

Impact of Annual Snowpack on the Abundance of the Sierra Nevada Gray-Crowned Rosy Finch

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The alpine is a specialized ecosystem characterized by its lasting snowpack. It is home to a multitude of unique species that are highly adapted to the harsh wet winters and dry summers of the alpine. However, as climate change continues to have worsening effects on specialized habitats, alpine species are facing increased vulnerability with little time to adapt (Siegel et al., 2014, Gibson-Reinemer et al., 2015). There are few studies that show how high alpine species can serve as a useful representation of the effects of climate change (Elsen & Tingley, 2015, Sekercioglu et al. 2007). Such being the case of the American pika (*Ochontona princeps*) as an indicator species for climate change in the alpine. Our study focuses on the Sierra Nevada Gray-crowned Rosy-Finch (hereafter, GCRF), a generalist species residing in California's Sierra Nevada and White Mountain ranges. Because GCRFs are breeding at their maximum elevation, there is a possibility that this species could serve as a surrogate for the responses of other high-alpine species to a changing climate. Snowpack is becoming limited to higher elevations, causing habitat loss to those biota that depend on it (Elsen & Tingley 2015), as well as the recession of potential foraging habitat. Using project data from 2018 -2020 of varying snowpack, we investigated if the abundance of Sierra Nevada Gray-crowned Rosy-Finch (GCRF) populations are influenced by variation in annual snowpack across an elevational gradient. We found that the high snow year showed more GCRFs when snow was present, whereas the low snow year showed abundance was split more evenly between areas with and without snow presence (66:34 respectively). With more snowpack available, elevation had no relation with GCRF abundance, whereas locations with less snow showed a positive correlation between GCRF abundance and elevation. Snowpack can be a proxy for the available forage, and as a generalist species, the GCRF reflects the health of its ecosystem. Analyzing mountaintop species' responses to environmental fluctuations, allows us to make more conservation decisions surrounding the receding alpine zone. As well as opening the door to further research such as, exploring the long term implications of climate change on the success and diet of Rosy Finches.



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