

WATER

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GLOBAL INSTITUTE AT THE
UNIVERSITY OF NEBRASKA

SPRING 2026

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



**Nebraska
Water Center**
Daugherty Water for Food Global Institute

A center pivot sprinkler head delivering fertilizer along with water at the Eastern Nebraska Research, Extension and Education Center near Mead, Nebraska.

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And More!



From the Director

Chittaranjan Ray, Ph.D., P.E.
Director, Nebraska Water Center (NWC)

Dear Reader,

I am pleased to share with you our first newsletter of 2026. As spring brings new growth across the state, the Nebraska Water Center continues to advance research, outreach, and extension efforts focused on our state's water resources.

In terms of research, our team has been hard at work to address water quality through a better understanding of the vadose zone (pages 6 and 7) and we are pleased to fund early-career faculty with 104b awards to consider channel morphology, snow drought, and the impact of wetlands on water quality (page 10).

On the outreach front, plans are in full force for the 2026 Water and Natural Resources Tour. Hosted in partnership with the Central Nebraska Public Power and Irrigation District, we will visit the Republican Basin from June 22 to June 24 to experience water and natural resources management in southwest Nebraska. Registration is currently open and additional information can be found on the following page.

With respect to extension efforts, our team has been working diligently this spring to provide training for producers to strengthen farm profitability and water stewardship through Master Irrigator sessions that have been held throughout the state. You can learn more about the Master Irrigator program on page 5. In addition, this newsletter provides updates on water availability in western Nebraska on pages 8 and 9, as discussed at Nebraska Extension's annual Yonts Water Conference held in Scottsbluff in April.

Finally, I would like to share a staff update with you. After 36 years at the Water Sciences Laboratory, Dr. Daniel Snow has announced his retirement. He will complete his service as the Water Sciences Laboratory Director at the end of 2026. I deeply appreciate his long commitment to understanding water quality, developing new research methods, and training the next generation of scientists. Dr. Snow shared some of his experiences at the lab on page 4. Please join us in wishing him well as he enters retirement.

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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

Craig Chandler, University Communication

Editor

Ann Briggs
Editorial Assistants: Patricia Liedle and
Crystal Powers

Designer

Ann Briggs

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



2026 Water and Natural Resources Tour to visit the Republican Basin

By Ann Briggs, Communications and Program Specialist, Nebraska Water Center

Join the Nebraska Water Center and Central Nebraska Public Power and Irrigation District as we visit the Republican Basin for the 2026 Water and Natural Resources Tour, held in southwestern Nebraska from June 22 through June 24 with stops in McCook, Curtis, and the surrounding areas.

Registration includes all meals, hotel, commercial transportation, on-board refreshments, and activities from Monday evening through Wednesday at 4 pm. The tour will begin and end in McCook, Nebraska, with transportation provided from Lincoln for interested attendees.

- \$390 per person, single occupancy room
- \$330 per person, double occupancy room

Registration will be open until May 22. Spaces are limited, so act fast to secure your seat!

We'll partner with the Nebraska Department of Water, Energy, and Environment, Frenchman Cambridge Irrigation District, Middle Republican Natural Resources District, and Upper Republican Natural Resources District to experience southwestern Nebraska's water and natural resources. The tour will include expert insights on automated canal systems, digital resources for producers, aquifer recharge projects, large water users, and more.

On Monday, June 22, we'll meet in McCook in the evening for a tour check-in and a kickoff supper. Attendees coming from eastern Nebraska are welcome to ride the bus from Lincoln to McCook in the afternoon while attendees coming from other parts of the state are welcome to join us in McCook that evening.

On Tuesday, June 23, we'll tour Frenchman Cambridge Irrigation District's updated automations to the canal system. We'll hear from Middle Republican Natural Resources District to learn about their Producer Connect dashboard and AEM data they've collected in their district. In the afternoon we'll explore a few additional sites in the Curtis area, with specific details to be announced soon.

On Wednesday, June 24, we'll head west. Hosted by the Upper Republican Natural Resources District, our tour will experience the Rock Creek augmentation sites, fish hatchery, and one of the largest feedlot operations in Nebraska. The tour will wrap up in McCook at 4 pm. Attendees from eastern Nebraska will return to Lincoln on the tour bus and attendees from the rest of the state can depart from McCook.

This tour is sponsored by the Central Nebraska Public Power and Irrigation District, the Nebraska Water Center, Middle Republican Natural Resources District, the Daugherty Water for Food Global Institute, HDR, Reinke, and the Water Futures Partnership.

The draft agenda and registration site are available at go.unl.edu/WaterTour.



Water Sciences Laboratory Director to retire this year

By Taytem Carmichael, Communications Intern, Nebraska Water Center

This year, Daniel Snow will retire from the University of Nebraska faculty, stepping down as the Director of the Water Sciences Laboratory and leaving behind a legacy that has impacted every part of the lab. Serving as Director over the last 22 years, Snow has worked closely with almost every student, faculty, staff, and visiting scholar who has used the facility. “It is hard for me not to be personally attached to the lab,” he says, “when I have been involved from the very beginning.”

When Snow moved to Lincoln to pursue a Ph.D. in geochemistry in 1986, he didn’t expect to spend a good part of the following four decades building one of the most advanced water research labs in the country. The lab was established by the Institute of Agriculture and Natural Resources on the University of Nebraska-Lincoln’s East Campus in 1990. Its founding director, Roy Spalding, encouraged Snow to apply to be its first laboratory manager. Halfway through a Ph.D. program supervised by Spalding, Snow jumped at the chance to run a state-of-the-art analytical laboratory aimed at supporting water research in Nebraska and beyond.

When the lab began, there were only ten or twelve major instruments to support facility users conducting water quality and quantity research in Nebraska. Samples and results were tracked using paper forms and spreadsheets. Today, the facility supports more than thirty major instruments, many based on advanced mass spectrometry technologies, and is implementing a new cloud-based information system allowing clients from across the globe to submit samples, select methods, and access their results online.

Snow describes the early days, “Our first instruments were not nearly as sensitive and fast as the new triple quadrupole mass spectrometers we now use. Faster scan rates, automated data processing, and improved instrument interfaces have helped make our methods much more robust.” These changes didn’t happen overnight, but under Snow’s leadership the lab grew from less than 20 methods and three full time staff members to more than 200 methods supported by five full time staff members operating \$3.5 million in sophisticated laboratory equipment. The growth of the lab reflects years of hard work and close collaboration between faculty, students, agencies, and partners across Nebraska and the world.

Snow has been a part of some of the lab’s most impactful research. One of his early breakthroughs involved developing methods to measure traces of antibiotics in livestock wastewater using liquid chromatography tandem mass spectrometry.

“I remember giving a talk on our method and receiving an award at the American Chemical Society national meeting in 2001 when our method was first published,” Snow said. “It is still one of the earliest and still highly cited papers describing how to measure these biologically important chemicals in wastewater.” Analysis of antibiotics in agricultural, domestic, and municipal wastewater are among the most commonly requested methods owing to their potential for affecting antibiotic resistance. Together with methods for detection of new emerging contaminants such as per- and polyfluorinated alkyl substances (aka PFAS) and multiple pesticides screens, the lab serves a variety of projects and priorities to ensure safe water for multiple uses worldwide.



Daniel Snow, Water Sciences Laboratory Director



Daniel Snow working in the Water Sciences Laboratory as the first laboratory manager in 1990.

The lab’s work aims to measure and understand sources of contamination and then devise ways to remediate and protect water resources. “The main reason we measure the substances we do is to understand how water becomes contaminated so we understand the consequences and, when necessary, reduce the incidence and impact of contamination,” Snow said. “The lab tests most water and environmental samples to inform decisions about the way we use natural resources. Agriculture can always be more efficient and sustainable, and the technology in the lab provides answers that can stimulate new ideas and innovation.”

After decades of service, Snow’s vision for his legacy, and legacy of the lab, is focused on supporting science with purpose. “The legacy I want to leave is showing how we can use science, particularly chemical and isotope analysis, to better manage and protect our water resources worldwide,” he said.

He credits Nebraska as part of his story, emphasizing that there is no better place to study and understand groundwater. For him, this lab is more than instruments and methods, it represents the generations of students trained, partnerships built and knowledge shared, in collaboration to protect the world’s most valuable resource.

Nebraska launches Master Irrigator program to strengthen farm profitability and water stewardship

By Crystal Powers, Statewide Water Extension Educator, Nebraska Water Center

Nebraska farmers and agriculture advisors joined a new education series designed to improve irrigation farming operations through efficiency, increased profitability, and strengthening long-term water stewardship. The Nebraska Master Irrigator program brings together producers, agricultural advisors, and industry partners to support data-driven decision-making that reduces groundwater pumping and nitrate losses while positioning farms to have a competitive edge.

A Program Built Around Practical, Data-Driven Learning

The Nebraska Master Irrigator program focuses on practices that help producers manage water and nutrients more efficiently and profitably. Learning is structured around hands-on activities, peer-to-peer discussion, and real-world data from Nebraska farms.

Program events were hosted across Nebraska in Beatrice, Norfolk, Grand Island, and North Platte, making participation accessible across the state. A signature component of the program is a two-day challenge format focused on irrigation and nitrogen management.

During the Irrigation Challenge, participants competed in a virtual version of TAPS (Testing Ag Performance Solutions), making in-season irrigation and nitrogen decisions. Teams were evaluated on efficient yield production and profitability. Sessions included discussions on reducing electricity costs, understanding groundwater level trends, available Natural Resources Districts (NRDs) incentive programs, and strategies for getting the most return from every inch of irrigation water. Participants also explored the latest industry tools designed to apply the right amount of water at the right time.

The Nitrogen Challenge addressed rising fertilizer costs and in-season nitrogen management. Participants examined satellite-based sensors and other technologies for monitoring crop nitrogen needs, reviewed data from farmer-led trials across the Nebraska On-Farm Research Network, and heard updates on nitrate levels from NRDs. Interactive discussions explored how water movement through soil affects groundwater quality, while a conservation incentives panel featuring NRDs, the Natural Resources Conservation Service (NRCS), and The Nature Conservancy highlighted resources available to support management changes. Regenerative agriculture practices and their impacts on both water and nitrogen were also a key focus.



Attendees at the Master Irrigator program held in Norfolk learned practices that help producers manage water and nutrients more efficiently from University of Nebraska experts.

These activities allow producers to test management decisions in real time and compare outcomes related to yield, profitability, and resource efficiency.

Strong Participation and Measurable Impact

The Nebraska Master Irrigator program has already demonstrated meaningful impact. A total of 158 participants—including producers, agricultural consultants, industry professionals, conservation partners, NGOs, and university staff—took part in 2026 challenges. Post-event surveys showed significant gains in both knowledge (4.2 out of 5) and motivation to try new practices (4.4 out of 5).

Collectively, participants manage more than 350,000 acres and influence management decisions on several million acres across Nebraska. Participants estimated the value of what they learned at an average of \$12 per acre, with some reporting values as high as \$30 per acre. Notably, 95% of participants reported having an intended follow-up action, ranging from management practice changes to participation in TAPS or on-farm research. Among returning participants from the previous year, 100% reported implementing at least one follow-up action.

Looking Ahead

By combining peer learning, on-farm data, and strong public-private partnerships, the Nebraska Master Irrigator program is helping producers strengthen profitability while protecting Nebraska's vital water resources. As participation continues to grow, the program is poised to play an important role in advancing sustainable, resilient agriculture across the state.

Led by Nebraska Extension, the Nebraska Water Center, and the Daugherty Water for Food Global Institute and supported through a five-year technical assistance agreement with USDA NRCS, the program also benefits from strong industry sponsorships and partnerships. Nebraska joins a growing national network of Master Irrigator programs operating in ten states, many located across the Ogallala Aquifer region. Locally, collaboration among NRDs, NRCS, and more than a dozen industry partners helps ensure the program is responsive to Nebraska's water and nutrient management challenges.



Master Irrigator programs provide hands-on opportunities for attendees to collaborate and learn more efficient water and nutrient management practices from one another.

Looking underground: why vadose zone core collection matters for Nebraska's groundwater quality

By David Munyaneza, Program Coordinator, Daugherty Water for Food Global Institute

In Nebraska, groundwater is the lifeblood for our homes, our crops and our communities. It's the water we drink and the foundation of our state's agriculture. Protecting this vital resource is a top priority, and that protection begins long before contamination ever reaches the deep aquifer. It starts in a critical, often-overlooked layer beneath our feet called the vadose zone: the region between the land surface and the groundwater table.

"This is the part of the system that tells the story before groundwater is impacted," explained Arindam Malakar, a research assistant professor at the Nebraska Water Center (NWC), a part of Daugherty Water for Food Global Institute (DWFI). "By the time contaminants are detected in groundwater, the water is often already polluted," he said.

Malakar's team collects samples of the vadose zone at field sites across Nebraska. The recent efforts by his team represent the final phase of a project that has been underway for nearly three years, but vadose zone monitoring in Nebraska has a much longer history.

"Nebraska is one of the few states with nearly four decades of high-quality vadose zone data," Arindam noted. "That long-term record is a key reason the state has been a leader in groundwater management."

By studying this layer of soil, researchers can better understand how contaminants move underground over time and, importantly, anticipate future risks to groundwater quality rather than reacting after damage has occurred, which is hard to remediate.

Why the Vadose Zone Is So Important

Vadose zone data captures how land-use and management practices can influence contaminant movement through soil. It also provides the data needed to forecast what may happen next, offering information for better decision-making.

Traditional groundwater monitoring relies on sampling water directly from wells. Vadose zone research is a shift that allows scientists to

observe contaminants like nitrate as they move through soil and before they reach groundwater. This approach gives researchers valuable lead time.

"If we can study the vadose zone quantitatively," Arindam said, "we can predict when groundwater might become contaminated and take action earlier, rather than responding after the fact."

This proactive approach is especially important in Nebraska, where groundwater supports agriculture, communities and ecosystems throughout the state.

How Vadose Zone Cores Are Collected

Vadose zone testing is a carefully planned and hands-on process. Each testing site is selected in collaboration with local Natural Resources Districts (NRDs), often based on groundwater nitrate levels and management classifications.

NRDs group areas into different phases depending on the severity of nitrate contamination in groundwater. These designations help determine where samples should be collected, how many samples are needed and how deep researchers must drill. Each sample—or core—is a vertical, cylindrical portion of soil and rock material taken from the vadose zone.

"We plan the coring strategy in advance," Arindam explained. "The phase designation and the depth to groundwater guide our decisions about equipment and how deep the cores need to go."

At each site, the team collects cores from the land surface all the way down to the groundwater table. The depth to groundwater can vary significantly across Nebraska. When the water table is relatively shallow, typically around 40 to 50 feet or less, the team uses a Geoprobe Systems direct push technique, which is efficient for reaching those depths. When groundwater lies deeper than that, they switch to a CME auger system, which is better suited for drilling beyond



Calvin Epp, Anna Krepel, Matthew Marxsen, and Jeremy Steele (left to right) process a soil core after it has been collected.



Vadose zone coring uses columns of soil samples to better understand how contaminants move underground over time.

40 to 50 feet and allows them to safely and effectively reach greater depths.

Cores are collected at five feet intervals. Each soil section is sealed in a liner, capped, labeled by depth and set aside in order. The process continues until the water table is reached. When the cores are laid out side-by-side, they form a visible profile of the subsurface, showing how soil layers change with depth.

What Happens to the Samples

After collection, the cores are transported to the Water Sciences Laboratory at the University of Nebraska–Lincoln (UNL), which is also a part of the NWC and DWFI. There, the sediments are processed and analyzed for nitrate and other forms of nitrogen.

Using these measurements, researchers create depth profiles that show how nitrate concentrations vary throughout the vadose zone. These profiles help reveal how contaminants move through the soil and how long it may take for them to reach the aquifer and begin to affect groundwater quality.

“With enough data, we can use models to estimate when nitrate in the vadose zone will reach groundwater,” Arindam said. “We can also evaluate how changes at the land surface may influence nitrate movement and transformation before it gets there.”

This information supports the development of best management practices and informs long-term groundwater protection efforts across Nebraska.

A Long-Term Commitment to Groundwater Protection

Consistent monitoring of the vadose zone over the past 40 years has allowed researchers to identify trends, improve predictive models and support informed decision-making at both local and state levels. It reflects collaboration among UNL researchers, NWC, DWFI, NRDs and other water managers across the state.

Each core collected adds another piece to a larger picture and helps Nebraska have one of the most comprehensive views of our groundwater quality in the country. By looking beneath the surface today, researchers are helping protect groundwater resources for future generations.



The research team, from left to right: Dr. Arindam Malakar (NWC, SNR), Matthew Marxsen (CSD, SNR), Dr. Hanamant Halli (NWC, SNR), Anna Krepel (NRD), Jeremy Steele (CSD, SNR) and Calvin Epp (NRD).

Meet the research team and learn more about the vadose zone coring work on the Daugherty Water for Food Global Institute's YouTube channel.

View the video at go.unl.edu/VadoseStory.



Yonts Water Conference delivers low irrigation outlook

By Gary Stone | Nebraska Extension Water and Crops Educator, Jessica Groskopf | Nebraska Extension Agricultural Economics Cropping Systems Educator, John Thomas | Nebraska Extension Water and Crops Educator, Dr. Xin Qiao | Nebraska Extension Water Irrigation Specialist, Chabella Guzman | PREEC Communications Specialist

The annual Yonts Water Conference, held on Wednesday, April 8, packed the auditorium and overflowed into side rooms, with 270 attendees at the Panhandle Research Extension and Education Center in Scottsbluff. The crowd of Nebraska and Wyoming ag producers and irrigation stakeholders in the North Platte River Valley gathered to receive updates on snowpack/runoff conditions, reservoir carryover, tunnel replacement progress, and resources and options from the USDA Risk Management Agency.

The U.S. Bureau of Reclamation (USBOR) provided estimates for the snowpack/runoff for the North Platte River Basin. The 2026 forecasted runoff/inflow for the North Platte Project (Pathfinder and Guernsey) is approximately 550,000 acre-feet. This number includes water ownership/carryover of 340,000 acre-feet in both reservoirs. The 550,000 acre-feet of water is split between the Pathfinder Irrigation District, Goshen Irrigation District, and the Gering-Fort Laramie Irrigation District. The amounts each district will receive will depend on the final estimated forecasts from the USBOR and on each district's carryover amounts. Other irrigation districts in the North Platte River valley may have some storage water carryover at Glendo and rely on natural-flow water rights. The average runoff/inflow is around 891,000 acre-feet. The snowpack/runoff started approximately 30 days earlier than normal, with a snow water equivalent approximately 9-10 inches less than normal. The North Platte River Basin snowpack is at 39% of normal at this time.

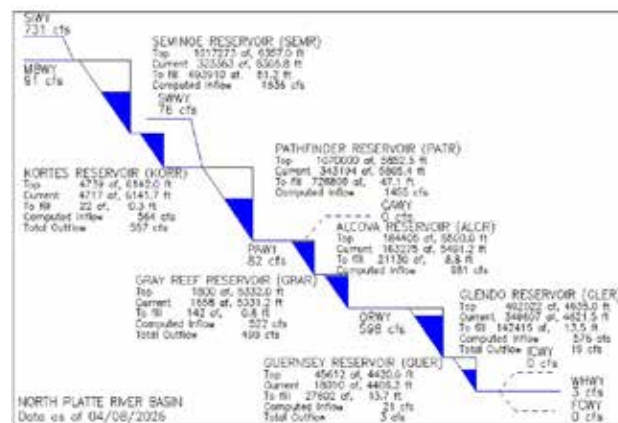
Currently, Pathfinder Reservoir, 343,194 acre-feet full, and Seminoe Reservoir, 323,363 acre-feet full, are each 32% full. Glendo Reservoir, 349,607 acre-feet, is 71% full. Water allocations are expected for the 2026 growing season. The trigger amount for a forecasted allocation is a supply of less than 1,100,000 acre-feet.

"We have received interest from irrigation districts regarding water loans," said George Finnegan, USBOR Wyoming Office Water Scheduler. "We have approached Wyoming Seminoe/Alcova reservoirs (Kendrick Project), and they have agreed to work with us."

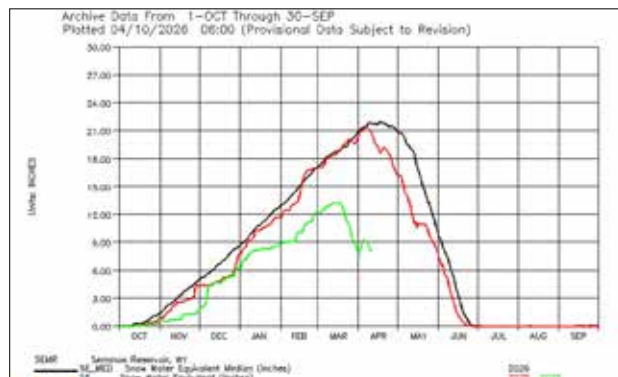
Irrigation districts would need to notify the USBOR of their interest in a water loan, the requested water quantity, and the payment terms. The water loan cannot exceed 100,000 acre-feet. The loan request must be approved by the Casper-Alcova Irrigation District, the State of Wyoming, and the USBOR, and a NEPA review must be completed. The cost has yet to be determined, there is no carryover, and the loaned water must be repaid to the Casper-Alcova Irrigation District prior to the 2027 water delivery. The potential for a call on the river by the senior water-right holders exists, and the details of the call would have to be worked out by Nebraska and Wyoming. How many days and when water deliveries will take place will be determined by the irrigation districts at a later date. Many of the producers at the meeting are also waiting on the irrigation districts' decisions. Given the current drought, producers are hard-pressed to make agronomic decisions for their operations.

"Well, it sure looks like we're probably in a situation where we're not going to be allowed a lot of irrigation water," said Doug Harimon, Scottsbluff farmer and crop adjuster. "It is getting pretty dire. The problem is that our ground is so dry right now that getting the crop started is an issue. Even if we have 40 to 50 days of water, we will need it just to get the crop up."

Nebraska Extension personnel provided information on nitrogen application rates, amounts, and timing to help reduce over-application of this nutrient and avoid groundwater contamination. The conference also highlighted research on deficit irrigation for area crops to producers, should there be limited water supplies this growing season. Field specific ET for sugarbeets, corn, and dry beans for irrigation water application management can be found at: <https://go.unl.edu/o4uc>. The free ACREE app is a mobile irrigation-scheduling tool that does not require soil-moisture sensors.



U.S. Bureau of Reclamation TEACUP image of the North Platte River reservoir levels, inflows, and outflows along the North Platte River in Wyoming for April 8, 2026.



Snow water equivalent above Seminoe Reservoir in the Snowy Range and Sierra Madre mountains.

Representatives from the Gering-Fort Laramie Irrigation District and HDR Engineering provided an update on the replacement of Tunnel No. 2 on the Goshen/Gering-Fort Laramie Irrigation District's main line canal. New entrances and exits for the tunnel are being constructed for the digger shield to commence tunnel replacement starting in the fall of 2026. The two affected irrigation districts have secured the funds to replace both tunnels, thanks to efforts by Nebraska and Wyoming legislative representatives and the USBOR.

The USDA Risk Management Agency representatives outlined programs available to producers and answered questions about potential scenarios producers may encounter with the expected water shortage in the North Platte River valley. Local weather forecaster Don Day provided the spring and early summer weather outlook.

A special thanks to the Goshen Irrigation District, Gering-Fort Laramie Irrigation District, Pathfinder Irrigation District, and Farmers Irrigation District board members and staff who helped make this conference possible.

The Yonts Water Conference was livestreamed to accommodate producers, landowners, and related agricultural entities. To view the conference recording, visit go.unl.edu/yonts.

Nebraska Extension is a Division of the Institute of Agriculture and Natural Resources at the University of Nebraska–Lincoln cooperating with the Counties and the United States Department of Agriculture. Nebraska Extension educational programs abide with the nondiscrimination policies of the University of Nebraska–Lincoln and the United States Department of Agriculture.



Crystal Powers, Nebraska Extension Statewide Educator, discusses nitrogen applications at the 2026 Yonts Water Conference.

Master Irrigator program featured on KRVN Rural Radio

By Ann Briggs, Communications and Program Specialist, Nebraska Water Center



University of Nebraska–Lincoln leaders recently highlighted the Master Irrigator Program during a Rural Radio Network interview, emphasizing its role in helping producers manage irrigation, nutrients, and costs through practical, farmer-led collaboration.

Tiffany Heng-Moss, NU vice president and IANR vice chancellor, said water management remains a pressing issue across Nebraska agriculture. “Water management is top of mind for Nebraska producers, whether they are dealing with rising input costs, variable weather, or making decisions field by field,” she said. Heng-Moss noted that irrigation efficiency and nitrogen management are essential to protecting both productivity and profitability.

She emphasized that the program builds on producers’ existing expertise. “Nebraska farmers are among the most knowledgeable irrigators in the world, and that expertise is one of our state’s greatest strengths,” Heng-Moss said. “The Master Irrigator Program builds on that strength by bringing producers together with our team in IANR, industry partners, natural resource districts, and other University of Nebraska programs.” She described the initiative as “designed by farmers for farmers,” with a focus on whole-farm, real-world decision-making.

Crystal Powers, a Nebraska Extension water and cropping educator, explained what makes the program unique. “What makes it really unique is that we really wanted to bring together the whole team around how do we make irrigated acres successful,” she said. Powers compared farming to running a race, noting that while producers operate independently, success relies on strong support. “How do we come alongside to help run that race the best as we can?”

Powers said farmers played a central role in designing the program through a statewide summit and advisory board. The first year focused on irrigation and nitrogen management in response to drought conditions and high fertilizer prices. “Those are two of the biggest pieces in irrigated systems that really need to be tackled,” she said.

Heng-Moss concluded by linking the program to the land-grant mission, calling it an innovative way to meet the evolving needs of Nebraska agriculture.

To listen to the interview, visit go.unl.edu/MasterIrrigatorInterview.

Nebraska Water Center supports early-career funding through USGS 104b program

By Taytem Carmichael, Communications Intern, Nebraska Water Center

Every year the Nebraska Water Center provides grant funding for research through the U.S. Geological Survey 104b program. The 104b program supports early-career faculty conducting research in Nebraska as they address important water challenges within and outside of the state.

In 2025, \$75,418 was awarded to three research projects. These projects not only advance scientific understanding, they also provide hands-on training opportunities for students and support impactful research across the University of Nebraska. In addition to these three projects, \$25,000 will be used to support undergraduate research fellowships to provide research experiences for students over the summer.

Funds are available to the researchers from January 2026 through December 2026. These funds are intended to kick start research programs and eventually lead to publications, collaborations, and extramural funding.

Awards were granted to the three following projects:

Examining River Evolution: A Historical Analysis of Riparian Vegetation and Channel Morphology of the Platte River, Nebraska. *PI Mark Stone, co-PI: Aaron Mittelstet. \$28,982*

The Platte River is one of Nebraska's most important waterways. The river supports both agriculture and industry, provides drinking water to communities across Nebraska, and sustains critical wildlife habitat for species. Over time dam construction, groundwater withdrawals, and upstream diversions have changed the river's flow and shape. Sections of the Platte have narrowed and become vegetated, which is decreasing habitat for endangered species and changing the river's flood dynamics. This project will examine how the river's channel and riparian vegetation have changed from 1984 to 2025 using Landsat satellite imagery. Combining satellite data with temperature, precipitation, and streamflow records, will allow the research team to identify trends in vegetation and channel movement. The findings will help inform adaptive river management and restoration strategies, for a more sustainable future.



Mark Stone

Snow Drought in the Missouri River Basin and Its Hydrological Implications. *PI Liang Chen. \$27,936*

Snowfall is an important factor in the hydrology of the Missouri River Basin. In recent decades, "snow drought" has become more common, which are periods of abnormally low winter snow accumulation. The frequency, severity, and downstream impacts of snow drought in the Missouri River Basin aren't fully understood yet. This project will develop a 40-year climatology of snow drought across the basin, identifying patterns in frequency, duration, and intensity. Using high-resolution observational and modeling datasets, the study will also examine how winter snow drought influences soil moisture and hydrologic drought conditions in the spring and summer. Finding the connections between winter snowpack deficits and soil moisture, will allow the research team to improve understanding of drought risk and water resource management in the basin. The findings will be used to receive further grant funding.



Liang Chen

Impact of Wetlands on Improving Water Quality in Pecan Creek and Deadman's Run. *PI Jean Niwenshuti, co-PIs Derek Heeren and Aaron Mittelstet. \$18,500*

With the City of Lincoln and the Lower Platte South Natural Resources District, this project addresses flooding and water quality concerns in Deadman's Run, where more than 500 homes and businesses are currently located within the floodplain. Planned mitigation efforts include two retention ponds, one located on UNL's East Campus, and four on wetlands along the tributary. The research team plans to develop a hydrologic model (HEC-HMS) to simulate storm events and assess peak flows. Water samples collected upstream and downstream of the wetlands will be analyzed for nutrients, sediment, bacteria (including *E. coli*), and other indicators of water quality. Laboratory analyses will be conducted at UNL's Water Sciences Laboratory and Ecological Engineering Lab. This study will help estimate how effectively constructed wetlands can reduce pollution and mitigate flood risk. The team plans to attain more federal funding to continue monitoring after construction is finished to ensure long term environmental benefits for Lincoln.



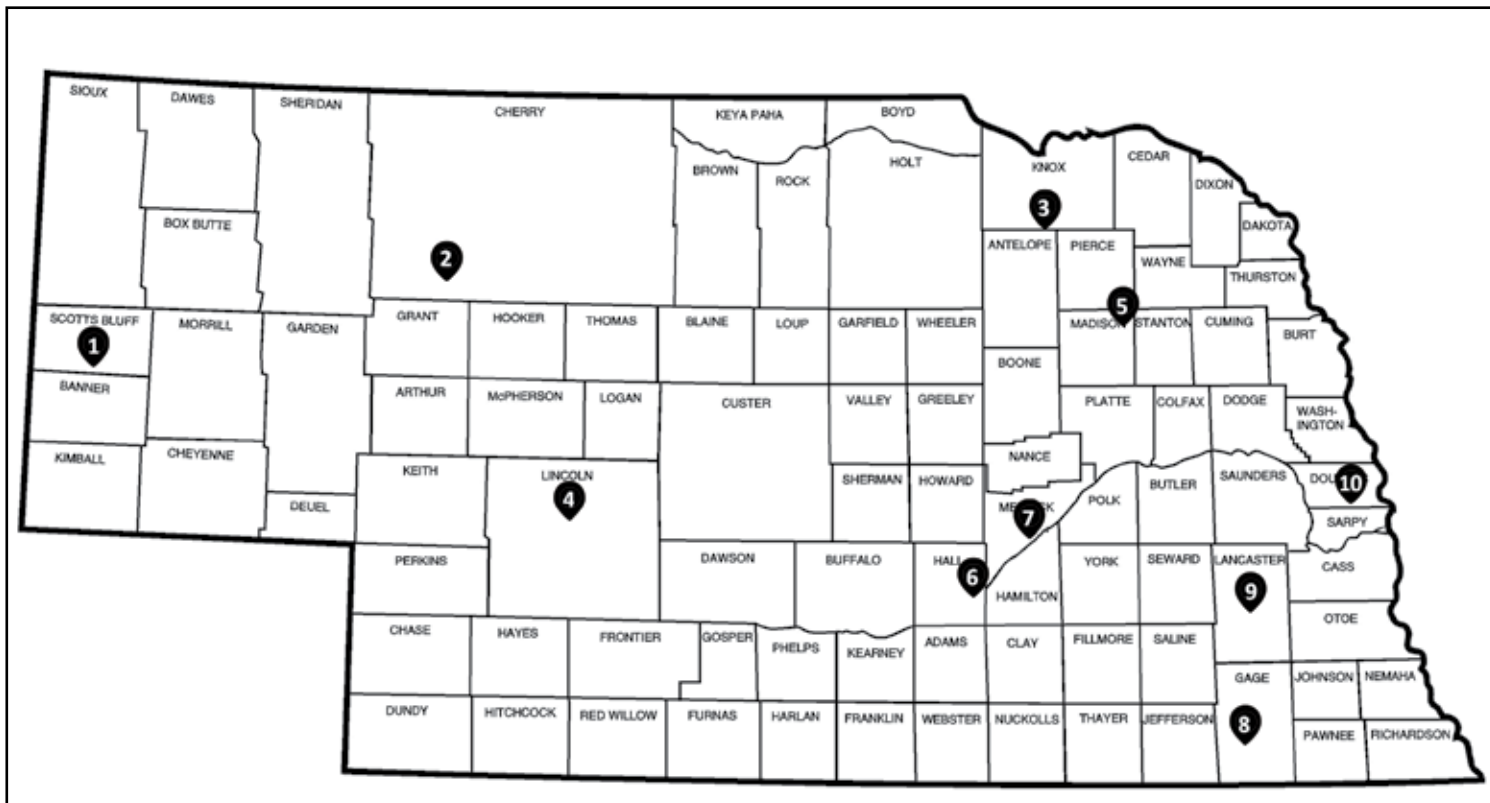
Jean Niwenshuti

Nebraska Water Center impact across the state

By Ann Briggs, Communications and Program Specialist, Nebraska Water Center

The Nebraska Water Center addresses water research, education, and training throughout the state by providing funding for research, hosting training events, and supporting education programs.

This map shows a selection of Nebraska Water Center projects throughout the state that have been undertaken in the past six months.



- 1, 2 Locations of 104b funded projects for Sandhills groundwater level monitoring and water smart lawn care community education
- 3 Field site for nitrate management project in partnership with the Nebraska Corn Board
- 4 Field site for Testing Ag Performance Solutions educational program
- 5 Master Irrigator Shop Talk session location
- 6 Know Your Well professional development workshop held at Central Platte NRD office
- 7, 8 Master Irrigator Design Summit locations
- 9 University of Nebraska – Lincoln campus location, home to the Nebraska Water Center and the Water Sciences Laboratory
- 10 Westview High School, part of Know Your Well classroom curriculum writing and testing team

Join us at our upcoming events

Water and Natural Resources Tour
Water Management in the Republican River Basin

June 22 - 24, 2026
McCook and Curtis, Nebraska

Nebraska Water Conference

October 15 and 16, 2026
East Campus Union
Lincoln, Nebraska

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