

Increasing Pace & Scale of Wood Utilization

From the Eastern Central Sierra and Western Nevada

Executive Summary



LIVING
FORESTS

Key Findings

- There are no simple answers for the crisis in western forests
- More precise calculations at every stage will help create adaptive protocols for rising temperature and prolonged drought
- Administrative boundary issues are impeding progress
- Implementing nature-based solutions will require joint partnerships at all levels from local to federal
- Stimulate forest management by partnering with the private sector and providing incentives
- There should be an emphasis on local projects to build regional forest project economies and decrease emissions by minimizing shipping

Forests are in crisis in California and Nevada.

A century of fire suppression and extensive logging has created forests that carry high fuel loads, are more damaged by fire, have less biodiversity, and are less resilient to climate change than they were under a pre-European contact (natural) fire regime. Although these forests evolved with and are adapted to fire, fires are now behaving in ways never seen before. Since 1900, only six fires have burned more than 200,000 acres in the Sierra Nevada. All of those fires occurred in the past 10 years—and four of them in 2020 and 2021. In 2021, the Dixie Fire became the largest single wildfire in state history, burning nearly 1 million acres.¹ The first two wildfires to cross the crest of the Sierra Nevada in recorded history (Dixie and Caldor) occurred in 2021.

Ecologists know how to treat forests to reduce wildfires, improve ecosystem health, and mitigate climate change.

Goals of science-based forest management practices include modifying fire behavior, improving wildlife habitat, and restoring the natural regime of low intensity frequent fires that are necessary for ecological processes. These forest management practices have the added benefit of reversing the massive contribution wildfires make to greenhouse gases, turning forests into factories for sequestering carbon instead. As temperatures continue to increase and droughts get longer and deeper, the urgency of accomplishing this work increases. Improved management and restoration of forests and other ecosystems reduce greenhouse gas emissions and increase carbon storage, with the potential to offset one-fifth of the net annual emissions in the United States.²

¹ Another Historic Sierra Nevada Fire Season. Sierra Nevada Conservancy. January 2022.

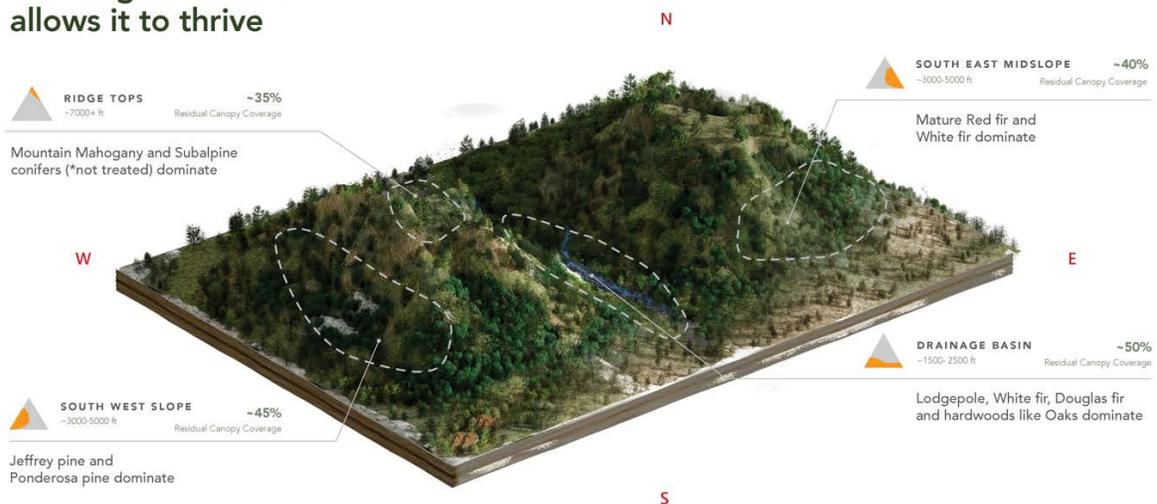
² Fargione, J.E., et al. 2018. Natural climate solutions for the United States. *Sci. Adv.* Eaat 1869, 14 pp

Fresh approaches are needed to address the forest crisis effectively and comprehensively.

New innovative solutions are required to address the forest crisis effectively. Finding better uses for the wood and woody biomass generated by forest management projects in the Eastern Sierra and Western Nevada is needed to maximize overall reduction of life-cycle carbon emissions, and to realize more economic value from timber removed to reduce the risk of catastrophic wildfires. Without sufficient economic demand for the wood removed during forest thinning operations, and without adequate logistical support to remove it, hundreds of thousands of burn piles are left behind, as blankets of wood chips are left on the forest floor. Ecological forest management practices can change fire behavior by removing ladder fuels and encouraging some biomass to decompose more quickly.

AFTER TREATMENT

Thinning the forest allows it to thrive



* REGIONAL DOMINANCE ALLIANCES, PERCENT COVER AREAS, RESIDUAL BASAL AREA, AND RESIDUAL CANOPY COVER MODIFIED FROM SAGEHEN FOREST PROJECT PRESCRIPTIONS BASED ON THE ADVICE OF MALCOLM NORTH, 2/18/2019 AND 5/24/19*

However, thinning alone without wood utilization does not modify fire risk or mitigate climate change to the extent possible with other solutions. Wood utilization helps defray the cost of forest management by engaging the profit motive of the private sector and promotes sequestering carbon in wood products.

This study evaluates emerging wood technologies and growing markets for wood products. An array of options were assessed, which can be broadly classified as **“Build, Burn, or Bury.”** *Burn* represents converting biomass to energy in various forms, ranging from firewood to small or large-scale biomass energy facilities; *Build* represents storing biomass in durable materials, commercial lumber and other primary building products,

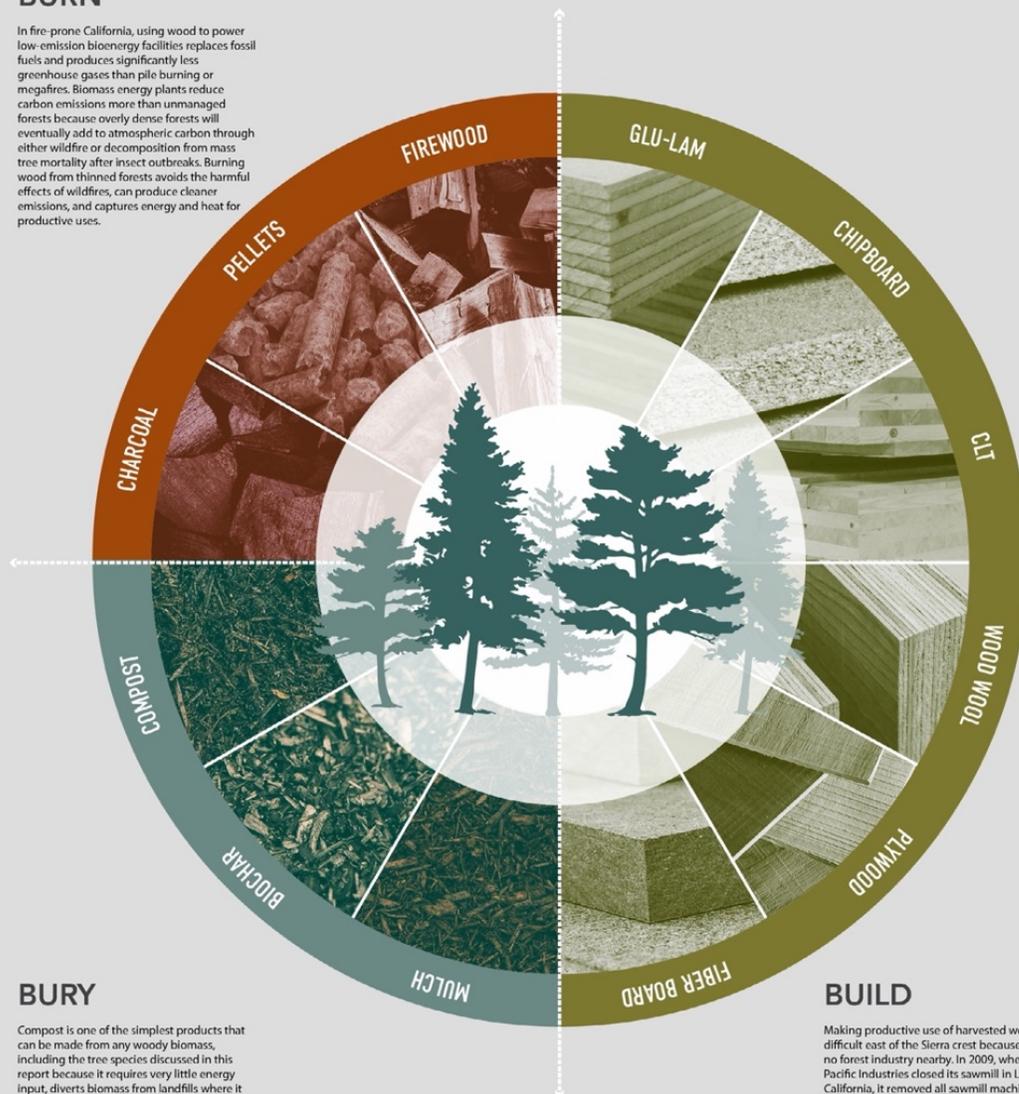
including community-scale mills and production of engineered wood. Finally, *Bury* represents returning biomass to the soil in various forms including compost, ground covers and biochar. The study evaluates each of the options through lenses of carbon sequestration potential, economic cost and benefit, scale, and feasibility.

Creating a full circle wood economy

The many products coming from ecologically managed forests

BURN

In fire-prone California, using wood to power low-emission bioenergy facilities replaces fossil fuels and produces significantly less greenhouse gases than pile burning or megafires. Biomass energy plants reduce carbon emissions more than unmanaged forests because overly dense forests will eventually add to atmospheric carbon through either wildfire or decomposition from mass tree mortality after insect outbreaks. Burning wood from thinned forests avoids the harmful effects of wildfires, can produce cleaner emissions, and captures energy and heat for productive uses.

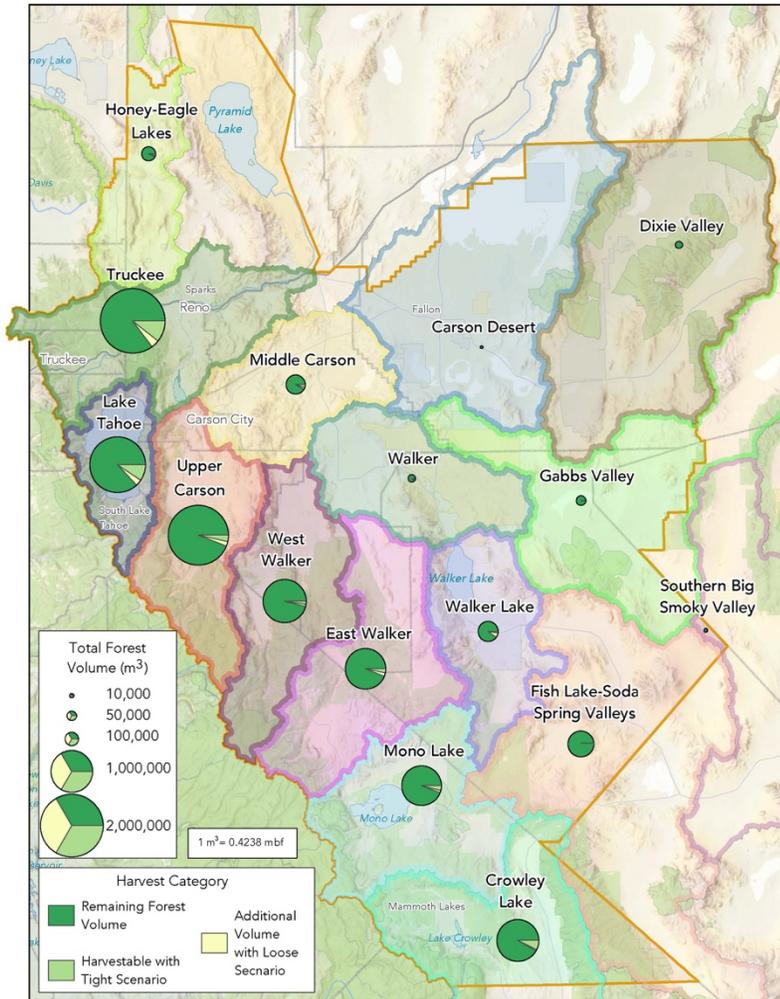


BURY

Compost is one of the simplest products that can be made from any woody biomass, including the tree species discussed in this report because it requires very little energy input, diverts biomass from landfills where it generates significant amounts of methane, improves soil productivity, and helps to mitigate effects of climate change. Large-scale diversion of organic waste can only be achieved if decision makers adopt consistent regulations, incentives, and policies across jurisdictional boundaries.

BUILD

Making productive use of harvested wood is difficult east of the Sierra crest because there is no forest industry nearby. In 2009, when Sierra Pacific Industries closed its sawmill in Loyalton, California, it removed all sawmill machinery and left only a biomass power plant (see Appendix D for Loyalton Case Study). More distributed solutions for utilizing small diameter wood as building material need to be pursued urgently in order to create a more viable economy for ecological forest management.



The entire study area is nearly 18,343 square miles, of which the vast majority (<80%) is federal land, mostly Bureau of Land Management and U.S. Forest Service, but also Army Corps of Engineers, Department of Defense, and U.S. Fish and Wildlife Service. A significant portion of the study area was eliminated to focus on forested areas, which resulted in a total area of about 624 square miles (over 400,000 acres).

Wood Utilization Outlook

It is clear that there are no simple answers to solving the forest crisis in the Sierra Nevada and western Nevada. Many people have worked very hard to find ways to increase the scale of treatment programs as an essential part of resilient forest management. Trends in temperature and drought increase the urgency for getting this work done. More creative thinking is required.

A more favorable picture of the potential for forest industry east of the Sierra crest could emerge with more precise calculations. More timber could be removed from the forest if prescriptions are adjusted to anticipate the impacts of rising temperatures and increasing drought on the amount of forest biomass that can be sustained in a healthy condition. Estimates in this study of chips generated are likely understated because they do not include the fact that 50% of the wood used for sawtimber would generate chips as well. We also may want to consider management by watershed with fewer carve outs for protected areas, therefore increasing the percentage of forest accessed. This would

set limits based on the desired result or condition instead of a fixed number of feet, percent slope, or dates of the season for forest activities.

Some potential for improved forest management is being missed by administrative boundaries. Both state and federal forest management end at the state boundary which can miss forests that cross state lines. In California, the Sierra crest can be another barrier, as there is greater focus west of the Sierra crest because the forests and water supplies are more lucrative. In addition, the facilities for processing timber are located closer to the wood source, which means that the costs of transporting logs from the east slope to a mill is prohibitive.

Nature-based solutions often involve multiple actions taking place over broad landscapes, crossing jurisdictional boundaries. To be successful, governance of nature-based solutions requires joint decision-making across different local, regional, or even national governments and among multiple sectors such as agriculture, forestry, and environment, finance, development, and transport.³

Governments should consider additional ways to stimulate forest management. Other studies have considered costs that could be avoided with better forest management



such as decreased property damage, improved water quality, and lower insurance payments. One way to increase pace and scale is to subsidize forest management costs to communicate to the private sector a more accurate signal of the value of removing more wood. Another idea is to provide incentives to use locally grown and produced wood products. One way to do this is to label wood products with emission savings per unit of carbon. This might increase demand for locally sourced utility poles and solid wood doors. More highly processed wood products such as engineered wood floors and Oriented Strand Board would not compare as well. Including information about the emissions associated with transporting wood products would also make locally produced products more attractive.

³ Seddon, op. cit.

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The Center for the Study of the Force Majeure, based at the University of California, Santa Cruz, brings together artists, scientists, ecologists, planners, and visionaries to design mitigation systems and policies that respond to the issues raised by global temperature rise at the scale that they present.