

New University competition is “Testing Ag Performance Solutions” Steve Ress



Daran Rudnick, University of Nebraska–Lincoln’s West Central Research and Extension Center, explains the TAPS program to those on June’s water and natural resources tour.



A new competition is aimed squarely at seeing if local producers can out-farm university scientists.

In a field competition for managing center pivot irrigated corn for the current growing season at the University of Nebraska-Lincoln’s West Central Research and Extension Center (WCREC) in North Platte, contestants are making production and management decisions for individual plots, including: irrigation management, nitrogen management, hybrid selection, plant population, grain marketing and risk management.

The competition, which culminates in August, is known as “Testing Ag Performance Solutions,” or UNL-TAPS. University of Nebraska–Lincoln’s Daran

Rudnick, Department of Biological Systems Engineering; Matt Stockton, Department of Agricultural Economics; Chuck Burr, Nebraska Extension; and Rodrigo Werle, Cropping Systems developed it in partnership with the Nebraska Water Balance Alliance (NEWBA).

TAPS is hosting its First Annual Farm Management Competition at North Platte, which culminates with a field day and workshops on Aug. 24 and 25.

During the growing season competition, producers have been competing with each other, as well as University scientists for (1) most profitable farm, (2) highest input (water and nitrogen) use efficiency, and (3) greatest grain yield.

Monetary awards will be given at the final awards banquet in January 2018 for most economically profitable, highest input (water and nitrogen) use efficiency and highest grain yield.

The competition’s goal, Rudnick said, is to promote efficiency and profitability while making opportunities to learn from those who grow corn profitably.

It is being widely supported by Nebraska Extension, several Natural Resources Districts, NEWBA, Aquamart, The Nature Conservancy, Central Nebraska Public Power and Irrigation District, Platte River Recovery Implementation Program and the following industry partners: Agri-Inject, Airscout: Ag Valley CO-OP, AquaSpy, Climate Corp, Divirod, Farmers Edge, Nebraska/Iowa Equipment Dealers Association, LI-COR Biosciences, Martin Industries, Plains Equipment Group, Precision Planting - Cedar Lane Seeds Inc., Servi-Tech and SureFire Ag Systems, among others.

“Our mission is to engage forward looking agriculturalist to tap into the unlimited power of innovation, entrepreneurialism, technological adoption, improved techniques and methodologies to help Nebraska farm’s, farm businesses and farm families to maintain profitability and sustainability through the wise allocation and application of all their resources.”

“A group of us here at WCREC, including Matt Stockton, Chuck Burr, Rodrigo Werle, and myself, developed the new program in partnership with NEWBA to enhance our ability to engage with producers at a very high level,” Rudnick said.

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Summer brings research work, students, tours and farm shows

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

We have had quite a variety of programming and projects to keep us fully engaged over the past several months. Our Nebraska Water Center and University of Nebraska activities definitely do not pause over the summer months, as some might imagine.

One of those summer activities that generates a great deal of interest and general buzz among our constituents is the annual water and natural resources tour, with this June's tour certainly being no different. For three days in late June, we took about 60 people on tour, including a state senator, a state agency head and two members of the working media, to get a closer look at all of the competing uses and entities vying for their share of water in the critical Central Platte River Basin. The tour was June 27-29. It began at Central Nebraska Public Power and Irrigation District headquarters in Holdrege, and ranged westward to Lake McConaughy and back. Along the route we looked at organic farming, surface and groundwater irrigation issues, water for threatened and endangered species, water for recreation, water to meet our interstate compact obligations, water for producing hydroelectric power and water for many other uses. We toured the largest coal-fired power plant in the state, near Sutherland, and looked at how corn is handled that is used to produce all the Frito-Lay corn chips west of the Mississippi River. We also spent time at a Monsanto learning center that does a good job of showing people how modern agriculture makes more efficient use of the water they use to grow the crops we depend upon.

We also spent nearly a day at Lake McConaughy, which provides for hydro-power, recreation and surface irrigation water needs as far east as Minden.

Among our extremely varied and diverse group of tour attendees were more than a dozen members of the current Water Leaders Academy class.

Since there aren't any opportunities to white water raft in Nebraska, as there were on last year's tour in Colorado, it seemed fitting to end this year's tour with a somewhat slower and gentler kayaking of CNPPID's irrigation supply canal from Midway Lake to Gallagher Canyon, near Cozad. It sounded as though our tour was the first organized group to kayak that waterway and we thank CNPPID for their efforts to make that possible.

Also this summer there have been meetings on our High Plains Ogallala Aquifer study at Colorado State University in Ft. Collins. This project involves all states overlying the aquifer and is quite comprehensive, including modeling, biophysical, and economic analysis groups that have been

meeting to discuss progress on the projects and work that we expect to accomplish during the study's second year. These meetings are important opportunities to closely examine what activities are progressing smoothly and where we need to reassess what may need a boost. Our Nebraska colleagues are very involved in all three mentioned phases of this endeavor.

Closer to home last month, I had a chance to meet with several of our Natural Resources District managers at Ord to discuss nitrogen management and groundwater issues in the Bazile Groundwater Management Area in northeast Nebraska. We wrote extensively about this unique project in the last issue of the Water Current, which can be found online at watercenter.unl.edu. Our jointly funded (NWC, DWFI, Nebraska Extension) liaison, Ben Beckman, is also keeping close track of university involvement in this critical project.

I am currently working on another large research proposal for U.S. Department of Agriculture-NIFA with NWC as the lead in a project that will address water sustainability for food production systems in the Missouri River basin in the context of climate change. We are partnering with North Dakota State University, South Dakota State University, South Dakota School of Mines and Technology, University of Wyoming, and USDA-ARS in Sidney, Montana on this proposal.

Another unique project that is garnering a lot of attention this summer is the "Testing Ag Performance Solutions," or TAPS, program. TAPS is a field competition for managing center pivot-irrigated corn that is being managed by University of Nebraska faculty at the West Central Research and Extension Center at North Platte. The competition is seeing if local producers participating in it can out-farm our university scientists, but all will be winners, since the competition promotes efficiency and profitability while making opportunities to learn from those who grow corn profitably. A wide range of companies, agencies, NRDs, non-governmental entities and others are supporting this project. Workshops and culminating activities will be held at the North Platte center Aug. 24 and 25. You can read more about the competition in this issue of the Water Current.

Earlier this summer we were able to present a special seminar by Ron McMullin, executive director of the Alberta Irrigation Projects Association in Alberta, Canada. It was very interesting to hear the similarities and differences in irrigated agriculture between Nebraska and our neighbors to the north. Alberta is the center of irrigated agriculture in Canada, where it's 1.7 million irrigated acres account for more than two-thirds of Canada's total irrigated lands. Some of their money-making crops are a bit different than ours and include potatoes, hybrid canola seed, alfalfa seed, dry beans, sugar beets, mint, hay and a new one, hemp.

Upcoming, the annual Husker Harvest Days farm show near Grand Island will be Sept. 12-14. This year the research and extension exhibits are themed to "Small Changes, Big Payback: Strengthening Nebraska's Agricultural Economy." This is an anniversary year for not only the show itself and the university's involvement in it, but also for NWC involvement. It is the show's 40th anniversary and the university's Institute of Agriculture and Natural Resources has been present for every one of them, from the beginning in 1978. It marks the 20th show our communicator Steve Ress has been involved with and his 10th in leading coordination efforts for university exhibits. He's missed only one since 1997. That's a lot of farm shows.

Keep your eye on watercenter.unl.edu for details on the upcoming Nebraska Water Law Conference on Oct. 6, which will be at the NU College of Law in Lincoln, and our annual water symposium, which will be Oct. 26 and 27 at Nebraska Innovation Campus, also in Lincoln.

Nebraska Water Law Conference

Friday, Oct. 6, 2017

University of Nebraska College of Law, Lincoln

Nebraska Water Symposium

Thursday and Friday, Oct. 26/27, 2017

Nebraska Innovation Campus, Lincoln

Go online to watercenter.unl.edu
for up-to-date details as they become available

New University competition is "Testing Ag Performance Solutions"

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Producers enrolled in the competition are responsible for six management decisions, including irrigation scheduling, nitrogen fertilizer (fertigation), hybrid selection, seeding rate, insurance selection, and marketing of their grain, which will be implemented on three randomized plots under a variable rate irrigation system.

Competing producers submit their management decisions through a web form on the UNL-TAPS website. The competition kicked-off in mid-March and concludes with an award banquet January 15th, 2018. In season workshops/field tours were held June 27 and the upcoming event on August 24/25. On Aug. 24 field tours, research updates and industry

booths will be featured. Participants can choose from one of three interactive tracks in agronomy, economics and hydrology.

The following day is a half-day workshop on "Accelerating Innovation: New collaborations by producers, researchers, extension and the tech industry."

This newsletter is published with partial financial support from the Department of the Interior; U.S. Geological Survey. The content does not necessarily reflect the views and policies of the Department of the Interior, nor does mention of trade names or commercial products constitute endorsement by the U.S. Government.

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The Ebb and Flow

Ben Beckman

For those of you who may not yet know me, I was jointly hired by Nebraska Extension, the Daugherty Water for Food Global Institute at the University of Nebraska and the Nebraska Water Center late last summer to interact closely with our constituents, get a fuller picture of where and how we can interact and cooperate better, and to share information about our research, extension programming and outreach work that impacts all Nebraskans.

These constituents can be anyone in our state working on water and natural resources issues and include, but are certainly not limited to, our network of Natural Resources Districts, state and federal agencies, non-governmental organizations, irrigation organizations, and many others.

Much of my first few months on the job have been getting myself acquainted with the great things being done in Nebraska for management of water and natural resources and looking for places where we can contribute to resources and efforts.

The last few months have been full of visits to NRDs in the southern tier of the state, a trip to Valentine and then Scottsbluff with the Nebraska Water Leader's Academy, work with the Bazile Groundwater Management Area, Wellhead Protection meetings in Hastings, and of course my first Nebraska Water and Natural Resources Tour.

Before coming to the Nebraska Water Center/DWFI, I was an extension assistant for two years in the University's Pesticide Safety Education Program, which provides educational programming and materials on safe use of pesticides for extension educators who work with producers and applicators who are applying for state pesticide use licenses. Interestingly, that office, when it was known as "Environmental Programs" and was headed by Ed Vitzthum and Larry Schultze, was once an integral part of the NWC.

Since it is impossible for me to meet with everyone of you on a quarterly basis, I thought a regular column in this publication might help serve to keep you up-to-date on where I have been, what I have been doing and whom I have been talking to.

It has been a busy summer and I am learning a lot from all of you, part of a process I know is only beginning. I'll keep traveling the state to meet with those of you I haven't had the pleasure of meeting yet and welcome any ideas on people and places I should be visiting. You can give me a call at (402) 472-3305 or email at bbeckman@nebraska.edu. And if you're ever in Lincoln and want to chat in person, feel free to stop by our offices on Nebraska Innovation Campus (the old state fairgrounds) at 2021 Transformation Dr. Suite 3220.

The last week of June, NWC and Central Nebraska Public Power and Irrigation District hosted their annual Water and Natural Resources Tour in the central Platte River basin. Water use in the Platte River on the surface may not seem like the most exciting topic to spend three days discussing. It might not even seem like something you'd like to discuss for half a day. But when you dive down and start to look into the details that provide the motivation and governing guidelines for water management in the basin, you find a much more interesting story.

When you take time to step off the beaten path and do some exploring you find lots of interesting things; a rich history of producers and lawmakers with the foresight and drive to harness the river for power and irrigation, innovators who reached down deep underfoot and pulled water up from below to further improve agricultural production, and people who saw the uniqueness and variability across the state as an opportunity to provide local control of natural resource management.

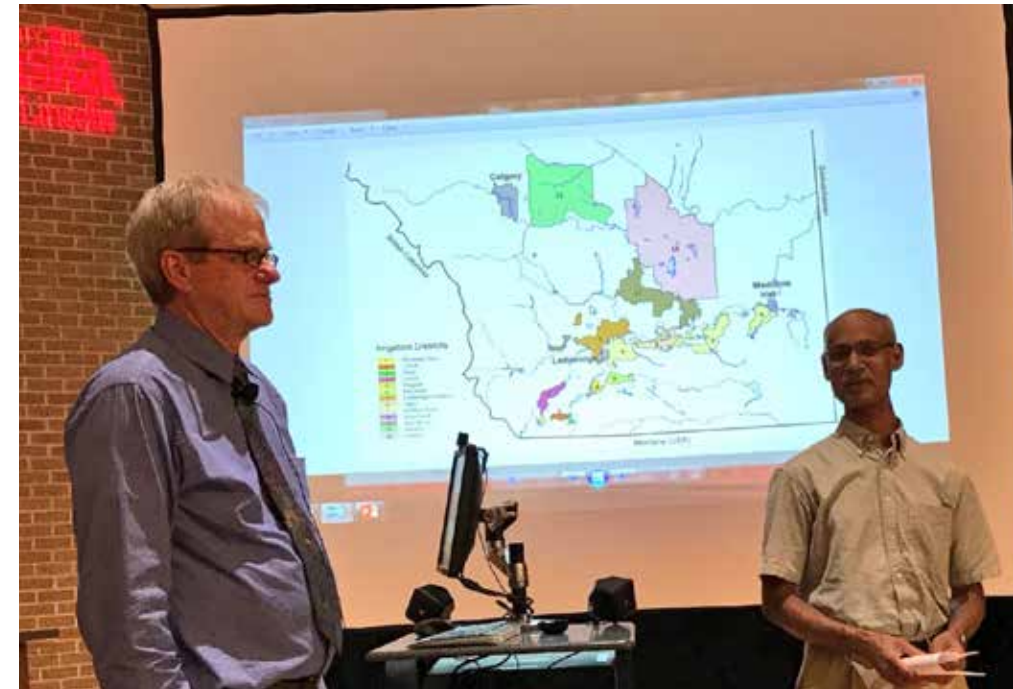
Against this backdrop of historical titans and clear thinkers, are those who work in the basin today. Their task is no easier than those who came before, despite our improvements in technology and understanding. They continue to seek new ways to manage water so that we can maximize its use for all needs along the river.

The ability to adapt to the issue at hand makes Nebraska a system poised to succeed in a world that demands more and more from our water resources. Solutions like canal rehabilitation, inter-basin transfers, improved crop use efficiency, groundwater recharge projects, and many more can all be wielded as tools to reach a common goal. While consensus on what the best path forward is may not always be easy, the unique approaches and cooperation highlighted in our tour stops, I believe, promises a bright future.

And this willingness to look at the issue in front of us and come up with outside of the box solutions is not unique to the Platte River; it's playing out all across the state. It took efforts just like this to put Nebraska on the map as a heavyweight in agricultural production, policy pioneer, and vibrant communities. It's nice to look around and see that vision and drive continue just as strong today.

McMullin brings Canadian irrigation to Nebraska; Irrigation in Alberta, Canada: Gaining Efficiency, Driving the Rural Economy

Steve Ress



Visiting lecturer Ron McMullin (left) and Nebraska Water Center director Chittaranjan Ray.

improve and rehabilitate Alberta's irrigation systems.

The principle money-making crops are potatoes, hybrid canola seed, alfalfa seed, dry beans, sugar beets, mint, hay and a new one, hemp.

A 30 percent efficiency and productivity gain in the 10 years from 2005 to 2015 was set as a target by the provincial government, a target not only met but exceeded by irrigation farmers and districts combined, he said. About

17 percent of the food processing in the province uses irrigated production as its primary product resource.

In Alberta, beef is another main product of the irrigated region, where there are more cattle than people. The County of Lethbridge alone is licensed for 700,000 head in feedlots.

New industry is popping up in the heart of irrigation country, and innovation and entrepreneurial spirit are high, McMullin said. But everyone takes time for fun, not on lakes, because there "aint any" in Palliser's Triangle – but there are 49 reservoirs used by city and rural populations alike.

"Irrigation is the lifeblood of rural society in the rural southern Alberta, and its influence spreads out to Alberta's 4.1 million people," he said.

McMullin has been executive director of AIPA since 2008. Its primary purposes are to influence policy and legislation affecting irrigation in Alberta.

Ron McMullin, executive director of the Alberta Irrigation Projects Association, has worked for more than 20 years to strengthen Alberta's irrigation community and ensure the area's water resources are wisely used to grow food, provide drinking water, serve industry and provide for ecosystems and recreation.

On June 15, McMullin presented a special seminar on his work at the University of Nebraska-Lincoln's East Campus Union, his visit being sponsored by the Nebraska Water Center, part of the Daugherty Water for Food Global Institute.

Alberta is the center of irrigation in Canada, McMullin said. Its 1.72 million irrigated acres comprise 68 percent of Canada's irrigated lands.

Mountain snow melt, retained by reservoirs, supplies 6,000 irrigation farmers growing about 50 different crops, he said, noting that only 14 crop types are grown on the other 28 million acres of rain fed farmland in the province.

Diversity, consistency, quality, high yields, and lower risk make investment in irrigation a no brainer, McMullin said. Government even kicks in some dollars each year, currently \$19 million to

46th annual tour visits Nebraska's central Platte River basin June 27-29

Jasmine Mausbach



Jasmine Mausbach kayaks an irrigation supply canal near Gallagher Canyon, south of Cozad.

This year's 46th Annual Water and Natural Resources Tour explored Nebraska's central Platte River basin and the many uses and users associated with what is arguably Nebraska's most important surface water resource.

The tour departed Holdrege Tuesday, June 27 at a brisk 8 a.m., kicking off with a talk from executive director, Jerry Kenny about the Platte River Recovery Implementation Project (PRRIP) water augmentation site near Overton. PRRIP is now in its 20th year as a major player in Nebraska water and environmental discussions on the Platte River, with its overall purpose being to aide habitat restoration efforts for four target species – the whooping crane, pallid sturgeon, least tern and piping plover. This specific site however, diverts water from the nearby Platte River, pumps it onto the land through cells, and creates a recharge area to maintain a lowland grassland/wetland for whooping crane nesting and migration. PRRIP achieves this by re-timing water, leasing water, or by working on ways to reduce water consumption near the Platte River.

Our second stop was at an organic farming operation near Smithfield where owner/operator Tom Schwarz explained how he grows peppers, tomatoes and other crops to make a signature salsa and sloppy joe mix. He also spent a good deal of time explaining what exactly an organic farm entails and the steps that have to be followed to be certified as "organic." En route to our next destination at Johnson Lake, John Thorburn, general manager of the Tri-Basin Natural Resources District (NRD), spoke about the proposed Platte to Republican River Diversion Project. At the lake's inlet structure, tour co-organizer Jeff Buettner of The Central Nebraska Public Power and Irrigation District (CNPPID) spoke about Turkey Creek in relation to the Platte to Republican River Diversion Project. The diversion project will involve installing a culvert under U.S. Highway

23 to divert flows from the CNPPID E-65 Canal to the east branch of Turkey Creek to maintain compliance with the three-state Republican River Compact.

In the afternoon at the Monsanto Water Utilization Learning Center near Gothenburg, our group of 60 was treated to lunch and a presentation about the goals and projects of Monsanto, who operates four of the targeted learning centers. The Gothenburg center focuses on water use, so after lunch, we took a tour of Monsanto's extensive test plots for corn, wheat and soybeans.

Next up was a visit to Frito-Lay's Gothenburg Corn Handling Facility, where all of the chip giant's yellow and white corn west of the 100th meridian is handled for all of the various corn-based chips the company produces in the western United States. If you are eating a Frito-Lay corn chip anywhere between Iowa and California, the corn to produce that chip came through their storage facility at Gothenburg.

The day's final stop was at CNPPID's Gothenburg Control Center, where engineer Devin Brundage, the Gothenburg Division Manager, talked about the ins and outs of the operating systems for CNPPID's hydroelectric and surface irrigation facilities along the Platte River.

Day two involved a drive to Nebraska Cooperative Republican Platte Enhancement (NCORPE) project's well field, where manager Kyle Shepherd and Kent Miller explained the project's goals. Out of 120 wells in the area supporting the project, 30 are used as augmentation wells to meet compliance issues associated with the Republican River compact. The next stop at the Nebraska Game and Parks Commission's (NGPC) North Platte Fish Hatchery allowed us to learn how Nebraska stocks rivers and lakes in the state with certain fish and mussel species.



Kayakers finish a five-mile run on CNPPID's supply canal, from Midway Lake to Gallagher Canyon SRA.

Lunch was served at the University of Nebraska-Lincoln's West Central Research and Extension Center in North Platte, after visiting field research plots where the extension center is currently hosting a much talked-about farm management competition known as Testing Ag Performance Solutions, or TAPS. Our final destination for the day was the Gerald Gentleman Station (GGS), just south of Sutherland. Owned by Nebraska Public Power District, GGS is the largest single producer of electric power in Nebraska and also the state's largest traditional, coal-fired generating plant. NPPD plant management also pointed out that it is consistently rated as the cleanest coal-fired plant in the nation. GGS uses water from the Sutherland canal to create steam that spins huge turbines, which generate electricity within the plant, releases the water from the plant into a cooling pond, and then releases that water back to the Sutherland Reservoir where it ultimately ends up in the Platte River to continue flowing east.

On the last day of the tour, our first stop was at Lake McConaughy's Water Interpretive Center where the group learned about the area's updated water management plan from NGPC's Colby Johnson. We then split into two groups; with one touring the inflow point of Big Mac's Kingsley Dam while the other toured the control center of the outflow point on the other side of the dam with Devin Brundage. After a quick lunch break at Ole's Big Game Bar and Grill in downtown Paxton and a clothes change in Gothenburg, the last event of the tour was a kayak trip down CNPPID's main supply canal, between Midway Lake and Galagher Canyon, near Cozad. Once a sufficient amount of sunscreen was applied, we left in our yellow and orange plastic kayaks, heading about five miles east to our end point at Gallagher Canyon Lake. There, a bus full of cold beverages awaited our return.

Overall, the tour provided many different outlooks on how water from the Platte River is used in Nebraska. From habitat restoration for whooping cranes to electricity generation at Gerald Gentleman Station, water from the Platte River Valley is used by more entities than I imagined, all with the desire to conserve and properly utilize this precious water resource so that Nebraskans can continue to benefit from it for generations to come.

Lastly, I want to give special recognition to the following groups who organize and sponsor the annual tour: Nebraska Water Center; the University of Nebraska-Lincoln's Institute of Agriculture and Natural Resources; The Central Nebraska Public Power and Irrigation District; Nebraska Public Power District; and the Robert B. Daugherty Water for Food Global Institute at the University of Nebraska. Without these sponsors and their contributions, this year's tour wouldn't have been possible, and I wouldn't have had the opportunity to learn about the many entities utilizing Platte River Valley water resources within the state.

Editor's Note: Blogger Jasmine Mausbach is a University of Nebraska-Lincoln undergraduate student pursuing bachelor's degrees in both environmental restoration and Spanish. Curious about all things water, Jasmine is now a three-year veteran of the annual Water and Natural Resources Tour, as well. This year's tour was June 27-29 in Nebraska's central Platte River basin. Each year, the tour examines local and regional water issues, including agricultural water use, water management, water quality and environmental impacts. Initiated by Nebraska Extension in the early 1970's and nurtured for many years by the Nebraska Water Center, the tour is now in its 46th year.

2017 Water Tour



Amber Poythress successfully navigates CNPPID's supply canal at Gallagher Canyon.



Manager Kyle Shepard (left) presents on NCORPE projects, near their outlet structure on the NPPD irrigation supply canal west of North Platte.



Daugherty Water for Food Global Institute Executive Director Peter McCornick and CNPPID Public Relations Coordinator Jeff Buettner chat at the Lake McConaughy visitor center.



CNPPID Gothenburg Division Manager Devin Brundage explains operations at Kingsley Dam.



Touring NPPD's Gerald Gentleman Station near Sutherland.

Water tour photos by Amber Poythress and Steve Ress

2017 Water Tour



Daran Rudnick (center) talks about irrigation research and this summer's TAPS program at University of Nebraska-Lincoln's West Central Research and Extension Center at North Platte.



Tom Swarz outlines his organic farming operation near Smithfield.



University of Nebraska-Lincoln's Doug Hallam and Chittaranjan Ray at the West Central Research and Extension Center in North Platte.



A glimpse inside the firebox of one of the boilers at NPPD's Gerald Gentleman Station power plant.



Director Jerry Kenny updates progress of the Platte River Recovery Implementation Program.



A stop in the shade at Johnson Lake near Lexington.



A tour of test plots at Monsanto's Gothenburg Learning Center, one of four such center's the company operates.



KRVN's Jesse Harding gets video of NPPD's supply canal west of North Platte.



Nebraska Game and Parks Commission North Platte fish hatchery.



CNPPID's Jeff Buettner (second from left) tells tour attendees some of the history of the "Tri-County Project" that resulted in Lake McConaughy.

Small changes, big payback; university exhibits key to strengthening Nebraska's ag economy

Steve Ress

Husker Harvest Days exhibits put on by the University of Nebraska-Lincoln will help show farm and ranch families how small changes can bring big payback.

"Small Changes, Big Payback: Strengthening Nebraska's Agricultural Economy" is the theme for the University of Nebraska-Lincoln's Institute of Agriculture and Natural Resources exhibits at the Sept. 12-14 Husker Harvest Days show near Grand Island.

"Exhibits will outline a wide range of decision points, strategies and tools for farmers, livestock producers and farm families that can have a direct impact on their economic well being—many of which are incremental in nature, but can have dramatic impacts on their bottom line," said University of Nebraska Vice President and University of Nebraska-Lincoln Harlan Vice Chancellor for the Institute of Agriculture and Natural Resources (IANR), Mike Boehm.

Exhibits inside IANR's trademark Husker Red steel building at Lot 321 on the south side of the exhibit grounds will provide information on:

- Specific strategies for managing family budgets during challenging economic times; making informed choices in terms of food, entertainment, utilities and other monthly expenses.
- The relationship between cost, nutritional value and impact of various feed sources for cow/calf operations in order to make better management decisions
- Understanding the county-by-county differences in the risk factors that affect crop insurance rates and how they affect profitability and management decisions for farmers
- How farmers can better utilize the Farm Bill safety net during a time of transition into new realities in the agricultural marketplace
- Benchmarking the true costs of pumping irrigation water in order to better control input costs and make decisions related to pump efficiency and energy usage
- Crop production strategies that can have a positive bottom-line impact on cost-per-acre and profit margins



Husker Harvest Days is September 12-14 near Grand Island. The irrigated farm show is celebrating its 40th year.



Nebraska FFA students sight-up for information on the University of Nebraska-Lincoln's College of Agricultural Sciences and Natural Resources at Husker Harvest Days.



Steve Ress and Chittaranjan Ray of the Nebraska Water Center (center) greet international visitors at last year's Husker Harvest Days show near Grand Island.

- Using crop budgets to analyze the true operating costs for a farm in order to become a low-cost producer
- An update on the University's annual survey of agricultural land value and rental rates in Nebraska, which provides valuable data for land owners, renters and lending professionals.

Outdoor exhibits adjacent to the building will feature a variety of demonstrations related to improving irrigation efficiency and reducing irrigation pumping costs including variable rate irrigation, variable frequency drives, running sprinklers down in the canopy, and using the IrrigatePump app.

The outdoor area will also feature a solar-powered cell phone charging station, free of charge to attendees.

Back inside the building, IANR faculty and staff will be available to answer questions on a variety of extension and research-related topics, provide copies of helpful NebGuides, and direct those needing further information to extension experts in their local area.

Show goers can also learn about the latest opportunities for students at the university's College of Agricultural Sciences and Natural Resources, and the Nebraska College of Technical Agriculture at Curtis. College representatives will be available throughout the show to answer questions from potential students. Those interested in the Nebraska LEAD (Leadership

Education Action Development) program can also visit with a LEAD representative.

"We view this event as an excellent opportunity for us to bring the best of IANR and Nebraska Extension and research to Husker Harvest Days and we take that very seriously," Boehm said. "This year marks Husker Harvest Days 40th anniversary and IANR has been a proud part of it ever since the very first show in 1978," he said.

EPA launches new Waters of the U. S. website

The U.S. Environmental Protection Agency has launched www.epa.gov/wotus-rule to provide information about their review of the definition of “Waters of the U.S.” (WOTUS) as set out in the 2015 “Clean Water Rule.”

The site replaces the website developed for the 2015 rule-making process.

“EPA is restoring states’ important role in the regulation of water by reviewing WOTUS,” said EPA Administrator Scott Pruitt.

“The president has directed us to review this regulation to address the concerns from farmers and local communities that it creates unnecessary burdens and inhibits economic growth. This website aims to provide the public with information about our actions to meet the president’s directive.”

In the spirit of transparency, the site will provide the public with relevant information explaining EPA’s actions, along with the Department of the Army and the Army Corps of Engineers (the

agencies), to review the WOTUS rule, including how the agencies are working with our local, state and tribal partners, to examine our role in the regulation of water under the Clean Water Act.

All the pages, information and documentation from the Clean Water Rule site will remain available in the EPA archived site, archive.epa.gov.

Nebraska researchers join national team studying psychology of water use

Six University of Nebraska researchers will join colleagues at Penn State University, Arizona State University and the U.S. Department of Agriculture’s Agricultural Research Service (USDA/ARS) to develop a model for engaging communities and stakeholders to ensure adequate supplies of good-quality water both for and from agriculture.

The USDA’s National Institute of Food and Agriculture has awarded \$2.2 million for the first year of a planned four-year, \$5 million project to 18 researchers from the University of Nebraska-Lincoln, Penn State University, Arizona State University and USDA/ARS.

“The project’s main goal is to promote sustainable water management through the use of a proven, flexible, and transferable model of engagement of farmers and other stakeholders,” said Chittaranjan Ray, director of the Nebraska Water Center, within the University of Nebraska’s Daugherty Water for Food Global Institute.

Case study locations in Nebraska, Arizona and Pennsylvania represent different types of water issues and various institutional settings.

“Development of the stakeholder engagement model will involve testing how what we know, how we behave, and how our institutional partnerships, collective norms and other factors affect the way we address increasingly complex water issues faced by farmers and water resource managers at the local level,” said University of Nebraska-Lincoln School of Natural Resources environmental scientist Mark Burbach, who is part of the study.

Joining Burbach and Ray from the University of Nebraska-Lincoln are agricultural economists Lilyan Fulginiti, and Richard

Perrin, Department of Agricultural Economics; crops-economic risk management extension educator Jessica Grosskopf, Panhandle Research and Extension Center, Scottsbluff; and Daran Rudnick, irrigation management specialist, Department of Biological Systems Engineering.

The full research group includes nine researchers from Penn State University, including the project’s leader, rural sociologist Kathryn Brasier; two from Arizona State University and one from USDA/ARS.

“Part of the viability of this project comes from the depth and diversity of the cooperating researchers from three separate regions of the country,” Ray said.

The project will develop a model for stakeholder engagement that transforms the way scientists, extension educators, government officials and others combine their knowledge, communication and engagement skills to effectively reach out to water users who have their own knowledge base, perceptions and societal influences on how and why they use water in their agricultural operations.

“The project will help us better understand how farmers and other water users get information and make decisions about water usage in agriculture” Burbach said.

Researchers will conduct the project in parts of Nebraska, Arizona and Pennsylvania and will also consult with partners in Israel and Australia to learn about their engagement and assessment work. The collected data will be used to help create a transferable engagement model that can be used internationally.

Project to make state’s electromagnetic survey data available

Shawna Richter-Ryerson

The creation of a cloud-based software program will make all airborne electromagnetic survey data available for the state of Nebraska.

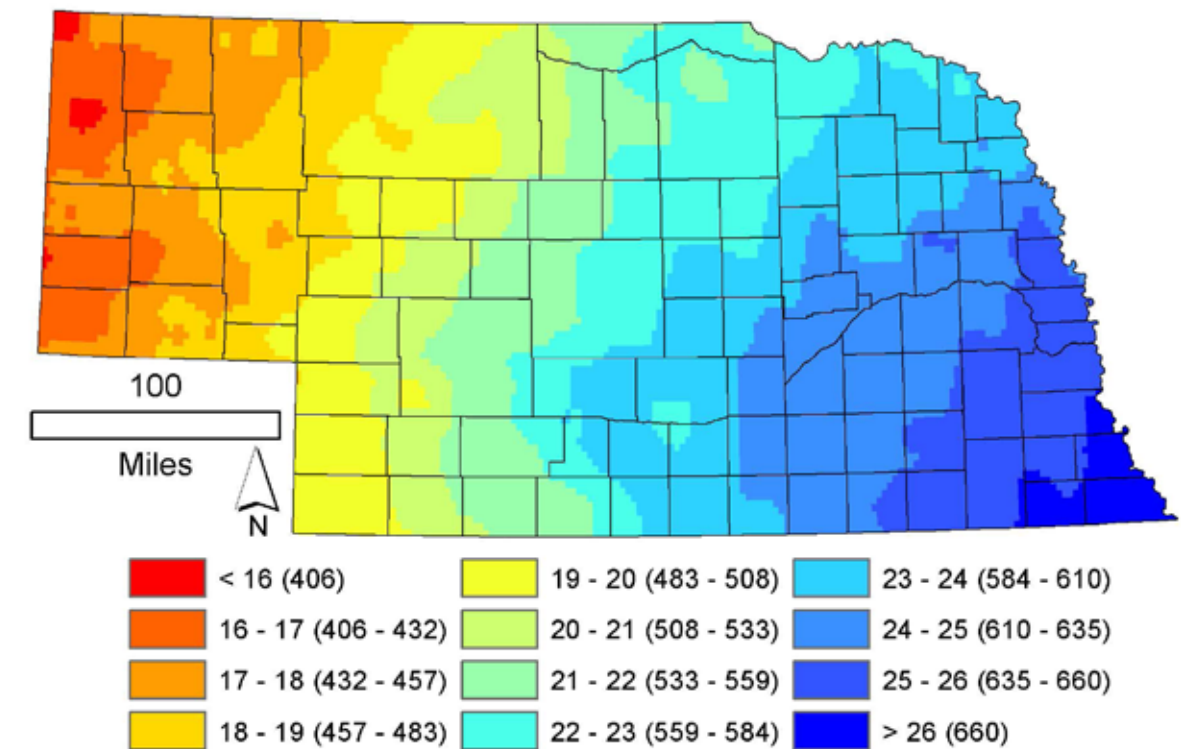
A surge in airborne electromagnetic surveying across the state — a cost-effective method of quickly mapping the Earth’s subsurface over large areas — has created a surge in data. The information, which can inform people’s understanding of how groundwater flows from one area to another, can help the state, counties and natural resource districts make more informed water management decisions.

The program, dubbed the Nebraska GeoCloud, will make this data available, but will also include maps, completed reports, boreholes and model layers. The layers provide information about the depth and thickness of geologic materials, such as aquifers composed of sand or sandstone, and can be used to locate wells, address water quality concerns and refine groundwater management plans. Borehole data is invaluable to the application of airborne electromagnetics.

The project is made possible through a Water Sustainability Grant and matching funds, and is a collaboration among 10 of the state’s natural resource districts, the Conservation and Survey Division at the University of Nebraska-Lincoln’s School of Natural Resources, and the U.S. Geological Survey Nebraska Water Science Center.

Nebraska GeoCloud will be developed by I-GIS, a Danish firm that specializes in airborne electromagnetic data management as well as customized 3-D visualization software.

30-year normals (1981 - 2010) of annual ET (inch)



Jesse Korus, a groundwater hydrologist at the School of Natural Resources, is leading the project. Katie Cameron, survey hydrogeologist with the survey division and the Lower Platte South NRD, and Matt Joeckel, state geologist and associate director for the survey division, are assisting.

“The goals of this project fall in line with the mission statements of the Conservation and Survey Division and U.S. Geological Survey, which are tasked with investigating and reporting the geology of Nebraska and the quantity and quality of its water resources,” Korus said.

The Conservation and Survey Division and the U.S. Geological Survey will conduct hydrogeologic studies so they can develop better methods of mapping aquifers and characterizing groundwater resources through the use of airborne electromagnetics, which works by flying a tool over a target area. As it sends an electromagnetic signal toward Earth, the tool records the electrical response of the subsurface.

Clay, for example, is more electrically conductive than sand or gravel and can be easily distinguished from other materials on 2-D and 3-D images created in the software program. This method is able to record extremely detailed information as much as 1,500 feet below the surface.

The project is scheduled for completion in 2020. It will provide natural resource districts, state agencies, consultants and research geologists with access to hydrogeologic data that is necessary for the proper management and protection of Nebraska’s groundwater supplies.

“This is a singular achievement for our survey personnel,” Joeckel said. “It will prove to be an accolade for the University of Nebraska-Lincoln.”

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Bulletin utilizes innovative method to provide baseline evapotranspiration rates for state

Shawna Richter-Ryerson

A recently released bulletin provides baseline mean annual evapotranspiration rates for the state of Nebraska, which in the future could show whether changes in climate have altered rates and affected water, agriculture or forestry resources.

“This is the offspring of cutting-edge research in evaporation studies utilizing the very latest advances providing regional evapotranspiration rates with an accuracy that has not been available before,” said author Joe Szilagyi, research hydrologist with the Conservation and Survey Division at the School of Natural Resources.

“Basic Meteorological Data Derived 30-year Normals (1981 - 2010) of Actual Evapotranspiration Rates in Nebraska, USA” is available for \$8 from the Nebraska Maps & More Store on the first floor of Hardin Hall, 3310 Holdrege St. It also can be purchased on-line at marketplace.unl.edu/nemaps and amazon.com. To place an order by phone, call (402) 472-3471.

The bulletin includes mean monthly evapotranspiration and annual precipitation data for 1981 and 2010, the latest period of “climate normals” that represent the most recent three-decade average of climatological variables and provides the baseline that future values can be compared against.

“In the future, one could see if climate change altered the evapotranspiration to precipitation ratios or not either via altered ET rates, altered precipitation rates or changes in both,” Szilagyi

said. “The higher the evapotranspiration to precipitation ratio, the scarcer water availability becomes for municipal, agricultural or other purposes.”

Szilagyi recently mapped evapotranspiration rates at 4-kilometer resolution for the entire contiguous United States, but made Nebraska’s results available separately to fulfill the Conservation and Survey Division’s mission of making widely available work completed in the area of geology, soils and water across the state.

Evapotranspiration is the sum of evaporation from the Earth’s surface and that from plant leaves. One of its key functions is the regulation of the surface temperature of crops, protecting them from overheating and cellular damage when temperatures are hot. Variables that affect evapotranspiration involve land use, including irrigation, and land cover in addition to air temperature, humidity, wind and available energy at the surface.

In Nebraska, the years between 1981 and 2010 show the highest rates of evapotranspiration in the extreme southeast part of the state, where precipitation levels are highest. The lowest evapotranspiration rates are in the panhandle region, where droughts remain frequent.

The Conservation and Survey Division, is the geologic and hydrologic survey component of the School of Natural Resources at the University of Nebraska-Lincoln.