WATER CURRENT

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

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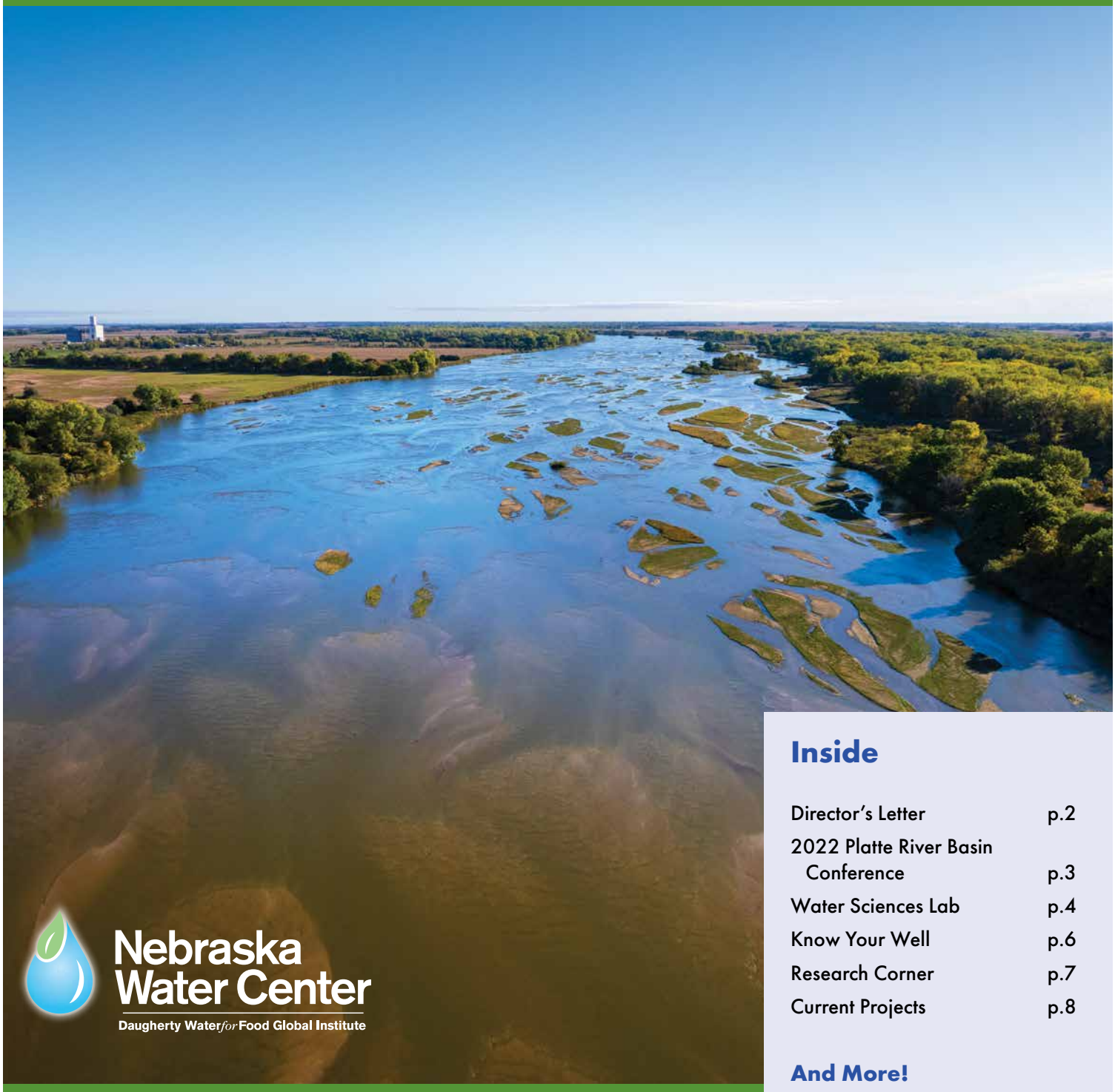
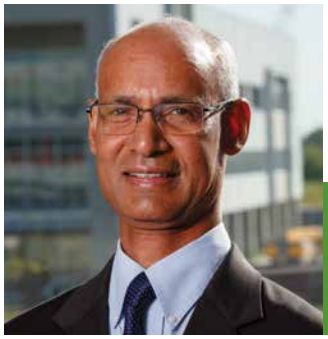
Fall Harvest: Research, News and More from the Nebraska Water Center



Platte River south of Silver Creek, Nebraska.

Inside

And More!



From the Director

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

Director, Nebraska Water Center (NWC)

Dear Reader,

As summer quickly fades into fall, I'm excited to share a new edition of the Water Current with you. While you haven't heard from us in this publication since last winter, we've been working hard on several fronts. As you'll learn in the articles shared in the following pages research, outreach, and growth have been our priorities in 2022.

Our faculty researchers have been hard at work to address water quality and quantity issues throughout Nebraska. From the Bazile Groundwater Management Area (page 8) and the AltEn site in Mead (page 4) to aquifer recharge in the Central Platte Valley (page 10), you'll find NWC working across the state to address Nebraska's water for the present and the future.

The final touches are coming together for our fall conference. Titled "Braided Paths: Science, Policy, and Culture", the Platte River Basin Conference and 3rd Playa Research Symposium will be held October 24th through October 27th. This Tri-State conference brings together an impressive array of voices from throughout the Platte River Basin in Wyoming, Colorado, and Nebraska. The University of Nebraska's Water Resources Advisory panel (WRAP) will also be convening at this conference.

Our growth in the past year has come in the form of new opportunities and new staff. The Water Sciences Lab has experienced its best year yet in terms of revenue and is participating in groundbreaking research close to home and abroad. Pages 4 and 5 share the current state of the lab and their plans to continue the recent growth into the future.

We're excited to welcome Ann Briggs to our team. Ann joined in July as our new Public Relations and Engagement Coordinator. With a background in science communication and previous experience at the University, Ann is looking forward to meeting you at our upcoming events.

I have spent some of my summer traveling across the state to meet stakeholders and visit field sites. It has been a pleasure to reconnect with existing partners and meet new ones as we work together on the issues of the day. I look forward to seeing many of you in October at our Platte River Basin Conference.

Chittaranjan Ray

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Platte River Focus of Tri-State Conference in Kearney

The Platte River is a critical shared resource across Nebraska, Colorado, and Wyoming.

Entitled "Braided Paths: Science, Policy, and Culture", the Platte River Basin Conference and 3rd Playa Research Symposium will be held Monday, October 24th to Thursday, October 27th at the Younes Conference Center in Kearney, Nebraska. An impressive array of voices from throughout the Platte River Basin in Wyoming, Colorado, and Nebraska will discuss the interrelated perspectives needed to create vibrant, resilient solutions for the future of the people and wildlife who depend on this river.

The Nebraska Water Center in partnership with Audubon Nebraska and the Rainwater Basin Joint Venture are hosting this year's event.

From October 24th through the morning of October 26th the conference will facilitate education and discussion on cultural, agricultural, and research-focused aspects of the river basin. The afternoon of October 26th and all day on October 27th will be dedicated to the 3rd Playa Wetlands Research Symposium. Attendees are welcome to attend both portions of the conference or select the days that are most interesting to them. While the Platte River Basin Conference and 3rd Playa Research Symposium are both designed as in-person events, some sessions will include virtual options.

Additionally, the conference will feature an evening of art, food, and conversation at Audubon Nebraska's Rowe Sanctuary.

The Nebraska Water Center is a part of the Daugherty Water for Food Global Institute at the University of Nebraska.

To learn more and register for the conference, visit *https://watercenter.unl.edu/*.

Water Sciences Lab Sees Rapid Growth in 2022

On the heels of a sharp decline in laboratory testing in 2020 and inconsistent growth in 2021, the Water Sciences Lab experienced more growth than ever before in 2022. Lab manager Victoria Dey shared her insights on the rollercoaster ride the lab has experienced in the last few years. "2019 was a really good year for us in terms of samples, projects, and revenue. We were on an upward trajectory and then, like many COVID affected businesses, the numbers fell off drastically in 2020 and 2021. And in some aspects, 2021 was still low and was not ideal, but this year we'll hit a record in terms of sample number and service revenue by the end of June." So far, the lab has received almost twice as many samples in the first six months of 2022 than at the same point in 2020, with figures on track to exceed the peaks we experienced in 2019.

Finding the true cause of this unprecedented growth poses a challenging question. Dey attributes their success to several different avenues. She observed a noticeable uptick in sample submission in the fall of 2021 when researchers returned to universities, but the growth surpassed the expected figures if academic research was the only cause. A combination of new lab equipment, several publications featuring the lab, and outreach events seems to have contributed to the growth the Water Sciences Lab is currently experiencing.

Dan Snow, Water Sciences Lab Director, shared his perspective on the causes of this growth. "Getting a new LC/MS/MS (liquid chromatography tandem mass spectrometry) has really helped us because these methods are fairly unique and generate a lot of revenue. We received the Waters Xevo TQS LC/MS right before COVID hit and we didn't start using it until six months into 2020 because it took a while to get the methods up and running". Waters Corporation, the instrument manufacturer, has collaborated with the Water Sciences Lab to host a series of webinars on environmental mass spectrometry to showcase this technology from 2021 through 2022.

In addition to new lab equipment, the lab's past successes are attributing to current and future growth. "There are more research publications out there that highlight the use of the laboratory," Snow states, "so the more articles that get into the scientific literature the more people are aware of what we can do." From academic journal articles to current events and other news articles, an increase of publications in the past few years has risen the profile of the lab for a wide variety of potential clients.

While the Water Sciences Lab has worked with clients from all over the United States and beyond for years, the lab has experienced a recent increase in partnerships with international researchers. These scientists are largely requesting pesticide, pharmaceuticals, PFAS (emerging contaminants), and isotope testing. "We have more international researchers reaching out to us now than in the past," Dey shared. "Sometimes we don't know (how these researchers found the lab), they've just heard about us for one reason or another."

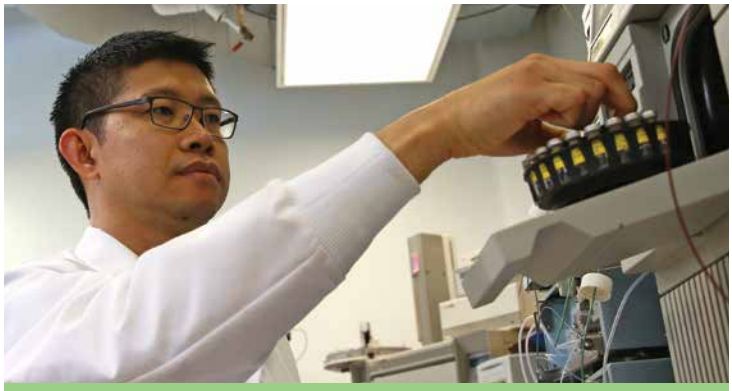
Dan Snow credits the lab's unique capabilities as a key factor in their U.S. and international project involvement. "There's no other lab that provides this combination of testing services anywhere. It's convenient for the clients that want to measure a suite of contaminants and use stable isotope methods."

The Water Sciences Lab tests samples from Nebraska and around the world.

New testing methodologies make the Water Sciences Lab a premier choice for a wide variety of research.

> "There's no other lab that provides this combination of testing services anywhere. It's convenient for the clients that want to measure a suite of contaminants and use stable isotope methods."
>
> — Dan Snow

Victoria Dey, Water Sciences Lab Manager, preparing samples in the lab.



The lab's growth in 2022 will provide for 3 new full-time employees and 3 new hourly student interns.

Dan Snow, Water Sciences Lab Director, collecting data in the field.

Water Science Lab leaders are planning to strengthen outreach and public engagement to continue their current growth beyond short-term pandemic rebound and into sustainable long-term expansion. The Water Sciences Lab is represented locally by staff at East Campus Discovery Days, local and state Natural Resource District meetings and events, and high school and college tours of the lab.

Dan Snow, Water Sciences Lab Director, is an invaluable resource to the lab when it comes to high-profile events. He has been asked to present at and attend water resources symposiums held by the Daugherty Water for Food Global Institute and other international venues. Dan Snow also represents the University and Nebraska as a whole through global outreach and education events. Most recently, he has partnered with institutes in Kazakhstan to provide irrigation and environmental science education and research projects in Central Asia.

Snow credits the University and its various programs as a main vehicle for the lab's global outreach opportunities, stating "Nebraska has a very strong water resources research program promoted by the Daugherty Water for Food Global Institute and the Nebraska Water Center (NWC). We have several very strong academic units supporting water faculty so all this together helps to increase the chances we get funding to do these collaborations."

Closer to home, the Water Sciences Lab is collaborating with IANR, University of Nebraska Medical Center and USGS research groups across the nation to address the ecological and human health aspects of the recent AltEn ethanol plant release of pesticide residues near Mead, Nebraska. "We were measuring many of these pesticides and their degradation products well before the AltEn incident in early 2021. Our lab was in very a good position to support the environmental response since the bioenergy facility chemical release made the news and have already analyzed hundreds of samples from the area. We are also coordinating sample collection and making connections with other researchers across the U.S. to help provide a more complete picture of any environmental effects."

A key part of NWC, the lab's mission is to provide technology, expertise, services, and training in advanced analytical science supporting today's water and natural resources students, researchers and stakeholders. Aligned with these missions, the lab's growth in 2022 has led to 3 new temporary full-time employees and 3 new hourly student interns.

Know Your Well Project Enters Third Phase

From its inception in 2016, Know Your Well has brought citizen science into classrooms to not only increase groundwater testing throughout Nebraska, but to also showcase the vulnerability of groundwater quality and importance of safe drinking water for rural residents and communities.

In the past six years, Know Your Well has been implemented in more than 28 school districts throughout the state. Participating schools receive educational materials, colorimetric testing kits, and training to conduct domestic well sampling and water testing. Participants collect split samples sent to the Water Science Laboratory for quality-assured testing and results are supplied to the well owner and participating schools. Students are encouraged to compare their test kit measurements with the laboratory tests and develop research projects about local well water quality. Many classes present their findings at science fairs, Nebraska Junior Academy of Science meetings, as well as city council and Natural Resource District board meetings.

Each new phase has allowed the program to expand in scope and impact through various grant opportunities. Know Your Well is now entering its third stage, led by the Papio-Missouri River NRD with partnerships between the University of Nebraska at Kearney, the University of Nebraska–Lincoln, Chadron State College, the Nebraska Water Center and Daugherty Water for Food Global Institute. Grant funding for phase three is primarily from the Nebraska Environmental Trust and the Nebraska Department of Environment and Energy. The Papio-Missouri River NRD, Central Platte NRD, and Lower Platte South NRD have all promised a cash-match while 13 other NRDs have promised in-kind match.

Well monitoring allows students to understand their local water quality.

The latest grants provide funding to equip over 50 Nebraska schools with Know Your Well training, kits, and laboratory test results to highlight domestic well water quality through multiple NRD. The third phase also includes additional science communication and educational resources for the program, and a partnership with UNL's School of Computer Science and Engineering to develop new mobile apps that improve data collection for students and teachers. Know Your Well is evolving to represent the truly interdisciplinary nature of hydrogeological sciences and management while opening doors for students to visualize many possible careers in groundwater and natural resources sciences.

Know Your Well is an educational gem for Nebraska's natural resources and on the cutting edge of citizen science research. As more schools participate, the team has the opportunity to grow groundwater science literacy at the high school level and observe the impact student scientists have on local management practices and the adoption of conservation behaviors. Students are the decision-makers and stakeholders of tomorrow. By giving them the tools and agency to participate in water quality discussions now, they may become leaders in groundwater stewardship later in their professional and personal lives.

Learn more at *https://knowyourwell.unl.edu/*.

Papio-Missouri River NRD provides trainings on Know Your Well for high school teachers.

Conservation Innovation Grant Supports Water Conservation through Agricultural Practices

Daran Rudnick

Daran Rudnick, DWFI Faculty Fellow, recently received a Natural Resources Conservation Services (NRCS) Conservation Innovation Grant for $850,000. Titled *Accelerating adoption of water conservation technologies and management practices through innovative engagement programming,* Rudnick leads this project with subawards to Ohio State and Colorado State. The purpose of Rudnick's project is to provide support directly to producers to adopt and evaluate innovative conservation practices and offset implementation risks.

Water for Ag Project Completed

Mark Burbach

The USDA funded Water for Ag project involving eight UNL faculty associated with the Nebraska Water Center as well as colleagues from Penn State University and Arizona State concluded June 30th. The purpose of the project was to 1) facilitate community-directed stakeholder engagement to address water and ag issues that matter most to them, 2) support these teams with biophysical and social science research and information, and 3) study what changes with *individuals*, *groups*, *communities*, and the *environment* through the engagement process. In addition to numerous peer-reviewed research publications detailing the changes that can occur from community-directed stakeholder engagement, the project produced several practical and useful resources to help promote sustainable water for agriculture in Nebraska. A guidebook designed to help those seeking to develop a community-directed stakeholder-engaged approach to addressing issues natural resource and community settings (*https://sites.psu.edu/engagementguide/*).

A team of stakeholders in the Central Platte region created the Platte River Resilience Fund through the Nebraska Community Foundation to develop a perpetual source of funds for long-term support of activities that will ensure conveyance of water on the Platte River in Nebraska. A team of stakeholders in the North Platte region created the annual Yonts Water Conference to share information about water issues affecting the North Platte River basin, and contributed equipment and resources to the University of Nebraska StreamNet program, a project that will combine high-frequency surface water quality data in the North Platte basin with an easily accessible web portal (*https://streamnet.unl.edu/about*).

Drought Center Kicks Off $1 Million Defense Project to Predict Unrest

Mark Svoboda

Weather and climate can contribute to civil unrest, especially in countries with little to no social safety nets, where people depend on subsistence farming to feed themselves and their families. The question is, can civil unrest be predicted along with the weather? To begin answering that question, researchers at the National Drought Mitigation Center, based in the University of Nebraska–Lincoln's School of Natural Resources, received $1 million in funding from U.S. Air Force Weather this spring for the first phase of a bigger project.

The project, "Building a Global Composite Drought Indicator Hot Spot Early Warning and Information System," is led by DWFI Faculty Fellow Mark Svoboda, director of the drought center. It began in March. The center is teaming up with others on campus, including Ross Miller, associate professor of political science; Tirthankar Roy, assistant professor of civil and environmental engineering; and Brian Wardlow, director of the Center for Advanced Land Management Information Technologies.

In the first phase of work, the drought center will develop a global composite drought indicator, based on physical measurements of water availability such as precipitation, soil moisture, evapotranspiration and vegetation health. The center has extensive experience working with countries around the globe to construct composite drought indices, based on which data is available and which sectors are most vulnerable. Socioeconomic indicators that describe vulnerability to drought will be incorporated as a next step. Machine learning techniques will help guide the team, along with feedback from key partners within the Air Force.

"Using multiple data sources and adapting to whatever is available for a country or region is consistent with the 'convergence of evidence' approach that the U.S. Drought Monitor is based on," Svoboda said. "A key difference here, besides generating an operational global product for the first time, is that we may have to use remote-sensing data for countries that don't have enough on-the-ground weather stations, or in countries where they don't share data freely. We may also need to use innovative methods to come up with drought assessments in areas where the period of record is short or nonexistent. Drought is always a comparison to some normal, and there are places where we don't have enough data to say what is normal."

Svoboda said the next stage of work will be expanding to include more partners and examine more drought hotspots.

Partnering for a Clean Water Future in Northeast Nebraska

Northeast Nebraska is unique in many ways. One of those is the first groundwater-focused management plan in the nation to address nonpoint source pollution.

The Bazile Groundwater Management Area (BGMA), as it's known, emerged from a partnership among four area Natural Resources Districts and the Nebraska Department of Environment and Energy who shared the goal of reducing rising nitrate levels in communities and domestic drinking wells. This is significant since BGMA residents rely on groundwater for drinking water and elevated nitrate levels can be harmful to human health and costly for small communities to treat.

In 2019, the Nebraska Water Center (NWC), through funding from the Nebraska Environmental Trust, helped establish local demonstration farms that model different agricultural management practices to reduce nitrogen leaching. The three farms — diverse cropping rotations, soil health and nitrogen inhibitors — provided opportunities for educational outreach at the BGMA Field Day in September 2021 and July 2022. The in-person engagement was complemented by a virtual winter meeting series featuring Nebraska faculty, postdocs and external scholars.

Additionally, NWC is invigorating water quality research and education in this area. In the classroom, a citizen science project is empowering high school students with water quality awareness and science literacy through groundwater sampling and data collection. In the field, Water Sciences Lab Director Dr. Dan Snow and collaborators launched a project in spring 2021 titled "Novel Approaches for Controlling Nitrate Leaching and Protecting Nebraska Groundwater." The research is injecting mulch into the subsoil to evaluate its potential to absorb and remove excess nitrate.

Researchers collect samples in the Bazile Groundwater Management Area.

Ray Serves on Mayor's Advisory Council as Lincoln Searches for a Second Water Source

Dr. Chittaranjan Ray, Nebraska Water Center Director, joins the City of Lincoln and water resource specialists in the search for a secondary water source for Lincoln. The City's existing infrastructure for clean, safe drinking water consists of wells built on the Platte River near Ashland in 1932. Current projections estimate the existing wellfield is adequate to supply drinking water for the next 26 years. A secondary water source is needed to support future generations of Lincolnites in the following decades.

Mayor Leirion Gaylor Baird created the Mayor's Water Source Advisory Council to advise decision-makers in the new initiative titled Water 2.0: Securing Lincoln's second source. This initiative is expected to be the largest public works project to support Lincoln's health, growth, and vitality into the future. Dr. Ray joins representatives from natural resource, business, and community leaders in providing direction and identifying outcomes for this project.

Mayor Leirion Gaylor Baird announces Lincoln's search for a second water source. (Credit: Jaiden Tripi, Journal Star)

Solutions-focused Research Uses Naturally Occurring Nanosized Mineral to Address Soil Contaminants

Arindam Malakar

(Editor's note: A portion of this article originally appeared in the November 24, 2021 edition of Nebraska Today)

Arindam Malakar, research assistant professor, combines scientific design and problem solving to address real issues for producers and resource managers in Nebraska and beyond. Malakar's research was recently published in the prestigious Environmental Science and Technology and Science of the Total Environment journals and was done in collaboration with Chittaranjan Ray, Daniel Snow, and other Nebraska Water Center staff and University researchers.

This project examined how ferrihydrite — a nanoscopic mineral universally found in soils but also used to treat groundwater and drinking water — can be used to lower toxic elements including arsenic and uranium in soils.

As part of a greenhouse experiment using soil from the university's Panhandle Research and Extension Center, the Husker team planted corn in three sets of soils: one with no ferrihydrite, another with 0.05% ferrihydrite, and a third with 0.10% of the mineral. After irrigating the soils with arsenic- and uranium-fortified water, the researchers tracked the growth of the corn plants and monitored concentrations of the trace elements in water surrounding the plant roots, soil, and crop tissues.

The team found that ferrihydrite-amended soils lowered the concentrations of arsenic and uranium by about 20% in crops. They also appeared to reduce the loss of nitrate, which is essential to plant growth but can cause health issues when leaching into groundwater, by roughly 30-50%. Soil water content, meanwhile, rose from about 13% with no ferrihydrite to roughly 17% with it.

Crucially, the corn likewise seemed to benefit: Plants in the ferrihydrite-amended soils grew taller, produced 12-15% more living tissue, synthesized more chlorophyll, and yielded kernels containing nearly twice as much iron. The initial findings suggest that adding even small doses of ferrihydrite to soils could limit concentrations of toxic elements while boosting crop growth and nutrient uptake.

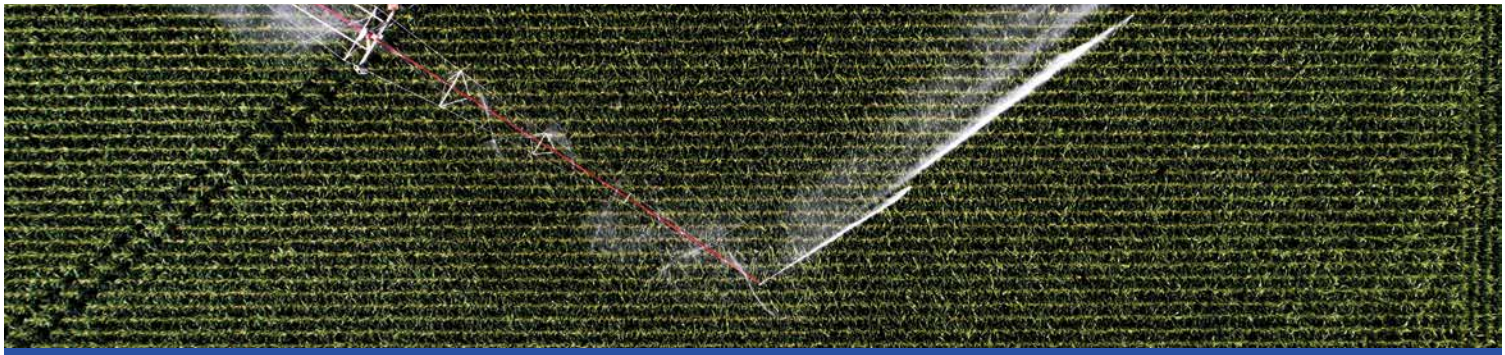
As the research currently stands, ferrihydrite has been found effective in greenhouse conditions. Full validation will require field testing, which is a future part of the process. These field tests would identify several locations throughout the state to compare results on different environmental and soil type factors.

Conducting field tests will help Malakar understand the full scope of future applications. "My assumption would be that we may be able to apply it on a larger scale, but as a researcher I have to be conservative on that," Arindam Malakar stated. "We would need to try the soil nanoamendment at different locations and under varied field conditions to know what the full scope of the method could be. Chemistry-wise, it should work but real-world testing is needed to confirm that."

While these findings are an impressive addition to Malakar's continued research in the topics of groundwater, crop production, and the vadose zone, the applications of this project go beyond journal publications and academic research. As he puts it, "My goal is to understand contemporary environmental challenges and come up with viable solutions." From the beginning of this project, Malakar was focused on improving crop production from the ground up by optimizing the soils through naturally existing minerals.

Arindam Malakar shared his thoughts on why these findings are impactful beyond an academic sense. "Ferrihydrite occurs naturally and it is something the soil knows and already has, and we're just fine tuning the concentration to improve performance."

The results from this project will be useful for producers and resource managers in Nebraska and beyond. The addition of ferrihydrite to soil leads to reduced levels of toxic metals, which is an important factor for the public health impacts of these crops. In addition, adjusting the levels of minerals naturally found in the soils allows the crops to produce more biomass. This increases yield and decreases the need for artificial fertilizers and other interventions commonly taken by farmers to create the optimal balance for crop production.



Malakar's research applies ferrihydrite to irrigation water in order to reduce toxins found in soils.

Aquifer Recharge Project in Central Platte Valley Nebraska Featured in International Publication

Crystal Powers

The project was selected as one of 28 global examples of effective collaboration, management and outcomes

A new book published by UNESCO includes a project from Nebraska's Central Platte Valley as a case study in effective managed aquifer recharge (MAR). The case study was co-authored by Crystal Powers, research and extension communications specialist with the Daugherty Water for Food Global Institute (DWFI) and the Nebraska Water Center.

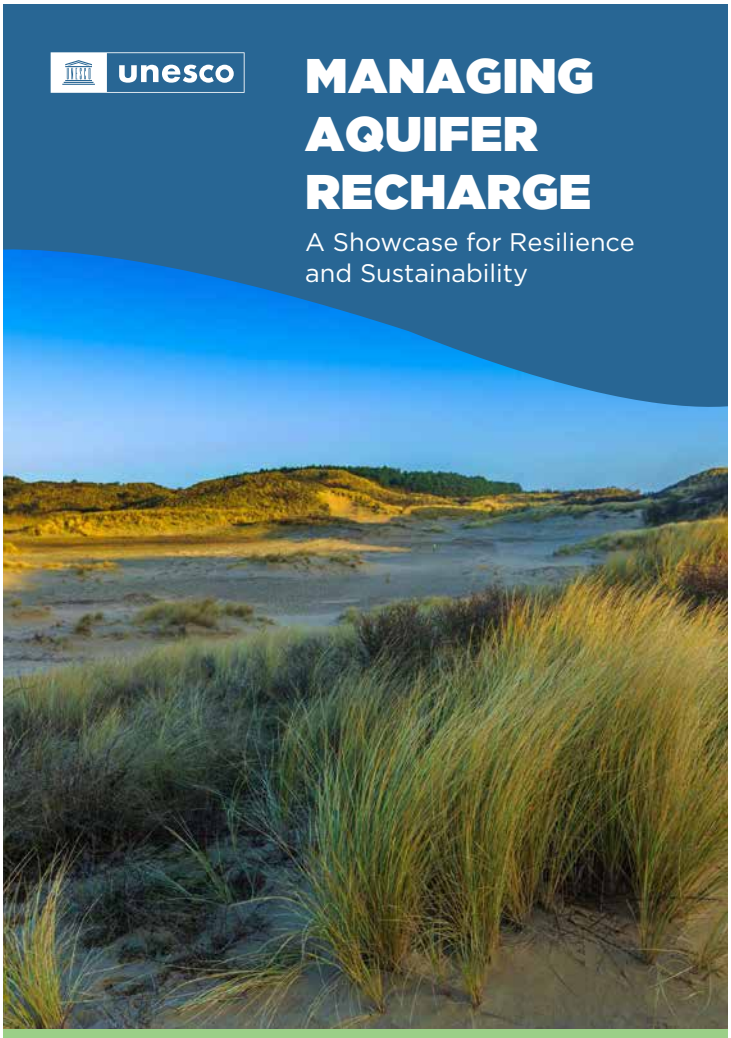
The book highlights 28 successful examples of collaborative MAR around the globe. MAR is a method of intentionally creating projects to increase the flow of water. According to UNESCO, the publication demonstrates "how MAR has helped communities overcome water challenges, prepare for the future, increase safety of water supplies and enhance ecosystems."

The Central Platte Valley project involved a collaboration between the Central Platte Natural Resource District (CPNRD), the Nebraska Department of Natural Resources (NeDNR), and the Platte River Recovery Implementation Program (PRRIP), as well as private irrigation districts and canal companies. The project was initiated when the river canals needed to be repaired after more than 100 years of use. MAR was identified as an innovative way to both satisfy endangered species' habitat restoration and benefit crop irrigators in the area. MAR now contributes to the streamflow targets of each endangered bird species, with an estimated value of $43.7 million. MAR effectively accomplishes this by timing the flow of the water and managing its gravitational seep into the ground. "The Central Platte Natural Resources District project provides benefits to all water interests in the area. It not only assures future water deliveries of our surface water canals but also protects groundwater uses and provides base flow for endangered species concerns," said Lyndon Vogt, General Manager of CPNRD.

The CPNRD, NeDNR, and local irrigation districts worked closely together at the local level to bring about optimal outcomes. "A great advantage of this particular example in Nebraska is that it's a place where the people, the wildlife and the water system are all benefiting from this low cost, low energy method that most efficiently provides all of these benefits," says Powers.

UNESCO is the United Nations Educational, Scientific and Cultural Organization which seeks to build peace through international cooperation in education, sciences and culture. Powers hopes that the UNESCO publication will inspire water managers around the world to implement MAR in their own communities.

A full link to the publication can be found at *https://unesdoc.unesco.org/ark:/48223/pf0000379962*.



The Central Platte Valley's work on improving river canals was featured in this international publication.

Study Finds Change in Niobrara's Nutrients Following 2019 Flood

Editor's Note: This version of Pocket Science originally appeared in the June 15, 2022 edition of Nebraska Today.

Welcome to Pocket Science: a glimpse at recent research from Husker scientists and engineers. For those who want to quickly learn the "What," "So what" and "Now what" of Husker research.

What?

Rivers transport important nutrients across landscapes and into larger bodies of water. Among those nutrients are nitrogen and phosphorous, which stimulate the growth of crops but, when accumulating in water, may also yield "dead zones" that deprive marine animals of oxygen.

Precipitation can influence how nutrients get into and flow within rivers. But relatively few studies have examined how extreme flooding — more frequent and intense yet less predictable amid ongoing climate change — might alter that nutrient transport.

So what?

To investigate the effects of the historic flood that submerged the Cornhusker State in spring 2019, Nebraska's Jessica Corman and former UCARE student Matthew Chen analyzed nutrient concentrations in the Niobrara River from June through November of both 2019 and 2020. The team compared the concentrations with those recorded from 1990 to 2018.

In the two years following the flood, concentrations of total phosphorous doubled — an increase that was more or less expected, and suggests that agricultural runoff is contributing to phosphorous in the Niobrara.

By contrast, concentrations of nitrate — a nitrogen-based compound that can leach into waterways — declined by 91.5%. While phosphorous reverted to its pre-flood concentrations by fall 2020, nitrate remained low even after the flood waters receded, a finding the researchers called "relatively unique."

Why the persistent drop? The researchers aren't sure. It could stem from flooding-based losses in the Niobrara's organic matter, whose decomposition can reduce nitrate concentrations. Another hypothesis: High precipitation following the flood may have helped flush nitrate from the groundwater that feeds the Niobrara.

Now what?

Continually monitoring the Niobrara is essential to determining whether the post-flood decrease in nitrate will subside or endure, the team said. Analyzing nutrient cycles during and after future floods, especially by deploying more in-river sensors, could also help clarify the causes of the waning nitrate.

Kayla Vondracek, Jessica Corman and Matthew Chen look over a sand sample in the Niobrara River. (Credit: Craig Chandler)

University of Nebraska

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Join us at our upcoming events

Platte River Basin Conference & 3rd Playa Research Symposium

October 24-27, 2022
Younes Conference Center
Kearney, Nebraska, USA

2023 Water for Food Global Conference

May 8-9, 2021
Nebraska Innovation Campus Conference Center
Lincoln, Nebraska, USA

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