Crown of the Continent
Research Learning Center

National Park Service
U.S. Department of the Interior

Resource Bulletin

Climate Change and the Pika

A Cold Climate Rabbit

Glacier carved peaks, waterfalls, mountain goats, and grizzly bears all define the alpine country of Glacier National Park. What many people do not see are the smaller, less obvious members of this dramatic environment. Take the potato-sized, furry, North American pika (*Ochotona princeps*) for instance, found among talus slopes in Glacier National Park.

Princeps is a Latin version of the Chipewyan Indian name for pikas, translated to mean, "little chief hare." Pikas are in the lagomorpha order, related to rabbits, and have evolved to live in cool climates near the interface of talus slopes and meadows. A talus slope differs from a scree slope in that talus rocks are larger, up to 1 meter in diameter. Individual pikas defend home territories about 14 – 33 square meters. They define the perimeter by rubbing rocks with their cheeks, which contain apocrine glands, to scent mark the borders. In the center of their territory is often a large boulder. They use this conspicuous rock to survey for predators. If a coyote, pine marten, fox or a human arrives, pikas scream a shrill "eek!" to warn their kin of danger. If it is a long or short-tailed weasel, however, pikas remain silent, attempting to conceal their presence from their most efficient predator.

When not on the lookout, pikas take advantage of the short growing season of an alpine summer. They are generalized herbivores that also eat their caecal pellets, or protein-filled excretions typical of lagomorphs. Not only do pikas feed directly on plants and pellets, but they collect and store them as well. These storage caches, known as hay-piles, provide supplemental nutrients to help the pika survive the nine-month alpine winter.

Pika collect and store plants in "haypiles" to provide them sustenance through the nine-month alpine winter.

Pikas do not hibernate. They are actually excellent cold-climate survivalists. Their insulation and high metabolism keeps their body temperature at 104 °F. These attributes benefit pikas in the winter, but are ineffective for rapid heat dissipation in warmer weather.

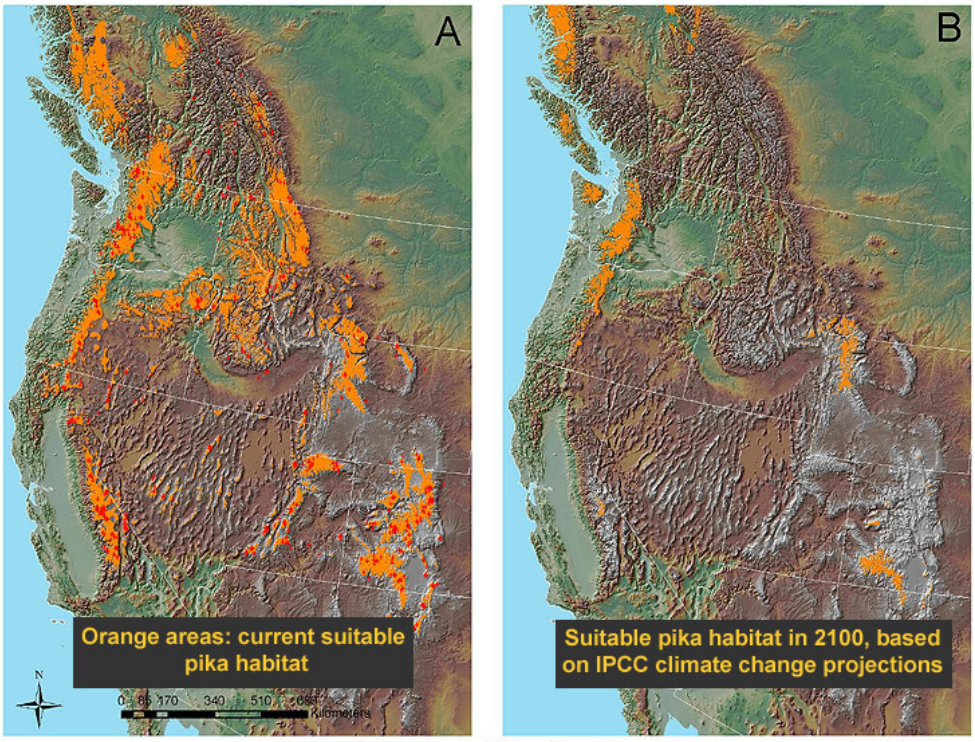
Scientists have found that pikas exposed for half an hour in 78 °F temperatures can die by overheating. Their lethal body temperature is 109 °F. In other words, just a 5 °F increase in body temperature can cause pikas to die. So the troubling question remains, how will climate change effect the pika?

Climate Change Effects on the Pika

Climatology models predict that the average temperature in North America will rise by 2 – 10 °F by the end of the 21st century. Glacier National Park has garnered climatology attention due to the receding glaciers, but climate change may also have an impact on numerous species within the park...particularly alpine species like the pika.

Temperature is a crucial factor in determining pika habitat. In warmer climates, pikas live at higher elevations. In colder climates, they are able to live in lower elevations. In fact, fossil records indicate that pikas did not always live in the alpine. Prior to the Early Holocene Era, over 8,000 years ago, pikas lived in valley bottoms and grassland habitats in North America.

This long-term shift in habitat preference is important for understanding how the pika is likely to respond to global warming. Scientists in the Great Basin of Nevada found that 7 out of 25, or 28% of documented pika populations have gone extinct within the past 30 – 80 years. Evidence from the Great Basin shows that during the past 8,000 years, as the climate has generally warmed, pika populations have become extinct in lower elevations and have grown increasingly isolated on mountaintops. If the alpine warms at the predicted rates, even the mountain summits may not be cold enough to sustain pika populations.



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Warming temperatures may also affect pika reproduction. Averaging only 2 – 3 offspring per litter, a pika's first (and most successful) of two litters, is conceived one month prior to the melting alpine snow pack. Timing is critical because it provides the lactating female pika with an abundance of food when she needs it the most. Earlier snow melt and unpredictable winter snow pack depths may disrupt natural timing, potentially leaving the offspring and mother susceptible to starvation.

Due to their vulnerability to high temperatures, increasingly isolated populations and low reproductive rates, scientists are concerned how climate change will affect the North American pika.

Glacier's Management Strategy

The effects of climate change on the pika in Glacier National Park are unknown. Therefore, in 2007, a University of Wisconsin PhD candidate, Lucas Moyer-Horner, began a three-year study monitoring pikas within the park.

Mr. Moyer-Horner and his research assistants identified 200 talus sites within the park suitable for pika habitat. Throughout the summers of 2008 and 2009, Lucas and his team monitored and collected data from these sites. This data will be used to develop a mechanistic model to test the hypothesis that climate change increases the risk of pika extirpation. Over time, this will greatly improve our understanding of how pika distribution is affected by climate change.

Additionally, The Crown of the Continent Research Learning Center coordinates a citizen science program that monitors pikas. Citizen Scientists are trained to monitor mountain goats, Clark's nutcrackers and pikas throughout the park. The data collected will complement Lucas Moyer-Horner's study and establish a foundation for long-term monitoring of this charismatic creature of the alpine and its relation to a changing climate.


Cindy Cone Photo

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Resources For More Information

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Documents and web sites

Broader History of Pikas
http://fwp.mt.gov/mtoutdoors/html/articles/portraits/pika.htm

Climate Change and Pikas
http://www.worldwildlife.org/species/finder/americanpika/item2835.html

The Millenium Ecosystem Assessment
http://www.millenniumassessment.org/en/index.aspx

Volunteer to monitor pikas with High Country Citizen Science. Contact Jami_Belt@nps.gov for more information.