

**Friends of Nachusa Grasslands**  
**2020 Scientific Research Project Grant Report**  
**Due June 30, 2021**

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**2020 grant amount:** \$3,400

Please answer the following questions with 1- to 2- sentence summaries:

**Research Project Topic:** The landscape ecology of small mammals and the relationship between small mammal populations and management activities such as prescribed fire.

**Research Project Purpose:** To investigate the factors driving the populations of small mammal species at Nachusa Grasslands in order to better predict the impacts of management activities on the community. Additionally, to gain a more sophisticated understanding of the heterogeneous impacts of prescribed fire on the landscape.

**Research Project Outcomes to date:** So far, we have shown species-specific responses to prescribed fire, not just as a categorical variable, but a relationship to how much burned area is in proximity to the trapping site. We have also produced comprehensive digitized fire maps for the entire history of Nachusa which can be used to support future work in understanding the impacts of prescribed fire.

**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 from Friends of Nachusa Grasslands have supported our work by helping fund the annual small mammal trapping. Funds were used to acquire new flagging and materials to maintain the grids for trapping. They were also used to support travel to the site and acquisition of supplies for small mammal trapping.

**Describe how your project has benefited the work and goals of Nachusa Grasslands:** By gaining a better understanding of the broad and heterogeneous impacts of prescribed fire on small mammals, managers can better predict the impacts on the community as a whole. Small mammals are a key prey source in prairie food webs, as well as a significant consumer of seeds. By understanding the potential for rises and falls in mammal populations, managers may better be able to anticipate changes in predator populations or seed consumption in restoration sites. Additionally, understanding the heterogeneity of prescribed fire impacts will help managers to more successfully apply prescribed fire to achieve management goals.

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

significant role in prairie ecosystems. They are especially relevant to managers in their role as consumers of seeds. By better understanding population drivers, managers can better anticipate the potential impacts of small mammals on vegetation and overseeding efforts. Additionally, a better understanding of the complexities of prescribed fire impacts will allow for more informed decision-making regarding the application of fire for various management objectives. I hope to identify conditions on the ground that lead to less intensity in prescribed fire, which may help managers create circumstances that maximize the use of fire to achieve their goals.

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

- (2020) Rowland, E.G., Jones, H.P. "Seeing the Big Picture: Spatial Analysis and Landscape Ecology at Nachusa Grasslands." Department of Biological Sciences FUSION Seminar, Northern Illinois University (Presentation)
- (2021) Rowland, E.G., Bach, E., Kleiman, B.P., Jones, H.P. "Beyond Burned and Unburned: A New Approach to Quantifying the Impacts of Prescribed Fire on Prairie Small Mammals." Midwest Fish and Wildlife Conference (Symposium Presentation)
- (2021) Rowland, E.G., Bach, E., Kleiman, B.P., Jones, H.P. "Beyond Burned and Unburned: A New Approach to Quantifying the Impacts of Prescribed Fire on Prairie Small Mammals." Midwest Ecology and Evolution Conference, Northern Illinois University (Presentation)
- (2021) Rowland, E.G., Bach, E., Kleiman, B.P., Jones, H.P. "The View From Above: Spatial Trends in Prescribed Fire and Edge Proximity at Nachusa Grasslands." Nachusa Grasslands Virtual Science Symposium (Poster)
- (2021) Rowland, Jones, H.P. "On the Prairie Floor: Multi-Scale Landscape Ecology of Small Mammals." BIOS 457: Biology of Birds and Mammals. Northern Illinois University (Presentation)

**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.)**

- A data manuscript on the prescribed fire mapping work will be submitted to the British Ecological Society journal Ecological Solutions and Evidence within the next two months.
- I anticipate at least 2-3 additional publications from this work to be submitted during the course of my PhD over the next 3 or so years.

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

I believe that there is abundant more work to do in the field of landscape ecology at Nachusa Grasslands. With a more complex understanding of prescribed fire heterogeneity, I believe there is ample opportunity to examine the impacts of this heterogeneity on other taxa, especially plants. I also would love to see a full system-wide landscape classification work in order to examine the broad impacts of habitat heterogeneity, not just on small mammals, but on other species of interest.

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