

Fall 2015

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## MEET THE FACULTY

**Elizabeth A. Slack,**  
B.S., M.P.S

Elizabeth “Libby” Slack joined the faculty of the University of Nebraska–Lincoln’s Northeast Research



*Elizabeth Slack*

and Extension Center in Neligh as a food, nutrition and health extension educator earlier this year. Before coming to UNL, Slack was a graduate student teacher at the Public Service Center in Ithaca, NY and a community nutrition intern with the Boys and Girls Club of Portage County, Stevens Point, WI and a research assistant, Health Promotion and Human Development, University of Wisconsin Stevens Point.

**Education:**

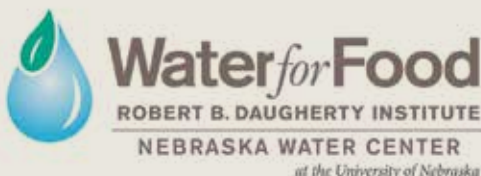
M.P.S., Agricultural Sciences, Cornell University, 2015

B.S., Dietetics, University of Wisconsin Stevens Point, 2014

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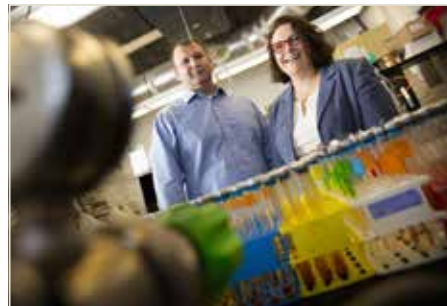
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## Study: Two Major U.S. Aquifers Have High Levels of Natural Uranium

**Scott Schrage**



*Jason Nolan (left) and Karrie Weber used data from roughly 275,000 groundwater samples in the High Plains and Central Valley aquifers to show that many Americans live less than a mile from wells that often far exceed EPA uranium guidelines.*

Nearly 2 million people throughout the Great Plains and California live above aquifer sites contaminated with natural uranium that is mobilized by human-contributed nitrate, according to a study from the University of Nebraska–Lincoln.

Data from roughly 275,000 groundwater samples in the High Plains and Central Valley aquifers show that many Americans live less than two-thirds of a mile from wells that often far exceed the uranium guideline set by the Environmental Protection Agency.

The study reports that 78 percent of the *continued on page 6*

## Water Advanced Research and Innovation Fellowship Program (WARI)

**Steve Ress**

WARI. A short acronym for a long title that is all about fostering mutually beneficial, long term Indo-American science and technology partnerships that will help feed a growing world population.

The Daugherty Water for Food Institute (WFI) and the University of Nebraska–Lincoln recently partnered with the Indian government’s Department of Science and Technology and the Indo-U.S. Science and Technology Forum to nurture and increase cooperation between students and scientists from both countries under the guise of WARI.

WARI will help Indian students and scientists gain access to world class research

facilities at UNL, promote cooperative research in many water science and engineering arenas and pave the way for the next generation of scientists and technologists from India to work with their peers in the U.S., leading to long-term research and development connections.

The program complements UNL’s land grant mission to focus on applied teaching, said the program’s WFI coordinator, Richael Young.

“This makes WARI a perfect fit to train young researchers in water science and engineering. The global trend of growing populations with changing diets and more effective water use for food production will

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## From the Director

Chittaranjan Ray, Ph.D., P.E.

### A Busy, Productive and Diverse Summer

We are always grateful for the work done by our external advisory panels and boards, which do so much in helping to define the directions and paths taken by the Nebraska Water Center. These boards are comprised of faculty and staff colleagues, outside professionals and members of the public that often bring fresh perspectives and ideas on what we should be doing and how we should be doing it. They are an invaluable resource to draw upon.

Our Water Resources Advisory Panel, or WRAP, which meets three to four times annually under the direction of Daugherty Water for Food Institute assistant director Rachael Herpel, recently welcomed new members Joel Christensen, vice president of water operations, Metropolitan Utilities District in Omaha; Jim Macy, director of the Nebraska Department of Environmental Quality; and Pat O'Brien, general manager, Upper Niobrara-White Natural Resources District in Chadron.

WRAP last met for discussions on Sept. 24 and you will find details of that meeting elsewhere in this issue. They next meet on Wednesday, Jan. 20, 2016 prior to a reception for Nebraska state senators at the historic Ferguson House, across from the state capitol in Lincoln.

Special thanks are due off going WRAP members Jerry Obrist, retired chief engineer for the Lincoln water system; Mike Linder, former director of the Nebraska Department of Natural Resources; and Lyndon Vogt, director of the Central Platte NRD in Grand Island for their years of service on WRAP.

The Water Center Advisory Board advises and strengthens the NWC as it carries out its mission of supporting water-related research, education and outreach, and helps share information with constituent groups. They often have valuable advice for us on how and where we should go about executing our mission.

Recent additions to this board include UNL

faculty members Tom Franti, UNL School of Natural Resources and Department of Biological Systems Engineering; Dana Divine, School of Natural Resources and Conservation and Survey Division;

Dan Miller, Department of Agronomy and Horticulture and USDA/ARS; and Karrie Weber, Department of Earth and Atmospheric Sciences and School of Biological Sciences. Leaving the board after several years of service were UNL faculty Valery Forbes, UNL School of Biological Sciences; and John Gates, UNL Department of Earth and Atmospheric Sciences.

Thanks to all of them for their past and present service to the NWC.

Since the last Water Current, we have also had some marked success with external grant awards. We are very pleased to be able to announce the following awards:

An award in the amount of \$180,666 from the Nebraska Environmental Trust for a project entitled A Spatial Index for the Leachability of Chemicals in Nebraska. Term of this award is 04/30/2015 through 06/30/2017. Chittaranjan Ray, PI.

Additional funding of \$24,800 from the U.S. Department of the Interior/FWS for a project entitled POCIS to Measure Agricultural Tile Drainage Contaminants within Madison Wetland Management District. The term of this award extends through 08/01/2017. Daniel Snow, PI.

An award in the amount of \$46,100 from the U.S. Department of Agriculture/ARS for a project entitled Monitoring Antibiotics in



*continued on page 14*

## Meet the Interns



*Cara Oldenhuis*

**Cara Oldenhuis** is a senior advertising and public relations major at the University of Nebraska-Lincoln. A native of Shawnee, Kan., she plans to graduate in May 2016 and pursue a career in public relations. As a public relations intern this fall at the Water for Food Institute, Cara is creating content that furthers the mission of WFI. She also assists in the various needs of the communications team. Cara is excited to learn more about agricultural and research communications through this internship experience.



*Gloria Kimbulu*

**Gloria Kimbulu** is pursuing an advertising and public relations major and Spanish minor at the University of Nebraska-Lincoln. This summer she worked as a new student enrollment leader and is currently the racial affairs representative and a member of the OASIS Leadership Board. Gloria is passionate about using social media to create awareness on social justice issues and is sharing her skills with the institute. She plans to study abroad in Spain next summer and graduate in May 2017.

## Postdoctoral Researcher



*Isidro Campos*

**Isidro Campos** joined the Daugherty Water for Food Institute in July 2014 as a postdoctoral researcher. He earned a doctorate at the University of Castilla-La Mancha, Spain. His background includes development and validation of remote sensing-based methodologies for calculation of crop evapotranspiration and irrigation requirements at plot and regional (river basin) scales. Campos also uses remote sensing methodologies for the assessment of natural vegetation dynamics and water status and the estimation of vegetation canopy biophysical parameters.

His current research at WFI focuses on assimilation of remote sensing data in crop growth and production models. Assimilation of remote sensing data in these models allows for calibrating and adjusting mathematical algorithms modeling crop growth to field conditions.

For more information, go to [waterforfood.nebraska.edu/blog/2015/07/28/isidro-campos/#sthash.vnK3USum.dpuf](http://waterforfood.nebraska.edu/blog/2015/07/28/isidro-campos/#sthash.vnK3USum.dpuf)

## Doctoral Student



*Pongpun Juntakut*

**Pongpun Juntakut** is a doctoral student from Thailand working with Nebraska Water Center director Chittaranjan Ray. His research focuses on studying groundwater quality and modeling in the vadose zone. Currently, he is working on several articles examining long-term trends in groundwater contamination and salinization in the High Plains aquifer in Nebraska. Pongpun is pursuing a doctorate in civil engineering (water resources) at the University of Nebraska-Lincoln. In his home country, he worked as a lecturer and is a lieutenant colonel at the Chulachomklao Royal Military Academy.

## Meet the Faculty *continued from page 1*

### Examples of Current Research/Extension Programs:

Slack is currently working on creating programming based on behavioral strategies to unconsciously make better food choices.

### Examples of Past Research/Extension Programs:

Over the past year, while in graduate school, Slack and two teammates designed a list of recommendations for a winery and brewery to implement so that they could sell more product. All the strategies we recommended were behavioral techniques for the consumer.

### Examples of Outreach Programs:

Behavioral Strategies for Health. As part of her extension programming, Slack focuses attention on ways to increase healthy decision-making.

### Teaching:

She is responsible for programming and public interactions with residents of Knox, Boone, Nance and Antelope Counties and likes to keep her focus primarily on youth wherever possible.

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## WRAP Meets for September Talks

Steve Ress

The University of Nebraska Water Resources Advisory Panel (WRAP) met for presentations, networking and discussions on September 24 at UNL's East Campus Union.

WRAP's first updates came from NU vice president, Institute of Agriculture and Natural Resources Harlan vice chancellor, and UNL senior vice chancellor for academic affairs Ronnie Green, who told the group that UNL's overall student enrollment is continuing its record pace of growth and that 30 percent of all student enrollments are now coming from outside Nebraska.

Most recent enrollment figures also show 11 consecutive years of growth for IANR's College of Agricultural Sciences and Natural Resources, he said.

Green also told WRAP that the Nebraska Innovation Campus (NIC), located on the former Nebraska State Fairgrounds, is nearly finished with its first stage of development and growth. That growth was punctuated by the recent construction of several state-of-the-art greenhouses. NIC's next notable building construction will likely take shape just north of the greenhouse complex, across the street from the Innovation Commons building, which houses both the Daugherty Water for Food Institute (WFI) and Nebraska Water Center (NWC).

He noted that public-private partnering opportunities at NIC are beginning to take hold and he told WRAP that ongoing development of the campus is viewed as a 25-year growth project.

IANR associate vice chancellor Ron Yoder told WRAP that IANR has hired two groundwater hydrologists and one surface water hydrologist, in addition to irrigation engineers located at UNL's West Central Research and Extension Center in North Platte and the Panhandle Research and Extension Center in Scottsbluff. All are replacements within existing positions, except one of the groundwater hydrologists, which is a "new" hire. These five positions will focus on water management in western Nebraska. These most recent hires are in addition to seven water faculty "cluster" hires that were made 2012-13, he said.

He noted that the next water faculty hires will be made in the critical research areas of remote sensing, data analysis, and water quality.

He also told the group that an international search is currently underway to find a replacement for WFI founding executive director Roberto Lenton, and was hopeful that that search could yield a name perhaps before the end of the year.

Green said a key to that hire is finding the right person who can build on WFI's five-year history of organization and accomplishment, and take the Institute to the next level.

In giving his update, Lenton expanded on that by saying it will be critical for the next director to be able to build WFI for

long-term sustainability.

He noted that WRAP coordinator Rachael Herpel had been elevated to the new position of assistant director and said that WFI was working on hiring a joint WFI-NWC-UNL Extension engagement position for working with agencies, natural resources districts, non-profits and other cooperators.

WFI's next Water for Food Global Conference will be held at NIC in April 2016 and will focus on agricultural water efficiency and the areas of health and productivity.

He said that WFI and NWC have been adding undergraduate and graduate-level student interns and postdoctoral researchers and noted that an office expansion project would begin later this fall.

NWC director Chittaranjan Ray commented on the success of this summer's Water and Natural Resources summer tour to the Republican River basin in Nebraska and Colorado in June and said that NWC was sponsoring a one-day collaboration symposium for water faculty and cooperators at the University of Nebraska, Kearney in October.

Dan Snow, director of NWC's Nebraska Water Sciences Laboratory, told WRAP members that the lab was continuing to work on development of new scientific methodologies, as well as assisting research faculty with critical analysis for their research projects.

Monica Norby, assistant vice chancellor for UNL's Office of Research and Economic Development, told WRAP that a "game changer" could be coming for NU water researchers in the form of possible availability of up to \$75 million being made available nationwide through the National Science Foundation for research in the areas of food, energy and water systems.

A networking lunch followed NU presentations and then several WRAP members updated the group on news from their areas, including an update on statewide water planning from Jesse Bradley of the Nebraska Department of Natural Resources.

New members welcomed to WRAP were Joel Christensen, vice president of water operations, Metropolitan Utilities District, Omaha; Jim Macy, director, Nebraska Department of Environmental Quality; and Pat O'Brien, manager, Upper Niobrara-White NRD, Chadron.

Herpel thanked outgoing members Jerry Obrist, Mike Linder and Lyndon Vogt for their years of service to WRAP.

WRAP next meets 1:30 – 3:30 p.m. Wednesday, Jan. 20, 2016, prior to a 3:30 – 4:30 p.m. reception for state senators at the historic downtown Ferguson House (across from the State Capitol). Their following meeting is Monday, April 25, 2016, 7:30 – 8:30 a.m. in the NIC board room of the Innovation Commons building, NIC campus.

# New Website Captures Behind-the-Scene Stories from Nebraska Natural Resources Districts Early Leaders

**Jesse Starita**

Like the Unicameral, Nebraska's Natural Resources Districts (NRDs) are part of the state's innovative fiber. As local governance institutions, they guide how Nebraska manages groundwater, soil, trees, flood control and recreation projects that are vital to the state and have become a model other states are following. The NRDs have helped shape Nebraska's environment for more than 40 years. But until now, there has not been a comprehensive history of how they were formed.

Thanks to the NRD Oral History Project, at [nrdstories.org](http://nrdstories.org), the early leaders tell the founding stories in their own words – and voices. The project, a collaboration between the Robert B. Daugherty Water for Food Institute, Nebraska Association of Resources Districts, Nebraska State Historical Society and several former and current stewards of Nebraska's natural resources, features 80 45-minute audio interviews with individuals from all 23 NRDs. And through [nrdstories.org](http://nrdstories.org), visitors can listen to interviews, read transcripts, look through photos and search stories via an interactive NRD map.

The project began in 2013 when Jim Barr, Gayle Starr and Dayle Williamson, all involved in the NRDs' early years, sat down to interview one another.

"While I was mostly a witness to the idea of merging many special purpose organizations throughout the state into 24 natural resources districts, I thought then – and now – that this was a remarkable achievement," said Jim Barr who helped gather information from

interviewees. "I believe it's a story that needed to be told while many of the participants could still tell it."

As the interviews piled up, so too did the importance of organizing and sharing them. From January to September 2015, student interns and staff at the Water for Food Institute developed the project's website. Visitors can tap into NRD history with a simple click and hear from those who made it happen in seconds.

"It took a lot of gritty hours by our talented staff to bring this to life," said Jesse Starita, Water for Food Institute Education Outreach Associate. "Our web developer Craig Eiting and student interns Cindy Reyes-Cortes and Sandra Dizdarevic did an outstanding job of creating the website's design and navigation."

"In the end, this project, in a very personal way, gives you a sense of the incredible individual and group efforts undertaken to get Natural Resources Districts off the ground back in 1972. One of the reasons our state has this unique system is because the people telling these stories – ranchers, state senators, lawyers, hydrologists, agricultural economists – were united by their desire to create a better system to steward our land and water," said Starita.

The project's website launched at the NRD Annual Conference in Kearney, Sep. 27-29.

For more information, contact Erika Hill, NARD Public Relations/Communications Director at [ehill@nrdnet.org](mailto:ehill@nrdnet.org) or (402) 471-7672.

## New Irrigation and Nitrogen Management Program

**Steve Ress**

Few places on earth have the abundant sources of fresh water available that Nebraska does.

This wealth of both ground and surface water brings challenges to conserve and protect it for future generations. A large part of this task falls on Nebraska's Natural Resources Districts (NRDs), who manage the quantity and quality of Nebraska's groundwater. Some NRD's have implemented groundwater quality management areas in the past and more recently several have joined the ranks of those that have implemented integrated water management plans.

A common aspect of these plans is a requirement that groundwater users participate in an educational program, with that program's goal being to familiarize users with water issues and what steps can be taken to conserve and protect Nebraska's water.

Under a U.S. Environmental Protection Agency, Region 7, 319 grant through the Nebraska Department of Environmental Quality,

University of Nebraska and NRD colleagues have collaborated to develop new educational materials. These materials are included on an online training program that each of the state's 23 NRDs will provide access to on their home webpage, said project leader Bill Kranz, a UNL Extension irrigation specialist at UNL's Haskell Ag Lab near Concord.

"Overall the program includes video clips, printed materials and study questions," Kranz said, noting that overall, the program consists of 13 sections providing information on the current state of groundwater quantity and quality.

Individual sections include summaries of producer practices over the past several years, nitrogen management practices including soil sampling and application method recommendations, use of soil water sensors, and how to minimize surface runoff and deep percolation of water when irrigating with different types of irrigation systems.

"Basically the materials are a compilation of practices aimed at

*continued on page 6*

## New Irrigation and Nitro Management Program *continued from page 5*

protecting the supply and quality of Nebraska water resources,” Kranz said, pointing out that this project could not have been completed without the efforts of several NRD water resources managers and UNL colleagues in Lincoln and at other UNL research and extension centers statewide.

“I know we would not have the type and quality of educational

materials we now have if it weren’t for the participation of a lot of people,” he said. “The neat thing about this program is that these materials are available to people worldwide in addition to serving the needs of our Nebraska producers.”

Training materials can be found online at [water.unl.edu/waternmgt](http://water.unl.edu/waternmgt)

## Water Advanced Research and Innovation Fellowship Program (WARI) *continued from page 1*

require more than ever proficient collaborative teams to address water and agricultural issues,” Young said.

WARI will provide for annual internships for up to 10 Ph.D. water science and engineering students from India to UNL, as well as fellowships for Indian citizens already possessing a Ph.D. Internships will be three to six months in length, while fellowships may be for up to one year.

WFI is looking to secure funds to support Nebraskan researchers to study in India, making the program two-way, Young said.

There are several water-related topic areas that WARI interns and fellows can involve themselves in at UNL. Several of them are currently in the areas of water quality, supply and sanitation. Faculty

mentors in these areas include Nebraska Water Center director Chittaranjan Ray and Nebraska Water Sciences Laboratory director Dan Snow. Many UNL research and engineering faculty with long-standing NWC affiliations, such as former interim director Bruce Dvorak of the UNL Department of Civil Engineering, are also helping with the program.

Candidates applied to the program by Sept. 15. The selection process is currently underway, with final decisions expected in November. The first participants should arrive in March 2016, Young said. More information on WARI is available at [www.iusstf.org](http://www.iusstf.org), at [waterforfood.nebraska.edu/wari](http://waterforfood.nebraska.edu/wari), or by emailing Young at [WARI@nebraska.edu](mailto:WARI@nebraska.edu).

## Study: Two Major U.S. Aquifers Have High Levels of Natural Uranium *continued from page 1*

uranium-contaminated sites were linked to the presence of nitrate, a common groundwater contaminant that originates mainly from chemical fertilizers and animal waste. Nitrate mobilizes naturally occurring uranium through a series of bacterial and chemical reactions that oxidize the radioactive mineral, making it soluble in groundwater.

UNL researchers Karrie Weber and Jason Nolan found that the High Plains aquifer contains uranium concentrations up to 89 times the EPA standard and nitrate concentrations up to 189 times greater. The uranium and nitrate levels of the California-based Central Valley aquifer measured up to 180 and 34 times their respective EPA thresholds.

The authors published their findings in the August edition of the journal *Environmental Science and Technology Letters*. Their research was funded in part by the U.S. Geological Survey.

“It needs to be recognized that uranium is a widespread contaminant,” said Weber, assistant professor of biological, Earth and atmospheric sciences. “And we are creating this problem by producing a primary contaminant that leads to a secondary one.”

Prior research has suggested that prolonged drinking of uranium-

contaminated water may lead, or make people more susceptible, to kidney damage and elevated blood pressure. According to Weber, peer-reviewed studies have also indicated that food crops can accumulate uranium when irrigated by water containing high concentrations of it.

The High Plains aquifer – the largest in the United States – provides drinking water and irrigation for an eight-state swath that stretches from South Dakota through Nebraska and into northern Texas. As California’s largest reservoir, the Central Valley aquifer sits beneath some of the state’s most fertile agricultural land. According to a 2012 census from the U.S. Department of Agriculture, the two aquifers irrigate cropland that accounts for one-sixth of the annual revenue generated by U.S. agriculture.

The researchers also determined that only one of the six wells located near a former or current mining site was contaminated. This finding counters the notion that uranium contamination stems primarily from mining operations or spent nuclear fuel, Weber said.

“We hope that this study serves as a catalyst to get other people interested in this issue,” she said. “If the problem is this widespread,

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## NWC Advisory Board Meets in October

The Nebraska Water Center's (NWC) advisory board met in October to catch-up on current and proposed research projects receiving federal funding via the center.

Presentations at the Oct. 28 meeting were made on seven current research projects being funded, at least in part, by U.S. Geological Survey funds administered by the NWC. Most, but not all of the USGS funds used in these projects are for a one-year period.

The five to 10 minute PowerPoint presentations were submitted by:

- Jane Okalebo, UNL School of Natural Resources: "Climate Variability and a Decision Support Tool for Optimizing Yield with limited Water Available for Irrigation."
- Trenton Franz, UNL School of Natural Resources, Daugherty Water for Food Institute Fellow: "Design of Multi-scale Soil Moisture Monitoring Networks in Agricultural Systems Using Hydrogeophysics."
- Matteo D'alessio, Nebraska Water Center: "Fate Of Manure-Borne Antimicrobials Monensin, Lincomycin, and Sulfamethazine and Potential Effects to Nitrogen Transformation in Soil."
- Shim, Jaehong, UNL School of Natural Resources: "Development of Smart Alginate Hybrid Beads for Eco-Friendly Water Treatment."
- Amy Millmier Schmidt, UNL Departments of Biological Systems Engineering and Animal Science: "Fate of Steroid Hormone Conjugates and E. coli from Manure in Soil: Potential Sources of Free Hormones and Pathogens in Forages and the Environment."
- Karrie A. Weber, UNL School of Biological Sciences and Department of Earth and Atmospheric Sciences: "Nitrate Mediated Mobilization of Naturally Occurring Uranium in Groundwater."
- Doug Hallum, UNL School of Natural Resources and Conservation and Survey Division: "Documenting Stream/ Groundwater Interaction in the South Platte River."

Following the research presentations, NWC director Chittaranjan Ray and communicator Steve Ress filled members in on some of the NWC's most recent activities, including the June water and natural resources tour of the Republican River basin and October's water faculty and cooperator's retreat at the University of Nebraska, Kearney.

Ress also laid out initial plans for a summer 2016 water and natural resources tour of the South Platte River basin in Colorado that will likely center on increasing urbanization of basin water use and the Nebraska-Colorado South Platte River compact.

NWC's next Nebraska water symposium, scheduled for October 2016, Ray said, will also be themed toward understanding interstate water compact issues.

Ray told the group that the coming spring semester water seminar lectures, which begin in January and run through April, will feature seven or eight lectures themed to "Water and health." The seminar is offered for public viewing and for course credit through UNL's School of Natural Resources.

New equipment in use or planned for installation at the Nebraska Water Sciences Laboratory was also discussed before group members spent a little time discussing possible USGS research funding options for the coming year.

Current advisory board members are: John Bender, Nebraska Department of Environmental Quality; Dean Eisenhauer, UNL Department of Biological Systems Engineering and Daugherty Water for Food Institute; Tom Franti, UNL Department of Biological Systems Engineering; Shannon Bartelt Hunt, UNL Department of Civil Engineering; Jesse Bradley, Nebraska Department of Natural Resources; Richard Holland, Nebraska Game and Parks Commission; Alan Kolok, UNO Nebraska Watershed Network; Dana Divine, UNL School of Natural Resources and Conservation and Survey Division; John Miyoshi, Lower Platte North NRD; Tim Shaver, UNL Department of Agronomy and Horticulture and West Center Research and Extension Center; Steve Thomas, UNL School of Natural Resources; Ron Zelt, USGS Nebraska Water Science Center; Dan Miller, U.S. Department of Agriculture/ARS; Karrie Weber, UNL School of Biological Sciences and Department of Earth and Atmospheric Sciences; Chittaranjan Ray, Nebraska Water Center and UNL Department of Civil Engineering; Bruce Dvorak, UNL Department of Civil Engineering; and Roberto Lenton, NU Daugherty Water for Food Institute.

The most recent additions to the board are Divine, Franti, Weber and Miller.

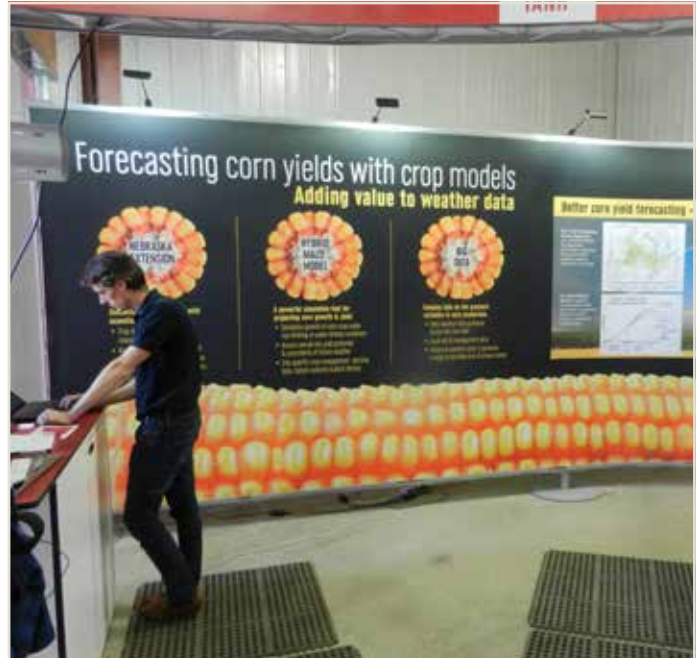


## 2015 UNL Extension Husker Harvest Days Exhibits

### Explore Climate Change Impacts with “Successfully Weathering Extremes”



NU President Hank Bounds (center) fields a local television news interview.



One of UNL's themed displays dealt with forecasting corn yields with crop models



NU President Hank Bounds and NU Vice President and IANR Vice Chancellor Ronnie Green chat with LEAD director Terry Hejny.



Todd Whitney waters corn-nitrogen test plots.





Students pause at the Nebraska College for Technical Agriculture's (NCTA) booth.



Sending FFA students out on scavenger hunts over the HHD grounds.



Alli Raymond from UNL's Department of Animal Sciences sends FFA scavenger hunt participants on their way.



Students from one of 68 state FFA chapters sign-up for the on-grounds scavenger hunt sponsored by UNL's CASNR.

## 2015 UNL Extension Husker Harvest Days Exhibits

### Explore Climate Change Impacts with “Successfully Weathering Extremes”



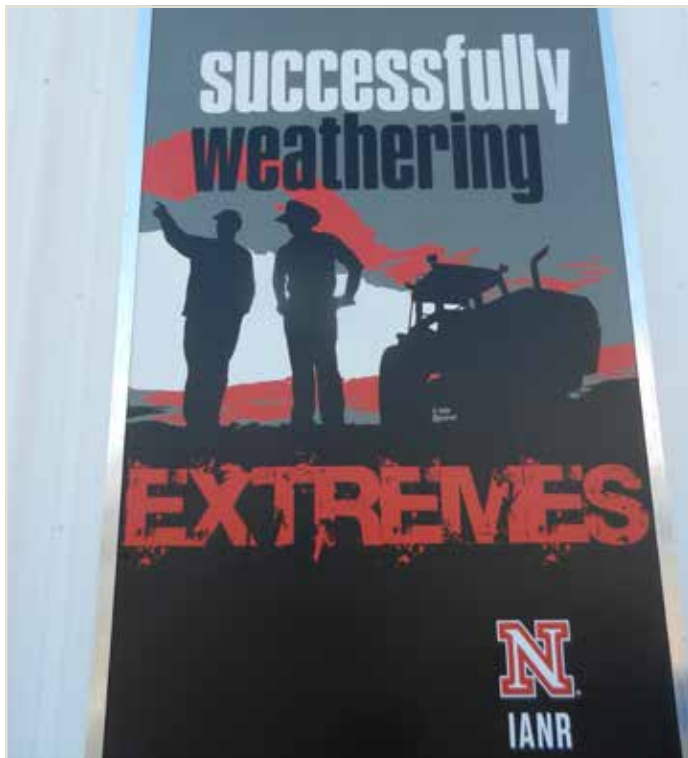
Mary Drewnoski talks to a producer about cover crops and diversified forage possibilities for livestock.



UNL Dean of Extension Chuck Hibberd (left) talks with educators demonstrating the benefits of shading for livestock.



CASNR's Sue Ellen Pegg greets high school students looking at UNL Extension and research exhibits.







*New signage to attract show goers to UNL exhibits.*



*Jeff Wilkerson and Kurtis Harms film Market Journal programming at Husker Harvest Days.*



*An aerial view of the more than 600 exhibits and displays that make-up Husker Harvest Days.*



## October Faculty and Partner Retreat at UNK

University of Nebraska faculty members joined with current and potential partners for a day of discussing collaborations at the University of Nebraska, Kearney (UNK) on Oct. 7.

More than half those attending traveled from Lincoln's Nebraska Innovation Campus to Kearney and back on a large tour bus, arriving at UNK's Ockinga Seminar Center ready for a day of presentations and discussions.

In the retreat's first two hours, UNK and University of Nebraska-Lincoln (UNL) faculty gave four-minute presentations on current research projects and some of their future collaborative interests. Departments represented in these presentations included UNL's School of Natural Resources, Department of Civil Engineering, Department of Agronomy and Horticulture, National Drought Mitigation Center, Department of Earth and Atmospheric Sciences, West Central Research and Extension Center and others. UNK's Department of Chemistry and others joined in the presentations.

After lunch and poster viewing, federal, state, regional and local partners delivered short presentations on where potential opportunities for collaboration with NU faculty may exist.

Some of the agencies represented in these presentations included the U.S. Department of Agriculture's Natural Resources Conservation Service, U.S. Army Corps of Engineers, U.S. Geological Survey, Nebraska Department of Natural Resources, Nebraska Environmental Trust, Nebraska Department of Agriculture and the Nebraska Water Balance Alliance.

Many of the state's 23 Natural Resources Districts were also represented, as was The Nature Conservancy, Platte River Recovery Implementation Program, The Central Nebraska Public Power and Irrigation District, Field to Market and the Lower Platte River Corridor Alliance.



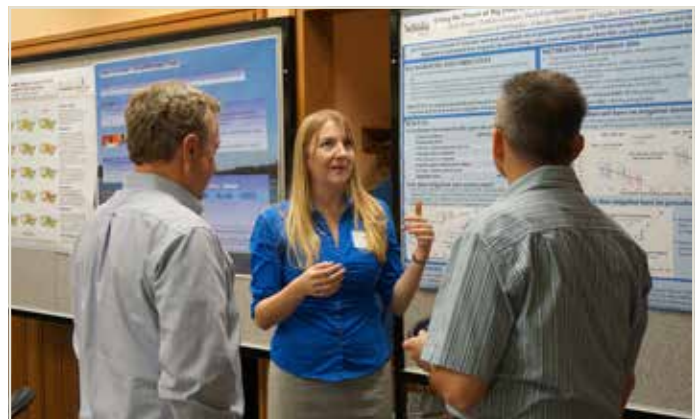
*More than 70 University of Nebraska water faculty members and representatives of many federal, state and local agencies, as well as those from non-profit groups, attended an Oct. 7 collaboration retreat at the University of Nebraska, Kearney.*



*UNL's Doug Hallum was one of many giving a four-minute presentation on their research and current projects.*



*Mike Hayes of UNL's National Drought Mitigation Center studies the day's agenda.*



*Kate Boone of UNL talks about her research at the poster session.*



*Rick Koelsch, UNL associate dean for Extension, presents at the UNK retreat.*



*Nebraska Water Center director Chittaranjan Ray opens the retreat.*



*Meghan Sittler of the Lower Platte River Corridor Alliance.*



*Listening to presentations.*

## **Study: Two Major U.S. Aquifers Have High Levels of Natural Uranium** *continued from page 6*

more research needs to be done. We're limited by the data that's been collected, and uranium isn't often monitored."

Weber said the expense of water treatment plants – specialized facilities that can cost tens of millions of dollars – often puts them out of financial reach for smaller and rural communities. Addressing the issue might require managing groundwater and focusing on the aquifers' sediment, which houses bacteria that can help control uranium by breathing and eating it, she said.

Regardless of the approach, Weber said it is important for decision-makers and researchers to account for the presence of

uranium in U.S. water sources.

"When you start thinking about how much water is drawn from these aquifers, it's substantial relative to anywhere else in the world," Weber said. "These two aquifers are economically important – they play a significant role in feeding the nation – but they're also important for health.

"What's the point of having water if you can't drink it or use it for irrigation?"



## From the Director *continued from page 2*

Irrigation Return Flows in the Magic Valley of Southern Idaho. The term of this award is 05/01/2015 through 10/31/2016. Daniel Snow, PI.

An award in the amount of \$10,345 from al-Farabi Kazakh National University in Kazakhstan for a project entitled Emerging Contaminants and Environmental Security in the Syr Darya River Basin. The term of this award is 07/10/2015 through 12/31/2015. Daniel Snow, PI.

An award in the amount of \$249,970 from the National Science Foundation (NSF) for a project entitled U.S.-Czech Student Research Experience on Understanding Water and Chemical Transport in the Earth's Vadose Zone. The term of this award is 09/01/2015 through 08/31/2018. Chittaranjan Ray, PI.

In September, we had the privilege of hosting a couple of very successful special seminars by visiting faculty. On Sept. 24 "USDA Process-based Tool for Estimating Runoff, Soil Loss and Sediment Yield – The WEPP Model" was presented by Dennis Flanagan, research agricultural engineer at the USDA/ARS National Soil Erosion Research Laboratory in West Lafayette, IN. The seminar was very well attended by UNL research and engineering faculty.

A week later, on Sept. 30, we welcomed Hatim M.E. Geli, Department of Civil and Environmental Engineering at Utah State University. His seminar was on "Remote Sensing for Water Resources Management: Needs and Challenges."

On Oct. 7 we hosted a very successful retreat at the University of Nebraska, Kearney for water faculty and off-campus collaborators and professionals. This was a good day for talking about how we can all work together more toward common goals and on collaborative research proposals. The event was attended by more than 70 faculty and professionals from many different agencies and companies, as well as University departments and schools.

Events such as these are helping tremendously in connecting people and are bearing fruit in terms of research proposals both submitted and funded.

I should note that we have begun planning for the 2016 Water and Natural Resources summer tour, which as this was being written



*Dennis Flanagan, research agricultural engineer at the USDA/Agricultural Research Service National Soil Erosion Research Laboratory in West Lafayette, Ind., presented a special seminar on Sept. 24 on "USDA Process-based Tool for Estimating Runoff, Soil Loss and Sediment Yield."*

was beginning to take shape as a three-day June tour of the South Platte river basin in Colorado, an area the tour has not examined in-depth for several years. There are many current issues effecting both Colorado and Nebraska on the South Platte, so planning an itinerary and agenda will inevitably boil-down to what we have to leave out in the limited time available. Mike Jess, Steve Ress and Jeff Buettner were planning to take their first planning trip to the area in late November and early December, so we will have more to tell you via our web site and social media pages very soon.

We will likely start and end the tour in Fort Collins, which will give tour registrants the chance to go out before the tour, or stay afterwards.

Finally, NWC retained leadership and management of IANR and UNL Extension staffing and exhibits for September's Husker Harvest Days show near Wood River via communicator Steve Ress' partial appointment with UNL Extension. Exhibits were themed to dealing with the effects of climate change under the banner of "Successfully weathering extremes," a theme that could carry-over to the coming 2016 show since these are such important topics to address.

This was the ninth year NWC staff helped lead and facilitate this event, which attracts about 20,000 visitors, and involves more than 50 IANR faculty and staff in making the three-day event happen.

## NWC Social Media

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## New Mailing Addresses

*Daugherty Water for Food Institute*  
2021 Transformation Drive, Suite 3220  
P.O. Box 886203  
Lincoln, NE 68588-6203

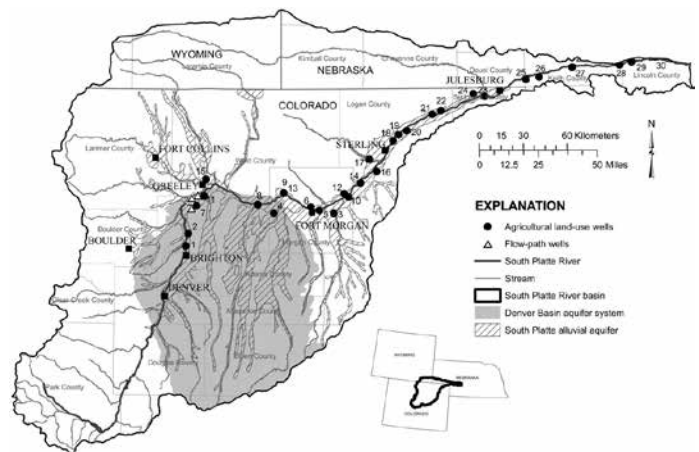
*Nebraska Water Center*  
2021 Transformation Drive, Suite 3220  
P.O. Box 886204  
Lincoln, NE 68588-6204

## 2016 Tour to Visit Colorado's South Platte Basin *continued from page 16*

Center and water projects being undertaken by the Northern Colorado and Southeastern Colorado Water Conservancy Districts.

Organizers expect to announce tour dates and an itinerary by January 2016. Registration will likely open by early spring and will be through The Central Nebraska Public Power and Irrigation District in Holdrege. The tour will begin and end in the Denver area. Tour participants will be responsible for their own travel arrangements to and from the event.

More information on the tour will be available at [watercenter.unl.edu](http://watercenter.unl.edu) as it develops.



## Nebraska's Top 10 Water Challenges *(Source: Nebraska Water Center, rev. 8/21/15)*

This listing is unranked. It also recognizes that several challenges may fit into more than one of the three sub-categories (e.g., challenge #7—monitoring system, also has immediate water quantity implications, and #8 also poses water quality challenges); K-gray education/outreach are inherent and very important needs in all of these challenges:

### Water Quantity

1. Effects of water consumption and conservation practices on instream-flows, groundwater recharge and water supplies, including ethanol production; realizing the maximum water use efficiency for irrigation (e.g., changing from gravity flow to center pivot) is a key factor.
2. Invasive species (e.g., purple loosestrife, salt cedar, Phragmites), particularly in riparian buffer strips and in stream channels.
3. Climate change, especially the impacts of global warming and increased climate variability, particularly the frequency and severity of droughts and floods on water availability.

### Water Quality

4. Nitrate, uranium, arsenic, and pesticide contamination of drinking water supplies, and nitrate contamination of irrigation sources.
5. Non-point source (NPS) nutrient and sediment inputs in lakes, streams and reservoirs, including toxic algae treatment and prevention, and establishing maximum contaminant loadings (MCLs) for nutrients in Nebraska.

6. Potential surface and groundwater contamination by emerging contaminants (including endocrine disrupting compounds), such as steroid hormones, antibiotics, pesticides, surfactants, nanomaterials, and disinfectants, from grain and livestock production, biosolids application, biofuel production, and municipal/ residential wastewater sources.

### Water Institutions

7. Creating and supporting more comprehensive, ongoing, real-time water monitoring, including stream gauging and cyberinfrastructure networks linked to predictive models, readily accessible to the public and coupled with smart decision-support tools. Understanding the connection between surface and groundwater is especially important.
8. Aging water infrastructure, including drinking water distribution systems (especially in small rural communities), wastewater treatment, storm runoff, irrigation systems, dams, levees, and canals.
9. Water economics and water policy, including establishment of water markets and water banking, and recognition and development of water resources as a natural resource amenity for recreational use (including greater public access) and wildlife habitat.
10. Creation of effective social systems to influence individual and institutional behavioral change for sustainable management of water resources, including a viable legal framework, ongoing financial support, new water management systems, and increased collaborative solution development.





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## 2016 Tour to Visit Colorado's South Platte Basin

The 2016 summer Water and Natural Resources Tour will be taking three or four days to visit sites and examine issues in Colorado's South Platte River basin.

Dates for the South Platte tour have not yet been set, but mid-June dates are currently looking the most promising, organizers said. It also has not been decided whether the tour will be three days or four. Dates and tour length will likely be decided sometime after a late November trip to the area by organizers to look at possible tour destinations, arrange logistics and talk with possible speakers and cooperators.

The tour will likely key-in on basin water use and development in Denver and the surrounding front-range metropolitan area, including ongoing conversion of former agricultural water rights to urban and suburban use as the Denver metropolitan area continues to grow.

Operation and development of several metropolitan and small town water systems will likely be examined, possibly to include Frisco, Aurora and the Denver Water Board.

Much of the trip would be in the heart of Colorado's high country as the tour examines municipal reservoir systems and looks at other water and natural resource related topics. These could include snowmaking operations, mining, logging and deforestation issues, reservoirs and water transport systems and many others.

Tour organizers are also looking at possibilities that could include a white-water rafting excursion, a Denver Rockies baseball game, a stop at the National Center for Atmospheric Research in Boulder and the High Country Conservation Center in Frisco.

Presentations related to Colorado's drafting of its first-ever, comprehensive state water plan and shared use of basin water under a Nebraska-Colorado interstate compact would also likely be part of the tour.

Other sites and attractions being discussed as possibilities for the tour have included the Prairie Waters Project in Aurora, the growth of high-value dairy farming operations along the South Platte River near Greeley, the Colorado Water Congress, the High Country Conservation

*continued on page 15*