

"Pikas in Peril" Research Project



University of Colorado
Boulder

Project Update 2014

Crater Lake National Park

Project Background

The American pika (*Ochotona princeps*) is considered an indicator species for detecting ecological effects of climate change at high elevation. The Pikas in Peril project works to address questions regarding the vulnerability of the American pika to future climate change scenarios projected for the western United States and provide important insights to park managers about potential impacts of climate change on park ecosystems.

Landscape effects on pika gene flow

A species' ability to disperse through complex landscapes is an important and often ignored factor when assessing species vulnerability to climate change. Among animals, dispersal ability affects gene flow, when individuals carry their DNA to new areas and interbreed with individuals living there. If dispersal among inhabited areas becomes difficult, groups of animals may become isolated and gene flow decreases, causing loss of genetic diversity and thus, increased risk of population extinction. Landscape features, including complexity of topography, lakes and rivers, aspect (which direction a slope faces), elevation, and land cover, can limit, encourage, or prevent dispersal. Climate change may change the influence of landscape on dispersal, for instance by making areas too hot and dry to cross, and thus affect gene flow.

At Crater Lake NP, we have completed the first fine-scale, individual-based genetic analysis that addresses the effects of landscape and climate on dispersal and gene flow for American pikas. We found that gene flow in pikas was primarily restricted by avoidance of hotter aspects (south and west-facing slopes) and very steep areas such as cliffs and ravines. We suggest that physical restrictions related to small body size, as well as exposure to relatively high temperatures, limit pika dispersal. These relationships suggest that increasing temperatures could isolate groups of pikas at Crater Lake. However, investigation of other landscapes is required before making generalizations at the regional and/or species range scale. We are currently conducting similar studies at other NPS units. Together, these studies are an important step in understanding climate change effects on a species of concern.

Project Goals

- Document pika occurrence patterns and predict pika distribution across eight NPS units.
- Measure gene flow and model connectivity of pika populations within five park units representing major genetic subdivisions and habitat types.
- Project climate change effects on the future distribution, connectivity and vulnerability of pika populations in each park.



A pika perches on talus, its preferred habitat at CRLA. Pikas are related to the rabbit, have rounded ears, and no visible tail. They are temperature sensitive, and cannot survive in temperatures much above 80° F.

For more information, please visit our website

http://science.nature.nps.gov/im/units/ucbn/monitor/pikas_in_peril.cfm

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