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Amy Burgin, Ph.D.

Amy Burgin is an assistant professor in the University of Nebraska–Lincoln’s School of Natural Resources, since September 2011. Her research integrates the fields of microbial ecology, biogeochemistry and aquatic ecosystem ecology. I use tools from analytical chemistry, microbiology and molecular biology to better understand how microbes control ecosystem-level nutrient fluxes. Her research program has valuable connections to current environmental concerns including global change, the effects of land-use change on ecosystems and aquatic eutrophication. Her research focuses on nitrogen (N) cycling. Excessive N causes many water-quality problems. Much of the N that enters watersheds is flood,” said Steve Ress, tour co-organizer and communicator at the University of Nebraska’s

November Law and Science, Practice and Policy Events at Cornhusker Hotel

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Summer and Fall Brings Full Slate of Activities for Nebraska Water Center

When you work on a college campus, everyone looks forward to May, when the traditional spring semester ends and summer brings with it opportunities to change pace and do some things outside the normal realm of classroom studies, research programming or outreach projects. The summer pace at the Nebraska Water Center never really slackens, though.

It tends to be one of our busier times of the year, both in terms of actual activities and for planning fall events and programs. Later this month, the water center staff and I will be busy with the Robert B. Daugherty Water for Food Institute’s fourth annual global conference, May 30-June 1, 2012. This premier event brings together experts from around the world to discuss how advances in science, technology and policy will help rain-fed and irrigated agriculture sustainably feed an ever-growing world population.

The conference will feature plenary addresses by Jeff Raikes, CEO, Bill and Melinda Gates Foundation; Roberto Lenton, founding executive director of the Daugherty Water for Food Institute; Malin Falkenmark, senior scientific adviser, Stockholm International Water Institute; Colin Chartres, director general, International Water Management Institute; Ruth Meinzen-Dick, senior research fellow, International Food Policy Research Institute; and others.

The day after the conference, Saturday, June 2, I will be very involved in a one-day tour of Nebraska that will help showcase best practices in integrated water management and agriculture when the tour stops at UNL’s South Central Agricultural Laboratory near Clay Center. There, some of my ongoing irrigation research will be featured, as part of a variety of projects demonstrating large-scale irrigation engineering/agricultural water management, crop production, crop water productivity, evapotranspiration and variable irrigation/ fertigation under center pivot, subsurface drip irrigation, lateral-move irrigation systems and surface irrigation systems.

For more on the conference, go to http://waterforfood.nebraska.edu/wff2012.

Registration is open for our summer water and natural resources tour, which will visit flood-ravaged stretches of the Missouri River in Nebraska and Iowa July 17-19. We have been planning this tour with our long-standing partners at the Kearney Area Chamber of Commerce and Central Nebraska Public Power and Irrigation District in Holdrege and we think it will go a long way toward addressing some of the issues and outcomes from the devastating 2011 Missouri River flood. Other tour cosponsors are Omaha Public Power District, U.S. Geological Survey Nebraska Water Science Center (USGS NEWSC) and Nebraska Public Power District.

For registration details, contact Jennie Nollette at the Kearney Area Chamber of Commerce at (308) 237-3168.

Coming November 13 and 14 are one-
Alan Corr

Alan Corr is an Extension Educator at the University of Nebraska–Lincoln’s (UNL) West Central Research and Extension Center in North Platte and in Dawson County. He has been a UNL faculty member since 1987 specializing in such areas as irrigation management, groundwater education and limited irrigation management practices.

Education:

B.S., Agriculture, dual major, Agronomy and Animal Science, UNL, 1978
M.S., Agronomy, Oklahoma State University, 1986

Examples of Current Research/Extension Programs:

Groundwater and surface water adult and youth Extension education programs utilizing a large scale water model have resulted in an enhanced knowledge and understanding of ground and surface water management, increased awareness of Nebraska’s water balance and understanding of the contaminant leaching process, increased understanding of the occurrence of groundwater and groundwater/surface water interaction, an increased understanding of Nebraska’s water resources, and an enhanced understanding of water related career opportunities in Nebraska. This new program has created the opportunity to teach Nebraska water education, focusing on responsible use of Nebraska’s most precious natural resource, and educating today’s youth about the long-term career opportunities available for them in Nebraska, which will directly lead to increased interest in higher educational opportunities. Several thousand youth and adults have been involved in groundwater and surface water education through this program during the past 2 years. Further goals of this program are to initiate a positive change in the water management practices of Nebraska irrigators, and to increase youth understanding of Nebraska’s water resources. The ultimate goals of this project will result in a better understanding and greater conservation of Nebraska water resources, a rejuvenation of Nebraska stream flow, and the protection of ground and surface water quality.

Irrigation Management - This program teaches farmers, agribusiness personnel, irrigation districts and governmental agency personnel, water-conserving strategies that will reduce water usage and lower pumping costs while producing near top yields. Adopting these strategies will help preserve the economic viability of the farms and property value, thus avoiding the financial impacts that threaten the security and stability of farmers and the communities caused by the water allocations. The primary goal of the program is to demonstrate research-based irrigation management strategies in farmer fields and provide a hands-on practical teaching environment for farmers and consultants to learn how to implement these practices. The success of this program plays a key role in helping Nebraska manage her waters within the limitations of the Republican River Compact. This program is partly supported by the Bureau of Reclamation.

Examples of Past Research/Extension Programs:

Alternative crop production and marketing under limited rainfall/irrigation. This Extension research and education focused on identifying alternative crops for Nebraska that would provide acceptable profits for producers faced with limited crop water supplies. I developed and conducted a survey that has established base-line information on current irrigation management practices of Nebraska agriculture producers, and serves as an educational needs assessment. The goals included exploring what areas of research and education will produce the greatest impact for Nebraska agriculture producers and provide a mechanism to measure these impacts. The expected long-term impacts of this research include maintaining the agricultural economy under limited irrigation, responsible use of water for irrigation, and an enhanced understanding of irrigation management practices by agriculture producers. Survey information has been presented at various meetings and seminars.

Examples of Outreach Programs:

Presented water education and irrigation management techniques at numerous local, state, and multi-state meetings and workshops. Plan and coordinate the annual WCREC Water and Crops Field Day where farmers and policy makers to learn and see irrigation practices and cropping systems on a farm scale that maintain or increase crop production while conserving water.

Teaching Responsibilities:

Guest speaker at Nebraska College of Technical Agriculture (NCTA) at Curtis in courses pertaining to groundwater/surface water education and irrigation management.

E-mail:

acorr@unl.edu
Four years ago, I began writing this series of articles on emerging contaminants for the Water Current. The genesis for them was a meeting I had in Lincoln with a number of faculty and state employees where we agreed that some basic information on the subject was needed, which precipitated my writing this series.

Now, 16 articles later, I find myself writing the final installment. I would argue that over the course of the last four years the field of emerging contaminants has established itself as a permanent fixture on the scientific landscape locally, nationally and internationally.

The scientific community can be compared to a family, where new ideas, like newborn children, vie for a limited amount of attention that was once exclusively given to the older siblings. Emerging contaminants, on all levels, are currently vying for attention (both scientifically and publicly) with other environmental concerns such as global climate change, loss of biodiversity and hazardous waste disposal.

Further, the siblings from within the brood of emerging contaminants, (endocrine disrupters, pharmaceuticals and personal care products) have momentarily held the public’s attention. As an example, a few years ago the presence of feminized male smallmouth bass in the Potomac River was featured, and periodically reemerges, in one of the nation’s premier newspapers, the Washington Post.

On a more academic level emerging contaminants, just like teenagers at Thanksgiving dinner, have the opportunity to sit at the scientific equivalent of the “adult’s table”.

While it can be argued that the “birth announcement” for the field of endocrine disruption was Our Stolen Future in 1996, recent publication of an article by Laura Vandenburg and 11 other authors in Endocrine Reviews shows just how far the field has grown in the last 16 years.

The review article is an opus on the subjects of low-dose effects of contaminants, and non-monotonic dose response relationships. The strength of the review article is not in its innovation, but rather in its comprehensiveness, as it details how low doses of some synthetic compounds can act as cell signals, thereby altering normal development.

The 50-page article cites over 840 scientific papers. The weight of evidence approach employed in the paper is convincing and is a testimony to how far the field has come, and how deep scientific inquiry into the field has become.

When related to pollution and environmental remediation, it is tempting to believe that scientific process provides unilateral and permanent solutions for vexing problems. While this may be true on a regional scale, globally these issues often act more like infectious diseases, where they can appear to be controlled, only to flare up again at localities distant to the original areas of concern.

Even lead, an old toxicological human nemesis, continues to rear its head here in Omaha as a result of a now defunct lead smelting operation that was previously located on the downtown waterfront. In reality, issues associated with ancestral chemical contaminants (for example, metals) never really go away but rather fade from the public and scientific eye, only to resurface due to some calamity or a scientific finding that thrusts the issue back into the public eye.

Emerging contaminants have truly emerged and have taken their place at the scientific table.

Sub-disciplines within the overall field (like the feminized fish in the Potomac River) may flare into public and scientific attention, only to die down again after the media’s attention is inevitably diverted elsewhere.

Regardless, emerging contaminants’ place at the table has already been set and like any other scientific discourse, it is for all practical purposes a permanent one. While emerging contaminants may undergo a face-lifting name change, and oscillate in stature, scientific funding and public interest due to flare-ups of regional or national concern, it seems quite clear the field is here to stay.
It fuels both bombs and power plants, but uranium probably doesn’t come to mind to many people when they think about Nebraska. Still, it’s there and a University of Nebraska–Lincoln researcher is mapping the aquifers and rock formations that may contain it.

Most of the world's uranium is mined in Canada, Australia, Kazakhstan, Russia and other locales, yet Nebraska currently has one of the few working, commercial mines in the U.S. where uranium is mined that helps fuel power plants.

The Crow Butte mine, in the northwest reaches of the state’s Panhandle, near Crawford, has produced about 16 million pounds (or 8,000 tons) of uranium extracted from local water bearing geologic formations since 1991.

The uranium it mines is present as a solid mineral, which is then dissolved with oxygen and pumped out.

In an area of the Panhandle south of that mine, UNL Conservation and Survey Division hydrogeologist Steven Sibray is using cutting-edge technology to map the shallow High Plains (or Ogallala) Aquifer where the data he and his research partners have collected “Indicates we are also seeing the deeper water bearing formation at the base of White River Group in the southern Panhandle.

“Our research suggests that commercial uranium mining companies could use this technology to locate uranium bearing sandstones within the deeper formation,” Sibray said, noting that finding the uranium-bearing sandstones is just the first of several high-risk and costly steps needed to find mineable quantities of the mineral.

“Recent advances in the application of airborne electromagnetic [AEM] surveys to our ongoing groundwater management programs can also be utilized to map water bearing formations that host uranium deposits,” Sibray said.

This AEM data, collected by the U.S. Geological Survey and UNL’s Conservation and Survey Division, is one part of an ongoing project to define the hydrogeologic framework of the Panhandle’s principal shallow aquifer, what groundwater geologists refer to as the High Plains (or Ogallala) Aquifer, Sibray explained.

“With additional interpretation of these data sets, the deeper confined aquifer of the White River Group can be identified that may contain mineable quantities of uranium,” he said.

The evidence of the potential for uranium mineralization as far south as Cheyenne County, about 90 miles from the Crow Butte mine, is found in radioactive anomalies shown on borehole geophysical logs from oil and gas tests drilled in the area. This information has been a factor in recent decisions by several mining companies to lease land in the southern Panhandle to explore for uranium.

The airborne AEM technology, which relies

continued on page 11
Groundwater levels rose or were unchanged throughout much of Nebraska over the past year, but over the past 30 years, there have been markedly different changes in eastern Nebraska compared to western Nebraska.

The latest statewide groundwater monitoring report by the University of Nebraska–Lincoln’s Conservation and Survey Division (CSD) shows mixed results, depending on where and over what period of time groundwater levels are measured, but over the past five years, and especially over the past year, the news for Nebraska’s groundwater levels is generally pretty good.

“The five-year period from spring 2006 to spring 2011 was characterized by groundwater level rises in almost all areas of the state except the Southwest and Panhandle Tablelands,” CSD and UNL School of Natural Resources (SNR) groundwater geologist Jesse Korus said.

Over just the past year, from spring 2010 to spring 2011, 70 percent of the wells monitored for the report indicated rises in groundwater levels, with 36 percent showing rises of more than a foot. Only 11 percent of monitored wells showed declines of more than a foot.

“The (groundwater level) rises over the past five years are a result of a combination of factors, including increased flows in streams and canals, decreased irrigation withdrawals and increased aquifer recharge compared to the several dry years prior to 2006,” said SNR geoscientist Mark Burbach, who co-authored the report with Korus and CSD cartographer Les Howard.


The 23-page illustrated report details and maps changes in Nebraska groundwater levels from Spring 2010 to Spring 2011, over the past five years and 10 years, from predevelopment of irrigation to Spring continued on page 10
The U.S. Geological Survey Nebraska Water Science Center (USGS NEWSC) is one of 48 Water Science Centers in the USGS Water Resources Mission Area.

USGS NEWSC collects, analyzes and disseminates impartial hydrologic data and information needed to wisely manage water resources for Nebraskans and across the U.S.

USGS NEWSC partners with federal, state and local agencies, educational institutions and other public and private organizations to assure that our work is relevant and useful. Center funding comes from a variety of sources, including direct federal appropriations, other federal agencies and the Cooperative Water Program, which allows USGS NEWSC to partially cost-share federal funds with state and local funds to address important scientific and water-resources issues.

The Cooperative Water Program is directed toward potential and emerging long-term problems, such as water supply, waste disposal, groundwater and surface-water quality, effects of agricultural chemicals, floods, droughts, and environmental protection.

These projects include surface- and groundwater modeling, water quality reconnaissance, and geophysical investigations.

Standardized scientific methods are used so that study results are transferable to similar problems in other areas and contribute to issues that have interstate, regional, or international significance. Data collected by USGS and study results are generally accepted as impartial and accurate in disputes and furnish the basis required for interstate and international compacts, federal law and court decrees, congressionally mandated studies, regional and national water-resources assessments, and planning activities.

Other programs USGS NEWSC participates in include:

Continuous real-time streamflow, groundwater, and water-quality information as well as discreet measurements are vital to safeguard lives and property in Nebraska and enable management of adequate water resources for a healthy Nebraska economy. In Nebraska, USGS operates 105 streamflow-monitoring gaging stations; more than 90 recording groundwater sites (36 of which are real-time);
Throughout North America, invasive species are a source of significant ecological and socio-economic problems and a major threat to global biodiversity.

They have colonized virtually every ecosystem on Earth subsequently affecting native biota, and causing economic hardships to invaded regions. Globally, more than $1.4 trillion is spent annually to reduce their impacts, representing nearly five percent of the global economy. An estimated 50,000 plant, animal and microbe invasive species inhabit the U.S., costing more than $120 billion annually.

Invasive species are a current and growing threat to Nebraska’s economy and environment and can have widespread impacts for natural resource users, including industry, municipalities, farmers and ranchers, sportsmen and other recreationalists, among others. The U.S. Geological Survey has identified more than 100 non-native aquatic species in Nebraska representing plant, animal, and microbe groups, and there are currently over 500 non-native plant species threatening Nebraska agriculture, wetlands, forests, and grasslands. Though some non-native species present no readily discernible threat to the economy or environment, several have already become major problems in Nebraska or neighboring states, costing millions of dollars in damages (e.g., Phragmites).

The Nebraska Invasive Species Project, within the Nebraska Cooperative Fish and Wildlife Research Unit at the University of Nebraska–Lincoln, coordinates invasive species programs across Nebraska. Begun in 2006 with a grant from the Nebraska Environmental Trust, it focuses on conducting research, outreach and education pertaining to invasive species in Nebraska and coordinating invasive species management. The project continues to grow and a major funder is now the Nebraska Game and Parks Commission. Additional grants from the trust, U.S. Fish and Wildlife Service and private organizations also help shape program direction. The Nebraska Invasive Species project also coordinates activities of the legislatively appointed Nebraska Invasive Species Council and works closely with legislators on new and existing invasive species bills.

In Nebraska, we rely on water for agriculture, recreation and consumption to list a few. Aquatic invasive species threaten the quality and availability of water for our vast demands. A species receiving much attention in Nebraska is the zebra mussel. Zebra mussels (and

continued on page 16
University of Nebraska–Lincoln Extension’s Master Gardener program dates to 1976 and has continued to evolve to meet changing needs.

The program is a horticulture-based program designed to train Nebraskans in basic horticulture and best management practices and taught by UNL Extension specialists and educators statewide.

The initial program year consists of 40 hours of education and 40 hours of volunteer service. Extension Master Gardeners (EMG) continuing in the program after the first year are then required to attend a minimum of 10 hours of continuing education units (CEU) and perform a minimum 20 hours of volunteer service to retain their EMG title. To aid in CEU training, the state program provides 15 hours of on-line education. These Adobe Connect classes are horticulture-based modules with best management practices emphasized. In addition to the EMGs, these classes are available to homeowners.

The 2011 Adobe Connect Lawn and Landscape Extension Master Gardener series addressed topics on plant physiology and growth, wildlife damage control, backyard greenhouses, fruit trees, tree and shrub selection and native plant selection. Class attendance averaged 200.

Emphasis on water conservation was placed within the plant-based sessions. Native plants were listed along with many adapted plants for their drought tolerance. Rain harvesting was addressed by teaching EMGs and homeowners the basics of rain gardens, rain barrels, and strategies for reducing dependence on irrigation systems.

As sessions concluded, EMGs and homeowners were surveyed on potential change of practices. The surveys tell a story of change. With just over 1,200 attending the complete Extension Master Gardener Lawn and Landscape series, water conservation became one of the focal points of potential change. Surveys show 49 percent of EMGs and homeowners increased their use of water conservation methods in the landscape. Water conservation will consist of manually running in-ground sprinkler systems (instead of relying on pre-determined setting) and using rain barrels and rain gardens to hold and re-use water within the landscape instead of allowing it to run off to the street. Many session participants are starting to use many more water wise or drought tolerant plants. Many of these plants have been under-utilized and will help with both water conservation and increased plant diversity in the landscape.

The Extension Master Gardener Lawn and Landscape series have increased in popularity each year. Many counties have added it to help educate homeowners on new horticultural and best management practices. Sessions are recorded and archived to help support the Nebraska EMG program.
Nebraska and the Great Plains, Benson said. The USGS NEWSC is cosponsoring this event.

The call for presenters is open and will remain so through mid-July. It can be found online at watercenter.unl.edu. Topics are not thematic or exclusive. “Any water-related topic that’s relevant to Nebraska or the Great Plains is welcome,” she said.

The Wednesday, Nov. 14 water conference will focus on information of interest to practicing attorneys, but is open to all. The NU College of Law is cosponsoring this event.

Continuing Legal Education (CLE) credits will be applied for in Nebraska, Iowa and Colorado. The conference’s agenda is currently being developed and suggestions for topics or speakers can be directed to Benson at (402) 472-7372.

Information on both events, including registration information, will be presented online at watercenter.unl.edu as soon as it is available.

GW Level Changes continued from page 6

2011 and new with this report: from predevelopment to spring 1981 and spring 1981 to spring 2011. It also includes average daily streamflows in 2010 and other related information.

The report’s authors chose to include maps comparing periods before and after 1981 because “Several recorder wells in south-central Nebraska show markedly different patterns of groundwater level fluctuations during these two periods, and we wanted to investigate whether or not these patterns were consistent statewide,” Korus said.

“Up to 1981, groundwater declines were generally equal in magnitude in eastern and western areas of the state,” Korus said.

In general, the 30-year period after 1981 shows some significant rises in groundwater levels in the eastern half of the state, with equally significant declines in some areas of the Panhandle and Southwest Nebraska.

“Some, but not all of these trends are reflective of statewide precipitation patterns compared to the long-term norms,” Korus said, “The hypothesis is that the post-1981 recovery of groundwater levels in central and eastern Nebraska resulted from a combination of factors, including reduced (groundwater) withdrawals during several long periods of above-average precipitation, increased irrigation efficiencies, increasing rates of recharge and the aquifer equilibrating to the new conditions imposed on it by irrigation development decades earlier.”

Overall, from predevelopment (of irrigation) to spring 2011, the “Long term groundwater level changes in Nebraska primarily reflect aquifer depletion in areas of dense irrigation development and increases in storage due to seepage from canals and reservoirs,” Burbach said.

Predevelopment water levels are estimated, but generally occurred before the early to mid-1950’s depending on when intensive groundwater irrigation began.

Average daily streamflows across Nebraska also got a considerable boost from above-average precipitation over much of the state in 2010.

“Average daily streamflows were higher than the 30-year average for most of Nebraska’s streams in 2010,” Korus said. Highest discharges occurred in some tributaries to the Republican, Elkhorn, North Platte, White and Little Nemaha Rivers.

Groundwater level change maps included in the report can be downloaded free at the SNR web site at http://snr.unl.edu/information/GroundwaterMaps.asp. Maps from previous years, dating to 1954, are also archived there. Efforts to monitor the state’s groundwater levels began in 1930.

Data for the maps, graphs and reports is based on recorded measurements from more than 6,000 observation wells taken by 27 organizations, including each of Nebraska’s 23 Natural Resources Districts, U.S. Geological Survey, Central Nebraska Public Power and Irrigation District, U.S. Bureau of Reclamation, and CSD.

Groundwater level change maps rely on well readings recorded as close to April 1 as possible, before the start of the irrigation season.

The full report, “Nebraska Statewide Groundwater-Level Monitoring Report 2011,” (Nebraska Water Survey Paper Number 79), can be purchased for $15 online at both snrsales@unl.edu or Amazon.com or at the Nebraska Maps and More store, first floor Hardin Hall, UNL East Campus, N. 33rd and Holdrege Sts., Lincoln.
Aquifers continued from page 5

on identifying water bearing formations by their electrical resistance compared to surrounding materials, has helped confirm the presence of potential uranium bearing formations in several areas that were previously mapped from more traditional oil and gas borehole tests.

“The airborne geophysics may be sexy, but you need the borehole data first,” Sibray said. “That gives us the “dots” for subsurface mapping while the airborne AEM allows us to connect those dots.”

“We use a borehole geophysical tool to measure the same rock properties as the AEM - how rocks conduct electricity. It’s relatively old technology using electrodes that was developed for the oil and gas industries in the 1920’s. These tools have been updated using modern electronics and computer technology for use in studying aquifers and water bearing uranium deposits.

“During World War II, engineers developed an electromagnetic tool for locating landmines, which ultimately led to airborne electromagnetic tools after the war that were used by the mining industry to locate metallic mineral deposits,” Sibray explained.

“Recently, the airborne methods have been refined and we can now map aquifers using them,” he said.

The newer AEM methods can also “see” and measure deeper into aquifers than was previously possible, with some systems and is able to map with good results to as much as 500 meters below the earth’s surface.

“Deeper mapping AEM systems would allow mapping of the larger channel deposits of sands and gravels within the White River Group that were formed by rivers approximately 35 to 37 million years ago, Sibray said, noting that the formation exists over most of the Nebraska Panhandle.

“Using current AEM technologies, both groundwater and uranium resources can be mapped using technologies that are suitable for the depths and the characteristics of the target,”

Sibray is conducting this research in cooperation with Bruce Smith, Jared Abraham and James Cannia, of the U.S. Geological Survey. He is a geoscientist and hydrogeologist at UNL’s Panhandle Research and Extension Center in Scottsbluff, where for nearly 25 years he has specialized in developing and using reliable, efficient groundwater monitoring systems that help conservationists, land users and researchers.
Nebraska Water Center (NWC), a part of the Daugherty Water for Food Institute.

“The flood disrupted the lives of thousands,” said tour host and co-organizer Mike Jess, a retired UNL senior lecturer.

From Decatur to Nebraska City, tour participants will inspect a variety of locations where the flood’s destructive impact will be fully in evidence.

Elsewhere, participants will inspect Omaha’s Eppley Airport, where an ambitious water-well dewatering network allowed commercial air traffic to continue unabated throughout the duration of flooding, despite the fact that the airport borders the river.

The tour will also stop at Omaha Public Power District’s coal-fired power plant near Nebraska City. There, special pumps, a series of temporary dikes and elevation of a railroad coal supply line permitted uninterrupted production of electricity throughout the flood emergency, Jess said.

Details of other tour stops and registration details are still being developed. Registration information is expected to be online at watercenter.unl.edu by the time you read this.

Flooding through much of the Missouri River basin in 2011 was caused by a combination of snow-melt in the northern Rocky Mountains and record-setting rainfall runoff in Montana and North Dakota. Extending for more than three months, floodwaters broke through levees and flowed beyond vulnerable lowlands near the river. Homes, businesses and highways were destroyed at many locales and the flood disrupted the lives of thousands.
Looking much like the Dust Bowl, wind whips river sand around an irrigated field bordering the Missouri River, near Tekamah (Steve Ress photo).

Flood waters took-out many jetties on the river, include here, near Lake Wiconda (Steve Ress photo).

Tour host Mike Jess inspects a geological outcropping on a bike trail near Peru (Steve Ress photo).

The 2012 tour is being co-sponsored by Omaha Public Power District, U.S. Geological Survey Nebraska Water Science Center, Nebraska Public Power District, Kearney Area Chamber of Commerce, Central Nebraska Public Power and Irrigation District and the NWC.

The tour begins and ends at Hardin Hall on the UNL East Campus in Lincoln. Registration fee of $645, single lodging occupancy, includes all meals, transportation expenses and lodging in both Omaha and Nebraska City. To register, contact Jennie Nollette at the Kearney Area Chamber of Commerce at (308) 237-3168.
Measuring Vanishingly Small Levels of Chemicals

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

How often does the average person think about what is in the glass of water? Why would you ever care about traces of pesticide residues or toxic organic chemicals produced by cyanobacteria in a lake? Who would think about the consequences of vanishingly small amounts of pharmaceuticals from livestock waste or steroid hormones in municipal wastewater?

Individually, finding traces of these and other chemicals in water and the environment seems fairly inconsequential, but because these are all biologically active substances, they can exert effects on organisms even at tremendously small levels.

This is one reason so much effort is devoted to developing methods to test for organic chemicals at the University of Nebraska Water Sciences Laboratory. The Lab is part of the Nebraska Water Center, in the Robert B. Daugherty Water for Food Institute.

Part of my research as an associate professor in the University of Nebraska–Lincoln’s School of Natural Resources is to direct the Water Sciences laboratory and work on new methods for measuring these and other chemicals in our water.

In graduate school I was involved in a project measuring traces of herbicides such as atrazine and metolachlor in Nebraska’s surface water. We predicted that water in the Platte River, its tributaries and lakes in eastern Nebraska would contain higher levels of these herbicides in the spring and early summer, shortly after crops had been treated with them.

Collecting samples during and after spring rains helped us show that pesticide levels in the rivers were directly related to storm run-off. We later collected samples from well fields immediately next to rivers and found traces of these same herbicides in groundwater.

Pesticides in spring run-off events can also get into drinking water, particularly if you look for degradation products. After application, atrazine and other herbicides are converted to a number of different chemicals, many of which are more water soluble and resistant to degradation. When we look for degradation products in water supplies we find traces of even more chemicals than when we look for the parent herbicides.

While these degradation products are likely to be less toxic than their parent compounds, the fact that we find more and more residues in water leads one to wonder what the combined effects may be.

Atrazine Not Likely to Exceed Drinking Water Standard In Agricultural Groundwater

A new model predicts that atrazine, plus its breakdown product deethylatrazine, has less than a 10 percent chance of exceeding the U.S. Environmental Protection Agency’s (EPA) standard for public drinking-water supplies in shallow groundwater in about 95 percent of the nation’s agricultural areas.

Atrazine is a commonly used herbicide for weed control in corn and sorghum production.

“With the intensive, widespread use of the herbicide atrazine in agricultural production, some communities will need to carefully monitor the risk to groundwater and human health from this contaminant and its residues,” said USGS director Marcia McNutt. “The advantage of this new research is that it reveals the spatial variability of risk for atrazine contamination in groundwater across the U.S., allowing communities to make wise decisions on allocating scarce financial resources for water-quality testing.”

These findings are based on new statistical models developed from almost 20 years of nation-wide water-quality monitoring data collected by the USGS National Water Quality Assessment Program (NAWQA).

“These models are an improvement over previous models because they predict concentrations rather than detection frequencies. Concentrations can be compared to water-quality standards and guidelines to evaluate potential human-health concerns,” said Paul Stackelberg, USGS hydrologist and lead author on the report.

“These models are not for regulatory purposes, but can be used to identify areas where concentrations of atrazine are most likely to be of potential concern and also to set priorities among groundwater resources for future monitoring.”

EPA’s Maximum Contaminant Level (MCL) of 3.0 µg/L for atrazine in public drinking-water supplies is not a regulatory standard for shallow groundwater or domestic supplies, but serves as a benchmark for potential human-health concerns. Predicted concentrations are compared to the MCL for atrazine in order to provide a perspective on potential significance to human health.

Results of the USGS study Regression models for estimating concentrations of atrazine plus deethylatrazine in shallow groundwater in agricultural areas of the United States are published in the Journal of Environmental Quality. The study can be found online at http://water.usgs.gov/nawqa/pnsp/.

continued on page 17
USAID and NU Partner to Optimize Use of Middle East Water Resources

The U.S. Agency for International Development (USAID) and the University of Nebraska announced a new partnership to expand research and development capacities in the Middle East, with a focus on water management.

USAID Administrator Rajiv Shah and NU President James Milliken signed a Memorandum of Understanding (MOU) in February that hopes to increase food production and improve water management in the Middle East.

“The MOU signing represents our Agency’s commitment to high impact engagement with universities,” Shah said. “We look forward to deepening our partnership with the University of Nebraska, as we help to build scientific and research capabilities throughout the world.”

Shah and Milliken were joined by Sen. Ben Nelson, Rep. Jeff Fortenberry, Roberto Lenton, executive director of the University of Nebraska’s Robert B. Daugherty Water for Food Institute; Mara Rudman, Assistant Administrator for USAID’s Middle East Bureau; and John Wilson, Director of the Office of Technical Services for USAID’s Middle East and Asia Bureaus.

“Nebraskans have been leading the world in new irrigation techniques and groundwater management practices for more than 100 years. The success of our state has always depended upon it,” Nelson said. “This partnership has the potential to have a lasting impact in a part of the world where water scarcity causes dangerous tensions between countries and severe suffering among people.”

Fortenberry said, “As a Member of Congress from Nebraska with responsibilities in both agriculture and foreign affairs, I am extremely proud of the University of Nebraska’s leadership in agriculture and water management research. The University of Nebraska’s Water for Food Institute is invested in exciting world-class research that may lead to advances in farming technology of immense global impact.”

This new partnership will leverage USAID and NU’s comparative advantages to reduce the use of water in agriculture while sustainably maintaining crop yields. Through collaborative research, education, and outreach programs, USAID and NU will focus on irrigation, groundwater management, rain-fed agriculture, drought risk assessment and mitigation and support the Middle East North Africa Network of Water Centers of Excellence (MENA NWC).

USAID and NU are eager to work together to support research program development and implementation undertaken by the MENA NWC. Rudman concluded the event with promise of a continued partnership, “We look forward to seeing the benefits of this partnership in the years to come, and we trust that our collaboration will grow over time.”

About the Middle East North Africa Network of Water Centers of Excellence The MENA NWC links technical institutions across the Middle East and North Africa region, with each other and with counterpart U.S. institutions to address water challenges confronting the region.

The Network helps build and exchange regional science and technology capacity to improve water planning and management, expand water supply, manage demand, and dramatically increase its efficient and productive use. MENA NWC strengthens and reinforces an important alliance of governments, research and educational institutions, civil society, and the private sector working together to resolve water challenges through research, capacity building, innovation, and knowledge sharing. This should help lead to sustainable development and improved livelihoods.
their close relative, quagga mussels) are often referred to as the most important biological invasion in North America, both for ecological and economical stresses they cause.

They can have profound effects on the ecosystems they invade, as they out-compete native species for food and other resources. They are notorious for clogging water supply pipes of power plants, public water supply plants and industrial facilities, costing millions in clean-up. They can even cause major problems to irrigators by clogging pipes and degrading systems.

To date, all samples from 2011, except Offutt Base Lake, were negative for zebra or quagga mussels, including Zorinsky Lake. The lake is refilling and fish were stocked last fall. It was officially reopened April 28. To help keep zebra mussels and other unwanted species out of Nebraska, we also hired technicians to spend time at boat ramps where staff conduct boater surveys, provide information on how to prevent the spread of zebra mussels and offer voluntary boat inspections.

In our first summer, we surveyed over 3,500 boaters and educated/trained over 12,000 individuals on Nebraska’s “Clean, Drain, and Dry Protocol.” As the 2012 boating season builds, plan on seeing us out there again. Preliminary analyses of last year’s surveys indicate Lake McConaughy, Harlan County Reservoir and various eastern Nebraska reservoirs are still at high risk for zebra mussel infestation. We will continue surveys and outreach at these locations, but are hoping for expansion.

Invasive species legislation (LB 391) recently passed in the Nebraska Legislature will help Nebraska better manage invasive species in the future. The bill prohibits possession and transport of aquatic invasive species and allows Nebraska Game and Parks Commission to develop rules and regulations. It also creates the Nebraska Invasive Species Council to serve as an advisory council for state invasive species issues.

**How To Help**

Learn to identify zebra and quagga mussels (and other invasive species). Always Clean, Drain, and Dry your boat after a day on the water and check your boots and vehicle tires before leaving a recreational area for weeds.

Invasive species can hitch a ride on your clothing, tires, boat and other items, then transfer to another field, lake or river. By following a simple procedure each time you leave a recreational area, you can help stop their spread in Nebraska: Visit the Nebraska Invasive Species Project website (http://snr.unl.edu/invasives/htm) for more information.
and 15 continuous water-quality sites. A majority of these stations are jointly funded partnerships with local, tribal, state and other federal agencies. The National Streamflow Information Program (NSIP) provides full or partial funding for over 40 USGS stream gages in Nebraska. Using these various real-time water-monitoring networks, USGS provides long-term, accurate, and unbiased information to meet partner and public needs.

The National Water-Quality Assessment (NAWQA) Program is a primary source for long-term, nationwide information on the quality of streams, groundwater, and aquatic ecosystems. NAWQA goals are to assess status and trends of water quality and to understand factors affecting it. Nebraska NAWQA activities include the Central Nebraska Basins, South Platte and High Plains study units covering the majority of the state.

USGS’s Groundwater Resources Program conducts assessments of the nation’s principal aquifers, which includes a study of groundwater availability in the High Plains aquifer, to gain a clearer understanding of the status of groundwater resources and the natural and human factors that can affect them. This is a two-fold effort: First, the High-Plains water-level study monitors declines or gains in the aquifer extending from Texas to South Dakota; and second, the High-Plains Water Availability Study is developing numerical groundwater models to simulate and predict changes in the aquifer due to natural and anthropogenic (pumping) processes.

Goals of this effort are to better estimate availability and suitability of those resources for use in the future and to provide tools to estimate future availability of groundwater for its various uses. Assessments will help characterize how much water we have, where groundwater resources are most stressed and where groundwater resources are most available for future use.

For more information, visit the following online links:
- Streamflow-monitoring gaging stations: http://waterdata.usgs.gov/ne/nwis/current/?type=flow
- Real-time groundwater recorder sites: http://waterdata.usgs.gov/ne/nwis/current/?type=gw&group_key=county_cd
- GroundwaterWatch: http://groundwaterwatch.usgs.gov/
- Continuous water-quality sites: http://waterwatch.usgs.gov/wqwatch
- NAWQA: http://ne.water.usgs.gov/nawqa.html
- Groundwater Resources Program: http://water.usgs.gov/ogw/gwrp/

### Levels of Chemicals

Pesticides are not the only chemicals showing up where we might not expect them. Antibiotics such as sulfas and tetracyclines, for example, are regularly used in livestock production to help prevent disease and improve feed conversion. Traces of antibiotics are excreted after use on animals and may wind up in wastewater or animal manure.

Much of this wastewater and manure is then applied to crops or pastures as a nutrient source. A project involving agronomy, agricultural engineering and chemistry scientists focused on the occurrence of tetracyclines in manure from cattle that was used to fertilize corn.

We found traces of oxytetracycline in manure and the soil. The method we developed also included some of the oxytetracycline degradation products, and allowed us to monitor degradation of the parent compound in soil. We found that these degrade over time and because they are not very water-soluble tend to stick to soil particles.

This method was later modified to include both human and veterinary antibiotics and is now being used to follow antibiotic degradation and persistence in synthetic laboratory prepared wastewater used to irrigate food crops.

A major question is whether the presence of low levels of antibiotics in water or soil can lead to an increase in antibiotic resistance of bacteria. A group of UNL engineering and agronomy faculty and students, funded by a grant from the U.S. Department of Agriculture’s National Institute of Food and Agriculture (NIFA) is now addressing this question. The research requires both chemical and microbial analysis of water, soil and vegetables to help understand the potential occurrence of antibiotic resistant bacteria in irrigated food crops.

Methods for detecting water-soluble pesticide degradation products and antibiotics require specialized equipment. Liquid chromatography tandem mass spectrometry, or LC-MS/MS, is the best method to accurately and reliably measure these compounds. Though expensive, this equipment is available at the Water Sciences Laboratory.

LC-MS/MS equipment at the lab has been used for research projects focused on measuring these and other chemicals ranging from synthetic steroids in manure and wastewater to naturally produced cyanotoxins in lake water and fish.

Each chemical or group of chemicals typically needs a new method tailored to both the properties of the compounds and the sample type.

It’s often amazing to me that we are able to measure chemicals at such low levels with this technology. Because each project has a different focus, we spend a lot of time and effort devising and tailoring methods that will provide reliable results at vanishingly small levels. Because of the implications of the results, we have a tremendous responsibility to use this equipment to produce data of the highest quality. My job is to make sure that we continue to do so now and in the future.
Standard Methods Manual Updated

Respected and globally utilized water examination manual, Standard Methods for the Examination of Water and Wastewater, has been expanded and revised and a 22nd edition is now available.

Published jointly by the American Public Health Association, the American Water Works Association and the Water Environment Federation (WEF), Standard Methods reflects the latest developments in water analysis. One significant change in this edition is an emphasis on quality assurance/quality control (QA/QC) practices. Both the U.S. Environmental Protection Agency (EPA and the Standard Methods Committee feel strongly that QA/QC is necessary to ensure that each method produces accurate results. More than 40 percent of the new edition is new or updated.

“The 22nd edition provides more than 400 proven analytical methods — many officially approved by EPA,” said WEF Executive Director Jeff Eger. “This manual belongs on the shelf of any chemist, radiochemist, or microbiologist who evaluates water quality.”


Rain Gardens

On rainy days, rainwater flows over our roofs, lawns and impermeable surfaces, picking up pollutants and carrying them into the stormwater system and, ultimately, into streams and rivers. The volume of runoff can damage bodies of water by changing their natural flow and increasing erosion. The pollution rainwater carries (E. coli, hard metals, oils, fertilizer, sediment, etc.) also damages water quality.

In the past, the goal was to get rainwater off our properties as quickly as possible. This is changing, and now communities are looking at ways to reduce stormwater runoff, improve water quality and use the moisture by finding ways to slow it down, spread it out and soak it in before it reaches larger bodies of water.

One way homeowners can reduce runoff is to install a rain garden. A rain garden is a small garden with deep-rooted plants that is specifically designed to temporarily hold rain water (24-48 hours) coming from roofs, lawns, driveways or other surfaces. The water in the rain garden soaks into the ground, is used by plants or evaporates into the air. Since a rain garden does not hold water for more than 48 hours, mosquitoes are not a problem.

Rain gardens are designed to be aesthetically pleasing and the best rain gardens are ones that tie into existing landscapes. Usually native or near-native plants are used in rain gardens for their deep root systems that help absorb water and open up pore space in the soil, improving its capacity for drainage. These plants also provide important habitat for many beneficial insects. No landscape is no-maintenance. Rain gardens require weeding and cutting back like typical perennial gardens.

- University of Nebraska–Lincoln Extension has technical information on how to design and install a rain garden: http://water.unl.edu/web/landscapes/rain-gardens.
- City of Lincoln offers a cost-share program and how-to workshops: http://lincoln.ne.gov/city/pworks/watrshed/.
- Blue Thumb has some publications and other resources: www.bluethumb.org.

Warning of World Water Crisis

The U.S. intelligence community warned in a report released in March that problems with water could destabilize countries in North Africa, the Middle East and South Asia over the next decade.

Increasing demand and competition caused by the world’s rising population and scarcities created by climate change and poor management threaten to disrupt economies and increase regional tensions, the report concludes.

While the report concluded that wars over water are unlikely in the coming decade, it said that countries could use water as political and economic leverage over neighbors and that major facilities like dams and desalination plants could become targets of terrorist attacks. Coupled with poverty and other social factors, problems with water could even contribute to the political failure of weaker nations, it said.

The public report, unlike the classified version, did not specify countries at greatest risk for water-related disruption but analyzed conditions on major river basins in regions with high potential for conflict — from the Jordan to the Tigris and Euphrates to the Brahmaputra in South Asia.

The report warned that water shortages would become acute in some regions within the next decade, as demand continued to rise. While disputes over water have historically led to negotiated settlements over access, upstream countries will increasingly use dams and
other projects “to obtain regional influence or preserve their water interests” over weaker countries downstream.

The report said improvements in management — such as the use of drip irrigation systems — could ease the potential for shortages, especially in agriculture, which accounts for 70 percent of the world’s water use.

“Numerous countries have over-pumped their groundwater to satisfy growing food demand,” the report said. “Depleted and degraded groundwater can threaten food security and thereby risk social disruption.”

(Editor’s Note: From The New York Times)

**EPA Approves Nebraska’s List of Impaired Waters**

The U.S. Environmental Protection Agency (EPA) has approved Nebraska’s list of impaired waters, which removes 21 waters from the previous impaired waters list and adds 92 waters. Today’s decision brings the total number of impaired waters in the state to 330.

The Nebraska Department of Environmental Quality (NDEQ) submitted its impaired waters list to EPA for review and approval as required by the 40-year-old Clean Water Act (CWA). The act requires EPA to review the state’s list of impaired waters to determine if the state reasonably considered available water quality-related data, and identifies waters to be listed.

EPA Region 7 Administrator Karl Brooks said, “The impaired waters list sets priorities for reducing sources of water pollution in the state. Nebraska is making solid progress in assessing and restoring its waters for all Nebraskans.”

A water body is placed on the impaired waters list when monitoring finds that pollutant levels prevent the lake, river, or stream from attaining its beneficial uses. Beneficial uses in Nebraska include human recreation, agricultural water supply, and maintaining healthy aquatic life.

EPA’s April 16, 2012, decision letter provides a more detailed description of EPA’s review and the basis for this action. The decision letter, including the 2012 impaired waters list, is available at [www.epa.gov/region7/newsevents/legal/](http://www.epa.gov/region7/newsevents/legal/).

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**We’re Updating!!**

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

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Send update to:

**Nebraska Water Center**  
Robert B. Daugherty Water for Food Institute  
University of Nebraska  
516 Hardin Hall  
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Lincoln, NE 68583-0979  
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or e-mail changes to: sress1@unl.edu
The U.S. Fish and Wildlife Service (USFWS) and Ducks Unlimited (DU) are working with the Migratory Bird Conservation Commission to focus on wildlife habitat in the Prairie Pothole Region of the northern plains, breeding grounds for a majority of the continent’s ducks.

The grasslands of the Prairie Pothole Region have long been recognized as the “Duck Factory” of North America. The area is known to produce 50 percent of the continent’s ducks on an average year and up to 70 percent when water and grass are abundant. This focus will stem the threat posed by the increasing rate of conversion of native grasslands and isolated wetlands to agricultural and other uses.

“The Prairie Pothole Region is vital to waterfowl and other migratory birds in North America. At the same time, it is home to thousands of people who have stewarded and worked the land for generations,” said USFWS Service Director Dan Ashe. “This effort will help us work with willing landowners to put conservation easements in place on tens of thousands of additional acres, helping to stem the loss of these breeding grounds.”

Under this initiative, USFWS, DU and other partners will work with the Migratory Bird Conservation Commission to expend upwards of 70 percent—approximately $30 million—of the Migratory Bird Conservation Fund to help secure the future for waterfowl and grassland species on the prairies. Additional funding available through the Land and Water Conservation Fund (LWCF) will further bolster the effort to conserve the prairies. The Service has recommended LWCF investments of an additional $3.5 million in the president’s 2013 budget to support this strategy.

The Migratory Bird Conservation Fund is primarily composed of revenue from the sale of Federal Migratory Bird Hunting and Conservation Stamps, commonly known as federal duck stamps. Each year, millions of waterfowl hunters and other outdoor enthusiasts directly contribute to habitat conservation with the purchase of these stamps. Since 1934, funding from the sales of duck stamps has protected more than 5 million acres of wetlands and grasslands for ducks, geese and other wildlife, including hundreds of thousands of acres in the Prairie Pothole Region.

Through its Grasslands for Tomorrow initiative, DU has pledged to perpetually protect two million acres of native prairie for future generations—one of the most ambitious conservation initiatives ever undertaken. Protection of native prairie is achieved through perpetual grassland and wetland easements, land purchases and donated conservation easements. These approaches are always directed at willing landowners.

USFWS’s Small Wetlands Program uses funds from federal duck stamps to permanently protect waterfowl production areas—nearly three million acres so far. The habitat protected through the Small Wetland Program consists of small wetlands and surrounding grassland habitat, primarily in the U.S. portion of the Prairie Pothole Region. These areas, protected in perpetuity through fee-title acquisition or easement, are called waterfowl production areas.

“We will work with private landowners to accelerate the conservation of native prairie—both wetland and grassland habitats—within the Prairie Pothole Region in the eastern parts of North Dakota and South Dakota,” Ashe said. “The conservation area is an easement program that will be part of a strategic, landscape-scale conservation effort to conserve vital habitat.”
removed before reaching the oceans, but how and where the removal occurs is not well understood.

Education:

Ph.D., Zoology and Ecology, Evolutionary Biology and Behavior (EEBB), Michigan State University and Kellogg Biological Station, 2007
B.A., Biology and Environmental Sci., magna cum laude, Coe College, Cedar Rapids, Ia, 2002

Examples of Current Research/Extension Programs:

Burgin's research integrates the fields of microbial ecology, biogeochemistry and aquatic ecosystem ecology. She uses tools from analytical chemistry, microbiology and molecular biology to better understand how microbes control ecosystem-level nutrient fluxes. Much of her research focuses understanding connections and interactions between carbon (C), nitrogen (N), sulfur (S) and phosphorus (P) cycling in lake, river and wetland ecosystems. Understanding the connections between elemental cycles is particularly important in ecosystems that have been highly altered by anthropogenic activities (e.g., nitrogen loading from agriculture) as these actions are simultaneously affecting multiple elemental cycles, resulting in unknown synergistic effects. Questions asked in her research program have valuable connections to current environmental concerns including global change, the effects of land-use change on ecosystems and aquatic eutrophication.

She began her position in UNL’s SNR in September of 2011 after completing two years as an Assistant Professor of Earth & Environmental Sciences at Wright State University (Ohio, USA). There, she worked on three funded projects, which serve to illustrate the type of work she hopes to continue in SNR. Two grants focus on N transformation and greenhouse gas production in wetlands and are funded by the National Science Foundation (NSF) and the U.S. Department of Agriculture (USDA). Wetlands are particularly difficult ecosystems to study because of their complex hydrology, yet they a well-recognized as important “filters” of contaminants on the landscape scale. The goal of the NSF grant is to understand how increased inputs of salt and S from sea level rise will alter a coastal wetland’s ability to remove N loading from nearby agricultural fields. The goal of the USDA grant is to understand the implications of wetland restoration on agricultural lands for C and greenhouse gas balances. The third grant is funded by the State of Ohio to study the addition of aluminum sulfate (“alum”) to a hyper-eutrophic lake to combat harmful algal blooms. These three projects highlight the connections between human activities and biogeochemical cycling in freshwater ecosystems, and the implications for those actions under changing land use and climate.

Teaching:

Limnology, NRES 459

Selected Publications:


E-mail address:

aburgin2@unl.edu
Platte River Basin Time-lapse Project Continues to Collect Images

By Sandi Alswager Karstens, IANR News

From waterfowl and wildlife to its floods and droughts, the “flat water” that played a significant role in the westward expansion of the United States has a story to tell.

The Platte River Basin Time-lapse project (plattebasintimelapse.com) seeks to shed some light on what really happens on this system that provides water for people and for crops that feed the world.

A team led by photographer Michael Forsberg and NET Television’s Michael Farrell will finish installing the remainder of 45 customized digital SLR remote cameras at fixed locations along the basin this spring. Jeff Dale of TRLcam.com has provided technical assistance in setting up the cameras.

Protected by the elements in specialized cases, the remote-control cameras capture a single photo an hour in every daylight hour of every day. The team’s goal is to capture the ebb and flow of the river, showcasing how natural and manmade events change it over time.

“We want to be able to show people how the complex story of the Platte River unfolds over days, months and even years,” Forsberg said.

It was when Forsberg and Farrell were shooting a documentary for NET/PBS based on Forsberg’s book, “Great Plains: America’s Lingering Wild”, that they started talking about creating the time-lapse of the entire ecosystem — from its Rocky Mountain starting points to its run across Nebraska and into the Missouri River.

The team already has thousands of images collected and would like the project to continue for at least a wet to dry cycle but hopes maybe it could last for a couple of decades, depending on if it continues to receive funding.

Both Farrell and Forsberg have personal connections to the Platte, both having photographed it for years.

“We think this project can be extremely educational for
end these solutions are inherently context-specific and must be locally determined,” he said.

Lenton said WFI is well positioned at a land-grant university in Nebraska to be a key player in the research, policy and technology challenges to come. The state is home to the largest aquifer in North America, with decades of data on which to draw; major river systems; diverse climates and soil types; a reputation for successful management of water resources; and a keen interest in the issue.

“If you’re going to have a water institute, you’d better have it in a place where water is vital and where there is local experience you can draw on,” said Lenton, an internationally recognized expert in water management and development who most recently served as chairman of the independent World Bank Inspection Panel.

NU is such a place, with more than 120 faculty, on all four NU campuses, involved in all aspects of water. And UNL’s land-grant tradition will be key, Lenton added.

“There should be a focus on innovation and connecting the research with practice and policy,” Lenton said, predicting, “The greatest revolution in technology might actually come at this stage in information technology, not irrigation technology.”

“We have a huge task ahead of us,” Lenton concluded. WFI was established in April 2010 with a $50 million founding gift from the Robert B. Daugherty Charitable Foundation to the University of Nebraska. The institute already is forging key public and private partnerships in the Netherlands, Brazil, India, China and the United States, Lenton said. Just last week NU and the U.S. Agency for International Development agreed to collaborate on expanding research and development capacities related to water management in the Middle East and North Africa, work that will be conducted through WFI.

Lenton also is former chairman of the Water Supply and Sanitation Collaborative Council and of the Technical Committee of the Global Water Partnership; lead author on the final report of the United Nations Millennium Project Task Force on Water and Sanitation, which he co-chaired; director of the Sustainable Energy and Environment Division of the United Nations Development Programme in New York; and director general of the International Water Management Institute in Sri Lanka.
Water for Food Institute Director: Challenges Global, But Solutions Local

By Dan Moser, IANR News

It’s important to have a global understanding of water issues, but in the end solutions will come locally, said the newly arrived director of the Robert B. Daugherty Water for Food Institute.

Roberto Lenton, who assumed directorship of the institute in February, spoke Feb. 21 as part of the Heuermann Lectures in the University of Nebraska–Lincoln’s Institute of Agriculture and Natural Resources.

Lenton’s talk, “Water for Food: Think Globally, Act Locally,” is a key theme for the NU’s Water for Food Institute (WFI). Lenton said he expects the institute to play a key role in solving the challenges facing a world that will need to feed a population expected to grow from about 7 billion to 9 billion by 2050 on finite resources such as land and water.

Already, Lenton noted, agriculture worldwide consumes 70 percent of available water. In some parts of the world, a trend of decreasing precipitation is having an impact even as the world becomes more urbanized, meaning “thirsty cities” will compete with agriculture for water.

Lenton noted that water availability and uses depend on local conditions, and technological and policy options also are locally driven. So, one-size-fits-all solutions to getting “more crop per drop” are not realistic.

“It’s very important to have a global understanding, but in the