The Friends of Nachusa Grasslands
2019 Scientific Research Project Grant Report
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2019 grant amount: $3,126

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

Research Project Topic: Our research centers on root hemiparasites, which are green plants that attach to roots of neighbors to extract water and nutrients. We are interested in the mechanisms by which hemiparasitic plants affect the composition and abundances of species in plant communities.

Research Project Purpose: Through observational studies we aim to test hypotheses for how annual vs. perennial hemiparasites affect plant communities. By understanding the impact of hemiparasites through direct parasitism and nutrient redistribution such research can inform decisions in prairie management.

Research Project Outcomes to date: Through vegetation surveys at Senger Prairie and Eight Oaks Prairie we determined that moderate abundances of *Castilleja sessiliflora* (but not *Pedicularis canadensis*) are associated with significantly greater species richness and floristic quality, but concentrations of NO3, PO4, and NH4 in soil near four hemiparasitic species, are unrelated to hemiparasite presence. Scheidel will defend a M.S. thesis on this work this summer.

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:
$1500 was used to support a graduate student for one month at Illinois State University for the processing of ionic membranes for analysis of soil nutrients and for assistance with other aspects of this research. The remainder of the funds were used for purchasing supplies (e.g., ionic membranes, chemicals, plastic ware), for the cost of conducting analysis at Morton Arboretum, and for travel to Nachusa Grasslands.

Describe how your project has benefited the work and goals of Nachusa Grasslands:
Our project provides baseline data on current communities and soil nutrients that may be of value now for management decisions at Nachusa Grasslands and for future research. Understanding how hemiparasites affect natural communities can contribute to restoration of native plant diversity.

Describe how your findings can be applied to challenges in management practices for restoration effectiveness and species of concern:
Our data provide some support for a common assumption that hemiparasites can be useful for reducing aggressive species that tend to depress diversity, particularly in restorations. Until we can work through a larger data set currently being assembled from many sites, we cannot confidently recommend addition of hemiparasites to a sensitive site, but we hope to develop specific recommendations soon.

Please list presentations/posters you have given on your research:
Due to COVID-19 shutdown, opportunities for local, regional, and national presentations were cancelled. Anna Scheidel presented a poster at the 2019 Nachusa Grasslands Science Symposium and a seminar at Illinois State University with the following title: Effects of hemiparasites' life history on community and soil nutrient distribution.

Have you submitted manuscripts to scientific journals? If so, which ones? If not, do you anticipate doing so?
We anticipate submitting a manuscript to Restoration Ecology later this year after Anna Scheidel has completed her M.S. The survey data will also be included in a broader analysis of hemiparasite effects that will eventually be published, but at this point the journal is not known.

What follow-up research work related to this project do you anticipate (if any)?
<u>Optional</u>: Suggestions for improving the application and award process for future Friends of Nachusa Grasslands Scientific Research Grants:

Compared to many sources of funding, the process was straightforward and not at all burdensome, so thank you!
We do not have specific plans for follow-up research at this time but if the staff has plans for introductions, we would be interested in collaborating in studying emergent effects of hemiparasites as they become established.