

Implications of changing fire regimes for Sierra Nevada bat and bird communities

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Topic: Managing fire regimes in a changing world (good fire/bad fire)

Proposal Type: Symposium - select this if you are part of an organized session

Abstract:

Managing ecosystems for multiple objectives and multiple taxa is challenging under any circumstance but especially given uncertainties surrounding how biological communities will respond to changing fire regimes. To inform conservation and management efforts we studied the response of bats and birds to fire-induced changes in habitat and landscape pattern. For the bat community we conducted acoustic surveys in and around three wildfire areas during 2014-2017 in conifer forests of California's Sierra Nevada. We tested effects of mean burn severity and its variation, or pyrodiversity, on bat occupancy and diversity using hierarchical models that account for imperfect detection. Of the 17 species that occur in the region, occupancy rates increased with severity for at least 7 and with pyrodiversity for 2. Species richness increased from 8 species in unburned areas to 11 species in moderate- to high-severity burned areas with high pyrodiversity. We contrast these results with studies of avian post-fire habitat relationships in the region. While many bats appear to benefit from wildfire, even high-severity wildfire, bird responses are more mixed. As wildfires continue to grow larger with more area at risk of type conversion from forest to sustained early successional habitat, some species will benefit in the short-term while others lose habitat. Managing for resilience requires understanding how altered disturbance regimes are affecting all components of an ecosystem. For fire-adapted systems, actions that encourage mixed-severity wildfire and pyrodiversity will likely benefit the most species across taxa by limiting habitat extremes such as overly dense, fire-suppressed forests and very large high-severity patches. Coauthors: Brent Campos Ryan Burnett Winifred Frick Alissa Fogg Jay Roberts Hugh Safford