

**The Friends of Nachusa Grasslands  
2024 Scientific Research Project Grant Report  
Due June 30, 2025**

Please answer the following questions with clearly written summaries to give Nachusa Friends' science committee members, officers, and board members a good idea of what you accomplished using your grant money. Unless you object to the Friends doing so, your report will be uploaded into the science section of the Friends' website: [nachusagrasslands.org](http://nachusagrasslands.org).

1. Please save this form to your desktop with a unique file name that includes "Friends 2023 Science Grant Report" and your last name.
2. Complete the form using the headings in **bold** as your guide.
3. Save the file as a Word document or a PDF.
4. Attach the file to an e-mail, and send it to: [nachusafriendsscience@gmail.com](mailto:nachusafriendsscience@gmail.com) no later than June 30, 2025.
5. The subject of the e-mail should be "2024 Scientific Research Grant Report" and your last name.
6. If you have not completed your work, please submit this form anyway by the June 30 deadline and plan to contact Friends after your project is complete so that we may learn from and publicize the outcomes as appropriate.

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**2024 grant amount:** \$ 3,137.00

**Research Project Topic:** To evaluate the small mammal communities that occur within restored prairies and their community-level responses to local and landscape-scale variables.

**Research Project Purpose:** The purpose of this research project was to examine how habitat and landscape-level covariates influence small mammal occupancy in restored prairies. The findings aim to inform management decisions and provide site-specific guidance to enhance habitat quality, making restored prairies more suitable for prairie-associated species and supporting the reestablishment of functional ecological communities.

**Research Project Outcomes to date:**

The outcomes of this project to date include a comprehensive assessment of the small mammal and plant communities at one of the restored prairie sites at Nachusa Grasslands, as well as at 20 additional restored prairies across central and northern Illinois.

We also conducted genetic testing on ear tissue samples using an established PCR protocol to compare allele lengths and confirm species identity between two morphologically similar but genetically distinct vole species, *Microtus pennsylvanicus* and *Microtus ochrogaster*.

Finally, we developed and applied statistical occupancy models to evaluate how seven small mammal species, representing grassland specialists, facultative species, and habitat generalists, respond to local habitat characteristics and landscape-scale variables. The results also indicated whether a specific survey method between bucket cameras or Sherman traps, would increase detection probabilities for specific small mammal species. These model results provide key insights into the factors influencing small mammal use of restored prairie sites.

**Describe how the grant funds you have received from the Friends of Nachusa Grasslands have been used in regard to the above topic, purpose, and/or outcomes:**

The grant funds provided by the Friends of Nachusa Grasslands were essential to the successful completion of both the field and lab components of this research. Funding supported a research technician who assisted with data collection, which allowed us to increase the number of sites surveyed during the 2024 field season and complete the work more efficiently and effectively. Additionally, the grant supported the purchase of laboratory equipment used to genetically differentiate the two morphologically similar vole species referenced in our study. This capability was critical for validating field identifications and ensuring the accuracy of our community-level occupancy analyses. Although these vole species appear similar, they are genetically and ecologically distinct, making species-level identification vital to the ecological integrity and reliability of our findings.

**Describe how your project has benefited the work and goals of Nachusa Grasslands:**

This project contributed valuable information about the diversity of the current plant and small mammal communities within a restored prairie at Nachusa Grasslands, supporting the organization's long-term monitoring and active management efforts. Additionally, the results from our statistical analysis, which incorporated data from 20 other restored prairie sites along an urban-to-rural gradient across central and northern Illinois and Indiana, identified key landscape- and habitat-level factors influencing the use of restored sites by habitat generalists, grassland specialists, and facultative grassland small mammal species. These findings provide actionable guidance for Nachusa's management team, highlighting which site-level habitat features and surrounding landcover types influence the presence of grassland-associated species. This information can inform future restoration strategies aimed at enhancing site conditions to support grassland specialist species and increase overall biodiversity at restored sites.

**Describe how your findings can be applied to challenges in management practices for restoration effectiveness and species of concern:**

An important component of effective restoration is the monitoring of wildlife communities within restored sites, a practice that Nachusa Grasslands has actively undertaken. However, ensuring that monitoring methods accurately detect all species present can be challenging. In small mammal communities, for example, cryptic species like shrews are notoriously difficult to capture using traditional methods, and when captured, they are often found deceased. This research demonstrated that a more modern technique, bucket cameras, offers a promising alternative. Not only did this method reduce mortality risk, but it also increased detection probabilities for elusive species like shrews. Thus, the results from our analysis suggest that bucket cameras, especially when combined with traditional methods, can offer a more complete assessment of small mammal communities in restored prairies. In addition, the study offered valuable insight into how different aspects of vegetative structure influence small mammal use of restored habitats. Specifically, it identified key plant community characteristics that promote higher diversity and increase the presence of grassland specialists. These findings are directly applicable to management, helping inform decisions that enhance restored sites for species of conservation concern while also supporting overall biodiversity.

**Please list presentations/posters you have given on your research:**

Paper presentation for 2025 Natural Resource and Environmental Science Research Symposium, Urbana-Champaign, IL (03/2025) entitled, “The Big Picture: How Habitat and Landscape Variables Shape Small Mammal Communities in Restored Prairies”

Poster presentation for the 2025 Nachusa Grassland Science Symposium (04/2025) entitled, “The Big Picture: How Habitat and Landscape Variables Shape Small Mammal Communities in Restored Prairies”

**Have you submitted manuscripts to scientific journals? If so, which ones? If not, do you anticipate doing so? (Please send digital copies of published articles to the Friends so that we can learn from your work.)**

The manuscript is near completion and will be submitted to *Restoration Ecology*.

**What follow-up research work related to this project do you anticipate (if any)?**

Future research should explore how annual variation, the successional age of restored sites, and specific management practices influence small mammal community occupancy responses over time. Additionally, it would be valuable to investigate the role of interspecific interactions, such as competition or facilitation, within the small mammal community, as these dynamics may significantly affect whether and how grassland specialists use restored habitats.

**Optional: Suggestions for improving the application and award process for future Friends of Nachusa Grasslands Scientific Research Grants:**

I think the application and award process is very clear and feasible for first-time grant writers, such as myself.