



College of Agriculture and Life Sciences

# Research helps farmers succeed with prairie

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AMES, Iowa – More landowners are interested in planting strips of deep-rooted prairie within crop fields or on marginal land as an effective soil conservation and water quality practice. But they need reliable answers about the costs and benefits, the best seed mixes to use and how to establish a prairie that resists weedy invasion.

Answers to practical questions like these are coming out of projects led by University of Northern Iowa researchers, funded by the [Iowa Nutrient Research Center at Iowa State University](#).

“Restoring prairie at strategic locations in agricultural landscapes is a practice that can gain huge improvements in water quality and bring other benefits, like reduced weed pressure and valuable habitat for pollinators and wildlife,” said Justin Meissen, Research & Restoration Program Manager at the [University of Northern Iowa's Tallgrass Prairie Center](#) and principal investigator on one of the

projects.

“For the practice to catch on, we need to help make prairie plantings more dependably successful and cost-effective,” Meissen said.

The researchers emphasize the importance of considering soil conditions and site location for long-term success. One result of the project is a new tool, the [Tallgrass Prairie Seed Calculator](#) to guide selection of seeds to fit a landowner’s site conditions, goals and budget.

### **Seed mix and management**

The study compared three prairie seed mixes and studied the short- and long-term impacts of a first-year mowing treatment to help prairie plants become established. Researchers looked at three years of data from sites in eastern Iowa, on the Iowa State Northeast Iowa Research Farm at Nashua in Floyd County and on privately owned farms in Tama and Grundy counties. They found significant differences between their treatments that can help inform landowners’ decisions on what to plant and how to manage their plantings.

In prairie reconstruction, they found that seed mix design is the biggest influence on costs and ecological outcomes.

The seed mix the researchers assessed the overall best buy, considering price and performance, was a customized blend of about 70 species balanced with grasses and flowering forbs. Designed to resemble the makeup of a native prairie matched to the sites’ geography and soils, this “diversity mix” resulted in a robust stand that was resistant to weeds and protected soil. This treatment also produced the highest number of flowering forb species of the three seed mixes studied.

The lowest-cost “economy” seed blend studied of about 20 species resembled USDA specifications for its grass filter strip conservation practice. The mix provided good grass cover to reduce soil erosion, intercept and filter nutrients from agricultural runoff and resist weeds. That mix was dominated by grasses and had fewer flowering species.

The highest-priced seed blend the researchers studied was the “pollinator mix” that included 38 species with more forbs than grasses, and resembled mixes recommended for USDA’s pollinator habitat conservation practice. This mix provided good habitat for pollinators. However, its lower grass stem density left more bare ground open to erosion and weeds.

Seed used in the study was sourced from Iowa and regional suppliers. Costs for the seed mixes ranged from about \$130 per acre for the economy mix, \$291 for the diversity mix and \$368 for the pollinator mix. Actual costs can vary widely, said Meissen, depending on factors like seeding rates and seasonal growing conditions that affect supply.

The researchers also looked at the impact of mowing prairie as a management tool. “Mowing resulted in better, faster establishment,” said Meissen. Mowing the first year also significantly decreased weed competition.

“By the third year, the benefits of early mowing were leveling off,” he said, “but the study shows that more intensive early management accelerates the benefits from a prairie planting, especially weed suppression and water quality benefits from dense perennial stems.”

## **Biomass and beyond**

A previous study by the Tallgrass Prairie Center, also supported by the Iowa Nutrient Research Center, resulted in the report [Linking Nutrient Reduction Practices with Biomass Energy](#), which provides detailed data and case studies on the energy potential of prairie-based biomass with information on processing, transport and storage.

For landowners and entrepreneurs considering growing prairie as an energy source, the report suggested that prairie biomass will be best suited for commercial, mid-scale uses such as greenhouses that now use propane or natural gas.

Eric Giddens, Energy Education & Outreach Coordinator for UNI’s Center for Environmental and Energy Education, led the biomass study. He found that some European countries have developed the infrastructure to use biomass as a power and heat source, even for homes. “If we had more favorable policies – or a strong economic driver like higher fuel prices – Americans would likely take a stronger interest in these technologies,” he said.

The research briefly discusses other economic uses for prairie plants, including uses for absorbents for the oil and gas industry and animal bedding. “Prairie biomass, loosely dried or pelletized, has a high absorption rate and is in many ways superior to wood shavings and small grain straw currently used by livestock producers and others,” said Giddens.

Most farmers planting prairie are using incentives through the federal Conservation Reserve Program, said Laura Jackson, professor of biology and director of the Tallgrass Prairie Center at UNI, who worked on the prairie biomass study. “Current policy prohibits economic use of CRP acres, which discourages interest in prairie as a paying enterprise,” she said. “One can imagine many changes that could more strongly favor prairie.”

Larry Roadman, one of the landowners cooperating with the Tallgrass Prairie Center’s studies, says planting prairie on the family’s fifth-generation farm near Dike was an idea his son presented to him after reading a [national news article about prairie strips research sponsored by Iowa State University](#). As a result, the family has established three prairie strips in their cropland and an area of prairie on a

low-lying area next to a saturated riparian buffer they installed.

“With our farm, we’ve been blessed with an unbelievably rich resource,” Roadman said. “Taking care of it is important, and I’m happy that my sons agree.”

The Roadmans have hosted several field days for the Tallgrass Prairie Center and like to share information about the benefits of their prairie. [Read more about the Roadman prairie](#), including a perspective from the farm's manager.

“Prairie is starting to gain respect as a conservation alternative with multiple potential advantages,” said Jackson. “These research projects are an important way to help landowners find answers they need so we can scale up this practice that is an important part of Iowa’s unique heritage.”

[The Tallgrass Prairie Center](#) at the University of Northern Iowa restores native vegetation for the benefit of society and the environment through research, education and technology transfer. The Center is in the vanguard of roadside vegetation management, Source-Identified seed development and seed mix research, primarily serving the Upper Midwest Tallgrass Prairie Region.

[The Iowa Nutrient Research Center](#) was established by the Iowa Board of Regents in response to legislation passed by the Iowa Legislature in 2013. The center pursues science-based approaches to areas that include evaluating the performance of current and emerging nutrient management practices and providing recommendations on implementing the practices and developing new practices. Iowa State University leads the partnership that includes the University of Iowa and the University of Northern Iowa. In its first five years, the center has supported 76 projects.

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Professor Laura Jackson, director of the Tallgrass Prairie Center at the University of Northern Iowa, holds up long prairie roots at a field day on the Roadman family farm in northeast Iowa.

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