



A partnership to conserve the American Pika

Front Range Pika Project 2014 Final Grant Report

Introduction

The Front Range Pika Project (FFRP) is a citizen science initiative that aims to engage the public in real world wildlife research and conservation work in the Rocky Mountains. Rocky Mountain Wild scientists, along with our partners at the Denver Zoo, train and equip volunteers to monitor American pika distribution across the Front Range. The data collected by volunteer citizen scientists will be used by researchers to help determine how American pika distribution is changing over time, and inform efforts to better understand the effects of climate change on this alpine species.

In partnership with the Denver Zoo, Colorado Division of Wildlife, the University of Colorado, and the Natural Resources Ecology Lab, Rocky Mountain Wild carried out the fifth season of the Front Range Pika Project in 2014. This work was supported in part by a generous grant of \$1,000 from the Boulder County Nature Association. BCNA's early investment and ongoing support has been central to our success in gathering baseline data on pika distribution across the Front Range, an essential first step in long-term monitoring of the status of the American pika in this area. In addition, data gathered as part of this and other similar citizen science projects, and housed in a central database, will contribute to ongoing research to better understand the effects of climate change on the American pika at the University of Colorado, Colorado Parks and Wildlife and elsewhere.



Photo by Mike Molloy

2014 Front Range Pika Project

Community Involvement

We trained 52 volunteer citizen scientists for the 2014 field season. New volunteers were required to attend classroom and field trainings. Returning volunteers were trained via an online refresher course and training quiz, allowing us to train a larger total number of volunteers with a smaller number of in-person trainings. We expanded our online training program for returning volunteers; with new and improved online videos demonstrating the survey protocols. A large proportion of our volunteers this year were from the Boulder area. Forty-one volunteers participated in the survey effort. Our volunteers spent more than 46 days traversing mountainous terrain collecting survey data for this project.

In our end-of-season volunteer survey, volunteers reported enjoying watching wildlife; learning about pika ecology, alpine ecosystems and climate change; making a difference by helping to address the threat of climate change; contributing to scientific research; hiking in the alpine; exploring new places; and meeting new people.



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Survey Outcomes

The Front Range Pika Project aims to survey up to 45 long-term monitoring sites in the Front Range each year. These sites are divided up into Tier 1 and Tier 2 sites. At minimum we aim to survey each of the 23 Tier 1 sites twice each year. Repeat surveys are useful in quantifying observer bias. After volunteers have signed up to survey all Tier 1 sites twice, volunteers are then allowed to sign up to survey additional Tier 2 sites. Given yearly uncertainty in the number of volunteers that will participate and the length of the field season, this helps to ensure that a minimum number of sites will be surveyed every year, and that we will have some data useful in quantifying observer bias.



Photo by Mike Molloy

In the 2014 field season, trained volunteer citizen scientists conducted field surveys at 21 of 23 Tier 1 sites. Fifteen of 23 Tier 1 sites were surveyed twice. Eight Tier 2 sites were surveyed. Thus a total of 29 of 45 long-term monitoring sites were surveyed.

Citizen scientists gathered data to evaluate factors that may drive changes in pika distribution, including current distribution of pika, elevational bounds of pika habitat, pika occupancy, vegetation communities, and climate in talus slopes. At each site, volunteers:

- Determined whether talus was present (an indicator of potential pika habitat)
- Looked for evidence of present pika occupancy (sightings, calls, fresh hay piles)
- Recorded the GPS coordinates of the talus patch
- Documented variables that influence pika detectability (cloud cover, temperature etc.)
- Recorded habitat variables (surrounding vegetation, depth/size of talus patch, water nearby)
- Collected fresh scat (potentially useful for understanding stress hormones and genetics)
- Placed temperature data loggers (collect continuous data on temperature under talus patches)
- Captured photos to document surrounding vegetation

Raw data collected in 2014 (as well as in previous field seasons) can be downloaded from the FRPP website at www.pikapartners.org.

Conservation Impact

We have now successfully gathered baseline data on pika distribution in the Front Range for five consecutive years. Each year, we have coordinated with two partner projects across the state. Mountain Studies Institute has used the same site selection process, data collection protocols and volunteer training manuals to conduct citizen science to gather baseline data on pika distribution in the San Juan Mountains of southwest Colorado. Colorado Division of Wildlife technicians used the same data collection protocols to gather similar data across the rest of Colorado. Over the past five years, this collaborative effort has generated a consistent baseline data set on pika distribution and variables that may influence pika distribution, across the state. Coupled with continued long-term monitoring of the same sites, this will ultimately facilitate analysis of whether and how pika distribution is changing over time, and what factors are driving any observed changes in distribution. This information is critical to understanding how climate change is affecting this species in the Front Range and across the Southern Rocky Mountains.

We are beginning to analyze data on trends in occupancy at our long-term monitoring sites on the Front Range, though data from additional field seasons is needed before we are able to begin to make conclusions about long-term trends in occupancy on the Front Range.

The Front Range Pika Project is contributing to large scale research on American pika, by directly contributing data gathered by volunteers, and by serving as a model for other citizen science efforts. Data from all five field seasons of

the Front Range Pika Project are being used in a range-wide analysis to test how climate affects the species. This range-wide analysis is also using data from other citizen science programs modeled after FRPP.

Data collected by our citizen scientists is housed in a customized website (www.pikapartners.org) created and maintained by the Natural Resources Ecology Lab at Colorado State University (NREL). The data is available to scientists and managers, and can be downloaded in several useful formats. In addition, we worked with our partners at NREL to develop a cyber-infrastructure to allow for FRPP data to be entered, stored, and accessed online. This cyber-infrastructure is being used to allow citizen scientists from other projects to contribute to a national pika database.

Finally, the Front Range Pika Project is informing research on best practices for citizen science projects more broadly, including through the following articles, presentations and posters:

- Bonney, R., G. Newman, A. Wiggins, R. Stevenson, J. Shirk, K. Oberhauser, G. LeBuhn, J. Turner, J. Parrish, K. Lotts, and R. Simpson. 2015. Characteristics of Citizen Science Projects that Generate Measureable Scientific Outcomes (a Meta-Synthesis). In Preparation
- Masching, A., M. Mueller, B. Fauver. 2015. How Much is Too Much? Lessons in Realistic Volunteer Expectations from the Front Range Pika Project. Citizen Science 2015, San Jose, CA.
- Fauver, B., G. Newman, A. Mashing, M. Mueller. 2015. Is Citizen Science Worth It: Identifying Natural Resource Manager's Values Through Cost Benefit Analysis. Citizen Science 2015, San Jose, CA.
- Varner, J., L. Erb, A. Craighead, A. Masching, L. Moyer-Horner, M. Mueller, E. Olson, C. Ray, W. Simpson, S. Shivappa, and M. Weddle. 2015. Don't crawl under a rock, look there for pikas! Engaging the public in climate-change science through surveys of a rock rabbit, the America pika. Citizen Science 2015, San Jose, CA.

Lessons Learned and Next Steps

We continue to improve the project each year, based on feedback from volunteers and scientific advisors, and our own experience.

We were successful in increasing the total number of sites surveyed compared with 2013, and came close to our minimum goal of surveying all Tier 1 sites twice. Two Tier 1 sites were not surveyed at all. One of these two is being removed from the study because it is not talus, and the second is a very strenuous 18 mile hike. It is difficult to find volunteers willing to visit that site every year, so we may remove it from Tier 1 and replace it with a site that is easier to access. All but six of the remaining Tier 1 sites were surveyed twice. Though we got close to reaching our minimum goal, we did not reach our ideal goal of surveying 45 long-term sites, despite implementing several measures to increase the number of sites surveyed (online training to reduce training needed for returning volunteers, setting an earlier deadline for completion of surveys, more encouragement of volunteers during the field season etc.). It may be an unrealistic goal with 50-60 volunteers, a short field season and a desire to have Tier 1 sites visited twice. We may need to increase the number of volunteers to reach that goal and are considering ways to do so, though it is a challenge with our current funding for staff time to manage volunteers.

This year, we plan to train roughly 50-60 volunteers and survey a minimum of 23, and ideally 45 sites on the Front Range. We will continue to use the online training program we developed last year for returning volunteers and to require new volunteers to attend classroom and field trainings. If we are able to obtain additional funding for staff time, we may aim to recruit and train a larger number of volunteers to increase our ability to survey a larger number of sites.

Though we were able to expand the number of temperature data loggers put in place this year, some volunteers had substantial difficulty in finding temperature data loggers placed in the talus last year. We are now considering ways to refine methods for placement and retrieval of temperature data loggers to address this issue, and to maximize the number of sites where temperature is continuously monitored over the next five years.

Volunteers collected scat for a second year in 2014, and were able to collect a substantial number of scat samples. Scat samples have not yet been analyzed. Recent research has shown that levels of particular stress hormones in

individual pika are a strong predictor of survival. We are hopeful that scat samples will ultimately be useful in research on levels of stress hormones in pika at our long-term monitoring sites.

This year we hope to improve the descriptions of the hikes to our long-term monitoring sites, and offer an optional in-depth GPS training.

Finally, in the coming year we plan to analyze the data from the five field seasons that we have completed to-date and publish a report summarizing progress towards answering our research questions, and insights into best practices for citizen science projects gained from our experience. We will make adjustments to the program for the remaining five years based on results of this report. In addition, we will consider publishing results in journal articles in 2015. Finally, we anticipate that substantial progress will be made in the range-wide analysis to test how climate affects the species. As always, we will continue to look for and take advantage of opportunities to collaborate with other pika research efforts.

The consistent financial support provided by Boulder County Nature Association has been instrumental in our ability to develop and refine the program, gather baseline data, and build a solid foundation for a long-term monitoring of the status of the American pika in the Front Range and across Colorado.

FRPP Participants

The Front Range Pika Project is co-directed by:

- Megan Mueller, Senior Conservation Biologist and Wildlife Program Director at Rocky Mountain Wild
- Amy Masching, Conservation Outreach Coordinator at the Department of Conservation Biology at the Denver Zoo.

The following individuals and organizations are key participants in the Front Range Pika Project:

- Brian Fauver, FRPP Intern and M.S. Candidate at Colorado State University
- Dr. Chris Ray, and Jennifer Wilkening, Department of Ecology and Evolutionary Biology, University of Colorado
- Liesl Peterson-Erb, Colorado College
- Greg Newman and Russell Scarpino, Natural Resource Ecology Laboratory, Colorado State University
- Amy Seglund, Conservation Coordinator, Colorado Parks and Wildlife

Conclusion

Thanks to the continued support of the Boulder County Nature Association, the Front Range Pika Project completed a fifth successful field season in 2014, and continues to make solid progress towards meeting our long-term goals of: 1) carrying out a robust, long-term citizen science program to monitor the distribution and status of American pika, 2) providing an opportunity for citizens to contribute to scientific research and engage in wildlife conservation in the region, and 3) contributing information needed to understand the impacts of climate change on American pika, and to develop management strategies to help the American pika persist into the future. We are grateful for BCNA's generous support.