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Water Current

PART OF THE ROBERT B. DAUGHERTY WATER FOR FOOD INSTITUTE

MEET THE FACULTY

Dr. Sathaporn (Tong) Onanong Research Technologist II - LC/MS

Dr. Sathaporn (Tong) Onanong is a Research Technologist II – LC/MS in the University of Nebraska’s Water Sciences Laboratory (WSL), which



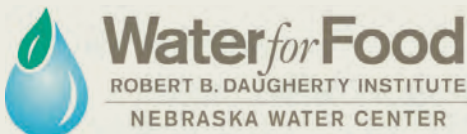
Sathaporn (Tong) Onanong

is part of the Nebraska Water Center, within the Robert B. Daugherty Water for Food Institute. Tong runs the WSL’s triple quadrupole mass spectrometer and other trace level equipment. He performs analysis of water, soil, and sediment samples for pharmaceuticals, algal toxins, munitions, antibiotics and degradation products using gas chromatography/mass spectrometry, high performance liquid chromatography, liquid chromatography/mass spectrometry, and liquid chromatography/

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Planning Continues on July 2014 NU Water And Natural Resources Tour

Organizers have completed much of the initial planning for the University of Nebraska’s annual water and natural resources tour, which will leave Kearney for points in Western Nebraska, Northern Colorado and Wyoming on July 15.

The tour will examine the present state of sharing limited water supplies in the North and South Platte River basins in the three states and will include a visit to the U.S. Bureau of Reclamation’s (USBR) North Platte irrigation project in Wyoming.

“The North Platte Project is central to much irrigation, power production and recreational water supplies for western Nebraska,” said Nebraska Water Center com-

municator and tour co-organizer Steve Ress, “But it is very remote and not easily accessed, so there always tends to be a long list of people in the water community that know of the project’s importance, but who have never had a chance to see the unique system of dams and

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Water tour planning committee members Megan Colling and Mike Jess at the Seminoe dam overlook in Wyoming.

Neale Joins DWFI as Director of Research

By Dana Ludvik, Daugherty Water for Food Institute

The University of Nebraska’s Robert B. Daugherty Water for Food Institute (DWFI) has added Christopher M.U. Neale to its leadership team as director of research.

Neale oversees DWFI research efforts, engaging NU faculty in new projects and initiating partnerships to help address critical worldwide water for food challenges. His academic home is in UNL’s Department of Biological Systems Engineering and a research appointment in the UNL School of Natural Resources Center for Advanced Land Management Information Technologies.



Christopher Neale

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From the Director

Chittaranjan Ray

Progress in Moving the Ball Forward

It has now been more than six months since I took on the responsibilities and challenges of being director of the Nebraska Water Center, enough time that I am beginning to feel like I'm making some progress on moving the ball forward on a number of fronts.

One of the things I have been most interested in pursuing since coming to Nebraska and taking on these new responsibilities and challenges is solidifying, and in some cases reestablishing, firm partnerships with a wide range of colleagues, cooperators and stakeholders, both on and off University of Nebraska campuses.

With that as a goal, it was very encouraging to see the large turnout and to participate in the very enthusiastic and lively discussions we had at the center's faculty retreat at the East Campus Union on Jan. 23.

A large part of our overall goal for that afternoon's interactions was to continue the process of widening the discussions of the water center's future in terms of how it can be a more significant and relevant presences in enhancing water-related research, education and outreach activity across the NU campuses. We want as many faculty and stakeholders involved in these ongoing discussions as possible, so we plan to hold more of these retreats, both on campus and at neutral sites, in the months ahead, to continue our initial momentum. Some of these discussions will be targeted toward inter-disciplinary research collaborations, which we are also trying to encourage and expand.

A group we are leaning heavily on to advise us on future roles and courses of action is our Water Resources Advisory Panel (WRAP) facilitated by Daugherty Institute outreach coordinator Rachael Herpel. They had a very successful and well-attended meeting in early January and we will be asking them,

as well as those attending future retreats, to help update a rather lengthy and detailed list of state and regional water priorities that the WRAP first published five years ago.

These are another good starting point for inclusive discussions on which directions the water center should be heading in for the foreseeable future.

Planning for our summer water and natural resources tour to western Nebraska, northern Colorado and Wyoming is proceeding apace, I am happy to report. We have gathered a rather large group of sponsors and cooperators for this tour and are already receiving high interest in reserving seats on the tour bus. We expect those seats to fill rather quickly once registration details are released (probably in early May) since the U.S. Bureau of Reclamation dams and reservoirs that form the North Platte and Kendrick projects in the mountains near Casper, Wy. always draw a crowd.

Our tour organizing committee traveled the proposed tour route last month and will be working the next couple of months to finalize details, and then registration will open via the Kearney Area Chamber of Commerce. If you are thinking about attending, the best thing you can do is keep an eye on watercenter.unl.edu for details as they develop.

I am happy to report that we will be hosting, Dr. Sujata Mandhar, a post graduate researcher at Tohoku University, Sendai, Japan, who will be visiting us in March, being

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Dr. Sathaporn (Tong) Onanong *continued from page 1*

tandem mass spectrometry. Tong has been with the WSL for more than seven years.

Examples of Current Research/Extension Programs (brief descriptions):

Method development and analyses of water, soil, and sediment samples for pharmaceuticals, steroids, illicit drugs, pesticides, antibiotics and degradation products using high performance liquid chromatography/tandem mass spectrometry.

Examples of Past Research/Extension Programs:

Remediation of chlorinated pesticides and solvents using zerovalent iron Fe(0).

Selected Publications:

Snow, D.D., Damon-Powell, T., **Onanong, S.**, Cassada, D. A. 2013. Sensitive and simplified analysis of natural and synthetic steroids in water and solids using on-line solid phase extraction and microwave-assisted solvent extraction coupled to liquid chromatography tandem mass spectrometry atmospheric pressure photoionization. *Analytical and Bioanalytical Chemistry*, 405, 1759-1771.

Albano, J., Comfort, S.D., Zlotnik, V., Halihan, T., Burbach, M., Chokejareonrat, C., **Onanong, S.**, Clayton, W. 2010. In situ chemical oxidation of RDX-contaminated ground water with permanganate at the Nebraska Ordnance Plant. *Ground Water Monitoring & Remediation*, DOI: 10.1111/j.1745-6592.2010.01295.x

Satapanajaru, T., **Onanong, S.**, Comfort, S.D., Snow, D.D., Cassada, D. A., Harris, C. 2009. Remediating dinoseb-contaminated soil with zerovalent iron. *Journal of Hazardous Materials*, 168, 930-937.

Waria, M., Comfort, S.D., **Onanong, S.**, Satapanajaru, T., Boparai, H., Harris, C., Snow, D.D., Cassada, D.A. 2009. Field-scale cleanup of atrazine and cyanazine contaminated soil with a combined chemical-biological approach. *Journal of Environmental Quality*, 38, 1803-1811.

Onanong, S., Comfort, S.D.*, Burrow, P.D., and Shea, P.J. 2007. Using gas-phase molecular descriptors to predict dechlorination rates of chloroalkanes by zerovalent iron. *Environmental Science and Technology*, 41, 1200-1205

Onanong, S., Burrow, P.D.*, Comfort, S.D., and Shea, P.J. 2006. Electron capture detector response and dissociative electron attachment cross sections in chloroalkanes and chloroalkenes. *Journal of Physical Chemistry A*, 110, 4363-4368.

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WRAP Meets in January

By Steve Ress, Nebraska Water Center

The Nebraska Water Center's Water Resources Advisory Panel (WRAP) met in January to review a variety of information relating to the center's research, education and outreach activities.

The meeting was held Jan. 7 at UNL's East Campus Union.

Rachael Herpel, outreach coordinator for the Robert B. Daugherty Water for Food Institute and WRAP coordinator, distributed DWFI's first annual report (2012-2013), Working to Ensure a Water and Food Secure World and reported that DWFI's 2014 Global Water for Food Conference, Harnessing the Data Revolution: Ensuring Water and Food Security from Field to Global Scales, will be held in Seattle, Wash. at the Hyatt Regency Bellevue, with an evening banquet hosted at the Bill & Melinda Gates Foundation.

Chuck Hibberd, dean and director of UNL Extension said that planning of Extension's next 100 years, during Extension's national centennial year, will be the focus of a pending Lincoln conference to be held March 18-19.

He also noted that the Panhandle Agricultural Summit was held at the Gering Civic Center Dec. 12-13, 2013.

Hibberd also told WRAP members that UNL is leading the

development of a National Center for Agricultural Literacy.

Monica Norby, assistant vice chancellor in UNL's Office of Research and Economic Development, and Rick Koelsch, associate dean, UNL Extension reported on soliciting external partners on behalf of Nebraska's Experimental Program to Stimulate Competitive Research (EPSCoR) program.

They noted that a series of meetings are underway to develop a proposal for USDA's National Institute of Food and Ag (NIFA) Agriculture and Food Research Initiative (AFRI) Challenge Area Request.

Draft Framework — *Building Resilient Agroecosystems: Harvesting the Power of Big Data for Water and Food Security*. Platte River and/or High Plains Aquifer are potential areas of focus.

Ron Yoder, associate vice chancellor for UNL's Institute of Agriculture and Natural Resources welcomed UNL Department of Biological Systems Engineering irrigation and water resources engineer Derrel Martin as advisor and co-convenor of the WRAP.

He also reviewed the status of DWFI/IANR "cluster hires." The candidate pool and the importance of water to Nebraska's economy

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Water Center Hosts January Faculty Retreat

The Nebraska Water Center (NWC) hosted a well-attended and very successful half-day retreat in late January to discuss the center's missions and roles and how it can be a more significant presence in enhancing water-related research, education and outreach activities at the University of Nebraska.

"The large and diverse faculty and stakeholder turnout for the discussions was very encouraging and made for some very thought-provoking and fruitful discussions," NWC director Chittaranjan Ray said of the Jan. 23 event.

During the retreat, Ray and Robert B. Daugherty Water for Food Institute founding director Roberto Lenton revisited the NWC's missions and mandates as one of more than 50 congressionally mandated Water Resources Research Institutes nationwide and as a member of the National Institutes of Water Resources, as well as NWC roles within the federal Land Grant mission.

UNL Institute of Agriculture and Natural Resources (IANR) associate vice chancellor Ron Yoder also delivered a brief talk on the organizational structure of the NWC and Daugherty Institute and how they fit into IANR's and the University of Nebraska's overall mission areas.

Ray and Lenton both emphasized that these mission areas and activities will only be

strengthened within the new administrative structure of the NWC being a part of the Daugherty Institute within NU's Institute of Agriculture and Natural Resources.

"It is our intent to continue to serve Nebraskans, which is at the core of our mission, as the water center traditionally has done for nearly 50 years," Ray said.

After further defining the NWC's educational, research, outreach and communications, and service (through its affiliated Water Sciences Laboratory) missions, the group of nearly 70 attending used a comprehensive ranked list of priorities, developed by the NWC's Water Resources Advisory Panel, as a guide toward honing existing priorities and further identifying key Nebraska water issues.

The detailed priority list, to which there were many suggestions, represented an



Nebraska Water Center director Chittaranjan Ray listens intently to small group discussions at January's retreat (Jesse Starita photo).



Attendees spent much of Jan. 23's Water Center brainstorming retreat in small group discussions (Steve Ress photo).

all-inclusive "wish list" according to WRAP member Eugene Glock.

Several attending noted that the NWC is in a unique position to move forward on many of the priorities since it is always willing to work across campuses and academic disciplines and with varied faculty and stakeholder groups.

There also was discussion on NWC's roles in coordinating multi-disciplinary and interstate research proposals, in connecting with new faculty and stakeholder groups and with sponsoring seminars and roundtable events.

Later in the afternoon, small groups focused discussion on such issues as water quantity and quality in urban, rural and agricultural settings, prioritizing NWC core values in service, faculty and stakeholder engagement, opportunities for students and in communications and outreach.

Before adjourning, Ray laid-out suggestions for a detailed research and proposal writing retreat to be held mid-May. Faculty and stakeholders will be notified of the details of this event well in advance, he said.



Robert B. Daugherty Water for Food Institute founding director Roberto Lenton helped open and set the tone for January's Nebraska Water Center brainstorming retreat (Jesse Starita photo).

Annual NU Water Lectures Run Through April

By Steve Ress, Nebraska Water Center

Eight public lectures on a slate of state and regional water issues form the University of Nebraska's spring semester water seminar that began in January and runs through April.

The free public lectures continue on a roughly every-other-week basis through April 23, each being held on Wednesday afternoon from 3:30 to 4:30 p.m. in the first floor auditorium of Hardin Hall, northeast corner of N. 33rd and Holdrege Sts, University of Nebraska-Lincoln East Campus, Lincoln.

Remaining lectures are on Feb. 26, March 12, and April 2, 9 and 23.

Lecture topics include groundwater quality in Nebraska, owner responsibilities for private water wells, source water protection planning, variable rate irrigation as a means of improving

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Water lectures are presented January through April in UNL Hardin Hall's first floor auditorium at N. 33rd and Holdrege Sts. (Steve Ress photo).

Third Edition Groundwater Atlas Available

By Mekita Rivas, UNL School of Natural Resources

After more than two years of research, writing and editing, the third edition of the "Groundwater Atlas of Nebraska" is available from the University of Nebraska-Lincoln.

"Rather than just reproduce maps that have been published in the past, we wanted our readers to know that our understanding of groundwater in Nebraska has evolved over the past half-century," said Jesse Korus, survey geologist in UNL's Conservation and Survey Division (CSD) and lead author/coordinator of the third edition atlas.

"In some cases, it has improved substantially. In other cases, things we once thought we knew are now being questioned, and

more work is needed to provide accurate and detailed maps on a statewide level."

CSD, a multidisciplinary research, service and data-collection organization established by Nebraska state statute in 1921, produced the atlas. CSD is also the natural resource survey component of UNL's School of Natural Resources.

Korus and co-authors created maps, wrote text and compiled and interpreted data for topics that fell within their respective areas of expertise.

One of the challenges authors faced was deciding which topics to include in the latest edition of the atlas.

"Groundwater impacts the lives of Nebraskans in so many ways that we were reluctant to exclude any topic," Korus said. "We focused on our best developed understandings, (which are) those relating to the physical and chemical aspects of groundwater hydrology."

The third edition atlas has some unique features, including an additional 20 maps and diagrams illustrating aspects of groundwater not covered in

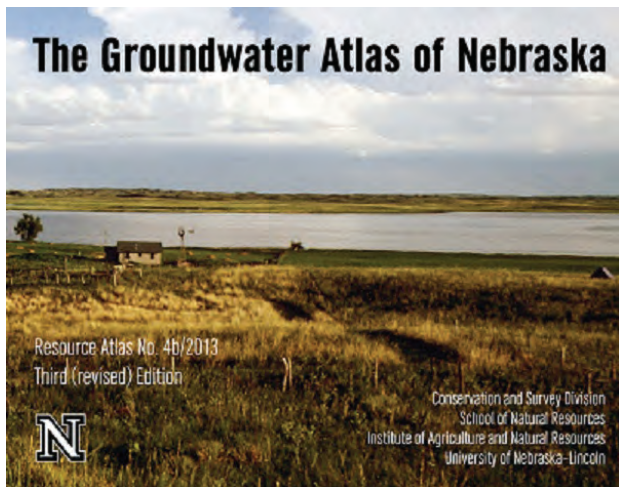
previous editions. It also includes new chapters describing the interconnections among groundwater, surface water and the hydrochemical aspects of groundwater.

"The previous two editions of the atlas have been among the most popular publications ever produced by CSD," Korus said. "They have been used for decades as a general source of information for a wide audience."

That audience includes well drillers, teachers, conservationists, farmers, ranchers and other professionals. The atlas is also a popular resource for training and licensing programs.

"We expect the third edition to be used in much the same way," he said. "No one atlas or book can contain everything there is to know about groundwater, but this atlas is a good starting point for someone seeking answers to questions about Nebraska's most valuable natural resource."

"The Groundwater Atlas of Nebraska" is \$15 and available for purchase from the Nebraska Maps and More Store on the first floor of Hardin Hall at 33rd and Holdrege streets, Lincoln. The book can also be purchased online at <http://nebraskamaps.unl.edu> and <http://amazon.com>, or by calling (402) 472-3471.



Sixth Annual Global Water for Food Conference Travels to Seattle

Mark your calendars for the sixth annual global Water for Food Conference Oct. 19-22, 2014 in Seattle, Washington. The conference will be held at the Hyatt Regency Bellevue, with an evening banquet hosted at the Bill & Melinda Gates Foundation. Organized by the Robert B. Daugherty Water for Food Institute at the University of Nebraska, this event brings together experts from around the world to discuss how advances in science, technology and policy will help the world efficiently use its limited freshwater resources to increase global food security. Each year, the event attracts roughly 500 industry, academic and policy leaders and features a mix of plenary addresses, panel discussions, case studies, poster competitions and more.

The 2014 theme is “Harnessing the Data Revolution: Ensuring Water and Food Security in a Digital World.”

Data and analytics are increasingly used by private and governmental sectors to make decisions regarding food and water. Conference presentations and panel discussions will focus on the changing landscape of data, analytics, modeling and visualization, as well as how to capitalize on this ongoing data revolution to ensure a water and food secure world. Tools, such as UNL’s Global Yield Gap and Water Productivity Atlas, will also be unveiled at the conference.

Seattle, a hub for major data and technology organizations, is the ideal place to hold a conference on using data to ensure

water and food security.

Generous support for the 2014 conference is provided by the Gates Foundation, Robert. B. Daugherty Charitable Foundation and University of Nebraska.

Further details, including how to register online, will be announced in early 2014 at <http://www.waterforfood.nebraska.edu>.

The Robert B. Daugherty Water for Food Institute at the University of Nebraska is a research, education and policy analysis institute committed to helping the world efficiently use its limited freshwater resources, with particular focus on ensuring the food supply for current and future generations.

UNL Research Raises Concerns About Future Global Crop Yield Projections

By Dan Moser, IANR News Service

About 30 percent of major global cereal crops — rice, wheat and corn — may have reached their maximum possible yields in farmers’ fields, according to University of Nebraska–Lincoln research published last December in *Nature Communications*.

These findings raise concerns about efforts to increase food production to meet growing global populations.

Yields of these crops have recently decreased or plateaued. Future projections that would ensure global food security are typically based on a constant increase in yield, a trend that this research now suggests may not be possible.

Estimates of future global food production and its ability to meet the dietary needs of a population expected to grow from 7 billion to 9 billion by 2050 have been based largely on projections of historical trends. Past trends have, however, been dominated by the rapid adoption of new technologies — some of

which were one-time innovations — which allowed for an increase in crop production.

As a result, projections of future yields have been optimistic — perhaps too much so, indicates the findings of crop scientists Kenneth Cassman and Patricio Grassini, of UNL’s Department of Agronomy and Horticulture, and Kent Eskridge of UNL’s Statistics Department.

They studied past yield trends in countries with the greatest cereal production and provide evidence against a projected scenario of continued linear crop yield increase.

Their data suggest that the rate of yield gain has recently decreased or stopped for one or more of the major cereals in many of the most intensively cropped areas of the world, including Eastern Asia, Europe and the U.S.

The Institute of Agriculture and Natural Resources scientists calculate that this decrease or stagnation in yield gain affects 33 percent

of major rice-producing countries and 27 percent of major wheat-producing countries.

In China, for example, the increase in crop yields in wheat has remained constant, and rate of corn yield increase has decreased by 64 percent for the period 2010-2011 relative to the years 2002-2003 despite a large increase in investment in agricultural research and development, education and infrastructure for both crops.

This suggests that return on these investments is steadily declining in terms of impact on raising crop yields.

The authors report that sustaining further yield gain likely would require fine tuning of many different factors in the production of crops. But this is often difficult to achieve in farmers’ fields and the associated marginal costs, labor requirements, risks and environmental impacts may outweigh benefits.

From the Director *continued from page 2*

co-hosted by both the Nebraska Water Center and the Daugherty Water for Food Institute. This relationship began with my visit to Japan last September on invitation from Tohoku University.

I will also have a new postdoctoral researcher, Matteo D'Alessio, beginning in mid-May. D'Alessio is completing his Ph.D. in Civil Engineering from the University of Hawaii and defended his thesis in January while I was there to work on some ongoing projects.

Our pending move to UNL's new Nebraska Innovation Campus (NIC), on the site of the old state fairgrounds, just north of UNL's city campus, is looking very promising. Construction is coming along nicely and it appears that the water center and Daugherty Institute will be ready to occupy new offices there sometime in late spring or early summer. We are looking to be settled-in at NIC well before the 2014 fall semester begins in August.

I am currently working with the Office of the Vice Chancellor for Research and Economic Development to complete a five-year review of our Water Sciences Laboratory, which is a Nebraska Research Initiative Core Facility. The external review will take place

in late March/early April and I will be conducting a series of listening/brainstorming meetings with our stakeholders and the lab's advisory board. We will report more on that process as it moves forward.

Please note that our annual water seminar series continues through the end of April. As this issue of the *Water Current* went to press, there were still five lectures remaining. These are free to the public and we encourage you to add any or all of them.

We were very saddened to hear of the death in January of Ron Bishop, who was the founding general manager of the Central Platte Natural Resources District in Grand Island. Over the last 40 years, Ron was involved in virtually every water issue affecting the Platte River and central Nebraska. Ron was universally respected in the Nebraska water community and leaves a lasting legacy.

One of the last in a string of honors to go to Ron was when our own Bob Kuzelka (former longtime assistant to the director of the UNL Water Center) was on-hand to help present him with The Groundwater Foundation's annual Kremer Award last November.

2014 Water Tour *continued from page 1*

reservoirs where much of our surface water resources come from."

The water tour last traveled to there four years ago.

"It is one of the most historic federal impoundment projects in the western U.S. and something anyone interested in or working in Nebraska water issues needs to see to fully appreciate, Ress said.

Nebraska, Wyoming and Colorado are all dependent on irrigation water and hydropower generated in the North Platte watershed and legally must share its waters.

Project construction began more than 100 years ago under then-President Theodore Roosevelt. Water impounded in its series of reservoirs irrigates a large swath of cropland in western Nebraska, above Lake McConaughy.

This summer's tour begins in Kearney on Tuesday, July 15 and ends there on Friday, July 18.

Primary sponsors and co-organizers are NU's Nebraska Water Center, part of the Robert B. Daugherty Water for Food Institute; Kearney Area Chamber of Commerce (KACC); Central Nebraska Public Power and Irrigation District; and Nebraska Public Power District.

Additional sponsors and cooperators include Osher Lifelong Learning Institute at UNL (OLLI), the Nebraska State Irrigation Association's Water Leaders Academy, and the Nebraska Rural Radio Association.

Ress, tour host Mike Jess and Megan Colling of the KACC spent four days in mid-January driving the planned tour route, talking to

potential speakers and checking on food and lodging arrangements for the tour.

"That was a very productive four days, allowing us to set much of the tour route and itinerary," Ress said. "We will of course be looking closely at North and South Platte River basin issues from the standpoint of how they effect us here in Nebraska from a number of perspectives."

Some of the planned tour stops and topics include the Platte River Recovery Implementation Program, wind tunnel pesticide research at UNL's West Central Research and Extension Center in North Platte, Lake McConaughy, Northern Colorado Water Conservancy District in Berthoud, Colo., irrigation canals and diversion dams in western Nebraska and many others.

There will be discussions on water supply challenges in Colorado's urbanized "Front range," stream flow allocations among irrigators in Nebraska and Wyoming, water for wildlife habitat, effects on the rivers from invasive species, irrigation efficiency measures, and generation of hydroelectric power.

Nebraska tour stops could focus in part on issues facing local irrigation districts and Natural Resource Districts.

Overnights will likely be in Fort Collins, Colo., Casper, Wy. and Scottsbluff.

Organizers are continuing to work on the tour itinerary with eye toward being able to accept registrations sometime in May.

Tour updates can be found at watercenter.unl.edu and within the pages of this newsletter. Registrations will likely be capped around 55-60.

January Scouting and Set-up Trip for the July 15-18 Summer Water and Natural Resources Tour to W. Nebraska, N. Colorado and E. Wyoming



Snow covered roads in Northern Colorado during January's summer tour planning trip.

Scottsbluff National Monument in Western Nebraska. On the day the water tour-planning group was there in January, winds were in excess of 65 mph.



The face of historic Pathfinder Dam. The Wyoming dam and reservoir, part of the U.S. Bureau of Reclamation's North Platte Project, were completed in 1909.



Seminoe dam and reservoir in Wyoming.



Lake Ogallala



Water tour planning committee members Megan Colling and Mike Jess at the Seminoe dam overlook in Wyoming.



Ryan Henry (center), a research technologist at UNL's West Central Research and Extension Center in North Platte, talks to (from left) Megan Colling, Doug Hallum and Mike Jess about the center's two wind tunnels.

Northern Colorado Water Conservancy District in Berthoud, Colo.



Chimney Rock near Scottsbluff.



Big Horn Sheep in the Poudre River Canyon north of Fort Collins, Colo.

Iced-over Glendo dam.



Water Leaders Academy Project Yields VideoGage Pages

Every year during the Nebraska State Irrigation Association's (NSIA) Water Leaders Academy, there is a class project, and in the case of the academy's first year, a project that has recently resulted in some rather unique pages on the Nebraska Water Center's website.

David Kracman, water resources planner at The Flatwater Group in Lincoln, had the idea during NSIA's Academy I, to take videos of streams and reservoirs across Nebraska and share them online through a hybrid YouTube-Google Earth type platform so that most anyone could see what the various stream flow and water levels looked like at different locations at a given point in time.

While others in his project group were enthusiastic about the idea, Kracman took the initiative to make it happen.

Called the VideoGage Project, Kracman wanted to find a relatively simple visual way to help individuals, water users, casual observers, media who cover water issues or students get a sense of what water quantity in Nebraska looks like.

He started by taking video at the gauging station near Cody Park in North Platte on the North Platte River near his hometown. "It's helpful if there's a gauging station in the area," Kracman explained, "so we can tie an actual quantity to see the differences in flow and water levels that we see visually."

Once he teamed with the University of Nebraska's Nebraska Water Center, part of the Robert B. Daugherty Water for Food

Institute, the project found a home. NWC's Lorrie Benson, Steve Ress and Craig Eiting teamed with Brett Bieber, and Michael Fairchild, project developers (along with Eiting) to launch the videos on NWC's website.

Visit <http://watercenter.unl.edu/WaterVideoGage> to find an interactive web-based platform where users can screen results based on desired ranges, by date, flow rate or volume. For example, click on Lake McConaughy near Morning Glory Spillway and you'll see a beautiful 30-second video of serene lake at sunset. The technical data is noted on the page as well.

There are about 20 reservoir and stream locations to visit so far, but Kracman hopes that Academy alums as well as others will begin to take video and make it available to the site.

Currently outside contributors cannot upload videos directly to the site, but Kracman has been talking with the NWC about how the process of posting videos can be streamlined to encourage outside contributions. "We would love to have video contributions from the rivers and reservoirs all across the state," Kracman said.

For questions or if you have video that you would like to contribute to the project, contact Kracman at (402) 435-5441 ext 2222 or email at dkracman@flatwatergroup.com. He will in turn work with the NWC to upload the video.

Wrap *continued from page 3*

were both so strong that seven faculty were hired (two more than originally planned).

They are:

- Guillermo Baigorria, crop simulation modeler, UNL School of Natural Resources
- Trenton Franz, hydrogeophysicist, UNL School of Natural Resources
- Patricio Grassini, cropping systems agronomist, UNL Department of Agronomy and Horticulture
- Derek Heeren, irrigation engineer, UNL Department of Biological Systems Engineering
- Francisco Mu-oz-Ariola, hydroinformaticist and integrated hydrologies, UNL Department of Biological Systems

Engineering/School of Natural Resources/Earth and Atmospheric Sciences

- Haishun Yang, crop modeler, UNL Department of Agronomy and Horticulture
- Roger Elmore, cropping systems agronomist, UNL Department of Agronomy and Horticulture

Jill Brown, assistant to the vice chancellor for external relations for IANR, briefed WRAP members on the Heuermann lecture series that began in January. Those lectures can be viewed online at <http://heuermannlectures.unl.edu/>

Chuck Schroeder, founding executive director of NU's Rural Futures Institute, reported that, after coming on board December 1, he has been meeting with stakeholders and collaborators in preparation for developing an RFI strategic plan. He is looking forward to working with the DWFI.

Bishop Receives 2013 Kremer Award

Ron Bishop was a prominent figure in Nebraska's water world — and because of his lifetime dedication to protecting and conserving groundwater, was selected to receive The Groundwater Foundation's 2013 Maurice Kremer Groundwater Achievement Award.

Bishop, who died in January after a long battle with cancer, was retired founding general manager of the Central Platte Natural Resources District in Grand Island. He received the award last November at the Nebraska Water Resources Association and Nebraska State Irrigation Association joint convention in Kearney.

The Kremer Award was established in 1985 to recognize Nebraskans who have made a substantive contribution to the conservation and protection of Nebraska's groundwater.

"He was an excellent sounding board during those times when I was developing groundwater management and protection guides for the NRDs", said Kremer selection committee member Bob Kuzelka, an emeriti faculty member at the University of Nebraska-Lincoln.

Bishop became founding manager of the Central Platte NRD when the statewide NRD system formed in 1972 and has played a critical role in developing NRD structure and promoting the importance of natural resources conservation. He wrote and testified on water and conservation legislation in Nebraska and nationally. Nationally, he was one of the founding members of the Ground Water Management Districts Association (GMDA), serving as president from 1989 to 2002. He also served on the National Water Resources Association board representing groundwater since 1990.

Locally, he exemplified a career and life dedicated to conserving and managing Nebraska's natural resources, working with the NRD Board of Directors in local, state and national conservation projects.

Bishop served on the Nebraska Water Resources Association for over 30 years and received the George W. Norris Award for

distinguished public service in 1985. During his tenure as CPNRD general manager, the district was known for being innovative and accomplished many milestones to protect and conserve natural resources.

This included efforts such as implementing Nebraska's first water banking program, which provides water for new and future uses and maintains economic sustainability in rural economies. First NRD to

implement a prescribed fire program for area landowners to manage rangelands, restore grasslands and control invasive species. First to help irrigation districts convert surface water irrigation to groundwater irrigation, increasing efficiency by irrigating the same number of acres and return excess water to the Platte River. Excess flows will help bring the over-appropriated area of the CPNRD back to a fully appropriated status and used as part of the responsibility to the Platte River Recovery Implementation Plan.

The annual Kremer

Award is chosen by a selection committee appointed by The Groundwater Foundation board of directors. Members are: Jim Goeke and Bob Kuzelka, University of Nebraska; Jane Griffin, The Groundwater Foundation; and Don Kraus, Central Nebraska Public Power and Irrigation District.

Past awardees: 1986: Vincent Dreeszen 1987: Maurice Kremer 1988: Eugene Reed 1989: Val Kuska 1990: Warren Fairchild 1991: Ralph Marlette 1992: Ted Filipi 1993: Robert B. Crosby 1994: Virginia Smith 1995: Fred Salmon and Family 1996: Frank A. Smith 1997: Robert B. Daugherty 1998: Les Sheffield 1999: Richard Harnsberger 2000: Wayne Madsen 2001: Jim Goeke 2002: Eugene Haarberg 2003: Chris Beutler 2004: Darrell Watts 2005: Roger Patterson 2006: Senator Ed Schrock 2007: Jim Cook 2008: Ann Bleed 2009: Vance Anderson 2010: Mike Jess 2011: Lee Orton and 2012: Dayle Williamson,



UNL's Bob Kuzelka presents Darla and Ron Bishop with The Groundwater Foundation's annual Kremer Award (photo courtesy of TGF).

Fritz Leads Research Project on Amazon Biodiversity

The Amazon rain forest's incredible biodiversity has been luring naturalists since before Charles Darwin's famous expedition in the 1830s. Now, modern-day naturalists are teaming up to use new tools to answer age-old questions about the natural world, with implications for understanding today's global threats.

University of Nebraska–Lincoln paleoclimatologist Sherilyn Fritz is project coordinator for a large multidisciplinary team of North and South American scientists that recently won a five-year, \$4.4 million Frontiers in Earth-System Dynamics (FESD) grant from the National Science Foundation.

The researchers will study how climate and geology interact to shape biodiversity in the Amazon and Andean forests through time. FESD is designed to improve knowledge of the Earth's resilience by exploring connections among the planet's dynamic systems.

"Those are the most diverse forests on the planet," Fritz said of the Amazon and Andes. "So why is it that this particular region has such great diversity, and what is the role of these long-term geologic and climatic processes in fostering that diversity?"

To answer these questions, Fritz and colleagues — a team of geologists, climatologists, biologists and modelers — will collaborate to understand how the creation of the Andes Mountains affected erosion, climate and other processes in the lowland Amazon region, and how those processes, in turn, influenced species evolution.

Deciphering these historic interactions will help scientists and decision-makers better understand modern threats to biodiversity posed by climate change, dam building, deforestation and other human activities, and how best to protect the region's ecosystems, said Fritz, George Holmes University Professor of Earth and Atmospheric Sciences.

USGS to Once Again Track Water Use by Power Plants

For the first time since 1995 the U.S. Geological Survey (USGS) will reinstate reporting the amount of water consumed in the production of thermoelectric power.

Tracking water used by thermoelectric power plants could allow water resource managers to evaluate the influence of this type of use on the overall water budget of a watershed. The use of heat and water budgets to estimate water consumption at individual thermoelectric plants provides a useful check on other estimation approaches and in many cases may be the most accurate method available.

Thermoelectric water withdrawal refers to water removed from groundwater or surface water for use in a thermoelectric power plant, mainly for cooling purposes. Much of the water currently withdrawn for cooling is reintroduced into the environment, and immediately available for reuse.

Consumptive use occurs when some of the water evaporates during the cooling process or is incorporated into byproducts as a result of the production of electricity.

"Thermoelectric withdrawal occurs in both freshwater and saline water sources," says Eric J. Evenson, coordinator, and USGS National Water Census. "It is the most significant use of saline water in the country."

The study presents a method for collecting location and cooling-equipment data. An upcoming study will be released providing the consumption numbers derived from our heat/water budget models. About half of all U.S. water withdrawals are for thermoelectric cooling water.

Methods for estimating evaporation presented in this study will

play a key role in the National Water Census, a USGS research program on national water availability and use that develops new water accounting tools and assesses water availability at the regional and national scales.

"The most significant contribution of this report," according to Timothy H. Diehl, hydrologist at the Tennessee Water Science Center, "is to present an updated method for estimating evaporation from surface water downstream from once-through cooling systems, and make the tool available in the form of a spreadsheet."

USGS classifies water withdrawals for thermoelectric cooling by the two types of cooling systems used at the plants: recirculating systems and once-through systems. A recirculating cooling system circulates water through the generating plant condensers and is then cooled in a structure such as a cooling tower or cooling pond, before it is re-used in the same process.

A once-through cooling system withdraws water from a surface-water source to circulate through the generating plant condensers and then discharges the water back to surface water at a higher temperature.

"Most consumption by once-through cooling systems and recirculating ponds takes the form of evaporation from surface water," Diehl said. "This type of consumption has been estimated by a variety of methods and is sometimes considered insignificant."

This action was taken at the recommendation of Government Accountability Office reports on the Energy Water Nexus and represents a joint effort between the USGS and the Energy Information Administration.

The project's scope is unique. Paul Baker at Duke University conceived and leads the project. He and Fritz developed the framework and recruited 12 U.S. researchers at nine universities, as well as six South American collaborators. As project coordinator, Fritz will facilitate discussions and data exchanges. She is one of four project co-leaders, along with colleagues from the University of Washington, University of Michigan and University of Texas at Austin.

Research teams will tackle distinct aspects, such as understanding when and how fast the Andes Mountains uplifted, deciphering the climatic past and reconstructing the evolutionary history of rain forest plants. The teams will come together, along with climate and earth-system modelers, to interpret the data as an entire system.

In addition to coordinating the project, Fritz will research the area's climate history by studying fossil microorganisms. Identifying organisms found in geologic deposits helps determine what environmental conditions and habitats existed at that time. Colleagues will measure chemical variations in the deposits to infer temperature, moisture and other conditions.

"As a team, we'll be trying to reconstruct what the environments were at times in the geologic past and what their associated climate conditions would have been," Fritz said.

Also unique is the role of geneticists and ecologists. Biologists interested in species evolution have long looked to geologic events to understand causes of genetic divergence or extinctions. This project, in contrast, will use genetic data to inform geologic hypotheses. For example, the age of parts of the Andes Mountains is disputed. Plant genetic evolution data may provide time constraints to help determine when mountains formed.

Project participants anticipate this new approach will become a new field they're calling "geo-genomics."

"These questions are not new, but in each of these sub-disciplines there have been some really big developments," Fritz said. "We're trying to provide a more integrated understanding by combining a lot of disciplines that often operate in parallel to understand how the system itself works."

(Editor's note: From the NU Office of Research and Economic Development)

Water Lectures *continued from page 5*

agricultural water use efficiency, potential concerns over nitrates and uranium in drinking water and managing water resources for multiple benefits.

"The lectures collectively form a very broad overview of water and water-related topics that are important to and of interest to all Nebraskans," said Chittaranjan Ray, director of NU's Nebraska Water Center (NWC), which has helped sponsor and organize the annual spring semester lecture series on water topics for more than 40 years.

Cosponsoring the lectures with NWC, part of the Robert B. Daugherty Water for Food Institute, is UNL's School of Natural Resources, which also offers the lecture series as a course for student credit.

The remaining lectures appear below and are posted at water-center.unl.edu. Individual lecture videos and speaker PowerPoint presentations are also posted at that site within a few days of the lecture.

Feb. 26, A Vision for an Ultra-High Resolution Integrated Water Cycle Observation and Prediction System, Paul Houser, professor of global hydrology, George Mason University

March 12, Kremer Memorial Lecture, A New Approach to Source Water Protection Planning: Groundwater Site Investigations, Becky Ohrtman, SWP program director, and Dan Cook, project manager, Iowa Department of Natural Resources

April 2, The Potential to Increase Agricultural Water Use Efficiency through Variable Rate Irrigation, Tim Shaver, nutrient management specialist, UNL West Central Research and Extension Center

April 9, Nitrate and Uranium in Drinking Water, Marty Stange, environmental supervisor, Hastings Utilities, and Karrie Weber, assistant professor, UNL School of Biological Sciences

April 23, Managing Water Resources for Multiple Benefits, Don Kraus, general manager, Central Nebraska Public Power and Irrigation District



Listening to a water seminar lecture at Hardin Hall.

Kremer Award

I want to express the appreciation of The Groundwater Foundation to the Nebraska Water Resources Association and the Nebraska State Irrigation Association for so frequently allowing us to use their annual conference for the presentation of the annual Kremer Ground Water Achievement Award. Most of the award winners, including tonight's, have been very involved with both organizations.

In 1979 when I began work for the UNL Conservation and Survey Division as a water resources planner I had a very steep learning curve to become familiar and proficient in this area of planning. Early on I found my greatest source of practical information and criticism came from the managers of the then 24 NRDs. And, at the head of that pack was tonight's Kremer Award winner Ron Bishop.

Ron is the 28th person to be given this award. He is the first award winner to have been a NRD manager. He joins six other past award winners whose contributions to Nebraska's groundwater supply and system was to implement the laws for the protection of this valuable state resource. However, he is unique from them in that his task was implementation at the local regional government level. Not the easiest of tasks. I am sure that the namesake of this award — "Mr. Water," Nebraska State Senator Maurice Kremer — is pleased with this presentation. He would be the first to point out that passing laws may be difficult but implementing them is in many ways much more challenging.

I don't have to recount to this audience all of Ron's many accomplishments in groundwater protection both quantity and quality. You know of them. As manager he led the Central Platte NRD in a pioneering role in this area and also contributed tirelessly to state level efforts and programs related to groundwater and many other natural resources as well.

I am quite pleased to be able to present the 2013 Kremer Ground Water Achievement Award on behalf of the foundation. Congratulations Ron!

Bob Kuzelka on November 25th, 2013 Kearney, NE

Neale *continued from page 1*

Neale is president of the International Commission on Remote Sensing of the International Association of Hydrological Sciences. He previously was a professor in the Irrigation Engineering Division of the Civil and Environmental Engineering Department at Utah State University, where he served as a leader in remote sensing and management of agricultural water resources since 1988. Neale holds a Ph.D. in agricultural engineering from Colorado State University.

Neale brings to NU an extensive background in water research and management projects in the western U.S., Africa, South America, and the Caribbean, which will greatly enhance DWFI's global research mission to sustainably grow more food with less water.

Changes to NWC and WSL Websites

Nebraska Water Center (NWC) webmaster (change your title if you don't like this one) Craig Eiting has been devoting considerable time and talents to updating both the NWC and associated Water Sciences Laboratory web sites over the past couple of months, with a goal of making them more comprehensive, easier to interact with and more user friendly.

"We began by spending a considerable amount of time carefully evaluating both the NWC and Water Sciences Laboratory websites," Eiting said. "Broken links have been fixed and navigation on the websites has been improved in order to help visitors find the information they are looking for."

A primary goal of all this work in dissecting the sites and testing pages is to make the most relevant and current information easier for visitors to find and to remove old and outdated pages.

"But the process of updating the website has not been just removing old information. Several features have been added and updated. A new YouTube channel has been created, which houses several videos created by the NWC over the years," Eiting said.

The NWC's Digital Commons Library has also been updated and expanded. Digital Commons being the University's primary electronic library.

The process of updating the NWC site is ongoing.

A new version of the Water Sciences Laboratory website is currently under construction and should be available soon. Goals of this reconstruction include extensive updating of research methodologies used by the laboratory, as well as pricing information for lab customers.

If you experience problems accessing information on either the Water Center or laboratory sites, please contact Water Center communications coordinator Steve Ress at sress@nebraska.edu or phone (402) 472-3305.

"Dr. Neale brings a wealth of experience in developing and leading significant research projects focused on the water and food challenge," said Roberto Lenton, DWFI's founding executive director.

"He will play an important role in helping to further engage faculty in interdisciplinary research to advance the work of the institute, growing our current programs and pursuing new opportunities."

The Robert B. Daugherty Water for Food Institute at the University of Nebraska is a research, education, and policy analysis institute committed to helping the world efficiently use its limited freshwater resources, with particular focus on ensuring the food supply for current and future generations.

Consider Using Native Plants in Home Landscapes

By Amy Seiler, Nebraska Forest Service

Homeowners should consider using native plants for the majority of their landscape plants and minimize the use of exotic plants, according to Amy Seiler, Community Forestry Specialist with the Nebraska Forest Service.

Native plants are ideal, according to Seiler, because they have adapted to the unique conditions of western Nebraska over thousands of years. Great Plains plants are adapted to the very high temperatures and low humidity in the summer, but also very low temperatures in winter.

One key to Great Plains plants' success is their ability to put down deep roots that tap farther into the soil profile, allowing them to survive extremely dry years like the summer of 2012. But they can also withstand very wet years like 2011, because those same deep roots also break up the soil compaction and allow water to drain more quickly, preventing the crown and roots from rotting, Seiler pointed out.

Seiler said homeowners will reap many benefits from using native plants. Once native landscapes are established (usually two to three years, depending on species), watering can be reduced significantly or even removed, and the plantings will thrive. Native plants keep their form best and do not tend to seed down as prolifically if they are limited to rainfall.

Homeowners will find they are using significantly less water, possibly enough to translate into significantly lower utility bills, she said.

Native plants also require less pesticides and fertilizers. Many natives have developed their own defenses against pests and diseases. And removing pesticides allows naturally occurring predatory insects to control other pests in the landscape. Fertilizer is unnecessary when using natives because it pushes the plants into unnatural growth levels that they are not adapted to maintain.

Using native plants in the landscape also attracts indigenous insects, birds and wildlife, which will thrive in a familiar habitat, Seiler said.

Finally, using natives in the landscape conveys enjoyment of the

native landscape of the Great Plains, and replicates that beauty around homes.

Notable regional natives that should be used in the landscape include the plants on this list, which also have attractive blooms, plentiful fruits, and seeds and showy fall color:

- **Trees:** Limber pine, ponderosa pine, Rocky Mountain juniper, hackberry, bur oak, cottonwood.
- **Shrubs:** American plum, Apache plume, common chokecherry, skunkbush sumac, mountain mahogany, rabbitbrush, Saskatoon serviceberry, silver buffaloberry, western sandcherry.
- **Perennials:** Butterfly milkweed, goldenrod, leadplant, penstemons, purple prairie clover, spiderwort, scarlet globe mallow, common milkweed.
- **Grasses:** (ornamental or for turf) sandlove grass, little bluestem, big bluestem, Indian grass, prairie drop seed, buffalograss, blue grama.

Seiler noted that native plants at nurseries sometimes look ragged or undesirable in their containers. This is because they prefer less water, but nurseries typically are on a strict watering schedule because their exotic annuals and other ornamental plants demand more water.

Her recommendation: This is common among native plants, but purchase them anyway. Once they are incorporated into the home landscape and irrigation is reduced, the plants will resume their natural beauty and look amazing.

The website of the Nebraska Statewide Arboretum, <http://arboretum.unl.edu/nsa-publications>, has lots more information on the plants listed and other plants native to Nebraska and the Great Plains.

Kazakhstan Graduate Student *continued from page 16*

potential health risks, including kidney damage. It is one of the things NU water researchers assiduously test water for.

With this track record and its cutting-edge water analysis tools and research methodologies, Aidyn says the WSL a perfect place for him to expand his practical knowledge.

"Sometimes in my education I just read. But here I can do. I can improve my practical knowledge and get good practice," he said.

But Aidyn is also a keen reader. He graduated high school at 16 and four years later received a bachelor's degree in "Chemical Technology of Inorganic Substances." He then began graduate-level work at Al-Farabi KazNU last September and will return home with fond memories of Nebraskans:

"Very friendly," Aidyn says. "I like the people here."

According to Snow, there is little known about the occurrence, fate, and environmental impact of many chemicals found near water sources in Kazakhstan. Future collaborative research with students of Aidyn's caliber will aim to answer some of these unknowns. Aidyn, for his part, is sure of one thing.

Asked about the bitter wind chills in Nebraska this January, he smiled.

"In Kazakhstan, -20°C (-4°F) is not very cold."

The WSL is part of the Nebraska Water Center, both of which are part of NU's Robert B. Daugherty Water for Food Institute.

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Kazakhstan Graduate Student Studying at NU Water Sciences Laboratory

By Jesse Starita, Daugherty Water for Food Institute

Though 10,541 kilometers (or nearly 6,550 miles) separate Lincoln and Almaty, Kazakhstan — a distance equal to the combined length of the Amazon and Mekong rivers — the two are closer in areas of water quality and quantity than distance alone would suggest.

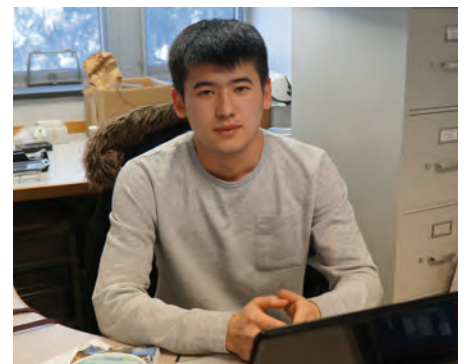
A nascent collaboration between the NU Water Sciences Laboratory (WSL) and Al-Farabi Kazakh National University (Al-Farabi KazNU) is growing and bringing the two even closer, which helps explain why Al-Farabi KazNU graduate student Abilkas Aidyn is burrowed in a UNL East Campus lab so many kilometers from the rugged, snow-capped mountains of his home.

Last spring, Dan Snow, director of laboratory services for the WSL, contacted researchers in Almaty after reading about uranium isotopes found in the Shu River between Kazakhstan and Kyrgyzstan.

That fueled a trip by Snow to the world's largest landlocked country and a reciprocal one to Nebraska by Aidyn's advisor, Uralbekov Bolat, Head of General and Inorganic Chemistry at Al-Farabi KazNU. While there, Snow learned how Kazakhstan — one of the

world's leading producers of uranium ore — must also unearth solutions to contamination in its groundwater and surface water.

Nebraska is no stranger to uranium mining either, with one of the largest mines of its type in the U.S. located near Crawford in the state's panhandle. Nebraska's uranium was originally deposited in soils as a part of rocks carried here by glaciers and volcanic ash. It has also been present in some groundwater sources for many years, where it can be linked to many



Abilkas Aidyn at the NU Water Sciences Laboratory (Jesse Starita photo).

continued on page 15