

Our Burning Challenge: RESTORE OUR FORESTS



Fire sweeps through a ponderosa pine forest during Arizona's Hochderffer Fire of 1996. © Allen Farnsworth/BLM/USFS

Fire is Burning the West

Our communities and forests are in peril. Hot-burning fires fueled by a warming planet are devastating our air and water quality and charring dry pine forests across the West. By late summer 2021, more than 95 percent of the West was in drought and 4 million acres across 12 western states had burned, consuming homes, ruining habitat for wildlife, and in some tragic cases, destroying lives and communities.

Western pine forests are overgrown due to a century of fire suppression and an exceptionally intense period of hot drought. As a result, these forests – and the communities in and near them – have become increasingly vulnerable to catastrophic fire. The combination of a warming climate and overly dense trees is so severe that once burned, these forests may not soon recover.

There is a solution: Restoring our forests

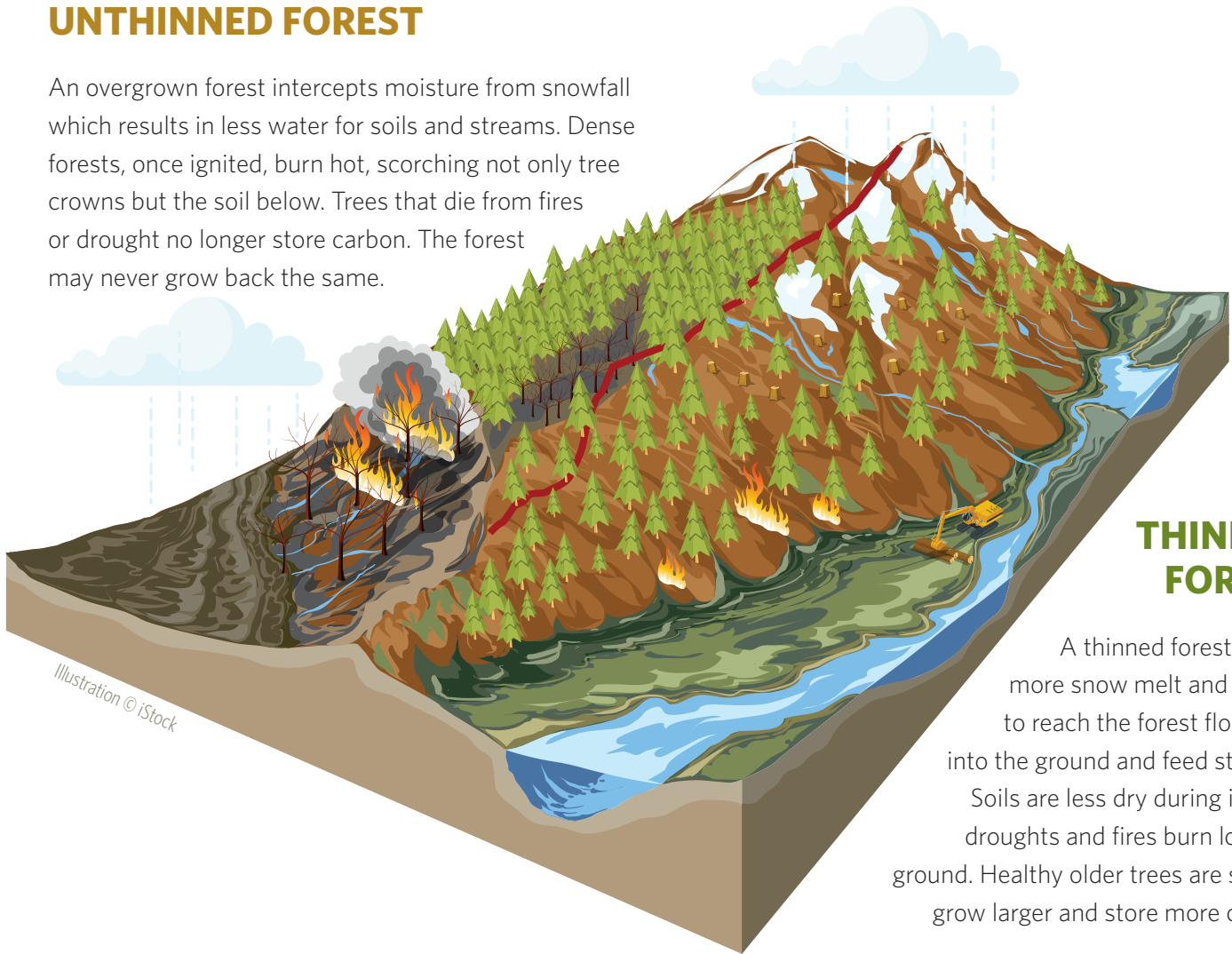
To prevent this scenario, we need to thin and restore our forests so that frequent, low-level fires can return and

help keep our forests resilient, healthy and safe. Every day we delay action, another piece of forest and the many benefits they provide is lost.

The Nature Conservancy is working with forest professionals across the West to map out how to achieve cost-effective restoration at a scale large enough to make a difference. In Arizona, the Conservancy is working with the U.S. Forest Service on its Four Forest Restoration Initiative, which aims to restore 2.4 million acres of ponderosa pine forest.

UNTHINNED FOREST

An overgrown forest intercepts moisture from snowfall which results in less water for soils and streams. Dense forests, once ignited, burn hot, scorching not only tree crowns but the soil below. Trees that die from fires or drought no longer store carbon. The forest may never grow back the same.



THINNED FOREST

A thinned forest allows more snow melt and rainfall to reach the forest floor, sink into the ground and feed streams. Soils are less dry during intense droughts and fires burn lower to ground. Healthy older trees are spared, grow larger and store more carbon.



Map Western Frequent-Fire Forests

- Overly-dense forests at risk of severe fire: 57 million acres (80%)
- Forests at less risk: 14 million acres (20%)

INSET: Arizona's Restoration Initiative

The Four Forest Restoration Initiative (4FRI) is a collaborative effort to restore Arizona's ponderosa pine forest on portions of the Coconino, Kaibab, Apache-Sitgreaves and Tonto national forests. The goals: Restore natural fire regimes, assist native plant and animal populations, and reduce destructive wildfire. 4FRI does not include state, tribal or private lands.

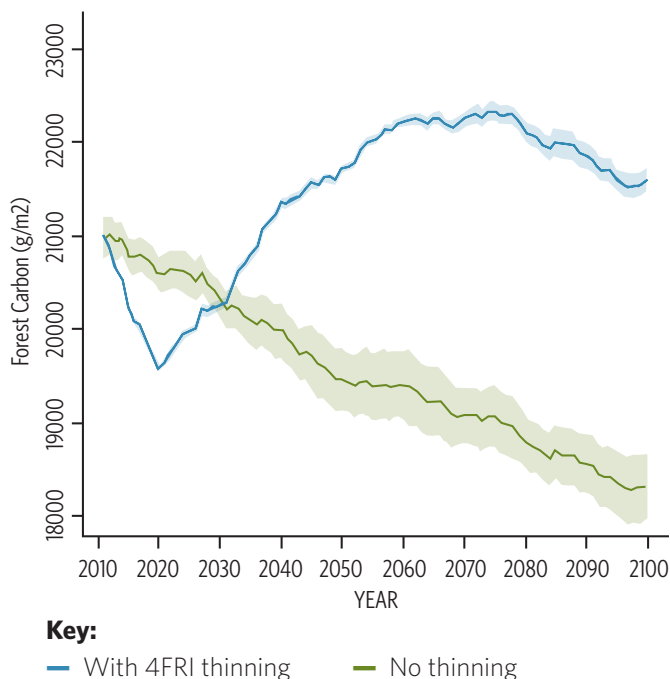
Forest Thinning is a Natural Solution

Strategic mechanical thinning and prescribed fire offer many benefits to people and nature by making forests more resilient in the face of climate change. Opening up the forests allows more water to filter into the soil that feeds streams, creating more and cleaner water. In a warming climate, thinning reduces competition for water, allowing trees to grow faster, store more carbon and be more resilient to drought and pests.

Benefits to Communities

Scientific and professional firefighting evidence shows that where thinning is completed before wildfires, fire severity is reduced, and in some cases, damage to communities is averted. Arizona's Wallow Fire of 2011, the largest and most severe fire in the state's history, burned more than half a million acres in eastern Arizona's White Mountains, including forests surrounding the small town of Alpine. The town itself, however, was spared thanks to forest thinning done before the Wallow Fire as part of the White Mountain Stewardship Project.

Chart 1. Forest Carbon



4FRI THINNING BENEFITS



15% increase in carbon



20% increase in stream flow



30% increase in tree growth

25% reduction in tree mortality



Benefits to Climate

In addition to protecting homes and communities, restoration thinning provides climate benefits. Research published by Nature Conservancy scientists in Arizona shows large-scale thinning prescribed as part of 4FRI would significantly increase tree growth and stabilize carbon over the long term. Initially, when the trees are cut, carbon is lost, but after several years, when remaining trees have less competition for water and sun, those trees will grow and store more carbon. Storing carbon in trees is a good way to prevent greenhouse gases from further heating the atmosphere.

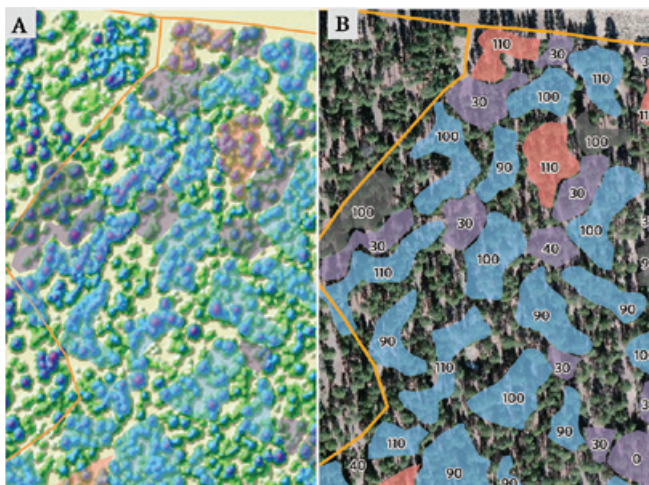
While 30 percent of carbon gain is from increased tree growth, an additional 70 percent comes from reduced wildfire emissions. The quicker the thinning is done, the greater the amount of carbon stored. In the case of the fastest restoration scenario – which means completed thinning in the Coconino and Kaibab national forests in a decade – the amount of **carbon stored would equal that of removing 110,000 vehicles from the road every year**, up until the year 2100, say the authors.

Achieving Cost-Effective Restoration

The benefits of restoration are immense, but thinning on a large-scale is a huge and costly undertaking. The Nature Conservancy, as part of its Future Forest Project, has identified new practices and technologies that reduce thinning costs and could potentially attract industry to invest in Arizona. The technology platform streamlines the process of removing small-diameter trees and the remaining biomass. Both have low value, which creates challenges for private contractors to profitably develop and sustain business.

This new technology platform allows the Forest Service to replace the labor- and resource-intensive paint-marking method with a more efficient Designation by Prescription process. With this process, the Forest Service provides digital instructions to the wood harvesters, who use designated parameters to decide which trees to remove to create the desired conditions in the contract.

Over time, the use of these technologies could result in significant cost savings — up to a four-fold decrease in time spent on site preparation and harvesting.



Remote sensing data is used (left panel) to provide wood harvesters with digital instructions about where to leave trees in groups and where to create openings (right panel). Computer tablets with this technology are mounted in the cabs of tree harvesters.



A thinned forest in the White Mountains © Tana Kappel/TNC

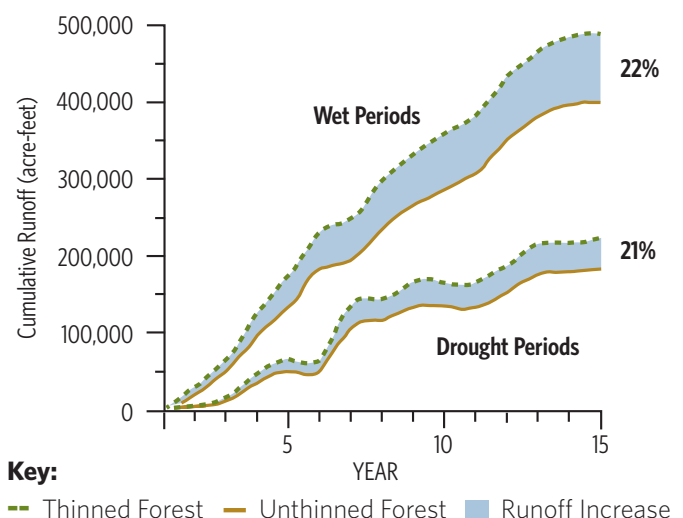
Water Benefits

Thinning, according to Nature Conservancy research, also benefits our headwater streams. That's because more snowmelt soaks into the ground instead of evaporating on the tree canopy.

Much of the water flowing in our forests, aquifers and streams is provided by melting snow in the high country. Overgrown forests use more water than healthy forests because excess trees act like straws all competing with each other for limited water.

Thinning reduces competition for water. Conservancy research found that where forests are thinned, more water, potentially up to 20 percent more, is available to replenish aquifers and seep into streams in the upper watersheds. This additional runoff may help offset reduced stream flow due to drought and warming, and reduce the impacts to native fish and other water-dependent natural resources.

Chart 2. Water Gains From Thinning





Nature Conservancy thinning project at Parks West in the Kaibab National Forest west of Flagstaff. © Roses Lockwood

Addressing The Challenges

The scale of the challenges across our western forests is daunting. Yet we have strategies that, if implemented rapidly and efficiently across the region, could improve forest and watershed resilience even under warmer and drier conditions. Thinning projects are the start of a recovery process, not the end point. They will allow managers to hit the reset button on forest resilience, and are likely to have multiple benefits, not just for climate and water, but to reduce severe fire risk and improve wildlife habitat.

If we substantially increase public and private investments in forest restoration, then we can envision a future where forests act as a natural climate solution that stabilize carbon for future generations and reduce harmful wildfire emissions that currently plague the West.

Contact your community leaders and legislators and tell them to support forest restoration across western forests.

For more information

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