

Population Density of the American Pika in Relation to its Habitat

**A Bridal Veil Living Classroom Project
Telluride Institute's Watershed Education Project**

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Abstract

Bridal Veil Basin is the site of the first pika study done in the Telluride region of southwest Colorado in the summer of 2007. The objective of this study was to prove that there will be a higher population density of pika at a higher elevation of 12,300 feet rather than at a lower elevation of 9,000 feet due to cooler temperatures and a more ideal habitat. Data was collected using 50-meter plots to record observations and vocalizations of the pika at the same time on consecutive days. A total of 14 pika were found at the cooler high elevation site while 1 was found at the lower site. The hypothesis was proven correct, that pikas prefer high elevations due to cooler temperatures in order to survive.

Introduction

American Pikas (*Ochotona princeps*) are prevalent throughout the San Juan Mountains of Colorado. The pika has a small, round body, peppery brown fur, large round ears and no visible tail. It is between six and eight inches long and weighs about six ounces. The pika lives in rocky mountain areas and boulder-covered hillsides, usually at elevations between 8,000-13,000 feet, between the timberline and down into sub-alpine forest. It makes its home in rock piles and slides. Although pikas live in groups, they are territorial and will guard and defend their own area from other pikas.

(<http://www.nhptv.org/NatureWorks/americanpika.htm>)

The American Pika, which are the smallest member of the rabbit family, are a potential indicator species of warming temperatures due to global warming and climate

change. (Ray, 2005) Global climate change is affecting pika because since the pikas rely on cooler temperatures and an ideal habitat they can only be in those areas which happen to be up high in the mountains. With global warming more of the high mountainous areas are becoming warmer climate, the pika can go only so far to the top of the mountain peaks and once they are there, there is no where further to go so the pika could die off.

There have been other studies done on the American Pika postulating this same theory on temperature change. Past pika studies have shown that as their environment and habitat areas are warming in the Rocky Mountains, the pika are moving to more ideal habitats with cooler summer temperatures (Ray, 2005). Although studies have been made in southwest Montana, the same theory applies to the San Juan Mountains in southwest Colorado near Telluride. This theory is that the pikas are moving up in elevation due to temperature change. Past research done on the American Pika has served as a foundation for the research recently conducted in the Bridal Veil Basin. Through the Bridal Veil Living Classroom, a field-based biodiversity monitoring course near Telluride, Colorado these pika studies were possible. This research on the American Pika is one of the first studies on the pika population in the Bridal Veil Basin and San Juan Region. The study on the American Pika hypothesizes that there will be a higher population density of American Pikas at a higher elevation site of 12,300 feet rather than at a lower elevation of 9,000 feet due to cooler summer temperatures and a more ideal habitat at the upper site.

Site Description

The study was conducted in Bridal Veil Basin, located in the San Juan section of the Rocky Mountains in southwest Colorado. At the headwaters of the San Miguel River, the surrounding mountains are jagged remnants of ancient volcanic activity. This area, a hanging glacial valley was the site of the Bridal Veil Living Classroom. Two sites were chosen for the pika monitoring study. The first (Plot 1) was up at Blue Lake a high alpine lake at 12,300 feet in elevation (N37degrees53'20. 7", W107degrees46'23. 6"). This site is an alpine area filled with talus slopes, consisting of huge deposits of 10 to 15 inch rocks descending from the surrounding mountainsides, a rock glacier of various sized rocks and boulders, and open grounds of alpine meadows full of wildflowers, grasses and forbs. The second study site (Plot 2) was down around Idarado Mine at 9,000 feet in elevation, located in the upper Telluride valley below the mouth of Bridal Veil Basin (N37degrees55'50. 0", W107degrees46'47. 2"). In this area there are big boulders with underlying crevices, surrounded by spruce and aspen trees. There are also occasional willow bushes and shrubs.

Methods and Materials

The methods used for the pika-monitoring project were quite simple. The two sites were chosen on a basis of pika activity and previous pika observations. The two sites were also chosen by elevation, so as to have comparable sites with previously observed pika activity at two extremes of elevation within the same general area. Both of the sites were measured for two hours on consecutive days. Each site was measured for pika

population density, the current temperature, and general field observations, the number of plant species in a one-meter circle that the pikas forage on were counted as well.

At each site plot counts were taken, using a 50-meter circle. The observer sat on a boulder in a talus covered hillside and watched for pika movement, while also listening for the high pitched squelch of the pika, and documenting other animals such as the weasel, the pikas' main predator.

The materials used were as follows. Binoculars and three different cameras were used to watch and document pika activity. First, a video camera was utilized to catch the pika in action. A small digital camera was useful to get good resolution pictures of the pika and surrounding area. Finally a motion activated camera (StealthCam) was installed at the lower site to catch the pika on film when an observer was not present. A standard dial thermometer was used to take the current temperature, at time of observation, while for a future long term pika monitoring project year-long temperature loggers were installed (HOBO U10 Temp Data Logger), which record the temperature every two hours. A Garmin eTrex Vista GPS was used to get accurate locations for each site.

Results

The results for Plot 1 were as follows: the date was August 7, 2007, and the time of day was 12:00 pm to 1:00 pm. The temperature at 1:00 pm was 40 degrees Fahrenheit. A total of fourteen pikas were observed, while nine pikas were heard vocalizing. A vegetation count in a one-meter circle close to pika hay piles was also documented; the total number of plant species in the one-meter circle was twelve.

Plot 2 was monitored on August 8, 2007, from 12:00 pm to 1:00 pm. The temperature at 1:00 pm was 64 degrees Fahrenheit. A total of one pika was observed, while four pika were heard vocalizing. The one-meter circle at the lower site consisted of six different plant species.

See chart 1 for differences in temperature

See chart 2 for pika density differences

Conclusion/Discussion

Data collected during this research supported the hypothesis that there will be a higher population density of American Pikas at a higher elevation rather than at a lower elevation due to a more ideal habitat and cooler summer temperatures. The data supported the hypothesis as the higher site (Plot 1) had a total of fourteen pikas, while at the lower site (Plot 2) a total of one pika was observed. The temperature also relates to how many pika were observed, by again proving that pika prefer cooler temperatures. At the upper site, the temperature was 26 degrees lower than the lower site, so more pikas were observed. At the lower site, the temperature was much higher therefore only one pika was observed.

The vegetation diversity directly corresponds to the hypothesis, suggesting that if there is a greater diversity of plant species, then the pika will have a greater food source, therefore providing a better pika environment.

This data collected from the San Juan region of Colorado corresponds to previous research done in Montana, which shows that pikas have a low tolerance for high temperatures. This study was the first study on pikas undertaken in the Telluride region in southwest Colorado.

Changes to the study for further research should include more days to collect more consistent data. Data from both locations should be taken when the temperature is the same to assure that the pikas are observed when they are more attracted to the cooler temperatures. It would be worthwhile to experiment with different times throughout the day for the most pika activity. For an example, one could use early morning, noon, and evening times to observe pika activity. Future studies could also include more about climate change, and how it affects the pika. For instance, a long-term study would be useful which looks at global warming's influence on plant life and snow pack conditions that affect pika distributions.

This study proves that the American Pika relies on cooler temperatures, which are normally found in high mountain areas, in order to survive.

Chart 1:

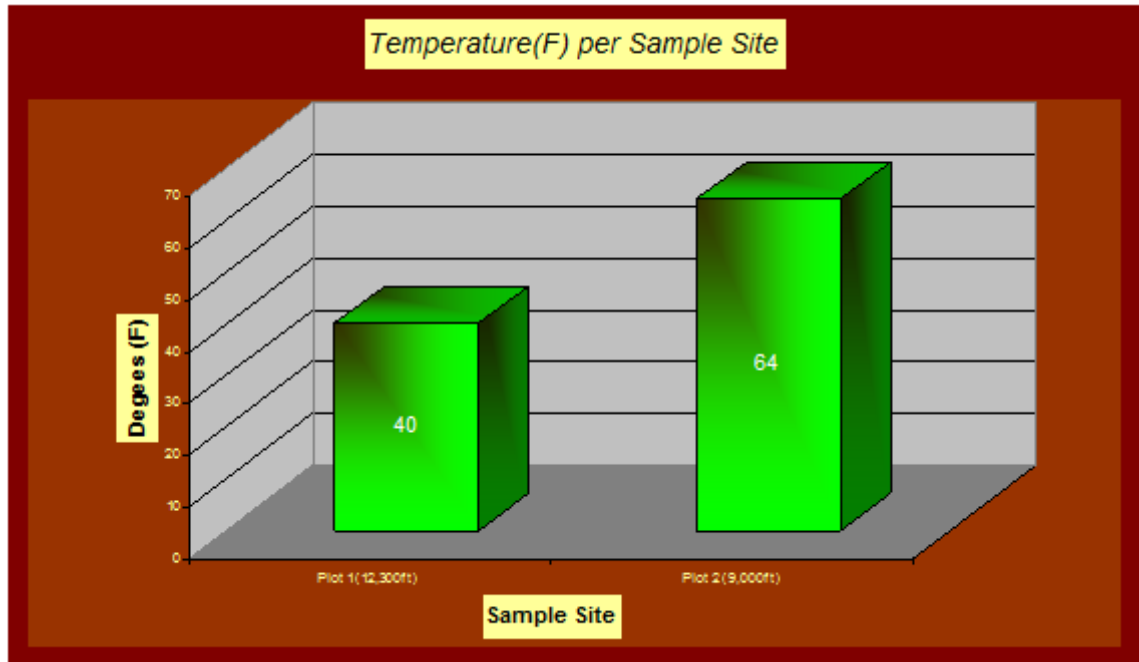
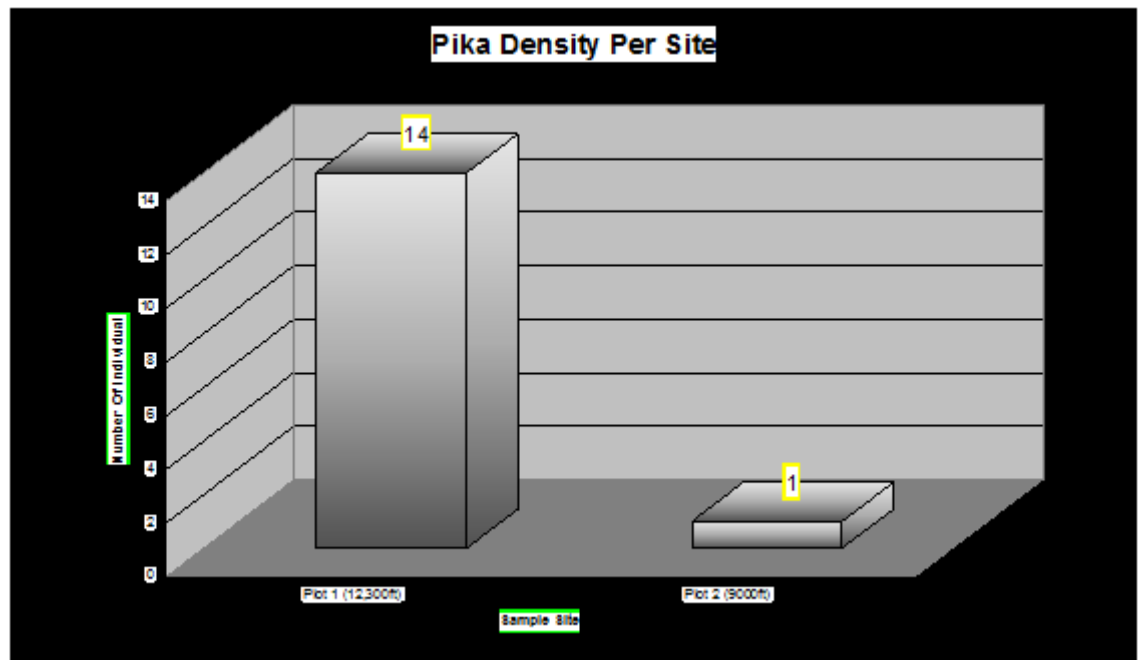


Chart 2:



Works Cited

(Ray, Chris 2005 “inferring the role of climate in the decline of the American pika” powerpoint presentation)

(<http://www.nhptv.org/NatureWorks/americanpika.htm> “American Pika- Ochotona princeps”)

Nijhuis, Michelle “In the Great Basin, Scientists Track Global Warming” High Country News, October 17, 2005.