COS 169-4 - Impacts of snow variability in the presence of supplemental feeding on the spatial distribution of a large herbivore in an Alpine environment

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Friday, August 11, 2017: 9:00 AM

D133-134, Oregon Convention Center

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Background/Question/Methods

Climate plays a critical role in the distribution of animals across the landscape. In boreal and subalpine ecosystems, winter climate is often the energetic bottleneck that limits species distributions both latitudinally and altitudinally. Large herbivores, in particular, are limited by the snow layer, but climate change is rapidly altering these patterns. The Alps are an excellent stage for examining the effects of winter weather variability in large herbivores. Roe deer, in particular, represents an excellent model species, because it shows aversion to areas with deep snow, making Alpine habitats the altitudinal limits of the species' range. We hypothesized that the upwards migration of the snow-line in the Alps and the increased availability of supplemental feeding have led, over the past decades, to significant climate- and resource provisioning-driven shifts in roe deer patterns of space use. Our analysis built upon a resource selection function (RSF) model that predicts habitat selection as a function of snow depth, presence of canopy cover, and feeding station proximity. By fitting this model to contemporary (2012-2015)

and historical (1997-2002) datasets of roe deer movement relocations, we analyzed changes in roe deer habitat selection between the two study periods.

Results/Conclusions

The fitted resource selection function model indicated that roe deer strongly avoid areas without canopy cover ($\beta = -2.105 \pm 0.362$, $p < 0.001$) and with high snow depths ($\beta = -0.021 \pm 0.007$, $p < 0.01$), while they select for areas in proximity of feeding stations ($\beta = 91.803 \pm 14.807$, $p < 0.001$). Comparisons of the relative probability of selection showed historical intra-period coefficients to be significantly less variable than inter-decadal coefficients for all winter months, and significantly less variable than contemporary intra-period coefficients during the months of February and March. Contemporary intra-period coefficients were significantly less variable than inter-decadal coefficients only in December and April.

The comparison between selection coefficients confirms that habitat selection by roe deer was more variable in the contemporary period than in the historical one, reflecting more evident variability of snow patterns in the contemporary period. Feeding stations become attractive points for roe deer in snowy years, while with less snowfall, a greater range of areas are similar in relative quality. We conclude that higher variability in snow conditions in recent years has come with increasing variability in habitat selection patterns, and that these patterns are further strongly affected by the distribution of supplemental feeding stations.

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