



Point Blue Publication Brief

Recent drought may provide a glimpse of the future for the avian community in the Sierra Nevada

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How wildlife respond to climate change is likely to be complex. To gain insight into the effects of climate change on the bird community in the Sierra Nevada region we monitored birds through an extreme drought that resulted in widespread mortality of pine trees due to bark beetles (*Dendroctonus*). Under the assumption that climate conditions and species' responses to those conditions during the drought are analogous to those that may occur in the future, we assessed the influence of temperature, water deficit, and tree mortality on bird abundance for 45 species and then used those models to project the effects of climate change on the bird community through 2050.

While beetle mortality resulted in a substantial reduction in the live tree cover in our study area, the short-term effects on the avian community were rather modest. Our results showed that about a third of the species declined with high tree mortality, but the magnitude of those declines was small relative to the influences of the climate. Total avian community abundance in

our study area increased during the drought period and our model results projected similarly high future abundances in response to warmer climate conditions.

Nearly half of the species in our study responded positively to high temperature, while only 20% declined. Roughly one third of the species declined in response to higher water deficit, while one third increased. However, many of the species that benefited from increased temperature were also sensitive to high water deficit and tree mortality. Thus, their positive response to increasing temperatures in the future could be offset by drought or habitat change.

Our models predicted modest increases in many bird species' populations into the future, however the full effects of the recent drought and tree mortality event are still unfolding. It appears that an abundant and diverse bird assemblage still inhabits the forest stands affected by mortality, and therefore managers should consider this potentially important

biodiversity when choosing management actions like salvage and reforestation.

Understanding the mechanisms that lead to changes in bird abundance can inform climate-smart conservation and management actions to enhance resiliency and adaptive capacity of species and their habitats.

Main Points

The Sierra Nevada avian community appears to be more sensitive to dry conditions and high temperatures than the initial effects of conifer mortality.

Many species may benefit from increased temperatures in the future, especially if coupled with an increase in precipitation.

Monitoring bird populations for a longer post-mortality period will be required to fully evaluate the effects of the bark beetle outbreak.

L. Jay Roberts, Ryan Burnett, James Tietz, and Sam Veloz. 2019. [Recent drought and tree mortality effects on the avian community in southern Sierra Nevada: a glimpse of the future?](https://doi.org/10.1002/eap.1848) Ecological Applications. <https://doi.org/10.1002/eap.1848>