

This one fact will completely change how you think about California wildfires

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The rash of mega-fires in recent years has stunned Californians. But one astonishing fact stands out amid the devastation: Even more of the California landscape used to be on fire.

By [Claire Hao](#) | Oct. 15, 2022



The Karuk Tribe organized a prescribed burn in the Happy Camp area of Siskiyou County this week. Gabrielle Lurie / The Chronicle

In recent years, [California's wildfires](#) have seemed [ever more apocalyptic](#). Huge swaths of forest have been wiped out, forcing thousands to flee and choking many more with smoke.

But here's a fact that may seem surprising: Even more of the California landscape used to be on fire. Before the 1800s, when Europeans flooding into California outlawed fires set by Native Americans, at least 4.5 million acres — and sometimes up to 12 million acres — burned in California every year, [according to UC Berkeley researchers](#).

That figure has only one modern equivalent: 2020. That year, California wildfires [burned](#) over 4.3 million acres — more than [double](#) the state's previous record. One astonishing day in September, the sun never rose in the Bay Area's skies, which instead [glowed](#) an eerie orange from smoke.

"2020 really shocked me because it was the first year ever that we actually approached 4 million acres; in fact, we reached it," said UC Berkeley forest ecology expert Scott Stephens, the study's author.

Before European colonizers arrived, the land experienced many small, frequent fires, mostly in the fall and sometimes through the spring and summer. These low-intensity fires were beneficial for the landscape because they cleaned out underbrush — which otherwise serves as fuel for larger fires — and helped native species regenerate. Anywhere from 4.5% to 12% of California was on fire every year from a mix of lightning fire and [fires](#) set by Indigenous peoples, according to Stephens' study.

Today there are fewer individual fires, but each one is more likely to be destructive. Fires before the 1800s killed about 10% of trees, with 90% surviving; those numbers flipped in, for example, the 960,000-acre Dixie Fire of 2021, according to Stephens.



Firefighters work on a back burn in Calistoga in 2020 in an attempt to keep the Glass Fire off of Highway 29. That year, wildfires burned 4.3 million acres across California, the most in recent memory. Santiago Mejia / The Chronicle

“That is devastating, because how do (the trees) regenerate? Where are the seeds coming from? How do you get a forest back?” Stephens said.

For thousands of years, Indigenous peoples have tended the land with fire. The Amah Mutsun Tribal Band, whose traditional land ranged from San Mateo County to Monterey County, uses fire in ceremonies and prayer and to enhance natural resources needed for food, medicine, clothing and craft-making, Tribal Chairman Valentin Lopez said.

“We did not look at fire as anything negative or harmful or anything else. We saw it as a way to cleanse and purify landscapes,” Lopez said.

Europeans first arriving in California found a landscape on fire and an aircscape filled with smoke. When a U.S. government official visited the Northern California forests in 1898, he wrote: “Of the hundreds of persons who visit the Pacific slope in California every summer to see the mountains, few see more than the immediate foreground and a haze of smoke which even the strongest glass is unable to penetrate.”

Cultural burning requires deep familiarity with the land, said Ron Goode, chairman of the North Fork Mono tribe along the western edge of the Sierra Nevada National Forest. It entails understanding fire behavior, how specific plants respond to fire, how weather conditions factor in and the needs of particular ecosystems.



Jess McLaughlin of the Karuk Tribe ignites flames on Wednesday during a prescribed burn in Siskiyou County. The goal of the burn is to share knowledge about prescribed fire with other groups in addition to reducing wildfire risk and revitalizing the landscape. Gabrielle Lurie / The Chronicle

“We’ve never had a fire get away from us ... but it’s all in how you prep the land, how you prep for your fire. We don’t have fire trucks, we have buckets. So you have to learn how to burn correctly, and you only burn what you need to be burning,” Goode said.

European colonizers, blind to the sophistication behind Indigenous burning practices, viewed fire as a danger to settlements and profitable lumber. State agencies sought to prevent all fires and extinguish them as soon as they occurred, a forest management policy known as fire suppression.

Fire suppression in the American West

1793

José Joaquín de Arrillaga, the Spanish governor of California, prohibits all burning and calls for using “the most severe punishment” to enforce this policy.

1850

The first meeting of the California Legislature outlaws intentionally setting large fires, as part of a horrifically racist act directed against Native Americans.

1905

The U.S. Forest Service is established with a policy of fire suppression.

1910

The “Great Idaho Fire” kills at least 85 people, including 78 firefighters, and burns more than 3 million acres of land.

1911

Influenced by the fire season of 1910, President William Taft signs into law the Weeks Act of 1911, in part providing cooperation for firefighting between federal, state and private actors.

1933

Federal government creates the Civilian Conservation Corps, recruiting thousands to fight fire.

1935

U.S. Forest Service establishes “10 a.m. policy,” which directed that all fires be suppressed by 10 a.m. the next day.

1944

U.S. Forest Service creates the Smokey Bear mascot to promote its fire prevention message.

1963

UC Berkeley Professor A. Starker Leopold suggests the use of prescribed fire to the U.S. Secretary of the Interior.

1968

U.S. National Park Service begins to allow lightning fires to burn within special fire management zones.

1970

U.S. Forest Service allows some lightning fires to burn on its lands, abandons 10 a.m. policy and encourages more prescribed fires.

1989

Federal government places tighter limits on “let it burn” policies after massive wildfires through Yellowstone National Park.

2022

A new California law reducing liability risk for prescribed burns and cultural burns takes effect in January.

Sources: Salmon and Acorns Feed Our People, by Kari Marie Norgaard; Forest History Society; University of California: “The History and Evolution of Wildland Fire Use,” by Jan W. van Wagtenonk; “A Note from the Fireline,” by Jordan Thomas

Part and parcel of fire suppression was state-sanctioned violence against California’s Indigenous peoples. In 1850, the first meeting of the California legislature outlawed intentionally setting fires as part of a larger act that allowed white settlers to enslave California Indigenous peoples, remove them from their traditional lands and separate children from families.

Some “renegade whites” and Indigenous people set fires out of “‘pure cussedness’ in the pure cussedness class the only sure way is to kill them off, every time you catch one sneaking around in the brush like a coyote shoot at them,” a U.S. Forest Service ranger wrote in a letter to his supervisor in 1918, according to a letter posted on the Karuk Tribe website.

The problem with fire suppression is that California forests have adapted to frequent surface fires, meaning fires that burn along the forest floor. Unlike the large, severe fires we see today, surface fires don’t send flames shooting hundreds of feet off the ground or kill healthy trees.

Instead, surface fires clear the forest floor of decomposing matter and kill pests and disease-ridden trees. Some plants, such as the lodgepole pine, require the heat that fire brings for their cones to unseal and release seeds.

Small, frequent fires also clear out smaller trees, shrubs and branches. This helps to filter in more sunlight, lessen competition for nutrients and reduce the buildup of fuel that can feed larger, more destructive fires.



Members of the Karuk tribe including Ka-nuk Jones, 27 (center), Crispin McAllister (second from right) and Marcos Fernández listen during a briefing ahead of a prescribed burn in Happy Camp (Siskiyou County) on Wednesday. Gabrielle Lurie / The Chronicle

“This landscape used to be a mosaic of frequent fire, and there was very little fuel on the landscape at all. Fires were bumping into other fires and going out throughout the year, even in the middle of summer,” said Will Harling, executive director of the Mid-Klamath Watershed Council.

Big trees dominated the open forests in the late 1800s and early 1900s, according to UC Berkeley adjunct Professor Brandon Collins, an expert in forest science. But as the fire suppression continued, more trees grew to fill in the gaps, a welcome development for early foresters, for whom more trees meant more lumber.

The ecological result today, according to Collins: The forests have lots of overgrown shrubs and branches. The tops of small trees touch medium trees, and the tops of medium trees touch large trees.

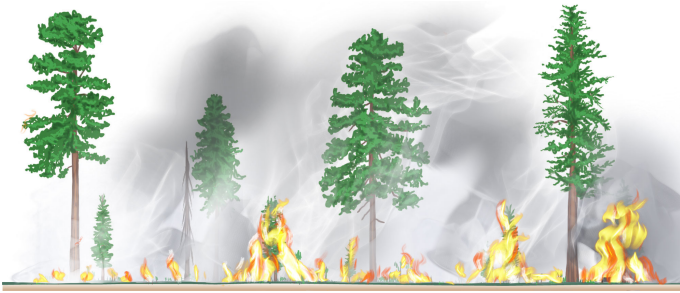
In other words, forests are perfect for fire to travel from tree to tree and spread in the out-of-control way we see today.

How fire suppression changed our forests

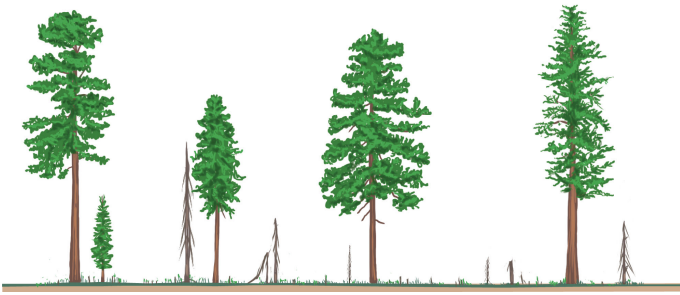
Pre-1800s: Forests that experienced regular fire



(1) Historic forests had lots of open space and were dominated by large trees such as ponderosa and sugar pine. If you looked at the forest from above, about 20-25% of that view would be occupied by trees; this is known as canopy cover.



(2) Historic forests burned an estimated 4 to 10 times per century from a combination of lightning fires and fires set intentionally by indigenous peoples. These small fires mostly stayed on the forest floor because of the openness of the forest.



(3) Fire cleared out dead undergrowth and got rid of pests and disease-ridden trees, among other ecological benefits. The cyclical nature of fire in historic forests kept them open and healthy.

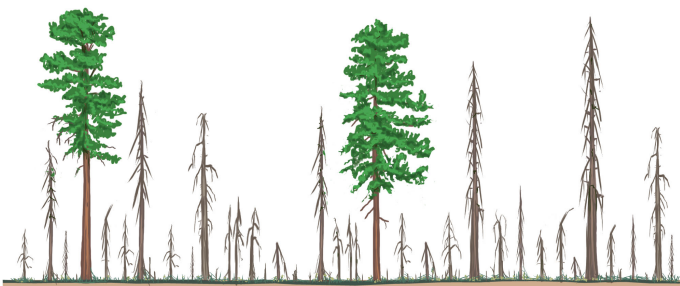
Modern-day: Forests in the age of fire suppression



(1) After more than a century without fire, forests have become 5 to 10 times denser, with canopy cover now at 60-80%. There are many more small- and medium-sized trees, shrubs and organic material on the forest floor.



(2) Wildfires burn hotter in these forests in large part because of the buildup of fuel after more than a century of fire suppression. Fire also travels more easily up smaller trees to larger trees, resulting in more intense fires that are difficult for firefighters to put out.



(3) Severe wildfires can make it difficult for forests to regenerate. Seedlings of native species may not be able to grow in the soil that remains after vegetation burns, especially with fewer trees providing cover and increasingly frequent droughts.

Sources: Central Oregon Fire; Brandon Collins, UC Berkeley professor; Nature Conservancy; U.S. Department of Agriculture; Department of the Interior; [Project Wildfire](#)

“What most of us who are alive today have experienced in our lifetime is a fire regime that has never before existed on this continent,” University of Oregon sociology and environmental studies Professor Kari Norgaard said.

Climate change exacerbates the problems facing these already-volatile forests. Prolonged drought kills trees, creating even more fuel susceptible to burning. Hotter and drier conditions also span longer periods of the year, lengthening the fire season, noted Malcolm North, an expert in forest ecology at UC Davis.

This year’s fire season has been relatively mild, due in part to unusually wet weather on both ends of summer. But the fire problem in the state is ongoing, and generally it’s about due to 25% climate change and 75% due to forest condition, Stephens estimated. “In some ways, that’s actually a really good thing to hear, because it means you can do something about it,” he said.

Forest managers use two main tools to reverse the effects of fire suppression and reduce the buildup of flammable materials. One is thinning forests and clearing away shrubs; the other is [prescribed burns](#), planned fires that mimic the small, frequent surface fires once characteristic of the California landscape.

But prescribed burning has limits. The Karuk Tribe, whose traditional lands lie in the Klamath Mountains, recently had to abandon plans to burn lands that haven’t seen fire for over one hundred years. Even prescribed fire was causing too much damage to old trees due to excessive fuel accumulation. Still, the tribe has been able to host a more modest, up to 500-acre burn this month. The goal was not only to reduce wildfire risk and revitalize cultural resources such as acorn-producing tanoak trees, but also to share knowledge about prescribed fire with other groups.



Top left: Jess McLaughlin, of the Karuk Tribe, Top right: Fire personnel Ash McAllister and husband Crispin McAllister, Bottom: Flames burn the forest floor during a prescribed burn on Wednesday in Siskiyou County organized by the Karuk Tribe. Gabrielle Lurie / The Chronicle

Tree thinning and prescribed burns also face pushback — the former because of distrust toward logging, which environmentalists fear can target big trees rather than the small ones that can be more ecologically problematic, and the latter due to smoke concerns and fears that fires could get out of control. The acreage treated by prescribed burns has increased but is still far off from what's needed. Across 13 million acres of

Sierra Nevada forest, for example, about 620,000 acres should burn every year — but only 10% to 15% of it actually does, North said.

A law that took effect at the beginning of this year reduces liability risk for private fire-setters, such as Indigenous practitioners. But Indigenous cultural burners still face many barriers, among them lack of respect for tribal sovereignty, air quality restrictions, expensive permits and bureaucratic back-and-forth.

Another problem for some Indigenous groups is that traditional lands may span multiple owners. “If you own property, you can do cultural burning of your property, and you don't have to have this whole legal rigamarole around it,” said Vikki Preston, a cultural resources technician with the Karuk Tribe’s Department of Natural Resources.

The Amah Mutsun Tribal Band has found that only 1 out of 10 planned fires is successfully conducted, and it usually takes a year or more to get a burn approved, according to Lopez.

More prescribed and cultural burns will happen only with mainstream understanding that fire has always and will always be a part of the California landscape. Instead of a few massive wildfires causing lots of destruction, we could have regularly planned small burns during good weather to prevent uncontrolled spread — and nearby neighborhoods could be given warning of smoke impacts, U.S. Forest Service ecologist Paul Hessburg said.

“Do you want fires escaping and raging and burning for months and producing incredibly large amounts of harmful smoke? Or do you want that meted out in doses and timed as well as we can to be able to deal with the human health effects?” he said.

Neighbors of the Amah Mutsun Tribal Band were opposed to and afraid of cultural burning when the tribe first tried to introduce it to them in 2014, Lopez said. But following the 86,500-acre CZU Lightning Complex fires of 2020, they began honking horns to show approval.

“They said, ‘You know, something different has got to happen,’ ” Lopez said. “And Indigenous burning seems like a good alternative to them.”

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