Pika abstracts associated with the symposium 'Biology, management, & conservation of pikas & other montane animals'

16 October 2012, The Wildlife Society International Conference, Portland, OR

(ORAL) PAPERS:

Using physiological samples to measure stress in American pikas. **Jennifer L. Wilkening**[1], Chris Ray[1], Karen Sweazea[2], [1]University of Colorado, Boulder, CO, [2]Arizona State University, Phoenix, AZ, ***Contact***: Jennifer.Wilkening@colorado.edu; 1:50 PM

Abstract: The American pika (*Ochotona princeps)* is considered a sentinel species for detecting ecological effects of climate change, but previous studies have focused on local pika extinction as a metric of change. We have validated simple procedures designed to provide an earlier warning signal, based on non-invasive sampling and analysis of physiological stress in living pikas. Pikas were sampled at several locations in the Rocky Mountains for the measurement of stress hormones (glucocorticoid metabolites, GCMs) in fecal samples as well as glucocorticoid concentration (GC) in plasma samples. Trapped pikas underwent data collection procedures known to induce stress, including blood sample collection via retro-orbital bleeding. Individuals were then held on site for up to 24 hours in a chamber specifically designed for non-invasive collection of fecal samples. Fecal samples were collected every 1-2 hours, and animals were released back into their home territories at the end of the collection period. All samples were frozen immediately, and later transferred to a lab for extraction and measurement. Collected fecal samples were analyzed for GCM concentrations, and comparisons were made between GCM levels measured in samples collected at different times subsequent to capture. Results reflect the expected increase in GCM level following a stressful event, and also identify the time delay (12.5 hours) between a pika's exposure to a known stressor and subsequent elevation of its GCM level. GC measured in plasma samples reflects individual variation seen in GCM levels, and further validates the techniques used. This is the first study to measure stress hormone metabolite levels in fecal samples for any species of pika. Non-invasive collection of fecal samples can be utilized to assess the physiological condition of pikas inhabiting different environments, and to determine whether local habitat variables specifically related to climate can explain levels of physiological stress in pikas.

Microclimatic drivers of pika population density in the Southern Rocky Mountains. Liesl P. Erb, Chris Ray, Robert Guralnick, University of Colorado, Boulder, CO, Contact: liesl.erb@colorado.edu

Abstract : Alpine species are among those most threatened by climatic shifts due to their physiological and geographic constraints. One such species is the American pika (*Ochotona princeps*), an alpine mammal found in rocky habitats throughout much of western North America. Recent evidence from the Great Basin shows extensive climate-driven local population extirpation, and yet population extirpations have been less frequent in the Southern Rocky Mountain Region. In this study we investigated local population density as a more precise metric of population response. The density of 20 pika populations was estimated in both 2009 and 2010 using line transect-based distance sampling methods. While three different types of pika sign (scat, vegetation caches, and visible individuals) were investigated, pika scat as the most consistent and stable metric of population density. To better understand the mechanisms driving differential density patterns across the landscape, we collected habitat data including vegetation, talus depth and elevation and also used data loggers to record microclimate at each site.

Local pika densities and climatic trends are highly variable across the Southern Rockies. In an analysis of habitat and microhabitat variables, the best predictors of pika population density were climatic factors. Density

was lowest at sites with highest mean summer temperature and lowest mean annual precipitation. Site aspect, elevation, latitude, and talus depth were not predictive of pika population density. Our findings indicate that hotter, drier sites do not support pikas in high densities. Direct thermal stress is implicated as a driver of lower densities at hotter sites. Data from sub-talus temperature loggers implicate a lack of snowpack at drier sites as the precipitation-based driver behind low pika densities. Reduced snow cover reduces the thermal insulation available to pikas during winter, but may also reduce water content in forage resources.