

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Water Current Newsletter

Water Center, The

---

2-2003

## Water Current, Volume 35, No. 1, February 2003

Follow this and additional works at: [https://digitalcommons.unl.edu/water\\_currentnews](https://digitalcommons.unl.edu/water_currentnews)



Part of the [Water Resource Management Commons](#)

---

"Water Current, Volume 35, No. 1, February 2003" (2003). *Water Current Newsletter*. 71.  
[https://digitalcommons.unl.edu/water\\_currentnews/71](https://digitalcommons.unl.edu/water_currentnews/71)

This Article is brought to you for free and open access by the Water Center, The at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Water Current Newsletter by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

## Summer Water/Natural Resources Tour Examines Republican River Issues

by Steve Ress

**T**his summer's annual water and natural resources tour will examine issues and potential impacts related to the recent settlement of the Republican River lawsuit.

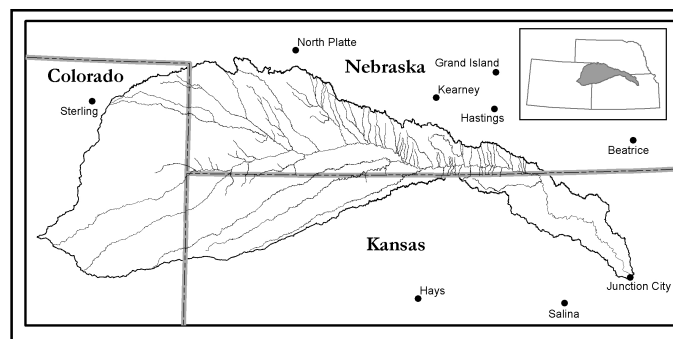
Though planning is only in preliminary stages, tour dates will be July 21-23, beginning and ending in Kearney.

"Obviously, with the recent settlement of the long contested lawsuit, plus some of the harshest drought conditions anywhere in Nebraska, we believe this is an area of considerable interest to state water users, natural resources district and state agency staffs, educators and researchers and others," said Michael Jess, acting director of the University of Nebraska-Lincoln Water Center.

Settlement of the lawsuit was announced in mid-December. The suit, initiated by the State of Kansas against the States of Nebraska and Colorado, focused on each state's compliance with the 1943 Republican River Compact.

Provisions of the settlement include a basin-wide moratorium on construction of new irrigation wells, among others.

Many of this summer's tour stops will include facilities directly relating to compliance with terms of the settlement, as well as others having general agricultural and natural resources interest. Tour co-sponsors will visit the area and plan details of the trip in early March, Jess said.



This summer's water and natural resources tour will visit a number of locations in the Republican River Basin (courtesy of Less Howard, UNL Conservation and Survey Division).

"Expectations and how local and state water management officials intend to enforce compliance with terms of the settlement will also be explored," he said.

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

Additional tour details will be presented in the April *Water Current*.

### INSIDE

- 2..... Geologists to Meet in Lincoln
- 3..... Meet the Faculty
- 4..... New Lab Equipment
- 5..... Guest Column

- 6..... Guest Column
- 10..... Water News Briefs
- 11..... Calendar
- 12..... Free Lectures Continue

# Plans Taking Shape for Summer Tour; State Geologists to Meet in Lincoln

## from the DIRECTOR



J. Michael Jess

### 2003 Water & Natural Resources Tour

**F**or nearly two decades, Nebraska and several surrounding states have intently disputed the allocation of stream flows in the North Platte and Republican Rivers. Each time, the disputes were taken to the U.S. Supreme Court. In addition to their courtroom efforts, the sides entered into extensive settlement efforts.

The North Platte River dispute among Nebraska, Wyoming and Colorado continued for more than a dozen years. Several rulings important to Nebraska were made by the Court. The remaining elements were finally settled in early 2001. The Water & Natural Resources Tour conducted last July focused attention upon the North Platte River basin settlement and the drought which continues to impact that portion of the Great Plains region.

On December 16, it was announced that Nebraska's second interstate lawsuit also had been settled. That suit, initiated by the State of Kansas against the States of Nebraska and Colorado, was specifically focused on each state's compliance with the 1943 Republican River Compact. In announcing terms of the settlement, officials from each state characterized the compromise as a "win, win, win."

For Nebraska the prospect of proceeding with the lawsuit and possibly being found liable for some \$100 million in damages, plus an obligation to pay additional legal expenses, were all mentioned as significant incentives to settle. Among other things, members of

Nebraska's negotiating team agreed to a basin-wide moratorium on construction of new irrigation wells and to other regulatory provisions that are intended to result in a more dependable flow of water from Nebraska to Kansas.

This long awaited close of Republican River negotiations, as well as the continuing moderate to extreme drought conditions plaguing southwest Nebraska, are why we have decided to focus this year's Water & Natural Resources Tour on the Republican River basin. The tour will take place July 21-23, beginning and ending in Kearney. Stops will include facilities having specific relevance to compliance with the three-state settlement, as well as agricultural and natural resources points of interest. Tour participants also will learn about efforts aimed at attaining a better understanding of the watershed's hydrological character. Expectations and how local and state water management officials intend to enforce compliance with terms of the compromise will also be explored. Tour plans are developing and more details will be forthcoming in the next issue of the

(continued on page 8)

## WATER CURRENT

Water Center  
University of Nebraska-Lincoln  
103 Natural Resources Hall  
Lincoln, NE 68583-0844  
Phone: (402) 472-3305  
Fax: (402) 472-3574  
E-mail: [sress1@unl.edu](mailto:sress1@unl.edu)  
  
<http://watercenter.unl.edu>

Kyle D. Hoagland - Director  
J. Michael Jess - Acting Director  
and Water Specialist  
Mark S. Kuzila - Director,  
Water Sciences Laboratory  
Steven W. Ress - Editor  
Patricia A. Liedle - Editorial Assistant  
Anne M. Moore - UNL CIT,  
Layout and Design

*This newsletter is published with partial financial support from the Department of the Interior; U.S. Geological Survey. The content does not necessarily reflect the views and policies of the Department of the Interior, nor does mention of trade names or commercial products constitute endorsement by the U.S. Government.*

# Meet the Faculty

## Dr. Dennis D. Schulte

Environmental Engineer and Professor of Biological Systems Engineering in the Department of Biological Systems Engineering, University of Nebraska-Lincoln. Registered Professional Engineer.



Dennis Schulte

### Education:

Ph.D. in Agricultural Engineering, Cornell University, Ithaca, NY.  
M.S. in Water Resources Systems Analysis, Cornell University, Ithaca, NY.  
B.S.A.E. in Agricultural Engineering, University of Nebraska-Lincoln.

### Current Research Interests:

Air pollution from agricultural wastes.  
Biogas production from organic materials.  
Constructed wetlands and lagoons for waste treatment.

### Teaching:

BSEN/CIVE 326: Introduction to Environmental Engineering.  
BSEN/CIVE 455/855: Nonpoint Source Pollution Control.  
BSEN 441/81: Animal Waste Management

### Selected Publications:

- Lin, S., D. Hawley, D.D. Schulte and D.P. Billesbach. 2002. "Use of solid phase microextraction (SPME) fibers for detecting odorous compounds in ambient air." Paper No. 02-4161 Annual Mtg. of the ASAE. Chicago, IL. 12 p.
- Woldt, W.E., M.F. Dahab, D.D. Schulte and Y. Wang. 2002. "Modeling wastewater treatment performance of a subsurface flow constructed wetland using fuzzy logic." *Proc. Intl. Water Resources Assoc. 3rd World Congress*, Melbourne, Australia.
- Schulte, D.D., B.I. Dvorak, W.E. Woldt, J. Hyngstrom and M.F. Dahab. 2002. "Assessment of student learning in an innovative educational partnership with business, industry and government agencies." *Proc. 2002 ASEE/SEFI/TUB Colloq. on* (continued on page 7)

## Dr. William L. Kranz

Assistant Professor of Biological Systems Engineering and Extension Irrigation Specialist, Northeast Research and Extension Center, University of Nebraska-Lincoln, Norfolk.

### Education:

Ph.D. in Agricultural Engineering, Iowa State University, 1998.  
M.S. in Agricultural Engineering, University of Nebraska, 1981.  
B.S. in Agricultural Engineering, South Dakota State University, 1976.

### Current Research Interests:

Developing irrigation system's design and management to improve water and chemical application uniformity and minimize transport of applied crop production chemicals into ground and surface water.

### Current Extension Interests:

Assisting producers with sprinkler equipment selection and management to increase water use efficiency. Work with state and federal agencies to develop and deliver educational programs to minimize contamination of groundwater due to irrigation practices.

### Sampling of Recent Publications:

- Benham, B.L., J. Blumenthal, R.B. Ferguson, G.W. Hergert, W.L. Kranz, C.A. Shapiro, W.B. Stevens and C.D. Yonts, 2000. "Crop response and Nitrogen Availability as a Function of Climate, Variable-Rate Nitrogen Application and Every- and Alternate-Row Furrow Irrigation." *Proceedings of the 4th Decennial National Irrigation Symposium. American Society of Agricultural Engineers*, Phoenix, AZ. pp. 501-506.

- Thompson, A.S., D.L. Martin and W.L. Kranz, 2000. "Water Application Distribution Under Center Pivot systems." *Proceedings of the 4th Decennial National Irrigation Symposium. American Society of Agricultural Engineers*, Phoenix, AZ. pp. 103-108.

(continued on page 7)



Bill Kranz



# New Analytical Equipment Increases Water Sciences Laboratory Capabilities

by Steve Ress

New automated equipment that quickly and accurately analyzes stable isotopes and minute traces of organic compounds could give University of Nebraska faculty an extra edge in conducting research and competing for research funds.

"The UNL Water Sciences Laboratory (WSL) is one of a very few facilities to have the equipment and faculty and staff with expertise in both trace organics and stable isotope analysis," said research assistant professor Dan Snow, who manages the WSL.

The UNL East Campus lab has been providing analytical support for water-related research and been a part of the UNL Water Center since 1990. It recently acquired a triple quadrupole mass spectrometer and two new isotope ratio mass spectrometers that will help WSL faculty and staff perform a wide range of laboratory analysis in support of NU research projects across the state.

The new Quattro Micro triple quadrupole mass spectrometer is a state-of-the-art instrument for quantitative analysis and structural identification of organic compounds.

New AP2003 and AP2005 isotope ratio mass spectrometers are both equipped with automated preparation systems that allow for rapid and highly precise analysis of stable isotopes of carbon, oxygen and hydrogen.

"This instrumentation is the most advanced available and will serve to both strengthen and expand our current capabilities. We can develop and apply methods for (analyzing) a wide variety of organic compounds, from pesticide metabolites and possible endocrine disruptors to antibiotics and biomarkers," Snow said.



The inside of the UNL Water Sciences Laboratory's AP2005 isotope ratio mass spectrometer alone (with no prep system).

The Quattro Micro system, complete with a high performance liquid chromatograph, is capable of rapid, sensitive and highly selective analysis of organic compounds using a process called liquid chromatography tandem mass spectrometry (LC/MS/MS).

"This is among the most powerful instrumental methods available for quantifying and identifying polar (water-soluble) organic compounds and represents a tremendous improvement in sensitivity for quantitative analysis of polar organics," Snow said.

The WSL's existing ion trap LC/MS is a highly sensitive instrument, but it can't provide the level of selectivity and sensitivity a triple quadrupole can provide in analyzing minute traces of explosives, pesticides and other organic compounds, he added.

The AP2003 is a computer-controlled system for automated preparation and analysis of water and

(continued on page 8)



Micromass Technologies engineer Paul Trent installs the new Quattro Micro Triple Quadrupole Mass Spectrometer at the UNL Water Sciences Laboratory. (photo: Dan Snow)

# Effects of Excessive Sedimentation on Rainwater Basin Wetland Hydrology

By Randy Stutheit,  
Wetland Biologist, Nebraska Game and Parks  
Commission

The retention and accumulation of sediment and associated pesticides is an important function of wetlands that helps maintain water quality.

However, when sediment deposition is accelerated due to human activity, it can overload and stress wetland systems to the point of causing severe deterioration of the normal hydrologic cycle and the quality of wildlife habitat found in these wetlands. Many of the wetlands in Nebraska, particularly those in the Rainwater Basin, suffer from accelerated sedimentation.

To better understand why culturally accelerated sedimentation causes these problems, it is helpful to have an understanding of how Rainwater Basin wetlands functioned before European settlement.

Rainwater Basins are isolated, emergent wetlands with closed watersheds. Their water regimes are temporarily, seasonally, or semi-permanently flooded. Most of these wetlands are playas formed by wind deflation. The watersheds historically were intact and vegetated in prairie grasses and forbs.

Trampling and grazing by herds of large mammals such as bison and elk seeking water and lush vegetation kept wetlands from becoming heavily overgrown. Occasional prairie fires sweeping through the basins would also remove plant biomass. Bare soil exposed to strong winds was blown out of the wetlands and carried onto the uplands.

Today, the landscape has been reversed. The watersheds surrounding these wetlands have mostly been converted to row crop agriculture, which allows a higher rate of soil erosion than permanent grass cover. The wetlands often sit idle and have rank growths of vegetation. The vegetation traps soil that erodes from the watershed and is blown or washed into the wetland.

Without the historic landscape and processes, sediment accumulates at a faster rate and is not as easily removed by wind deflation as it once was.

Resource professionals have become increasingly concerned about sediment in Rainwater Basin wetlands. Sediment depths of up to 24 inches have been measured in some basins. Sediment affects hydrology by doing the following:

1. Reducing water storage capacity of the wetland.
2. Acting like a sponge to absorb and hold water making it less available.
3. Eliminating wetland micro-topography thus altering historical flow paths and water movement.

4. Causing water to “overflow” the edge of the hydric soils and seep away due to reduced storage capacity.

Excessive amounts of sediment also have a negative effect on plant communities within wetlands. The uncompacted sediment, which frequently remains saturated throughout the growing season, is favorable to the growth of aggressive perennial vegetation such as river bulrush (*Scirpus fluviatilis*) and hybrid cattail (*Typha glauca*). These two species spread by rhizomes and can quickly overwhelm and dominate more wildlife friendly plant communities. Another aggressive species, reed canary grass (*Phalaris arundinacea*), also favors sediment as a growth medium. Reed canary grass is a prolific seed producer, and once established, spreads rapidly throughout a basin both by rhizomes and seed. A rank, monotypic stand of reed canary grass provides very little habitat for wildlife and displaces the rich plant communities that were found there historically.

(continued on page 9)



A scraper cut on the Sandpiper Wildlife Management Area in Fillmore County illustrates an overlying layer of sediment approximately seven inches thick (photo: Mace Hack, Nebraska Game and Parks Commission).



# Students Get Their Feet Wet at Audubon Spring Creek Prairie

by Marian Langan, Director,  
Audubon Spring Creek Prairie

When people think of tallgrass prairie, they envision vistas of big bluestem, purple coneflowers, and meadowlarks. But what's below ground, out of sight, is a critically important part of the prairie as well. Prairies naturally occur in areas that can undergo periods of drought. Many native plants, like the compass plant, can grow roots fifteen feet deep or more in order to reach groundwater. In some places, though, water comes to the surface as natural springs, streams, and wetlands.

Audubon purchased the 610-acre O'Brien ranch south of Denton in 1998, and it is now known as Spring Creek Prairie. The site encompasses approximately five hundred acres of native tallgrass prairie.

This parcel is part of an over 2,000-acre tallgrass prairie complex, one of the two largest remaining remnants in the state. Plans are underway to create a nature center at the Spring Creek Prairie site. Thousands of children and adults have already had nature education experiences in our first two years of offering programs.

The importance of water is an integral part of our education programs. All of our programs have inquiry-based education at their core. In other words, students get to self-direct a part of their learning. We also work with teachers directly, making sure the programs support their curriculum objectives. Combining all of these goals allows students to have opportunities to explore the wetlands and streams, discovering backswimmers and water scorpions, while enforcing

their classroom study of prairie ecosystems.

The majority of the soils at the site are glacial till, which overlie a layer of siltstone. Water flows down through the sandy soil and starts migrating laterally when encountering the siltstone. Where the siltstone becomes exposed in creeks and ravines, the groundwater surfaces as springs. These springs allow students to have a first-hand experience with how ground and surface water are related, which is sometimes a difficult concept for learners.

College students have had opportunities to do projects related to wetland delineation, methane production measurement, and a variety of other research subjects.

Spring Creek Prairie was designated as a Groundwater Guardian Community in 2000. It was awarded the 2002 Environmental Education/Awareness Award for Lincoln/Lancaster County from the City of Lincoln and the Lincoln/Lancaster



County Department of Health.

The prairie offers miles of walking trails that wind through the prairie, wetlands, and bur oak woodland. The site is open year-round, Monday through Friday, from 9 a.m. to 5 p.m. Weekend open hours are seasonal; contact the office for details. If you would like further information, please check our website at <http://www.springcreekprairie.org/> or [www.springcreekprairie.org](http://www.springcreekprairie.org). For information on educational programs, volunteer opportunities, or making a contribution in support of our programs, please call Marian Langan at (402) 797-2301 or e-mail <mailto:mlangan@audubon.org> or [mlangan@audubon.org](mailto:mlangan@audubon.org).

# Meet the Faculty

**Dennis D. Schulte** (continued from page 3)

*Engineering Education*. Berlin, Germany.

- Koelsch, R.K., B. Woodbury, D. Stenberg, D. Miller and D. Schulte. 2001. "Total reduced sulfur concentration in beef cattle feedlots. International Symposium on Animal Production and Environmental Issues." *Research Triangle Park, NC*. October.
- Burns, N.L., D.D. Schulte and M.F. Dahab. 2001. "Dual removal of perchlorate and nitrate from groundwater through biological reduction." Paper No. MC01-308 presented at the Mid-Central Conference of the ASAE. St. Joseph, MI. 16 p.
- Gilley, J.A., D.P. Spare, R.K. Koelsch, D.D. Schulte, P.S. Miller and A.M. Parkhurst, 2000. "Copper and zinc in swine diets affect phototrophic anaerobic lagoons." *Trans. of the ASAE* 48(6): 1853-1859.
- 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.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.
- 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.D. Schulte and J.A. Nienber, 1999. "Flat-plate freeze sampler for sludge characterization in a feedlot runoff storage pond." *Trans. of the ASAE* 42(1): 123-125.
- Willers, H., X.N. Karamanlis and D.D. Schulte, 1999. "Potential of closed water systems on dairy farms." *Water Science and Technology* 39(5): 113-119.
- Brown-Brandl, T.M., M.M. Beck, D.D. Schulte, A. Parkhurst and J.A. DeShazer, 1998. "Modification, operation and error analysis of an indirect calorimeter for within-chamber control and data acquisition." *Trans. of the ASAE* 41(4): 1115-1118.
- Monteny, G.W., D.D. Schulte, A. Elzing and E.J.J. Lamaker, 1998. "A conceptual mechanistic model for the ammonia emissions from free stall cubicle dairy cow houses." *Trans. of the ASAE* 41: 193-01.

## Web address:

Email: [dschulte1@unl.edu](mailto:dschulte1@unl.edu)  
<http://ianrsearch.unl.edu/bse/About/Faculty/schulte.htm>

**Dr. William L. Kranz** (continued from page 3)

- Shapiro, C.A., D.L. Holshouser, W.L. Kranz, D.P. Shelton, J.F. Witkowski, K.J. Jarvi, G.W. Echtenkamp, L.A. Lunz, R.D. Frerichs, R.L. Brentlinger, M.A. Lubberstedt, M. McVey McCluskey and W.W. Stroup, (in press). "Tillage and Management Alternatives for Returning Conservation Reserve Program Land to Crops." *Agronomy Journal*. ARD Journal Series No. 12857.
- Kranz, W.W. and R.S. Kanwar, 2000. "Impact of Tillage and Tracer application method on Spatial Distribution of Leaching Losses." *Transactions of the ASAE* 43(5): 1103-1116. ARD Journal Series No. 12327.
- Scherer, T.F., W. Kranz, D. Pfost, H. Serner, J.A. Wright and C.D. Yonts, 1999. "MWPS-30: Sprinkler Irrigation Systems." *First Edition, Midwest Plan Service*, Ames, IA. 250 pp.
- Kranz, W.L., R.S. Kanwar and C.E. Peterson, 1998. "Collection and Monitoring of One Meter Cubic Soil Monoliths for Leaching Studies." *Transactions of the ASAE* 41(2): 333-344. ARD Journal Series No. 11780.
- Shapiro, C.A., B. Kranz, M. Brumm, 1998. "Determining the Environmental Impact of Irrigating with Swine Effluent. Proceedings of the manure Management: In Harmony with the Environment and Society." *Soil and Water Conservation Society*, Ames, IA. pg. 350-353.
- Kranz, W.L., D.E. Eisenhauer, A.M. Parkhurst, 1996. "Calibration Accuracy of chemical Injection Devices." *Applied Engineering in Agriculture Journal* 12(2): 189-196.
- McVey McCluskey, M., C.A. Shapiro, D.L. Holshouser, W.L. Kranz, D.P. Shelton, J.F. Witkowski, K.J. Jarvi and S.D. Rasmussen, 1996. "Cropping Systems for Returning Conservation Reserve program (CRP) Acres to Production." *Agronomy Abstracts*, pg. 129.
- Weber, R.W., R.D. Grisso, C.A. Shapiro, W.L. Kranz and J.L. Schinstock, 1995. "Anhydrous Ammonia Application Rate Errors." *Applied Engineering in Agriculture* 11(2): 211-217.
- Kranz, W.L. and R.S. Kanwar, 1995. "Spatial Distribution of Leachate Losses Due to Preplant Tillage methods." *Proceedings of the Clean Water-Clean Environment 21st Century: Team Agriculture-Working to Protect Water Resources Conference*, Kansas City, MO. Volume II: 107-110.

## Web/email addresses:

[wkranz1@unl.edu](mailto:wkranz1@unl.edu)  
<http://bse.unl.edu/About/Faculty/kranz.htm>



## From the Director (continued from page 2)

*Water Current*, as well as in registration mailings later this spring.

The Four States Irrigation Council is joining us in sponsoring the tour, as is The Groundwater Foundation, in addition to our regular tour sponsors.

### Annual meeting of Association of American State Geologists

Following an invitation from State Geologist Mark Kuzila, Nebraska has been chosen to host this year's annual meeting of the Association of American State Geologists (AASG). Both active and retired members of State Geological Surveys in each of the 50 states and several Canadian provinces are expected to attend. The

meeting frequently attracts students, faculty members and working professionals as well.

Besides routine business matters, AASG participants receive reports from federal and provincial agencies and professional organizations, enact resolutions important to their discipline and confer awards. Several tours (Sandhills, Ashfall Fossil Beds, North Platte & Platte valleys) intended to acquaint those attending the meeting with Nebraska's rich geological setting are being arranged by members of UNL's Conservation and Survey Division.

The meetings will be held in Lincoln June 15 - 18. Neither attendance nor participation is exclusive. If you wish to receive additional information and registration materials, contact me at 402/472-7570.

## New Analytical Equipment Increases Water Sciences Laboratory Capabilities (continued from page 4)

gas samples for carbon-13 and oxygen-18 analysis. The AP2005 is designed for automated sample preparation and analysis of deuterium (HD) in water samples. Both will analyze a large number of samples in a relatively short time.

"We also can provide methods for rapid analysis of carbon, oxygen and hydrogen isotopes and can develop new methods for exploring uses of stable isotopes," Snow said.

Analysis of stable isotope samples that used to take a day can now be done in less than an hour with equivalent accuracy and precision as the WSL's manual methods.

"Having two separate systems permits simultaneous analysis of both O-18 and deuterium and the ease with which samples can be prepared and analyzed allows this tool to be more readily applied to support research in hydrology, geology, physics, chemistry, biology, ecology and even forensic sciences," said Snow.

"We can continue to provide nitrogen isotope analysis using manual sample preparation methods and our Optima mass spectrometer while exploring ways to simplify and perhaps even automate nitrogen-15 methods," he said.

WSL separations chemist David Cassada and research technologist Steve Monson operate the Quattro Micro, along with existing ion trap and gas chromatography mass spectrometry equipment.

"Cassada and Monson each have over 10 years experience in organic mass spectrometry and have helped develop methods for pesticides, munitions, antibiotics and degradation products for UNL research," said Snow.

WSL isotope chemist Glen Martin operates the AP2003 and AP2005 systems, along with the a Micro-mass Optima mass spectrometer and high vacuum preparation systems.

"Dr. Martin has nearly 20 years experience in isotope ratio mass spectrometry, maintains all stable isotope equipment and has helped improve WSL isotope methods since the lab was founded in 1990," Snow said.

The new instruments were funded by a U.S. Environmental Protection Agency grant made possible through the efforts of U.S. Congressman Doug Bereuter. The Quattro Micro was purchased for about \$220,000 from Micromass Technologies, a subsidiary of Water Corp., Manchester, England. The AP2003 and AP2005 were purchased together from Analytical Precision Products (APP) Ltd., Cheshire, England for about \$150,000.

"Many of the staff at APP, LTD were involved in development of our Optima isotope ratio mass spectrometer and have been very helpful in helping maintain our existing mass spectrometers," Snow said.

The combination of equipment and expertise available at the WSL could give faculty an advantage in competing for research funding. Published methods used at the WSL can be incorporated into research proposals and used to demonstrate analytical capabilities.

Researchers wanting more information on the WSL, its equipment and capabilities and how it can be employed to help with a research project or in competing for research grant funding should contact Snow at (402)472-7539 or at dsnow1@unl.edu.

The WSL is part of the UNL Water Center, School of Natural Resources and NU Institute of Agriculture and Natural Resources.

## Effects of Excessive Sedimentation on Rainwater Basin Wetland Hydrology (continued from page 5)

Traditional wetland management often has limited success when applied to Rainwater Basin wetlands containing excessive sediment and the problematic plant communities associated with it. The less costly and labor-intensive techniques such as grazing, mowing, and prescribed burning usually have only temporary effects on the vegetation. The benefits of more aggressive approaches to vegetation management such as disking, rototilling, or herbicide application last longer but still do not address

the hydrologic problems caused by the sediment.

A more radical approach to wetland restoration/enhancement is now being employed by the Nebraska Game and Parks Commission and other resource agencies to help restore wetland hydrology, and concurrently, eliminate problematic vegetation. This approach involves the use of soil scientists with the Natural Resources Conservation Service first surveying a

wetland to determine sediment depths across the basin and then employing the use of heavy equipment to remove the sediment, thus restoring the historic soil profile.

Reed canary grass, river bulrush, cattail and other vegetation are removed along with the sediment. Historic wetland seed banks buried and lying dormant under the sediment are frequently uncovered, and re-vegetation of the scraped areas begins almost immediately. The sediment that is removed is used to further restore wetland hydrology by filling water reuse pits, deepened road ditches, and drainage ditches found in the hydric soil footprint or building control structures to enhance water management.

The results of sediment removal projects can be viewed at the Sandpiper Wildlife Management Area (WMA) in Fillmore County and at the Renquist and Spikerush WMAs in York County.

## Test Your Groundwater Knowledge (Answers from page 10)

1. A water-bearing layer of permeable rock, sand, or gravel that can yield usable quantities of water to a well or spring.
2. A rock or clay layer that is not permeable enough to yield usable quantities of water to a well or spring.
3. A water-bearing layer between two impermeable layers, where the ground water is under pressure.
4. Solid or hardened rock masses.
5. Areas where ground water flows toward the land surface and either evaporates or escapes into springs, streams, lakes or wetlands.
6. Rock composed of calcium or magnesium carbonate.
7. Rocks formed by solidification of molten rock material (magma) with the earth.
8. The movement of water from the land surface into the soil.
9. A landscape underlain by rocks containing solution channels and other features caused by dissolving action of ground water.
10. Rock that has been changed to a more compact and crystalline form by intense heat and pressure within the earth.
11. Seeping of water or other fluids through permeable material, such as soil.
12. A measure of a material's ability to transmit water or other fluids.
13. A region of similar geologic structure and climate with a characteristic set of landforms.
14. The level to which water will rise in a cased well drilled into a confined aquifer.
15. The movement of water from the land surface to an aquifer.
16. The area of land surface from which water seeps into the ground to recharge a particular aquifer.
17. The area below ground surface in which all available pore spaces are filled with water.
18. Rock formed deposition (sedimentation) of particles by water, wind or ice.
19. A depression, usually in a limestone area, that is often connected to an underground channel.
20. An underground opening or passage formed by the dissolving action of water on rocks such as limestone or dolomite.
21. A water-bearing layer whose upper boundary is the water table.
22. Loose earth materials or sediments.
23. The area below ground surface in which the pore spaces are filled partially with water and partially with air.
24. The upper boundary of the saturated zone.

### 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.

\_\_\_\_\_ Change my address

\_\_\_\_\_ Delete me from your list

\_\_\_\_\_ Add to our list

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

#### Send update to:

Water Center, University of Nebraska, 103 Natural Resources Hall,  
P.O. Box 830844, Lincoln, NE 68583-0844  
FAX (402)472-3574  
or e-mail changes to [sress1@unl.edu](mailto:sress1@unl.edu)



# Water News Briefs

## Preserving the Ogallala

Jim Goeke, a hydrogeologist at the University of Nebraska-Lincoln, has formed an eight-state Ogallala Aquifer Institute to consider various scenarios in managing and protecting the 174,000 square-mile supply of groundwater.

The UNL Conservation and Survey Division professor said the institute's goals are to promote education and cooperation among the eight states and to find common solutions to problems, such as the increasing demands made on the aquifer from this year's drought.

States represented in the institute include Texas, New Mexico, Kansas, Colorado, Nebraska, Oklahoma, Wyoming and South Dakota; all of which benefit from groundwater contained in the Ogallala Aquifer. The institute had its first meeting in Garden City, KS, last October.

The aquifer contains an estimated 3.25 billion acres of recoverable water and comprises about 20 percent of all the groundwater in the United States and 30 percent of its irrigated cropland acres.

"Some 66 percent of the Ogallala Aquifer's recoverable water supply is under Nebraska. That makes the state a likely target for future management concerns," Goeke said.

"Plans need to be in place to deal with pressures that could be placed on the aquifer," he said.

## 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 centen-

nial 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.

## Water Toxin Percentage Low

Water has been less affected by the release of 7.1 billion pounds of toxic chemicals into the U.S. Environment than were the country's land and air, according to a recent U.S. Environmental Protection Agency report.

Approximately 27 percent of released toxic chemicals entered the air and 69 percent settled on land, while only four percent were released to water.

The 7.1 billion pounds of toxins released to the environment (for the year 2000) represents an improvement over the 7.8 billion pounds released nationwide in 1999, EPA said.

Consistent with previous years, metal mining industry releases account for a substantial portion of all chemical releases, about 47 percent, or 3.4 billion pounds.

More information can be found at <http://www.epa.gov/tri/>.

## Wastewater on the Web

Alternative wastewater management program:

[www.ci.austin.tx.us/wri/altern.htm](http://www.ci.austin.tx.us/wri/altern.htm)

Federal Emergency Management Agency: [www.fema.gov/mit/](http://www.fema.gov/mit/)

Water recycling: [www.waterrecycling.com](http://www.waterrecycling.com)

Farm\*A\*Syst: [www.uwex.edu/farmasyst](http://www.uwex.edu/farmasyst)

U.S. Water News: [www.uswaternews.com/hompage.html](http://www.uswaternews.com/hompage.html)

Home\*A\*Syst: [www.uwex.edu/homeasyst](http://www.uwex.edu/homeasyst)

Constructed Wetlands Page - University of South Alabama: [www.usouthal.edu/usa/civileng/wetlands.htm](http://www.usouthal.edu/usa/civileng/wetlands.htm)

## Test Your Ground Water Knowledge

How much do you know about words and terms commonly associated with groundwater and groundwater use? Test your knowledge of the definitions of the two dozen words and terms below. Answers on page 9:

1. Aquifer
2. Aquitard
3. Confined or artesian aquifer
4. Consolidated geologic deposits
5. Discharge areas
6. Dolomite
7. Igneous
8. Infiltration
9. Karst terrain
10. Metamorphic
11. Percolation
12. Permeability
13. Physiographic province
14. Potentiometric surface
15. Recharge
16. Recharge area (or zone)
17. Saturated zone
18. Sedimentary
19. Sinkhole
20. Solution channel
21. Unconfined aquifer
22. Unconsolidated geologic deposits
23. Unsaturated zone
24. Water table



## FEBRUARY

**13:** Lower South Platte Symposium, "The South Platte: Learning How It Works and How To Make It Work." Contact Joel Schneekloth at (970)345-0508, email jschneek@coop.ext.colostate.edu.

**19:** "Agroforestry in the United States: Linking Sustainable Forestry and Sustainable Agriculture," Michele Schoeneberger, Research Program Leader and Soil Scientist, USDA National Agroforestry Center, 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.

**26:** "Animal Monitoring Programs: Why, What and How," James D. Nichols, USGS Patuxent Wildlife Research Center, Laurel, MD. 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.

**25-26:** Twelfth Platte River Basin Ecosystem Symposium, Ramada Inn, Kearney. For information, contact Steve Ress, University of Nebraska-Lincoln Water Center at (402)472-3305 or email sress1@unl.edu.

## MARCH

**5:** "Missouri River Main Stem Reservoir Management During Drought," Larry Cieslik, Chief of Reservoir Operations, U.S. Army Corps of Engineers, Omaha. 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.

**12:** "Implementing Drought Mitigation Strategies," Donald A. Wilhite, Director, National Drought Mitigation Center, 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.

**14-16:** Audubon Nebraska and Audubon's Rowe Sanctuary's 33rd Annual Rivers and Wildlife Celebration, Holiday Inn, Kearney. Speakers and daily field trips including crane-viewing blinds along the Platte River. For a registration brochure, contact Audubon Nebraska, P.O. Box 117, Denton, NE 68339, email nebraska@audubon.org or online at www.nebraska.audubon.org.

**17-18:** Festival Expedition: A conference to teach people how to host children's water education events, Grand Island. Associated with the Children's Groundwater Festival. Registrations accepted until Mar. 7. For information or a registration brochure, contact The Groundwater Foundation at (800)858-4844 or info@groundwater.org.



**18-20:** Fifteenth Annual South Dakota Department of Environment and Natural Resources Environmental and Ground Water Quality Conference, Ramkota River Center, Pierre, SD. Abstracts are being accepted until Feb. 1, 2003. For information on general topics and program format, contact Gary Haag at (605)773-5855 or email gary.haag@state.sd.us.

**26:** "Environmental Remediation and Restoration of Soils," Patrick J. Shea, Professor, and Steven D. Comfort, Associate Professor, School of Natural Resource Sciences, UNL. 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.

**27-28:** "Watering Your Future" - 2003 Arkansas River Basin Water Forum, University of Southern Colorado, Pueblo, CO. Call (719)336-9421 or email rappel@co.usda.gov.

**31-April 1:** Third Annual Alternative Water and Wastewater Technologies for Small Communities Conference and 47th Annual Great Plains Waste Management Conference, Holiday Inn Central, Omaha. Contact Jackie Stumpf at the Nebraska Department of Environmental Quality at (402)471-3193, email Jackie.Stumpf@ndeq.state.ne.us or online at www.deq.state.ne.us.

## APRIL

**2:** "Well Field Management for the Lincoln Water System," Jerry Obrist, Director, Lincoln Water System, 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.

**7-11:** International Workshop on Integrated Water Resource Management, Denver, CO. Email Leanna Principe at lprincipe@do.usbr.gov.

**9:** "Integrating Satellite and Climate Data to Improve Tools for Drought Monitoring," Jess Brown, USGS/EROS Data Center, Sioux Falls, SD. 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.

**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.

**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.

**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).

## JUNE, 2003

**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.

# Free Water and Natural Resources Lectures Continue at UNL

by Steve Ress

A variety of topics related to Nebraska's drought conditions and other current water and natural resources issues are being explored in this year's UNL Water and Natural Resources seminars, which run weekly through April 30.

The free public lectures began on Jan. 15 and continue each Wednesday through April 30 (except March 19) from 3 to 3:50 p.m. All but the final seminar will be presented in Room 116, L.W. Chase Hall on the UNL East Campus. That lecture will be presented at the Lied Center for Performing Arts, 12th and R Sts.

Many of this year's lectures are focusing on various aspects of drought, drought preparedness and drought monitoring.

On Mar. 5, "Managing the Missouri River during drought" will be presented by Larry Cieslik, chief of reservoir operations for the U.S. Army Corps of Engineers.

Drought mitigation and monitoring strategies will be explored in seminars by Don Wilhite, director of UNL's National Drought Mitigation Center and Jess Brown of the U.S. Geological Survey's EROS Data Center, Sioux Falls, SD, on Mar. 12 and April 9.

Other seminar topics cover sustainable agriculture, animal monitoring programs, managing the Lincoln water system's well field, conservation buffer strips and water as a world issue.

The seminar is presented by UNL's School of Natural Resources, Water Center, Conservation and Survey Division, and Institute of Agriculture and Natural Resources.

For information on parking arrangements on the UNL East Campus, phone the Water Center at (402)472-3305.

**Feb. 19** "Agroforestry in the United States: Linking Sustainable Forestry and Sustainable Agriculture," Michele

Schoeneberger, Research Program Leader and Soil Scientist, USDA National Agroforestry Center, Lincoln.

**Feb. 26** "Animal Monitoring Programs: Why, What and How," James D. Nichols, USGS Patuxent Wildlife Research Center, Laurel, MD.

**Mar. 5** "Missouri River Main Stem Reservoir Management During Drought," Larry Cieslik, Chief of Reservoir Operations, U.S. Army Corps of Engineers, Omaha.

**Mar. 12** "Implementing Drought Mitigation Strategies," Donald A. Wilhite, Director, National Drought Mitigation Center, UNL.

**Mar. 19** No seminar due to UNL spring break.

**Mar. 26** "Environmental Remediation and Restoration of Soils," Patrick J. Shea, Professor, and Steven D. Comfort, Associate Professor, School of Natural Resource Sciences, UNL.

**Apr. 2** "Well Field Management for the Lincoln Water System," Jerry Obrist, Director, Lincoln Water System, Lincoln.

**Apr. 9** "Integrating Satellite and Climate Data to Improve Tools for Drought Monitoring," Jess Brown, USGS/EROS Data Center, Sioux Falls, SD.

**Apr. 16** "Conservation Benefits of Riparian Buffers," Dean E. Eisenhauer, Professor, Biological Systems Engineering, UNL.

**Apr. 23** "ACI-Evolution of the Giant Senecios and Giant Lobelias On The Mountains Of Eastern Africa," Eric B. Knox, Department of Biology, Indiana University, Bloomington, IN.

**Apr. 30** "Water and War: Issues for the 21st Century," Peter Gleick, Pacific Institute for Studies in Development, Environment and Security. (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).

UNIVERSITY OF  
**Nebraska**  
Lincoln | **WATER CENTER**

103 Natural Resources Hall  
P.O. Box 830844  
Lincoln, NE 68583-0844

ADDRESS SERVICE REQUESTED



Printed with soy ink on  
15% post-consumer recycled paper

**Non Profit  
U.S. Postage  
PAID  
Permit 46  
Lincoln NE**