

# Contemporary climate change alters the pace and drivers of extinction

April 20 2011

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Local extinction rates of American pikas have increased nearly five-fold in the last 10 years, and the rate at which the climate-sensitive species is moving up mountain slopes has increased 11-fold, since the 20th century, according to a study soon to be published in *Global Change Biology*. The research strongly suggests that the American pika's distribution throughout the Great Basin is changing at an increasingly rapid rate. The pika (*Ochotona princeps*), a small, hamster-looking animal sensitive to climate, occurs commonly in rocky talus slopes and lava flows throughout the western U.S. The study demonstrates a dramatic shift in the range of this rabbit relative, and illustrates the increasingly important role of climate in the loss of local pika populations across the nearly 150,000 square miles of the hydrological Great Basin.

The authors investigated data across 110 years on pika distribution and 62 years of data on [regional climate](#) to first describe the patterns of local pika loss, and then examined strength of evidence for multiple competing hypotheses to explain why the losses are occurring. They found that among 25 sites in the Basin with 20th-century records of pikas, a species dependent on cool, high-mountain habitats, nearly half (four of ten) of the local pika extinctions have occurred after 1999. In addition, since 1999 the animals are moving up mountain slopes at an average (Basin-wide) rate of about 145 m (475 feet) per decade, as compared with an estimated Basin-wide average of about 13 m per decade during the 20th century. In contrast, a recent (2003) review found that worldwide, species demonstrating distributional shifts

averaged upslope movement of 6.1 m per decade. The species does not seem to be losing ground everywhere across its geographic range, but at least in the [Great Basin](#), it may be one of a group of species that can act as 'early-warning' indicators of how distributions of species may shift in the future.

The study's most novel scientific contribution was that the factors apparently driving the local-extinction process were strongly different during the 20th Century than during 1999-2008. This may mean that knowledge of past population dynamics of a particular species may not always help researchers predict how and why distributions change in the future. That is, the rules of the 'extinction game' seem to be shifting. This study was distinctive in that it relied upon fieldwork across an entire region rather than at just a few sites; had temperature data from the talus spaces that were previously or currently occupied by pikas (rather than simply estimated temperatures from weather recorders far from the study sites); and had three periods of data collection, which allowed for comparison of dynamics during the two intervening periods. Unlike most other mammals that have attracted management and conservation attention in the past, pikas are not widely hunted, don't require large areas of habitat for their individual home ranges, and live in remote high-elevation areas that experience a smaller array of land uses than that experienced by other species. Additionally, with a few localized exceptions, these pika losses have occurred without significant change in the amount or geographic arrangement of their rocky talus habitat. Habitat loss or degradation has typically been the most common cause of [species](#) decline, not only in mammals, but also among all animals. In addition to being sentinels, pikas are important because they are food for an array of animals, and as the 'ecosystem engineers' that they are, their presence affects the local plant composition and nutrient distributions.

Provided by Wiley

Citation: Contemporary climate change alters the pace and drivers of extinction (2011, April 20)  
retrieved 10 April 2024 from

<https://phys.org/news/2011-04-contemporary-climate-pace-drivers-extinction.html>

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