

Nebraska Water Center Conference Hits the Road to Scottsbluff in August



The charismatic landscapes of western Nebraska are host to this year's water conference.

After postponement in 2020, the Nebraska Water Center's annual conference will return this August.

Entitled "The Shape of Water in Western Nebraska," the conference will be held Monday, August 16, at the University of Nebraska–Lincoln's Panhandle Research and Extension Center in Scottsbluff. An all-star lineup of Nebraska water professionals will discuss water infrastructure in the panhandle, western Nebraska's unique hydrogeology, and innovation in water and agricultural management.

Additionally, the conference will feature a research poster session and evening banquet at the Legacy of the Plains Museum. On August 17 and 18, a post-conference water tour — organized by the Scottsbluff/Gering United Chamber of Commerce — will meander through natural landmarks, canals,

recreation areas and working farms and ranches in western Nebraska.

"We are grateful the pandemic has reached a point that allows us to again offer an engaging, in-person conference," said Nebraska Water Center Director Dr. Chittaranjan Ray.

"Furthermore, we're excited to co-host the conference and tour with the Panhandle Research and Extension Center and the North Platte NRD."

Round trip transportation will be offered from Lincoln to Scottsbluff on a first-come, first-served basis and will depart Sunday, August 15, and return Thursday, August 19.

Learn more and register for the conference at go.unl.edu/2021water.

Inside

Mead Research	p. 2
Nitrate Groups Update	p. 3
McCornick Reappointment	p. 4
Water Variability Study	p. 5
NET Funding	p. 6
Irrigation Well Water	p. 8
WSL Interns	p. 9

And More!

UNMC, NU Researchers Join Forces to Investigate AltEn Pollution

Editor's Note: This article is adapted from a UNMC website tracking the AltEn pollution.

A team of multi-disciplinary scientists and public health professionals is investigating the contamination of water, soil, and air caused by a closed ethanol plant that the State of Nebraska is suing.

Toxic piles of ethanol byproduct — called wet cake — are rotting on the grounds of the plant near Mead, Nebraska, and a stench permeates the area. Snow and rain send chemical-laden runoff into waterways, contaminating groundwater and drinking water. In dry weather, the wind kicks up toxic dust that has been linked to public health issues in local residents.

The AltEn LLC plant used seed corn coated with fungicides and insecticides — including those known as neonicotinoids or “neonics” — to produce ethanol, becoming one of the largest stockpilers of surplus seed corn in the United States. The wet cake was sold to farmers as fertilizer until 2019 when it was found to be contaminated with levels of toxins in excess of 1,000 times the legal threshold.

After being prohibited by the State from continuing to sell their wet cake, the company piled 84 tons of toxic wet cake and excess seed corn outdoors, rather than disposing of it.

Public health experts, led by the UNMC College of Public Health, have launched an investigation to determine the extent of the pollution by testing animals and taking samples of water, soil and air. This work will track the path of chemicals from the AltEn plant into drinking water and its impact on the lives of Nebraskans. Adverse effects on human health will be assessed and monitored as the research continues, and such data will be reported on these pages.

In addition to UNMC researchers, several UNL faculty are participating, including: Dr. Dan Snow, research professor and director of the Water Sciences Lab; Dr. Shannon Bartelt-Hunt, professor and chair of the Department of Civil and Environmental Engineering; Elizabeth VanWormer, assistant professor, School of Natural Resources; and Judy Wu-Smart, Extension and research entomologist, Department of Entomology.

For more information visit unmc.edu/publichealth/departments/environmental/mead/.



A pesticide pile at the AltEn ethanol plant in Mead, Nebraska. (Credit: Judy Wu-Smart)

Statewide Nitrate Proposals Complete

By Crystal Powers, Research and Extension Communication Specialist, NWC/DWFI/Extension

New collaborative proposals to address statewide nitrate awareness and policy have been submitted by the Nebraska Nitrate Working Groups.

Leaders from across Nebraska’s water and agricultural sectors were convened by Crystal Powers, NWC Research and Extension Communication Specialist, and Katie Pekarek, Extension Educator in the UNL School of Natural Resources. For the past several decades, organizations across Nebraska have taken the lead on a variety of programs seeking to address the increasing nitrate levels in the state’s groundwater. The Nitrate Working Groups were convened with the purpose of complimenting these individual programs by finding common efforts which partner organizations can prioritize and collaboratively address.

Three working groups met through the past winter: Awareness, Policy, and Education. A systems-thinking approach with facilitated ideation was used to develop actionable projects that can be implemented in the next three to five years and require cross-organizational support. Overall, 85 participants from 31 organizations developed the proposals.

Awareness Working Group Proposal

Most Nebraskans do not perceive nitrate in their drinking water as a concern, despite evidence of rising nitrate concentrations throughout most groundwater in the state. As concerns about the impact of Nebraska’s water quality on human health grow, improved public health communication dealing with these water quality challenges is needed. The Nitrate Awareness Working Group recommends an awareness campaign as part of a broader strategy designed to motivate locally-driven actions and generational changes which restore and protect water resources by providing needed tools, skills, and data.

Goal: Connect all Nebraskans to actionable information about water quality.

Action 1: Develop shared communications resources

Action 2: Empower local champions to deliver messaging

Action 3: Deliver programing to protect drinking water and public health

Action 4: Develop a “Nebraska Water Quality App” and facilitate its use

Policy Working Group Proposal

Agriculture policy can be a tool for encouraging equitable minimum standards and incentivizing innovation. Nebraska has a robust local water governance structure in the Natural Resource Districts. This working group looked at policies that can complement on-going local water quality efforts.

Goal: Nebraskans will have continued access to safe water through encouraging equitable adoption of behaviors that address the nitrate issues in Nebraska.

The Policy working group proposes to develop a checkoff program for nitrogen fertilizer. Funds from the checkoff would be placed in a fund governed by a representative board. The checkoff would fund activities which help ensure all Nebraskan’s have access to safe drinking water. This includes prevention, treatment, research, education, and communication activities. Prioritization will be data driven and solution oriented.

For full proposal details visit the NWC website.



The growing concern of nitrate in groundwater motivated the formation of working groups and solutions. (Credit: University Communication)

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

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

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Editor
Jesse Starita
Editorial Assistants: Patricia Liedle and
Crystal Powers

Designers
Stephanie Severin
Macy Behrens

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



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McCornick Reappointed to Lead Daugherty Water for Food Global Institute

Editor's Note: This article originally appeared in the June 9 edition of IANR News.

Peter McCornick, who has led the Daugherty Water for Food Global Institute (DWFI) at the University of Nebraska since 2016, has been reappointed for a second five-year term.

Under McCornick's leadership, the institute has made huge strides in fulfilling its mission to improve agricultural water management to ensure sustainable food and water security in the face of population and income increases, a changing climate and the growing demand for scarce water resources, said University of Nebraska System President Ted Carter.

"The University of Nebraska's Daugherty Water for Food Global Institute is helping to solve one of the most urgent and complex challenges facing our world today," Carter said. "Thanks to the work of our faculty and our many partners, Nebraska is leading that conversation. We have much work ahead, and I believe Dr. Peter McCornick is the right person to lead the institute forward. I look forward to what we will achieve under Peter's leadership in helping improve the human condition here and around the world."

The institute's recent accomplishments include improving food security through farmer-led irrigation efforts. DWFI has also continued to develop and apply its suite of tools to provide usable, accurate and real-time information on water use across Nebraska and beyond for

farmers, water managers, planners and other researchers.

The institute has also helped advance successful business models in irrigated agriculture. For example, the International Fund for Agricultural Development recently partnered with DWFI and provided a \$1 million grant to identify and promote new irrigation opportunities in Rwanda and five other sub-Saharan African countries.

Last year, DWFI, the University of Nebraska Medical Center's College of Public Health and the University of Nebraska-Lincoln's Institute of Agriculture and Natural Resources established the Water, Climate and Health partnership to address some of Nebraska's most pressing public health issues associated with water and climate.

"Dr. McCornick is a highly effective leader and a wonderful partner who has significantly advanced the mission of DWFI, leading to many impactful outcomes for the people of Nebraska and beyond," said Mike Boehm, NU vice president for agriculture and natural resources and Harlan Vice Chancellor for IANR. "Because of his leadership and vision, DWFI is well positioned to continue its upward and exciting trajectory."

Prior to joining DWFI, McCornick was the deputy director general of research at the International Water Management Institute. With an international career focused on improving the sustainable management of water resources, he



DWFI Executive Director Dr. Peter McCornick.

has led interdisciplinary research and development programs on water, agriculture and the environment in Africa, Asia, the Middle East, Canada and the United States.

McCornick earned a bachelor's degree from the University of Newcastle and master's and doctoral degrees from Colorado State University. He is a licensed professional civil engineer in Colorado and a member of the American Academy of Water Resources Engineers. In 2018, McCornick was elected a board member of the World Water Council and a member of the Food and Agriculture Organization's international steering committee of the Water Scarcity in Agriculture initiative. His second term leading DWFI takes effect July 1.

“ The University of Nebraska's Daugherty Water for Food Global Institute is helping to solve one of the most urgent and complex challenges facing our world today. ”

— Ted Carter, University of Nebraska System President

New Study Highlights Variability of Water Values for Crop Production in the Central High Plains



Dr. Renata Rimsaite is the paper's lead author and a DWFI postdoctoral research associate.

Farmers use irrigation to reduce the impacts of drought and to maintain their crop yields despite variability in weather. Understanding the monetary value of irrigation water helps to inform farmers and policymakers about potential impacts of water shortages. It also highlights the importance of a reliable water supply in supporting agricultural land values.

A new study co-authored by Daugherty Water For Food Global Institute (DWFI) Postdoctoral Research Associate Renata Rimsaite, Corteva Agriscience Data Scientist Justin Gibson, and DWFI Director of Policy Nick Brozovic introduces a framework for understanding the economic value of water used in agricultural production. In their paper, the three authors apply the framework to corn production in the central High Plains region of the United States.

"We used corn revenue corresponding to both irrigated and non-irrigated yields and adjusted for irrigation requirements in different geographies. Our results show that in areas where rainfall is the main source of water for crops, irrigation can still provide significant economic value to agricultural producers," said Gibson. Gibson is also a past postdoctoral researcher with DWFI.

The findings suggest that the per unit value of irrigation water is highest not during severe droughts and not in more arid areas of the study region, but rather when and where irrigation can make the largest improvements to average crop productivity.

"Policymakers can use these results to reduce the impacts of future droughts on agriculture, especially where climate change leads to increases in irrigation needs," said Rimsaite.

Read the full article in Environmental Research Communications at go.unl.edu/water-value.

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The new study was published in Environmental Research Communications.

“ Policymakers can use these results to reduce the impacts of future droughts on agriculture, especially where climate change leads to increases in irrigation needs. ”

— Dr. Renata Rimsaite

23 Faculty Awarded Nebraska Environmental Trust Grants

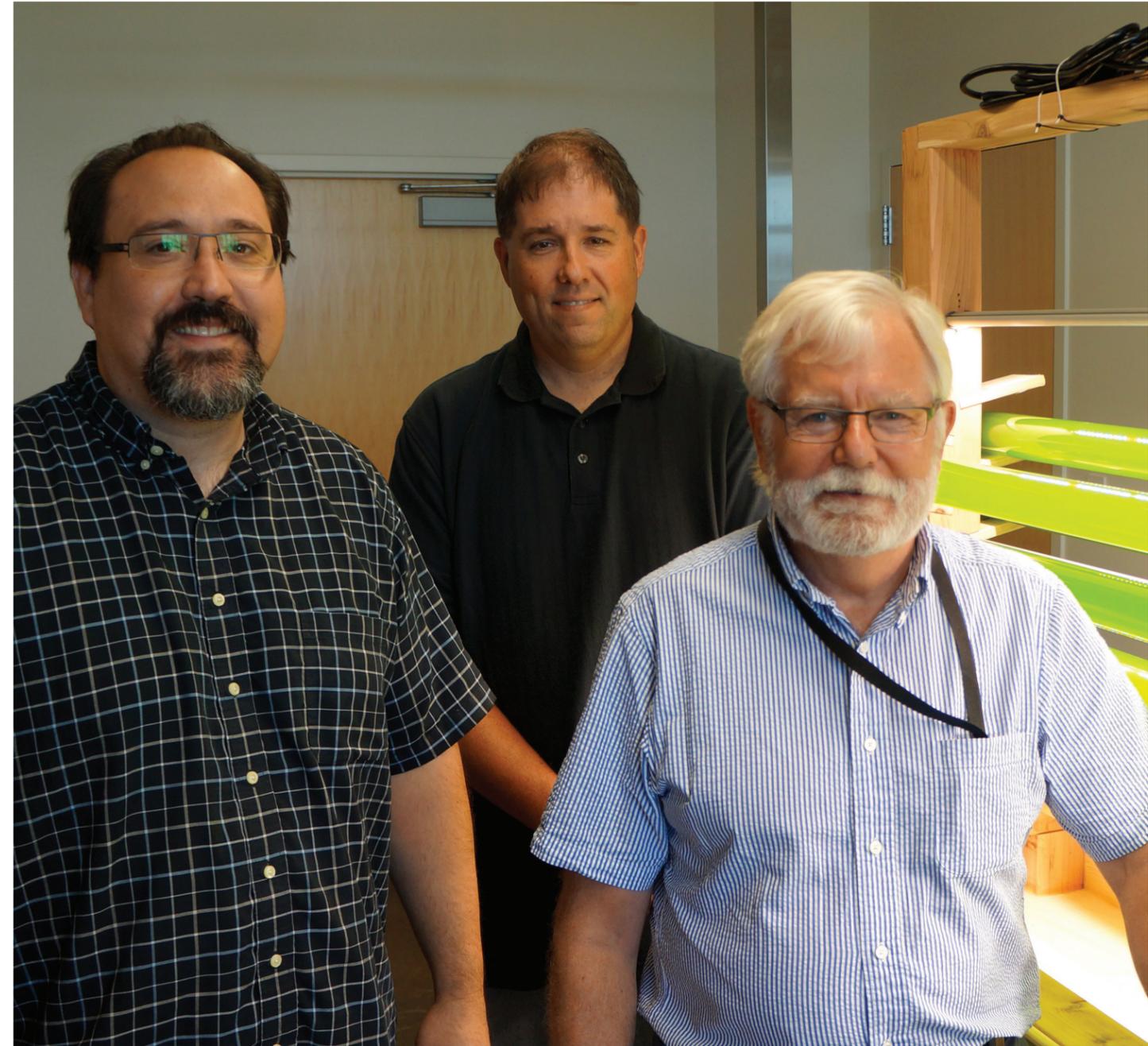
Editor's Note: This article originally appeared in the May 25 edition of IANR News.

The following Husker projects and principal investigators received 2021 awards totaling \$2.1 million:

- Direct removal of groundwater nitrate coupling water treatment and algae growth, James Allen, research assistant professor of biochemistry, \$216,775.
- Assessment of greenhouse gas sequestration resources in Districts 5, 6 and 7 to improve carbon management opportunities in Nebraska, Seunghee Kim, assistant professor of civil engineering, \$196,467.
- StreamNet: Building capacity to improve water quality, Jessica Corman, assistant professor, School of Natural Resources, \$183,996.
- Improving statewide performance of conservation investments on Eastern redcedar invasions, Dirac Twidwell, associate professor of agronomy and horticulture, \$161,000.
- Nebraska farmers and farmland owners' attitudes of targeted conservation, Andrew Little, assistant professor, School of Natural Resources, \$152,447.
- Nebraska Master Naturalist — engaging Nebraska's youth as naturalists, Dennis Ferraro, professor of practice, School of Natural Resources, \$142,630.
- Flaming alfalfa to preserve soil health and prevent surface and ground water degradation, George Gogos, professor of mechanical and materials engineering, \$141,143.
- Adaptive management of Sandhills grasslands, Craig Allen, director, Center for Resilience in Agricultural Working Landscapes, and professor, School of Natural Resources, \$134,192.
- Surface water nutrient removal in eutrophic ponds using floating treatment wetlands, Tiffany Messer, adjunct assistant professor, School of Natural Resources and biological systems engineering, \$111,797.
- Detecting atrazine dissipation and evaluating herbicide programs without atrazine for weed control in corn and their environmental impact quotient: research and extension, Amit Jhala, associate professor of agronomy and horticulture, \$96,195.
- Improving soil health using heat-treated manure, Xu Li, professor of civil and environmental engineering, \$90,314.
- Water use and soil-water storage effect of individual and mixed cover species' impacts on soil quality, Suat Irmak, Harold W. Eberhard Distinguished Professor of biological systems engineering, \$87,884.
- Transforming manure and cedar mulch from "waste" to "worth" – Part II, Amy Schmidt, associate professor of biological systems engineering, \$81,949.
- Delivery of watershed science education to decision-makers — a multi-agency collaboration, Troy Gilmore, assistant professor, School of Natural Resources, \$78,600.
- Improving water quality and surveying fish populations using eDNA in Nebraska, Mark Pegg, professor, School of Natural Resources, \$75,000.
- Developing statewide community tree canopy map, Yi Qi, assistant professor, School of Natural Resources, \$44,218.
- Developing a decision-support tool for the successful incorporation of cover crops into Nebraska cropping, Andrea Basche, assistant professor of agronomy and horticulture, \$41,180.
- Effects of redcedar on the diversity and ecosystem services of Nebraska's forests, Sabrina Russo, professor, School of Biological Sciences, \$28,163.
- Niobrara River ecology and education, Jessica Corman, assistant professor, School of Natural Resources, \$27,637.
- Protecting the terns and plovers of Nebraska and mentoring the next generation, Mark Vrtiska, professor of practice, School of Natural Resources, \$21,884.
- Milkweed in the classroom, Douglas Golick, associate professor of entomology, \$19,259.
- Student-integrated forest and prairie management at Cedar Point Biological Station, Jon Garbisch, associate director, School of Biological Sciences, \$14,794.
- Eastern redcedar design — build microdwelling, Jason Griffiths, W. Cecil Steward Professor of Architecture, \$6,500.



The Nebraska Legislature created the Nebraska Environmental Trust in 1992. Using revenue from the Nebraska Lottery, the trust has provided more than \$349 million in grants to more than 2,400 projects across the state. Anyone — citizens, organizations, communities, farmers and businesses — can apply for funding to protect habitat, improve water quality and establish recycling programs in Nebraska. The Nebraska Environmental Trust works to preserve, protect and restore natural resources for future generations.



Dr. James Allen (left), research assistant professor of biochemistry, recently received Nebraska Environmental Trust funding for his water quality research.

Irrigation Well Water in Nebraska: Nutrient Concentrations and Other Properties

Author's Note: This article is by UNL Emeritus Soil Science Professor Charles Wortmann and originally appeared in the March 31 CropWatch newsletter.

The EC 3052 titled “Irrigation Well Water in Nebraska: Nutrient Concentrations and Other Properties” has been published by UNL Extension and is available for free download. This EC reports the results of a survey conducted in 2020 with the cooperation of all 23 Natural Resources Districts and the Nebraska Department of Environment and Energy. It involved analysis of samples from 642 irrigation wells (map). The results are reported in 21 maps and additional figures and tables.

Nutrients and liming effect applied are reported as concentrations and as pounds applied in 10 acre-inches which is then compared to the nutrients removed in the harvest of corn grain. The liming effect from irrigation is compared to amount of lime needed to neutralize the acidity produced by the application of 200 lb of fertilizer-nitrogen.

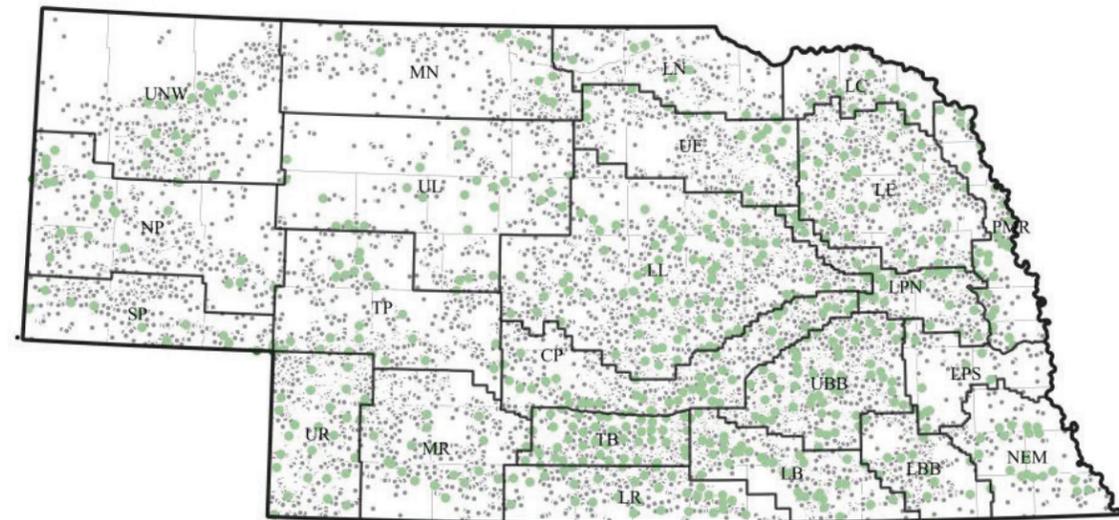
Statewide highlights include the percent of irrigation wells with a supply in 10 ac-in in excess of removal in 200 bu/ac of corn grain is:

- 100% for calcium and chloride
- 93% for magnesium

- 73% for sulfur
- 20% for potassium
- 16% for manganese or molybdenum
- 7% for boron
- <2% for zinc, copper, and iron
- 0% for phosphorus; and
- the liming effect exceeds acidification due to 200 lb fertilizer-N for 70% of wells.

Most of the remaining wells supply sufficient nutrients and liming effect to help maintain soil fertility and reduce the amount of fertilizer and lime application that is ultimately needed. None of the sampled wells had a high sodium problem and <0.5% had a salinity concentration. Water hardness was high enough with some wells that it might reduce the effectiveness of chemigation and cause formation of concretions on nozzles and pipes.

There is much variation between wells, so the testing of irrigation water for the supply of essential nutrients and liming effect is advised for each well or group of similar wells. This may only need to be done just once every 15 years, but is advised to help optimize nutrient and soil management.



Distribution of sampled wells (green symbols) relative to center pivot (gray dots) distribution.

Student Interns Promote, Enliven Water Sciences Lab

This spring, the Water Sciences Laboratory (WSL) at the University of Nebraska–Lincoln put out a call. That call asked for student interns to raise WSL’s profile — locally, nationally, and internationally. Ultimately, two Nebraska undergrads answered the call and they are now diving into a number of business and marketing projects to promote the lab’s unique services.

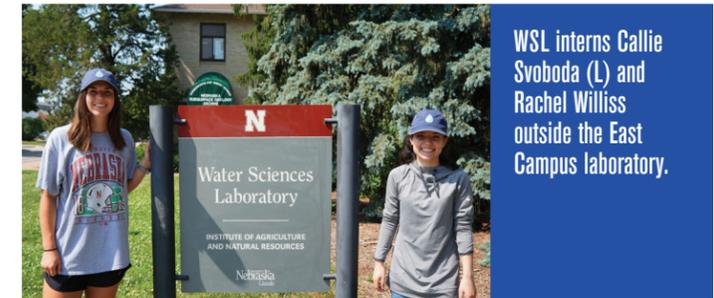
Callie Svoboda is a senior marketing major in UNL’s College of Business. The Lincoln native brings a diverse set of experiences to bear, including stints as a babysitter, YMCA camp counselor and retail salesperson. She said the position fascinated her and aligned with a desire to contribute to an on-campus organization. As part of her internship, Callie is writing in-depth profiles of lab researchers and projects and quarterbacking lab participation at events like East Campus’s Discovery Days.

Rachel Williss is a senior double majoring in integrated science and agricultural and environmental sciences communication in UNL’s College of Agricultural Sciences and Natural Resources. The Omaha native is simultaneously interning at the Daugherty Water for Food Global Institute this summer, applying her talent for graphic design,

videography and storytelling to both organizations. Rachel has already accumulated a rich store of experiences during college: a trip to Rwanda, an internship with the Rural Futures Institute and work at the Henry Doorly Zoo, among others. She intends to pursue grad school with a focus on One Health.

Callie and Rachel are interning through the year and both plan to graduate in May 2022.

For more information on WSL, visit watercenter.unl.edu/wsl.



WSL interns Callie Svoboda (L) and Rachel Williss outside the East Campus laboratory.

Water Sciences Lab Debuts New Course This Fall

By Callie Svoboda, WSL Business and Marketing Intern

What’s more fundamental for society than water? Now more than ever, so much depends upon this vital natural resource. Which is why the University of Nebraska’s Water Sciences Laboratory (WSL) is proud to debut its unique course on water this fall. NRES 439, Environmental Laboratory Instrumentation and Methods, is a one-credit-hour, in-person and online class for students who want to learn in a real-world setting. Students will expand their knowledge of environmental laboratory operations, testing, methods, safety, and documentation. Furthermore, students will complete lab training and prepare samples using state-of-the-art analytical equipment. Prerequisites for this course are CHEM 106A and CHEM 106L, or CHEM 110A and CHEM 110L. Graduate credit is available for independent study.

With 35 years of laboratory experience, Dr. Dan Snow will teach and share his expertise of water sciences throughout.



The Water Sciences Laboratory’s new course offers students hands-on and virtual learning opportunities.

When asked about the importance and necessity of offering this class to UNL students, Snow emphasized that “Studying and protecting the quality of our environment requires professionals who understand how to produce high quality results in a testing laboratory. NRES 439 will give students a practical introduction to environmental testing and a hands-on guided experience in laboratory testing methods. I think anyone using data from a testing laboratory, or who intends to produce their own test results, should take this class.”

In its 30-plus years on campus, the WSL has trained hundreds of undergraduate and graduate students and visiting scholars. Similarly, the lab has amassed over \$3 million worth of groundbreaking instruments, including the recent addition of a Xevo TQS triple quadrupole mass spectrometer. However, the researchers and students who devise the experiments and methods of testing are the lab’s most valuable assets.

Ultimately, students who complete this course will have a competitive advantage for a future paid internship at WSL. If you are looking to strengthen your water science knowledge and skills in a dynamic, working lab, sign up today as the course is capped at 12 students and will fill up fast!

The WSL is part of the Nebraska Water Center and Daugherty Water for Food Global Institute at the University of Nebraska. Learn more at watercenter.unl.edu/wsl.

Water for Agriculture Project Surveys Panhandle Residents on Local Water Issues



This article originally appeared in the May 12 edition of IANR News.

The University of Nebraska–Lincoln Water for Agriculture project, in collaboration with

local agencies and organizations, is now mailing short surveys to residents of the North Platte Valley about their views on local water and agricultural issues.

The Water for Agriculture project, funded by the U.S. Department of Agriculture’s National Institute for Food and Agriculture (USDA-NIFA), is a community-led effort to identify and respond to water and agricultural issues important for area residents.

Under the project, a local leadership group has been formed and active in several water issues, including sponsoring the Yonts Water Conference in Gering and helping in recovery efforts in the wake of the Gering/Fort Laramie Irrigation District tunnel collapse of 2019.

The local group represents agricultural producers, local agribusinesses, irrigation districts, natural resources districts, conservationists, and other stakeholders.

The purpose of the mail survey is to identify the water and agricultural needs, concerns and priorities of those who live in the North Platte Valley of western Nebraska. This survey will ask about views on quality of life, water quantity and quality

issues, and programs and projects to address these issues. The results of this research will help guide local leaders and the many partners working in western Nebraska as they identify key issues of concern and opportunities for action.

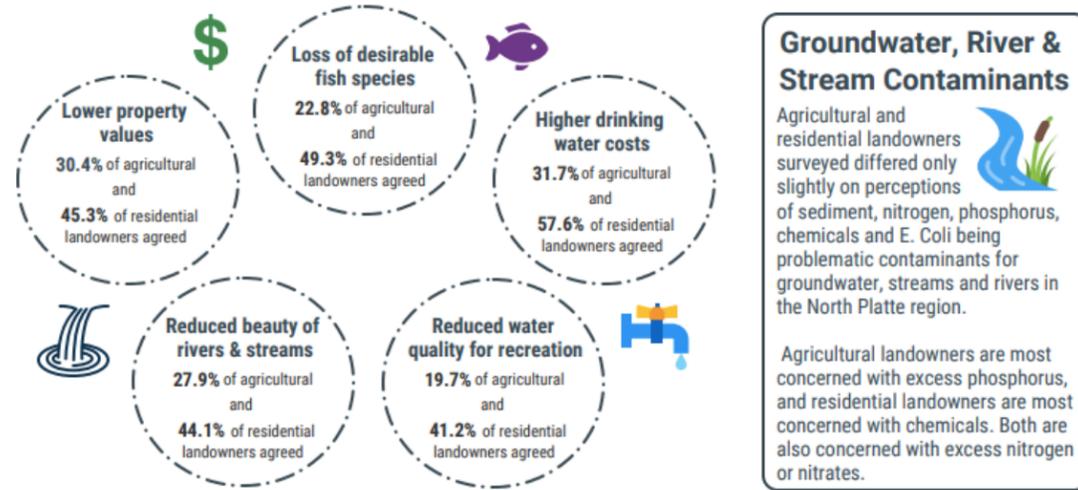
Anybody who receives a survey is asked to complete it so that those leading local efforts can better understand the area’s needs and concerns relative to water and agriculture. Responses are completely confidential.

The Water for Agriculture project in the North Platte Valley Region is part of a national project designed to bring together researchers, technical experts, local partners, Extension professionals, and communities to foster community-led solutions to the water and agriculture issues most important to them. The goals are to:

- Work in cooperation with five community-led working groups in Pennsylvania, Nebraska, and Arizona — one of which is in the North Platte Region
- Assist these working groups in identifying and addressing the water and agricultural issues that matter most to area residents
- Study the impact of the community-led engaged approach used with these working groups to work on water and agricultural issues

Learn more about these activities by visiting the Water for Agriculture project website, water4ag.psu.edu.

What are the biggest quality of life impacts related to water problems in the North Platte region?



Nebraska Water Center Partners with Nebraska Department of Environment and Energy for Brown Bag Series



The Nebraska Water Center (NWC) at the University of Nebraska–Lincoln has collaborated with partners across Nebraska since its founding in 1964. Examples include Extension research to benefit individual producers, equipping budding water professionals with employable skills and engaging Nebraskans around water issues through tours, conferences, presentations and publications. Key to this work is a strong relationship with Nebraska’s state agencies.

For years, NWC has organized a brown bag lunch series that provides a stage for Nebraska faculty and researchers to share their work with professionals who manage our water resources. This spring, NWC joined forces with the Nebraska Department of Environment and Energy (NDEE) to virtually showcase the university’s deep well of water and natural resources experts.

The series featured NWC staff, Extension educators, doctoral students, and faculty from multiple NU departments. The overarching goal was to present updates of existing collaborations between the university and the agency to spark conversations that could fuel new efforts.

Ryan Chapman, NDEE’s water quality assessment section supervisor, coordinated his agency’s participation in the brown bag series. He sees the series’ benefits spreading beyond agency staff.

“NDEE has a long history of collaboration, and I am delighted that we

are able to continue building relationships through this series. These partnerships help make it possible for Nebraskans to live, work, and enjoy a healthier environment,” said Chapman.

Planning is underway for a corresponding series this fall with the Nebraska Department of Natural Resources.

Ryan Chapman, NDEE water quality assessment section supervisor, helped coordinate the brown bag series.



Spring Seminar Series Concludes First All-Virtual Edition

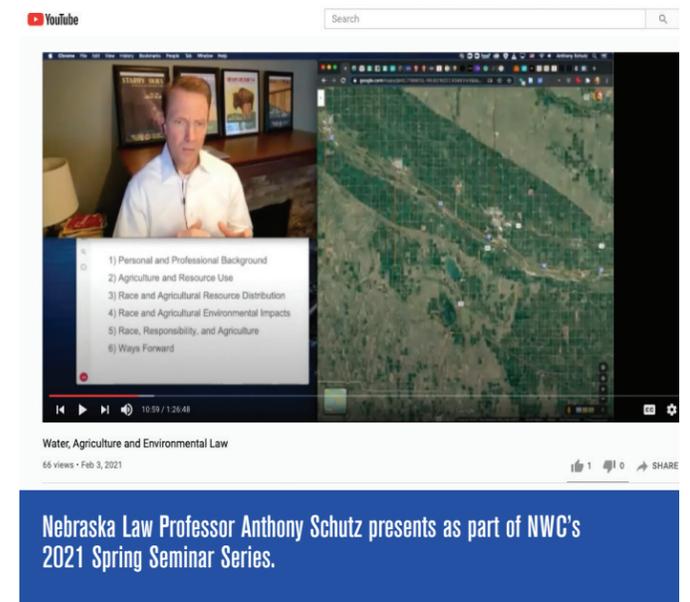
For the first time ever, NWC held its annual spring seminar series virtually. This enabled speakers from across the country — and other continents — to participate and share case studies based around the theme of “Tributaries: Race, Justice and the Environment.”

Indeed, the 2021 speaker lineup was one of the most diverse in series history. While they represented engineering, climatology, water chemistry, legal, policymaking and tribal backgrounds, the speakers also were geographically diverse, hailing from Oklahoma, North Dakota, Arizona, Puerto Rico and Kazakhstan. Nebraska speakers included legal scholars and tribal representatives.

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.

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.

All seminars are available at youtube.com/nebraskawatercenter.



ADDRESS SERVICE REQUESTED

The Ebb and Flow

By Crystal Powers, Research and Extension Communications Specialist, NWC/DWFI/Extension



The Water and Health Summit this June kicked off a budding partnership between the University of Nebraska Medical Center's College of Public Health and the Daugherty Water for Food Global Institute and Nebraska Water Center. As we met, the very issues we discussed were hitting the national news: a mega-drought stranding fish in drying rivers; farmers tearing out almond trees and culling cattle with no water

available for them; all-time-high temperature records breaking in places like Lytton, British Columbia, where a wildfire burned 90% of the village in the days after recording Canada's highest ever temperature. All of this while Nebraska's water quality issues continue their slow march upwards, with research pointing toward lifetime health risks: from the highest pediatric cancer rate in the Midwest to increased birth defects and rising thyroid disease.

What are we to do against such overwhelming conditions? Nebraskans have long seen extremes in weather and have learned the key: Tenacious Hope. This is not some naïve idleness. It is exemplified by the pragmatic, hard-working ethic of those who see a challenge and take responsibility. Exemplified by all those at the Summit committed to improving Nebraska's water. Such as Barb Cooksley, who shared her family ranch's long-standing commitment to stewardship in the fragile Sandhills and who joined the State of Nebraska's Climate Assessment and Response Committee. Also shown by Matt Bailey, farmer and co-chair of the Shell Creek Watershed Improvement Group, whose 20-plus year commitment led to the return of shells to Shell Creek and first de-listing of an impaired waterway in the United States, and whose daughter is now a student leader sampling the creek with Newman Grove science teacher Mark Seier, who for over 20 years has engaged over 140 students in understanding and caring for their own water.

As Renee Sans Souci of the Omaha Tribal Nation reminded all of us who live here today in this land Ní Btháska, "land of flat waters:" WATER IS LIFE.