



Center for Grassland Studies

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Photo: Ethan Freese

Grassland Systems | CRAWL | Beef Initiative Hub

March 2023

New Assistant Director for The Center for Grassland Studies



David Wedin

In Fall 2022, my official UNL position description changed and I became Assistant Director for Properties and Land Management at the Center for Grassland Studies. Rather than taking a new direction, the position acknowledges a role I have played for years. I took over management of UNL's Nine-Mile Prairie 15 years ago from retired professor Jim Stubbendieck. There were no official documents, but I recall Jim buying me a Manhattan at a CGS event hosted by Dr. Martin Massengale, the only time I've had that cocktail. My involvement with Dalbey Prairie began in 2014, when IANR Vice Chancellor Ronnie Green asked me to help conserve UNL's Dalbey-Halleck property as its management evolved. Today, these two unplowed tallgrass prairies, which total 375 acres, are administered by the Center for Grassland Studies and supported by generous endowments at the University of Nebraska Foundation.

Our stewardship of Dalbey and Nine-Mile Prairies is tied to the teaching, research, and outreach missions of CGS. Grassland stewardship has been central to my teaching and research responsibilities in UNL's School of Natural Resources for 25 years. Our students are our land managers at Nine-Mile Prairie. Public and private grassland stewards rely on the same management techniques including ruminant grazing, prescribed burning, haying, seeding new species, controlling woody encroachment, and removing noxious weeds. With that in mind, Walt Schacht and I developed a capstone course in 2014 that uses our UNL grasslands to teach students these skills. This spring, we are developing new strategies to simultaneously expand experiential learning opportunities for our grassland students and to address deferred management at our prairies (for example, accelerating woody species encroachment). This effort includes a new staff person, new courses, new partnerships with land management agencies, new equipment for prescribed burning, and a new tractor. Hot-wiring a 30-year-old tractor is one skill we will no longer be teaching our students at Nine-Mile Prairie.

Center for Grassland Studies Policy Advisory Committee

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& Horticulture, UNL

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Derek McClean, IANR Administration, UNL

David Wedin, School of Natural
Resources, UNL

The Center for Grassland Studies is a unit within the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources. It receives guidance from a Policy Advisory Committee and a Citizens Advisory Council.

Note: Opinions expressed in this newsletter are those of the authors and do not necessarily represent the policy of the Center for Grassland Studies, the Institute of Agriculture and Natural Resources, or the University of Nebraska – Lincoln.

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Director's Column

by Jerry Volesky, Interim Director, Center for
Grassland Studies, Lincoln, NE / Range and Forage Specialist, Nebraska Extension / Interim
Associate Director, WREC, North Platte, NE



Some changes have occurred at the Center over the last several months. Most notable is that Margo McKendree resigned from her position as Administrative Associate to take a position with a private company. Margo had been instrumental in maintaining the operation of the Center for the past 6 years. Her efforts and contribution to the Center are greatly appreciated.

With that, we are excited to introduce Ashley Branting as our new Administrative Associate.

Ashley began the position in mid-November and has been busy learning the Center's operations and functions. Dave Wedin has also taken on a partial administrative appointment to provide management and oversight for Nine-Mile Prairie and the Dalbey Prairie.

The Center for Grassland Studies, along with the Center for Resilience for Agricultural Working Landscapes (CRAWL), is continuing its active role with the Beef Innovation Hub. The Hub will host a 2-day workshop in mid-October with the purpose of identifying the most critical and well-aligned issues, opportunities, and solutions. Follow up discussions with the Hub's Faculty Advisory Committee are ongoing.

In August, the 22nd annual Nebraska Grazing Conference was held in Kearney. Daren Redfearn was chairman of the organizing committee for this event. The conference opened with a field tour at two waterfowl production areas in south central Nebraska. The formal conference included sessions on conservation, grazing management, invasive species, and wildlife management.

The Center for Grassland Studies also organized the Nebraska Range Short Course in June at Chadron State College. There were 29 participants in the Short Course which consisted of a series of classroom and field sessions, and focused on principles of range management for efficient, sustainable use of rangeland for multiple purposes.

Congratulations Graduates!

The Center for Grassland Studies wishes the following December 2022 graduates much success on their future endeavors.

- ❖ *Grazing Livestock Systems and Animal Science*: **Emily Burnside** (Firth, NE).
- ❖ *Grazing Livestock Systems and Agricultural Leadership Communication*: **Britney Emerson** (Whitman, NE).
- ❖ *Grazing Livestock Systems and Animal Science*: **Miranda Mueller** (Yutan, NE).

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 Grazing Lands Ecologist for Grassland Studies



Nic McMillan

I am excited to join the Center for Grassland Studies as the new Grazing Lands Ecologist here at the University of Nebraska-Lincoln. I am originally from the Carolinas, and attended Clemson University for both my Bachelor of Science and Master of Science degrees. For my M.S. degree, my research focused on addressing how American bison reintroduction in Montana has affected rangeland plant community composition, and rangeland health, compared to best-practice cattle grazing or livestock removal. I attended Oklahoma State University for my Ph.D., where I worked on a variety of projects associated with how fire and grazing affect biodiversity and livestock production in the tallgrass prairie. During my Ph.D., I also worked to address how the invasive legume sericea lespedeza (*Lespedeza cuneata*) affects livestock productivity, as well as whether management actions aimed at reduc-

ing this invasive plant (e.g., growing season fires or herbicide application) actually benefit livestock producers in the region.

As the new Grazing Lands Ecologist at UNL, I am excited to continue working on research projects that are transferrable to livestock producers, while also working to help develop management strategies that promote grassland conservation. I am also going to be heavily involved with our undergraduates at UNL, where I am set to teach courses related to grassland management and ecology in both the School of Natural Resources and the Department of Agronomy and Horticulture. I will also be stepping into the role of advisor for The Range Club. Undergrads will get the opportunity to dive deeper into the grassland management and conservation profession. I am very excited to be part of the team here at the University of Nebraska-Lincoln and the Center for Grassland Studies, and look forward to helping carry out our land-grant mission.

New Administrative Associate for Grassland Studies



Ashley Branting

As a Lincoln, NE native I am thrilled to have the opportunity to work for the University of Nebraska's Center for Grassland Studies.

Having worked for the University of Nebraska since 2017, over the last five years. I have had pleasure of being a part of the UNL Housing team as well as the College of Engineering. All of the opportunities here at UNL have led me to this wonderful position at the Center for Grassland Studies.

I look forward to learning more about grasslands and the agriculture behind it.

Apply Now for CGS Scholarships and Assistantship

The Center for Grassland Studies has several funds available to provide academic and professional development scholarships for eligible undergraduate students pursuing degrees in grassland management and stewardship.

Go to <https://grassland.unl.edu/grassland-systems/grazing-livestock-scholarships> for application links and deadlines.

New guidelines for reducing eastern redcedar in grasslands

by Dillon Fogarty, Program Coordinator, Working Lands Conservation, UNL

Woody encroachment by species like eastern redcedar is among the greatest threats facing Great Plains grasslands. In the absence of fire, eastern redcedar outcompetes native forbs and grasses, resulting in a 75% reduction in herbaceous biomass production, collapse of grassland wildlife, and reduced stream flow as grasslands transition to an eastern redcedar woodland. Past approaches for dealing with the threat of encroachment have focused on the removal of encroaching trees after impacts have already occurred. However, this approach is akin to treating symptoms without addressing the basic cause of the problem. Ultimately, this approach has proven to be unsustainable long term and has led to a consistent decline of grassland resources in the Great Plains.

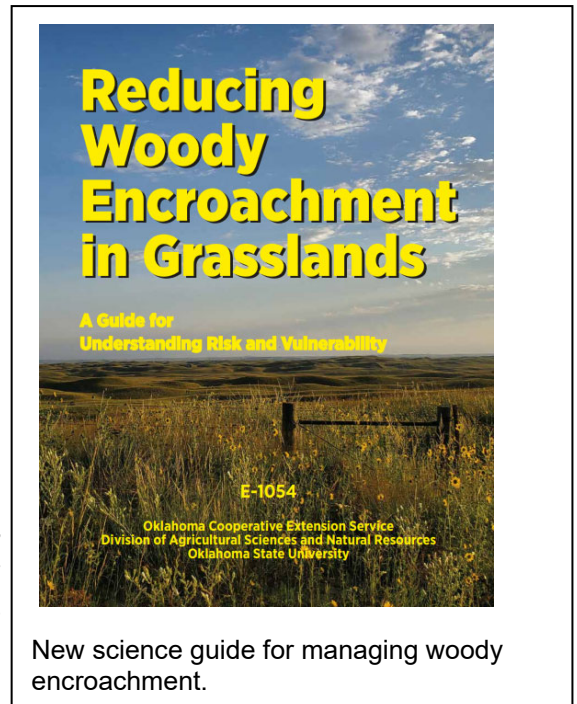
That's why a team of rangeland scientists from across the Great Plains came together to develop new guidelines for managing encroachment. The new guide recognizes the increasing scale of the threat in Great Plains grasslands and the urgency to adopt more proactive strategies that reduce the underlying sources of risk. As a basis for improved management strategies, the guide helps managers address two essential information needs: 1) understanding why grasslands are vulnerable or likely to become vulnerable to woody encroachment and 2) identifying where grasslands are vulnerable or likely to become vulnerable to woody encroachment.

Together, these factors help inform a spatial game plan for managing woody encroachment that can be applied in any landscape: *Defend the core, grow the core*. This plan prioritizes defending grassland *cores* that have yet to be compromised by eastern redcedar seed and seedlings, the early stages of the problem. Once defensive strategies are in place for grassland cores, the focus shifts to growing the core through integrated treatments that remove nearby seed sources and deplete seedbanks over time. One of the advantages of this approach is that it provides a basis for neighbors to work together under a unified strategy to collectively reduce the threat of woody encroachment on their lands.

The new guidelines have been adopted by a large coalition of landowner groups and natural resource agencies and organizations as part of the Great Plains Grassland Initiative (GPGI). The GPGI is a large and partnered effort for grassland conservation in the Great Plains. The initiative is a key part of scaling up management and technical guidance to conserve the last best grassland regions in the Great Plains that are threatened by encroachment.

GPGI partners in Nebraska estimate that new guidelines save \$25 to \$500 per acre compared to past approaches for managing encroachment. The cost savings come from the *defend the core, grow the core* approach which helps identify cost-effective management treatments and allows more acres to be impacted with the same amount of dollars.

For more information on eastern redcedar encroachment and guidelines for tackling the problem visit the eastern redcedar science literacy project at <https://cedarliteracy.unl.edu>



New science guide for managing woody encroachment.

New Science Guide

Twidwell, D., D. Fogarty, and J. Weir. 2021. Reducing woody encroachment in grasslands: a guide for understanding risk and vulnerability. Oklahoma Cooperative Extension Service, E-1054.

Available at: <https://agronomy.unl.edu/eastern-redcedar-science-literacy-project/how-manage-it>

Year One Barta Brothers Ranch CAM update

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



Craig Allen

A portion of the UNL Barta Brothers Ranch is under a collaborative adaptive management program. Collaborative adaptive management is a stakeholder-driven process that treats management options as hypotheses, and puts those hypotheses at risk with data collected following management. The Barta stakeholder group wished to focus management uncertainty on the use of fire, and the effects of fire in reducing invasive woody species and enhancing biological diversity and heterogeneity, while increasing, or at least not negatively affecting, cattle weights. Pre-treatment data were collected in 2021, and one pasture (~150 acres), formerly under rotational grazing, was burned in March 2022. Rather than continue rotational grazing, gates between four pastures were left open following the burn, and cattle could choose where to forage among three unburned and one burned pasture. This approach mimics patch-burn grazing approaches, but within a four-pasture system so that it could be adopted by others with little effort.

Following the March 2022 burn, we collected data on vegetation, bird communities, soil properties, soil erosion, and more. Cattle (yearlings) were weighed prior to entering the pasture and at the middle and end of the grazing season. The burn was successful, and recovery was surprisingly rapid given limited precipitation. A critical component of collaborative adaptive management is that results are continually monitored and evaluated following treatments. Two graduate students and a research technician spent the summer at the ranch, collecting data on the effects of effects of the burn. Additionally, imagery collected by satellites and winged aircraft are being used to monitor vegetation responses across the entirety of the ranch. Moving forward, we also expect this data to enhance our understanding of the diversity and resilience of grassland vegetation across the ranch.

The stakeholder group met at the ranch in June and October for a field tour, to discuss preliminary results, and to plan for 2023. A stakeholder mental mapping exercise conducted in June displayed that there are some cause-and-effect relationships we still need to assess; however, stakeholders and participants noted healthy growth in plants in the burned section of the pasture, despite the fact that cattle preferentially grazed in the burn. Preliminary data suggest that cattle within our AM burn gained more weight than cattle in the control group (four-pasture deferred rotation). The stakeholder group is eager to continue building on these single-season results through continuation of the collaborative adaptive management cycle.

Nebraska Grazing Conference: August 8-9, 2023

by Daren Redfearn, Chair, Nebraska Grazing Conference

Planning has begun for this year's Nebraska Conference on August 8-9 in Kearney, Nebraska at the Younes Convention Center. The preconference tour on Tuesday morning will highlight Stress-free Livestock Management. Additional conference themes include Precision Livestock Management and Emerging Wildlife Issues on Grazing Lands among others. The planning committee is also organizing a producer panel made up of former Leopold Award winners.

Forty Years Reflection on Grassland Fire Weather

David Wedin Assistant Director Center for Grassland Studies, Professor School of Natural Resources

In April 2023, I will have been conducting prescribed burns in grasslands and prairies for 40 years. I have neither extensive federal (NWCG) certification for wildland fire, nor in-depth training in weather and climate. However, Nebraska's bad wildland fires in 2022 prompt me to make a few comments about grassland fire weather, how it's changing, and the extensive weather resources available to the grassland owner or manager. I've also been a college teacher for 30 years and this seems like a teachable moment. Each insight I share was based on a mistake I made over four decades. Whether you are a rural resident, a manager planning a prescribed burn, or a grassland owner anticipating field activities, do not rely on rules-of-thumb from 25 years ago regarding the season for "typical grass fires" or simple prescriptions for "safe" fire weather. By simple prescriptions I mean defining a safe burn "window" with maximum and minimum values for temperature, wind speed and relative humidity (RH) without considering their interaction or other key factors. Nor should you over rely on Red Flag warnings from the National Weather Service to protect you. Red Flag warnings are important, but they are generally issued only 24 hours in advance of severe fire weather conditions. As a grassland manager, you need a longer forecast with better precision for your local conditions. When teaching, I use a simple Australian model called the Grassland Fire Danger Index (GFDI). Some National Weather Service (NWS) offices in our region (Iowa, Kansas, and eastern Nebraska) include GFDI calculations with hourly weather forecasts. I use an online version of the model (<https://gypmieweather.com/mcarthur5.htm>), which, unfortunately, is metric. I encourage you to play with the model, use the internet for metric conversions, and explore how five key factors interact to determine grassland fire danger.

Grasses are considered 1-hour or fine fuels, in contrast to coarse woody fuels found in woodland and forest landscapes which are defined as 10-, 100-, and 1000-hour fuels. I have burned prairies in the afternoon that had half an inch of overnight spring snow in the morning. I have burned wet prairies in early spring with my feet under water. Droughts and long-term weather impact grass-



Photo by Danielle- Near Olive creek Lake

land fire, but the key question for 1-hour fuels is what were the weather conditions, especially humidity, temperature and windspeed, for the last few hours? Do not rely on weather forecasts that are 12 or 24 hours old. Coarse fuels in woody ravines, dormant redcedars, stumps or hay bales in your grassland complicate fire behavior and change both pre- and post-fire considerations. Typically, woody draws are still moist from the winter in early spring while upland grasslands quickly dry out prior to green up. However, given our current drought conditions, one needs to assume coarse woody fuels are dry and flammable. Coarse woody fuels, such as brush piles, burn much longer than 1-hour fuels. I asked Ken Cook, NWS meteorologist in Wichita KS, about their biggest problem with grass fires. He answered, "brush piles". While a 24-hour forecast may cover 1-hour fuels in a prescribed burn, coarser woody fuels require the land manager to look at 3 to 5 day forecasts and anticipate changing fire weather.

A second fuel consideration for grasslands is "grass curing", which is the inverse of greenness. 90% to 100% curing represents extremely brown and dry conditions (think upland Sandhills grasslands in the winter), while values less than 30% curing represent mostly green vegetation. The NWS has difficulties estimating "curing" at the county or regional scale for calculating GFDI, but the local land manager can accurately estimate the greenness of their grassland. Have the cool season grasses in your mowed fire breaks greened up? Only 10% to 20% green grass in the vegetation will make a huge difference in flammability. Experiment with the GFDI and see the difference. Warm, snow-free periods in the non-growing season are highly flammable in our Nebraska grasslands. The grasses are well "cured", particularly our dominant warm season grasses, and the right weather can dry out fine fuels in a few hours. The 6000-acre Four Corners Fire (January 15, 2006) was an excellent example of this (<https://digitalcommons.unl.edu/nebforestpubs/40/>). Expect more winter fires like this.



Smoke rises from a wildfire sparked in late July 2022 by lightning south of Gering, in Nebraska's Panhandle. (Courtesy of Nebraska State Patrol)

Forty Years Reflection on Grassland Fire Weather

(Continued from Page 6)

We know that relative humidity (RH) is a key fire weather parameter. A prescribed burn often settles down in the evening as relative humidity increases. As relative humidity decreases and drops below 20%, fire behavior becomes increasingly extreme. However, remember that relative humidity means relative to air temperature. If your forecast air temperature is off, your relative humidity estimate is wrong. As our winter climate becomes warmer and more unpredictable, I grow skeptical of forecast high temperatures. For example, consider winter air with constant actual moisture content (a dew point of 25°) at three temperatures: 40° F, 60° F, and 70° F. As the winter air warms, the RH at those three temperatures drops from 55% to 26% to 18%.

(<https://www.calculator.net/dew-point-calculator.html>). A few years ago, I conducted a prescribed burn...and temporarily lost control...on a December day. The temperature exceeded the morning's forecast and I failed to get current, local RH data.

Integrating the net effect of 5 variables (temperature, wind speed, relative humidity, grass curing, and fuel load) on fire weather danger requires either vast experience or mathematical models. NOAA's National Weather Service has both. Below I provide Internet links to several valuable resources for understanding and forecasting fire weather, all of which involve NOAA and NWS. Some folks enjoy finding the best weather information from multiple maps, charts, and tables at multiple web sites. If you do not, just call your National Weather Service office. Bryan Barjenbruch, meteorologist at the Omaha NWS office, told me to tell you that. They would be happy to chat with you. Here are the numbers for the 6 local NWS offices that cover Nebraska:

Omaha/Valley NE: 402-359-5166

Hastings NE: 402-462-4287

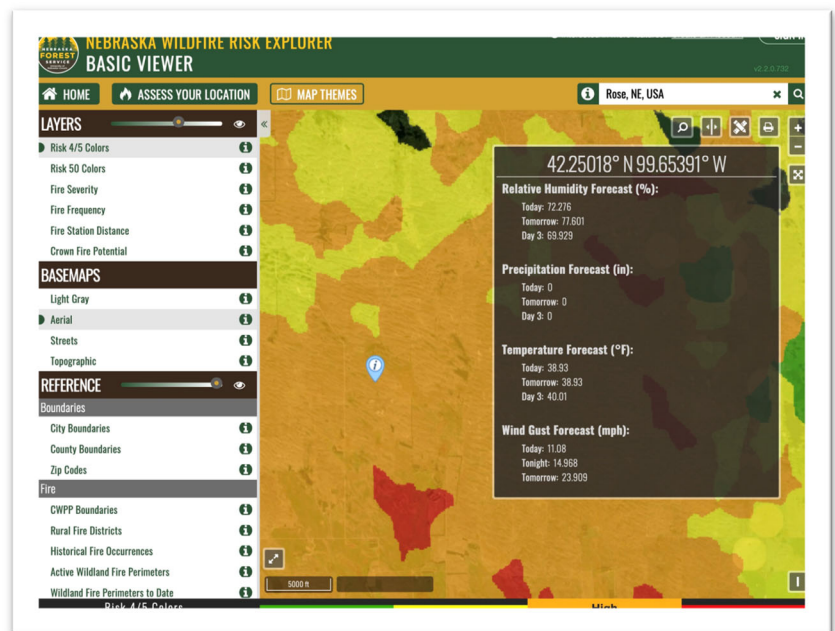
North Platte NE: 308-532-4936

Goodland KS (SW Nebraska): 785-899-7119

Cheyenne WY (NE Panhandle): 307-772-2468

Sioux Falls SD (Dixon & Dakota Counties): 605-330-4247

These six NWS offices produce local Red Flag Warnings (typically 12 to 36 hours) and Fire Weather Watches (1 to 4 day). These offices also tailor a Fire Weather resources page on their website to local needs and produce hourly weather forecasts available in several formats. Get local, hourly NWS weather forecasts going out 3 days at <https://weather.gov> or <https://www.weather.gov/dlh/fwd> .



The Nebraska Forest Service collaborated with NWS, UNL's National Drought Mitigation Center, and other agencies to develop the Nebraska Wildfire Risk Explorer (<https://nfs.unl.edu/nebraska-fire-danger>). This site provides point forecasts for weather, fire danger, drought, distance to local fire department and other fire resources. The example shown gives fire conditions and weather for UNL's Barta Brothers Ranch west of Rose NE, where another prescribed fire is planned this spring. Various federal agencies provide regional and national fire weather outlooks on time scales longer than 3 days. NOAA's Storm Prediction Center provides 1 day, 2 day, and 3-8 day national fire danger maps

(https://www.spc.noaa.gov/products/fire_wx/). An overview of NOAA fire weather resources is available at <https://www.noaa.gov/noaa-wildfire> .

In summary, grassland fire weather conditions are changing as our climate changes, especially in the non-growing season. This creates challenges for ranchers, rural property owners, grassland managers, and fire professionals. However, the number of available resources for anticipating and managing those changes are also increasing rapidly. They are just a computer mouse click or a phone call away.



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Nebraska Youth Range Camp

June 5 — 8, 2023

Nebraska College of Technical Agriculture
Curtis, NE

Youth ages 14 to 18 will experience hands-on activities related to rangeland management, conservation, ecology, animal science, and wildlife during the 58th Annual Nebraska Youth Range Camp. University, college, and agency professionals facilitate field activities, lectures, leadership/team-building

exercises, and field trips to local working ranches to illustrate management activities and goals.

Through the generous donation of sponsors, approximately 50 youth from across the state receive a discounted rate to attend the event which promotes education, leadership skill development, and interaction with other students with similar interests. Individuals and organizations are encouraged to become a sponsor of the Nebraska Youth Range Camp to support student participation. **Sponsors responding prior to May 1 will have their brand appear on event t-shirts.**

Online applications are available at nesrm.org and due by May 20, 2023. A \$75 registration fee is due by May 27. Youth are encouraged to contact their FFA advisor or 4-H Club leader for possible scholarships, as well as local Natural Resources Districts office managers regarding sponsorships.

For more information, contact **KyLee Kime** at kylee@sandhillstaskforce.org