

The Friends of Nachusa Grasslands 2017 Scientific Research Project Grant Report

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2017 grant amount: \$1500.00

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

Research Project Topic: Small mammal community response to herbicide application

Research Project Purpose: To determine if small mammal (i.e. mice, voles, ground squirrels, etc.) abundance or diversity are affected by the use of herbicide to control invasive plants in prairie ecosystems. I also conducted a brief experiment in a greenhouse to determine if selected herbicides are effective at killing birdsfoot trefoil seeds prior to germination.

Research Project Outcomes to date: Data from 2017 and early 2018 indicate that there are no differences between small mammal communities in sprayed versus unsprayed sites, although more robust statistical tests are needed to make final conclusions. Initial data also suggest that Milestone, Garlon 3A, and Crossbow herbicides reduce BFT germination rates.

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 largest expense has been travel to and from Nachusa Grasslands, as was expected when submitting the grant application. We have also purchased several hundred PIT tags (used to mark individual small mammals, in order to track survival and movement patterns). Other expenses have been peanut butter and oats, used to bait the small mammal traps, and other minor items (hand sanitizer, flagging, and paper/pens).

Describe how your project has benefited the work and goals of Nachusa Grasslands: This study, part of an ongoing monitoring project, has resulted in a thorough inventory of the small mammal species present at Nachusa, which has expanded the information available to managers and stewards. My investigation of herbicide impacts involves spraying red clover in several sites, which directly advances Nachusa's goal of eliminating invasive nonnative species in their restored plantings. This study has also required the help of several dozen volunteers, many of whom visited Nachusa for the first time. Virtually all of them enjoyed their time here and were impressed by the restored habitat. Besides simply raising Nachusa's public profile, many of them have returned with friends or family, and some have donated to the Friends of Nachusa or attended Saturday work days.

Describe how your findings can be applied to challenges in management practices for restoration effectiveness and species of concern: My project will help managers understand previously undescribed impacts of herbicide application – the (potential) changes to small mammal abundance and diversity. These animals play a crucial role in prairie food webs, affect plant community assembly, and disperse seeds of both native and invasive plants. Therefore, understanding the factors that affect their population dynamics has broad implications for Nachusa’s mission to restore prairie ecosystems. In addition, my experiment with birdsfoot trefoil may reveal alternative options to reduce the spread of this aggressive invader.

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

Posters: 2017 Nachusa Science Symposium (Title: Of Mice and Management: Small Mammal Monitoring and the Effects of Invasive Plant Removal)

Presentations: 2018 Midwest Ecology & Evolution Conference (Title: Of mice and management: Small mammals and the impacts of herbicide in a restored prairie)

2018 Ecological Society of America conference (anticipated August 2018)

Have you submitted manuscripts to scientific journals? If so, which ones? If not, do you anticipate doing so? (Please keep us informed on publications.)

I have not submitted any manuscripts to any scientific journals, but I anticipate doing so after I complete my Master’s degree.

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