July’s water and natural resources tour will focus on a variety of issues affecting northeast Nebraska and the Missouri River.

The tour is July 18-20, beginning and ending in Lincoln. “Northeast Nebraska has some unique water and natural resources issues effecting small communities, tribal lands and threatened and endangered species, that the tour hasn’t delved into previously. In addition, navigation, recreation, land use and a host of other issues continue to add to the mix of topics on how the Missouri River should best be managed,” said tour co-organizer Michael Jess, associate director of the UNL Water Center.

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Adaptive Management Sees Resilience, Uncertainty as Allies; Third Annual Conference Looks at Innovation in Water Management

By Charles Flowerday, Editor/Communications Coordinator, UNL School of Natural Resources

Sometimes a policy is a legally binding agreement. Sometimes, in an approach to natural resources policy called “adaptive management,” it is a hypothesis, an experimental dynamic that helps people plan amid uncertainty.

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Out of Deepest, Darkest Africa

from the DIRECTOR

By Kyle Hoagland

The last few months have been profitably busy ones for the Water Center and the Water Resources Research Initiative and our plates look just as full for the summer ahead.

As this was being written in late April I was at a conference in South Africa with WRRI co-leader Sandi Zellmer of the UNL College of Law and Cooperative Fish and Wildlife Research Unit leader Craig Allen. We left on the trip with some pretty high expectations for establishing some meaningful and productive collaboration with fellow conference attendees. I plan to give you all a more complete report on that conference and the bonds we were able to forge in the next issue of the Water Current.

Interestingly, some of the same speakers we were fortunate enough to attract to our own Water Law, Policy and Science Conference in Nebraska City were also among those we heard in South Africa, most notably Lance Gunderson of Emory University in Atlanta, Ga.

Within days of returning from that conference the Water Center, WRRI, College of Law, College of Journalism and Mass Communications, Department of Geosciences, School of Natural Resources and Institute of Agriculture and Natural Resources teamed to present the third annual Water Law Policy and Science Conference at Nebraska City’s Lied Lodge and Conference Center. The Lied Lodge was an absolutely stunning venue to gather international, national and state experts for some in-depth discussion of adaptive management views, theories and possible strategies for resilient Great Plains water resources.

The breadth and quality of conference speakers, panelists and moderators were a large part of its overall success and in working to develop that list I particularly want to thank WRRI co-leaders Sandi Zellmer, Sheri Fritz, and Ron Yoder, as well as Craig Allen, Carolyn Johnsen and Karina Schoengold for their concerted efforts over the past few months. Without the dedicated assistance of Steve Ress, Tricia Liedle and Jacki Loomis, the event would not have taken place.

UNL Vice Chancellor for Research Prem Paul and the NU Foundation provided much of the funding to support the conference, which was greatly appreciated.

Since the last Water Current, we have added two staff members who will be addressing a number of issues for both the Water Center and the Water Resources Research Initiative that we simply hadn’t had the staffing to adequately address in the past.

Many of you know Lorrie Benson, who joined us from The Groundwater Foundation. Lorrie is deputy program manager for the WRRI, where she is working on funding, policy development, event coordination and serving as a liaison to other groups.

Jessica Harder joined us as an outreach associate, a position created through a Water Center, WRRI and UNL Rural Initiative partnership. Jessica is a recent UNL College of Law graduate who has been working as a freelance writer. See the article on them in this issue for more information on these welcome additions to our small staff.

Mike Jess and Steve Ress have been working to help organize the annual water and natural resources tour, which (continued on page 5)
Meet the Faculty

Karina Schoengold, Ph.D.

Assistant Professor and environmental economist, University of Nebraska–Lincoln, joint appointment in the School of Natural Resources and Department of Agricultural Economics, 2005.

Education:

Primary Research and Teaching Interests:
— Primary: Environmental and natural resources economics, water resource economics, water pricing, irrigation technology choice, agricultural economics.
— Secondary: Applied economics, agribusiness, political economy.

Examples of Current Research:
— Water pricing and irrigation technology choice - using data from Kern County in the Central Valley of California. I am looking at how the price of water affects a farmer’s joint choice of the crop he or she grows and the type of irrigation technology that he or she uses.
— Groundwater extraction in Mexico - this work looks at the price of electricity and its effect on the amount of groundwater farmers pump.
— Equity considerations in water pricing - this work looks at trade-offs between equity and economic efficiency under various ways of pricing water.

(continued on page 12)

Erkan Istanbulluoglu, Ph.D.

Assistant Professor in the University of Nebraska-Lincoln Departments of Geosciences and Biological Systems Engineering, beginning in August 2005.

Education:
Ph.D., civil and Environmental Engineering (Hydrology, Geomorphology), Utah State University, Logan UT, 2003.
M.S., Agricultural Engineering (Hydrology), Uludag University, Turkey, 1998.
B.S., Agricultural Engineering (Irrigation Engineering), Uludag University, Turkey, 1996.

Primary Research Interests:
My goal is to advance the physical understanding of complex and highly non-linear interactions and feedbacks between basin hydrologic and geomorphic response to stochastic forcing of climate, and the role of vegetation and its dynamics in modulating these processes. I am also interested in the influence of climate change, as well as human interventions on regional water balance, ecosystem dynamics, and sediment movement in river basins. My research integrates both fieldwork and numerical modeling.

I am currently involved with two research topics. One is investigating the landscape system response to different climate change scenario in different time scales, ranging from days to millions of years, using models of water balance and landscape evolution.

The second is developing a water balance modeling framework for the Great Plains. My ultimate goal is to couple a fine-resolution surface hydrology model with a regional scale climate model to investigate climate dynamics in the Great Plains and its societal and economic impacts.

Teaching:
— Beginning in spring 2006 I will open a new course called: Land and Water Dynamics. Beginning in fall 2006 I will be teach Surface Processes (Landscape Evolution).

(continued on page 12)
Great Plains CESU Funding Assistance For UNL Nears $1 Million

By Steve Ress

Early 50 research, technical assistance and educational projects at the University of Nebraska-Lincoln (UNL) have received a combined total of nearly $1 million in funding support through the Great Plains Cooperative Ecosystem Studies Unit (GPCESU) since the unit was formed in October 2000, according to coordinator Christine Lockert.

Overall, within its geographical area of influence, the GPCESU has funded 140 task agreements for more than $4.5 million, Lockert said.

“UNL has received more than $960,000 of that amount through 46 task agreements, with a majority of those funding agreements involving small budget projects that would not otherwise be feasible without the benefit of the reduced overhead rate that the cooperative agreement provides," she said.

The UNL-based projects are divided among research (14), technical assistance (18), and educational (seven) needs of the agency partners.

“Although a majority of the projects are associated with UNL’s School of Natural Resources, eight additional departments or units have received funding through the GPCESU, including the Departments of History, Anthropology & Geography, Agronomy & Horticulture, Biological Systems Engineering, and Geosciences; Center for Great Plains Studies, College of Arts & Sciences; College of Architecture; Cooperative Extension and University Libraries,” Lockert said.

Nationwide, the CESU program facilitates cooperative research, technical assistance, and education by universities to support science-based management of federal lands.

UNL hosts the GPCESU, which has a dozen more university partners in the central United States. These include Black Hills State University, Colorado State University, Kansas State University, Langston University, North Dakota State University, South Dakota State University, Texas A&M University, University of Minnesota, University of North Dakota, University of Oklahoma, University of South Dakota and University of Wyoming.

Additionally, six federal agencies currently partner with the GPCESU, Lockert said. These include National Park Service, Bureau of Land Management, Natural Resources Conservation Service, Bureau of Reclamation, U.S. Geological Survey and U.S. Forest Service.

Director of the GPCESU is UNL limnologist and Water Center director Kyle Hoagland. Lockert is administrative coordinator. The National Park Service research coordinator is Gary Willson.

Visit GPCESU online at http://greatplains.cesu.unl.edu/
Two Join Staff of Water Center and Water Resources Research Initiative

Lorrie Benson and Jessica Harder have respectively joined the staff of the UNL Water Resources Research Initiative (WRRI) and UNL Water Center.

Benson joined the WRRI in March as deputy program manager where she will have responsibilities in many areas of the WRRI, including funding, event coordination, policy development, and serving as a liaison to other groups, said Water Center director and WRRI co-leader Kyle Hoagland.

“Successful management of water resources for the benefit of all aspects of society requires interdisciplinary efforts, including all aspects of water science, economics, law, and sociology.

“The WRRI’s mission is to bring all these elements together and my job will be to help facilitate these collaborations,” Benson said. “I’m delighted to be part of an effort that holds so much promise for our water future.”

Benson received a B.S. from Iowa State University and a J.D. from Creighton University in Omaha. She comes to the WRRI from the Lincoln-based Groundwater Foundation, a nonprofit organization, where she served as senior policy advisor. Before that she was executive director of a nonprofit association, was in the private practice of law and was an elected county attorney in Iowa.

Jessica Harder joined the UNL Water Center in February as a water outreach associate, a position created jointly by the Water Center, WRRI and UNL Rural Initiative.

Her focus will be on bridging the gap between policy and science and acting as a liaison between UNL faculty with water expertise, and Nebraska’s natural resources districts and legislature on water policy issues.

“I am excited to help faculty members’ water-related research make even more of an impact on Nebraska’s future,” Harder said. “I am also looking forward to building relationships both with faculty and Nebraska’s decision-makers.”

Harder received a J.D. from UNL in 2005, completing the College of Law’s Natural Resources and Environmental Law Program of Concentrated Study.

She has a deep interest in natural resources policy stemming from a love for the outdoors, especially the mountains. A Lincoln native, Harder earned B.A. degrees in Journalism and Political Science from Colorado State University, where she graduated Cum Laude.

From the Director (continued from page 2)

will look at Missouri River and northeast Nebraska issues. The tour is July 18-20 and due to some logistics limitations on getting people out on the water, will be limited to around 50 participants. The tour itinerary and other information will be coming to you soon, if it hasn’t already. If you have questions, contact Steve here at the Water Center.

Finally, two new hiring searches are about to commence as we work toward adding water policy and hydrologic information systems faculty members to our growing base of expertise in water-related disciplines. I hope to have more to tell you on these important searches in the next issue.

As we approach the arid summer months, enjoy the cool temperatures and emerald lawns while we have them. I hope to have seen you at the conference in Nebraska City or at other events this spring or summer.
Bellevue’s Marian Maas has embarked on a project to survey and improve the Papillion Creek Watershed using a Water Quality Cooperative Agreement grant from the U.S. Environmental Protection Agency.

Maas is project manager for the Papillion Creek Watershed Project.

The EPA grant, which runs through March 2007, is for water quality assessment and improvement in the Papillion Creek watershed in Douglas, Sarpy, and Washington Counties.

“The grant is for investigations, surveys, and studies focusing on watershed and best management practices for the prevention, reduction, and elimination of water pollution. The Omaha and adjacent area was one of three priority areas in Nebraska for this grant request,” Maas said.

“Urbanizing of the watershed has increased water quality issues for streams in the Papillion Creek watershed. Streams in the Omaha metropolitan area receive high levels of stormwater runoff from industrial, commercial, and residential areas, all of which contribute contaminants,” she said.

Stormwater runoff carries pollutants from construction sites, parking lots, industrial repair and manufacturing sites, streets, driveways, alleys, retail areas and lawns.

Pollutants in this mix include chemicals, sand and salt compounds, oil, antifreeze and gas drippings from vehicles, plastic bags and bottles and pet wastes as well as fertilizers and chemicals from lawns, parks and golf courses.

Agricultural activity, including confined animal feeding operations, in the upper reaches of the watershed contribute containments such as soil sediments, nitrates, phosphorus, bacteria and pesticides. Many fields do not have protective buffer strips along the streams that can help reduce runoff, filter sediments and chemicals and enhance infiltration of runoff.

The Big Papillion Creek and the West Papillion Creek are on the Nebraska Department of Environmental Quality’s impaired waters list for bacteria, PCBs and Dieldrin, with the full length of the Big Papillion being listed as impaired.

Fecal coliform levels rise significantly in many of the tributaries and main stem during storm events and can exceed Nebraska water quality standards during dry weather as well. Excessive turbidity from sediment and algae is another major problem for the stream system but there are no state water quality standards for this parameter.

Maas’ EPA grant will conduct water quality monitoring and land use surveys, compile and analyze data and recommend best management practices to help address problems in the watershed.

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Drought-related impacts can be expected to increase in intensity in the 21st century as human population increases and land uses change. To evaluate current drought-related problems and anticipate future issues, GSA and its partners announce a participatory conference, 18–20 Sept. 2006 near Boulder, Colo. While broad in scope, the meeting will focus on identifying successful strategies for drought and water scarcity management and on developing a clear and decisive action plan.

The goals of this meeting are to create an integrated, interactive, future-oriented forum for understanding and improving our management of drought and water scarcity in the U.S. and to stimulate national debate through the publication and wide distribution of a science- and policy-based discussion document.

Active participation of meeting attendees is sought in preparing recommendations for the roadmap for change. Key lessons learned will form the basis of a scientifically informed roadmap for implementing necessary changes in policy and practice to ensure adequate water resources for future generations. Active participation of meeting attendees is also sought in deriving and evaluating these key science and policy lessons and in preparing recommendations for the roadmap for change. The resulting document will be concise, impartial, informative, useful for congressional visits, letter-writing campaigns, and other efforts to accomplish policy changes. It will also address additional research and funding needs.

Poster presentations on case studies and innovative research and outreach efforts are invited on the following topics:

- Interactions among the physical and ecological environment and human behavior and institutions;
- Relationships between humans and the water environment as population pressures, urbanization, and quality-of-life expectations increase demands on already-strained water resources;
- Improved monitoring, innovative interrogation of historical records, and new approaches to the prediction of drought intensity, frequency, and duration;
- Economic aspects of drought (historical, contemporary, and potential future impacts);
- Ecological impacts of drought and extreme hydrological events, including quantitative impacts on biota/floral and faunal assemblages, and indicators of ecosystem alteration;
- Impact of global climate change on management of drought and water scarcity;
- Risk-based approaches, including probabilistic risk assessment, for assessing multiple uncertain future drought scenarios such as climate change–induced drought;
- Development of drought and water scarcity indicators;
- Enhanced prediction, monitoring, impact assessment, and policy development;
- Public policy approaches (social, economic, political, etc.), including past successes and failures, for managing and mitigating the impact of present and future drought;
- Improved insights into individual and corporate human decision making and behavior before, during, and after a drought;
- Qualitative and quantitative measures of confidence in drought analyses supporting public policy decision making;
- Facilitating communication, collaboration, and cooperation of social and natural scientists, resource managers, and policy makers; and
- The impact of community involvement in drought mitigation.

Registration and Abstract Submission

Registration will be limited to 250 people. Abstracts may be submitted April 1 - June 26. See www.geosociety.org/meetings/06drought/ for details. For more information or for questions, contact Deborah Nelson at (303) 357-1014 or email dnelson@geosociety.org.

Presented by:

More than 100 attended UNL’s third annual Water Law, Policy and Science Conference at Nebraska City’s Lied Lodge and Conference Center, May 4-5.

Mike Drain, J. Michael Jess and Jerd Smith respond to Thursday morning conference presentations.
Conference speakers and respondants Steven Light, Jim Goeke, Jan Sendzimir, W. Don Nelson and Ann Bleed.

(photos by Brett Hampton and Steve Ress)
Dealing effectively with environmental change and the resilience of policy systems is at the center of adaptive management. It was the focus of the University of Nebraska-Lincoln's third annual Water Law, Policy and Science Conference, May 4-5 at the Lied Lodge, Nebraska City.

Sponsored by UNL, UNL’s Institute of Agriculture and Natural Resources, Water Center, School of Natural Resources, colleges of Law and Journalism, Water Resources Research Initiative and Department of Geosciences, “Adaptive Management for Resilient Water Resources” featured international, national and regional experts discussing a range of topics related to better managing water systems and natural resources.

Adaptive management (AM) has emerged in the last 20 years as a prominent means of dealing with complex resource issues involving non-linear systems and multiple tradeoffs. It focuses on uncertainty and resilience in social and ecological systems and tries to turn these factors into advantages, or at least work with, not against them.

Keynoter Lance Gunderson, professor of environmental studies at Emory University, Atlanta, Ga. noted, “Humans for thousands of years have intervened in ecosystems. As we intervene, they change in ways we are essentially unable to predict. Our attempts to stabilize these systems (actually) lead to dramatic changes in ecology.”

Gunderson listed AM’s key characteristics: filling the knowledge-to-action gap, often with action; highlighting uncertainties versus ignoring or planning them away; learning while doing versus learning before doing; integrative science, including social science, versus piecemeal science; policy as hypothesis; management actions as weak experimental treatments; and safe-to-fail versus fail-safe approaches.

The last three strategies in particular distinguish AM from more linear, problem-solving management. Its practitioners expect the policy process to be flexible enough to experiment with incremental changes, and then adjust when the results of those experiments become evident, Gunderson said.

He also contrasted passive AM with a more active variety. Passive AM wants to successively update and evaluate policy; its actions relate to the system’s present state and historical constraints; it tries to resolve uncertainties; and it can fail due to conservatism in face of uncertainty.

Active AM involves deliberate experimentation; trade-offs between objectives and learning; and; and a design that can control actions and separate factors.

Gunderson noted that AM has been tried with the Columbia River; the Great Barrier Reef of Australia; the Colorado River and the U.S. waterfowl harvest. He also noted that it helped inform a change in management of the Florida Everglades but has suffered there from paralysis by analysis. More than 10 years of study and dialogue have not resulted in new management trials.

Karina Schoengold, assistant professor of environmental economics, UNL Department of Agricultural Economics and School of Natural Resources, said, “Adaptive management recognizes that there are multiple management options in natural resources, and that there are tradeoffs in choosing a particular strategy.”

One of the promising aspects of AM, she added, has to do with the importance of input from all stakeholders, including local people; this input helps define an environmental management choice between multiple alternatives. Another is the analysis of marginal changes such as the difference between two different flow rates below a reservoir.

Schoengold listed three kinds of environmental decisions that have different economic implications: easily reversible, such as an increase in dam releases; reversible but very costly, such as building a new, large dam – or decommissioning one and restoring river habitat; and irreversible, such as depletion of groundwater and extinction of species. AM is most useful with the first type, and the latter two should be approached with caution. Combining economics with AM can provide guidance about when to make such decisions, she said.

A panel responded to the morning’s presentations. Mike Drain, Central Nebraska Public Power and Irrigation District, said AM, in its broadest sense, applies to anything that includes feedback, from workplace projects, to dress and hairstyles. He voiced some reservations: “I am suspicious that in some instances the focus on adaptive management is an effort, or a hope, of finding a technical solution when perhaps a technical solution doesn’t always exist.”

It may not help resolve problems among different sets of values, he explained.

Mike Jess, associate director of the UNL Water Center and former director of Nebraska’s Department of Water Resources, said AM involves principles the private sector adopted long ago: if something doesn’t sell, pull it.

“I think people, generally, want to accommodate one another. After all, that’s what adaptive management is – attempting to find some sort of middle ground for all of us,” he added.

One of the hard lessons of AM for the public sector may be that governments have to give up some level of equity or control. Speaking from his experience in state government, Jess said it can be difficult for elected officials to share water management. The Missouri River is a classic example, involving 10 states and many sovereign American Indian tribes. Another challenge relates to compacts that cement agreements on water allocations: how to get the law to adapt to social or ecological changes?

Steven Light of Adaptive Strategies, a consulting firm in St. Paul, Minn., said, “Adaptive management is the most profound change in water or natural resource history in the last 100 years. It’s going to take another 20 years to roll out. I want to see somebody step up to the plate, a university that’s willing to take on adaptive management resilience, and lead the country, and (even) lead internationally in this area.” He challenged UNL to be that university.

Among other comments, he noted that AM is about collective learning; it requires an ecological, not engineering, design; and it treats action a way of knowing. He added that we need to move from seeing water as an enemy or victim to seeing it as an ally.
The tour leaves Lincoln for possible stops at Desoto Bend National Wildlife Refuge, the Papio-Missouri River Natural Resources District (NRD) in Papillion and Omaha District offices for the U.S. Army Corps of Engineers. The tour will also stop at the Sgt. Floyd Memorial across the Missouri River in Iowa enroute to an overnight stop in South Sioux City. Floyd was the only member of Lewis and Clark’s Corps of Discovery to die during the nearly three-year expedition.

Much of the second day will be spent on or near the river, with scheduled stops at the Ponca State Park visitor’s center and Gavins Point Dam. Nebraska Game and Parks Commission representatives will guide tour participants on a look at the Missouri River, from the water, near Niobrara State Park, where participants will get an up-close look at the unchanneled portion of the river above Gavins Point Dam. Overnight will be in nearby Yankton, S.D.

On the third day, the tour will take a look at tribal and community drinking water supply programs being conducted by the Lewis and Clark NRD in Hartington.

A stop at a meat-packing plant in Madison is also planned along the return route to Lincoln and throughout the tour a variety of speakers will address geology, hydrology and practical and political issues associated with the river and northeast Nebraska.

Tour registration price has not yet been set. Registration questions should be addressed to Sara Rector, even coordinator for the Kearney Area Chamber of Commerce, at (800) 652-9435. Registration is limited to the first 50 registrants.

Central Nebraska Public Power and Irrigation District, Gateway Farm Expo, Kearney Area Chamber of Commerce, Nebraska Water Conference Council, Nebraska Association of Resource Districts, Nebraska Public Power District and the University of Nebraska-Lincoln’s School of Natural Resources and Water Center cosponsor the tour.
Meet the Faculty

Karina Schoengold, Ph.D. (continued from page 3)

Examples of Past Research:

— Application of multi-lateral bargaining models to water allocation between sectors (application to California).

— Research assistant, Ag and Resource Economics at the University of California at Berkeley. Surveyed literature on agricultural water use and economics of irrigation; work which has led to several survey articles, including a forthcoming chapter in the Handbook of Agricultural Economics, Vol. 3. Collected and organized data on cropping and irrigation technology patterns in California's Central Valley. Developed econometric estimations of water use patterns.

Teaching:


Selected Publications:


Erkan Istanbulluoglu, Ph.D. (continued from page 3)

Selected Publications:


— Agricultural Water Demand and the Grains from Irrigation Precision Technology (with David L. Sunding and Georganic Morena), ARE Update 7:5, May/June 2004.

— Economics of Water Quality and Agriculture (with David Zilberman). Presented at the OECD Exert Meeting on Agricultural Water Quality and Water Use Indicators, Gyeongju, Korea, October 2003.

Web/email Addresses:

http://snr.unl.edu/schoengold/index.html
kschoengold2@unl.edu


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http://www.geosciences.unl.edu/faculty/erkan.html
erkan2@unl.edu
Making Every Drop Count

Kentucky bluegrass generally requires about one inch of water per week in April and May, 1.25 inches June, 1.5 inches in July and August, 1.25 inches in September and one inch in October.

Consider allowing Kentucky bluegrass and buffalograss lawns to go dormant. Irrigate only if no rain is received for three weeks. Tall fescue lawns do not recover well if allowed to go dormant in severe drought conditions.

Water to the bottom of the roots. Use a screwdriver or soil probe to determine how deep the roots are and how far the water has soaked in. Try to keep soil moist about a half inch deeper than the deepest living roots, or to a depth of eight to nine inches if root depth is not known.

Water early in the morning (4 to 10 a.m.). Watering is more efficient in the morning due to less evaporation and low wind speed.

Observe your automatic sprinkler system once per month. Look for heads that don’t turn, that spray the street or sidewalk, bent or damaged heads, clogged or worn nozzles or orifices, turf growth around heads, etc.

Mow Kentucky bluegrass lawns at 2.5 to three inches and tall fescue lawns in the three to four inch range to conserve moisture.

Install native and/or adapted plants that are drought-resistant and require minimal supplemental irrigation once established (refer to web sites, or consult local nursery/garden centers for suggestions).

Create water zones by putting plants together that have similar water needs. Ornamental plants, including turf species, can be grouped into low, moderate and high water users. Each zone should be watered according to need.

For more information, visit the University of Nebraska Cooperative Extension web site at http://www.ianr.unl.edu/pubs/drought.htm or http://extension.unl.edu/publications.html. Also, Backyard Farmer at http://www.byf.unl.edu and Nebraska Statewide Arboretum at http://arboretum.unl.edu/plantinfo.html.

A WRRI Primer

Water use and management decisions are rarely made strictly on science. Other factors, such as economics, law and policy, and community norms often influence decision-makers. This is the reality behind creation of UNL’s Water Resources Research Initiative (WRRI).

WRRI combines over 100 faculty from multiple disciplines, including natural sciences, engineering, computer science, economics, and law and policy. They are bound together by interests and expertise in some aspect of water and are uniquely positioned to address a wide variety of local, state, and national water challenges.

UNL’s Institute for Agriculture and Natural Resources recently conducted town hall-style listening sessions in 35 rural and urban communities across Nebraska, asking the question, “What are the critical issues for you, your community, or your business?” Water…both quality and quantity…was identified as one of the top two issues by Nebraskans from Chadron to Omaha. Similar studies in other parts of the U.S. have yielded similar results.

It’s fitting that Nebraska, which sits atop one of the largest aquifers in the world, is poised to become the home of one of the top water research and education universities in the nation, if not the world.

The WRRI is a relatively new initiative that began in late 2003, but it has already had a public impact. One of its first projects was establishing a Water Law, Policy and Science Conference. In 2004 the inaugural conference—Finding Solutions to Multi-Jurisdictional Water Conflicts—attracted 250 attendees. The 2005 focus was Water Management in the Great Plains: Implications of Drought and Climate Change, and it attracted 175 registrants. The 2006 conference, planned for early May, centers on Adaptive Management for Resilient Water Resources.

Faculty have undertaken several large multidisciplinary research projects. The Sandhills Biocomplexity project addresses how water and vegetation interact to stabilize sand hills over long time periods. A large project to classify all the lakes in Nebraska involves many faculty from natural resources, engineering, and geosciences.

A project to address arsenic in drinking water in western Nebraska towns is teaming water quality scientists with faculty and staff from the University of Nebraska Public Policy Center UNL faculty and staff held town hall meetings that address water science and societal dimensions in an effort to help towns solve their drinking water issues.

WRRI faculty are also building and strengthening relationships with external entities, including the Nebraska Department of Natural Resources, U.S. Environmental Protection Agency, National Park Service, Nebraska Department of Environmental Quality, and Nebraska Game and Parks Commission. New partnerships with public and private entities are welcome and being actively pursued.

Another key element of WRRI is strengthening education and experiential opportunities for students, particularly graduate students. UNL will play a key role in training the next generation of water scientists, managers, and decision-makers by expanding the water science major and offering multiple tracks, including water law and policy. At the graduate level, students from various disciplines will have classroom opportunities to explore multidimensional water issues, as well as internships that allow them to apply and expand what they’ve learned.

For more information about WRRI go online to http://wrri.unl.edu, or contact Kyle Hoagland or Lorrie Benson at (402) 472-3305.

(continued on page 15)
What’s New at the UNL Water Sciences Laboratory

By Daniel D. Snow, Ph.D.
Director of Laboratory Services
UNL Water Sciences Laboratory

Since the last Water Current, faculty and staff at the UNL Water Sciences Laboratory (WSL) met with scientists in the U.S. Geological Survey Organic Geochemistry Research Group at Lawrence, Kan. to learn about new techniques for measuring pharmaceuticals and algal toxins in water.

Dave Cassada, Teyona Damon, and Dan Snow visited with Mike Meyer, Keith Leftin, and Jennifer Graham of the USGS group to discuss new techniques for analyzing these and other emerging contaminants using the latest instrumentation. The WSL is planning to run “split samples” this year with the USGS laboratory as a comparison to help validate and verify the accuracy of several new methods developed for these contaminants.

WSL staff also developed new techniques using liquid chromatography mass spectrometry to identify unknown chemicals to support remediation research in the UNL School of Natural Resources (SNR).

SNR researchers have been testing different approaches to clean-up contaminated soil and water and found that each can produce different intermediates or by-products. Very often the composition of these intermediates must be determined to help understand the chemical reactions and whether or not these compounds are harmful.

The Lab’s Thermofinnigan LCQ “ion trap” mass spectrometer has been especially useful in identifying intermediates formed during remediation experiments on RDX, a nitrogen-based high explosive compound, as well as with commonly used herbicides such as metolachlor and acetochlor.

Recent installation of a radioactivity detector on the LCQ will allow for detection and identification of unknowns produced by “tagged” or labeled chemicals used to test remediation and degradation chemistries.

The WSL has nearly completed updates to its corrosives facility to handle processing samples for trace element analysis using the new Platform XS inductively coupled plasma mass spectrometer (ICP-MS).

Two badly corroded fume hoods were replaced last fall with new and larger Kewanee hoods in the corrosives lab. A CEM microwave digestion system, purchased with IANR equipment funds in cooperation with the UNL Veterinary Diagnostic Center, was also installed in this area. Both improvements will help with more rapid preparation of samples for analysis using the ICP-MS with less chance for contamination during processing.

As a bonus, new methods are also being developed to speed processing samples for elemental nitrogen and phosphorus using the CEM microwave digestor and the SEAL AQ2 autoanalyzer.
USGS Releases Report About Pesticides

The U.S. Geological Survey (USGS) released a report documenting pesticides in streams and groundwater across the U.S. The report is based on monitoring data collected from 1992-2001. The data included groundwater sites as well as streams in urban and agricultural areas.

Overall, the report found that pesticides are found in urban and agricultural streams throughout the year and are less common in groundwater. The levels of pesticides found were seldom at concentrations likely to affect human health. The report does raise concern about levels of pesticides that may affect aquatic life or fish-eating wildlife.

The most common pesticides found in streams in urban areas were diazinon, chlorpyrifos and malathion. However, since 2001 many urban uses of diazinon and chlorpyrifos have been phased out. In agricultural streams, chlorpyrifos, azinphos-methyl, p,p’-DDE and alachlor were most often found at concentrations considered to affect aquatic life.

Organochlorine pesticide compounds DDT, dieldrin and chlordane are no longer used, but were still detected in bed sediment and fish in both urban and agricultural areas. These detections do show a trend of lower concentrations of the compounds in fish.

The report, entitled “Pesticides in the Nation’s Streams and Ground Water, 1992-2001” is available online at http://water.usgs.gov/pubs/circ./circ1291 or by calling (888) ASK-USGS. More information about the study can be found at http://water.usgs.gov/nawqua/

Water Quality Improvement Grant for Papillion Creek Watershed

She will conduct in situ stream water quality monitoring at 30 sites on the Big Papillion Creek and tributaries in the three counties every two weeks over a three-month period this summer. Fecal coliform samples will be collected each time and samples for petroleum products and agricultural and lawn chemicals will be collected at selected sites.

“The data will help identify stream reaches with diminished water quality and this information will be combined with the land use surveys to provide a better idea about pollutant types and sources in the Papillion Creek watershed,” Maas said.

An outreach component is aimed at residents and businesses in the three counties and at improving awareness of water quality and stream-friendly practices.

Overall project goals are to improve knowledge of the water quality of the Papillion Creek streams; identify best management practices for targeted segments found to have diminished water quality; and convert the information into best management practices and water quality awareness through public outreach programming.

Water News Briefs

Water Colloquium

The Water Center will sponsor a fall water colloquium on Friday, Oct. 27 at the Embassy Suites Conference Center in Lincoln. Topics being considered for inclusion in the colloquium center on state and regional “hot topics” in water and the latest in water-related research and extension programming by the University of Nebraska-Lincoln.

The one-day event will embrace familiar themes from past state water conferences and Platte River Ecosystem Symposiums organized in part by the Water Center and UNL.

Look for more information on the October colloquium soon.
You Get the Last Word and
A Chance at Some Neat Prizes

We want the Water Current to deliver information you need. To be more sure of that, we’re asking that you take a little time to complete this questionnaire.

As a reward for your efforts, we will enter your name in a drawing for one of three Water Center rain gauges and one of three Water Center genuine Rapalla fishing lures.

To be eligible for the drawings, return your completed survey to Steve Ress, UNL Water Center, P.O. Box 830844, University of Nebraska, Lincoln, NE 68583-0844 or FAX it to (402) 472-3574 by Monday, June 12. UNL subscribers may return surveys via campus mail to 103 NRH, EC, 0844.

Mail or FAX the entire page (so we have your name and address for the drawings). Survey responses are held in confidence and are used only by the newsletter’s editorial staff.

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
   ___ Meet the Faculty
   ___ Reporting on upcoming events, seminars, conferences, tours, etc.
   ___ Director’s Notes
   ___ Reporting on water and environmental research and outreach activities
   ___ Guest editorials/columns
   ___ Information on what’s happening with the Water Sciences Laboratory, Water Resources Research Initiative, etc.

2. What would you like to see in upcoming issues of the Water Current?
   __________________________________________
   __________________________________________
   __________________________________________

3. What are your primary water and environmental interests?
   __________________________________________
   __________________________________________
   __________________________________________

4. Do you read each Water Current you receive?
   ___ Yes ___ No

5. Do you circulate your Water Current to anyone else?
   ___ Yes (if so, how many others __________) ___ No

6. Should the Water Current be distributed
   More often ___ less often ___ remain a quarterly ___

7. Do you ever access the virtual copy (pdf) of the Water Current that is on the Water Center’s web site at http://watercenter.unl.edu? ___ Yes ___ No

8. What can we do to improve the appearance and/or readability the Water Current?
   __________________________________________
   __________________________________________
   __________________________________________