WATER CURRENT

NEBRASKA WATER CENTER
PART OF THE DAUGHERTY WATER FOR FOOD GLOBAL INSTITUTE AT THE UNIVERSITY OF NEBRASKA

SPRING 2023

Core Research, News, and Events from the Nebraska Water Center

104B research site in Lincoln, Nebraska

Inside

And More!

From the Director

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

Director, Nebraska Water Center (NWC)

Dear Reader,

As spring makes its way across the state, I'm pleased to send our first Water Current of 2023 your way. After a busy end to 2022 we have quite a few things to share with you. From hosting events to supporting research, this newsletter is full of updates that I hope you find both informative and exciting.

With improved weather comes the opportunity to get out and meet with our stakeholders and partners once again. We're pleased to share that the Water Tour is returning this year. I invite you to join us and our Water Tour partner Central Nebraska Public Power and Irrigation District in northeast Nebraska from June 19 – 22 to experience first-hand the water management practices and water quality challenges unique to that region of the state. The Water Tour is also a great opportunity to build connections across the state and beyond.

The Water Tour provides the opportunity to experience water quality challenges in northeast Nebraska. As you may have seen in the news recently, water quality is of interest across Nebraska and beyond. NWC is proud to be involved in cutting edge research to address current water quality challenges while preparing for the future. You can learn more about our research efforts in water quality and more throughout this newsletter.

NWC and the Water Sciences Lab combined received over $3.5 million in grant funding in 2022. You may have seen that figure in our annual report, but it is so impactful I wanted to highlight it again. These funds involve several faculty across the UNL, UNO, and UNK campuses and reflect the expertise found in our researchers and the unique capabilities of our lab. I am excited to continue leveraging these funds in order to produce high quality research that addresses significant water issues in Nebraska and beyond.

With the new season, I'm looking forward to the opportunity to enjoy Lincoln's trails once again. I am glad the good weather will also provide opportunities for us to connect, and I look forward to seeing many of you at our Water Tour this June.

Chittaranjan Ray

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

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

Cover Photo Credit
Aaron Mittelstet

Editor
Ann Briggs
Editorial Assistants: Patricia Liedle and Crystal Powers

Designer
Stephanie Severin

Nebraska Water Center
Daugherty Water for Food Global Institute at the University of Nebraska
2021 Transformation Drive, Suite 3220
P.O. Box 886204
Lincoln, NE 68588-6204
Phone: (402) 472-3305
e-mail: waterinfo@unl.edu

NebrWaterCenter
NebraskaWaterCenter
watercenter.unl.edu

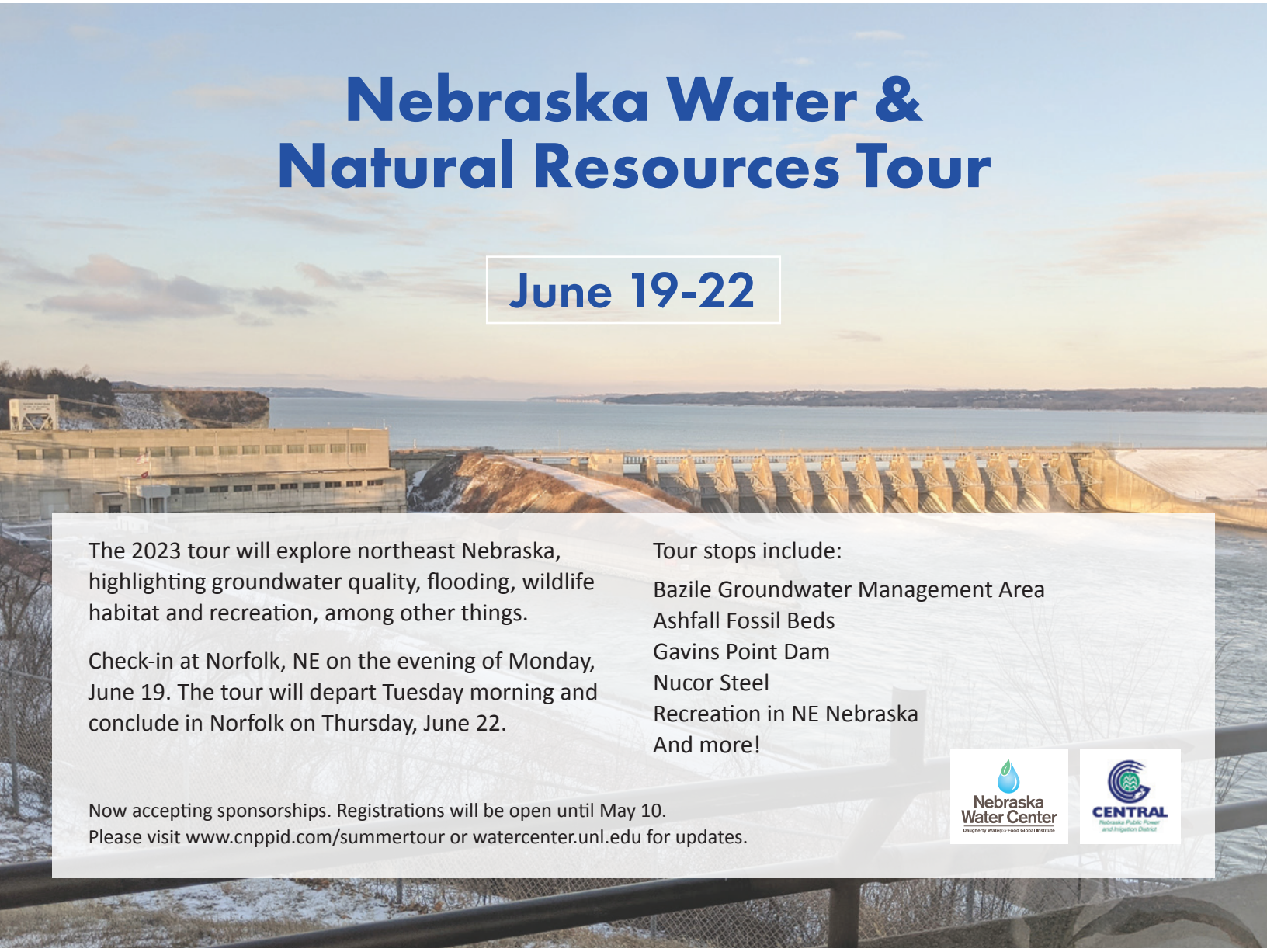
Water Tour Returns This Summer

The Nebraska Water Center will hold their annual Water Tour again this summer. From Monday, June 19, to Thursday, June 22, attendees will explore Northeast Nebraska and gain first-hand experience with the water management practices and water quality challenges of that region of the state. Tour stops include the Norfolk Riverfront development, the Bazile Groundwater Management Area, Gavins Point Dam, Ashfall Fossil Beds and much more.

The Water Tour was first held in 1975. The tours are designed to enhance understanding and appreciation for water management in Nebraska and beyond, providing a first-hand educational experience for anyone interested in natural resource management.

The 2023 Water Tour is being hosted by the Nebraska Water Center and the Central Nebraska Public Power and Irrigation District.

To see the full schedule and register for the Water Tour, visit *https://watercenter.unl.edu/water-tour*.



Water Sciences Lab Continues to Build International Partnerships

The Water Sciences Lab, part of the Nebraska Water Center and the Daugherty Water for Food Global Institute and located on UNL's East Campus, is continuing to build international partnerships with universities and researchers around the world. As a leading expert in water quality research, method development, and more, the Water Sciences Lab works with international partners to share their methods and improve water quality research around the world.

In recent years, the Lab has been creating and strengthening partnerships in Central Asia, Portugal, and Brazil specifically.

Dual Degree Program is Being Developed with a Portuguese University

The University of Nebraska–Lincoln (UNL) is in the process of developing a dual degree program with the Polytechnic Institute of Bragança (IPB) in Bragança, Portugal. Led by Dan Snow and Shannon Bartelt-Hunt from UNL and Helder Gomes from IPB, the degree program will advance environmental science and engineering programs at both institutions. It will provide avenues for graduate students in Portugal and Nebraska to conduct research and spend a portion of their academic program in another country learning about water quality and ways engineering can help solve difficult water problems. Helder Gomes's expertise in chemical engineering to solve environmental problems through recycling waste materials in water treatment fits nicely with Dan Snow's expertise in analytical chemistry and Shannon Bartelt-Hunt's expertise in studying the fate and transport of environmental contaminants. UNL and IPB have recently signed a memorandum of understanding to formalize their plan to establish the dual master's degree and research exchange program. A pilot research project, involving testing and treatment of wastewater in northern Portugal, is funded by the Luso-American Development Foundation (FLAD).

Dan Snow met Helder Gomes through Marjan Kalmakhanova, a young faculty member at M. Kh. Dulaty University in Taraz, Kazakhstan during an American Councils for International Education (ACIE) workshop. Marjan completed her Ph.D. under the supervision of Helder Gomes and assisted with organizing the workshop. She and Dan Snow collaborated with faculty at Al Farabi Kazakh National University on a second ACIE workshop grant expanding environmental science graduate degree programs in Central Asia. They also wrote a successful grant application with Helder now supported by the Kazakh Ministry for Education and Science to study novel treatment methods for pharmaceuticals occurring in municipal wastewater. The project includes Arindam Malakar, a new research assistant professor at the University of Nebraska who brings extensive expertise in nanomaterials and water chemistry. The samples for these multi-country projects are all analyzed at the University of Nebraska Water Sciences Laboratory.

Visiting Scholars from Brazil Focus on Insecticides and Wastewater

Dr. Cristale

Dr. Falcao Dantas

Two visiting scholars joined the Water Sciences Lab this spring and will stay through Spring of 2024.

Dr. Joyce Cristale, a researcher at the Center for Nuclear Energy in Agriculture in the University of Sao Paulo, Brazil will be housed at the Water Sciences Lab during her time at UNL. Her research will focus on developing methods for analyzing insecticide metabolites in wastewater, which fits in well with the Lab's AltEn Bioenergy and other environmental monitoring studies with Shannon Bartelt-Hunt and the University of Nebraska Medical Center.

Dr. Renato Falcao Dantas, a dean and Associate Professor at the School of Technology in the University of Campinas, Brazil, will be housed in the Civil and Environmental Engineering Department. His research focuses on treatment technologies for emerging contaminants, insecticides, and pharmaceuticals in wastewater.

The researcher's visits are funded through the United States Fulbright Brazil Commission, the São Paulo Research Foundation, and initiated through the SPRINT program aiming to implement scientific and technological cooperation between researchers from the University of Nebraska–Lincoln and Sao Paulo, Brazil administered through the Institute of Agriculture and Natural Resources. The purpose of this program is to promote exchanges between Brazilian scientists and University of Nebraska faculty and create new research collaborations. The Water Sciences Lab is a natural fit to collaborate with Dr. Cristale and Dr. Falcao Dantas. The lab has the capabilities to very accurately measure the contaminants both researchers are focused on, so it's a good partnership for both the visiting scholars and the lab.

Water Sciences Lab Collaborates with Central Asian Institutes to Improve Water Quality Research

Since 2013, faculty and researchers from the University of Nebraska system have collaborated with faculty and students in Central Asian institutes to improve water quality research across the globe. In the past ten years 10 grants have been awarded, 6 student trainings have been held, 5 journal articles have been published, and 6 presentations have been held at national conferences highlighting this work. The purpose of this effort is to share the University of Nebraska's knowledge and expertise in water quality research with a region that has limited resources and important water quality issues to address.

Why collaborate with Central Asia on water quality research?

Central Asian countries face similar water resources issues as the northern Great Plains, including Nebraska. There are many similarities between Nebraska and parts of Central Asia such as Kazakhstan.

Water Sciences Lab Director Dan Snow has been leading these collaborations from the beginning. What started as sharing a few publications back and forth with a researcher at Al-Farabi Kazakh National University in Almaty, Kazakhstan who has similar research interested quickly turned into workshops, field research, and collaborations on publications.

"It's amazing how similar the landscape is to Nebraska and the Great Plains, and how similar the people are." Dan Snow shared. "I feel a close connection there with their environment and with their desire to make the environment better."

Both landlocked regions have a history of intensive agricultural production and face similar challenges in water supply, drought, and contamination. Both regions face enormous and complex water quality issues arising from numerous, virtually invisible non-point-sources that enter the waterways across wide geographies that can dramatically vary over time. Furthermore, in both landscapes, people and agriculture depend on highly stressed surface waters despite uncertain futures for those resources.

As the economy improves in Kazakhstan and surrounding countries, investments are being made to build capacity not only in agricultural production, but also in science and engineering research. Water research is high on that list of priorities, given uneven distribution of water resources, a history of contamination from nuclear testing and agriculture, and complications from transboundary water use.

Dan Snow shared his thoughts on why these collaborations have been so successful. "It seems like every time I go back to Central Asia, we meet new people and make connections with people who want to learn about what we're doing here in Nebraska and apply those methods and those tools and the understanding of agriculture and impacts and the value of water in Kazakhstan and other countries in Central Asia. We've held several workshops funded through the American Councils for International Education and after those workshops we have created many connections not only with Kazakhstan, but with Kyrgyzstan, Uzbekistan, and Tajikistan. It seems that almost all the former Soviet Union countries are really wanting to learn about water and the ways they can better manage water in semi-arid climates like Nebraska."

Learn more at » **centralasiawater.unl.edu**

How the University of Nebraska can help

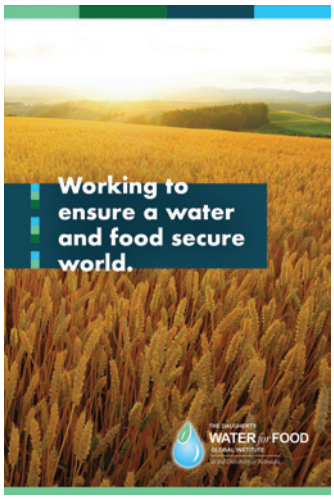
The University of Nebraska system is well poised to train Central Asian researchers to tackle these water quality issues. The Water Sciences Lab has been leading the way in cutting-edge research methodology for improving our understanding of a variety of water quality concerns. Specific methodologies of interest to collaborations with Central Asian institutes include trace level detection of neonicotinoids and other pesticides, uranium contamination from geogenic sources, measurement of pharmaceuticals in reused municipal wastewater, and development of novel wastewater treatment technologies for developing countries.

Learn more about Dan Snow, the Water Sciences Lab, and their international collaborations in the March episode of the Daugherty Water for Food Podcast.

Marjan Kalmakhanova (left center) and Dan Snow (center) help facilitate water quality workshops at Al-Farabi Kazakh National University in Almaty, Kazakstan.

University of Nebraska faculty conducted a joint research project at Lake Balkyldak in Kazakhstan.

Annual Report Highlights DWFI's Progress Toward Food and Water Security



Over the past year, the Daugherty Water for Food Global Institute at the University of Nebraska has made great progress in finding ways to grow more food with less pressure on water resources. Its work has been focused in the areas of research innovation, entrepreneurship, student involvement, faculty development and knowledge-sharing. The institute took advantage of more opportunities for in-person connection this year and offers a glimpse of its significant movement forward in its annual report for fiscal year 2021-2022.

A few of the highlights include:

- The publication of a new report analyzing various business ecosystems for smallholder irrigation in Rwanda — what works, what doesn't and what more is needed to support young entrepreneurs and farmers.
- Continual development and increasing application of our suite of tools to improve irrigation water use and agricultural productivity and help water managers and producers make informed decisions.
- Communication of Nebraska's diverse and localized policies for groundwater markets and transfers, so that Nebraskans — as well as others throughout the country and the world — can see how these programs could benefit their own areas.
- Research for solutions and fostered communication regarding the AltEn environmental crisis in Mead, Nebraska. While long-term solutions are still in development, the lessons learned have helped the Mead community heal and will benefit other communities dealing with similar challenges.
- Collaboration in the development of new methods for controlling nitrate leaching in agriculture. From innovative nitrate measurement tools to exploring the benefits of cover crops, we're working to protect our groundwater and soil quality.

Located in Nebraska, DWFI leverages the world-class research capabilities at the University of Nebraska, the state's water resources, and the state's rich agricultural involvement to function as a living lab and global think tank. The report demonstrates the work that this unique combination of resources can achieve in the state of Nebraska, as well as several global achievements and partnerships.

"Water and food insecurity have been front page news many times this year with the consequences of the war in Ukraine, severe drought in the horn of Africa, the western U.S. and Nebraska, and devastating floods across much of the productive farmland of the Indus basin in Pakistan," said Peter McCornick, Executive Director of DWFI. "This has only underscored the importance of DWFI's work, and our team has continued to engage purposefully. We have expanded our research and outreach activities, leveraged collaborations and partnerships to address complex issues, and seen marked progress toward impact."

To read the full report, visit *go.unl.edu/annualreport*.

Nebraska Water Center Seminars Focus on Hot Topics in Nebraska Water

The Nebraska Water Center, in partnership with the University of Nebraska–Lincoln's School of Natural Resources, held their annual Spring Water Seminar Series again this year. The 2023 Series highlighted hot topics in Nebraska Water. The Series is open to the public and was held at Hardin Hall on the University of Nebraska–Lincoln East Campus at 3:30 p.m. every other Wednesday. Each seminar was also available via Zoom.

In addition, the series — with writing assignments and in-class, student-led discussions on alternate weeks – doubles as a one-credit hour undergraduate/graduate course listed under NRES/AGRO/GEOG/GEOL 484/884 and WATS 484.

The 2023 seminars featured an extraordinary slate of specialists and researchers. They each brought unique expertise to their topic, providing attendees with the most up to date information available.

Established in 1968, the series provides a forum to increase awareness and allow for meaningful conversation regarding these issues. The series is a cornerstone of NWC's mission to help the University of Nebraska become an international leader in water research, teaching, extension, and outreach.

To watch recordings of the sessions, visit *go.unl.edu/2023seminarvideos*.

For more information, visit *watercenter.unl.edu/spring-seminar-series*.

WATERCENTER.UNL.EDU

SPRING 2023

WATER SEMINAR SERIES

'HOT TOPICS IN NEBRASKA WATER'

FEB. 1

WATER QUALITY AND HEALTH

ELEANOR ROGAN
University of Nebraska Medical Center

FEB. 15

HUMAN HEALTH AND CLIMATE

JESSE BELL
University of Nebraska Medical Center

MAR. 1

THE VALUE OF WATER QUALITY

HARSHANEE JAYASEKERA
Daugherty Water for Food Global Insitute

MAR. 22

NDMC PANEL ON SOCIAL SCIENCES AND DROUGHT

TONYA HAIGH, KELLY SMITH, DEB BATHKE, CODY KNUTSON
National Drought Mitigation Center

APR. 5

POINT OF USE – DRINKING WATER RESEARCH PORTFOLIO (KREMER LECTURE)

PAUL BRADLEY
United States Geological Survey

APR. 19

ECOLOGICAL SUBSIDIES AS FRAMEWORK FOR ASSESSING CONTAMINANT FATE, TRANSPORT, AND EXPOSURE ACROSS ECOSYSTEM BOUNDARIES

DAVID WALTERS
United States Geological Survey

MAY 3

THE ROLE OF ENVIRONMENTAL CHEMISTRY IN PESTICIDE RISK ASSESSMENT: THE PATH TO REGISTRATION AND REAL WORLD CASE STUDIES (WILLIAMS LECTURE)

LAURA MCCONNELL
Bayer Crop

SEMINARS ARE AT 3:30 P.M. IN HARDIN HALL AUDITORIUM ON UNL EAST CAMPUS OR ON ZOOM. DETAILS ON WATERCENTER.UNL.EDU.

Nebraska Water Center
Daugherty Water *for* Food Global Institute

University of Nebraska System

New Publication Researches the Connection Between Uranium and Nitrate in Groundwater

A Nebraska Water Center project funded by the USGS 104G competitive grant program has been published in the journal *Environmental Science and Technology*. This manuscript, led by Karrie Weber, Associate Professor in UNL's School of Biological Sciences and Department of Earth and Atmospheric Sciences and Director of the Microbiology Program, synthesizes all the work from the 104G project.

Uranium is naturally occurring in Nebraska. While the amounts are low enough to make any mining, milling, or other forms of extraction unproductive, they are high enough to be measurable. In stable systems, some of the naturally occurring uranium is consumed by microbes. The microbes form solid uranium minerals that do not readily leach into the groundwater. The mineral can be dissolved by oxygen or nitrate. Some of the dissolved uranium can bind to the surfaces of iron oxide minerals present in the sediments. The naturally occurring levels of uranium generally aren't a concern to Nebraskans, but interesting interactions can occur when the existing system is changed by human activities.

"We know that in the state of Nebraska we do have buried uranium." Karrie Weber said. "It's just high enough in the sediments that as we change things in the subsurface, we're also changing what and how uranium is behaving in the groundwater."

The challenges occur as nitrogen is added to the system. The additional nitrogen changes the way the microbes interact with the existing uranium. When more nitrogen is available to the microbes, they're likely to breathe the nitrate and turn it into nitrite rather than breathing the uranium. This can mean the uranium concentration remains higher because it isn't being consumed by the microbes. The production of nitrite can further increase groundwater uranium concentrations.

This interaction between microbes, uranium, and nitrogen has been studied by Weber and others. In 2015, Weber's research group published a correlation between nitrate and uranium concentrations in groundwater in the High Plains Aquifer. The recently published manuscript takes the research a step further.

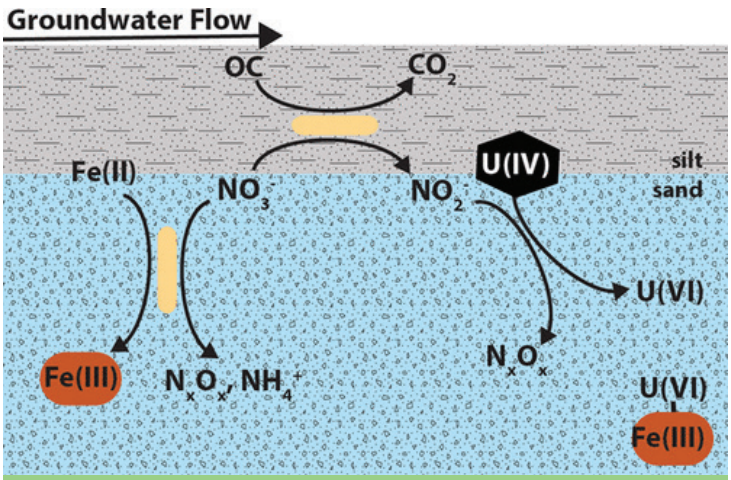
"The project in this publication is testing the hypotheses generated by the previous study." Weber shared. "What we wanted to know was in one of these regions where we had observed high uranium concentrations as well as high nitrate, could nitrate be driving the control? Our hypothesis was that in these alluvial aquifer sediments, the uranium gets buried and it's in a mineral form that is solid that nitrate can react with and change it to the soluble species."

In Nebraska and beyond, human activities have changed the nitrogen levels in soil. The research hypothesized that increased nitrate contamination in groundwater has the potential to periodically mobilize and release naturally sequestered uranium into the groundwater.

Two sites within the Platte River drainage basin in the High Plains aquifer located in Central Nebraska were used to collect field data for Weber's research. Weber and the team collected sediment cores to collect data on nitrogen concentration, uranium concentration, and sediment type. Aquifer water level was also measured at each core site.

Weber and the team found that microbes are reducing the nitrate to nitrite, which changes the uranium to the soluble form. Some of this nitrite can bind to the iron oxide surfaces and some will increase groundwater uranium concentrations. But this result is specific to shallow alluvial aquifers. Weber's ongoing research indicates that it is more complicated than it seems. "Nitrate can influence uranium concentrations, but it doesn't mean that if there is high nitrate there will be high uranium, or if there's high uranium it's because of high nitrate." Karrie Weber shared. "It's not that simple."

A systems-based approach is required to understand the connection between microbes, nitrate, and uranium. The researchers are looking to improve our understanding in their future work. The next phase of their research is focused on identifying the tipping point where nitrogen and uranium interact in order to improve management of the alluvial aquifer systems for the long term. By better understanding the interactions through the system as a whole, management of these systems can be improved because the microbes, nitrogen, and uranium are acting in expected ways.



Concentrations of nitrate (NO3), iron (Fe), and Uranium (U) in groundwater are influenced by microbial activity.

Karrie Weber provides sample collection instructions to students and researchers from the University of Nebraska–Lincoln.

Manuscript Abstract

Groundwater uranium (U) concentrations have been measured above the U.S. EPA maximum contaminant level (30 µg/L) in many U.S. aquifers, including in areas not associated with anthropogenic contamination by milling or mining. In addition to carbonate, nitrate has been correlated to uranium groundwater concentrations in two major U.S. aquifers. However, to date, direct evidence that nitrate mobilizes naturally occurring U from aquifer sediments has not been presented.

In this project, we demonstrate that the influx of high-nitrate porewater through High Plains alluvial aquifer silt sediments bearing naturally occurring U(IV) can stimulate a nitrate-reducing microbial community capable of catalyzing the oxidation and mobilization of U into the porewater. Microbial reduction of nitrate yielded nitrite, a reactive intermediate, which was further demonstrated to abiotically mobilize U from the reduced alluvial aquifer sediments. These results indicate that microbial activity, specifically nitrate reduction to nitrite, is one mechanism driving U mobilization from aquifer sediments in addition to previously described bicarbonate-driven desorption from mineral surfaces, such as Fe(III) oxides.

Read the full manuscript at *https://doi.org/10.1021/acs.est.2c07683*.

Health Concerns of Increased Uranium in Drinking Water

High levels of both nitrate and uranium in drinking water have been linked to adverse health outcomes. Nitrate levels in drinking water that exceed the EPA's recommended level of 10 parts per million have been linked to increased risk of cancer. Uranium levels in drinking water that exceed the EPA's recommended level of 30 micrograms per liter have been linked to kidney disease and risks of cancer.

Reverse osmosis is an effective treatment method for both nitrate and uranium in drinking water. Public water systems can be treated by reverse osmosis systems, and in-home systems are available as well for private water supplies.

Weber spoke on the importance of testing drinking water supplies. "We often think of water as just water, but it's not. Water reflects what it passes through. As we're pulling the water up, we're also capturing what's in the sediments and soils." Frequent water quality tests of drinking water allow communities and residents to be informed on what is in their water and what can be done to treat it.

New Grant Awarded to Test Co-application of Biosolids and Biochar to Soil

A research team from the University of Nebraska–Lincoln started to investigate the use of biosolids and biochar for agriculture recently. In January of 2023, the team was awarded a new grant from the Nebraska Center for Energy Sciences Research to expand their work. Michael Kaiser, Arindam Malakar, and Katja Koehler-Cole received $85,000 to establish a field experiment in Lincoln. The project is further supported with about $20,000 from the Nebraska Forest Service as well as from Oregon Biochar Solutions, USDA-NRCS, Paige Wireless, and The City of Lincoln providing the biosolids and the farmland for the field experiment.

Biosolids and biochar have both been studied separately to better understand their use in agriculture and to improve soil functioning. The new project is unique because it will study the benefits of applying biosolids and biochar in tandem to improve the sustainable usage of soil to produce fiber, fuel, or food.

What are biosolids?

Biosolids are generated from municipal wastewater treatment plants as a standard step in the wastewater treatment process. They are already available and require no additional effort to be created in a manner that is useful for agriculture. Biosolids provide a source of essential nutrients and organic matter that can be used as a replacement for fertilizer in high-intensity production systems.

While biosolids are made from municipal waste, two decades of academic research have found that there is low risk to human health when EPA guidelines for biosolid production and use are followed.

In 2021, the City of Lincoln generated 4,932 dry tons of biosolids, most of which was supplied to farmers free of charge and applied to agricultural land. Biosolids provide an efficient nutrient management solution for producers because they can be produced locally and do not need to be purchased.

What is biochar?

Biochar is made by burning plant materials at controlled temperatures under limited oxygen. Applied to soil, the pyrolyzed plant material can substantially increase the soil organic carbon storage instantly with just one application, which is a critical component in climate smart soil management practices. Co-benefits from biochar application extend from increased soil water and nitrate retention to decreased bulk density and erosion. By improving soil health and increasing resource efficiency, biochar might help in reducing the amount of required mineral fertilizer, especially in areas with high agricultural intensity.

In Nebraska, the production of biochar is an effective way to use invasive eastern red cedars that have been removed from Nebraskan ecosystems. A biochar production plant is being designed in Lincoln under the leadership of the City of Lincoln Biochar Initiative and is scheduled to begin production in the next few years.

Biosolids and biochar could be more effective together

In the past, biosolids and biochar have been applied separately. Kaiser and the research team hypothesized that the co-application of biosolids and biochar could amplify their benefits while reducing some of the potential drawbacks.

Biochar is used as a soil conditioner to improve soil organic content, and biosolids are used as a fertilizer to provide key nutrients. By applying them in tandem, the soil might be better able to retain the nutrients for a longer period of time.

Soil improvements are expected to be longer lasting when biochar and biosolids are co-applied, meaning producers would have to apply biochar and biosolids less frequently while still getting the same benefits.

Previous research in this field by Kaiser and the team was funded by a multi-state Hatch project. This project focused on the use of biochar in combination with cover crops and no-till and was completed in a greenhouse setting. The new funding provides the opportunity to test co-application of biochar and biosolids under field conditions and standard management practices.

Starting this spring, the research team will apply biosolids and biochar on a field under a corn-soybean rotation with cover cropping and no-till. Located on the edge of Lincoln, the field is owned by the City of Lincoln and will be managed by a crop contractor. One section of the field will have just biochar applied, one section will have just biosolids applied, and one section will be a mixture of both. In addition to a control plot that receives no treatment, the different applications will allow the research team to investigate the effects biochar and biosolids have when applied in tandem.

Funding will run through December of 2023, allowing data to be collected for the first season with the opportunity to apply for funding to continue the research in 2024.

Ph.D. candidate Britt Fossum collects soil samples to gather data on the impact biochar and biosolids have on soil health.

Beyond the Data:
Skills for Moving Conservation Agriculture Knowledge to Action

Crystal Powers

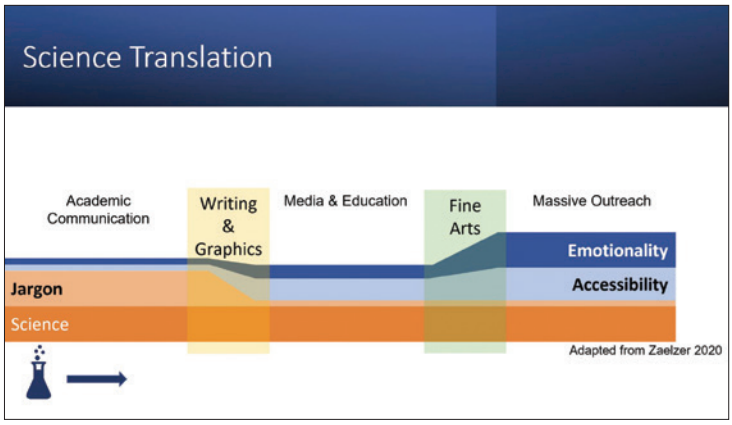
We all have been involved in growing the knowledge of how to address conservation agriculture's biggest challenges, from climate change to water pollution, drought, and soil health, significantly in the last half century. We've focused on providing opportunities for technical training and assistance. However, adoption of conservation practices still lags behind what is needed to rise to the challenges. This gap is a core challenge of science communication that has only grown with current cultural trends.

However, the social sciences have research-based tools to bridge this gap. Often it is assumed agriculture and conservation professionals, particularly new employees, will 'figure it out' or that they have innate personality traits that we need to hire for, leading to frustration and attrition. Instead, let's focus on these as learnable skills.

Here at the Water Center, we are taking our communications expertise and partnering with social scientists to create an interactive workshop to grow these skills we are calling Beyond the Data. The resources are based on a variety of applied social sciences, including social marketing, diffusion of innovation, behavioral economics, and communication. We hope participants take away:

1. How to co-create specific action goals.
2. Understanding how people change and how to provide resources tailored to their needs.
3. Analyzing the benefits and barriers to change.
4. Applying over 30 tools to design program methods and messaging.

Thank you to Lower Platte North NRD water team for workshopping the workshop last month and we look forward to offering this training widely later this year. Let us know if you are interested!



'Beyond the Data' Workshops Address Science Communication Challenges

Our science communication workshop, Beyond the Data, is focused on providing technical staff with social sciences training. Using a combination of peer reviewed research and real-world examples, the workshop uses data backed methods to inform and improve science communication practices.

Each workshop includes two interactive sessions. We identify a science communication challenge the participants are facing and provide multiple social science methodologies to address the challenge. Participants leave the workshop with a strategic plan to address their specific science communication challenge, as well as the resources to address future challenges.

Beyond the Data is tailored to fit each group. We meet you where you are both in terms of communication skills and relevant science communication challenges. Each unique workshop will provide technical staff with the resources to address science communication challenges today and in the future.

University of Nebraska

Nebraska Water Center
Daugherty Water for Food Global Institute at the University of Nebraska
P.O. Box 886204 | 2021 Transformation Drive, Suite 3220
Lincoln, NE 68588-6204

ADDRESS SERVICE REQUESTED

Join us at our upcoming events

2023 Water and Natural Resources Tour

June 19 - 22, 2023
Discovering water quality in northeast Nebraska
Norfolk, NE, Yankton, SD, and beyond

2023 Fall Water Conference

October 2023
Omaha Metro Area
Theme, date, and details to come

For more details and to register to attend, go to **watercenter.unl.edu**