

Western Ecological Research Center

Publication Brief for Resource Managers

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Responses in Bird Communities to Wildfires in Southern California

There is a growing body of literature covering the responses of bird species to wildfire events. A new USGS study, published in *Fire Ecology*, was unique among these in investigating the effects of large-scale wildfires on entire bird communities across multiple vegetation types. USGS scientists Mark Mendelsohn, Cheryl Brehme, Carlton Rochester, Drew Stokes, Stacie Hathaway, and Dr. Robert Fisher conducted avian point counts at two San Diego County nature reserves during the breeding seasons for two years before and two years after the Cedar and Otay Fires of 2003 in southern California. They found these preserve lands appeared to have successfully maintained a consistent level of avifauna species diversity, although there were changes in community structure and relative abundance of some species.

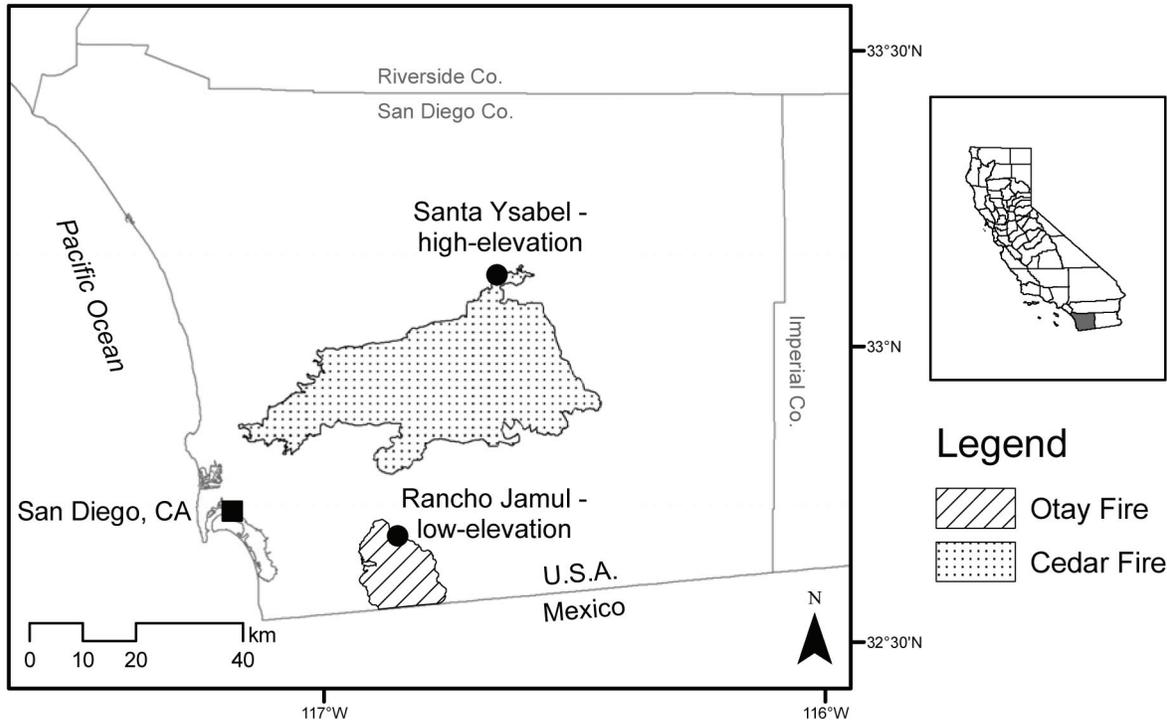
The study's balanced sampling effort took place at two sites, one low-elevation (Rancho Jamul Ecological Reserve) and one high-elevation (Santa Ysabel Open Space Preserve), each containing replicate stations (burned and unburned) within five vegetation types: chaparral, coastal sage scrub, grassland, oak woodland, and riparian. Although some degree of fire damage occurred at all of the impacted survey points, the authors found that the post-fire shrub and tree cover was significantly lower at only two of the vegetation types within the low-elevation site, coastal sage scrub and chaparral. They found no significant changes in cover at the high-elevation site.

The scientists detected 2,598 individuals of 88 species at the low-elevation site (during 1,138 minutes of counts before the fire and 1,200 minutes post-fire). At the high-elevation sites, they detected 4,364 individuals

Management Implications:

- Raptors, such as the white-tailed kite and golden eagle, used both the high and low-elevation sites, most likely due to the large open space provided within the boundaries of these preserved lands.
- The riparian vegetation that is protected within Rancho Jamul Ecological Reserve and Santa Ysabel Open Space Preserve may serve as refugia for species closely associated with this vegetation type, such as the least Bell's vireo, yellow warbler, and yellow-breasted chat, which were detected in low numbers.
- Chaparral and coastal sage scrub shrublands like those present at these two study sites provide habitat for many species of interest. Some shrubland dependent species, such as the California gnatcatcher, rufous-crowned sparrow, and Bell's sage sparrow, were detected both before and after the fires at both study sites.
- San Diego County experienced a repeat of these large-scale fires in the fall of 2007. The Witch Creek, Poomacha, and Harris Fires, which burned or re-burned portions of the study sites described here, may warrant further study to build on the body of knowledge present herein.

of 89 species (during 1,800 minutes pre-fire and 1,200 minutes post-fire). In total, they detected 6,962 individual birds of 107 species during all point counts across both sites. The five most commonly detected species at the low-elevation site across all samples, in descending order, were California towhee, spotted towhee, wrentit, bushtit, and mourning dove. At the



high-elevation site, the five most commonly detected species across all samples were spotted towhee, lazuli bunting, ash-throated flycatcher, mourning dove, and oak titmouse. Seventy species occurred at both the high and the low-elevation sites. Seventeen of these species carry special status according to local and federal government wildlife agencies.

Using univariate and multivariate analyses, the scientists tested whether the fires were associated with a change in bird species diversity, community structure, and the relative abundance of individuals within a species. They found that species diversity changed in only one circumstance; it increased in coastal sage scrub at the low-elevation site. Multivariate analyses revealed that there were significant differences in the bird community structure in the low-elevation chaparral, low-elevation coastal sage scrub, and the high-elevation grassland communities and that these differences were

related to patterns in shrub and tree cover. The relative abundance of some species (lazuli bunting and horned lark) significantly increased after the wildfires while other species declined significantly (Anna's hummingbird, wrenit, and bushtit). They detected mixed results for the spotted towhee, which increased in burned chaparral and declined in burned coastal sage scrub within the low-elevation site. The authors suggest that the observed responses of birds to these fires may be attributed to: 1) the availability of nearby unburned refugia, 2) the continued suitability of post-fire vegetation at the study sites, and 3) the generally high mobility of this taxon.

Mendelsohn, M. B., C.S. Brehme, C. J. Rochester, D. C. Stokes, S. A. Hathaway, and R. N. Fisher. 2008. Responses in bird communities to wildfires in southern California. Fire Ecology 4(2):63–82.