

October symposium panels will discuss “Managing an Essential Resource: Basin by Basin”

A series of basin-specific panels will look at water management in Nebraska at the Nebraska Water Center’s annual water symposium Thursday, Oct. 20.

The daylong symposium will be held at Nebraska Innovation Campus in Lincoln for the first time, followed the next day by the annual Nebraska Water Law Conference.

“Panels will be discussing what basin groups have concluded about an overlying state water policy and goals, objectives and problem areas in each basin,” said Lee Orton, who helped plan the symposium agenda with Prairie Fire publisher W. Don Nelson and Nebraska Water Center director Chittaranjan Ray.

Among the problems experienced in water management and planning for each of the state’s major river basins will be water supply, political structures, past management and development characteristics and other topics.

“The current state of water planning and management in each basin will be front-and-center in the discussions, along with



Panel discussions will be an important part of this year’s Nebraska water symposium in October.



This year’s water symposium and water law conference will be held at Nebraska Innovation Campus on Oct. 20 and 21.

unique and shared problem areas,” Ray said.

Basin panels will each consist of three to five members and have been organized to give a wide perspective of viewpoints. The panels will cover, Upper Platte, Lower Platte, Republican, Blue and Niobrara basins.

Invited panelists include:

Upper Platte: John Berge, North Platte NRD; Dennis Strauch, Pathfinder Irrigation District; and Aaron Thompson, U.S. Bureau of Reclamation, McCook.

Lower Platte: John Miyoshi, Lower Platte North NRD; Mace Hack, Nebraska Game and Parks Commission; Meagan Sittler, Lower Platte River Corridor Alliance; Don Kraus, The Central Nebraska Public Power and Irrigation District; and Jerry Kenny, Platte River Recovery Implementation Program.

Republican: Brad Edgerton, Frenchman-Cambridge Irrigation District; Mike Clement, Lower Republican NRD; and Tom Carlson, former state senator.

Blue: Dave Eigenberg Upper Big Blue NRD; Marty Link, Nebraska Department of Environmental Quality; Mike Onnen, Lower Big Blue NRD; and LeRoy Sievers, Nebraska Department of Natural Resources.

Niobrara: Pat O’Brien, Middle Niobrara NRD; Tim McCoy, Nebraska Game and Parks Commission; Steve Thede, National Park Service; and Warren Arganbright, attorney.

Bob Swanson, director of the U.S. Geological Survey’s Nebraska Water Sciences Center will conclude morning discussions with an update on USGS research work in Nebraska.

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Nebraska
Water Center

Daugherty Water for Food Global Institute



Summer Travel, Collaboration, Grants and International Students

From the Director
Chittaranjan Ray, Ph.D., P.E.

Earlier this spring, I attended a three-day workshop in Nebraska City on sustainability of agroecosystems in the context of food, energy, and water that was organized by the UNL Office of Research and Economic Development. About 30 faculty members across several NU campuses attended and three groups decided to form proposals. I am in one of the larger proposal groups that is headed by UNL's Derrel Martin of Biological Systems Engineering. The proposal was submitted to ORED the end of May. One of the best outcomes of this workshop was the chance to develop closer working relationships with local colleagues.

I am pleased to let you know that we have filled the new, joint Research and Extension Communication Specialist staff hire. For the past two years, Ben Beckman has been an extension assistant in the University of Nebraska-Lincoln's Pesticide Safety Education Program, which provides educational programs and materials on safe use of pesticides for extension educators statewide that work with applicators who are applying for state pesticide use licenses. At one time in the not too distant past, this program was called "Environmental Programs" and due to its direct and indirect influence on groundwater quality, was part of the Nebraska Water Center. The position is being shared between NWC, the Daugherty Water for Food Global Institute and Nebraska Extension and is housed within NWC. Review committee members were Rachael Herpel, WFI (chair); Steve Ress, NWC; and Wayne Moore, Nebraska Extension. Beginning later this summer and into the fall, Ben will be doing a good deal of in-state travel, getting to know our constituents and collaborators.

In May and June it seemed as though I was continually getting on and off commercial airliners: In May I was in West Palm Beach, Florida attending the Environmental and Water Resources Institute meeting of ASCE, where I received an award and presented a short course and then I was on the East Coast again in early June, visiting the National Science Foundation, U.S. Environmental Protection Agency and others in pursuit of potential funding and partnership opportunities. From there, I flew to Prague, Czech Republic to start the student IRES program funded by NSF and then home to attend the annual water and natural resources tour in Colorado and visits with colleagues at the U.S. Bureau of Reclamation office in Denver.

I thought we had a very successful, educational and entertaining June tour to the South Platte and Colorado River basins in Colorado. More than 50 participated, which left very few open seats for the three-day tour that explored surface and groundwater issues and interstate compact issues on the South Platte along with urban, industrial and recreational water development on Colorado's front range. All of these issues ultimately effect South Platte flows into Nebraska. We were extremely pleased to have a near record number of current and past Water Leader Academy

students among our diverse group, as well as a record number of partners and co-sponsors. These included NWC, WFI, Central Nebraska Public Power and Irrigation District, Nebraska Public Power District, UNL's Institute of Agriculture and Natural Resources, Lower Platte North NRD, LI-COR Biosciences and the Nebraska Water Balance Alliance. We have just begun planning for the 2017 tour and will have more to share on that in the next issue of the Water Current. For the first time in more than 30 years, the tour will be without the planning and guiding expertise of retired UNL faculty member Mike Jess. Obviously, Mike can't be replaced, but we are working on getting young staff involved in the tours, which will certainly yield more than acceptable substitutions. We hated to see Mike retire from the tour, but at the same time, we need to think ahead and get younger people involved in this long-standing tradition.

At the end of July, I was back in Prague to finish the 8-week IRES program for which I left four students with my Czech colleagues to conduct their research on flow processes in the vadose zone. They used both laboratory and field-scale experiments to understand flow behavior in soils. In the first week, after a crash course on flow in unsaturated soils they attended a conference at Decin, Czech Republic organized by the colleagues of Faculty of Nuclear Sciences of Czech Technical University for their graduate students. They had the opportunity to mingle with Czech graduate students and our four students presented their research plans to Czech students and colleagues. In subsequent weeks they conducted laboratory experiments to measure saturated and unsaturated hydraulic conductivity. They traveled with colleagues at CTU to their experimental sites in the Jijira Mountains and retrieved several undisturbed soil cores and took the cores to a laboratory in Brno, Czech Republic to scan it for cracks, fractures, and macropores using a high-resolution CT scanner. They also learned image analysis software on how to determine the pore volume, dimensions, and other features in the scanned CT image. They learned how to use a double-porosity model developed by the Czech colleagues to simulate how these large pores contribute to faster infiltration in the soil. On the seventh week, they again traveled to the Sumava Mountains to work with the Czech colleagues to conduct single-ring infiltration tests at 36 locations on a hill-slope. The final week, when I was present was for their reporting, final presentation, and program evaluation. The students will be presenting a poster of their work at our Annual Symposium in October.

That symposium, and the annual Water Law Conference, will be held at Nebraska Innovation Campus, Oct. 20 and 21. The Oct. 20th symposium will key on panel discussions centered on the challenges faced by Nebraska's major river basins, titled "Managing an Essential Resource...Basin by Basin." The following day's water conference, being organized by faculty at the NU College of Law, will focus on current Nebraska water law for practicing attorneys and water professionals.

Nebraska Water Sciences Laboratory Director Daniel D. Snow and I have selected Auburn and Nebraska City as the sites for our U.S. Environmental Protection Agency project on riverbank filtration. Several sets of samples have already been collected from the Auburn area and Nebraska City since May and the work will continue for two years.

The NWC submitted two proposals to the Nebraska Department of Environmental Quality and Hawaii Department of Agriculture, totaling \$124,300. During the same period, NWC was notified of the approval of three proposals awarded by the Nebraska Environmental Trust (2) and U. S. Department of Agriculture Multi-State Hatch Fund totaling \$941,103.

The NWC is currently working with partners at Pennsylvania State University (lead), USDA Agricultural Research Service, and the University of Maine to develop a CAP grant proposal that was submitted to the USDA Water for Agriculture Challenge Area in August. This project will evaluate the human dimensions of behavioral science, communication, and extension work; examine the institutional dimensions of water resource management work,

including law, regulations, and policies; and identify optimal, biophysical science-based solutions that meet stakeholder consensus.

I also submitted a pre-proposal on food, energy, and water nexus to ORED for the National Science Foundation - National Research Traineeship opportunity in June. Each university is allowed to submit three pre-proposal to the program. I was one of three PIs selected to submit pre-proposals to NSF. This project will develop an integrated framework for food production and energy conservation within the context of water availability for irrigation, and minimization of groundwater level changes and stream flow depletion. The project will support graduate student research and training in STEM disciplines that closely link with food, energy and water research. Students from social science disciplines will be recruited to participate in the program, to examine barriers to implementing energy and water saving technologies. Policymakers at local, state and federal levels will be able to use the results to balance long-term agricultural productivity and economic growth objectives with environmental concerns. The pre-proposals are due to NSF in December 2016 and if NSF selects our proposal, we will have to rush to put a full proposal by February 2017.

Visiting researchers begin series of networking lunches

On July 20, WFI hosted the first in a series of “Lunch and Learn” events for participants in the inaugural Water Advanced Research and Innovation Fellowship Program at Nebraska Innovation Campus. The WARI program is a partnership between WFI, UNL, the Indian government’s Department of Science and Technology and the Indo-U.S. Science and Technology Forum. The events give WARI scholars an opportunity to share ideas and learn more about their research in India and at UNL.

WARI Fellow Manish Kumar (pictured below, center) presented his research. At UNL, Kumar is being mentored by WFI Faculty Fellows Yusong Li and Pat Shea.



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Student intern and blogger Jasmine Mausbach in the pilothouse of the Snowstorm Placer mining dredge near Fairplay, Colo.

45th annual water and natural resources tour Visits Platte and Colorado River basins in Colorado

Jasmine Mausbach

Editor's Note: The 2016 water and natural resources tour, co-hosted by the Nebraska Water Center and The Central Nebraska Public Power and Irrigation District, was June 14-16 in Colorado's central Front Range area and into the interior of the Rocky Mountains. The annual tour examines local and regional water issues, including agricultural water use, water management, water quality and environmental impacts.

A nine-hour drive to Denver, Colo. on two-lane blacktop is how my journey began for this summer's three-day annual water and natural resources tour. Although the drive through central and western Nebraska was interesting to say the least, it paled in comparison to the Rockies of Colorado. Our first stop on the tour took us to the base of those fabled mountains, to the Kassler Center in Littleton, Colo. There, Matt Bond from the Denver Water Board spoke about municipal water for the Denver area. Most of the water used in Denver, Bond said, comes from the western side of the Rockies, which creates a rift between the "Front Range" and "West Slope." Denver's water use has also put a

strain on relations between Colorado and Nebraska concerning flows in the South Platte River. With a population growing by about 18,000 people per year, Denver is using more and more water each year, which means less water is making its way down the South Platte to Nebraska. Recently though, Denver has worked to reduce its consumptive water use through concerted efforts at conservation and efficiency, despite issues facing Denver water supply. Despite growth, climate change and a diminishing Colorado River are other such issues.

That same day, Nicole Seltzer and Sean Cronin from Colorado Water Education Foundation and St. Vrain and Left Hand Water Conservancy District respectively, spoke to the tour while we enjoyed lunch at the former state capitol building, which is now Old Capitol Grill in Golden, Colo. The highlight of the day ended with a tour of the Miller Coors Brewery in Golden, Colo., where I learned about the use of water in brewing beer.

The following day began with a bus ride to the Rocky Mountain Research Station

in the U.S. Department of Agriculture's Fraser Experimental Forest. Chuck Roades, a research biochemist for the U.S. Forest Service, spoke about the impact the native mountain pine beetle outbreak has had on the health of the forests in the area. In 2008, an infestation of mountain pine beetles occurred across several forested areas in the Rocky Mountain range, decimating almost 90 percent of all lodgepole pines in Colorado, many of which are still standing. The Rocky Mountain Research Station has been conducting experiments that study the impact the beetle infestation on lodgepole pines has had on the overall watershed of the area. They have found that with the dead trees still standing and with a lack of foliage, water seepage, mainly from snowmelt, into the watershed has increased, which in itself is good news. More seepage into the watershed translates to less water loss from evapotranspiration and more water for multi-purpose uses for Colorado. It also means potentially more water flowing into the South Platte that flows into Nebraska, which can be utilized by Nebraska producers to irrigate crops or replenish surface and groundwater supplies.

The last stop of the day involved whitewater rafting down Class 4 rapids on Clear Creek at Liquid Descent Whitewater Rafting Co. near Idaho Springs. There are only six classes of rapids, with Class

Grant supports development of water in society undergraduate course

Cory Forbes

A three-year, \$299,018 Improving Undergraduate STEM Education (IUSE) grant aims to foster undergraduate students' science learning and water literacy at the University of Nebraska–Lincoln.

The funding will support the development of a new “Water in Society” undergraduate course. Water in Society will be an interdisciplinary course, drawing from the fields of science, technology, engineering, and mathematics (STEM) education, hydrological sciences and social and decision sciences.

“This course will be an introduction to hydrology, but will also foster the teaching of science through big issues, such as water for agriculture,” said Cory Forbes, associate professor and science literacy coordinator at UNL and project leader of the grant.

Forbes is working on integrating this course into general education curriculum for students across all UNL campuses. It will be a required course as part of the new Food, Energy and Water in Society minor offered through the UNL College of Agricultural Sciences and Natural Resources. The minor is designed to prepare all students, regardless of major, to make informed decisions regarding

current and emerging food, energy, and water issues, and the interrelatedness of agriculture, natural resources and society.

“Our hope is that all UNL students, whether they’re studying to be a scientist, teacher or lawyer will have the background to make educated decisions when it comes to their food, and the Water in Society course can support that goal,” said Forbes.

The new course also aligns with the mission of the UNL Institute of Agriculture and Natural Resources Science Literacy Initiative which was formed to foster a scientifically-literate society capable of making effective decisions grounded in STEM-informed analysis of complex, real-world challenges associated with food, fuel, water, landscape and people issues.

In addition to Forbes, Nicholas Brozovic, director of policy at the Water for Food Global Institute, and Trenton Franz, assistant professor in the UNL School of Natural Resources are also working on the project.

Water in Society will be offered to all UNL students in the spring of 2017.

6 rapids equivalent to those of Niagara Falls. It was by far the most life threatening stop of the tour, but I am happy to report that no one fell overboard and due to our hospitableness, employees at Liquid Descent were left with a very good impression of we flatlanders from Nebraska.

On the last day of the tour, the day began bright and early with breakfast presentations by Ray Weller and Rick Cables from Vail Resorts, Inc. Weller educated the group about the snow-making process at Breckenridge Ski Resort and how they use water from the Blue River to make snow. Cables talked about the environmental mitigation activities with the U.S. Forest Service and how it related to water usage within and around Breckenridge. After breakfast, the next stop allowed the group to inspect a massive and historic gold/silver-mining dredge near Fairplay, Colo. Joanna Hopkins from Maryland Creek Ranch, who owns the 483-ton, 75-year-old dredge, spoke about its history and how water was used to clean thousands of tons of material that was run through the dredge in search of the

gold and silver found in the area.

Traveling back east, over the Continental Divide, the group was treated to lunch at Kenosha Steakhouse in Breckenridge where Troy Wineland, Water Commissioner for the Blue River Watershed, talked about water rights conversions and transfers in the Blue River watershed. The final stop of the tour brought the group to a dredge-mining reclamation site adjacent to Swan River, where we learned about the work being done to restore the native stream that once flowed through the land before the dredge-mining industry covered up the stream with waste material.

Lastly, I want to give special recognition to the following groups: Nebraska Water Center; the University of Nebraska–Lincoln’s Institute of Agriculture and Natural Resources; The Central Nebraska Public Power and Irrigation District; Nebraska Public Power District; Robert B. Daugherty Water for Food Global Institute; Lower Platte North Natural Resources District; LI-COR Biosciences; and Nebraska Water Balance Alliance (NEWBA). Without these sponsors

and their contributions, this year’s tour wouldn’t have been possible, and I wouldn’t have had the opportunity to experience Colorado water at such an in-depth scale.

The Nebraska Water Center and The Central Nebraska Public Power and Irrigation District co-sponsor water and natural resources tours annually, in and outside of Nebraska. Keep updated by following them at watercenter.unl.edu.

This year’s tour sponsors included UNL’s Institute of Agriculture and Natural Resources, LI-COR Biosciences, Lower Platte North Natural Resources District, Nebraska Public Power District, Nebraska Water Balance Alliance, and the NU Robert B. Daugherty Water for Food Global Institute.

Jasmine Mausbach is an undergraduate student pursuing bachelor’s degrees in environmental restoration and Spanish at UNL. <http://waterforfood.nebraska.edu/blog/2015/02/18/jasmine-mausbach/>

Szilagyi's research utilized in Tibetan Plateau study Featured in Journal of Hydrology

Shawna Richter Ryerson

For 19 years, Joe Szilagyi, research hydrologist with Conservation and Survey Division at the School of Natural Resources, has concentrated on evapotranspiration estimation techniques that require only minimal and widely available atmospheric or remote sensing data.

Those techniques were utilized in a new study on the expansion of lakes in the Tibetan Plateau by lead author Ning Ma, of the Institute of Tibetan Plateau Research at the Chinese Academy of Sciences, Szilagyi and four others in the June issue of the Journal of Hydrology and on the website glacierhub.org.

"This particular version of the ET estimation methods I work on developing and improving has been in existence for around 30 years and requires no wind data, which is very attractive in data scarce regions, such as the Tibetan Plateau," Szilagyi said.

This ET method, complementary relationship of evaporation, can be used over large areas, such as large river basins, states and continents, Szilagyi said, and it was used in the study that examined the Nam Co Lake in the northern section of the vast, mountainous plateau in southwestern China. The lake is the second largest one on the plateau that is home to more than a thousand, but it's one with a closed basin, meaning any water loss that occurs only occurs through evaporation.

"Evaporation variability of Nam Co Lake in the Tibetan Plateau and its role in recent rapid lake expansion" notes that this lake, like many others on the plateau, has been expanding since the 1990s. The researchers wanted to know why.

"The study suggests that the ability to more accurately model the rates of evaporation without wind speed data is key to counterbalancing the lack of meteorological observations in this area," Christina Langone wrote for Glacier Hub. "Further, the need to examine the lake over decades can best be addressed by models, granted the lack of data from the weather stations in the region. Accurate models may be able to help those in the region better understand lake expansion."

That means Szilagyi's research and evapotranspiration techniques could be utilized for years to come.

Read the Journal article here: <http://www.sciencedirect.com/science/article/pii/S0022169416301354>

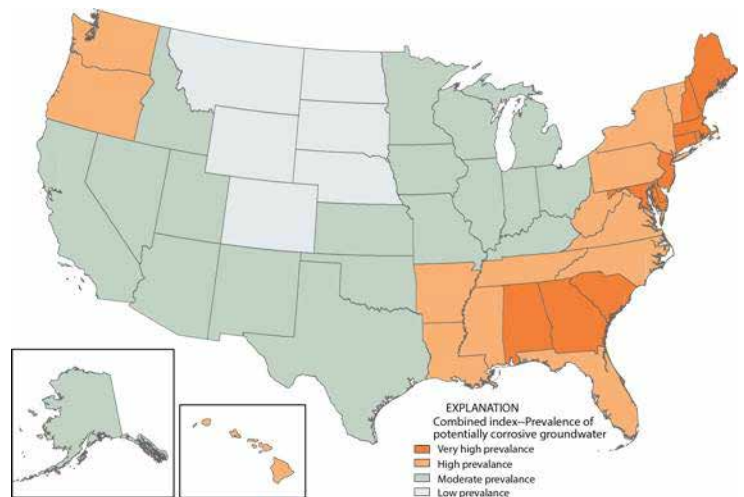
Read the Glacier Hub article here: <http://glacierhub.org/2016/05/04/slower-evaporation-rate-spurs-tibetan-lake-growth/>

Study shows high potential for corrosive groundwater in half of U.S. states

A recent U.S. Geological Survey assessment of more than 20,000 wells nationwide indicates that groundwater found in 25 states and the District of Columbia has a high potential for being naturally corrosive.

The findings have the greatest implications for homeowners with private drinking water systems. Naturally corrosive water is not dangerous to consume by itself. Nevertheless, it can cause health-related problems by reacting with pipes and plumbing fixtures in homes. If plumbing materials contain lead or copper, these metals may be leached into the water supply by corrosive water. Signs of corrosive water causing leaching of metals may include bluish-green stains in sinks, metallic taste to water, and small leaks in plumbing fixtures.

Two indicators were used to assess the potential corrosivity of groundwater. The first index is the Langelier Saturation Index,



an indicator of whether mineral scale may form on the inside of pipes and prevent the release of lead to drinking water. The second indicator, the chloride-to-sulfate ratio, measures the potential of source water to promote the release of lead in pipes through galvanic corrosion.

These two indicators were combined into one indicator to assess the prevalence of potentially corrosive groundwater nationwide.



Beckman joins NWC staff as communications specialist

Ben Beckman

University of Nebraska-Lincoln (UNL) extension assistant Ben Beckman has joined the staff of the Nebraska Water Center (NWC) as a research and communications specialist who will work as a liaison between UNL and constituent groups on water and environmental issues of mutual interest.

“Ben’s hiring will add new capabilities for the NWC and Nebraska Extension and the University of Nebraska’s Robert B. Daugherty Water for Food Global Institute (WFI) to interact with a wide range of constituencies that will include all of the state’s Natural Resource Districts and state and federal agencies, among others,” said NWC director Chittaranjan Ray.

The position is being jointly shared and funded by NWC, WFI and Nebraska Extension, Ray said.

“The goal was to find someone we could dedicate to understanding and carrying the messages of the important research, extension and outreach work these three entities do to our constituents and work with them to help determine what their needs might be and how we can work together to solve them,” he said.

For the past two years, Beckman has been an extension assistant in UNL’s Pesticide Safety Education Program, which provides educational programs and materials on safe use of

pesticides for extension educators working with applicators who are applying for state pesticide use licenses. At one time, the program was called “Environmental programs” and was part of the NWC.

Beckman earned a B.S. in Grassland Ecology and Management and an M.S. in Agronomy, both from UNL. He is a former state officer in the National FFA Organization, formerly Future Farmers of America (FFA).

“I’m excited to start this new position and to be working in collaboration with the NWC, WFI and Nebraska Extension and to begin reaching out and communicating with water managers across the state,” Beckman said.

He grew up on a family farm near Elgin where he was heavily involved in both 4-H and FFA.

“Both programs helped me develop an appreciation for natural resource management,” he said. “Since becoming part of Nebraska Extension, that appreciation extended to the production of training materials for pesticide applicators to receive their licenses and interacting with extension educators to provide those trainings.”

Beckman joined NWC staff Aug. 1.



Water for Food

ROBERT B. DAUGHERTY INSTITUTE

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June 14-16 Water and Natural Resources Tour visits Platte and Colorado river basins in Colorado



First stop on the tour: Denver Water Board facilities.



Breckenridge, Colo.



Rick Cables of Vail Resorts talks about mitigation activities with the U.S. Forest Service.



Sean Cronin of the St. Verain and Left Hand Water Conservancy District in Longmont, Colo.



Steve Snyder of Denver Water talks about expansion, conservation and efficiency.



The 75-year-old, 483-ton Snowstorm Placer gold dredge dwarfs Richard Young.



Though 75 years old and one of the few of its kind still existing, the Snowstorm Placer gold dredge, near Fairplay, Colo., only operated for a total of 16 months, helping extract 12,400 ounces of gold.



Tour group learns about a dredge mining reclamation site adjacent to the Swan River.

June 14-16 Water and Natural Resources Tour visits Platte and Colorado river basins in Colorado



The tour group hikes off to a reclamation site in the beautiful Rocky Mountains.



Joanna Hopkins explains the workings of the Snowstorm Placer dredge.



Mike Jess (right) guided his final water and natural resources tour this summer. Here he is joined by his wife Carol and son Adam.



A morning ritual: Getting bags, and people, on the tour bus.



Helen and Dale Miller of Parker, Colo., take-in the scenery at a mining site near the Continental Divide.



The South Platte River, looking a bit different than it does in Nebraska.



Amy Fosler and Jasmine Mausbach suit-up for rafting Clear Creek, near Idaho Falls, Colo.



Ready for rafting Clear Creek, complete with helmets and wet suits.

June 14-16 Water and Natural Resources Tour visits Platte and Colorado river basins in Colorado



Always time for a high-country selfie.



Signs in Colorado aren't always what you see in Nebraska.



Discussions on Denver water supply on the Strontia Springs Dam spillway.



Taking notes: Tyler Cavalli of KRVN radio.



Effects of the Pine Wilt Beetle at the Rocky Mountain Research Station, USDA Fraser Experiment Forest, near Fraser, Colo.



Ray Weller of Vail Resorts talks snow-making.

October symposium panels

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Afternoon panel discussions will key on the work being done by the Nebraska Department of Natural Resources from director Jeff Fassett and views from some of the state's largest utilities, including Joel Christensen of Metropolitan Utilities District and Steve Owen of Lincoln Water.

An integrated management plan panel discussion will be led by Christine Reed of the University of Nebraska, Omaha before a symposium wrap-up by Orton, of the Nebraska Well Drillers Association and Water Leaders Academy, and Ray.

Law Conference

The next day at Nebraska Innovation Campus, NWC and the University of Nebraska College of Law present the Nebraska Water Law Conference, featuring the latest in Nebraska water law for attorneys and water professionals (though open to all).

Organizer Anthony Schutz of the Law College opens the morning with sessions on Water Law 101 and updates in current water law, followed by attorneys Mike Klein and Justin Lavene on "Takings claims."

Attorney Don Blankenau then kicks off a conjunctive management session with a discussion of the western Nebraska N-CORPE project, followed by Upper Niobrara-White NRD manager Pat O'Brien on Niobrara transfers and Central Platte NRD manager Lyndon Vogt on short-term auctions in the Central Platte NRD.

Pre-lunch keynote speaker Roger Patterson will then talk about what California has learned from Nebraska as the Golden Gate state manages one of the worst long-term droughts in its history.

In the afternoon, Lincoln attorney Stephen Mossman and Drake University's Jerry Anderson will talk about landowner drainage liability followed by water quality discussions on Nebraska nitrates by Michael Linder and lessons from Flint, Michigan by Rick Kubat of Omaha's Metropolitan Utilities District. Attorney Lash Chaffin will explore the ethical dimensions of Flint, Michigan.

Other topics and speakers for inclusion in the day's events were being considered when this went to press.

Registration details have not yet been set. For the latest information on both of these coming events, go to watercenter.unl.edu.

Training Nebraska water leaders one class at a time

Steve Ress

Helping train a new generation of leaders and managers, armed with the knowledge to take-on Nebraska's increasingly complex water resources issues, is the goal of the Nebraska State Irrigation Association's (NSIA) successful Water Leaders Academy.

"Rapidly changing conditions of water resources in Nebraska demands knowledgeable and skilled leaders," said Mark Burbach, faculty leader of the University of Nebraska-Lincoln's School of Natural Resources and a coordinator of NSIA's Water Leaders Academy.

Recognizing this critical need for future leaders in water resources, NSIA organized the academy six years ago and established the Water Futures Partnership-Nebraska to support it. It also partnered with UNL to deliver sound program curriculum and recruited funding partners, such as Diamond Plastics Corporation, to sponsor the first Academy in 2011. The following year, the Nebraska Environmental Trust agreed to provide significant funding support for the academy and has since provided financial assistance to Academy programming.

NSIA, the oldest water association in Nebraska, is the academy's primary sponsor and has successfully recruited private funding support for it, including water related businesses and private citizens interested in sound water policy for Nebraska's future. It has also very successfully compiled annual academy classes that meet a specific goal of assembling participants from across Nebraska with a wide range of water resources interests.

The academy has built the leadership capacity of Nebraska's future water leaders by providing coordinated educational and developmental experiences, said Jason Orton, who oversees the academy for NSIA.

"These experiences are provided by experts from various disciplines in order to develop Nebraska's future water leaders, and cause lasting change in their leadership abilities, the academy employs a process-based curriculum with developmental experiences and opportunities to learn from these experiences," Orton said.

Since its inception, men and women from every corner of Nebraska have met in a yearlong program to learn the principles of first-rate leadership and about the vital role of Nebraska's rivers, streams and aquifers. The academy's mission, Orton said, is to provide learning opportunities that focus on cooperative approaches to solving the state's water issues.

The academy's specific objects are to:

- Identify men and women who have demonstrated leadership potential and who wish to enhance those skills in the water and natural resources arena.
- Develop scientific, social, and political knowledge about water and related natural resources.
- Provide training materials, professional presentations, and experiential learning activities that instill sound and accurate information about efficient, economic, and beneficial uses of Nebraska's water resources.
- Provide broad-based education activities that develop and enhance critical thinking and leadership skills.
- Encourage and assist participants toward active involvement in water-policy issues at all levels.
- Integrate multi-disciplinary educational and leadership programs to provide life-long leaders in water resources management.

- Challenge traditional paradigms about water resources and facilitate creative solutions to water-resources issues.

The Academy is structured around two tracks:

Leadership: University of Nebraska tenured professors and other experts share proven concepts and practical applications of leadership principals. The track is about conflict management, skills assessment, personal empowerment and motivation.

Resources: In Nebraska, it is hard to overstate the importance of water. We have abundant aquifers, but still there are disputes about how to use this precious resource. At each academy session, presenters explain the history of water compacts, decrees and regulations. Sessions focus on water policy, research and the economic value of our most important river basins. The goal is to gain a basic understanding of Nebraska's natural resources and water issues. This track includes classroom presentations as well as field trips at each session.

A float trip on the Niobrara, tours of water projects in the Panhandle and urban water projects in Omaha are only a sample of the hands-on experiences that the academy offers. Many academy members participate in the Nebraska Water Center's summer water and natural resources tour each year.

As part of a group, each participant is required to produce a final project about a natural resource related topic developed from their academy experience. The academy experience provides insights in working together, examining important issues and developing innovative approach to problem solving.

Sessions are held every two months for one year at various locations across the state. The sessions begin on Thursday morning and end the following afternoon.

Class members must:

- Commit to attend six, one and one-half day sessions.
- Provide their own transportation to sessions that take place across the state. All transportation, meals and accommodations that are part of the academy experience are covered by tuition.

NU agencies lead project to help MENA region respond to drought

Shawna Richter-Ryerson

The National Drought Mitigation Center at the University of Nebraska-Lincoln and the Robert B. Daugherty Water for Food Global Institute at the University of Nebraska are co-leading a \$4 million research effort with the Dubai-based International Center for Biosaline Agriculture. The project is designed to help the Middle East and North Africa region balance water consumption and increase agricultural productivity, with a focus on drought management.

The U.S. Agency for International Development is funding the MENA Regional Drought Management System project through March 2017, with \$1 million dollars designated for research activities conducted by the NDMC, Water for Food Institute and UNL's Center for Advanced Land Management Information Technologies.

The project has two major parts: improving drought-monitoring information and working with stakeholders across the water-scarce region to understand how this information can enhance decision-making, said Michael Hayes, NDMC director and principal investigator for the project.

"This project is a great opportunity for the University of Nebraska to capitalize on our strengths related to drought, water efficiency and remote sensing in the region," he said.

Researchers include a team of experts from the drought center; Brian Wardlow, CALMIT director; Christopher Neale, Water for Food director of research; and collaborators from the University of Maryland and the USDA Agricultural Research Service. Together they are developing composite drought indices for the region that countries may use to improve planning. Composite indices incorporate data collected from satellite remote sensors with data collected on the ground. Scientists at the International Center for Biosaline Agriculture are generating monthly maps.

"Our role is to produce the daily, satellite-based evapotranspiration product," Neale said.

With support from UNL's Holland Computing Center, Neale and the project's collaborators analyze the data and provide it to planners who use it to calculate the water balance within watersheds and estimate water productivity at field scales. Learning to predict crop yields based on field-level evapotranspiration and improve water productivity is an urgent need for agriculture in areas of the world that are chronically water-stressed.

Rachael McDonnell, head of the Climate Change Modeling and Adaptation Section at the International Center for Biosaline Agriculture, said, "The partnership between the University of Nebraska-Lincoln and ICBA is invaluable in bringing together international and MENA regional expertise to empower local decision makers to better manage droughts in these water-insecure countries."

While monitoring tools are being developed, the NDMC and International Center for Biosaline Agriculture are focused on helping governmental agencies and commodity groups better understand the water needs of the MENA region as well as its drought vulnerabilities. The agriculture research center has been conducting stakeholder needs assessments in each country. The findings will be presented at town hall-style forums planned for Tunisia, Morocco, Lebanon and Jordan from September through November. Insights gained from those meetings will help improve the effectiveness of tools developed during the project.

The project involves close collaboration with several United Nations activities and organizations, including the Food and Agriculture Organization.

The Middle East and North Africa region has the lowest level of renewable water resources per capita and the highest proportion of water withdrawals, compared with other major regions of the world.

Class size varies from 15 to 25 and the academy focuses on early to mid-career professionals in water resources management, production agriculture, law, media, agribusiness, fisheries and wildlife, education, recreation and environmental sciences

Eighty-six participants from across Nebraska will have completed the academy by the end of this year.

Burbach and Connie Reimers-Hild developed the academy's leadership component with contributions from other UNL faculty and staff. Nebraska water policy, law, and resource topics were addressed by leading experts in their respective fields from UNL; federal, state, and local agencies; NGOs; and other associations.

The academy starts taking applications on September 1 with an October 31 deadline each year. Applicants are notified of their acceptance by December 1 and classes begin in January of the following year. A limited number of need-based scholarships are available. For more information, go to <http://waterleadersacademy.org/>.



UNL experts offer advice on protecting ash trees

Justin Evertson

An adult emerald ash borer.

Experts from the Nebraska Forest Service, Backyard Farmer and Nebraska Extension are urging homeowners not to prematurely rush into treating their ash trees after the recent discovery of the invasive emerald ash borer in an Omaha park.

“The recommendation is not to treat trees until it’s known that the bug is within 15 miles of you,” said Justin Evertson, green infrastructure coordinator with the Nebraska Forest Service.

The Nebraska Department of Agriculture confirmed June 8 that the emerald ash borer, which attacks and kill all species of North American ash trees, was found during a site inspection in Pulaski Park in south Omaha. Nebraska is the 27th state to confirm the presence of the insect species, and the state’s taxpayers and homeowners are expected to spend more than \$961 million on ash tree removal, disposal and replacement.

The current treatment consideration zone extends from Fort Calhoun to Plattsmouth and from Gretna to east of Council Bluffs, Iowa. Treating outside of this zone will result in unnecessary exposure of the environment to pesticides, experts say. For anyone outside of the treatment zone, it’s important to take an inventory of ash trees and determine if it’s worth the cost of treatment.

Ash trees have an opposite leaf pattern, which means that leaves, buds and stems are located directly across from each other. Ash leaves are compound and typically consist of five to 10 leaflets. On average, ash trees grow to between 50 and 60 feet tall.

A variety of treatments are available for controlling emerald ash borer, including trunk injections and soil treatment. Professionally applied trunk injections involve pressure-injecting an insecticide into holes spaced around the lower trunk. All injection methods cause some internal damage to the tree. In general, the smaller the hole and amount of product injected, the less damage to the tree. Soil treatment is applied as a drench, by injection into the soil and as granules. Treatment is taken up by the roots and carried throughout the tree. Distribution in large trees may be uneven, resulting in inadequate control.

The cost of treatment can range from \$100 to \$200 per application, depending on the size of the tree. Each of the

treatment methods has advantages and disadvantages that should be discussed with a certified arborist.

While several factors come into play when deciding whether to treat a tree for emerald ash borers, the vast majority of ash trees are not worth treating, experts say. The best candidates are high-value, healthy trees properly sited in the landscape. If a homeowner in a treatment consideration zone wants to pursue treatment, it’s important to contact a certified arborist because he or she will have access to a wider range of products.

In addition, the yearly window of time that is recommended for treating an ash tree is closing. Soil treatments applied after mid-June will no longer be effective enough to control emerald ash borers this year. Also, trunk injections after mid-June will have quickly diminishing effectiveness the later they are applied because any tunneling by the insects will block the movement of the insecticide, and older emerald ash borer larvae in July and August are more difficult to kill. Instead of applying treatments in July and later, trees will see greater benefits if treated the next spring.

Experts remind homeowners that treatments are not a permanent solution and those outside of the treatment zone do not need to consider the option at this time.

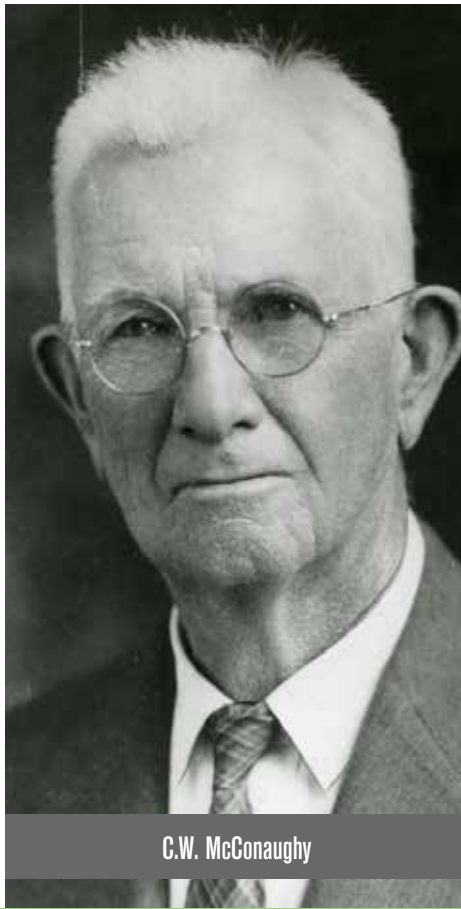
“Treatment will not save the tree forever; it only extends the time until the tree dies from either the treatments themselves or is overcome by EAB,” said Eric Berg, community forestry and sustainable landscape program leader with the Nebraska Forest Service.

The alternative is tree removal. Again, experts recommend contacting a certified arborist to examine the tree to determine whether it has emerald ash borers or another insect or disease problem. As trees are removed, they should be replaced with a diverse selection of trees to help avoid another significant loss of tree canopy when the next serious pest arrives, according to Evertson.

Many broadleaf trees are available as replacements for ash. More than 60 species of medium to large trees are adapted to eastern Nebraska, and at least 30 species can be grown successfully in the west. Experts encourage homeowners to visit their local city park or arboretum to see a variety of trees growing in the area. For more information, visit <http://eabne.info>.



George P. Kingsley



C.W. McConaughy

Kingsley and McConaughy, who were they?

The Central Nebraska Public Power and Irrigation District's (CNPPID) board of directors voted in July, 1937 to name the dam that would be completed in 1941 after George P. Kingsley, one of the original and most influential advocates for the irrigation project.

According to a Hastings Tribune article that announced the decision, "He piloted the movement through its most discouraging stages, never faltering in the face of almost unsurmountable obstacles and donating constantly to the funds which were required for its promotion.

"Countless trips to Washington and the state capital, meetings without number and unceasing labor with scientists,

technical persons, industrial leaders and others who had a part in shaping the project (and public opinion) ... were all part of Kingsley's contribution."

Kingsley died in 1929, long before others carried his dream to fruition, but his tireless efforts from 1913 until his death helped keep prospects for the project alive.

Charles W. McConaughy is credited with the idea that evolved into the "Tri-County Project."

In one of his first speeches (ca. 1914) to promote the irrigation project, McConaughy said:

"When I have stood and seen for weeks great volumes of water rolling down the Platte in the flood season ... and when I have seen the semi-arid lands in our counties suffering and thirsting for water during the crop-growing season, my heart has been set on fire with a vision. I have a vision of what Nebraska can be and ought to be if a combined effort (to build an irrigation project) were made by all of its citizens."

Although others before him had built canals to irrigate Nebraska lands, none were as ambitious, nor did they include large storage reservoirs (save for Pathfinder Dam in Wyoming, completed in 1909).

McConaughy's original idea closely followed this template. It wasn't until 1924 that plans to build reservoirs entered the picture. The plan called for two reservoirs on Plum Creek in Gosper County filled from a supply canal branching off the Platte River west of Brady.

Eventually, engineers recommended the present site of Kingsley Dam and - after original approval of the project - the site was affirmed by Central's board of directors.

McConaughy vehemently disagreed with the decision to build the dam on the North Platte River and resigned from the board on Dec. 7, 1935. "I take this action with a broken heart," he told his fellow directors.

Although he saw much of the project's construction, McConaughy died on April 13, 1941, a few months before dedication of Kingsley Dam and the reservoir that now bears his name.

(Editor's Note: Courtesy of the spring 2016 edition of "The Communicator" published by CNPPID).



Nate Nielsen, Kingsley Dam Foreman with Central Nebraska Public Power and Irrigation District, gives a tour atop the dam on Saturday, July 23 as part of 75th anniversary rededication activities.

Important and influential Kingsley Dam dedicated 75 years ago

The Great Depression was waning, America's entry into World War II was still to come and the country knew nothing about cell phones and personal computers let alone electricity on the farm in many parts of Nebraska.

Almost 30 years of hard work, disappointments, achievements and ultimately triumph, culminated on a hot summer day in 1941 when more than 2,000 people gathered to celebrate the completion and formal dedication of Kingsley Dam.

Construction of the dam began in March 1936, thanks to the tireless efforts of a core of people who were either among the founding fathers of the "Tri-County Project," or whose support and assistance directly led to the construction of the project. Men named Kingsley, McConaughy, Johnson, Norris, Canaday, Wallace, Aabel, Binderup, Shallenberger, Cochran, Mickey, Condra and many others refused to be deterred by obstacles and setbacks and were eventually

successful in building a project that, 75 years later, continues to benefit Nebraska.

On the afternoon of the dedication ceremonies — July 22, 1941 — the crowd consisted of many Keith County residents, but also included state and federal dignitaries, politicians and a large contingent from the media. The audience numbers were boosted by the occupants of two special trains that brought attendees from Omaha, Lincoln, Hastings and many other towns across the state.

A recorded message from President Franklin Roosevelt was delivered to the crowd and K. Sewell Wingfield, the chief of the Public Works Administration's Power Division, gave a stirring speech, including praise for Sen. George Norris. Sen. Norris, an ardent supporter of public power and the Tri-County Project, was unable to attend because of other commitments, but his personal intervention in Washington on behalf of the project were crucial to the eventual

approval of a federal grant and loan to build the massive hydro-irrigation project.

An article in the Keith County News read, "The enormity of the dam, which is the second largest earthen dam constructed in the world, is not realized fully even when the layman stands at the top of the hill to view the great structure. The earth material used to build the dam would form a train of loaded coal cars that would stretch from New York City almost to Hawaii."

Almost 1,100 people worked at the dam site during the peak construction period, many of whom resided at the construction camp, dubbed Georgetown for the many men named George who were designers, engineers or promoters of the project. Their labors produced one of the largest public works projects in Nebraska's history, a project that drew upon the initiative and foresight of those irrigation pioneers who saw a prosperous future for Nebraska in the development and beneficial use of the state's water resources.

The Keith County newspaper covered the event thoroughly; the enthusiastic and colorful prose reflected the excitement and optimism engendered by the new dam.

The reporter wrote:

“Kingsley Dam is officially, formally and perpetually dedicated. It is the first time in the history of Nebraska that 2,000 gathered in 100 degrees of heat to cast their blessings on a great pile of sand and gravel — which was once their bitterest enemy.

“For generations, the people of Nebraska have sworn a vengeance on the dirt and sand that filled the air, blotted out the sun and eventually laid itself over the fertile farm lands to choke vegetation to death.

“So, seven miles north of Ogallala Tuesday afternoon, a memorable event for Nebraska took place. On that hot summer day, people from every corner of Nebraska gathered to congratulate themselves. At last they had turned a terrible liability into a great asset. They had harnessed the sand and gravel that for all times past had wreaked havoc on the state of Nebraska.

“The people of Nebraska, through the intelligence of civil engineers and the benevolence of a federal government whose treasury has a seemingly bottomless pit, have made use of their enemy — dirt — to hold back the water that has been running away unused since time began. Keith County is serving as a fine reservoir to hold this once-wasted water.”

This summer The Central Nebraska Public Power and Irrigation District rededicated Kingsley Dam on the occasion of the 75th anniversary of its completion. A series of events and activities for the public and planned in cooperation with the Ogallala/Keith County Chamber of Commerce and the Keith County Visitors Bureau were held at Lake McConaughy July 22 and 23.

(Editor's Note: Courtesy of the spring 2016 edition of "The Communicator" published by CNPPID).



George E. Johnson, chief engineer for construction of Central Nebraska Public Power and Irrigation District's hydro-irrigation project, addresses the Kingsley Dam dedication audience on July 22, 1941 (CNPPID photo).



Crowds gather near the south end of Kingsley Dam on July 22, 1941 for the dam's dedication. The dam was closed and storage of water had begun, but work was still unfinished at dedication time, including work on Highway 61, which would run across the crest of the dam (CNPPID photo).



Jean Carter and Mary Menke, daughters of two of the engineers working on Kingsley Dam, cut a cable to send a time capsule into a casing buried within the dam. Originally intended to be opened on the dam's 100th anniversary, the capsule was located in the 1990's, but the casing had bowed and there was evidence that it had been damaged, leaving its future recovery questionable (CNPPID photo).

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Water for Food Global Institute welcomes new executive director

Peter McCornick

Peter McCornick, an internationally known expert in water, food and environmental research, begins work as the next executive director of the Robert B. Daugherty Water for Food Global Institute at the University of Nebraska on August 23.

McCornick most recently served as deputy director general for research at the International Water Management Institute in Colombo, Sri Lanka, one of the world's foremost institutions dedicated to improving management of water and land resources to ensure food security and reduce poverty. He succeeds Roberto Lenton, who became WFI's founding executive director in 2012 and is returning to his faculty role in the University of Nebraska-Lincoln's Department of Biological Systems Engineering.

"There is perhaps no more urgent challenge facing the world today than sustainably feeding the growing global

population," NU President Hank Bounds said. "The University of Nebraska, through our Water for Food Global Institute, is uniquely positioned to lead the way in developing solutions. We are fortunate to have attracted someone with Peter McCornick's reputation and expertise to the executive director position. His deep knowledge of water and agricultural development in global contexts and his strong leadership skills will accelerate the impact the institute is making toward ensuring water and food security in Nebraska and around the world."

In his role at IWMI, McCornick has already worked closely with WFI on research projects and events. He was instrumental in developing a memorandum of understanding between the two organizations that opened new opportunities for collaboration.

"I look forward to working with University of Nebraska leaders, faculty and staff, as well as its many partners in the U.S. and internationally, to advance the institute's achievements and impact," said McCornick.