

CALIFORNIA FOREST STEWARDSHIP PROGRAM

Forestland STEWARD

REGIONAL SPOTLIGHT: CENTRAL CALIFORNIA

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FORESTLAND STEWARD IS A JOINT PROJECT OF CAL FIRE, PLACER COUNTY RESOURCE CONSERVATION DISTRICT, UC COOPERATIVE EXTENSION, AND USDA FOREST SERVICE TO PROVIDE INFORMATION ON THE STEWARDSHIP OF PRIVATE FORESTLANDS IN CALIFORNIA

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An Introduction to Central California

California is a state of forests, from the towering redwoods of the North Coast, to the live oak woodlands of Central California, to the ancient bristlecones of the White Mountains. In this issue of the Forestland Steward Newsletter, we will highlight regional history and challenges facing forestland owners in Central California (see **previous issues** for focus on Northern California and Southern California). For the purposes of this issue, Central California will be considered the region encompassed by the map in Figure 1, adapted from the California Climate and Ag Network's **regional map**.

Central California is characterized by substantial biological diversity, featuring coastal mountain ranges, low-lying deltas, oak-savannah foothills, the High Sierra, and **more**. The coastline hosts the southernmost natural range of redwoods, towering Coulter pines (which produce the heaviest pine cones in the world), and Monterey cypress clinging to cliffsides. As one moves inland, the landscape transforms from scrubby chaparral-covered outcrops and mountains into oak savannahs, characterized by open stretches of grassland between mature oak trees. Across the central valley, these woodlands rise into lower montane forest (ponderosa pine, sugar pine, California black oak, and incense cedar), upper montane forest (red fir, white fir, and lodgepole pine), before rising into the subalpine and alpine zones, which feature rocky terrain and occasional mountain hemlock, whitebark pine, or bristlecone pine.



FIGURE 1
CALIFORNIA'S REGIONS

While many of these forest compositions have remained more or less static over time, stocking shifted dramatically following European contact, the displacement and disruption of native Californian communities, and the Gold Rush. Before the late 1700's to mid 1800's, much of Central California was **actively stewarded** by tribes such as the Esselen, Maidu, and Miwok through burning. By applying fire



Los Padres ForestWatch

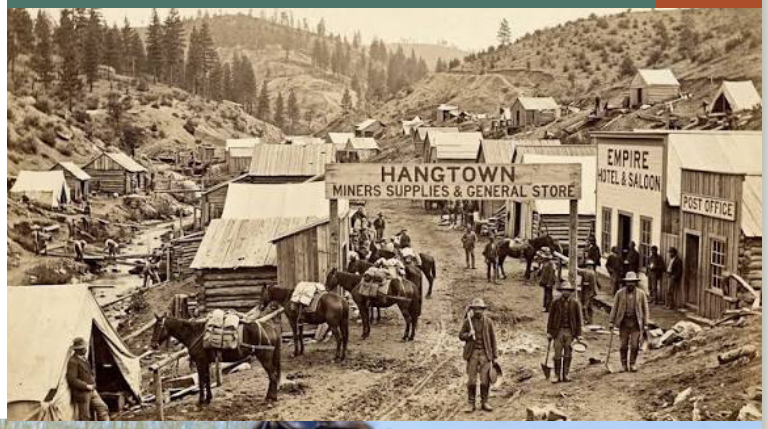
Cultural fire practitioner teaches the next generation, Courtesy of Placer Resource Conservation District



to the landscape, tribes cultivated food crops, enhanced acorn harvests, and promoted strong, straight shoots for basket weaving. In the late 1700's and again in the mid-1800's, these practices were banned first by the Spanish and then the Americans. Many of these communities were extirpated, but **today** Central California is seeing a strong resurgence of cultural burning enacted by tribes.

In addition to the shift away from tribal land management, the Gold Rush had a sizeable impact on the landscape of California. Forests that were once tended and maintained in a sub-climax state were cleared entirely to build infrastructure, provide firewood, and **more**. Historic logging practices led to dense, uniform regrowth and increased high-severity fire risk. Subsequent fire suppression statewide (starting in the early 1900's) exacerbated this, a legacy which remains in California's forests today.

Central California remains pivotal in the story of California's forests, particularly of forest policy decisions based out of Sacramento. In June of 2026, the California state government **fast-tracked over 500 wildfire prevention projects** throughout the state (many of which were rooted in Central California). In addition to these projects, Resource Conservation Districts, Firewise Communities and Firesafe Councils, Prescribed Burn Associations, CAL FIRE, the U.S. Forest Service, and other groups are heavily engaged in fuels reduction and conservation efforts throughout the region. These efforts have informed much of what you'll read in this issue. From controversies around reforestation methods, to cone collection, to landowner success stories, you will gain insight into the extensive work being done in Central California, and how it connects to nonindustrial private forestland owners throughout the state.





Diana Almendariz (left) and Melinda Adams (right), gather Tlaka, tule to construct a canoe; Courtesy of Melinda Adams

Middle: Placerville around 1850, Courtesy of University of California Archives



Bark Beetles

& GIANT SEQUOIA

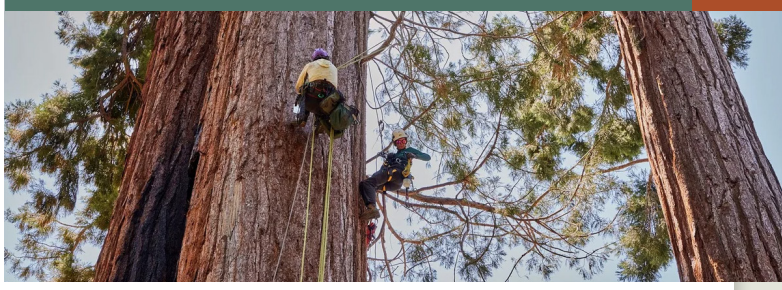
The giant sequoia (Sequoiadendron giganteum) is a symbol of California's forests. Mature specimens of this tree can reach up to 300 ft tall and 30 feet across, and are found in groves throughout the western slopes of the Sierra Nevada. Between their massive size and seemingly impenetrable bark (reaching up to two feet thick), it was previously considered impossible that bark beetles could contribute to mortality in sequoias. These insects (including western cedar bark beetle, western pine beetle, mountain pine beetle, and more) are no larger than a grain of rice, but have contributed to the death of well over **100 million trees** in California throughout the last fifteen years alone. Over the last several years, a group of researchers has found proof that bark beetles are now contributing to the mortality of the sequoia.

The Ancient Forest Society, in partnership with the Davis Lab at Colorado State University and with funding from CAL FIRE's Forest Health Research Program, has been spearheading efforts to garner a deeper understanding of the impact that **bark beetles** have on giant sequoia health. Their two-year study, Examining Bark Beetle Attack in Giant Sequoia, took place across five study locations: Calaveras Big Trees State Park, Mountain Home Demonstration Forest, Sequoia National Park, Tule River Reservation, and Yosemite National Park. As of 2025, fieldwork concluded, with 54 volunteers having collected data from 89 trees.

To determine the levels of stress the tree is experiencing, sap flow was measured to monitor water use and movement throughout the tree. Additionally, samples were collected from branches to test for the presence of tannic acid, which repels wood-boring insects. These data, along with additional information collected and analyzed by the Davis Lab at CSU, were cross-referenced with regional climate and soil data to characterize the local climate where each study tree is growing.

"Preliminary findings are hopeful, showing that healthy trees are generally able to defend themselves from beetle attack," the Ancient Forest Society shared in their **2025 Annual Report**.





"Beetles appear to be most successful at colonizing branches on trees that are already dying from other causes."

In addition to Examining Bark Beetle Attack in Giant Sequoia, the Ancient Forest Society is collaborating with the Giant Sequoia Lands Coalition to gain a better understanding of the overarching threat of bark beetles to sequoia across the state through **monitoring efforts**. Individuals who recreate or work in giant sequoia groves can fill out a form to report sightings of dead or dying trees. The Ancient Forest Society then begins monitoring reported trees by tree climbing and drone, "looking for signs of bark beetles, tracking beetle activity, and the health of trees over time." Their hope is that this database will deepen understanding of the range and extent of threats to giant sequoia, with the ultimate goal of creating effective management tools and strategies.

Left, top, and bottom: Courtesy of Ancient Forest Society

Herbicide:

IS IT REALLY **NECESSARY?**

Charlotte Beltran,
American Conservation Experience
via CAL-IPC



In recent months, herbicide application on forested land has entered California's zeitgeist to a previously unprecedented extent. In April of 2026, Nate Halverson published ***We Are Bombarding America's Forests With Roundup*** for Mother Jones, which characterized the application of herbicides – specifically glyphosate – in California's forests as "killing native plants", "treating forests as tree farms", and as a major threat to human and forest health. This article kicked off a slew of similar coverage, raising major concerns from the public about the impact of reforestation efforts on the public, wildlife, and future wildfire resilience.

The majority of the narrative in these articles focuses on the application of herbicide by the U.S. Forest Service for timber production, with claims that it leads to higher threats of wildfire by "killing deciduous trees, native shrubs, flowering plants, and anything else that might compete [for resources]". But timber production is not the only use case for herbicide application in forestry; indeed, it can be a useful tool in fuels reduction and reforestation efforts. When an entity is trying to restore a burned landscape before brush takes over, time is of the essence, and herbicide is a quick and effective tool. For many working in the reforestation and restoration field (not to mention timber production), herbicide use is a nuanced issue which requires careful consideration.

This article seeks to highlight the common concerns, explore the reasoning behind herbicide application, and understand both the costs and benefits of its use. Many, if not all, private nonindustrial forest landowners will be faced with the question of whether or not to use herbicide in their forest management, and understanding the big picture is an important step in making that decision.

Health Impacts

Halverson's article zeroes in on the health impacts, highlighting the conflicts of interest inherent in herbicide research and approval. The potential health impacts of glyphosate are well-documented; it is categorized by the **World Health Organization** as "probably carcinogenic to humans", and **thousands of lawsuits** have been brought against its previous and current manufacturers, Monsanto and Bayer – largely by farmers and gardeners who have been applying the herbicide over many years. Bayer, Monsanto, and the **Environmental Protection Agency** all have claimed that "there are no risks

LEARN **MORE**

For sciene-based information regarding pesticide use in California's forests, visit the UC ANR Fire Network's webpage on herbicide:

https://ucanr.edu/program/uc-anr-fire-network/herbicide-0



of concern to human health when glyphosate is used in accordance with its current label." What does all that mean for those who live, work, and recreate in California's forests?

In areas with known human access, the majority of herbicide is applied by individuals wearing proper PPE via backpack sprayers, which allow for mindful application and avoidance of sensitive species. Furthermore, application crews are required to leave a buffer around lakes and watercourses, reducing potential impacts on water sources and aquatic species. In areas with trails or known access, **warning signs** are placed or verbally provided to landowners, ensuring that areas are not accessed while the herbicide is drying. In some cases, a temporary dye is added to the herbicide to ensure it can be seen. Perhaps most relevant to human health, **glyphosate** does not easily pass through human skin, particularly once dry (which only takes a few hours). It also binds closely to the soil after application, minimizing additional risk of it entering waterways or impacting trees that have been planted for reforestation or native seedbanks.

Because of these application practices and traits of glyphosate, it is considered one of the **safer herbicides** on the market. Landowners looking to apply herbicide, or those recreating in areas undergoing reforestation, can likely rest assured that risks are low. But why risk it at all? Do we really need herbicide?

What Are The Alternatives?

In the original article b y Halverson, it is suggested that forests can recover after high-intensity fire with just hand treatments, machine treatments, and prescribed fire, and that herbicde use is merely a cost-cutting measure. With considerable **federal funding cuts** and a **sense of urgency** driving fuels reduction and reforestation efforts in the state, cost-cutting may not be a bad goal. Resource professionals throughout the state are driving toward restoring healthy, wildfire resilient forests before the next big fire comes; and they can use all the help they can get.

Fuels treatments such as machine treatments (chipping, mastication, etc.), handwork, and prescribed fire are all effective tools that are often employed in addition to herbicide when landscapes are being treated, depending on factors like terrain, proximity to homes and watercourses, and the presence of sensitive species. These treatments also target fuels that herbicides would have no effect on, such as woody debris or ladder fuels. Herbicide is **best applied** to brush and weeds that are regrowing following a fire, or as a pre-emergent immediately post-fire. If an entire burn scar were to be treated with manual thinning and fuel removal alone, costs would begin to pile up – quickly.

Herbicide **treatment** can range from $50 to $200 per acre for targeted sprayer treatments, compared with $400 to over $3,000 per acre for various manual treatments. This difference in cost is due to factors such as the time it takes to complete hand work, the expertise required of prescribed fire crews, the fuel and transportation costs of heavy machinery, and more. Cutting costs (while still doing effective work) allows contractors and restoration specialists to restore and replant more acreage than would otherwise be possible.

Why Not Just Let The Forest Grow Back Naturally?

It is not uncommon to see shrubs and brush growing back naturally after a wildfire, and it's easy to let that be a symbol of hope, or of nature finding a way. But the plants that are able to resprout or germinate from the seed bank after a high intensity and destructive wildfire are typically shrub species, not trees. These shrub species quickly grow into a dense and uniform layer of brush, posing extreme risk for another high-intensity blaze after only a few years.

Indeed, by treating emerging plants with herbicide and planting native tree seedlings, one can actually enhance native plant diversity. "Although the initial effect is to reduce native plant species richness, recovery is rapid, and plant diversity exceeds that in untreated areas within 8 years of application. Success of native forb and grass species in herbicide-treated areas appears to be due to early suppression of otherwise dominant shrubs"(**DiTomaso et al., 1997**).

Without a helping hand, California's forests are unlikely to regrow quickly, or to resemble thier original form. Managing brush regrowth and improving replanted seedlings' chances offer the possibility of seeing a forest again within a generation or two. Until more funding and manpower are available to federal, state, and local employees – and private landowners – working to restore fire-impacted landscapes, herbicide remains a critical tool in getting the work done efficiently and effectively. It is completely understandable to have concerns and reservations, and those who are considering using it on their own forested lands are free to make the decision for themselves based on their financial and physical capacity. But, when it comes to landscape-level efforts, herbicide is unlikely to go anywhere for some time.

United States Department of the Interior



Collecting Seeds

FROM THE **RAREST FIR** IN NORTH AMERICA

On a beautiful summer day on the Central Coast, CAL FIRE staff headed into the famed Hearst Ranch property. Though perhaps best-known for the opulent corridors of Hearst Castle and the zebras which intermingle with heritage cattle breeds in the rolling hills, Hearst Ranch harbors another unique feature: it is the southernmost known extent of the Santa Lucia Fir (***Abies bracteata***), the rarest fir tree in North America.

CAL FIRE staff aimed to collect cones for propagation at the L.A. Moran Reforestation Center in Davis. The only issue? There were relatively few cones to be found; it was too late in the season. "We don't plan to return until next June [2027] to get a much earlier look at the cones. They were ripe well before we expected them to be, but that kind of makes sense on the coast," shared Stewart McMorrow, Staff Chief of CAL FIRE's Wildfire Resilience Program.

Only one known **successful seed collection** has been conducted on this species, by the California Botanic Garden in 2017, though botanists have reportedly been trying since the **1840's**. Santa Lucia Fir cones are notoriously challenging to harvest. The trees are mast-seeders, meaning they only produce every few years when conditions are exactly right. Additionally, the steep hillsides and rocky terrain these trees favor make them particularly difficult to access. Finally, the cones are perched precariously on the tops of the trees, making them dangerous to reach via climbing.

The seeds collected by the California Botanic Garden have been stored for future reforestation efforts, in the event that the wild populations decline beyond natural regenerative repair. There are approximately 80 known occurrences of Santa Lucia Fir in the Santa Lucia Mountains, most of which are in the Ventana Wilderness. As of September, 2026, the **Timber Fire** was impacting several known stands.

Cone collection plays an incredibly important role in wildfire resilience, both of species and larger plant communities. By building seed banks and diversifying cone collection locations, reforestation efforts are enhanced through increased genetic diversity and species availability. This directly impacts private forestland owners throughout the state.

CAL FIRE's **Reforestation Services Program** is seeking forestland owners' support in enhancing reforestation efforts throughout the state through their new offering, Reforestation Because of You. Landowners with sizeable stands of conifers (at least 10 acres) and viable cone crops are encouraged to **sign up** to allow for cone surveys and collections to be completed on their land. Participants will not only support statewide reforestation and wildfire recovery efforts, but will receive a portion of clean seed back, ready for planting.

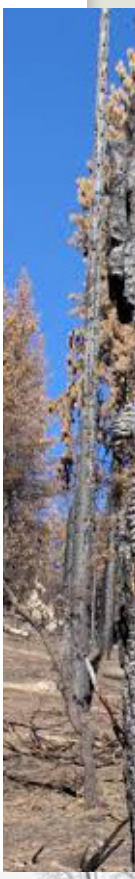


LEARN **MORE**

For official information regarding CAL FIRE's Reforestation Services Program and Reforestation Because of You, visit:

https://www.fire.ca.gov/what-we-do/natural-resource-management/wildfire-resilience/reforestation-services-program

Landowner Success Story:
ROCK HAVEN



In September of 2020, the Creek Fire swept through Fresno and Madera counties, burning 379,895 acres and destroying 858 structures in its path. One neighborhood remained unscathed: Rock Haven, a community of 17 homes on 160 acres near Shaver Lake. Only months before the Creek Fire, fuels reduction work had been completed through CAL FIRE's **California Forest Improvement Program** (CFIP) under the guidance of Registered Professional Forester Julianne Stewart.

Rock Haven is a collection of summer cabins built nearly 100 years ago by a group of families from nearby Fresno. Decades of prior clear-cutting in the Shaver Lake region had drastically altered the landscape, so the community had one simple rule from its inception: don't cut any trees down. This approach began to change after the 2014 drought, when beetle-killed trees increased in number, and neighbors began to realize the precarious situation they were in.

"We had at Rock Haven six times as much fire fuel on the ground as the average for California," said Jennifer Meux-White, a fourth-generation homeowner in Rock Haven, in an **interview** with NPR. "Well, you could imagine that's a hell of a lot of stuff that could burn." The community enlisted the support of Julianne Stewart in applying for a forest improvement reimbursement from CAL FIRE to help protect their neighborhood.

The California Forest Improvement Program seeks to "encourage private and public investment in, and improved management of, California forest lands and resources. This focus is to ensure... the protection, maintenance, and enhancement of a productive and stable forest resource system for the benefit of present and future generations," per CAL FIRE's website. Anyone seeking to enact reforestation, stand improvement, or fish and wildlife habitat improvement is eligible to apply with the support of an RPF.

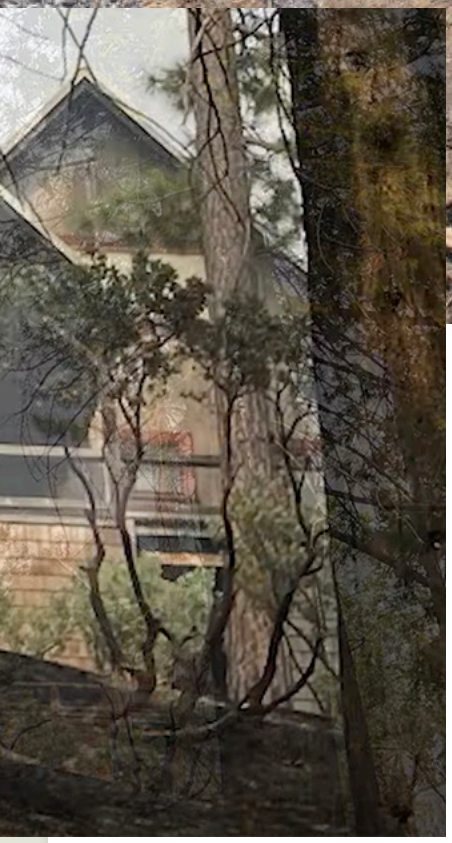


This cost-share support made all the difference to the Rock Haven community. "We never would have been able to pay for all of that in a timely manner," said Meux-White. In the end, timeliness made all the difference.

Only months after completing fuels reduction, defensible space, and thinning work, the Creek Fire erupted. Because of the recent work done, Rock Haven was not

Top: Danielle Venton, KQED
Bottom: CAL FIRE





only on CAL FIRE's radar, but was much easier to defend. "If that work hadn't been done, we may not have been as successful protecting homes and people's property in those areas," shared Jim McDougald with CAL FIRE (retired). As it was, all 17 homes remained completely unscathed, serving as an excellent example of CFIP's success and the power of a community coming together to protect itself.

LEARN **MORE**

CFIP is a cost-share program which releases up to $2 million per solicitation period. Prior to applying, carefully review **CAL FIRE's CFIP webpage** to better understand your eligibility and program requirements.

Read more about CFIP at: **https://www.fire.ca.gov/what-we-do/grants/california-forest-improvement**

"I think it's really clear to me that without the CFIP treatments that happened here, the Creek Fire would have destroyed all these cabins. There really would not have been a way to protect them."

– Julianne Stewart, RPF

Want to Know More?

As of 2026, the Forestland Steward Newsletter has been publishing resources for private nonindustrial forestland owners for 30 years. In that time, we've covered topics from watershed health to defensible space, and nearly everything in between. If you're looking for information on a particular topic, you can find it in our topic matrix at **placerrcd.org/forestland-steward**.

GIVE US FEEDBACK!

To ensure we continue to offer information that is useful and relevant to you, we would love it if you **filled out our survey**, also available at **placerrcd.org/forestland-steward**. Your feedback will allow us to tailor future issues to your concerns, and help share forestland management information for years to come.

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