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MBRWF Project Report

Title: Landscape Analysis of Native Bee Community Composition and Plant-Pollinator Interactions in Yellowstone National Park

The grant money was used for a graduate student summer stipend. Summer stipends are essential to afford living costs while conducting research. The objectives of the project have either been achieved or are still in progress. For the first objective, past and present data are still being analyzed, including pollinator, environmental, and climate data. For the second objective, a new field site was established but due to accessibility issues in the park, the decision was made to cut that site. The seven original sites from data collection in 2010-2012 were used. For the third objective, data was successfully collected at all seven sites from May to August 2020, and more data was collected continuing into September and October. We exceeded our summer data collection expectations. For the final objective in the approved grant application, bee species have been pinned, labelled, and are ready for identification. They will be brought down to the Utah Bee Laboratory in the coming weeks for identification. Analysis of vegetation, past bee data, and climate data will continue to be analyzed until the identifications are received from the laboratory. At that point, all data can be analyzed together. We also plan to develop conservation recommendations for Yellowstone National Park, but do not want to start that process until all data is analyzed. In the summer of 2021, we hope to spend time presenting the research at conferences and work on educational materials for pollinator outreach to the public. We will also seek publication in a scientific journal.

At this time, I do not have conclusions from the actual data. We will only be able to draw conclusions once all data has been properly analyzed. Based on my observations in the field, I

can describe some patterns I observed that may show up in the conclusions. Bees generally foraged on warm, sunny, clear days and seemed to be highly affected by weather patterns. There were times when not many flowers were present, but we collected many bees in the pan traps. This suggests that the pan traps may attract bees from farther away and be more enticing with limited flower options. There could be a preference for flowers over pan traps if we find that days with high flower diversity resulted in fewer bees in the traps. A few of the high elevation sites seemed to have less bees, especially the site that got a lot of wind. Bees have a hard time flying through windy conditions. We are already seeing evidence of environmental drivers of bee communities just from our initial observations.

Based on the amount of data we collected, I believe this project will be effective in better understanding how bee communities are impacted by environmental conditions. We collected the data carefully in order to maintain consistency in methods throughout the summer, and minimized human error as much as possible. Additionally, having a ten-year span of climate data and the bee data from the original study will greatly enhance my project and analysis. Since Yellowstone National Park is a protected area and the oldest national park in the United States, it is theoretically supposed to be one of the most pristine environments for wildlife. If we see bees declining between the two studies, that could serve as an indicator that climate negatively impacts bee communities. The other major known drivers of bee decline, like pesticides and habitat loss, are not factors at the sites I collected data from. Therefore, environmental factors would be important to consider if we find bee biodiversity loss at these sites since 2010. An area like Yellowstone National Park has the power to implement effective bee conservation methods, and I am hoping my project will contribute to their pollinator knowledge and the development of those actions.

