



Figure 1. Citizen science takes many forms at RMNP. Left to right: Students from Denver's Thomas Jefferson High School collect forest composition monitoring data as part of their forest ecology class. Members of the public work alongside subject matter experts during the 2012 National Geographic BioBlitz. Citizen scientists participate in a pika monitoring training session.

**Citizen Science** – projects that provide opportunities for the public to participate in scientific research – can have multiple benefits to the agency, community and our collective scientific knowledge. It can broaden the scale of a project, support management needs, improve science literacy and resource appreciation, and inspire collaboration in stewardship. Since RMNP first engaged in citizen science in 1953, through involvement with the annual Audubon Christmas Bird Count, there have been over 20 projects conducted throughout the park. Today, there are approximately 15 active projects underway, each varying in scope, level of public participation, and management relevance. The NPS and other agencies are currently exploring new ways to engage the public in meaningful research. In 2016, Colorado State University conducted a review of citizen science in RMNP and recommended next steps for the development and implementation of a comprehensive citizen science program.



## 2016 Citizen Science Review

The 2016 review of citizen science at RMNP compiled a list of past and current projects, assessed past and current projects for value and impact, and created a framework to maximize relevance and engagement of citizen science at RMNP. Recommendations include: targeting citizen science projects that meet RMNP's information needs; leveraging the 'power of place' by engaging the local community; adopting existing nation-wide projects that related to resources of significance; and developing a web portal to track and manage project data. While in many cases these recommendations are in progress, the report encourages a more deliberate effort by the park to tie citizen science to resource data needs, where appropriate.

Citizen science is a tool best suited for projects that have a clear question, involve plentiful resources, and have simple protocols. There must also be strong reasons to participate from the perspective of the public.

## Building a Community, Creating a Strategy

In response to the 2016 recommendations, the CDRLC has focused citizen science project development that targets resources and topics of management interest. These include the Lily Lake Phenology project, the Pika Monitoring Program, and expansion of the Forest Monitoring effort. We have also investigated on-line data entry options, including iNaturalist and CitSci.org.

In October 2018, the CDRLC coordinated RMNP involvement in a citizen science workshop. Staff from the CDRLC and the Interpretation division, as well as representatives from the Rocky Mountain Conservancy and Estes Park Environmental Center,

identified common interests in engaging the public in science, learned a step-by-step approach for developing new citizen science projects, and found ways to collaborate through the Lily Lake Phenology project.

Since then, the CDRLC has been working with interested park staff and partners to build a citizen science community in the park, to provide a support network for existing projects and those considering developing new projects. The CDRLC is also exploring the development of a park-wide strategy to encourage meaningful citizen science project development and provide guidance.

## RMNP Citizen Science At-A-Glance

Citizen science programs in general can vary in their level of public engagement, participation, and in the extent and detail of the data collected. Projects range from long-term RMNP specific surveys led by a few interested members of the public to one-time, intensive efforts

engaging hundreds of people. Many other citizen science programs at RMNP are done through partnerships between the park and local schools or are led by park staff and harness the interest and enthusiasm of large numbers of volunteers.

### Targeting Management Questions

Each spring, volunteers observe raptor nests and nesting areas as part of the **Raptor Monitoring** program. This work informs annual park area closures of raptor breeding areas.

Monthly **Elk Population Counts** are conducted with the overwhelming support of volunteers. These counts are done as part of the Elk and Vegetation Management Plan and are used to estimate the winter elk population size, population trends, and elk use of the winter range.

### Exploring Emerging Issues

The **Limber Pine Monitoring** Program supports a multi-agency conservation strategy through photo monitoring, cone collection, beetle deterrent application, and plant propagation. Citizen scientists have contributed up to 1000 hours a year and are key to this program's success.

From 2012 to 2018, Eagle Rock School's aquatic ecology class collected dragonfly larvae for the NPS-wide **Dragonfly Mercury Project**, led by the NPS Air Resources Division.

### Partnering for Conservation

**Pika Monitoring** at RMNP is made possible by the Front Range Pika Project, a program coordinated by researchers at CU-Boulder, the Denver Zoo, and Rocky Mountain Wild. This study supports our understanding of pika populations in a warming climate.

Working with local schools, the Estes Park Environmental Center engages youth in hands-on science-based learning at the park in a variety of areas including **Water Quality Monitoring**, **Vegetation Surveys**, and **Wildlife Camera Monitoring**.

### Engaging New Audiences

240 scientists and 5,000 citizens inventoried 490 species during the 2012 National Geographic **BioBlitz**. A total of 490 species were counted, including 23 new species for the park list.

Starting this summer, visitors to Lily Lake will be able to record observations for the **Lily Lake Phenology** project. This web-based data entry process will allow us to track changes in the timing of biological events. Rocky Mountain Conservancy, park interpreters, Lily Lake volunteers, and Eagle Rock school also support this effort.

### Inspiring Grassroots Initiatives

A general interest in butterflies led Rich Bray to start the **Rocky Mountain Butterfly Project** in 1995. This initiative continues today and has documented over 140 butterflies in the park thanks to over 38,000 volunteer hours.

Since 2003, a local couple has been studying hummingbird populations in the park. The **Hummingbird Survey** engages additional participants through Rocky Mountain Conservancy classes.

### Investing in Education

The **Costa Rica Science Exchange** promotes conservation beyond borders. Each summer, Costa Rican high school students conduct surveys to compare RMNP resources to those in our sister parks in Costa Rica.

Local high schools can "adopt" a forest monitoring plot and contribute to the **Forest Monitoring** project. Students learn about the scientific method, survey protocols, and data collection while supporting our understanding of forest change and disturbance.

## RMNP Wins with Citizen Science

### Benefits to Park Resources

Thanks to citizen scientists, RMNP has been able to take a proactive approach to Limber Pine Conservation. Annual rigorous surveys support early detection of White Pine Blister Rust, which has been kept at bay in the park!

### Benefits to Management

Citizen Science helps us see more than we could otherwise! The monthly winter elk surveys capture elk counts throughout the park and Estes Valley in three short mornings. These surveys also reduce the need for more frequent aerial surveys, which protects wilderness.

### Benefits to Community

Citizen Science cultivates support for park science and research and improves science literacy within our community. Each year, Eagle Rock students explore resources issues while collecting targeted data for the park.

### Benefits to Science

Without citizen science we would not have the capacity to examine certain resources to the same degree or at all. Our park species list would not be the same without the commitment of dedicated citizens!

**Reference:** Newman, G., Bruyere, B., and Scarpino, R. 2016. Citizen Science at Rocky Mountain National Park: A Framework for Citizen Science in Rocky Mountain National Park. Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, Colorado.

**RMNP contact** | Carissa Turner, CDRLC  
Carissa\_N\_Turner@nps.gov; 970-586-1416