



# Climate Risks to California Forests

## California's Diverse and Productive Forests

There are over 33 million acres of forested lands in California. Forest type, ownership, size, and uses are highly diverse across the state. Within these lands are the world's oldest, tallest, and most massive trees. The forested watersheds provide over 60% of the water supply and energy to the state's huge agricultural economy and millions of residents. As stewards of these lands for thousands of years, forests remain integral to the cultures and subsistence of many Native American tribes. These ecosystems generate hundreds of thousands of jobs and billions of dollars in revenue, while providing habitat for rich biodiversity, including black bears, elk, condors, endemic amphibians and reptiles, and abundant insect pollinators. California is home to the top carbon storage ecosystem: coastal redwoods, and its forests are capable of sequestering millions of tons of carbon.

## Climate Change Effects on Forests

Over the past century, fire exclusion and associated management decisions promoted denser forests with higher fuel loads. Today, California's forests are experiencing increasing stress and disturbance as a result of interactions among the cascading impacts of climate change, dense forest conditions, and the expansion of the wildland-urban interface.

- Greater year-to-year variability in precipitation and more intense droughts and floods
- Hotter summers and drier autumn and springs, which will promote drier soils
- Precipitation shifts from snow to rain will reduce snowpack and promote earlier snowmelt, which contribute to moisture stress
- Longer wildfire season with larger and more severe fires

Changing climatic conditions in California have lengthened the dry season, increased temperatures, insect pressures, and plant moisture stress, and reduced soil moisture. Research shows that changes in forest composition or type are likely as temperature and moisture suitability shifts northward and upward in elevation. Increased frequency and duration of drought, coupled with bark beetle infestations, may result in large-scale tree mortalities.



## The Role of the USDA Climate Hubs

The Climate Hubs are a unique collaboration across a number of USDA agencies. The Climate Hubs were designed to develop and deliver science-based, region-specific information and technologies to agricultural and natural resource managers to enable climate-informed decision-making. Here in California, the Climate Hub serves the unique and variable needs of our state, federal, and private forest managers, decision-makers, and policymakers.

# How the California Climate Hub Supports Forest Resiliency

Led by ARS scientist Dr. Steven Ostoja and housed on the University of California Davis campus, the USDA California Climate Hub provides science-based, actionable information with the mission to enable climate resilient forests, facilitate communication, and support co-production of knowledge, tools, and products. The Hub works towards its mission through producing:

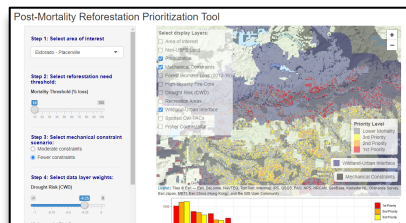
## Research and Syntheses

- Example: *Climate Change Primer for Forest Managers in the Sierra Nevada*



## Technology and Tools

- Example: *Climate-wise Reforestation Toolkit*
  - Prioritize locations
  - Post-drought stand condition
  - BMPs for planting techniques



## Education and Outreach

- Example: *Adaptation Strategies and Approaches for California Forest Ecosystems*



## Partnering for Success

In service of the state's working lands, the Climate Hub works with partners across federal and state agencies, universities, and industry to help enable climate-informed decision making and advance the adaptive capacity for California's forests and woodlands to meet the challenges of the future. Partnership examples include:

- **workshop collaborations with TNC** to assess regional perspectives on use of nature based solutions on natural working lands for achieving carbon neutrality .
- **co-leading the Science Advisory Panel of the Forest Mgmt. Task Force** to deliver vetted scientific opinions to the strategies and goals of the Task Force

## Climate Hub Partners in Forests

- USDA-USFS
- USDA-NRCS
- USDA Office of the Chief Economist
- National Park Service
- UC Agriculture and Natural Resources
- UC Davis John Muir Institute of the Environment
- California Forest Management Task Force
- Southwest Climate Adaptation Science Center
- California Natural Resources Agency
- Cal Fire
- California Environmental Protection Agency
- The Nature Conservancy

## For More Information

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