



Banff National Park Pika Monitoring 2013 Summary Report



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Roles:

J. Timmins coordinated survey efforts by staff and volunteers, collected survey data, and entered data in database.

A. Forshner produced summary maps and descriptive results, collected pika hair from survey stations and helped write this report.

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25 May 2014

Date

Introduction

In 2013 Parks Canada continued the pika monitoring program in the Banff and Kootenay, Yoho, Lake Louise Field Units. This program was initiated in 2011 to monitor pika population trends and growth rates by determining number of active sites across various locations in Banff National Park (Figure 1). The project is a collaborative initiative between Parks Canada, Dr. David Hik at the University of Alberta, Dr. Philippe Henry at the University of Northern British Columbia, and the Bow Valley Naturalists.

Ten monitoring locations were visited in 2013. Staff and volunteers recorded total number of active hay piles at each location. The purpose of this report is to summarize the results of this monitoring program to date, and to identify any key observations or recommendations for future study.

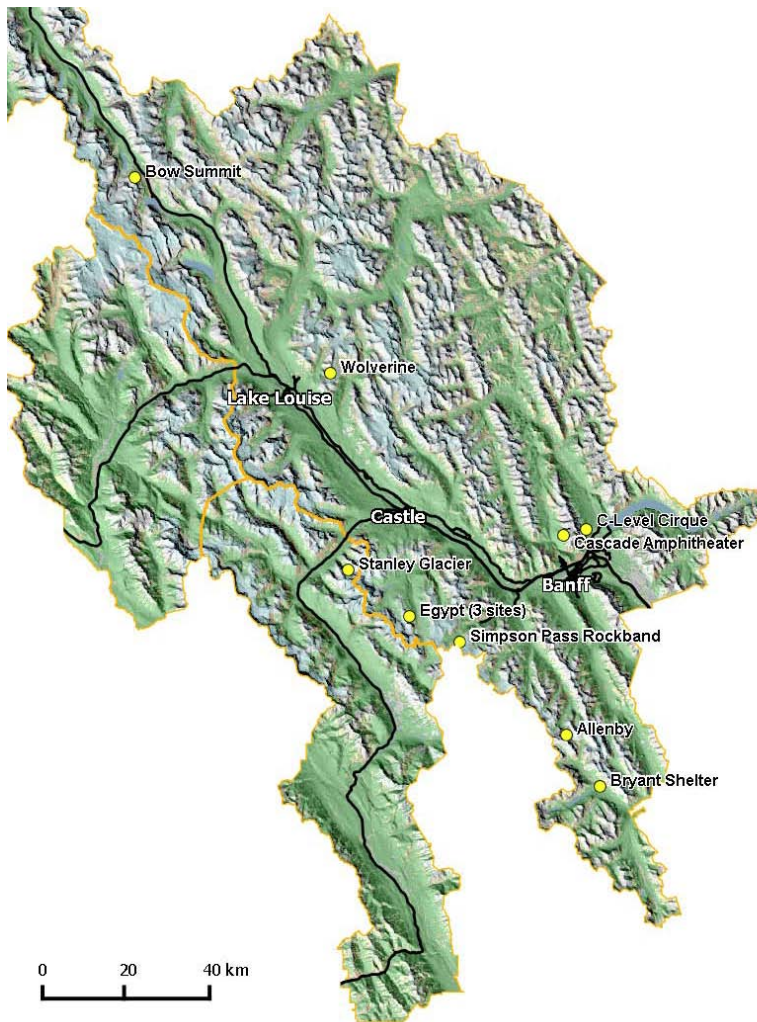


Figure 1. Locations for pika hay pile monitoring in Banff and Kootenay National Parks, 2011-2013.

Why Pikas?

American Pikas (*Ochotona princeps*) are small mammals that live along the interface between talus rocks and open meadows in alpine environments in Banff National Park. They are widely distributed in Canada and the United States, occurring south of the Peace River, including Banff National Park, and throughout much of the western United States. They gather herbaceous plants and shrubs in vegetated areas and carry that food into the talus where they place it under overhanging rocks or into deeper crevasses to dry. They do not hibernate in the winter, but instead use their hay piles to survive the snowy, winter months.

Pikas use the same hay pile storage sites within a talus slope for several generations and will re-use old hay pile storage sites after re-colonization. Therefore, annually counting the number of active hay piles can provide a good index of population trends and growth rates (Morrison and Hik 2008).

American pikas are an IUCN Red-Listed species that was classified as *Least Concern* in 2008 because of their wide spread distribution (Beever and Smith 2008). However, some subspecies are listed as *Vulnerable* or *Near Threatened* because of recent declines. Most of these declines have been caused by hotter, drier summers (Wilkening et al. 2010, Beever et al. 2011), low annual precipitation (Erb et al. 2011), warming temperatures (Loarie et al. 2009), loss of vegetation (Wilkening et al. 2010), and timing of spring snow melt (Morrison and Hik 2007). While pikas are extremely sensitive to predation risk (Holmes 1991), population dynamics appear to be driven mostly by climatic factors (Morrison and Hik 2007). Given projected trends for warmer climates, pikas face high risk of extirpation in many areas (Loarie et al. 2009). Most research on American pikas has been conducted in the Great Basin area of the United States and very little is known about American pikas occurring in Canada.

Results

In 2013, staff surveyed 10 locations for active pika hay piles and recorded total number of active sites across monitoring locations in Banff and Kootenay National Parks (Figure 1). A total of 447 sites were visited across all locations. At each site (=hay pile), staff recorded whether it was active ('Yes' or 'No') or whether nothing was found which would be entered as 'None'. At each site pika presence was entered as a 'yes' or 'no'. A 'yes' would be entered if a pika was either seen or heard at the site.

Between 2011 and 2013, on average 69% of all hay piles visited across all locations were active, with a range between 31% (Egypt Pharoah and Black Rock) and 92% (Allenby) active.

At all 10 pika locations, 2 temperature loggers were installed at one site to track temperature over time. The loggers are the size of a thumbnail and are placed above and below the haypile. The two temperature loggers are connected by a wire approximately 1m apart. Data will be downloaded from these units in August 2014. Samples of pika hair

were also collected from 4 locations: Simpson Rockband, C-Level Cirque, Wolverine Valley and Stanley Glacier. Hair samples were sent to Philippe Henry for DNA analysis.

So far there appear to be no clear trends in percent active hay piles across all locations, through time (Figure 1).

Data were analyzed with GLMM (Generalized Linear Mixed Models), which indicated no significant change in percent active hay piles across all locations over time (Likelihood ratio test: $p = 0.21$).

The formula for this analysis is:

GLMM: active ~ year + (1|location) + (1|hay.pile)

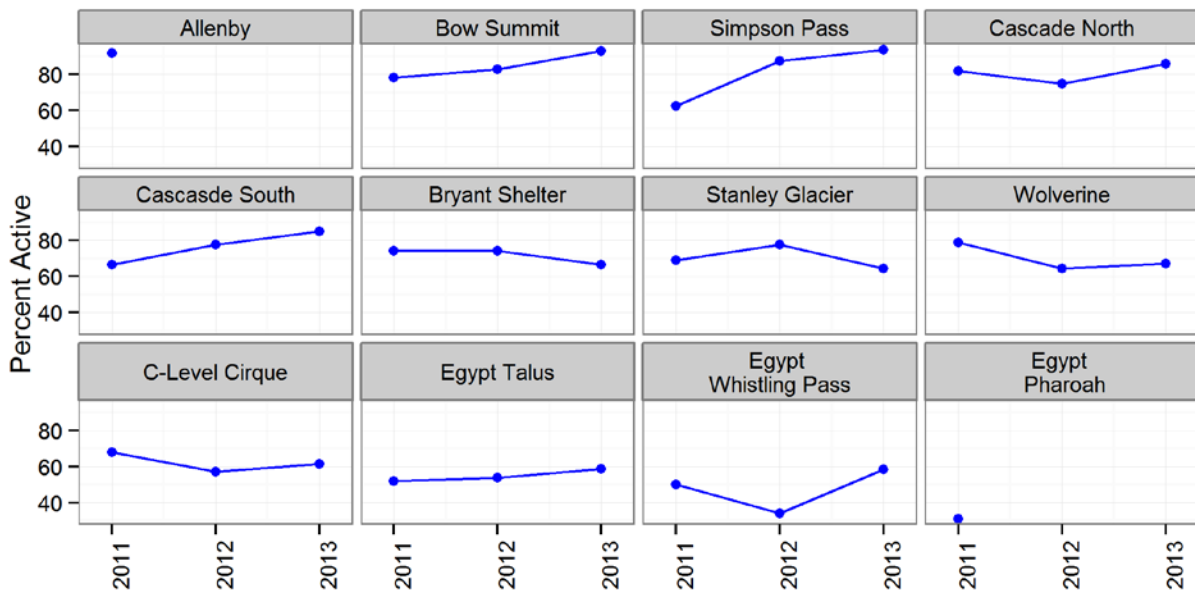


Figure 1. Percent Active Hay Piles by Location and Year, 2011 - 2013

Discussion

With three years of data, the number of active pika sites has not significantly changed over time, or across locations. Data will be re-analyzed in 2 more years to determine whether any significant changes have occurred in population trend and growth rate over time.

The citizen science component of this project has been extremely successful, and this project is well-suited to offering this opportunity. In 2013, 10 citizen scientists volunteered over 140 hours of time surveying 8 pika locations throughout Banff National Park (BNP). Volunteers also retrieved hair samples from 2 locations in BNP. Locally, there has been great interest and support regarding the pika project from the Bow Valley Naturalists as well as many members of the community and our citizen scientists.

Based on working with volunteers, we recommend that at least one trained park staff member accompany each volunteer group when surveying pikas. It takes constant vigilance to ensure that the correct terminology is used when completing the survey forms as some staff and volunteers tend to get confused and enter the wrong descriptors. This makes data entry very challenging.

For future 'consistency' a document has been created that clarifies the descriptors required when filling in the survey sheets.

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Recommendations

1. Continue to survey number of active sites annually for two more years. Beever et al. *in press*, have determined that abundance of a species will likely provide an earlier-warning indicator of change than will occupancy or presence/absence data.
2. After five years of annual counts, do power analysis to determine appropriate frequency of surveys to detect a 20% change in number of active pika sites. If possible, use elevation as a covariate to determine if pika abundance at low elevation sites changes more significantly.
3. Add two new monitoring locations
 - a. A low elevation site near confluence of Bow and Spray. Recent research has indicated that behavioral thermoregulation or other adaptations may enable pikas to inhabit low-elevation habitat that was previously thought as inhospitable to pikas (Jeffress et al. *in press*, Henry et al. 2012). By monitoring a low elevation location, we may be able to capture evidence of these adaptations.
 - b. An easily accessible site near Lake O'Hara or Lake Louise where we can provide interpretative signage on pikas and other alpine species.
4. Continue and expand the successful citizen science component of this project, but maintain trained Parks staff participation. Current research on citizen science and observer variability determined that volunteers are consistent at detecting site occupancy or presence/absence, but more complex research to determine population density, e.g., number of active hay piles, should be conducted by professionals (Moyer-Horner et al. 2012).

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