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## Prairie Contour Strips: Demonstrating the importance of custom seed mix design for biological integrity.

Laura Jackson  
*Tall Grass Prairie Center*

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## **Prairie Contour Strips: Demonstrating the importance of custom seed mix design for biological integrity.**

### **Abstract**

This project aims to add native vegetation to the agricultural landscape by establishing demonstration plantings of high quality prairie vegetation on farms and to be a source of information and expertise for a network of skilled practitioners. The ultimate result of the project is to enhance the ability of technical service providers, conservation professionals, landowners, and others who influence land use practices to design high quality seed mixes and plant them successfully.

# A final report prepared for the Leopold Center for Sustainable Agriculture

## Prairie Contour Strips

*Demonstrating the importance of custom seed mix design for biological integrity.*

E2015-16

Final Report due: July 31, 2017

Laura L. Jackson  
Director, Tallgrass Prairie Center  
University of Northern Iowa  
Cedar Falls, IA 50614-0294  
[Laura.l.jackson@uni.edu](mailto:Laura.l.jackson@uni.edu)  
319-273-2705

Ashley Kittle  
Program Manager, Prairie on Farms Project  
University of Northern Iowa  
Cedar Falls, IA 50614-0294  
[Ashley.kittle@uni.edu](mailto:Ashley.kittle@uni.edu)  
319-273-3828

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**TABLE OF CONTENTS**

Cover Page ..... Page 1

Table of Contents ..... Page 2

Nontechnical Report ..... Page 3

Background and Information ..... Page 3

Approach and Methods ..... Page 4

Results and Discussion ..... Page 4

Conclusion ..... Page 4

Impact of Results ..... Page 5

Education and Outreach ..... Page 5

Leveraged Funds ..... Page 5

# Prairie Contour Strips

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Director, Tallgrass Prairie Center  
University of Northern Iowa  
Cedar Falls, IA 50614-0294  
Laura.l.jackson@uni.edu  
319-273-2705

Q: How can The Tallgrass Prairie Center increase the professional connections among prairie restoration specialist and the agricultural community; increase awareness among decision makers who plan conservation practices and increase knowledge to design high quality prairie seed mixes for prairie strips?

A: The leaders of this project worked with landowners to establish perennial vegetation sites designed for teaching; held demonstration field days; organized and created a community of practice working group; published an on-line native seed mix calculator; increased awareness among decision makers of the distinction between general and custom native seed mixes and assessed commercial availability of native species that are well adapted for prairie contour strips within row crop systems.

## **ABSTRACT**

This project aims to add native vegetation to the agricultural landscape by establishing demonstration plantings of high quality prairie vegetation on farms and to be a source of information and expertise for a network of skilled practitioners. The ultimate result of the project is to enhance the ability of technical service providers, conservation professionals, landowners, and others who influence land use practices to design high quality seed mixes and plant them successfully.

## **BACKGROUND AND INTRODUCTION**

Midwest prairie states suffer from soil erosion, poor water quality and increasing frequency of floods. These challenges demand large scale, long-term restoration of perennial cover and biodiversity within working agricultural lands in the upper Midwest. Practitioners and conservation planners, who are not botanists, may improve their success if they have access to seed mix recommendations based on scientific research, in-depth knowledge of plant species characteristics, and mechanistic understanding of habitat restoration processes.

The general objective of this project is to facilitate the use of native tallgrass prairie for conservation purposes by applying research and the lessons of prairie restoration in the agricultural community. The ultimate goal is to enhance the ability of technical service providers, landowners, and others who influence land use practices to design high quality, high performance seed mixes and plant them successfully. By doing so, we greatly increase the chances prairie strips will remain and function well for decades or longer.

The project had three basic objectives:

1. Increase professional connections and foster peer-to-peer exchange.

2. Increase awareness and knowledge among decision makers and conservation planners of the distinction between general and custom native seed mixes and the importance of high quality native seed mix design and post-planting management.
3. Assess commercial availability of native species and work with the native seed industry to address potential gaps.

## **APPROACH AND METHODS**

Project leaders met the objectives by: organizing half day field days at established demonstration sites; cultivating and supporting a working group using a “community of practice” framework based on shared needs and interests; creating and publishing an on-line Iowa Prairie Seed Calculator; disseminating the “Principles of Seed Mix Development and Estimated Costs” document; providing public presentations and by assessing challenges and opportunities for providing species of high conservation value in order to fill the plant materials gap.

Two demonstration sites were established: (1) eleven acres near Dysart, Iowa and (2) a research plot at the ISU Northeast Research and Demonstration Farm in Nashua, Iowa. Three field days were held at both sites over the two years (six total demonstration field days). Seven additional demonstration sites in the Middle Cedar River Watershed were established. A map of these sites was created and will continue to be updated for the duration of the project. Twenty-five prairie strips (approximately 40 acres) were planted.

Two working group meetings convened to increase professional connections and foster peer-to-peer exchange between prairie restoration specialists, technical service providers and land managers in the agricultural community. Appropriate species for a diverse seed mixes were made available for every soil type in Iowa via the on-line Iowa Prairie Seed Calculator on the Tallgrass Prairie Center’s website as well as principles of seed mix development and estimated costs. The challenges and opportunities of providing species of high conservation value in order to fill the plant materials gap were assessed. The approach included communication with stakeholder agencies to compile a list of species, including sources, and some idea of potential demand or scale of restoration needs.

## **RESULTS AND DISCUSSION**

The creation and support of an Agriculture Conservation working group provided an opportunity for technical service providers, and conservation planners to gain awareness, familiarity and appreciation for well-designed prairie strips and for the expertise and support that exist outside of agricultural circles. The effects of first year mowing on native plant emergence and growth using three different seed mixes planted in Northeast Iowa research was shared as well as a tutorial on how to use the recently published on-line Iowa Prairie Seed Calculator.

Awareness and knowledge of seed mix design and post-planting management among decision makers and conservation planners increased as a result of the multiple presentations. A video tutorial of how to use the on-line Iowa Prairie Seed Calculator was made available on the Tallgrass Prairie Center website. A tracking tool was employed to determine calculator use. The Tallgrass Prairie Center explored challenges and opportunities for providing species of high conservation value in order to fill the plant materials gap.

## **CONCLUSIONS**

TPC staff noted key elements to consider in increasing knowledge, awareness and connections among conservation professionals and individuals that influence land use:

- Practitioners and conservation planners could improve their success if they had access to seed mix recommendations based on empirical research and mechanistic understanding of habitat restoration process.
- There is a need for scientifically based recommendations for seed mix design and a desire from technical service providers and conservation planners to have access to this information.
- Well-intended and informed conservation professionals are often affected by organizational limitations or specifications.
- Widespread use of the Iowa Prairie Seed Calculator recommendations will allow native seed companies to better anticipate demand and adjust their investments in seed production capacity.

### **IMPACT OF RESULTS**

During the 2015 and 2016 *field days*, TPC staff connected with more than 190 conservation professionals, landowners, technical service providers, and land managers to demonstrate and educate on the benefits of designing high quality prairie on agricultural lands. Responses from the *working group* evaluations indicated 67 percent *strongly* agreed the working group experience is useful in their work while the remaining 33 percent agreed.

This project is ongoing and efforts will continue to establish demonstration sites, publish scientifically based prairie restoration information, and strive to influence and educate technical and conservation agency professionals. Potential impacts of this project include a multifunctional approach to conservation incentive programs at the federal, state, and local levels. Decision makers may incorporate greater floral diversity and more effective, science-based methods into their practice standards. Expansion and further development of the on-line Iowa Prairie Seed Mix Calculator, its demonstration and ultimately widespread adaption throughout the Corn Belt, will empower decision-makers at the state level, and conservation planners at the local level.

### **EDUCATION AND OUTREACH**

A variety of activities and coverage emerged including field days, presentations and news articles. The publications include:

- Iowa Prairie Seed Calculator. <http://www.james.com/iowaPrairieSeedCalculator-D2/>
- Interim Research Report. The effects of first year mowing on native plant emergence and growth using three different seed mixes planted in Northeast Iowa. [http://www.tallgrassprairiecenter.org/sites/default/files/nashua\\_research\\_report\\_2015\\_final2\\_0.pdf](http://www.tallgrassprairiecenter.org/sites/default/files/nashua_research_report_2015_final2_0.pdf)
- Summary and management implications, Second Year Results <https://www.tallgrassprairiecenter.org/restoration-and-research/seed-mix-and-1st-year-mowing-study>
- Technical guides covering the basics of prairie reconstruction. <http://www.tallgrassprairiecenter.org/publications>

Six field days were held and two working group meetings. In addition, TPC staff provided twenty presentations on topics related to: Designing and managing cost-effective, diverse prairies in agricultural landscapes; Planting and Improving Prairies on Agricultural Lands; and Elements of an Ecologically Designed Seed Mix for Tallgrass Prairie Plantings.

### **LEVERAGED FUNDS**

The Leopold Center for Sustainable Agriculture was one of four major funders, in addition to the University of Northern Iowa, contributing to the Prairie on Farms Project. Other financial supporters include the Iowa Nutrient Reduction Center, The Natural Resources Conservation Service, and New York Community Trust.