

Science Brief

Forest Management and Carbon Stability

Large-scale disturbances including wildfire, drought, and insects threaten carbon stocks in dry forests across the Western U.S. Forest management can safeguard these vital carbon stocks.

➤ Forests sequester carbon but are threatened by severe wildfire

- Forests store millions of metric tons of carbon. In California alone, 1,600 million metric tons are stored in National Forests and 2.7 million metric tons are sequestered annually.¹
- Every year, increasingly severe wildfires release millions of tons of carbon into the atmosphere. **Minimizing severe wildfire risk is a critical component of climate change mitigation.**
- Selective logging and fire suppression in Western dry forests over the past 150 years have facilitated a transition from historically pine-dominated, fire-resistant ecosystems to more dense, fir-dominated forests that have a greater susceptibility to wildfire.² While these fir-dominated forests are more carbon-dense in the short term, their vulnerability to severe wildfires makes their carbon storage capacity short-lived.²



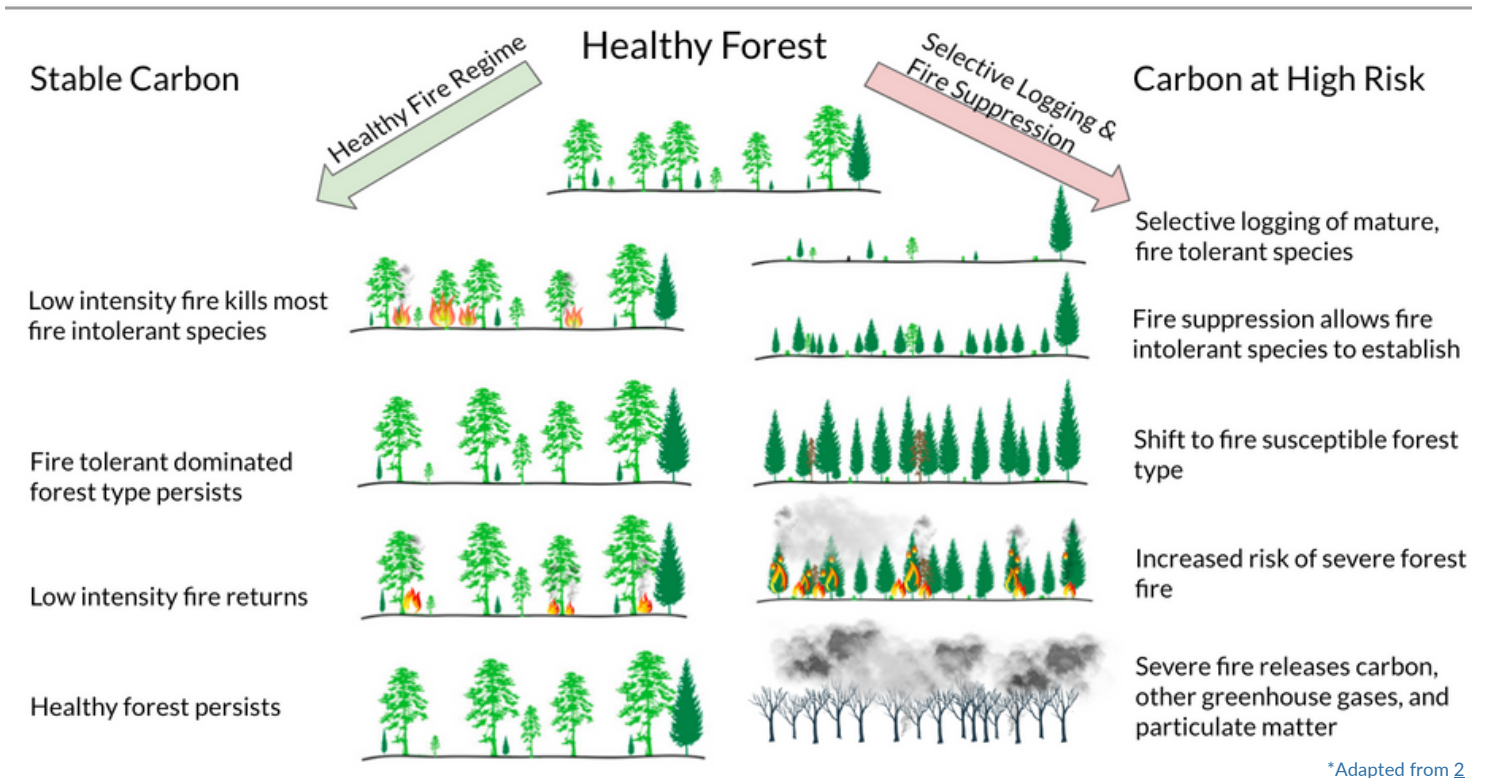
Vulnerable/Overstocked Forest



Resilient, Treated Forest

➤ **Healthy forest ecosystems achieved through forest management have carbon storage stability benefits**

- Forest restoration promotes a return to a more natural forest composition & reduced fuel load, reduced wildfire size and severity.²
- **The amount of carbon in a forest increases over time through forest restoration, particularly in larger, more fire-resistant trees.**
- By moderating fire size and severity while decreasing overall risk, restoration reduces tree mortality during wildfires, thus preserving more of the forest, increasing long-term forest carbon, and partially diverting a vegetation change from forest to shrublands, which hold less carbon.³
- A restored forest holds additional carbon in nearby untreated areas through fuel limitation, referred to as the "treatment shadow effect."⁴
- A thinned forest may grow at an enhanced rate compared to an untreated forest due to reduced competition for water, nutrients, and light. This can lead to financial returns for timber-managed forests and other ecosystem service benefits.⁵
- **Thinned forests in the Sierra Nevada are projected to have up to 42% lower emissions and store up to 0.6 additional tonnes of carbon per acre by 2100.⁶**



The carbon storage benefits of forest management vary by region and forest.

Reach out to learn about the benefits of a specific forest at connect@blueforest.org