ECONorthwest Says Nebraska Environment as Economic Engine Could Use Jump-Start

by Steve Ress

When Adam Switzer returned to his family’s 12,000-acre Sandhills ranch six years ago, he soon found cattle alone couldn’t pay the bills.

He fixed a vacant house on the ranch to lodge a few hunters, sold float trips down the Calamus River, field trips to prairie chicken breeding grounds and even got city slickers to pay to work on cattle drives.

Now, his mother works full time answering calls and e-mails from clients. The cattle ranching covers the cattle ranching, and Calamus Outfitters pays for everything else — including regular deposits to a savings account.

Recently, the 32-year-old rancher listened to Oregon economist Ernie Niemi say Nebraska’s natural resources could improve the state’s economy in ways other than raising crops or livestock. Switzer said Niemi spoke the truth.

“It’s there if you know how to use it,” Switzer said.

Niemi is vice president of ECONorthwest, a Eugene, Ore., economic consulting firm.

Niemi is the primary author of a 119-page analysis titled “Natural-Resource Amenities and Nebraska’s Economy.” The analysis is the first of its kind in the state and showed Nebraska could do more to take advantage of its natural amenities.

Fishing and Lake McConaughy, both illustrated here, important to invigorating Nebraska’s environment as an economic engine, according to an Oregon economist who recently studied and reported on the subject (photo: Brett Hampton).

(continued on page 11)

Future of Water Use in Agriculture

The Future of Water Use in Agriculture is the theme of the Fourth Water Law, Policy and Science Conference planned for spring 2007 in Lincoln.

“This theme is very timely for both Nebraska and the world as we all consider how to meet increasing demands for a finite supply of water,” said UNL Water Center director Kyle Hoagland.

The two-day conference will use both Nebraska and national speakers to examine the science, economics, policy and law of water use in agriculture for the future, Hoagland said.

The conference is co-sponsored by the UNL Water Center and Water Resources Research Initiative and UNL’s Institute of Agriculture and Natural Resources.

Look for emerging conference details online at http://watercenter.unl.edu in coming months.
from the DIRECTOR

Perhaps after seeing one too many negative political ads this fall, I’m particularly struck by how positive the “water world” is at UNL. A lot of good things are happening in water research (e.g., see “2006 Water Colloquium Attracts Nearly 200” in this issue), but in my opinion the real story lies beneath all of the new activity, as important as it is.

As faculty in water science and engineering are learning more toward the importance of societal dimensions in water resources management in addressing larger, increasingly complex water resource challenges, basic science water faculty at the University of Nebraska are beginning to learn to speak new languages in economics, sociology, psychology, law, and policy, while water faculty in those disciplines are becoming more fluent in the languages of geosciences, hydrology, ecology, and chemistry.

As with any new vocabulary, the younger, newer faculty are among the best and first to speak in foreign tongues, so the nine water faculty hired over the past three years have played significant roles in the larger research teams discussions that have taken place at retreats, conferences, colloquia, forums, and meetings, particularly recently. I anticipate that new faculty hires in water policy and hydrologic information systems will again increase our collective language skills and contribute in major ways to this ongoing dialogue.

An important point is that a vibrant “water community” is emerging from the past when identifying with or being identified as water faculty operationally meant only that you had received a U.S. Geological Survey grant from the Water Center sometime in the last three to five years.

This was a relatively small club of about 30 faculty members, representing a small subset of the “hard science” hydrologists, agronomists, and engineers. The water faculty directory that was published by the Water Center this year includes more than 100 faculty from the University of Nebraska’s Lincoln, Omaha and Kearney campuses, and is rapidly growing. New faculty at UNO, UNL and soon-to-be new hires have already required that we update the directory, released less than three months ago!

In addition to this new sense of belonging to a community of water faculty willing, able and wanting to take on more complex water issues, there are two other very positive undercurrents worth noting.

First, as the non-academic community in Nebraska and the region realize that our water resources challenges are not unique, even on a global scale, it is interesting to me that our water faculty also seems to be awakening to the same notion. Evidence of this is in part found in the number of grant proposals now emerging (e.g., water monitoring networks) that are based in Nebraska, as well as ongoing and recently completed projects based here that are viewed externally as applicable across much broader geographic scales (e.g., lake classification studies). Again, our new hires are leading the way in this new collective awakening.

Second, NU water faculty are working closely with our colleagues in the local, federal, and especially state agencies, perhaps more so than ever before. Several faculty in the School of Natural Resources for example are working with the Nebraska Department of Natural Resources on special projects to provide data, update models, etc. that assist DNR in its mandate to implement LB962.

(continued on page 12)
Meet the Faculty

Aris A. Holz, Ph.D.

Holz is a research assistant professor specializing in limnology and aquatic ecology in the University of Nebraska-Lincoln's School of Natural Resources since July 2005.

Education:
Ph.D., University of Nebraska-Lincoln, Natural Resources (Aquatic Ecology), 2005.
M.S., University of Nebraska-Lincoln, Biology (Parasitology), 1994.
B.S., University of Nebraska-Lincoln, Biology, 1992.

Current Research:
— Holz’s research interests are both applied and rooted in fundamental science. She is currently working on determining if the frequency of toxic algal blooms has increased since European settlement, using Nebraska’s Sandhills lakes as a model system. She is attacking this problem from another angle by developing a model to predict algal blooms and toxic blooms in sandpit lakes using both in-lake and climatic variables.

— Holz is in the process of creating a stream classification system for the State of Nebraska that will be used to establish protection and restoration goals. The basic research includes both monitoring and experimental manipulations to understand the underlying mechanisms of phytoplankton nutrient limitation in saline lakes. Typical nutrient/phytoplankton paradigms do not apply to saline lakes and are yet to be established.

Past Research:
— Holz’ dissertation research included developing a methodology for separating water bodies based on multi-parametric ecological thresholds. This approach was used to develop a lake classification (continued on page 12)

Mark A. Pegg, Ph.D.

Pegg is an assistant professor and fisheries ecologist in the UNL School of Natural Resources, since August 2005. From 2000 to 2005 he was an assistant professional scientist, Illinois Natural History Survey and director, Illinois River Biological Station and in 2004 and 2005 was director, Forbes Biological Station.

Education:
Ph.D., Fisheries Biology, Iowa State University, 2000.
M.S., Biology, Tennessee Technological University, 1994.
B.S., Fisheries and Wildlife Biology, Iowa State University (With Distinction), 1992.

Current Research:
— Impacts and control of Aquatic Nuisance Species – specifically working on control and viability of Asian carp populations in the Mississippi River Basin.
— Compatibility of blue suckers as a surrogate study species for the endangered—pallid sturgeon habitat use and selection.
— Population dynamics of Paddlefish in the Missouri River.

Past Research:
— Controlling the spread of invasive aquatic species using fish behavior alteration techniques like sound, bubble and electric barriers
— Fish community patterns in the Upper Mississippi River Basin using long-term monitoring data.

Teaching:
— Fisheries Science (NRES 463/863)
— Ichthyology (NRES 489/889)
— Managed Aquatic Ecosystems (Graduate level team taught with Dr. Kevin Pope)

Selected Publications:
Grant Will Help UNL Refine Irrigation Management Tool

By Dan Moser, UNL Communications and Information Technology

A University of Nebraska-Lincoln computer program that helps farmers facing limited water supplies to make irrigation decisions will be expanded and enhanced under a new grant from the U.S. Department of Agriculture.

The $885,000 grant will allow UNL researchers to conduct field research that will refine and improve the Water Optimizer, a tool that enables producers with limited water to evaluate what crops to grow, how many acres to irrigate and how much water to apply. Improvements will make the Water Optimizer more versatile and more widely applicable. USDA’s Risk Management Agency is funding the project, titled “Enhancing Irrigation Management Tools and Developing a Decision System for Managing Limited Irrigation Supplies.”

The first version of Water Optimizer, released by UNL in 2005, is useful but limited in scope. It covers the principal crops in Nebraska but doesn’t address all of the critical risk-management issues surrounding limited water, said Gary Hergert, a soil scientist at the university’s Panhandle Research and Extension Center at Scottsbluff.

Hergert will work with a multidisciplinary team from the Institute of Agriculture and Natural Resources including Paul Burgener, also from the Panhandle center; Derrel Martin of biological systems engineering; and Ray Supalla of agricultural economics. The departments involved will work to refine the Water Optimizer by:

— improving the tool’s function for crops grown in the semiarid High Plains, including canola, camelina, crambe, brown mustard, chickpeas, dry beans and sunflowers;

— expanding the tool’s geographic coverage area to additional counties in Nebraska and including irrigated areas in Colorado and Kansas;

— developing the capability to evaluate risk-management alternatives on a “whole-farm” basis, as well as field by field;

— developing the capability to determine the best strategies for managing multi-year water allocations;

— incorporating information for evaluating how irrigation system improvements affect decisions.

“We want to take a whole farm view” in considering how to manage the available water supplies,

USGS Releases Findings on Domestic Well Water

Scientists at the U.S. Geological Survey (USGS) have evaluated a range of inorganic and organic contaminants in domestic wells from every state and Puerto Rico.

Inorganic compounds arsenic and nitrate exceeded U.S. Environmental Protection Agency drinking water standards in well water most often while uranium, mercury, and fluoride also exceed standards at a lesser rate.

Organic compounds rarely exceeded drinking water standards; however, atrazine, metolochlor, simazine, MTBE and chloroform were all detected in more than five percent of the sampled wells.

Since the water quality of domestic wells is not federally regulated or nationally monitored, this study provides a unique, new perspective on the quality of the self-supplied drinking water resources used by 45 million Americans.

The national study is based on existing data from a large number of wells sampled as part of multiple USGS programs. USGS is continuing this research to include a broader list of contaminants from a selected set of wells to further investigate geographic patterns and the co-occurrence of multiple contaminants. This information should be released sometime next year.

An article on this latest well study is featured in the August issue of Ground Water Monitoring & Remediation. It can be accessed at http://health.usgs.gov/.

(continued on page 16)
UNL Faculty Respond to Advisory Panel State Research Priorities

By Jessica Harder, J.D.
UNL Water Center

After two recent meetings, University of Nebraska water faculty have submitted 10 brief research proposals aimed at addressing top state water research priorities set by UNL’s Water Resources Advisory Panel.

The 10-member Water Resources Advisory Panel (WRAP) is comprised of water resources decision-makers from across Nebraska that advise UNL on state water issues. The panel requested a water faculty response to a list of research priorities it created at an earlier meeting by cataloging and paring-down a broader survey of state water research needs.

UNL faculty had two opportunities to meet and respond to WRAP’s water research priorities list, said panel organizer and moderator Jessica Harder of the UNL Water Center.

More than 40 attended WRAP’s Sept. 22 Hardin Hall forum to get an initial look at the priorities list and begin developing input on WRAP’s research priorities list.

“Specifically, WRAP members wanted water faculty to answer three questions: 1) Have these priorities already been addressed by the University 2) Are these researchable questions framed in the right way 3) Are there adequate resources at UNL to address these priorities and is anyone addressing them,” Harder explained.

During the half-day forum, facilitated by Water Resources Research Initiative deputy program manager Lorrie Benson, faculty took each of these questions in turn and collaborated to begin crafting answers.

First, faculty present at the forum developed a list of ongoing, upcoming and past UNL research projects addressing the research priorities, then they divided into smaller groups surrounding the four major research priorities in order to utilize their expertise to discuss whether the panel’s list needed reframing to create researchable questions and to reword these questions where needed.

Finally, from their small groups, faculty assessed UNL’s ability to tackle these individual research questions.

A second faculty gathering on Oct. 3, during a WRRI retreat at Lincoln’s Wilderness Ridge, built on the work of the earlier meeting and resulted in creating 10 short proposals for the panel.

Four of the proposals address the panel’s first priority—water modeling and data gathering to develop a better understanding between surface water and groundwater resources.

Two each are aimed at the other three broad priorities categories: Impacts on the water budget, determining best management activities/tools to reduce consumptive use of water and provide the best economic environmental and social benefits per acre foot of water consumed, and economic impacts of management activities.

Over 30 faculty and staff were involved in these initial proposals. After the initial proposal list was announced to water faculty, many more faculty members have expressed interest in becoming involved in specific proposals.

The WRAP met with WRRI co-leaders Ron Yoder and Kyle Hoagland, and Assistant Vice Chancellor for UNL’s Institute of Agriculture and Natural Resources, Alan Moeller on Oct. 11 to briefly examine the faculty proposals and discuss the next step.

Panel members are now forming comments and questions on the proposals, and a future opportunity for WRAP members to meet and discuss these proposals with researchers is being organized.

Water Resources Advisory Panel Priorities:

First Tier Priorities:

1). “By basin” assessment of information needs to develop a better understanding between surface water and groundwater resources. A. Need for Geological/Land Use/Water Use surveys to provide basic required data (Especially focusing on glaciated regions where aquifers and their hydrology are affected by the presence of glacial till).

B. Develop formal ground water models where appropriate. C. Model verification and refinement (Gaining better understanding of pumping/recharge on groundwater aquifer and stream flow).

2). Related topics that impact the water budget. A. Impact of changes in land use and agricultural practices to increase yield with less water diverted/pumped. B. Impact of riparian vegetation on water use and groundwater surface water interaction. C. Improve estimates of groundwater recharge through vadose zone studies, improvements to CROPSIM or similar tools to assess potential recharge from irrigation.

3). Determine best management activities/tools to reduce consumptive use and provide the best economic, environmental and social benefits per acre-foot of water consumed.

A. Water transfers/water banking. B. Drought-resistant crops/Water-efficient crops. C. Deficit irrigation systems/management decisions. D. Drought mitigation. E. Increased water storage for retiming of flows through both surface and groundwater reservoirs. F. Drought triggers for management plans (In some cases, a management plan that is triggered by reduced stream flows may make sense – a groundwater impact on streamflow may be acceptable until drought effects are seen).

Second Tier Priorities:

4). Economic impacts of management activities. A. Sustainability of biofuel industry. B. Social, political and economic implications of retiring irrigated acres through incentive based programs. C. Economic impacts of trade-offs between water use for irrigation and other uses (instream flows, recreation).
Taking Drought Preparedness Messages to Congress

By Kelly Helm Smith
National Drought Mitigation Center, UNL

The United States can and must do a better job of preparing for drought.

That’s what Don Wilhite, director of the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln, told Congress in late September.

Wilhite was conveying a consensus that emerged from a drought conference he led in Longmont, Colo., September 18-20.

Climate change raises a strong possibility that droughts will be longer and more intense than anything most of us have experienced, especially in the western half of the United States. Population increases and land use changes mean that we will feel the effects of drought more acutely, he said.

Wilhite’s testimony, part of an effort by the Congressional Hazards Caucus, was in support of two pending pieces of legislation.

The first is the National Drought Preparedness Act which would, in the words of the Western Governors’ Association (WGA), “Put in place a comprehensive national drought policy that statutorily authorizes a lead federal agency for drought, and delineates the roles and responsibilities for coordinating and integrating federal assistance for droughts. It would move the country away from the costly, ad-hoc, response-oriented approach to drought, and move us toward a proactive, preparedness approach, similar to what we have for other natural disasters such as hurricanes, floods, and tornadoes.”

The second would create the National Integrated Drought Information System, which WGA says would “Provide water users across the board — farmers, ranchers, utilities, tribes, land managers, business owners, recreationalists, wildlife managers, and decision-makers at all levels of government — with the ability to assess their drought risk in real time and before the onset of drought, in order to make informed decisions that may mitigate a drought’s impacts.”

Wilhite organized the Colorado conference, titled “Managing Drought and Water Scarcity in Vulnerable Environments: Creating a Roadmap for Change in the United States” in cooperation with the Geological Society of America and others. More than 200 attended.

Wilhite and other conference organizers are currently drafting “The Roadmap for Change” which is expected to be ready next spring, in time for the next round of discussion on a national drought policy.

Message to Congress

Before heading to Washington, D.C., he condensed three days of scholarly and policy-oriented discussion from the conference into six takeaway messages for Congress:

1) **Increase understanding of the ‘drought hazard’ and how it may be changing in frequency, severity, and duration.** This would involve better monitoring, better understanding of past droughts through techniques such as paleo-climatology, and more use of projections of the effects of climate change.

2) **Improve our understanding of how societal vulnerability to drought is changing.** Factors that increase the effects of drought include population growth, urbanization and other land use changes, and greater awareness of environmental effects.

3) **Place more emphasis on managing the risks associated with drought.** Dr. Wilhite advocated a transition from relief programs to a risk management approach, in which agricultural producers provided with the very best available information would knowingly take calculated risks. He added that relief programs reinforce the status quo and reward lack of planning.

4) **Improve our assessment of the broad range of drought impacts.** We know that agriculture is only one of the sectors affected by drought, but its larger social, environmental and economic effects are not well-documented.

5) **Develop a national drought policy that outlines the principles for reducing societal vulnerability to drought.** It would include monitoring, risk assessment, planning, and improved coordination between all levels of government. This idea isn’t new: The Government Accounting Office recommended a national drought plan in 1980.

6) **Create a new ‘National Water Culture’ that would promote sustainable water management practices.**

NDMC is part of UNL’s School of Natural Resources.
With water as the common thread, researchers from the University of Nebraska–Lincoln and University of Nebraska–Omaha presented their latest research and programming to professional colleagues and the public at the 2006 Water Colloquium.

The event drew attendance of nearly 200 and was held at Lincoln's Embassy Suites Hotel, Oct. 27.

Topics ranged from water quality and quantity research and conservation programming to decision-making tools and economics, human behavior, policy and law during the fast-paced program. Nearly two-dozen speakers and more than 20 poster were presented.

“The Water Colloquium was an outstanding opportunity for researchers to give snapshots of their latest work with their professional colleagues and the public,” said Kyle Hoagland, UNL Water Center Director.

“The wide variety of disciplines represented, all water-related, demonstrates what an important role water plays in so many aspects of our lives. The research and programming we’re doing is critical to the future of water use in Nebraska and the world,” he said.

UNL’s Water Center and Water Resources Research Initiative hosted the colloquium.

Attendees included NU faculty, staff and students; elected officials and their representatives from local, state and federal government; Natural Resources District staff; state and federal agency personnel and others.

The program opened with a focus on water quality, including presentations on movements of contaminants in water and ways farming practices can impact the level of contaminants reaching water bodies.

Next were presentations on ways price and human behavior affect water usage, and impacts irrigation can have on budgets and land values.

Water quantity was addressed in several ways, including interactions of streams, aquifers and vegetation; modeling water balance components and impacts of terraces; impacts of beaver dams in watersheds; and decision-support tools for water management.

The afternoon closed with two legal analyses—one of Nebraska’s program for regulating groundwater that is hydrologically connected to surface water, and one challenging the federal government’s lack of a comprehensive water policy.

Throughout the day, participants could view and discuss 21 posters summarizing research and program by faculty and students. Poster topics covered such topics as viruses in landfill leachate, investigation of evapotranspiration and soil moisture, drought indices and lake restoration.

The colloquium program and PowerPoint presentations are online at www.wrri.unl.edu. The program includes abstracts of oral and poster presentations and contact information for presenters.

A New Way to Soak-up Nitrogen

When Nebraska researchers began looking for ways to soak up nitrogen fertilizer from cropland before it could make its way to groundwater, they turned the standard in absorption: disposable baby diapers.

The University of Nebraska’s Dean Krull has been working on the project in a corn field near Central City, studying the effects of a polymer applied to the soil. “This product is basically the same thing that is in those disposable diapers that absorbs that moisture,” Krull said.

The study, being done on behalf of the Central Platte Natural Resources District, seeks to gauge how much nitrogen the polymer will absorb. Otherwise, the nitrates would likely leach from fertilizer into the groundwater supply. Krull said the effort holds enormous potential.

“We are testing a product that may have the potential of eliminating nitrogen leaching,” he said.

The state authorized the NRD to monitor water quality in 1988 and much of its attention has focused on nitrates, manager Ron Bishop said. “We have been going hot and heavy since then, and Dean has been an important part of this program,” he said.

“It’s valuable research he conducts.” The polymer, buried in the top 3 inches of the soil, is a finely ground plastic that can absorb five times its weight in water.

The polymer was specially designed for soil application, Krull said, and is environmentally safe. Nitrogen fertilizer is a key component for crops grown throughout the Central Platte NRD.

The roots of the crops absorb the nitrates in the fertilizer to promote growth, but once those nitrates get past the crop’s roots, they eventually migrate into the groundwater supply, posing a possible health threat to people and livestock using that water.

The polymer has been used differently in Kansas, where it helped retain moisture for wheat. “This is an unbiased, factual look at the product,” Krull said.
Husker Harvest Days: Sept. 12-14

Governor Dave Heineman, IANR Husker Harvest Days Coordinator Larry Schulze and Bobbie Kriz-Wickham of the Nebraska Department of Agriculture at Heineman’s press conference in UNL’s Market Journal tent.

UNL Water Center communicator Steve Ress (right).

UNL Water Center Associate Director Mike Jess talks with a visitor at Husker Harvest Days in Grand Island.

UNL School of Natural Resources climatologist Qi (Steven) Hu.

Show goers throng the Institute of Agriculture and Natural Resources building at Grand Island’s Husker Harvest Days.

The Institute of Agriculture and Natural Resources’ easily seen building at Husker Harvest Days. Nearly 30 IANR exhibitors were on-hand for the annual irrigated farm show in Grand Island.

(Photos by Steve Ress)
Nearly 200 attended the UNL Water Center and Water Resources Research Initiative’s 2006 Water Colloquium, held October 27.

Erkan Istanbulluoglu presents on hydro-climatologic fluctuations and the land surface.

Don Rundquist and Anatoly Gitelson (pictured) gave a synopsis of water-related research by UNL’s Center for Advanced Land Management Information Technologies (CALMIT).

Vitaly Zlotnik presents on mechanisms producing variation in lake salinity in the Nebraska Sandhills.

Durelle Scott presents on nutrient and contaminant fate within riverine systems.

2006 Water Colloquium: Oct. 27

(Please note: All photos are by Brett Hampton.)
The University of Nebraska-Lincoln’s National Drought Mitigation Center (NDMC) is responding to user needs by making information from the U.S. Drought Monitor (http://drought.unl.edu/dm) and a related tool available on more local scales.

The weekly drought map is now available in a regional and state version that includes county lines. All versions are available online as both html and PDF documents, for easy printing and distribution.

NDMC and UNL’s High Plains Regional Climate Center have also launched the Daily Gridded Standardized Precipitation Index, which makes drought data immediately available on a sub-county level. Previously the data was available by climate divisions, which typically include several counties.

“This is part of a broader effort to enhance existing tools and develop new tools to help decision-makers at all levels, including agricultural producers,” said NDMC director Don Wilhite.

The U.S. Drought Monitor is increasingly used by decision-makers at all levels, including the U.S. Department of Agriculture and Internal Revenue Service. USDA tied relief under this summer’s Livestock Assistance Grant Program to the U.S. Drought Monitor’s designations of extreme and exceptional drought.

Launched in 1999 to depict severity and spatial extent of drought, the U.S. Drought Monitor is a synthesis of multiple climate monitoring tools as well as the informed judgments of its authors and more than 225 federal, state and academic reviewers across the country.

Other authors and collaborators include USDA and the National Oceanic and Atmospheric Administration.

The U.S. Drought Monitor has also been used to determine eligibility for emergency haying and grazing of Conservation Reserve Program land and to qualify producers in designated counties for the Cattle Feed Program and the Livestock Compensation Program.
Natural amenities are classically thought of as mountain ranges, seashores and old-growth forests. But they can also be rivers, grasslands, reservoirs and wildlife, all of which Nebraska has in abundance.

The problem is many people don’t know about the state’s natural attributes. Those who do often struggle to get to them, while policy makers and private landowners often fail to recognize their value.

Research shows natural amenities can be as effective in generating jobs as traditional industrial development, Niemi said. That’s largely because people want to live near natural amenities, especially younger, well-educated people adept at creating their own businesses and incomes.

Yet many Nebraskans hold the view that the value of land and water lies strictly in the commodity it can produce.

“If you don’t fold environmental quality in your economic development strategy, then you are undermining that strategy,” he said.

Niemi also believes that by tapping into a natural-amenity economy, the state can reduce “brain drain” by providing young professionals with reasons to stay and keep rural areas populated by providing additional jobs and opportunities. Doing so will, in part, require the state to do a better job protecting land, water and air from pollution. Also, in a state where 97 percent of land is privately owned, access to the great outdoors must be made easier.

The nearly $100,000 analysis compiled and interpreted information from nearly 100 published sources. The author issued the report to a coalition consisting of the Nebraska Game and Parks Commission, the Center for Rural Affairs, American Rivers, the Nebraska Department of Economic Development, the University of Nebraska–Lincoln Water Center, Sen. Ben Nelson and Rep. Jeff Fortenberry.

Study partners hope it will draw attention to the idea of using natural amenities as a foundation of economic development and, therefore, inspire protection of those resources.

“We don’t just put it on a shelf,” said Don Gabelhouse, fishers administrator for the Game and Parks Commission and coalition leader. “I hope people will start talking about this.”

Economic activity tied to natural amenities is already present in Nebraska. For example, thousands of ecotourists visit the Central Platte Valley each year to observe Sandhill Cranes and Missouri River restoration efforts in Omaha has prompted major real estate development near the city’s downtown.

In 2002, expenditures on hunting, fishing and wildlife watching in Nebraska totaled nearly $474 million, the report said. That figure could be higher if the state can encourage more outdoor recreation, particularly among nonresidents.

In comparison, sales of agricultural commodities in Nebraska generate about $10 billion annually.

The Department of Economic Development recognizes the potential for natural-amenity economic growth. Last year, the department created an ecotourism specialist, Tom Tabor. In his first year, he took 17 requests from rural landowners. This year he’s received 45.

Another message in the study is the idea that economic development efforts do not have to focus either on agriculture or natural-amenity growth, said Rebecca Wodder, president of the nonprofit conservation group American Rivers.

“It’s no surprise that a key finding of this study is that recreation, agriculture and healthy natural resources can coexist,” she said. “And they can do so to the economic benefit of Nebraska’s communities.”

Niemi’s report, Natural Resource Amenities and Nebraska’s Economy: Current Connections, Challenges and Possibilities examines the current status of and potential for natural resource-related, amenity-driven growth in Nebraska. Resource-related amenities may be able to stimulate economic growth in Nebraska through 1.) Improving quality of life, 2.) Encouraging feedback to the farm sector, 3.) Expanding recreation and other commercial uses of natural resources, and 4.) Protecting environmental values.

Although Nebraska has its own “distinctive style” of amenities, including rivers, reservoirs, agricultural and undeveloped landscapes, trails, state parks and opportunities for hunting, fishing and wildlife-watching, the four previously mentioned mechanisms can also work to the state’s disadvantage, the report states.

Among these are economic challenges that include a net loss of young people possessing at least a bachelor’s degree, pesticide contamination of surface waters and “manipulation of the Missouri River basin that has reduced invertebrate species important to the natural food chain.

Nebraska’s recreation industry is also one of the smallest in the U.S., where little land and water are open to public access.

Niemi’s report also notes problems stemming from groundwater pollution that threatens water supplies of many of Nebraska’s major cities and loss of wetlands.

The report also states rather tersely that “Unless Nebraskans act more aggressively to capitalize on them, the economic forces underlying amenity-driven growth are likely to work to the state’s disadvantage.”

Potential bright spots for amenity-driven growth include Omaha’s riverfront, Valentine and the Niobrara River, Middle Platte River, Missouri River trails, Ponca State Park, wetlands, natural wildlife refuges, the Pine Ridge region and Lake McConaughy.

“The state possesses resources that could be used to take advantage of these (amenity-driven economic) forces, but so far Nebraskans have not fully seized these opportunities,” the report concludes in part.

The executive summary of Niemi’s Nebraska report can be found online at www.econw.com

(EDITOR’S NOTE: part of this story was taken from an article by the Lincoln Journal-Star’s Joe Duggan.)
Meet the Faculty

Aris A. Holz (continued from page 3)

system for Nebraska from which nutrient criteria have been adopted for reservoirs and sandpit lakes.

Selected Publications:


Mark A. Pegg (continued from page 3)


Email:
mpegg2@unl.edu

From the Director (continued from page 2)

Much of this collaboration is being facilitated by the conscientious efforts of the Water Resources Advisory Panel (see note on “Water Faculty Forum” in this issue).

So with all of these results, it’s clear from my perspective that water can indeed “flow uphill” against the current of “how things used to be” or “that’s my turf” or “no way that will ever work here!”

I expect we’ll have a long string of UNL water program accomplishments to report on in subsequent issues for a long time to come.

Here’s one for this issue: the Water Center’s longtime communications chief, Steve Ress, received the School of Natural Resources’ 2006 Staff Recognition Award! His many accomplishments not only go beyond expectations and level of effort, but also are well beyond the call of duty. He’s one that sets a standard for what each member of the School of Natural Resources and the Water Center should strive to emulate.

Congratulations Steve!
Water News Briefs

Myers Named USGS Head

Mark Myers was confirmed by the U.S. Senate as the 14th Director of the U.S. Geological Survey (USGS) in September.

Myers succeeds Charles Groat, who served as director from 1998 to 2005 under both Presidents Clinton and Bush. P. Patrick Leahy was Acting Director of the USGS for 15 months from June 2005 to September 2006. During that time, Leahy managed the USGS response to hurricane Katrina and other major events.

“It’s incredibly important that the science is unbiased, that it is peer reviewed and objective,” Myers said to the Senate Committee on Energy and Natural Resources at his confirmation hearing in July. Noting that the USGS is not a regulatory agency, Myers said, “That’s the way it needs to be so the Survey can deliver objective information.”

Last fall, Myers was one of six Alaska officials who resigned their positions after a disagreement with Gov. Frank Murkowski. Myers resigned as Alaska State Geologist and Director of Alaska's Division of Oil and Gas, saying that “Staying in this position would require me to compromise my values as to what is right, both legally and ethically, and what is in the interests of the state.”

He previously served as Senior Staff Geologist for Exploration at ARCO Alaska, Inc. and Phillips Alaska, Inc. Earlier in his career, Myers was a Petroleum Geologist for the State of Alaska Division of Oil and Gas. He received a Ph.D. in geology from the University of Alaska at Fairbanks in 1994 and earned B.S. and M.S. degrees in geology from the University of Wisconsin at Madison.

Retirees Create Opportunities Says Casadevall

Many scientists at the U.S. Geological Survey (USGS) and Department of the Interior will retire in a decade. This will create opportunities for scientists starting careers with the nation’s leading authority on earth science information and the federal department charged with public lands management.

So said Tom Casadevall, USGS regional director for states between the Mississippi River and the continental divide. The current average age of a scientist with the USGS is 55, he noted.

Casadevall spoke to about 300 that attended open house festivities for the UNL School of Natural Resources new home at Hardin Hall on Sept. 29. The recently renovated East Campus building replaces eight buildings on two campuses that formerly housed SNR and its programs.

Casadevall said there are currently five priority areas of research for the USGS: the impact of agriculture; water availability; fire science; invasive species; and landscape management. SNR is preparing future scientists to deal with four of five of these areas, he noted.

And if one includes a close affiliate of the School, the Nebraska Forest Service, which trains and assists rural fire departments increasingly facing wildfires in drought-stricken regions, and the School’s pre-forestry program, the SNR offers expertise and training in all these areas.

The key to bringing more interdisciplinary expertise into natural resource study and management is to force people to integrate, Casadevall said. The best way to do that is to put them in one building where they interact every day.

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“The fact is now you're all together in one place to better address the priority issues facing our landscape,” he added.

Other open house activities included building tours, recognition for student scholarship recipients and a “tailgate” barbecue.

State Test-Hole Data Online

The University of Nebraska-Lincoln’s Conservation and Survey Division has an online database of nearly 5,000 test holes in its repository. It is one of the largest sets of test-hole records in the nation.

The catalog of subsurface geological conditions are of use to state and federal natural-resource or agricultural agencies, natural resources districts, county agencies, consultants, engineers, farmers, well drillers and the public, particularly those drilling private domestic water wells, according to UNL School of Natural Resources geologist and survey coordinator Jerry Ayers.

The next step is to make the records searchable directly from the Internet, the Institute of Agriculture and Natural Resources researcher added.

In a state with few outcrops and ample groundwater, this data is essential to understanding the occurrence and quantity of groundwater. Previously published in county hard-copy records, the data will be available online only at http://csd.unl.edu/general/testholes.asp. Once traditional log-books are sold out.

“The value of this data base is that you can search for any data you want – by township and range, by latitude-longitude, by topographic quad, by county, by natural resources district or by lithology (rock type) and stratigraphy (rock layer), for example,” Ayers explained.

Users can also search by total depth, by geophysical logs – additional means of determining subsurface conditions – by drilling agency and by other technical descriptors.

Schrock Receives Kremer Award

State Senator Ed Schrock received The Groundwater Foundation’s 2006 Maurice Kremer Groundwater Achievement Award. The award was established in 1985 to recognize Nebraskans who have made a substantive contribution to the conservation and protection of Nebraska's groundwater.

“Senator Schrock’s leadership, integrity, and common sense during his tenure as chairman of the legislature’s Natural Resource Committee served the people of Nebraska and our groundwater resources well,” said Groundwater Foundation President Susan Seacrest.

In 2002, Schrock carried the legislative bill that created the Nebraska Water Policy Task Force. The Task Force created LB962, which passed in 2004. LB962 is widely credited with helping Nebraska jointly manage ground and surface water in ways that benefit both over the long term. In 2006, he won financial support from the legislature to assist with the law’s implementation.

The award was presented at the joint convention of the Nebraska Water Resources Association and Nebraska State Irrigation Association on November 20 in North Platte.


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Water Sciences Laboratory Represents Unique, Powerful Research Facility

By Brent Atema

The University of Nebraska–Lincoln’s Water Sciences Laboratory (WSL) occupies a unique and important position in helping further a variety of local and regional water research.

Created in 1990, the WSL provides technical services and methods to support environmental and water related research. “It’s really a one-of-a-kind facility,” said UNL School of Natural Resources environmental chemist Dan Snow, who directs the lab. “I don’t know of any other laboratory like this anywhere that has the range of capabilities we do for analyzing trace levels of organic contaminants and for stable isotope analysis.”

The ability to measure very low concentrations of organic contaminants in a sample is referred to as trace level organics analysis. Water soluble contaminants, including many pesticide metabolites, pharmaceuticals, antibiotics and steroids, are difficult to accurately measure at low concentrations in water and according to Snow, few labs have the ability to do it.

Stable isotope analysis is measuring very small changes in the amount of each isotope of an element in a chemical. In many cases, this measurement helps determine the most likely source of contamination in groundwater samples.

The lab’s primary goal, Snow said, isn’t conducting environmental research, but supporting other researchers by developing methods to support their research. It is not a research facility, but a research services facility, he said.

Faculty and staff at the WSL, which is part of UNL’s Water Center and School of Natural Resources in NU’s Institute of Agriculture and Natural Resources, are currently developing methods to measure toxins that are produced by blue-green algae (or cyanobacteria) that may pose health risks to people and animals.

They began this study two years ago, Snow said, and are working with the Nebraska Department of Environmental Quality (NDEQ) and the U.S. Geological Survey (USGS) Organic Geochemistry Research Group to develop a very specific method that allows them to accurately measure concentrations of a variety of microcystins, the toxins produced by blue-green algae, at very low concentrations, as well as other algal toxins that can occur in area lakes.

When the WSL was established, the initial focus was on agrichemicals - particularly nitrates, the most common contaminant in Nebraska - and on pesticides and their potential effects on groundwater quality.

Over time, Snow said, they acquired instrumentation and developed methods for measuring a wider range of contaminants and stable isotopes. They also began developing methods to study compounds that pesticides are converted to in the environment and what happens to those conversion/degradation products. Snow said they studied whether these products entered our drinking water and, if so, in what concentrations.

More recently the lab has been developing methods for studying environmental consequences of pharmaceuticals, particularly livestock antibiotics, anabolic steroids used for growth promotion in livestock, and residues of explosives leftover from ordinance manufacturing facilities that were once common in Nebraska. Several of these sites are now contaminated with solvents and explosives residues.

Of the samples now coming to the WSL for analysis, 70 to 80 percent are from NU researchers. The rest are from a variety of local, state and federal agencies, as well as from researchers, consultants, and private individuals from as far as South Africa.

Snow said that currently the most popular services the WSL currently offers are testing for antibiotics and algal toxins and analyses for metals, nutrients, and stable isotopes.

In the future, Snow said he’d like to see the WSL continue to expand and improve methods for emerging contaminants such as algal toxins, pharmaceuticals, and steroids. Recent additions of new equipment in the stable isotope laboratory allow the WSL to offer a wider range of analysis as helpful tools in environmental chemistry and ecology.

Snow said he is most proud of the specialized capabilities and methods that the WSL offers. “May of methods we offer are some you just can’t go out and expect a commercial lab to be able to offer,” Snow said. “They’re specialized, they’re sophisticated, they’re sensitive, they’re accurate methods that you just can’t get anywhere else.”

For more about the lab, go online to http://waterscience.unl.edu/
Grant Will Help UNL Refine Irrigation Management Tool (continued from page 4)

Hergert said. “How do you divide that water among crops on your farm to make the most money? That’s a step above where we are now on Water Optimizer.”

This grant is an example of the leadership UNL researchers are providing to address complex and important water management issues for Nebraska and the region, said Prem Paul, UNL vice chancellor for research. “Developing the technology to help our farmers make the most of every drop of available water is important to the state’s overall economic well-being.”

The Water Optimizer was developed by Supalla, UNL agricultural economist, and Martin, UNL biological systems engineer, in response to several years of drought across the state and to farmers in several regions facing restrictions from irrigation-water suppliers.

USDA’s Risk Management Agency, which manages the federal crop insurance program, is funding this research with an eye toward using the tool to offer coverage for a deficit irrigation management practice. The intent is to use Water Optimizer to provide the information required by RMA to offer insurance coverage for deficit irrigation to irrigators in the region who need it.

Hergert said the project will integrate two years of field research on oil seed crops with previous research on principal crops to update the Water Optimizer and provide educational sessions to train farmers and agricultural consultants in its use.

The Water Optimizer allows users to input information into a Microsoft Excel spreadsheet, including soil type and irrigation system options. Irrigation options include center pivot or gravity irrigation systems, well or canal delivery, and systems powered by electricity, diesel, propane or natural gas. After entering this basic information, producers enter their production costs, irrigation costs, crop prices, crop type and available water.

After these parameters have been set, the program calculates what crops will be most profitable with the given costs and available water.

Tools such as the Water Optimizer are key at a time when farmers in parts of Nebraska and other states are dealing with limited water supplies stemming from multiyear droughts and from new water allocation restrictions. For example, farmers in the Middle and Lower Republican River basins of southern Nebraska were told in 2005 that they’d be limited to 33 to 39 inches of irrigation water over a three-year period. Another relatively recent restriction was a 14 inch per year allocation placed on farmers in the Pumpkin Creek basin in the Panhandle.

“When producers face limited water due either to drought or to water allocation regulations, they must make difficult cropping system decisions,” IANR researchers said in their grant application.

“Producers will need access to quality information outlining the potential profits from different crop choices, irrigation management practices and insurance strategies.”

The current version of Water Optimizer is available on the Web from UNL Extension at http://extension-water.unl.edu. A DVD/CD set is available for $7 by calling (800) 755-7765 or faxing (402) 472-9724. The DVD includes a program tutorial and the CD has the Water Optimizer tool.

The tool only is compatible for PC users with Microsoft Office XP or Microsoft Office 2003.

This research is conducted in cooperation with IANR’s Agricultural Research Division and UNL Extension.