

**The Friends of Nachusa Grasslands
2017 Scientific Research Project Grant Report
Due June 30, 2018**

1. Please save this form to your desktop with a unique file name that includes “Friends 2017 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, 2018.
5. The subject of the e-mail should be “2017 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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2017 grant amount: \$5000

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

Research Project Topic: Effects of bison on the plant-pollinator interactions of tallgrass prairie

Research Project Purpose: I have two broad goals for this project: 1) To identify and quantify the plant-bee interaction network at Nachusa (which plant species are interacting with which bee species), 2) To compare the network at sites with bison and sites without to determine whether the presence of bison impacts this iconic mutualist relationship. I expect that bison may affect plant-bee interactions because they may alter the composition and relative abundance of the plant community, and they may alter site structure in ways that affect bee nest site availability, and hence bee species composition and abundance.

Research Project Outcomes to date: Together with my field techs, Luis Rodriguez-Mendoza (undergraduate student at Rutgers University) and Greta Dupuis (now a Master’s student at Washington State University), we collected 1,500 native bee specimens during June and July. My bee specimens are currently in freezer storage in the University of Minnesota Native Bee Lab, where I have begun pinning them and preparing them for identification. I hope to finish processing my specimens within a year so that I can present results from this study at conferences in summer 2019 and prepare a paper for submission to a peer-reviewed journal.

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: Most of the grant money from the Friends (\$4000 out of my \$5000 total) was

used to pay my two field technicians, Luis and Greta. I was unable to spend the entire field season on-site at Nachusa due to other research commitments, so my field technicians were essential to completing the project at a scale that will result in a published scientific paper. Most of the remainder of the funds (\$800) was used to purchase field supplies used by Luis and Greta during fieldwork, cover some of their transportation costs from their homes to Nachusa, and pinning and pollen analysis supplies that I am using now in the lab. I have a small amount of money left over (\$200) that I am saving to assist with any costs associated with bee identification (e.g. mailing specimens to expert collaborators), additional lab supplies if I run out, and eventual publication costs.

On a personal level, the grant funds were invaluable to the careers of Luis and Greta. Luis, a 1st generation college student from a low-income urban background, was unable to pursue unpaid internships to further his biology. Because of the Nachusa grant money, he gained essential summer experience towards his degree and has continued with work in the biological sciences (though he has switched to a marine focus instead of terrestrial ecology). Greta is now pursuing a Master's degree working with native bees at Washington State University, and the experience she gained working at Nachusa was an important addition to her grad school application.

Describe how your project has benefited the work and goals of Nachusa Grasslands: To be determined pending analysis of the data. At a minimum, the results of my project will contribute to the wealth of natural history knowledge at Nachusa by providing a quantitative description of the associations between particular plant and bee species. Anecdotally, the method of data collection for this study (collecting individual bees by hand using nets) resulted in a different bee assemblage than the method Sean Griffin and I have used since 2013 to survey the bee community at Nachusa (passive sampling using traps). I expect that the net data will add bee species to the Nachusa species list and contribute to our understanding of the relative abundances of species already on our list. More ambitiously, I anticipate that my data set is robust enough to shed light on the impacts of bison on the ecosystem and the role that these keystone herbivores play in structuring the prairie food web. The number of specimens I collected (~1500 bee species) matches the size of other published data sets in the literature, so I am optimistic that my analysis will yield interesting results.

Describe how your findings can be applied to challenges in management practices for restoration effectiveness and species of concern: I anticipate that my data will inform our knowledge of the relationship between bison and the prairie ecosystem, particularly the role that bison may play in structuring the relationship between plants and pollinators. As we learn more about bee ecology and natural history generally, my data will help prairie managers determine how to support vulnerable groups of bees in prairie restoration.

Please list presentations/posters you have given on your research: None for this project so far. I anticipate 2 presentations or posters: one at the Nachusa Science Symposium and one at a national conference.

Have you submitted manuscripts to scientific journals? If so, which ones? If not, do you anticipate doing so? (Please keep us informed on publications.) Not yet for this project, but I'm currently preparing a manuscript using data from Sean Griffin's and my long-term monitoring of native bees at Nachusa, funded in previous years by the Friends.

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