Project Year-End Summary Report

Title of Project: Gypsum Mosses of the Chihuahuan and Mojave Deserts

Begin answering in the shaded box right beside or below each question and it will expand to accommodate as you type. Use up to a total of twoand a half pages for questions 1-8. More detailed presentations, a final report, articles or posters are welcome separately(See final instructions at the end of this form.)*

1. Organization name or Individual who received the grant:Katelyn Gobbie

2. Amount of Grant: $2000

4. Was additional outside funding obtained? (check box that applies) Yes ☒ No ☐
Other funding source(s) if you checked "yes."John Carroll University Department of Biology

5. Briefly, how was the grant money from the Carter Conservation Fund used?
The Carter Conservation Fund Grant money awarded to me was used to cover a portion of my lodging expenses while field sampling in NM and NV. See specific details below.
Carlsbad, NM airbnb (4 nights, $95/night +7.89% tax) = $529
Mesquite, NV hotel (1 night, $198.55 per night + $8.44 room tax + 16.38 sales tax) = $223.37
Las Vegas, NV airbnb (11 nights, $92.45/night + $80 cleaning fee + $154.87 service fee) = $1251.87
Total: $2004.24

6. Write an abstract or summary of the activities performed and the progress that was made this year on your project. (Save any conclusions, lessons learned, and benefits achieved for the final sections,7&8.)
Prior to field research, I applied for and received sampling permits to survey and collect biocrusts at the following locations: 1) White Sands National Park/Missile Range, NM, 2) The Jornada Experimental Range, NM, 3) NM BLM lands near Yeso Hills, and northeast of Socorro, NM, 4) NV BLM lands outside of Lake Mead National Recreation Area, NV, and 5) Lake Mead National Recreation Area, NV. On May 15, my research crew and I departed from John Carroll University, OH. We conducted field sampling across 20 study sites, 10 in each NM and NV, until June 5. A rough proxy of study site locations was determined before field sampling. Gypsum study sites (n = 10) were chosen based on the presence of extensive gypsum outcrops and well-developed biocrust communities. Non-gypsum study sites (n = 10) were selected for their relative distance to the gypsum study sites, the absence of gypsum influence, and the presence of biocrust communities. On a typical day of field sampling, we would arrive at the study site, set up transects, and perform the line-point intercept method to determine the percent cover of vascular plants, biocrust functional groups, and abiotic variables such as woody and herbaceous litter, rocks, bedrock, bare soil, etc. Next, we analyzed the percent frequency of the same variables using frequency quadrats. Finally, we performed soil assessments (soil stability and compaction) and collected soil samples. In late June, I analyzed soil samples in the lab for percent gypsum composition and concentrations of soil soluble Ca, S, P, K, and Mg using saturated paste extracts and ICP-OES. In the field, we collected moss biocrusts that were either hit during the line point intercept survey or fell within our frequency quadrat. Collected mosses were identified to species level in the lab via

dissection/microscopy and placed in herbarium packets to be submitted to the Wesley Niles Herbarium at the College of Southern Nevada and potentially other herbaria in New Mexico. All moss species were keyed out using Flora Neomexicana IV: Bryophytes (Mosses & Liverworts) by Kelly Allred, Russ Kleinman, and Karen S. Blisard, wnmu.edu/academic/nspages/gilaflora/index.html, or floraofnorthamerica.org. I am currently performing QA/QC on my moss identifications. My next steps are to perform statistical analyses and write my thesis.

7. How does your project further a Native Plant Society mission area, namely: *plant or ecological education; conservation/restoration of native plants and/or their habitats;adds to botanical research; promotes appropriate use of native plants to conserve water, land and/or wildlife.*

Gypsum soils are well-known to support many endemic and endangered plant species, contributing to some of the most biodiverse terrestrial hotspots worldwide. However, no conservation efforts have focused on gypsum biocrusts, potentially due to a limited understanding of their ecology. My research, comparing the frequency and cover of biocrust functional groups, as well as identifying moss species, on and off gypsum soils serves to minimize this ecological knowledge gap.Through the findings of this project, my collegues and I hope to foster the idea that New Mexico's small yet extraordinarily tolerant mossesshould not go unnoticed.Our goal is to encourage more studies on desert mosses within the botanical/ecological research community andpromoteeffortsto protect gypsum biocrusts and native mosses.

8. Any other conclusions., lessons learned, benefits to you, the community or the environment hopefully result from your work as assisted by this grant.

This project would not have been possible without the support granted to me from the Carter Conservation Fund. I have gained so much more from this experience than simply an increased appreciation and knowledge of New Mexico and Nevada's moss and biocrust communities. As a young botanist with aspirations to pursue a career in ecological research, I can now confidently say that I have the ability to write successful grant applications, obtain scientific research permits, coordinate thelogistics of a cross-country road trip, and step up to the challenge of being a leader, even when adversity arises. Having never been to New Mexico prior to this trip, I have a whole new appreciation for its rich culture and wealth of natural beauty (plus the amazing native plant diversity). A few New Mexico bryologists, namely Kelly Allred, Russ Kleinman, and Karen Blissard, heard about my project through this award, reached out to me, and have supported me with knowledge and resources that I do not believe I could have gained elsewhere.Because of them, I would like to continuestudying bryology and hopefully one day pass my knowledge onto students, just as they did for me. I am forever grateful to them and the individuals involved in the choosing of my project for the Carter Conservation Fund. Additionally, I hope this grant gives as much to the gypsum and bryological research world as it gave to me.

Final Instructions

Please send your completed form as pdfas an email attachment to cartergrantapps@gmail.com by December 1.

* *To remain in good standing for any future funding from the Native Plant Society of New Mexico, we ask that you educate our membership more fully in some way. This could be an article (250 words minimum, at least 1 high resolution illustration or photo) for our newsletter,*

or*a paper or electronic copy or link to a published article connected with the past year's work,* ***or****by making an educational and visual presentationto one of our chapters. Contact information for our 7 area chapters is found on our website at www.npsnm.org under the Chapters tab.*

What are your intentions in this regard? I intend to share a paper/electronic copy/link to a published article connected to this past year's work. I would also be more than happy to make an education and visual presentation to one of the NPSNM chapters.

This year end report is submitted by (Type your name) Katelyn Gobbie

My typed name is equal to my handwritten signature in testifying to the accuracy and truth of this report to the best of my knowledge today.

eMail address kgobbie22@jcu.edu

Date 20 November 2023

Please contact us again at cartergrantapps@gmail.com if you have any questions or alternate suggestions.