

# Executive Summary

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## Ecosystems of California A Definitive Resource on the Structure and Function of California's Ecosystems

California is one of the most biodiverse places in the world, in terms of both the number of species and the number of ecosystems found here. Since the mid-1800s we have accumulated a vast storehouse of knowledge about the plants and animals that reside in the state. However, only after the 1950s did knowledge begin to accrue about the structure and functioning of California's ecosystems. *Ecosystems of California* examines the biological, physical and social controls on California's natural systems in the past, present and future. By including marine, terrestrial and freshwater as well as both natural and managed systems, this compilation provides the beginnings of a capacity to address linkages and needs among these systems. It provides resource managers and decision makers with comprehensive, baseline knowledge about California's ecosystems and the potential consequences of expected changes in our social and physical environment.

### About the Researchers

Contributors to "Ecosystems of California" include 149 experts from more than 50 universities, government agencies, non-governmental organizations and private consulting firms. This definitive work was co-edited by ecologists Harold Mooney, Stanford University's Paul S. and Billie Achilles Professor in Environmental Biology, emeritus, and a senior fellow, emeritus, at the Stanford Woods Institute for the Environment; and Professor Erika Zavaleta, the Pepper-Giberson Chair in the Environmental Studies Department at the University of California at Santa Cruz.

## ECOSYSTEMS of CALIFORNIA

EDITED BY HAROLD MOONEY AND ERIKA ZAVALETA



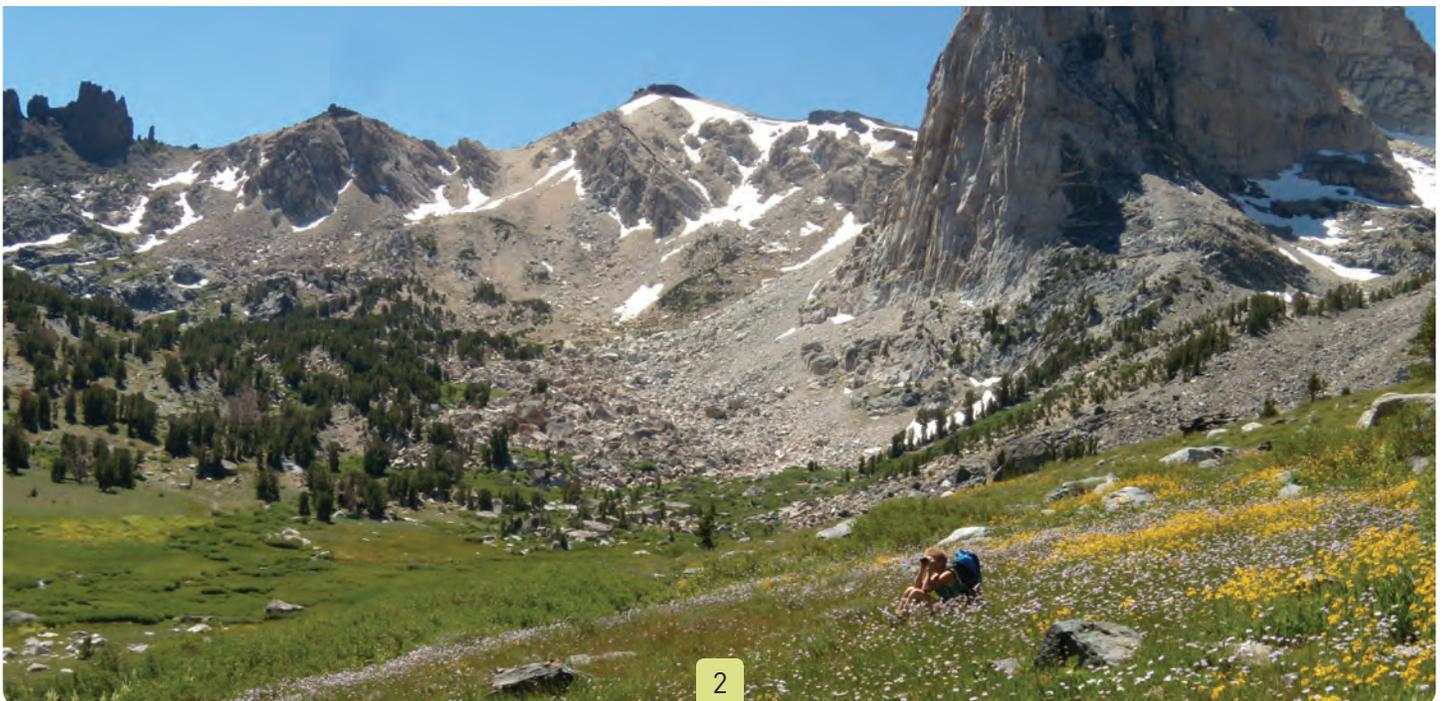
More than 140 contributors to *Ecosystems of California* shed light on some key patterns. First, several downward environmental trends in the state have successfully been reversed, with results ranging from improved urban air quality to reversing declines of unique species such as sea otters, peregrine falcons, and native island plants. Restoration, remediation and improved management have made strides addressing the damages of mining, overgrazing, overfishing and fire suppression in California's past.

However, these successes are tempered by at least two other trends: ongoing habitat loss to continued urban and suburban development, and the emergence of climate change as a growing force exerted through sea level rise, changing weather, and attendant changes in water availability, wildfire, snowpack, and myriad other forces. More than any other high-biodiversity region in the world, California has the economic, cultural and intellectual resources to have both thriving human communities and thriving ecosystems with their full diversity of species. *Ecosystems of California* points to several areas for action:

- **Though California has lost some of its unique species historically (~0.3%), it is in a position to be able to keep all that remains.** The successful re-introductions of Tule Elk, Bald Eagles, and California Condors demonstrate that even the most endangered of California's species can be saved.
  - California should lead by meeting International Convention on Biodiversity standards. Conservation targets should protect 17% or more of every terrestrial ecosystem, restore 15% of degraded areas

within each ecosystem, and adaptively manage the recently established marine protected area network, which protects nearly 10% of state waters.

- California should renew and strengthen its historic commitment to protecting its public trust resources, including fish, wildlife, navigable waters, and tidelands, and to conserving and restoring habitat on both public and private lands.
- **Climate change and growing population and attendant land use are the greatest challenges California's ecosystems face.**
  - Increasing access to open space and natural areas among the state's increasingly diverse human population will build public support for conservation and climate change adaptation and maintain the state's legacy as an inclusive state focused on quality of life.
  - Climate change response and conservation must be aligned. Development of low-carbon energy sources should not jeopardize biodiversity and ecological health at production and distribution sites.





- Funding for climate change adaptation should be applied to the persistence of vital ecosystem services and biodiversity as part of growing a resilient society.
- Habitat must be maintained and restored to provide pathways among protected areas for wildlife movement, especially in highly fragmented parts of the state.
- **Aquatic and coastal ecosystems, because they occur at the land-water interface, are at great threat from the squeeze imposed by climate changes (sea level rise, drought) coupled with land uses ranging from coastal armoring and development to agricultural intensification and water diversion.**
  - With less than 10% of California's wetlands remaining, wetland restoration is essential in most parts of the state, as is revision to California's water policies to structure effective allocation of water to include environmental benefits.
- Many contributors to this work point to the **importance of natural fire as a natural disturbance integral to California's ecosystem dynamics and essential as a management tool for replicating natural ecological processes.**
  - Prescribed fire should be encouraged as the most efficient means to promote forest resilience in many parts of the state.
- **Fundamental to future success is the need for sound science dealing with effectiveness of policy and management interventions and the measurement of outcomes.**
  - State funding through resource agencies is essential to build this capacity in order to protect California's ecosystems under rapidly changing conditions.

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