

**The Friends of Nachusa Grasslands
2018 Scientific Research Project Grant Report
Due June 30, 2019**

1. Please save this form to your desktop with a unique file name that includes “Friends 2018 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 no later than June 30, 2019.
5. The subject of the e-mail should be “2018 Scientific Research Grant Report” and your last name.
6. After your research project is complete, please contact Friends so that we may learn from and publicize the outcomes as appropriate.

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2018 grant amount: \$1,500

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

Research Project Topic: My research focused on the relationships between prairie restoration management (prescribed fire, bison reintroduction, and planting age) and plant functional diversity, and how it impacts ecosystem function. Using net primary productivity (plant growth during a growing season) as a proxy for ecosystem function, my research investigated the how management strategies may increase the diversity of plant traits (functional diversity) and promote ecosystem function.

Research Project Purpose: This research is intended to help restoration managers understand how prescribed fire and bison reintroduction affect the characteristics of plant communities, and how this can impact ecosystem function. Goals of restoration include not only reinstating native floral and fauna, but also key ecosystem functions like productivity, carbon sequestration, improved habitat for endangered species, and resilience. Connecting how management practices affect plant traits and ecosystem functions can help managers set and achieve restoration goals that prioritize desired ecosystem functions.

Research Project Outcomes to date:

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 funds of the grant were used to measure carbon and nitrogen percentages and isotope ratios in plant leaf samples. The percentages were used as functional trait measurements that are associated with water use efficiency, carbon

sequestration, forage quality, and others. Carbon and nitrogen isotope signatures were used in the broader ReFuGE project, lead by Dr. Barber and Dr. Jones.

Describe how your project has benefited the work and goals of Nachusa Grasslands: Taxonomic diversity and functional diversity were shown to decrease with restoration planting age. However, the combination of bison grazing and prescribed fire was shown to increase functional richness in plant communities, which may guide Nachusa's stocking density and burn intervals if functional richness is a goal in their management plans. Individual functional traits were also directly affected by bison and fire, such as bison grazing decreasing leaf nitrogen content and increasing leaf toughness. In addition, plant productivity was shown to increase with site that had higher functional evenness, which may influence management plans to prioritize and evenness in plant traits for more productive plant communities.

Describe how your findings can be applied to challenges in management practices for restoration effectiveness and species of concern: Nachusa has well documented the taxonomic diversity responses to restoration management. This research further shows that plant communities respond through functional traits selected for by bison grazing and prescribed fire, and that changes in functional diversity affect ecosystem function. Changes in bison grazing intensity and prescribed fire intervals may help managers craft more detailed plans to prioritize increased functional diversity or ecosystem functions.

Please list presentations/posters you have given on your research: Presentations at: Midwest Ecology and Evolution Conference (2018), Ecological Society of America Annual Meeting 2018, Friends of Nachusa Science Symposium (2018), Illinois Association of Environmental Professionals Fundraising Event (2018); Poster at: Friends of Nachusa Science Symposium (2017)

Have you submitted manuscripts to scientific journals? If so, which ones? If not, do you anticipate doing so? (Please keep us informed on publications.) My former advisor, Dr. Nick Barber is writing a manuscript of my research to be and submitted it in a special feature of *Restoration Ecology*. Dr. Barber will be the main contact for the manuscripts. This research is also used in combination with other Nachusa Grasslands/NIU research for additional manuscripts written by Dr. Barber and Dr. Jones, as part of their ReFuGE project.

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