



Center for Grassland Studies

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November 2023

Experiential Learning for Grassland Conservation

By: David Wedin, Director, Center for Grassland Studies; Professor, School of Natural Resources, Lincoln, NE

I recently attended the annual meeting of the Nebraska Section of the Society for Range Management. Walt Schacht, now retired, and I were amazed and gratified at the number of our former grassland students there. Ten years ago, Walt and I developed a new Grassland Conservation course for seniors and graduate students that emphasized getting out of the classroom, meeting natural resource professionals, and learning grassland management skills. Apparently, we found a successful approach. Over a dozen of our former students at the meeting are now professionals working with a range of conservation organizations and state/federal agencies.

Our Friday class sessions allow us to take half a dozen afternoon field trips every fall. This year our new faculty Nic McMillan is teaching the course with me. These field trips allow us to meet grassland professionals and learn or reinforce skills we learned in class. These might include developing conservation seed mixes with native seed after visiting Stock Seed Farm (see picture) or calculating forage availability and stocking rates after visiting a private ranch. Most years we have visited properties demonstrating cost-share conservation practices with NRCS biologist Ritch Nelson. We have seen how fire and grazing interact to maintain diversity with The Nature Conservancy's Chris Helzer and Audubon Society's Ed Hubbs. We use UNL's Nine-Mile Prairie as our field laboratory to demonstrate prescribed burns and the control of encroaching woody vegetation or noxious weeds. Covid shut down our field trip-oriented approach, but, like everyone else, we found a new strategy. In fall semester 2020, we took field trips (by Zoom) to see grassland conservation and meet professionals in Portugal, Australia, Namibia, and the Pampas of Argentina.

It constantly amazes me how willing natural resources professionals are to meet with our students on or off campus. We have 8 to 10 guest resource people in our fall class every year, some participating year after year. Our students not only learn basic concepts of grassland ecology and start to fill their management toolbox with useable skills, such as familiarity with prescribed fire. They learn that Nebraska has an incredible network of natural resources professionals that enjoy working collectively with diverse grassland owners and ranchers. Our experiential grassland conservation course invites UNL students to join that network, and, as the recent SRM meeting showed, many do.

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Director's Column

David Wedin, Director, Center for Grassland Studies; Professor, School of Natural Resources, Lincoln, NE



Greetings! I became the new CGS Director in July 2023. At that time, I transitioned from 25 years as a professor in the School of Natural Resources, where I maintain a 25% teaching position. Jerry Volesky, who became Interim CGS Director in January 2022, returned to his research and extension responsibilities while continuing to serve as CGS Associate Director. Much of the CGS program that Martin Massengale began in the 1990's continues, including the Nebraska Grazing Conference every August, the Fall Grassland Seminar series, and this Newsletter. We have young faculty from four UNL units coordinating and

teaching our Grassland Systems undergraduate program, which recently merged our Grazing Livestock Systems major and the former Range/Grassland Ecology major. One of my first activities this summer was to award \$20,000 in undergraduate scholarships to our Grassland Systems students. Generous past gifts to the University of Nebraska Foundation have created a dozen endowments that support our undergraduates, graduate students, UNL grassland management, and other CGS programming.

Inspiring and recruiting more UNL grassland undergrads from both rural and urban areas is our current highest priority at CGS. The opportunities and resources for both private and public grasslands are currently outstanding. The high enthusiasm in Nebraska's grassland community is seen in diverse groups including Lincoln's Prairie Corridor on Haines Branch, the Sandhills Task Force, Nebraska Grazing Land Coalition, and others. When T.J. Walker (Nebraska Game & Parks Commission) recently spoke to our seminar series, he said Nebraska has never had so many job openings for range specialists, grassland conservationists and prairie managers. We are modifying our Rangeland Management Specialist minor to make it clear that we offer the courses, faculty and field experiences needed to prepare our students for those jobs, especially with federal agencies. If you know potential undergraduate students for our program, send them our way!

Another recent transition for CGS has been a new leadership role in promoting teaching, research and outreach activities at over 20,000 acres of UNL grasslands. This includes developing Nine-Mile Prairie as a training center for prescribed fire and soil health, and new adaptive research by CRAWL and CGS with local stakeholders at the Barta Brothers Ranch. Finally, you might have noticed that UNL's PGA Golf program is no longer featured on the CGS website and newsletter. Don't worry! The PGA program is going strong but is now managed independently from CGS.

If you would prefer to receive an electronic copy of this newsletter instead of a print copy, please let us know by emailing abranting2@unl.edu. Thank you.

New Woody Invasions Ecologist Brings Additional Capacity for Grassland Conservation

By: Dillon Fogarty, Research Assistant Professor, University of Nebraska-Lincoln, Lincoln, NE



Dillion Fogarty

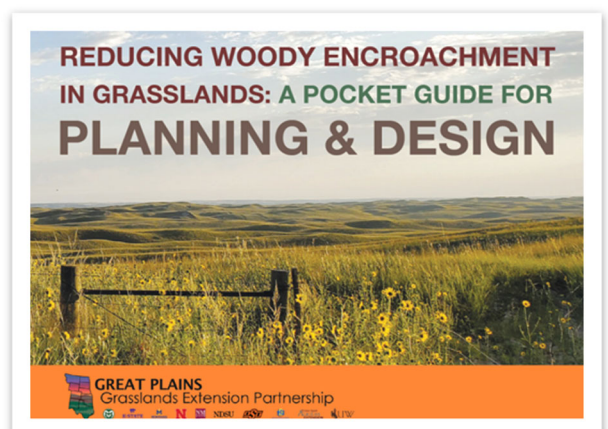
My name is Dillon Fogarty, and I am excited to join the Department of Agronomy and Horticulture as the Woody Invasions Ecologist at the University of Nebraska-Lincoln. I started my new role as Research Assistant Professor in June of 2023.

I am originally from Belle Plaine, Minnesota and completed my Bachelor of Science in Biology from Bemidji State University, in Minnesota. Prior to starting my master's degree at Oklahoma State University, I worked for South Dakota Game, Fish, and Parks and the Minnesota Department of Natural Resources as a wildlife technician on elk and waterfowl research projects, respectively. At Oklahoma State University, my graduate research explored how grassland-nesting birds can use habitat to conceal their odor from olfactory-based predators. After completing my master's degree, I joined the University of Nebraska-Lincoln as a PhD student in 2017. My dissertation research focused on the ecology and management of woody invasions in grasslands. As an overarching theme of my dissertation research, I worked directly with conservation partners to co-produce science that informed conservation policy and practice.

As the Woody Invasions Ecologist at UNL, I am excited to lead solutions-oriented research for better managing the threat of woody invasion in Nebraska's grasslands. Woody plant invasion, by native and non-native species, is a global driver of grassland loss and represents a primary threat to grassland biodiversity. As trees and shrubs spread into grasslands, they displace herbaceous plants and can reduce forage production by up to 75%. New rangeland monitoring data shows that Nebraska rangelands lose over 419,000 tons of forage production every year due to woody encroachment; that's equivalent to 698,880 1200-lb round bales (forage production losses are derived based on a 1990 baseline and depict production losses relative to what would have been achievable had tree cover in rangelands not increased since 1990; historically forested lands are excluded from analysis; for more information visit <https://www.wlfw.org/yieldgap/>).

One of my key roles as Woody Invasions Ecologist will be to develop training materials and lead extension activities to better equip rangeland managers with the knowledge and skills needed to prevent and reverse the impacts of woody encroachment. These efforts are already well underway with the recent development of a pocket guide for reducing woody encroachment in grasslands (available at <https://go.unl.edu/bsnf>). The pocket guide was developed in collaboration with rangeland scientists, extension faculty, and NRCS specialists from across the Great Plains region and will serve as an important resource for training activities going forward. The pocket guide builds on and complements new guidance for reducing woody encroachment by 1) providing a field-based resource for assessing woody encroachment through a lens of risk and vulnerability, 2) outlining a planning process putting new guidance into action, and 3) providing a suite of management options and scenarios that planners can use to reduce encroachment. Nearly 25,000 copies of the pocket guide have been distributed to conservation practitioners throughout the Great Plains region with supporting outreach and extension efforts underway.

I am excited to be at the University of Nebraska-Lincoln and I look forward to working with our diverse partners to help conserve the state's grassland resources.



Twidwell Racks-up awards for his work in Grassland Conservation

By: Geitner Simmons, INAR Media



Dirac Twidwell

Dirac Twidwell, professor with UNL's Department of Agronomy and Horticulture has received three awards in the past year that salute his educational efforts, research and outreach on grassland conservation, rangeland fire management, and the importance of his redcedar containment strategy.

The US Forest Service honored Twidwell with its 2022 Grassland Education Award. When receiving the award, the US Forest Service recognized Twidwell for his long-term education and outreach in grassland conservation and his innovative guidance for land management "tirelessly connects with people to prevent woodland expansion and meet with the public, private, NGOs and state legislators."

More recently, USDA NRCS Working Lands for Wildlife (WLFW) recognized Twidwell in its national meeting for conservation leaders in July 2023. Twidwell was presented with a commemorative belt buckle and identified as a "Guardian of the Grassland" for his service to private lands science and conservation.

Both of these national awards follow new science guidance on how to deal with the threat of woody encroachment across the nation's grasslands. Woody encroachment is particularly daunting in Great Plains grasslands, threatening water availability, rangeland productivity and biodiversity while increasing wildfire risk. To meet the challenge, the University of Nebraska-Lincoln is leading productive collaborations with government agencies, nonprofits, and landowners. As part of that partnership, Twidwell has developed new landmark scientific guidance and management strategies to counter woody expansion.

More than 30,000 copies of the management guide — titled "[Reducing woody encroachment in grasslands: A guide for understanding risk and vulnerability](#)" — have been requested and distributed to specialists, agencies and landowners across the Great Plains and intermountain West. At the July 2023 meeting for NRCS WLFW, he unveiled a supplemental pocket guide that will support future field trainings, workshops, and courses.

"There's a real demand to transfer the core ideas in that science guide into large-scale rangeland planning and conservation efforts," Twidwell said. "It is an exciting time, and I am proud to work with a network of great scientists, resource professionals, and landowners who want to see major improvements in the performance of conservation investments in rangelands."

The Vulnerability and Pocket Guides were developed by Twidwell, a rangeland ecologist, Dillon Fogarty, a research assistant professor within UNL's Department of Agronomy and Horticulture, and rangeland extension faculty at universities in Texas, Oklahoma, New Mexico, Colorado, Kansas, Wyoming, South Dakota, North Dakota, and Montana.

These documents represent the first comprehensive guidance to direct proactive rangeland management practices and solve limitations in past management strategies on the issue of woody encroachment.

The U.S. Forest Service's adoption of improved preventive strategies has taken on particular momentum due to Twidwell's efforts, said Julie Bain, previously the Forest Service district ranger who oversees the Bessey Ranger District in the Samuel R. McKelvie National Forest in Cherry County.

[Continued to Page 5 see Twidwell Award](#)

Continued: Twidwell Award

“There’s a large movement, Great Plains-wide, among agencies and non-governmental organizations to pull together to try address this issue,” Bain said. “It’s incredibly heartening, and I think Dirac has been a big driver of pulling this all together.” Twidwell has shown exceptional dedication in “attending all kinds of meetings big and small, talking about the issue, holding meetings himself.”

Twidwell also received the Lead Igniter Award for fire science education during the Great Plains Fire Summit, a conference in North Platte attended by more than 250 academics, fire management specialists, conservationists and land-owners focusing on wildland fire issues in the Plains region of the U.S. and Canada. The conference, with representation from multiple U.S. states as well as Canada, showed how Nebraska is receiving wide attention for its leadership on grassland conservation and fire management, Twidwell said.

“Nebraska stands out for its broad collaboration to promote stronger rangeland conservation, and Twidwell’s leadership has been a central reason for the progress,” Bain said. Because effective protection of wildlife ecosystems involves such a vast area, “it’s enormously important to get the word out and for ecological professionals to be working together to implement the concept across the Great Plains.”

The Forest Service notes that as a science advisor to NRCS, Twidwell provided science that allowed the NRCS to change its rating criteria to favor more preventative and cost-effective removal of cedars in low-density grassland areas instead of the previously more common and expensive practice of removing large-scale cedar infestations. “This possibly saved the state’s prairie,” said the Forest Service, which manages the Halsey portion of the Nebraska National Forest, as well as Samuel R. McKelvie National Forest.

“It’s been a wonderful community of people to work with here in Nebraska,” Bain said of the partnerships to tackle the redcedar issue. “It’s heartening — it feels like we’re making progress.” Forest Service staff are particularly encouraged because “for us, we can actually see it from the air. You can see how much has gotten cleared out. That’s really rewarding.”

Twidwell’s efforts have been crucial in such efforts, Bain said. “Dirac has the 30,000-foot view and has worked hard to get us down here on the ground to pull together toward the same goal.”

Platte Basin Timelapse premieres New Film on Nine-Mile Prairie By: David Wedin, Director, Center for Grassland Studies; Professor, School of Natural Resources, Lincoln, NE

Nine miles northwest of downtown Lincoln is Nine-Mile Prairie, a 235-acre prairie where University of Nebraska-Lincoln students and faculty have studied prairie ecology, soil science, grassland management and more for over 100 years. It is the subject of a new film which will premier during a special event on UNL’s East Campus on Friday, November 10, 2023 (7:00pm, Hardin Hall Auditorium). The film, “Nine-Mile Prairie: Hope in the Tallgrass” touches on the history, ecology, and future of the land, as well as ways it has been used by UNL and the public over the years.

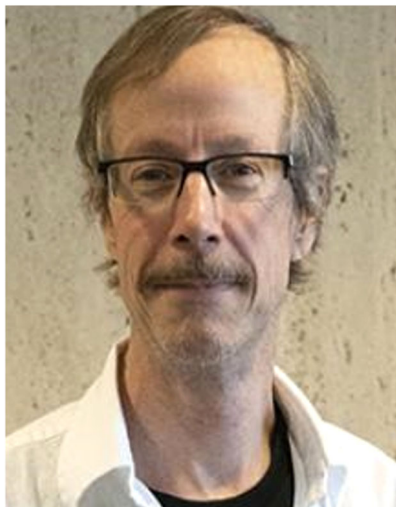
For filmmaker Ethan Freese, producing the Nine-Mile Prairie film was an opportunity to blend his passions of storytelling and prairies. Freese grew up in Lincoln and was always interested in the outdoors. But until he was a teenager, he was more interested in mountains than in grasslands. Then, when he was in high school, he interned at the Pioneers Park Nature Center just west of Lincoln. He attended college at UNL, where he majored in Fisheries & Wildlife and Grassland Ecology & Management. During his time in college, his interest in tallgrass prairies deepened, and he eventually served as student land manager for Nine-Mile Prairie. Now, as a producer for UNL’s Platte Basin Timelapse program, he documents prairies and other landscapes through photos and video.

Interspersed with shots of grasses, wildflowers, birds, and insects are interviews with Lincoln residents who regularly visit the prairie, including UNL faculty and students, a nature photographer, and a member of the Omaha tribe. “I hope I can encourage people who don’t think we have cool stuff in Nebraska and maybe pique their interest,” Freese said. Dave Wedin, director for UNL’s Center for Grassland Studies who is interviewed in the film, described Nine-Mile Prairie as a “hidden gem,” which is part of a larger network of greenspaces around Lincoln. Several of these properties are owned and managed by the University of Nebraska.

The film was supported by Center for Grassland Studies, the Dr. Kenneth C. Stout endowment at the University of Nebraska Foundation, and Platte Basin Timelapse. You can view it at <https://plattebasintimelapse.com/nine-mile-prairie-hope-in-the-tallgrass/>.

CRAWL Update on the Network for Integrated Agricultural Resilience Research

By Craig Allen, Director, Center for Resilience in Agricultural Working Landscapes, University of Nebraska-Lincoln, Lincoln, NE,



Craig Allen

The Network for Integrated Agricultural Resilience Research (NIARR) has created a North American Resilience Working Group. The Resilience Working Group is the primary vector by which the NIARR scientists convene to conduct the collaborative work of the NSF Research Collaboration Network. The USDA-ARS LTAR hosts the Resilience Working Group as one of many cross-cutting working groups in LTAR and provides access to Basecamp. Basecamp is a project management software which the Resilience Working Group uses to host all documents and information, and exchange messages. There are currently ~110 scientists from across the 4 networks of NIARR who have access to Basecamp and receive all communications of the Resilience Working Group.

A literature review has been completed and proved helpful in clarifying and reinforcing research gaps that also emerged in many hours of meetings by the Resilience WG and subgroups. These identified gaps have been the backbone of the research projects that have been developed. Creating a research agenda with an extensive list of possible research projects has been a major activity of NIARR over the past year and was ultimately narrowed down to 8. Four of those projects are slated for immediate action, and 4 have been tabled for future action. Many of the projects have the capacity to feed into each other in meaningful ways and contain first steps that are immediately actionable and possible subsequent steps that require primary data collection or significant data scraping and processing. The 4 projects that have just launched or will be launching shortly are as follows:

Regionalization North America

This project builds on an extended effort within LTAR to divide the United States into regions that represent subsets of social-ecological variables relevant to agricultural production. The goal was to define regions using data and methods that are statistically defensible, ecologically and socially meaningful, and useful for answering agricultural research questions of interest. Three sets of maps have been generated: climatic regions using variables crucial to agriculture, production regions (both for crops and livestock), and human dimensions regions. These sets of maps provide baseline boundaries useful for a wide variety of analyses, including for extrapolating and validating outcomes from experiments, or retroactively determining how spatial boundaries have shifted using historical data in order to predict future shifts. Regionalization North America is applying the same methodologies to create sets of maps for all of North America. i.e. including Canada and Mexico. As climate change heightens uncertainties and challenges in agricultural production, there is value in transcending political borders to understand key aspects of agriculture from a broader spatial perspective. This collaboration will provide spatial regions that can be used for local, regional, or North American-scale analyses, and should also lead to cooperative learning across borders as we will have statistical grounds for determining how far and to which regions we can extrapolate analytical results. This project is led by two LTAR and two AAFC senior scientists.

Indicators of agricultural resilience

The recent application of resilience concepts to agricultural systems has generated several excellent indicator frameworks appropriate for monitoring resilience in agricultural social-ecological systems. However, there are notable weaknesses and gaps in these existing frameworks that will be addressed by this project.

However, there are notable weaknesses and gaps in these existing frameworks that will be addressed by this project. In particular, this project aims to move away from single indicators that reflect a single scale and are from a single discipline. [Continued to Page 7 see CRAWL UPDATE](#)

Continued: CRAWL Update

The focus will be on developing resilience indicators that reflect social-ecological resilience, as opposed to social and ecological indicators, and that incorporate missing perspectives such as traditional knowledge and cross-scale impacts. This project will be led by a post-doctoral researcher at the University of Nebraska.

Resilience and crop rotation diversity

Crop diversification is a form of heterogeneity that is an important strategy for improving the multi-functionality of agricultural systems, as it can improve pest management, support soil health, and buffer against disturbances like extreme weather events and market volatility, among others. A program called DRIVES (Diverse Rotations Improve Ecosystem Services) uses long-term experimental data from 21 sites across North America to ask fundamental questions about yield and yield stability, nutritive value, energy use, changes in soil organic carbon, and price stability along a gradient of rotational complexity for each cash crop and at the rotation-level. NIARR is proposing a complementary project that will expand the analyses to include resilience questions centered on applying DRIVES findings at spatial scales larger than the field or farm, addressing barriers to the implementation of crop rotation diversity strategies, and situating DRIVES findings using resilience theory. This project will be led by a USDA postdoctoral researcher affiliated with the DRIVES project and LTAR.

Limits of resilience: Adaptive capacity, regime shifts, and transformation in socio-ecological agricultural systems in North America

Shocks to agricultural systems appear to be increasing as a result of climate change, land use change, globalization, and other factors. This project aims to ask a series of research questions about adaptive capacity and vulnerability to regime shifts in agriculture systems at several scales; the research questions are thematically related and will feed into each other, range from theory development to application, and will use a mix of social and biophysical data, some of which will be scraped from existing sources, and some of which will be collected as part of the project. We will use a social-ecological systems (SES) approach so that we can account for the reality of agricultural SES as complex and multi-scale systems with interacting components from both the social and biophysical dimensions. Most research on adaptive capacity in agriculture has focused on the farm scale and farmers. This project will focus on agricultural production sectors and regions at the national and North American scale. Similar to the Regionalization North America project, we want to work collaboratively across borders both to enhance our learning, and to ask fundamental questions about the future security of agricultural production on this continent. This project is the subject of a 2023 DISES Track 1 research proposal to be submitted in November, and the leadership team will include core NIARR PI's as well as new scientists from the US and Canada who are part of NIARR and the Resilience WG.

CGS Outreach By: Jerry Volesky, Associate Director, Center for Grassland Studies

Center for Grassland Studies affiliated faculty have been busy with several outreach activities the past few months. First, I would like to thank Daren Redfearn for his work in chairing the Nebraska Grazing Conference planning committee and Ashley Branting, CGS Administrative Associate, for help in making the event a success.

In late July, a Field Day was held at the UNL Barta Brothers Ranch. This event highlighted work that is being done on a collaborative adaptive management project that began in 2022. Stakeholders involved in the project and the general public had the opportunity to hear a report of the first year's results and view the treatment pastures. In August, the Gudmundsen Sandhills Laboratory held its annual open house with participants learning about current grazing and animal management topics.

Nebraska Extension continues to have an active role in Youth Range Judging contests. This fall, over 1000 high school students participated in area contests across the state as well as the state contest in Beatrice.

On October 19 and 20, the Nebraska Section of the Society for Range Management held its annual meeting in Central City. Several CGS affiliated faculty presented at this event.



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Center for Grassland Studies Awards 19 Scholarships Totaling \$17,500 for 2023-2024

David Wedin, Director, Center for Grassland Studies; Professor, School of Natural Resources, Lincoln, NE

The Center for Grassland Studies awarded 19 undergraduate scholarships for the 2023-2024 academic year. The scholarships went to University of Nebraska – Lincoln students enrolled in either a CGS major (Grassland Systems) or minor (Grazing Livestock Systems or Grassland Ecology and Management). The total value of this year’s scholarships was \$17,500, funds generated annually by University of Nebraska Foundation endowments. The investment into our students by past and present donors is remarkable and greatly appreciated by both the recipients and the CGS faculty.

Joseph O. Young Fund = Makenna Anderson, Makennen Havlat, Michelle Henkel, Caleigh Iwanski, Jacob Van-Dress, Connor Williams, Kaitlyn Fehlhafer, Celie Childears, Konnor Nielsen, Emily Samuelson, Kaleb Senff

Sandhills Task Force Scholarship = Frazier Kaelin, Sheridan Wilson

Martin and Ruth Massengale Fund = Sadie Ference

Center for Grassland Studies Fund= Jacob Wendell

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