland, T. Franti, and D. Eisenhauer.
— Sediment trapping in Beaver dams in small streams. ARD undergraduate research grant, J. Harper and D. Eisenhauer.
— Water Quality Functions of Vegetative Buffer Systems: Evaluation Procedures and Enhancements, USDA Forest Service, D. Eisenhauer, T. Franti, M. Dosskey.

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Dr. John S. Stansbury

Environmental Engineer and Assistant Professor, UNL Department of Civil Engineering (offices at the University of Nebraska at Omaha) since 1995. Interests include water resources, water quality, hazardous waste, risk assessment and risk management Licensed professional engineer in Nebraska.

Education:

Ph.D. in Engineering, University of Nebraska-Lincoln, 1991.
M.S. in Environmental Engineering, University of Nebraska-Lincoln, 1989.
B.S. in Biology, Kearney State College, Kearney, NE, 1972.

Current Research/Extension Programs:

— Constructed Wetlands: Monitoring constructed wetlands at several Nebraska locations to evaluate how they can be used to treat domestic and municipal wastewater. Use of constructed wetlands is a relative new and potentially cost-effective approach to wastewater treatment using "natural" processes to break down and remove the constituents in the wastewater. One of the major questions we are trying to evaluate is how well these systems will perform in the cold winters of the midwest.
— Lake Ogallala Dissolved Oxygen Study: Lake Ogallala is a small tail-water lake below Kingsley Dam in western Nebraska. The lake, which has been a productive trout fishery for many years, has recently experienced problems with low dissolved oxygen levels. A project team is studying the water circulation patterns and the potential sources and sinks of dissolved oxygen in the lake in an effort to restore dissolved oxygen to levels that are healthy for the fishery.
— Papillion Creek Watershed Management Study: This is a multidisciplinary effort to evaluate the current decision-making processes in the watershed. The study is assessing management issues in the watershed and is

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John Stansbury

Planning Continues for July Tour of Republican River Basin

by Steve Ress

Planning for this summer's water and natural resources field trip to the Republican River basin are beginning to jell and it is anticipated that registration materials will be mailed in the next few weeks.

The tour leaves the Kearney Ramada Inn, Tuesday morning, July 22 and concludes there late afternoon, Thursday, July 24.

"Our primary focuses will be looking at local responses to the settlement of the Kansas v. Nebraska lawsuit and how southwest and south central Nebraska are coping with the ongoing drought in the Republican River watershed," said tour co-organizer Michael Jess, Acting Director of the UNL Water Center.

Organizers could still make changes to the itinerary, but the following highlights are planned:

Tuesday, July 22

Visit the Dancing Leaf Lodge near Wellfleet and then proceed to Imperial for discussions with local NRD officials on water well permit moratoriums, metering compliance, exchanges of groundwater among local irrigators and local views of the terms in the Kansas v. Neb. interstate water compact settlement.

Inspect the south fork of the Republican River near Benkelman, where the river flows from Kansas into Nebraska and then proceed to Swanson Reservoir. Overnight will be in McCook where a "Cream can stew" will be served in the city park adjacent to the George Norris house.

Wednesday, July 23

Visit Harry Struck Reservoir and discuss exposures of the Ogallala formation found near there.

Frenchman-Cambridge Irrigation District officials will later talk to the tour about drought and lawsuit settlement issues in their district before the tour proceeds to lunch in Alma and discussions with Lower Republican NRD officials there.

The group will get a close look at Harlan County Reservoir as well, including a discussion of geological exposures and faulting visible along the south shoreline of the reservoir.

Overnight will be in Holdrege.

Thursday, July 24

First stop will be Kahr Farms near Bloomington where UNL hydrogeologist Jim Goeke will explain some of the investigations done in the area for the Nebraska Department of Natural Resources and Nebraska Attorney General's office in conjunction with the Kan. v Neb. lawsuit. Geological outcroppings in the area will also be examined.

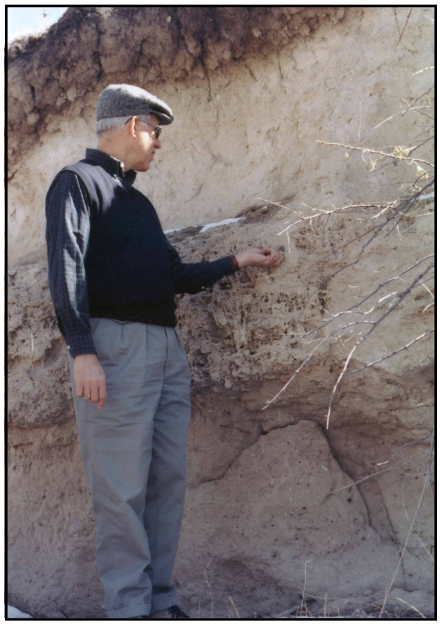
Canal lining activities and operations of the Nebraska Bostwick Irrigation District in Red Cloud will be the next stop before a catered lunch at Red Cloud's Webster County Community Center.

A final stop will be at the Guide Rock diversion dam, where the Courtland canal diverts Republican River water to neighboring Kansas. There, Nebraska Bostwick officials will explain operational obligations and deliveries of water to the Kansas Bostwick Irrigation District.

The tour expects to return to Kearney by late afternoon.

A block of rooms will be available at the Kearney Ramada Inn the night prior to the tour, for those wanting to drive-in on Monday.

Tour co-sponsors are the Nebraska Water Conference Council, Central Nebraska Public Power and Irrigation District, Gateway Farm Show, Kearney Area Chamber of Commerce, Nebraska Association of Resources Districts, Nebraska Public Power District, The Groundwater Foundation, U.S. Geological Survey - Nebraska District and UNL's Water Center, School of Natural Resource Sciences and Conservation and Survey Division.



Mike Jess examines an outcropping of the Ogallala formation at Enders Reservoir near McCook (photo: Steve Ress).

Guest Column:

Earth Systems Education: Opportunity and Challenges

by David C. Gosselin,
Research Hydrogeologist/Geochemist,
UNL School of Natural Resource Sciences and Conservation and Survey Division

In January 1993, the Nebraska Earth Systems (formerly Science) Education Network (NESEN) was launched to improve collaboration and exchange of information between K-12 educators and the expertise and resources at the University of Nebraska-Lincoln (UNL) as well as at other professional Earth Science organizations.

Through the efforts of many K-12 Nebraska educators and faculty/staff at University of Nebraska-Lincoln, NESEN is considered by K-12 educators as a beneficial and educationally relevant interdisciplinary outreach and educational program. NESEN currently has more than 550 members from 25 states and several foreign countries.

It has provided professional development opportunities for over 750 teachers that include workshops that range from one hour to five days. NESEN has an infrastructure and experience that can contribute to the development of relevant local and state-wide educational partnerships in a timely fashion.

UNL has many areas in which a national reputation in the area of undergraduate education can or has developed. For example, faculty in the Math Department have developed a nationally recognized math education program. I would suggest that another area with potential for developing a national reputation is Earth Systems Science Education.

There are several reasons. First, we have a large group of research and educational programs within UNL in the broad area of Earth Science, many of which are supporting and/or collaborating with NESEN.

Second, preschool to postgraduate students experience the earth system every day but do not have a basic understanding of the dynamic interactions between the biological, chemical and physical processes that control the Earth system. The Earth system serves as a natural laboratory that is intrinsically interesting and readily accessible to all students; it effectively demonstrates applications of fundamental principles of the physical and life sciences, mathematics and technology.

To develop practical solutions to environmental and natural resource issues, all citizens need a basic understanding of the earth upon which they live. This is one reason why the earth and space sciences have become an integral part of the National Science Education Standards.

Third, an Earth Systems Science Education program with this approach cuts across disciplines, helps get away from content ownership and focuses on current issues and problems, which is a key component in science education reform movements. Fourth, resources are available to support the development of Earth systems science education programs from a variety of federal agencies including the National Science Foundation and National Aeronautics and Space Administration.

Although as a university and state, we face many challenges, I hope the newly formed natural resources unit that includes the Nebraska Water Center, School of Natural Resources Sciences, and the Conservation and Survey Division at UNL will provide the leadership for what could be called, the Nebraska Earth Systems Research, Training and Education Alliance. This could take advantage of the unique resources that each unit has to meet the evolving educational needs of the citizens in the state and region.

Guest Column:

Dealing With the Impacts of A "Modern" Drought

by Donald A. Wilhite,
Director, National Drought Mitigation Center &
International Drought Information Center,
UNL School of Natural Resource Sciences

Few of us remember the protracted droughts of the 1930s and 1950s and the hardships that resulted, but severe and widespread drought conditions throughout the nation in recent years have reminded us of our continuing vulnerability to this slow-onset natural hazard. In Nebraska, the last three years have been sobering, a reminder of how dependent we are on a highly variable natural resource, water.

Most people associate the most serious impacts of drought with agriculture. Agriculture is usually the first sector to be affected and subsequent declines in agricultural production in turn affect Nebraska's economy. Multi-year droughts, such as those we have experienced recently, are even more devastating because impacts continue and magnify in subsequent years. If drought conditions persist into the summer of 2003, as it would appear they will, impacts will likely be much greater than in 2002 in Nebraska, the central Great Plains, and the western states. Crop production losses in Nebraska in 2002 were estimated at $1.2 billion.

An often asked question is, could we have a recurrence of the 1930s drought in the future? From a climatological perspective, the answer is yes. During the 1930s, drought conditions of varying degrees of severity plagued the Great Plains, Midwest, and West for a decade or more. History will repeat itself. Extended drought periods are a normal part of the climate.

A more complex element of this question is what would be the impact of a 1930s-type today. Most people assume that impacts would be less severe today because of improved agricultural practices, resource management techniques, and a variety of other factors. The fallacy of this assumption is obvious given the impacts of recent droughts in the state and nation and what may lie ahead in 2003. It is clear, however, that the impacts would be much different.

To fully appreciate the implications of an extended drought episode today for Nebraska, the Great Plains, and the nation, we need to better understand the full range of economic, social, and environmental impacts associated with drought. This discussion is beyond the scope of this editorial, but a brief overview would be illustrative.

Our society has changed dramatically since the 1930s. As a result, our vulnerability to drought has also changed. The question is, are we more or less vulnerable to drought today.

Impacts are increasing and becoming more complex. Annual drought losses in the United States, estimated at between $6-8 billion, now exceed those from any other natural hazard. The impacts of the 2002 drought nationwide were likely $20-$30 billion.

Why are drought impacts increasing? U.S. population has increased and shifted from humid, less drought-prone climates to arid, more drought-prone climates. This increase and regional shifts in population have increased demand for limited water resources, increased competition and conflicts between water users, and placed greater stress on water supplies. For many areas of the west, water supplies are over appropriated.

Today, people are concentrated in urban areas, overtaxing the ability of many communities and water supply systems to provide water during droughts. One need only look at the number of cities in 2002 that were under severe water restrictions to reinforce this point. What new or alternative water sources exist for these cities and at what economic and environmental cost? Most of this water must come from improved water use efficiency and through transfers from the agricultural sector.

Energy use has increased, but drought reduces hydroelectric power production and forces a shift to more expensive sources of energy. We are now placing greater importance on environmental protection, resulting in the reallocation of water supplies to the protection of critical ecosystems. The result has been increased competition and conflicts between users. We spend an increasing amount of time on leisure activities, many of which are water and natural resource dependent. Some of the greatest impacts of recent U.S. droughts have been in the recreation and tourism sector, which now competes with hydroelectric power, irrigation, transportation, and the environment for limited water resources. Drought losses attributed to recreation and tourism in Colorado in 2002 were estimated at $1.7 billion. These are just a few examples of why we are more vulnerable today.

It is clear that we must reduce the impacts of future droughts. Improved planning and better coordination within and between levels of government will help, but effective drought planning begins with the individual. We must all place a higher value on preserving water and other natural resources and strive to use them wisely. This is never more apparent than during a drought, when water supplies are scarce. Unfortunately, it is only at this time that we truly appreciate the value of water.

Researchers Honing Methods to Sample Field Run-off Water (continued from page 1)

publicly fund two million miles of new buffer strips nationwide by this year," Eisenhauer said.

Buffer strips can vary greatly in width, vegetative composition, age and level of development. These and other variables effect their performance in trapping sediments and pesticides. Still, it is known that properly buffered fields can be up to 90 percent effective in controlling runoff.

The sampling devices being developed and evaluated at UNL will help other researchers more accurately assess buffer strip design and construction. An even simpler version of the device is being developed for use by conservation agencies and natural resource districts. Versions of this device could use a plastic bottle containing a floating cork that would collect a small amount of runoff and then seal themselves with the cork when the bottle is full. The bottle and contents could then be removed from the buffer strip for laboratory analysis.

The research is being supported by an ARD interdisciplinary grant, the USDA's National Agroforestry Center at UNL and the Nebraska Corn Development, Utilization and Marketing Board.

Meet the Faculty

Dean E. Eisenhauer (continued from page 3)

— Hydrologic Modeling for Enhanced Design and Management of Vegetative Filter Strips, Channing B., and Katherine W. Baker Fund, D. Eisenhauer. T. Franti.
— Clear Creek Riparian Buffer Project, Central Platte NRD, Nebraska Corn Growers Association, Nebraska Department of Agriculture, Nebraska Research Initiative, R. Spalding, D. Eisenhauer, T. Franti, D. Snow.
— Development and Testing of Field Techniques for Estimating the Effectiveness of Vegetative Filter Strips, ARD Interdisciplinary Grant, D. Eisenhauer, M. Dosskey, T. Franti, K. Hoagland, D. Marx.
— Accuracy of Water Metering of Irrigation Wells with Cascading Water and Air Pumping: An Exploratory Study, Lower Republican NRD, D. Eisenhauer, B. Benham.

Examples of Past Research/Extension Programs:

— Water Quality Functions of Vegetative Buffer Systems: Evaluation Procedures and Enhancements, USDA Forest Service, (1999-2000), D. Eisenhauer, T. Franti, M. Dosskey.
— Hydrologic Modeling for Enhanced Design and Management of Vegetative Filter Strips, Channing B., and Katherine W. Baker Fund, (1999-2001), D. Eisenhauer, T. Franti.
— Development and Testing of Field Techniques for Estimating the Effectiveness of Vegetative Filter Strips, ARD Interdisciplinary Grant, (2000-2002), D. Eisenhauer, M. Dosskey, T. Franti, K. Hoagland, D. Marx.
— Development and Testing of Field Techniques for Assessing the Water Quality Impacts of Grass Filters, Nebraska Corn Development and Utilization Board, (1998), D. Eisenhauer, M. Dosskey, T. Franti, K. Hoagland.
— Movement of Agricultural Chemicals Beneath Conservation Tilled-Furrow Irrigated Land, USDA-CSRS, (1991-1994), D. Eisenhauer, R. Ferguson, F. Roeth, R. Spaldng.
— Improved Application of Ultrasonic Water Flow Measurement in Irrigation, Burlington Northern Foundation, (1996-1997), D. Eisenhauer, B. Benham, R. Hotchkiss.
— Reactive Management of Surge Irrigation Using Evapotranspiration Data, High Plains Climate Center, (1994-1996), D. Eisenhauer, J. Cahoon, C. Yonts.
— Conservation Tillage Effects on Denitrification from Irrigated Corn, National Water Research Institute, (1994-1996), D. Eisenhauer, J. Cahoon, C. Yonts.

Teaching (Examples of Courses Taught):

Soil Conservation and Watershed Management.
Soil and Water Resources Engineering.
Irrigation Systems Management.
Design in Agricultural and Biological systems Engineering (project advising).
Hydrologic Modeling of Small Watersheds.
Modeling Vadose Zone Hydrology.

Samples of Publications:

— Dosskey, M.G., M.J. Helmers, D.E. Eisenhauer, T.G. Franti, and K.D. Hoagland, 2002. Assessment of Concentrated Flow Through Riparian Buffers, *Journal of Soil and Water Conservation*, 57(6): 336-343.
— House, M.L., W.L. Powers, D.E. Eisenhauer, D.B. Marx, and D. Fekersillassie, 2001. Spatial Analysis of Machine-Wheel Traffic Effects on Soil Physical Properties, *Soil Science Society of America J.* 65: 1376-1384.
— Johnson, A.L., B.L. Benham, D.E. Eisenhauer, and R.H. Hotchkiss, 2001. Ultrasonic Water Measurement in Irrigation Pipelines With Distrubed Flow, *Trans. of the ASAE*, 44(4): 899-910.
— Eisenhauer, D.E., D. Fekersillassie and A. Boldt, 2000. Feedback-Controlled Surge Irrigation: III. Field Experiments, *Trans. of the ASAE* 43(6): 1643-1649.

— Eisenhauer, D.E., D. Fekersillassie and A. Boldt, 2000. Feedback-Controlled Surge Irrigation: III. Field Experiments, *Trans. of the ASAE* 43(6): 1643-1649.
— Fekersillassie, D. and D.E. Eisenhauer, 2000. Feedback-Controlled Surge Irrigation: II. Operating Criteria, *Trans. of the ASAE* 43(6): 1631-1641.
— Fekersillassie, D. and D.E. Eisenhauer, 2000. Feedback-Controlled Surge Irrigation: I. Model Development, *Trans. of the ASAE* 43(6): 1621-1630.
— Powers, W.L., M.L. House, R.D. Tejral and D.E. Eisenhauer, 1999. A simultaneous data collection system for several soil water release curves. *Applied Engineering in Agriculture* 15(5): 477-481.
— Parker, D.B., D.E. Eisenhauer, D.D. Schulte and D.L. Martin, 1999. Modeling seepage from an unlined beef cattle feedlot runoff storage pond. *Trans. of the ASAE* 42(5): 1437-1445.
— Parker, D.B. D.D. Schulte and D.E. Eisenhauer, 1999. Seepage from earthen animal waste ponds and lagoons - an overview of research results and state regulations. *Trans. of the ASAE* 42(2): 485-493.
— Parker, D.B., D.E. Eisenhauer, D.D. Schulte and J.A. Nienaber, 1999. Seepage characteristics and hydraulic properties of a feedlot runoff storage pond. *Trans. of the ASAE* 42(2): 369-380.
— Cahoon, J.E., D.E. Eisenhauer, R.W. Elmore, F.W. Roeth, B. Doupnik, Jr., R.A. Selley, K. Frank, R.B. Ferguson, M. Lorenz and L.J. Young, 1999. Corn yield response to tillage with furrow irrigation. *J. Prod. Agric*. 12(2): 269-275.
— Boldt, A.L., D.E. Eisenhauer, D.L. Martin and G.J. Wilmes, 1999. Water conservation practices for a river valley irrigated with groundwater. *Agricultural Water Management*, 38(3): 235-256.
— Enciso-Medina, J., D.L. Martin and D.E. Eisenhauer, 1998. Infiltration model for furrow irrigation. *J. Irrig. and Drain. Engr*., ASCE 124(2): 73-80.
— Katupitiay, A., D.E. Eisenhauer, R.B. Ferguson, R.F. Spalding, F.W. Roeth and M.W. Bobier, 1997. Long-term tillage and crop rotation effects on residual nitrate in the crop root zone and nitrate accumulation in the intermediate vadose zone. *Trans. of the ASAE*, 40(5): 1321-1327.

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John S. Stansbury (continued from page 3)

evaluating the impacts on the watershed of various management policies. The study also is evaluating the potential for using multi-criteria decision-making tools to facilitate management of urbanizing watersheds like that of the Papillion Creek.

Past Research/Extension Programs:

Omaha Public Schools pollution prevention study.
Engineering guidance for pollution prevention at hazardous waste sites.
Evaluation of use of zero-valent iron to remediate PCB-contaminated sediments.

Teaching:

— Water resources and environmental engineering courses in the Department of Civil Engineering. Courses taught focus on water resources, water quality, hazardous waste management and risk assessment. Courses have included fluid mechanics, principles of environmental engineering, introduction to water resources engineering, solid waste engineering, water resources development, water resources law and hazardous waste site investigation, among others.

Publications:

— Stansbury, J. and A. Mittelsdorf, 2000. Economic and Environmental Analysis of Retrofitting a Large Office Building with Energy Efficient Light Systems, *Environmental Management* (accepted for publication, 2001).
— Stansbury, J., I. Bogardi, E.Z. Stakhiv, 1999. Risk-Cost Optimization under Uncertainty for Dredged Material Disposal, *Journal of Water Resources Planning and Management* 125(6).
— Lee, M.A., J.S. Stansbury, T.C. Zhang, 1999. The Effect of Low Temperatures on Ammonia Removal in a Lab-Scale Constructed Wetland, *Water Environment Research*, May/June 1999.
— Adelman, D.D., J. Stansbury and M.A. Tabidian, 1998. A Risk/Cost Analysis to Manage Viral Contamination of Groundwater, *Water Science Technology* 38(12) 1-6.
— Ritterling, J. and J. Stansbury, 1998. Alternative Use of the Multimed Model for Subtitle D Landfill Applications. *ASCE Practice Periodical of Hazardous, Toxic and Radioactive Waste Management* 2(4).
— Saari, R., J. Stansbury and F. Laquer, 1998. Effect of Sodium Xylenesulfonate on Zinc Removal from Industrial Wastewater, *ASCE Journal of Environmental Engineering*, 124(10)

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Probing the Secrets of Salty Groundwater

by Steve Ress

Getting salty groundwater to tell its secrets may help save rare southeast Nebraska saline wetlands.

"These saline wetlands don't occur in many places across the United States outside coastal areas. If we identify how groundwater moves beneath them and feeds the salt marshes, we can help preserve these threatened ecosystems," said Ed Harvey, a University of Nebraska hydrogeologist and geochemist.

Harvey and UNL colleagues Jerry Ayers and Dave Gosselin are monitoring groundwater in the Dakota Aquifer under the Jack Sinn Wildlife Management Area near Ceresco and a Nature Conservancy wetland on Salt Creek near Raymond. They're analyzing the groundwater's chemical content and how it reaches the surface to replenish salt marshes.

Saline wetlands occur mainly in Salt Creek's floodplain in Lancaster and Saunders counties. Their salinity comes from groundwater passing through underground rock formations containing salts deposited by a sea that covered Nebraska over 100 million years ago.

Using carbon-14 dating techniques, Harvey's team determined groundwater at the sites is between 15,000 and 35,000 years old. Carbon-14 dating determines the approximate age of organic materials by comparing the amount of the radioactive isotope carbon-14 found in the sample to the amount in today's atmosphere.

The researchers also found the groundwater has salt concentrations as high as 15,000 milligrams per liter.

"That's salty, considering most seawater is about 35,000 milligrams per liter," the Institute of Agriculture and Natural Resources scientist said.

How and when that salty groundwater reaches the surface to feed surrounding marshes remains a mystery Harvey's team aims to solve.

"Our goal is to understand the flow dynamics of the groundwater and identify the origin of the saline water within the wetland's soils and underlying aquifer," Harvey said.

This information could help save threatened salt marshes, which don't appear to be getting as much salt as they used to. Researchers are working to quantify potential salinity changes.

"We know there are artesian conditions within the underlying aquifer that are moving water upward toward the stream valleys, but just how the salt actually gets from the upwelling water to the marshes still isn't entirely clear," Harvey said.

Most of the groundwater they've tested came from wells researchers drilled at the two sites.

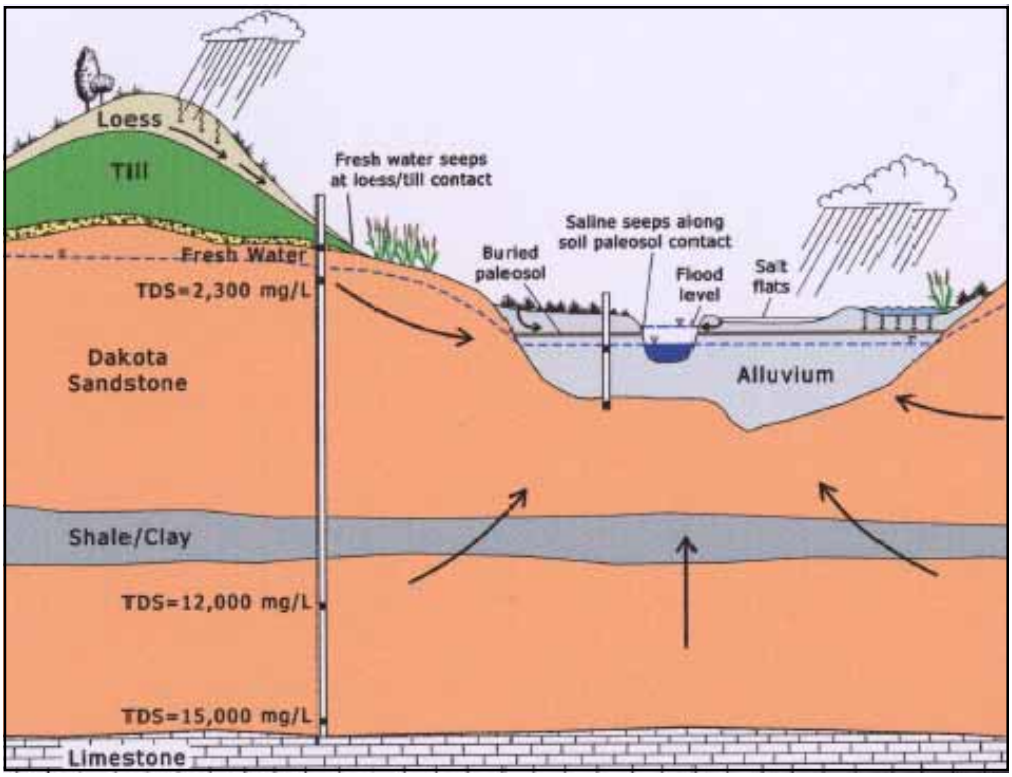
Over time, Salt Creek's natural flows have cut a deeper channel and the creek bed gradually has dropped farther below the surrounding land.

Because of this, salty groundwater-fed stream water that used to overflow creek banks with flooding rains doesn't seem to be happening often enough to replenish salts in the marshes. It's these salty-soil conditions that plants like Salt Wort and insects like the endangered Salt Creek Tiger Beetle need to survive.

"We're determining how the salt is being transported to the surface to replenish the marshes and the possibility that rain is just recycling existing soil salt when the marshes flood. That's the next big step in our research," Harvey said.

The U.S. Environmental Protection Agency funds this research, which is a collaborative effort between UNL, The Nebraska Game and Parks Commission and The Nature Conservancy.

(Editor's Note: Previously published in the March, 2003 edition of UNL's "Research Nebraska" magazine).



Water News Briefs

USGS Fact Sheet on Lincoln Ground Water

The U.S. Geological Survey (USGS) has recently published fact sheet *Age of Ground Water at City of Lincoln's Municipal Well Field near Ashland, Nebraska* by G.V. Steele. The publication was released as USGS Fact Sheet 091-02 on Jan. 17, 2003.

Copies are available from USGS, Water Resources Division, Federal Building, Room 406, 100 Centennial Mall North, Lincoln, NE 68508 or contact USGS Technical Editor Kathy Wilson at (402)437-5663 or email kewilson@usgs.gov.

Free Calendars/Special Issues

A limited number of 2003 calendars and copies of the October, 2002 Water Current commemorating the U.S. Bureau of Reclamation's centennial are available from the UNL Water Center.

The calendar commemorates dedication to water use, development and conservation by UNL's Water Center and Conservation and Survey Division through the years.

The 16-page Water Current issue is largely devoted to the history of Bureau of Reclamation irrigation projects in Nebraska and eastern Wyoming.

Both publications will be distributed on a first-come, first-served basis while available.

AASG To Meet in Lincoln

The Association of American State Geologists will hold their 95th annual meetings in Lincoln Friday, June 13 through Thursday, June 19.

The event is being hosted by the Nebraska Geological Survey, Conservation and Survey Division, and Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln.

Additional information and online registration are available at http://csd.unl.edu/aasg.

Meetings will be headquartered at Lincoln's Embassy Suites Hotel and Convention Center, adjacent to the UNL campus.

A variety of field trips will be offered, including opportunities to inspect geological sites and significant exposures throughout Nebraska. Other trips will focus on the development of Nebraska's groundwater and industrial applications of the state's mineral wealth. A special post-meeting field trip will visit Ashfall Fossil Beds in northeast Nebraska.

Spouses can visit Nebraska City, home of the National Arbor Day foundation; the DeSoto Bend historical site and the Western Heritage Museum; and Lincoln's State Capitol and nearby Governor's mansion.

We're Updating!!

We are updating our mailing list. If you have a change of address, title and/or name, or would like to have your name added to or removed from the *Water Current* mailing list, please let us know. Also, if you know of anyone who might be interested in receiving our publications, please give us their names and we will be glad to add them to our mailing list.

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Send update to:

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P.O. Box 830844, Lincoln, NE 68583-0844
FAX (402)472-3574
or e-mail changes to sress1@unl.edu

April

13-16: Ninth Annual Industrial Wastes Technical and Regulatory Conference, Adam's Mark San Antonio Riverwalk Hotel, San Antonio, TX. Sponsored by the Water Environment Federation. For information, go to www.wef.org, phone (800)666-0206 or email confinfo@wef.org.

16: "Conservation Benefits of Riparian Buffers," Dean E. Eisenhauer, Professor, Biological Systems Engineering, Lincoln. UNL School of Natural Resources Water and Natural Resources Seminars, Room 116 L.W. Chase Hall, UNL East Campus, 3:00 - 3:50 p.m.

22-25: Sixteenth Annual National Conference on Enhancing the states' lake Management Program, Chicago, IL. Contact Bob Kirschner, Chicago Botanic Garden, at bkirschn@chicagobotanic.org.

23: "ACI-Evolution of the Giant Scenarios and Giant Lobelias On The Mountains Of Eastern Africa," Eric Knox. UNL School of Natural Resources Water and Natural Resources Seminars, Room 116 L.W. Chase Hall, UNL East Campus, 3:00 - 3:50 p.m.

23-25: Sixth National Mitigation Banking Conference. For information, go to www.mitigationbankingconference.com, email cbahler@erols.com or phone (703)837-9763.

29-30: Twenth-sixth Annual Conference on Analysis of Pollutants in the Environment, Chicago, IL. Sponsored by the U.S. EPA. Contact Marion Kelly at (202)566-1045 or email Kelly.Marion@epa.gov.

30: "Water and War: Issues for the 21st Century," Peter Gleick, Pacific Institute for Studies in Development, Environment and Security. UNL School of Natural Resources Water and Natural Resources Seminars, (note: Lecture is at the Lied Center for Performing Arts, 12th and R Sts., at 3:30 p.m. and is part of the E.N. Thompson Forum on World Issues).

May

1-4: American Wetlands Conference, Minneapolis, MN. Sponsored by the Izaack Walton League of America. For details, phone (800)BUG-IWLA or go to www.iwla.org/sos/awm/conference.

11-14: Agricultural Hydrology and Water Quality Spring Specialty Conference, Kansas City Marriott Downtown, Kansas City, MO. Sponsored by American Water Resources Association. For information, go to www.awra.org.

12-14: AWRA's 2003 Spring specialty Conference: Agricultural Hydrology and Water Quality, Kansas City, MO. Contact Ramesh Kanwar, Iowa State University, Ames, IA at (515)294-1434 or email rskanwar@iastate.edu.

June

4: National Source Water Protection Conference, Washington D.C., "Protecting the Sources of the Nation's Drinking Water: Opportunities for Action. Information available online at http://www.epa.gov/safewater/protect/swpconf.html.

8-11: Eighth National Watershed Conference, Council Bluffs, IA. Contact Tammy Sawatzky, National Watershed Coalition, (405)521-4823 or email NWCTammy@aol.com or online at http://www.watershedcoalition.org.

9-13: 48th Institute in Water Pollution Control, Manhattan College, Riverdale, NY. Two one-week courses offered concurrently on Water Quality Modeling and Treatment of Contaminated Waters. Cost for each course is $1,200. For further information, contact Nafeeza Altaf at (718)862-7276 or email nafeeza.altaf@manhattan.edu.

13-19: Association of American State Geologists, 95th Annual Meeting, hosted by Nebraska Geological Survey, Conservation and Survey Division, and Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln. Information and registration available online at http://csd.unl.edu/aasg.

29-July 2: International Congress on Watershed Management for Water Supply Systems, Melennium Hotel Broadway New York, New York, NY. Sponsored by the American Water Resources Association. For information, go to www.awra.org.

July

22-24: Water and Natural Resources Summer Tour, Kearney. Co-sponsored by the UNL Water Center, Four States Irrigation Council and others. This year's tour focuses on the Republican River watershed. For information, go to http://watercenter.unl.edu, email sress1@unl.edu or phone (402)472-3305.

August

12: New Mexico Symposium on Hydrologic Modeling, a one-day technical symposium, Macey Center, New Mexico Tech, Socorro, NM. Abstracts are being accepted through July 1. For information on the symposium or submission of abstracts, contact Catherine Ortega Klett at the New Mexico Water Resources Research Institute at (505)646-1195 or coklett@wrri.nmsu.edu

September

17-20: Arizona Hydrological Society 2003 Annual Symposium, "Sustainability Issues of Arizona's Regional Watersheds," Mesa Centennial Center, Mesa, AZ. For information, go to www.azhydrosoc.org, email Pkroopnick@brwncald.com or phone (602)567-3850.

October

1-3: Forty-Eighth Annual Midwest Ground Water Conference, Fetzer Center, Western Michigan University. Abstracts being accepted until May 31. Session topics include: Agricultural chemicals in ground water; modeling, management and sustainability of ground water resources; novel remediation methods; applications of isotopes in ground water; geophysical applications to ground water flow and contamination; and ground water interactions with lakes and rivers. For more information, call Alan Kehew at (269)387-5486 or email alan.kehew@wmich.edu. Online at http://www.wmich.edu/geology/mwgwc.html

November

2-5: American Water Resources Association Annual Conference, Hilton San Diego Resort, San Diego, CA. For information, go to www.awra.org.

Time For the Last Word

We want to know what you think.

Please take a few minutes to fill-out and return our annual reader survey. If you do, we will enter your name in a drawing for one of three Water Center coffee mugs. To be eligible for the drawings, return your completed survey by **Friday, June 6** to Steve Ress, UNL Water Center, P.O. Box 830844, University of Nebraska, Lincoln, NE 68583-0844 or FAX it to (402)472-3574. NU subscribers may return surveys via campus mail to 103 NRH, EC 0844. Please mail or FAX the entire page (so we have your name for the coffee mug drawings.....your comments, on the other hand, will be held in confidence).

1. **Rank in order of importance, the usefulness of the following general areas of the *Water Current* (1 - most important to 7 - least important):**

   ___ News Briefs

   ___ Calendar

   ___ Meet the Faculty

   ___ Previews of upcoming events, seminars, conferences, etc.

   ___ Director's Notes

   ___ Articles on water and environmental research

   ___ Guest editorials/columns

2. **What articles would you like to see in upcoming *Water Currents*?**

   _____

   _____

   _____

3. **What are your primary water and environmental interest?**

   _____

   _____

   _____

4. **Do you read each issue of the *Water Current* you receive?**

   ___ Yes ___ No

5. **Do you circulate your copy of the *Water Current* to anyone else?**

   ___ Yes (if so, how many others _____)

   ___ No

6. **Should the *Water Current* be distributed**

   ___ more often

   ___ less often

   ___ remain six issues per year

7. **Do you like the revised appearance of the *Water Current* and the new two-color logo on the top of the front page?**

   ___ Yes ___ No

8. **Do you ever access the virtual copy of the *Water Current* on the *Water Center's* web site at http://watercenter.unl.edu?**

   ___ Yes ___ No

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