



Terrestrial Vegetation and Wildlife Impacts

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Introduction

Anthropogenic warming has disrupted terrestrial ecosystem dynamics across the planet and contributed to a global reduction in biodiversity and ecological stability (IPCC, 2022). Observations from California’s changing ecosystems provide critical insight into the harmful impacts of human-driven climate change on terrestrial plants and animals.

Changes in climate and land use have increased wildfire severity and magnitude, leading to widespread habitat loss. The minimal reliance on tribal knowledge and decades of fire suppression have systematically weakened terrestrial resilience, fueling catastrophic burns. Fire suppression, drought, pest infestations and higher temperatures have also led to a surge in tree mortality across California (Harrison et al., 2024). The reduction in forest biomass strains ecological and cultural resources and threatens some of California’s most iconic tree species, including the giant sequoia and coastal redwood. As demonstrated by elevational shifts and declines in the Sonoran and Deep Canyon Deserts, even vegetation thought to be tolerant to drought and heat stress is vulnerable to climate change. Changes in species composition and altered



migration patterns among small mammals, birds, and butterflies further reflect biological shifts in response to habitat loss and changing climate conditions.

Downward trends in winter chill and increased pest abundance also jeopardize the production of high-value nuts and fruits. Given that California is the largest agricultural producer for the United States, accounting for 13.5% of total national agricultural exports in 2024 (CDFA, 2025), altered maturation times and pest infestations are critical to prevent, but control methods can have costly consequences for human and environmental health.

The following chapters – Wildfires, Forest Tree Mortality, Changes in Forests and Woodlands Composition, Vegetation Distribution Shifts, Winter Chill, Fruit and Nut Pest Abundances, Fruit and Nut Maturation Time, Spring Flight of California Central Valley Butterflies, Changes in Small Mammal and Avian Distributions, Bird Wintering Ranges, and Migratory Bird Arrivals – highlighting the impacts of climate change on California's terrestrial ecosystems.

References

CDFA (2025). *California agricultural production statistics: 2024–2025 export and cash receipt data*. California Department of Food and Agriculture. Retrieved August 14, 2026.

Harrison S, Franklin J, Hernandez RR, Ikegami M, Safford HD and Thorne JH (2024). Climate change and California's terrestrial biodiversity. *Proceedings of the National Academy of Sciences* 121(32): e2310074121.

IPCC (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge, UK and New York, NY, USA.

