A partnership to conserve the American Pika

Front Range Pika Project
2016 Final Boulder County Nature Association Grant Report

Introduction

The Front Range Pika Project (FRPP) is a citizen science initiative that aims to engage the public in wildlife research and conservation work in the Rocky Mountains. Rocky Mountain Wild scientists, along with our partners at 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 America pika distribution is changing over time, and inform efforts to better understand the effects of climate change on this alpine species.

Photo by Neal Zaun

In partnership with Denver Zoo, Colorado Division of Wildlife, University of Colorado, and the Natural Resources Ecology Lab, Rocky Mountain Wild carried out the sixth season of the Front Range Pika Project in 2016. This work was supported in part by a generous grant of $2,000 from the Boulder County Nature Association (BCNA). 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 projects, is contributing to ongoing research to better understand the effects of climate change on the American pika across North America.

2016 Front Range Pika Project

Community Involvement

We trained 40 volunteer citizen scientists for the 2016 field season. New volunteers were required to attend classroom and field trainings. Returning volunteers were trained via an online refresher course, online videos demonstrating survey protocols, a training quiz, and optional attendance at classroom and field trainings. A large proportion of our volunteers this year were from the Boulder area. Our volunteers spent more than 59 days this year traversing mountainous terrain collecting survey data for this project.

During the six field seasons from 2011-2016 (not including the 2010 pilot field season), we have trained an average of 52 volunteer citizen scientists each year, and our volunteers have spent roughly 343 days conducting surveys for the project.

Field 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. Once Tier 1 sites have been surveyed twice, volunteers then survey Tier 2 sites. This helps to ensure that a minimum number of sites will be surveyed every year, and that we will have repeat surveys useful in quantifying detection probability.

In the 2016 field season, trained volunteer citizen scientists conducted field surveys at all twenty-four Tier 1 Sites. Nineteen sites were visited at least twice. Five Tier 2 sites were surveyed. Thus a total of twenty-nine of forty-five 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, wind, temperature etc.)
- Recorded habitat variables (surrounding vegetation, depth/size of talus patch, water nearby)
- Collected fresh scat (for data on stress hormones and genetics)
- Captured photos to document surrounding vegetation (to document change in vegetation over time)

In addition, returning volunteers and staff placed temperature data loggers (to measure temperature under the talus) at 23 of 24 Tier 1 sites. We developed an improved protocol which: 1) reduced the frequency of temperature measurements (from 30 min. to 2 hr. intervals) to improve battery life so data loggers can remain in place for five years, and 2) improved the procedure for recording data logger location. This will make data logger retrieval more efficient.

Finally, we enhanced volunteers' skill at navigating to sites, increased the number of volunteers interested in visiting off-trail sites, and reduced location errors, through offering: 1) improved GPS training during the field training for new volunteers, and 2) an optional full day map, compass and GPS training.

During the six field seasons between 2011 and 2016 (not including the 2010 pilot season), volunteers have surveyed an average of 25 sites each year. Raw data collected from 2011-2016 can be downloaded from the FRPP website at www.pikapartners.org. Data reviewed for quality assurance can be obtained by contacting frpp@pikapartners.org.

Conservation Impact

Education and Volunteer Experience

We completed a report this year summarizing the results of a formal survey of participants in FRPP from 2011-2015 that evaluated the effectiveness of FRPP in achieving the following goals: 1) enhance volunteers' knowledge about pika ecology and climate change, 2) enhance volunteers' awareness of and willingness to participate in science and conservation, 3) effectively recruit, engage and retain volunteers, and 4) provide effective training. The full report is available upon request. The following are highlights from the results (n=24):

- 62.5% of respondents reported that participating in FRPP changed their understanding of climate change.

- 75% of respondents agreed or strongly agreed to the statement "I have a strong understanding of pika ecology."
- 100% of respondents are likely to talk to their friends or family about pikas.
- 88% of respondents are likely to pledge to take personal steps to reduce carbon emissions.
- 83% of respondents are likely to donate to a conservation organization.
- The primary recommendation for improvement of the training was to increase GPS training and practice (n=4).

In 2016, we expanded our efforts to educate volunteers about American pika ecology and climate change through sharing articles and reports with volunteers via e-mail throughout the year, and providing opportunities for volunteers to attend the following additional educational events:

- A happy hour for pika experts and volunteers to provide an opportunity for volunteers to interact with and learn from experts in an informal setting.
- A day in the field with pika researchers assisting with Chris Ray's long-term demographic monitoring of an American pika population at the Niwot Ridge Long Term Ecological Research Site.
- A presentation on recent pika research by a Megan Wiebe (University of Colorado), at our annual end of season celebration.

At our end of season celebration this year, volunteers reported enjoying hiking, watching and learning about pikas, learning about climate change, making new friends, and contributing to pika conservation.

American Pika Research

We have now successfully gathered baseline data on pika distribution in the Front Range for six consecutive years (not including the pilot season in 2010). Throughout the life of the project 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. Colorado Parks and Wildlife technicians used the same data collection protocols to gather similar data statewide once every five years. Over the past six years, this collaborative effort has generated consistent baseline data 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 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 currently analyzing the data collected by FRPP to-date, to determine what factors constrain the distribution of American pika across the Front Range, and whether the distribution of American pika is contracting on the Front Range due to contemporary climate change.

Preliminary results suggest that pikas are still present at roughly 78% of historically occupied sites that we monitor, while 17% are unoccupied or have variable trends (these are very rough preliminary numbers that do not take into account detection probability). These preliminary results are consistent with previous research in the Southern Rockies done by Liesl Petersen Erb (74-89% occupancy rates), and with the results of statewide CPW surveys conducted once every five years (over 90% of historic sites occupied). Taken together, these results suggest Colorado is not yet seeing the dramatic declines in American pika occupancy at historically occupied sites seen in other portions of the species' range (e.g. in the Great Basin). However, recent National Park Service research predicts that a reduction in suitable habitat and a breakdown in connectivity due to warming temperatures will cause extirpation of pikas from Rocky Mountain National Park by the end of the century. Thus there is reason to remain concerned that pikas may be vulnerable to climate change in Colorado, and continued monitoring to track climate impacts is essential.

We do not yet have preliminary results from our analysis of factors that constrain the distribution of America pika on the Front Range. We anticipate completing the full analysis this spring.

In addition, Front Range Pika Project data is being used in large-scale American pika research. Data collected by our citizen scientists is housed in a customized website (www.pikapartners.org) created and maintained by the Natural Resources Ecology Lab (NREL) at Colorado State University. The data is available to scientists and managers, and can be downloaded in several useful formats. Data from the 2011-2016 field seasons of the Front Range Pika Project are being used in a range-wide analysis of the climatic and other variables that constrain the distribution of the American pika. This range-wide analysis is also using data from other citizen science programs modeled after FRPP. This analysis is ongoing.

Citizen Science

The Front Range Pika Project continues to serve as a model for other pika Citizen Science Projects, including several ongoing and potential future projects in Colorado and across the species' range (e.g. PikaNet/Mountain Studies Institute, Keystone Science School, Cascade Forest Conservancy, Colorado Mesa University, etc.). The online cyberinfrastructure we created with our partners at NREL allows pika data to be entered, stored, and accessed online, and 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 presentations:

- Mueller, M., E. Garroutte. 2017. Using citizen science data to assess the trend in the distribution of American pika (Ochotona princeps) across the Front Range of Colorado. 4th Conference of the North American Pika Consortium, Reno, NV.
- Garroutte, E., M. Mueller, H. Batts. 2017 (in prep). The process of citizen science. Lessons on evaluating and refining citizen science projects. Citizen Science 2017, Madison, WI.

Lessons Learned and Next Steps

We have completed several portions of an evaluation of all aspects of the project to-date. We are currently using the results to revise the program moving forward. We are revising our study design and data collection methods. Improvements we are considering include: improving methods to control for spatial survey effort, reducing the number of site visits and expanding the number of sites surveyed, simplifying the survey protocol, prioritizing re-visits of sites with variable trends in presence/absence over time, and a variety of other potential improvements. We are also investigating methods to recruit and train more volunteers, and to further enhance educational outcomes. Finally, we are working to improve fundraising strategies so that we can buy additional equipment and train and manage a larger number of volunteers.

In 2017, we will complete our analysis of the data we have collected to-date, and publish a report summarizing our research results and findings from our evaluation of the project. We will conduct another successful season of data collection at our long-term monitoring sites on the Front Range. In addition, we plan to pilot expansion of pika citizen science statewide (due to potential for reduction in CPW monitoring capacity, and interest in participation in pika citizen science from a number of potential new partner organizations across the state). Finally, we will develop an online climate pledge that will engage volunteers in taking action to address climate change.

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 America 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, Rocky Mountain Wild
- Erica Garroutte, Conservation and Outreach Coordinator, Department of Conservation and Research, Denver Zoo

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

- Dr. Chris Ray, Department of Ecology and Evolutionary Biology, University of Colorado
- Dr. Liesl Petersen Erb, Department of Environmental Studies, Warren Wilson 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 sixth successful field season in 2016 (in addition to a successful 2010 pilot season), 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 develop management strategies to help the American pika persist into the future. We are very grateful for BCNA's generous support.