

Wildfire has been an integral part of Pacific Northwest (PNW) forests for millennia, but in recent decades conflicts between people and fire have increased dramatically, largely due to climate change. As the planet continues to heat up, PNW communities must learn to adapt to a changing climate while simultaneously working to draw down excess carbon levels in the atmosphere.

Scientists have found that the most effective strategy to remove carbon at a scale that can meaningfully contribute to climate stability is to better preserve the world's forests. In fact, the forests of western Oregon, western Washington and northern California store more carbon per acre than almost any other landscape on earth. If protected from industrial logging, these forests can help slow down climate change while simultaneously buffering nearby communities and imperiled ecosystems from the impacts of a warming planet.

Below are the top 5 KEY TAKE-AWAYS from the latest science about how PNW forests, wildfire, and climate change interact. The final page includes the top 4 SOLUTIONS to help slow down climate change and make communities and ecosystems more resilient to the changes ahead.

KEY TAKE-AWAYS

[1] Annual wildfire acreage has been increasing in recent decades largely due to climate change, but forests today still burn far less than in they did prior to the mid-20th century.¹

- Climate change is causing hotter, drier conditions in many western forests, which is driving an increase in wildfire activity.²
- Since wildfire is primarily driven by weather conditions (i.e. drought, wind),³ we can expect more wildfire as the planet continues to heat up.⁴
- Climate trends from the 20th century provide us with numerous examples of how wildfires are driven by weather (see FIGURE 1).

Top Photo: The Thomas Fire of southern California, December 2017 (courtesy of Trip Jennings, Balance Media).

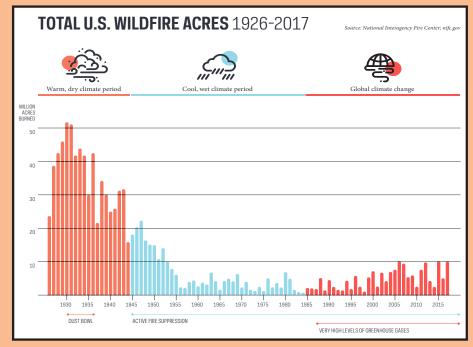


FIGURE 1 From the 1900s through the 1930s, the West experienced drought, which led to wildfires covering tens of millions of acres. Then a cool, wet climate period spanning from the 1940s to the 1980s ensued, which led to far less fire on the landscape. In recent decades, climate change has caused hotter, drier conditions, contributing to a sharp increase in fire activity throughout the West.

^{1.} Parks, SA, et al. 2015, Wildland fire deficit and surplus in the western United States, 1984-2012. URL: https://esa ournals.onlinelibrary.wiley.com/doi/full/10.1890/ES15-00294.1
Bradley, C, et al. 2016. Does increased forest protection correspond to higher fire severity in fequent-fire forests of the western United States? URL: https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.1492
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2. Abatzoglou, JT, et al. 2016. Impact of anthropogenic climate change on wildfire across western US forests. URL: https://www.ncbi.nlm.nih.gov/pubmed/27791033
3. Keyser, A, et al. 2017. Climate drives inter-annual variability in probability of high severity fire occurrence in the western United States. URL: https://lopscience.iop.org/article/10.1088/1748-9326/aa6b10/meta
4. Murphy, BP, et al. 2018. Beyond the 1984 perspective: narrow focus on modern wildfire trends underestimates future risks to water security. URL: https://jopscience.iop.org/article/10.1088/1748-9326/aa6b10/meta

[2] Fire is a natural and restorative force in Pacific Northwest (PNW) forests.

- Almost every forest in the PNW has burned at some point, but over the past century forests have been deprived of the fires they need to thrive.
- Fire actually helps rejuvenate forests by creating a diversity of forest structures like standing dead trees (snags) and sunny openings, which provide unique habitat for plants and wildlife. In fact, many native plants and animals depend on the unique forest habitat that fires create.5
- The native peoples of the PNW learned over thousands of years to work with, not against, wildfire. These days, tribal nations such as the Warm Springs Tribe, the Yurok Tribe, and the Umatilla Tribe are not able to manage their lands using fire because of government restrictions on cultural burning practices.⁶

FIGURE 2 The forests of the West are vast, and it's impossible to predict where fires will burn next. Researchers have found that less than 1% of thinned areas actually encounter wildfire each year, which means that the vast majority of thinning treatments are ineffective at influencing fire behavior.

[3] Thinning forests in the backcountry does not protect communities from fire, and emits more carbon than fire itself.

- Thinning or "fuels reduction" projects are often proposed to reduce fire risks, yet the best available science suggests that thinning forests far away from communities does not protect people or property from wildfire.
- The probability that any given "thinned" area will even encounter a wildland fire is very small, primarily because our forests are vast and we cannot predict where fire will burn next (see FIGURE 2).7
- What is advertised as "thinning" often involves the commercial logging of medium to large trees, which degrades wildlife habitat and releases significant amounts of carbon. In fact, most commercial thinning projects emit far more carbon than wildfires of the same size.8
- Research shows that thinning is most effective at protecting people and property when it's done directly adjacent to communities (especially within 60-100 feet of structures), not in remote backcountry areas far away from communities (see Solution #1).9

THINNING THE FOREST TO INFLUENCE FIRE BEHAVIOR IS A SHOT IN THE DARK



^{5.} Swanson, ME, 2012. Early Seral Forest in the Pacific Northwest: A Literature Review and Synthesis of Current Science. URL: ncfp.files.wordpress.com/2012/06/swanson_20120111.pdf
6. Boyd, R. 2019. Indian Use of Fire in Early Oregon. The Oregon Encyclopedia. URL: https://oregonencyclopedia.org/articles/anthropogenic_fire/#.XN8VKxNKgWo
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Campbell, JL, et al. 2011. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? URL: forestpolicypubs.com/wp-content/uploads/2011/12/campbell-2011.pdf
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[4] PNW forests can help us fight climate change by capturing and storing vast amounts of carbon, but only if protected from industrial logging.

- Forests are among the largest stores of living carbon on the planet. In fact, the sprawling forestlands that blanket Washington, Oregon, and northern California are globally significant for their ability to capture vast amounts of carbon from the atmosphere and keep it stored for decades or even centuries. 10
- Unfortunately, extensive logging in these forests over he past century has transferred massive amounts of forest-carbon to the atmosphere, creating a "carbon" debt." We can begin to repay this debt by protecting our public forests and by improving our logging practices on state and private lands (see FIGURE 3).11
- Climate-smart logging practices such as letting trees grow longer before logging and leaving more trees behind after logging – can increase the amount of carbon stored in our forests (see Solution #4).12
- Despite their impressive smoke plumes, scientists have found that wildfires only emit about 5-10% of the carbon contained in the forest. Logging, on the other hand, emits the majority of a forest's stored carbon, and only a fraction of the carbon originally stored in a forest ends up in wood products. 13

[5] Protected, intact forests provide a wide range of other benefits, and help buffer communities against the impacts of climate change.

- Scientists have found that clearcuts and tree plantations increase flooding and landslides in wet months and decrease stream flows in dry months. Older forests, on the other hand, are much better at storing, filtering, and gradually releasing clean water throughout the year. 14
- Dozens of communities across the PNW have protected their watersheds from industrial logging vet many rural communities are still at risk to having those water supplies polluted and diminished by industrial logging. Protecting forested watersheds will only continue to become more important as climate change causes more precipitation to fall as rain instead of snow.
- Researchers have also found that industrial logging practices make forests more prone to uncharacteristically severe wildfire, which poses risks to nearby communities.15

THE CARBON DEBT CREATED BY INDUSTRIAL FORESTRY nature's baseline Net transfer CARBON 323 tons of carbon 100 113 tons of carbon O=1 ton of carbon NATIVE OLD-GROWTH FOREST INDUSTRIAL TIMBERLAND Average carbon stored in old-growth Average carbon stored in timber plantations forests of western Oregon and clearcuts in Oregon Coast Range Sources: - Seidl et al. 2012. Multi-scale Drivers of Spatial Variation in Old-Growth Forest Carbon Density Disentangled with Lidar and an Individual-Based Landscape Model - Keith et al. 2009. Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests U.S. Forest Service, Bansal et al. 2017. Oregon's forest resources, 2001–2010: ten-year Forest Inventory and Analysis report Photos by Francis Eatherington and Charles Reneau (courtesy of Oregon Wild)

FIGURE 3 Before the arrival of western settlers, old-growth forests used to blanket the Pacific Northwest, but today less than 10% remain. Many of these forests were clearcut and converted into tree plantations, which store about a third as much carbon as old-growth forests ("nature's baseline"). This conversion transferred massive amounts of carbon from the forest to the atmosphere, creating a carbon debt that we can begin to repay by adopting climate-smart logging practices (see Solution #4).

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SOLUTIONS - WHAT WE CAN DO

For over a century, our forest policies have been largely focused on timber production, which has resulted in wide-spread forest degradation, significant carbon emissions, and a deficit of fire on the landscape. 21st century challenges such as global climate change, increasing human populations, and declining biodiversity demand 21st century solutions.

Below are the top 4 FOREST SOLUTIONS that can slow down climate change while simultaneously helping us adapt to its impacts:

Solution #1 Bolster community resilience to wildfires by retrofitting homes to be more fire-proof and educating communities to be more fire-wise.

- The best ways to do this are by:
 - working with landowners to install fire-resistant roofing and ember-proof vents;
 - regularly thinning small trees and shrubs within 100 feet of structures;
 - preventing human-caused fires during fire season;
 - limiting new development in fire-prone areas.
- Building public smoke shelters and working with homeowners and renters to install advanced air filtration systems can make our communities more resilient to the inevitable impacts of smoke.

Solution #2 Learn to work with, not against, fire to reap its social and ecological benefits.

- Instead of aggressively suppressing all fires on the landscape, land managers can save money and restore forests by allowing fires to burn in remote backcountry areas that don't pose risks to communities. By concentrating firefighting efforts on fires burning near homes and communities, we can protect property and people from wildfire risks.
- We should also support land managers and Native American tribes to use prescribed burns in ecologically appropriate settings. This practice can lower fire risks to nearby communities, restore cultural resources, and rejuvenate landscapes degraded by decades of industrial logging and fire suppression.

Solution #3 Reform the management of our national and state forestlands to prioritize climate change adaptation and carbon storage.

- By requiring an honest carbon accounting for all management decisions for our public forestlands, we can avoid actions that exacerbate climate change and incentivize actions that help store more carbon on the landscape.
- Where appropriate, certain public forestlands should be removed from the logging base to maximize their potential for carbon storage, water quantity and quality, recreation opportunities, and wildlife habitat. Protecting forested watersheds is particularly important because it makes nearby communities more resilient to flooding, drought, and wildfire.

Solution #4 Modernize our weak logging laws on state and private lands to include climate-smart practices.

- Here are four climate-smart logging practices that reduce forest degradation and help our forests store more carbon:
 - 1) Extend no-cut buffers around rivers, streams, and other water-ways.
 - 2) Ban clearcut logging especially in drinking watersheds and require more trees to be left on the landscape after logging.
 - 3) Let trees grow for longer before logging (e.g. every 60-80 years instead of 35-45 years).
 - 4) Increase biodiversity by limiting pesticide and herbicide use and encouraging diverse tree and plant life.