

CALIFORNIA'S STRATEGIC PLAN FOR EXPANDING THE USE OF BENEFICIAL FIRE

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California
**WILDFIRE
& FOREST
RESILIENCE**
Task Force



Wildfire and Forest Resilience Task Force

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Thank you to the numerous federal, state, and local agencies, tribes, tribal entities, nongovernmental organizations, and other stakeholders who contributed to this plan. This Strategic Plan is located on the Wildfire and Forest Resilience Task Force website:

<https://fmtf.fire.ca.gov/>

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EXECUTIVE SUMMARY

A Strategic Change In Our Relationship to Fire

California is facing an unprecedented and growing forest and wildfire crisis. Decades of fire exclusion, coupled with the increasing impacts of climate change, have dramatically increased wildfires' size and intensity throughout the state. The 2021 wildfire season brought with it new records, impacts, and images: the first wildfire to burn across the Sierra Nevada in recorded history; the destruction of towns like Greenville and Grizzly Flats; and pictures of the world's largest trees – the Giant Sequoia – wrapped in flame-retardant foil. Yet 2021 also demonstrated the effectiveness of prescribed fire and other forest management activities, treatments that were vital to protecting the communities of Kirkwood, Pollock Pines, and Meyers and the Giant Forest in Sequoia National Park during the Caldor and KNP Complex Fires.

California is already experiencing hotter temperatures and more frequent droughts, and these conditions are predicted to increase in severity and length in the coming decades. California is at an unprecedented crossroads; we must act to prepare our forests and other wildlands to be more resilient to fire threats, or we risk losing the natural systems upon which the state has thrived. One of the best tools at our disposal is the intentional use of fire. Through prescribed fire, cultural burning, and fire managed for resource benefit, we can significantly improve the resilience of many of California's fire-dependent ecosystems.

Building on [California's Wildfire and Forest Resilience Action Plan](#), this Strategic Plan for

Expanding the Use of Beneficial Fire provides a roadmap for significantly increasing the pace and scale of these forest management activities through 2025. The Strategic Plan establishes acreage targets for a broad spectrum of state and federal agencies, California Native American tribes, and nongovernmental partners. Land managers will seek to deploy beneficial fire on 400,000 acres annually by 2025.

Perhaps more important, the Strategic Plan will help build a culture of beneficial fire that will guide forest management in California for the decades to come. By 2025, we envision that California will have the policies, programs, capacity, and knowledge to effectively deploy sufficient prescribed fire, cultural burning, and fire managed for resource benefit—collectively referred to as beneficial fire—to meet our ecological, climate, public safety, public health, and cultural needs.

Governor Gavin Newsom and the state Legislature are allocating significant resources to beneficial fire activities and tackling some of the largest barriers to implementation. The state invested \$1.5 billion in wildfire resilience in 2021 alone, including significant support for prescribed fire and cultural burning. New policies, programs, and regulations will improve permitting, increase the availability of [State-Certified Prescribed-Fire Burn Bosses](#), address liability issues and the lack of insurance, tailor funding to prescribed fire activities, and increase capacity and collaboration.



The key elements of the Strategic Plan include agency commitments to:

- Launch an online prescribed fire permitting system to streamline the review and approval of prescribed fire projects;
- Develop a state-financed program to enable tribes and cultural fire practitioners to revitalize cultural burning practices;
- Establish a Prescribed Fire Training Center to grow, train, and diversify the state's prescribed fire workforce;
- Develop the state's new Prescribed Fire Claims Fund to address liability issues facing private burners;
- Develop an interagency beneficial fire tracking system;
- Launch pilot projects to undertake larger landscape-scale burns; and
- Undertake a comprehensive review of the state's smoke management programs to facilitate prescribed fire while protecting public health.

The Strategic Plan's key actions are oriented around the following nine goals:

Develop a Robust Beneficial Fire Workforce

- » The state and its partners will expand programs to increase the beneficial fire workforce, including people trained in burn planning, burn implementation, cultural awareness, public communication, air quality modeling and permitting, data analysis and modeling, and operational support, in order to implement more

beneficial fire projects across all land ownerships. Through the proposed Prescribed Fire Training Center and other programs, the agencies will significantly increase capacity and skills for all types of beneficial fire, including cultural burning, prescribed fire and fire managed for resource benefit.

Empower the Private Sector

- » Building upon new legislation to reduce liability for private landowners seeking to conduct prescribed fires, the state and its partners will expand the Prescribed Fire Burn Boss certification program and establish a Prescribed Fire Claims Fund for private burners and tribes.

Expand Cultural Burning and Tribal Engagement

- » The state and its partners will support expansion of cultural burning, and seek to better integrate tribal organizations and cultural fire practitioners into public agency prescribed fire projects and programs.

Improve Regulatory Efficiency

- » State agencies will seek to streamline the regulatory process for prescribed fire through CAL FIRE's new online permitting system, and through an evaluation of the California Air Resources Board (CARB) smoke management programs.

Protect Public Health

- » The state will expand its programs to monitor, assess, and mitigate the potential adverse public health impacts associated with beneficial fire smoke. CARB will continue to promote and improve its expansion of [Smoke Spotter App](#) to help

local communities and residents prepare for scheduled prescribed fires.

Build Public Support

- » The state and its partners will expand programs to better educate the public on the benefits of beneficial fire, including the development of a media toolkit for prescribed fire practitioners.

Facilitate Larger and Strategically Located Burns

- » Land management agencies will seek to develop several pilot projects to conduct larger and longer landscape-scale burns and expand burn windows to accommodate them.

Use Fire Managed for Resource Benefit Where and When Appropriate

- » Where feasible, appropriate, and planned, fire management agencies will work with land managers and owners to manage unintentional ignitions for biodiversity, forest resilience, community protection, and other benefits.

Improve Data Collection and Utilization

- » The state and its partners will develop an interagency, public-facing tracking system for prescribed fire and other treatments and CARB will seek to enhance its [Prescribed Fire Information Reporting System](#).

For too long, beneficial fire has been ignored as a management option, caught up in regulatory hurdles, or siloed within individual agencies or entities. This Strategic Plan sets a new course, where land managers, regulators, tribes, nongovernmental organizations, and landowners work collaboratively to promote and expand the use of prescribed fire as a key tool in improving the health of our forests and the safety of our communities.

INTRODUCTION

California's landscapes are among the most naturally fire-dependent on Earth. Their fire regimes were established by eons of geological, climatic, biological, and human influences, including both lightning and Native American cultural burning. In many California ecosystems, biodiversity, carbon stability, and overall ecological resilience are dependent on the regular occurrence of fire events. Science strongly points to the need to re-establish more frequent fire across a significant part of the state. Re-establishing fire regimes will not only restore ecosystem resilience, but will be critical to reducing the extreme costs of catastrophic wildfire: direct loss of life and property, significant resource damage, and an increasing public health threat from wildfire smoke.

Fire suppression will continue to be critical to protect communities and infrastructure in the wildland urban interface and more urbanized landscapes. The active use of fire, however, is also among the most important tools for improving the health of our landscapes and the safety of our communities. Restoring fire as a keystone natural process—through prescribed fire, cultural burning, and fire managed for resource benefit—will re-establish ecological resilience and better protect communities and public health. Especially in light of climate change and its exacerbation of catastrophic wildfires, science and cultural-based restoration of fire to much of the California landscape is essential.

Recognition and expansion of ongoing cultural burning practices will also begin to rectify historic injustices and return stewardship roles to California Native communities. Colonialism, genocide, and the forced removal of Native people from their ancestral homelands significantly reduced the extent of cultural burning. Efforts are underway to return Native people to the forefront of stewardship.

The public is beginning to recognize that California can no longer eliminate fire or smoke from the landscape. Instead, our best option is to deliberately engage with fire in order to proactively decide when, where, and how

it shapes our landscapes and environment. Successful implementation of this Strategic Plan will not eliminate fire and smoke, but will result in fire and smoke at intensities and return intervals that more closely align with the pre-suppression era.

The purpose of this Strategic Plan is to guide the expansion of beneficial fire across the state through 2025, as set forth in [California's Wildfire and Forest Resilience Action Plan](#)¹. For the past decade, state, federal, tribal, and local entities have been engaged in efforts to increase the pace and scale of these practices. However, bolder action is required if we are to effectively meet the threats posed by climate change and catastrophic wildfires. This Strategic Plan both recognizes the critical foundations that the state and its partners have built and establishes key actions necessary to address ongoing challenges. To successfully implement the Plan, the state must not only increase the number of restored acres, but create a robust, adaptive, and effective culture of beneficial fire use. State and federal agencies must continue to play a leadership role, while effectively catalyzing and promoting tribal, local, and private efforts as well. Ultimately, both California and its people must learn to “use fire as a constructive, rather than destructive, force.” (Biswell 1989).

¹ Key Action 1.18 (“CAL FIRE, CARB, USFS and other federal, state, local and tribal governments will develop and issue a Prescribed Fire Strategic Action Plan to coordinate and guide prescribed fire activities, and to address the key barriers to its widespread use in California.”). This Strategic Plan implements a number of other Key Actions from the Action Plan, indicated as [*Implementing Action Plan*].

PRESCRIBED FIRE, CULTURAL BURNING, AND FIRE MANAGED FOR RESOURCE BENEFIT IN CALIFORNIA

History of Fire Use

In California, the use of beneficial fire has varied based upon cultural objectives, vegetation fuels conditions, topography, weather conditions, societal norms, fire management capacity, and understanding of ecological and hazard reduction benefits.

One study suggests that prior to 1800, approximately 4.5 million acres of the state burned annually (Stephens et al. 2017). Native Americans were likely responsible for a significant portion of this acreage. They burned—and continue to burn—for a variety of reasons, including to recycle nutrients, manage plant and wildlife habitat, provide community protection, control insects and disease, and engage in cultural and spiritual practices. With colonization, many of these practices were significantly reduced or eliminated, fundamentally altering fire scope and intensity across the state.

Beginning in the early 1900s, federal and state land management agencies prohibited the use of prescribed fire (known as “light burning”) and cultural burning. The 1911 Weeks Act established a framework between the federal government and the states for cooperative firefighting, which effectively put the U.S. Forest Services (USFS) in control of fire policy. In 1935, the USFS established the “10 a.m. policy,” setting a goal of suppressing all fires by 10 a.m. the day following the initial report. A couple of decades later, the USFS introduced Smokey Bear, solidifying the public impression that fire was to be avoided at all costs.

In 1963, the Leopold Report to the Department of the Interior (DOI) made clear, however, that the ongoing suppression of fire was causing

ecological degradation in the National Parks. Around the same time, Dr. Harold Biswell and others began advocating new policies of controlled or prescribed burning to reintroduce fire in ponderosa pine and giant sequoia forests. This early advocacy set in motion a gradual shift in approach. By 1968, Sequoia-Kings Canyon became the first National Park with institutional prescribed fires and in 1973, California State Parks conducted its first prescribed fire at Montaña de Oro State Park. In some western wilderness areas, “wildland fire use” programs allowed naturally ignited fires to burn under appropriate weather and fuels conditions beginning in the early 1970s. Nevertheless, many landscapes across California began to move decades beyond their adapted fire return intervals.

In 1996, the DOI and the U.S. Geological Survey, through the Centers for Water and Wildland Resources at the University of California, Davis, released “The Status of the Sierra Nevada: The Sierra Nevada Ecosystem Project” report, in which an independent panel of scientists called for a re-establishment of the historic fire regime in the Sierra Nevada. Since that time, fire scientists and ecologists have continued to observe the negative consequences of fire exclusion (see Current Trends and Prescribed Fire Needs).

DEFINITIONS

Beneficial Fire: A term used to collectively refer to prescribed fire, cultural burning, and fire managed for resource benefit.

Prescribed Fire:

The intentional application of fire to land for wildland management goals, including the prevention of high intensity wildland fires, watershed management, range improvement, vegetation management, forest improvement, wildlife habitat improvement, restoring ecological integrity and resilience, community wildfire protection, carbon resilience, enhancement of culturally important resources, and maintenance of air quality. Prescribed fires undertaken for any of these reasons are considered “public purpose” burns pursuant to state law. (Public Resources Code § 4491(a).) Prescribed fires are typically conducted in compliance with a written prescribed fire plan that outlines the conditions necessary for the burn to be “within prescription.”

Cultural Burning: The intentional application of fire to land by California Native American tribes, tribal organizations, or cultural fire practitioners to achieve cultural goals or objectives, including for subsistence, ceremonial activities, biodiversity, or other benefits. Cultural burning can differ from prescribed fire in terms of size, seasonality, timing, prepping/ planning, and post-fire treatment.

Fire Managed for Resource

Benefit: The strategic choice to manage unplanned ignitions to achieve management objectives, such as ecosystem restoration or hazard reduction. Fire managed for resource benefit is typically deployed in wilderness areas, national parks, and other areas in public ownership under specific conditions or circumstances. It can also be referred to as “managed fire.”

Together, these terms encompass the full suite of beneficial fire activities that may be selected to reach certain management or stewardship objectives. These objectives range from fuels reduction, ecological benefits, cultural ceremonies, hazard abatement, restoration, replenishment of the spirit, and many more. They are as diverse as California, but all have the intention of restoring a more resilient landscape for our environment and future generations.

Recent Developments (2009-2021)

The mounting threat of catastrophic wildfire has sparked substantial change across California. Agencies, tribes, cooperators, and other stakeholders across all levels have set in motion an effort to increase the pace and scale of beneficial fire. Rather than passing blame or risk to others, such entities have been willing to embrace collaboration and begin to navigate the inherent complexities of returning fire to a changed landscape. Some notable activities include:

SIGNIFICANT COLLABORATIONS

Shared Stewardship Agreement

- » In August 2020, Governor Gavin Newsom and then Chief of the USFS Vicki Christiansen announced an historic [Agreement for Shared Stewardship of California's Forests and Rangelands](#) (Shared Stewardship MOU). The Shared Stewardship MOU establishes a 1-million-acre annual treatment target for California's forests and rangelands by 2025, including expanded use of prescribed fire. It explicitly recognizes that "coordinated stewardship is critical to success."

Regional Prescribed Fire Councils

- » Beginning with the emergence of the Northern California Prescribed Fire Council in 2010, prescribed fire practitioners and advocates across sectors have mobilized four regional prescribed fire councils in the state. Advocacy from these groups has helped set in motion interagency collaboration and state action.

Fire MOU Partnership

- » In 2015, 12 federal, state, and nongovernmental partners entered into a [Memorandum of Understanding for the Purpose of Increasing the Use of Fire to Meet Ecological and Other Management Objectives](#) (known as the "Fire MOU"). This collaborative working group now has 35 members, including the USFS, the National Park Service (NPS), CAL FIRE, the Bureau of Land Management (BLM), CARB, local air districts, the Sierra Nevada Conservancy, numerous nongovernmental organizations,

and an intertribal organization. The MOU is a living document; additional partners and collaborators continue to join. These partners set yearly action plans to guide statewide prescribed fire activity via Communication, Capacity, and Policy Working Groups.

Interagency Efforts

- » Federal, state, local, and tribal agencies are engaged in ongoing, collaborative work across a variety of task forces and working groups. The Prescribed Fire Work Group of the Governor's Wildfire and Forest Resilience Task Force (Task Force) helps to develop and align state and federal priorities, including the development of this Strategic Plan. Air and Land Managers meetings, which began in 2002, provide a forum for decisionmakers to stay current on federal, state, and local issues associated with prescribed fire and smoke management and to collaborate on solutions. Similarly, the interagency Smoke Communications Working Group formed in 2020 and has helped to develop unified communication strategies on prescribed fire. The deep partnerships between state and federal agencies solidified in these groups is particularly notable, given their potential to enable cross-jurisdictional approaches and larger burns. Likewise, the collaboration between land managers and air quality regulators is both the cause and effect of a shift in perspective at air agencies—instead of viewing prescribed fire as a risk to public health, more agencies are embracing prescribed fire as a potential tool for improving both air quality and climate resilience.

STATE COMMITMENTS AND INVESTMENTS

State Funding and Policy Directives

- » Both the state Legislature and Governor

Newsom have shown a willingness to lead on increasing prescribed fire resources,

addressing regulatory hurdles, and providing support to tribal and private burners.² In 2021, the state invested \$1.5 billion in wildfire resilience programs, including significant support for prescribed fire and cultural burning. These investments have extended to the significant federal lands within the state, where they are intended to catalyze further investment from the federal government.

State Plans

- » The state has recognized the importance of prescribed fire across a variety of its plans. The [2018 Forest Carbon Plan](#) identifies the

expanded use of prescribed fire as a means to enhance ecological resilience of forest lands. The [2018 Board of Forestry and Fire Protection Strategic Fire Plan](#) recognizes “both the inevitability and the necessity of fire in healthy wildland ecosystems.” The [2019 CAL FIRE Strategic Plan](#) commits the Department to “proactively reduce wildfire threats through prescribed fire use.” The forthcoming Climate Change Scoping Plan Update (2022) is expected to specify how prescribed fire and other practices on California’s natural and working lands can increase carbon storage and sequestration.

FEDERAL MANDATES AND POLICIES

National Cohesive Wildland Fire Strategy

- » The National Cohesive Wildland Fire Strategy, mandated by the Federal Land Assistance, Management and Enhancement (FLAME) Act of 2009, guides fire management for federal agencies and their partners, with three primary goals: (1) restore and maintain landscapes with the use of prescribed fire and fire managed for resource benefit, as well as with non-fire treatments; (2) promote fire-adapted communities; and (3) foster safe and effective response to wildfire. The [National Action Plan](#), adopted in April 2014 by the Wildland Fire Leadership Council, and the [Western Regional Science-Based Risk Analysis Report](#), adopted in November 2012 by the Western Regional Strategy Committee, support implementation of the Strategy.

2009 Federal Guidance

- » The 2009 Guidance for Implementation of Federal Wildland Fire Management Policy permits fire managers to manage

naturally ignited fires for multiple objectives contemporaneously and allows fire management objectives to be changed over time as conditions evolve. Previously, fires were required to be designated as suppression or resource-benefit fires, and the entire fire had to be managed for this single objective on all acres and at all times.

Collaborative Forest Landscape Restoration Program

- » The Collaborative Forest Landscape Restoration Program (CFLRP) was established by the Omnibus Public Land Management Act of 2009. The CFLRP program funds large landscape collaborative restoration actions across the United States, including at three sites in California. The Act encourages “the collaborative, science-based ecosystem restoration of priority forest landscapes” and the facilitation of wildfire management cost reduction “through reestablishing natural fire regimes and reducing the risk of uncharacteristic wildfire.”

² Appendix A outlines key state legislative actions.

Forest Planning

- » The federal 2021 Forest Planning Rule requires that forest plans provide for ecological sustainability, by maintaining or restoring ecological structure, function, composition and connectivity, including opportunities to restore fire-adapted ecosystems. Forest plans must also consider system drivers such as wildland fire in their consideration of integrated resource management and ecosystem service provision. In California, new forest plans have included specific provisions for use of fire managed for resource benefit.

Exceptional Events

- » In 2019, the U.S. Environmental Protection Agency released "[Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations](#)," to describe the circumstances that would allow regulators to treat prescribed fire activity as an "exceptional event" not subject to National Ambient Air Quality Standards under the federal Clean Air Act.

FUNDING

Funding for prescribed fire activities comes from a variety of different sources. Some of the major sources of funding include:

- Fire Prevention and Forest Health Grant Program (part of California Climate Investments or CCI)
- Regional Fire and Forestry Capacity Funding (also part of CCI)
- Base congressional and state allocations to agencies such as the USFS, National Park Service, and CAL FIRE
- Natural Resources Conservation Service Environmental Quality Incentives Program (EQIP)
- Private funding sources such as The Nature Conservancy, the Fire Learning Network, and the National Forest Foundation

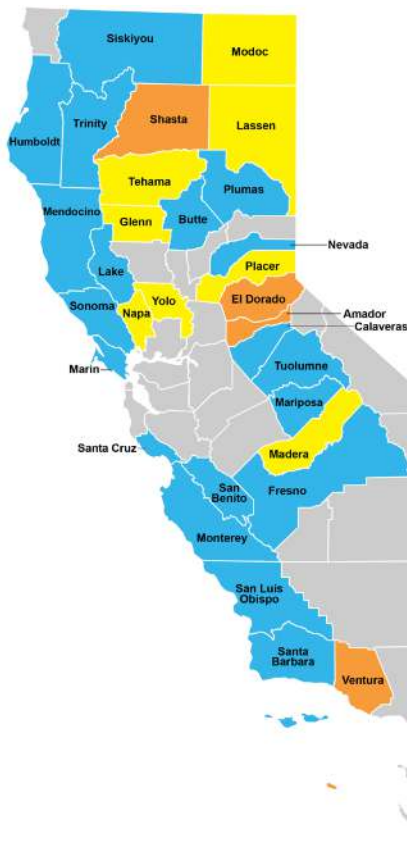
CULTURAL BURNING

Culturing Burning

- » Cultural burning practices by tribes and cultural fire practitioners are expanding and gaining public recognition and support. Tribes, tribal organizations, and cultural fire practitioners are engaging in partnerships with local, state, and federal agencies and nongovernmental organizations, and sharing Traditional Ecological Knowledge and Indigenous expertise with prescribed fire practitioners.

Tribal Organizations

- » In 2015 the Indigenous Peoples Burning Network, supported by The Nature Conservancy, formed through common interest among tribes in the Klamath basin and continues to grow. Such collaborations and interest have more recently led to statewide efforts, including the Intertribal Indigenous Stewardship Project.



California PBA/ Community-Based Burning Efforts

Blue: group formed and burning

Orange: group in formation

Yellow: having conversations about forming

Map created by Jeff Stackhouse, University of California Cooperative Extension; Katie Roberti, California Cattlemen's Association; January 2021

STAKEHOLDER CONTRIBUTIONS

Science and Communication

- » Scientists and key stakeholders are continuing to conduct research and educate the public on the impact of beneficial fire on ecological conditions, biodiversity, carbon storage, future fire risk, air pollution, and public health.

Cooperative Organizations

- » Nongovernmental organizations, the University of California Cooperative

Extension, California State Universities, Resource Conservation Districts, private landowners, local fire agencies, and their allies are working together to return fire to natural and working lands in and around their communities. Prescribed Burn Associations are expanding as county and multi-county partnerships across California, with 12 in operation and at least 14 more in development. Range Improvement Associations are focusing efforts on using prescribed fire to improve working lands.

Through all of these efforts, a new culture of beneficial fire is growing in California. This Strategic Plan builds on this strong foundation to improve the health of our forests and wildlands, and the safety of our communities.

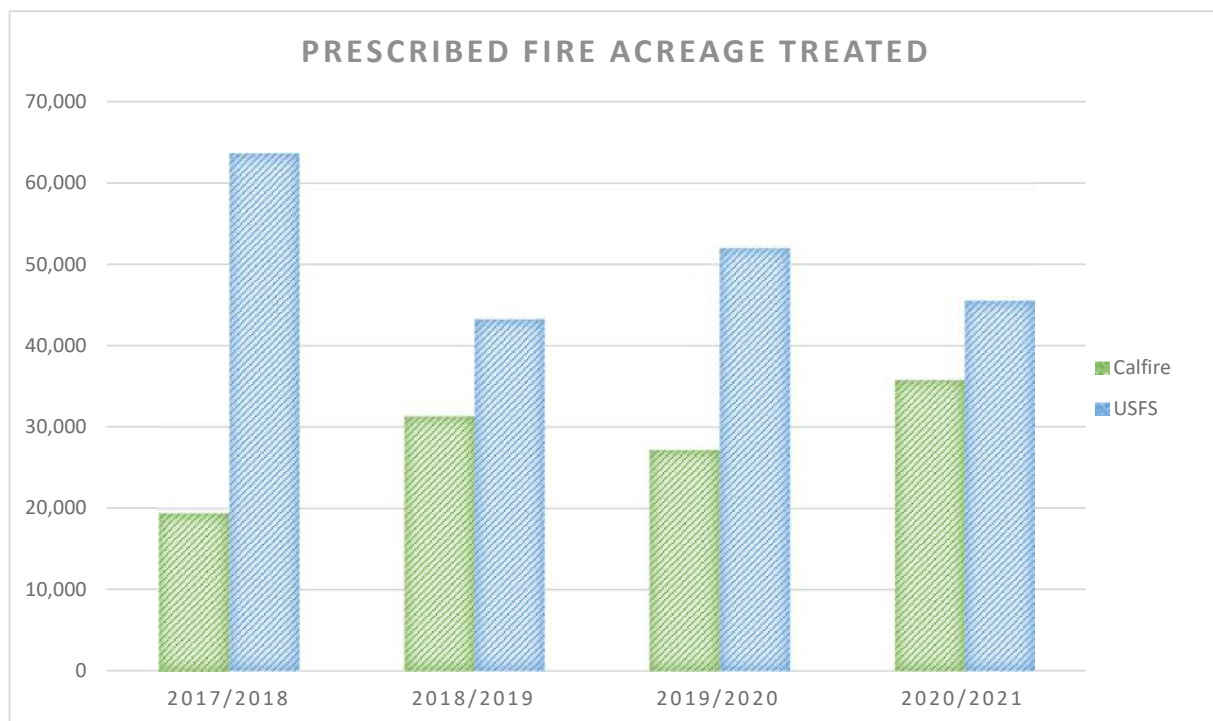
CURRENT TRENDS AND PRESCRIBED FIRE NEEDS

Much of California is currently experiencing larger, more frequent wildfires. The costs and impacts of these wildfires are significant: in 2020 alone, wildfires destroyed thousands of buildings, caused over \$12 billion in damages, killed 33 individuals, and produced hazardous levels of smoke that likely contributed to excess cardiorespiratory morbidity and mortality among the millions of Californians exposed across the state. Many of these impacts are disproportionately affecting low-income residents and people of color.

Large, high intensity “megafires” are also increasingly harming natural resources that have evolved to withstand regular intervals of smaller, low intensity fires. For instance, a single fire in 2020 destroyed 10 percent of the

world’s mature giant sequoias. High severity fire impacts on soil carbon and microbe respiration can last decades, and a single high severity fire event can produce post-fire erosion and stream sedimentation rates that exceed 1,000 years of background (unburned) rates. The increasing temperatures, droughts, and wind events linked to climate change are exacerbating fire outcomes across California.

According to some tribes, Native American cultural identity is at risk as well. Current Traditional Ecological Knowledge and Indigenous expertise related to cultural burning must be practiced and utilized to be maintained on ancestral lands and territories. To mitigate this risk, tribal communities must be able to revitalize cultural burning.

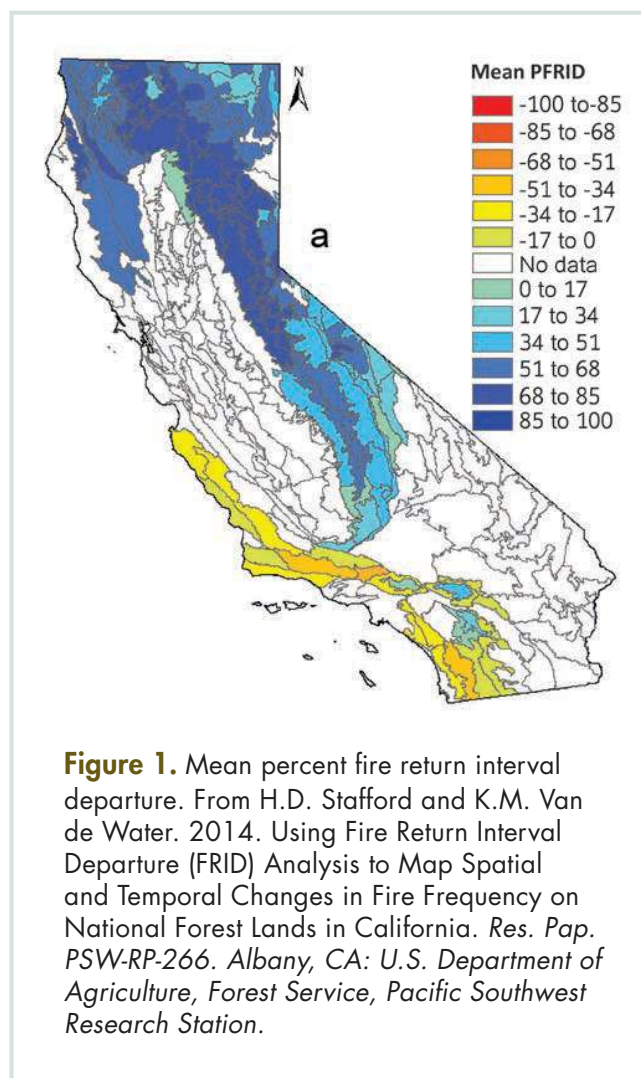


CAL FIRE data is for July 1 - June 30. USFS data is for October 1 - September 30

In significant parts of California, reintroduction of fire in controlled circumstances can limit the scope of catastrophic wildfire and improve ecosystem resilience. In many ecosystems, beneficial fire may be the only restoration tool available. Recent research indicates that with respect to air quality impacts, prescribed fire, cultural burning, and fire managed for resource benefit lead to better public health outcomes than catastrophic wildfires. Beneficial fire can also provide a host of other benefits, including targeted hazard reduction, increased stability of carbon stores, increased biodiversity, promotion of fire-dependent species, improved water management and nutrient cycling, traditional and subsistence food harvesting, cultural and religious practices, and enhancement of rangeland.

This is not to say that prescribed fire or fire managed for resource benefit is an appropriate management tool for all of California. Studies have found that much of Southern California is experiencing too much fire, as a result of increased ignition risk, population pressures, and climatic influences. See Figure 1. In these locations, wildfire risk reduction strategies must include ignition reductions, home hardening, and careful land use planning, with less focus on fuel reduction.³

In areas where fire has been excluded for too long, however, the current pace of restoration is far below levels needed to restore landscape resilience. Between 2017 and 2020, CAL FIRE and the USFS completed or assisted with prescribed fire activities on approximately 80,000 acres annually. In the same period, tribes, California State Parks, the NPS, local agencies, and private entities completed burns on tens of thousands of additional acres annually. The USFS and NPS also completed approximately 20,000 acres annually of fire managed for resource benefit. Numerous



³ Use of prescribed fire within chaparral ecosystems will be limited. As acknowledged in the Wildfire and Forest Resilience Action Plan, "chaparral habitats require fire for health, but the fire is happening too frequently," risking type conversion to grasslands and loss of associated biodiversity. However, prescribed burning of chaparral by private landowners is permitted under state law, and may be appropriate for cultural purposes or to provide community wildfire protection in proximity to developed areas, provided that limitations on type conversion established by Public Resources Code § 4483 and the CalVTP are met.

studies and assessments have identified barriers to expanding beneficial fire activities, including insufficient human and other resources, regulatory hurdles, lack of public buy-in, fear of liability and lack of insurance, and for tribes, a lack of access to ancestral territories.

As a result, current estimates indicate that between 10 and 30 million acres in California would benefit from some form of fuel reduction treatment. Fire activity at low to moderate severity is particularly needed, though higher severity patches can have ecologically beneficial outcomes as well. Most of these areas need both initial entry and subsequent treatments before they can be returned to a sustainable fire regime (where feasible) or maintenance activities. Ongoing prescribed fire and other management techniques will be required across much of the landscape to maintain ecosystem resilience.

California cannot completely address the current treatment deficit in the four-year life of this Strategic Plan. However, the state and its partners can establish a shared framework of policies, capacity, and infrastructure necessary to bring ecosystems into balance in the long term. This plan embodies the first “all hands” approach to expanding the role of beneficial fire in California, enrolling and empowering cooperators from different sectors, geographies, and interests to contribute to statewide strategies that no single agency, landowner, or community could hope to tackle alone.

Experts suggest that the state has only one to two decades at most to change course, or else risk loss of forest cover, destabilization of carbon stores, and decreased biodiversity. This Strategic Plan explains how the state and its partners are working to effect that change for the benefit of future generations.





PYRODIVERSITY PROMOTES BIODIVERSITY

In 1991, Robert E. Martin and David B. Sapsis published “Fire As Agents Of Biodiversity: Pyrodiversity Promotes Biodiversity.” This key paper argued that fire suppression led to a reduction in “pyrodiversity,” or variation in the frequency and severity of burns across an ecosystem. In turn, they argued that the reduction in pyrodiversity negatively impacted biodiversity, as the landscape became more homogenous. Ultimately, the paper instigated a larger conversation about beneficial fire in California and what it means to live in a strongly fire-associated landscape.

More recent studies support these conclusions, finding ecological and wildfire resilience benefits in heterogeneity in vegetation patterns (Stephens et al. 2021; Koontz et al. 2020; Kane et al. 2019; Stephens and Frederick 2020; Hessburg et al. 2016). Where fire is appropriately restored to an ecosystem, it creates fine-scale variability in forest structure, which may then interrupt fuel continuity and prevent future fires from killing overstory trees. (Koontz et al. 2020). As a result, lower-severity fire or scattered patches of higher-severity fire reduce the risk of conversion to other vegetation types. (Koontz et al. 2020; Hankins 2015; Hankins 2013).

Ultimately, fire must play a preeminent role in delivering and maintaining biodiversity and resilience in California.

- Craig Thomas, The Fire Restoration Group

THE VISION

By 2025, California will have the policies, programs, capacity, and knowledge to effectively deploy sufficient prescribed fire, cultural burning, and fire managed for resource benefit to meet our ecological, climate, public safety, public health, and cultural needs.

In August 2020, California and the USFS agreed to scale up vegetation treatment and maintenance to 1 million acres of federal, state, and private forest and wildlands annually by 2025. This restoration and fire hazard reduction goal provides a motivational target but is—on its own—an incomplete vision. To meet this ambitious goal, California needs to *create a strong culture of beneficial fire and the capacity to implement larger and more frequent projects*. By 2025, we envision a transformed system where state, federal, local, and tribal entities, and their cooperators in the private sector, have both the ability and resources to meet our beneficial fire needs.

This culture will be guided by the best available scientific information, including Traditional Ecological Knowledge and Indigenous expertise, in order to direct beneficial fire activity to the most in-need landscapes and to ensure protection of ecosystems, public

safety, public health, and culture. California will continue to build on significant investments in collaboration and communication across state, federal, local and tribal entities, the nongovernmental community, private landowners, and timber owners. State and federal agencies will recognize the role of tribal governments and communities to engage in cultural burning and the importance of restoring Traditional Ecological Knowledge and Indigenous expertise to the landscapes. Prescribed fire practitioners and regulators will engage from a place of acknowledgment that while prescribed fire can have adverse impacts—particularly related to smoke, public health, and the potential for escaped burns—the impacts of these risks are more predictable and significantly less than those from the catastrophic wildfires experienced in recent years. We need to restore sufficient beneficial fire to the ground to begin to reduce these threats.





By 2025, land managers will seek to deploy beneficial fire on 400,000 acres annually, based on the following targets and estimates⁴:

ANNUAL TARGETS FOR PRESCRIBED FIRE AND CULTURAL BURNING:

- » **CAL FIRE:** 50,000 acres.
- » **Forest Service:** 150,000 acres.
- » **National Park Service:** 20,000 acres.
- » **Bureau of Land Management:** 5,000 acres.
- » **State Lands**, including those managed by California State Parks, California Department of Fish and Wildlife, and State Lands Commission: 25,000 acres.
- » **Range Improvement Associations** and the California Cattlemen's Association: 25,000 acres.
- » **Other land managers**, including tribes, cultural fire practitioners, private landowners, nongovernmental organizations, Prescribed Burn Associations, and local jurisdictions: 25,000 acres.

ANNUAL ESTIMATES FOR FIRE MANAGED FOR RESOURCE BENEFIT:

- » **Forest Service:** 100,000-150,000 acres.
- » **National Park Service:** 20,000-50,000 acres.

⁴ These targets are intended to count toward the 1-million-acre annual target established in the Shared Stewardship MOU, which concerns treatments activities of all types—not just prescribed fire—conducted by the state and the USFS. They have been established by the agencies or other relevant stakeholders



This Strategic Plan does not establish specific geographic priorities for beneficial fire. It recognizes that land management activities must be tailored to ecosystems and natural resources, location of homes and other human infrastructure, time of year and climatic conditions, and goals and desired outcomes. As a result, land managers will continue to seek input from their communities and other stakeholders in selecting appropriate areas for prescribed fire projects. The Regional Forest and Community Fire Resilience Plans developed in accordance with Action Plan 1.29 will also play a role in integrating prescribed fire projects into regional plans.

Maintenance burning (i.e., reburning areas recently burned by wildfire or treated by beneficial fire or other means in line with adapted fire return intervals) is a critical part of this vision. Returning fire to the landscape is an ongoing, iterative process; it is not complete at the end of the first burn. Rather, to protect our investment of resources in prior treatments, to capitalize on recent wildfire footprints, and to take advantage of training opportunities, maintenance projects must become a meaningful portion of the beneficial fire projects undertaken as part of this Strategic Plan. If we can continue to maintain fuel reduction through prescribed fire, cultural burning, and fire managed for resource benefit, landscapes can be returned to more frequent fire intervals with lowered severity, allowing a significant portion of California to become more fire resilient.



ACTION PLAN

Develop a Robust Beneficial Fire Workforce

Beneficial fire activities often demand significant human and physical resources, including professional fire managers, project planners, knowledgeable regulators, communications experts, and sufficient equipment for site preparation and contingencies. To expand the pace and scale of beneficial fire activities, we will need to develop a significantly larger beneficial fire workforce, particularly within federal, state, tribal, and local agencies. The state and its partners must overcome challenges related to the seasonality of the work (wherein limited burn windows create intense need at specific times) and competing demands within the fire management agencies for suppression resources, especially during challenging wildfire seasons.

Goal #1: The state and its partners will grow, train, and diversify the beneficial fire workforce, including people trained in burn planning, burn implementation, public communication, air quality modeling and permitting, data analysis and modeling, and operational support.

Work Underway

Training Programs

- In 2021, CAL FIRE's Office of the State Fire Marshal issued a curriculum for certifying Prescribed Fire Burn Bosses. The new curriculum—offered for the first time in Spring 2021—certifies agency staff, firefighters, and other people interested in planning and/or managing prescribed fire on state or private lands. The program was developed pursuant to Senate Bill 1260 (2018).
- The USFS offers training on prescribed fire plan preparation, implementation, and smoke management techniques for its staff (including Type 2 and 1 Burn Bosses, prescribed fire managers, and holding bosses), as well as other agencies and nongovernmental organizations. CAL FIRE likewise engages in regular training activities at its training centers, including prescribed fire burn boss certifications for CAL FIRE officers.
- Since 2008, the Fire Learning Network (supported by the USFS and The Nature Conservancy) has run Prescribed Fire Training Exchanges (also known as "TREN") throughout California. These programs, which include fire professionals, land managers, tribes and cultural practitioners, and underrepresented groups, serve to increase the number of experienced burners, enabling more beneficial fire projects across diverse landscapes. In 2019 alone, TREN projects trained over 500 participants across the United States. Over the last five years, national TREN leaders have worked with the Watershed Research and Training Center to expand offerings in California through the Cal-TREN initiative, with support from CAL FIRE and the USFS Region 5.
- With California Climate Investment (CCI) funding and CARB technical support, the California Air Pollution Control Officers Association (CAPCOA) provides prescribed fire smoke management training programs. The curriculum covers all aspects of smoke management planning, monitoring, and reporting, and also provides a forum for participants to discuss best practices and how to overcome barriers to burning. The courses are open to all beneficial fire planners and practitioners.
- In 2023, Humboldt State University, now known as Cal Poly Humboldt, will begin offering a Bachelor of Science degree in Applied Fire Science and Management. Coursework in this new curriculum will be focused on fire weather, fire behavior, fire use, and fuels management. This program will emphasize gaining practical experience and training, especially related to prescribed fire and other fuel reduction methods. Students will also have the option of selecting a concentration in Tribal Fire Management that incorporates Native American history, practices, and governance. Other higher education programs that focus on workforce development and/or prescribed fire science include Cal Poly San Luis Obispo, Chico State, San Jose State, UC Berkeley, UC Davis, UC San Diego, UCLA, and Stanford, as well as a number of community colleges.

Workforce Development and Management

- The state has allocated \$35 million per year to CAL FIRE to maintain and expand its fuel crews to implement fuel reduction projects—including prescribed fire—on lands within the State Responsibility Area (SRA).

- CAL FIRE has hired additional foresters, fire control positions, and environmental scientists to support cooperative burning efforts and expanded relevant performance targets.
- The USFS has begun using Geographic Area Coordination Centers (GACCs) to better allocate prescribed fire resources across National Forests in California. Rather than managing resources within one National Forest, the GACCs promote “one region and one program of work.”
- California State Parks is using increased budget allocations to hire and train prescribed fire professionals and hire additional foresters.
- California Volunteers leads the California Climate Action Corps, which leverages the power of AmeriCorps to advance climate actions that engage communities for lasting impact.
- The Women-in-Fire Prescribed Fire Training Exchange (WTREX) program is specifically designed to promote and explore the growing role of women in fire management while undergoing prescribed fire operation training.
- The Department of Conservation’s (DOC) Regional Fire and Forestry Capacity program, the California Labor and Workforce Development Agency’s High Road Jobs Partnership, and many smaller community-level efforts led by local conservation corps, tribes, and nongovernmental organizations are providing introductory wildland fire trainings and work experience for tribal people, people of color, and other populations traditionally underrepresented in fire and forest management.
- The Governor’s Office of Planning and Research (OPR) is leading the development of the Just Transition Roadmap which will chart a sustainable and equitable economic transition to carbon-neutrality that builds a robust clean economy.

Promoting Diversity

- CAL FIRE, the California Conservation Corps, and the California Department of Corrections and Rehabilitation established the Ventura Training Center for formerly incarcerated firefighters. As part of the training program, participants work on

fuel reduction projects to gain valuable job skills, including prepping for and eventually helping to implement prescribed fire projects.

Key Actions

1.1 Establish Prescribed Fire Training Center:

The USFS, CAL FIRE, CARB, local and tribal governments, and nongovernmental partners will secure funding and establish a Prescribed Fire Training Center in California. The Training Center, modeled on the successful National Interagency Prescribed Fire Training Center in Tallahassee, Florida, will coordinate training opportunities

for public and private beneficial fire practitioners operating in ecosystems throughout California. The Training Center will facilitate use of satellite sites for necessary live fire training, given the diversity of California’s ecosystems. Hybrid delivery of online and in-person training will accelerate these efforts and avoid delays in capacity building. *[Implementing Action Plan 1.21].*

1.2 Develop Sufficient Prescribed Fire Crews:

State, federal, and local agencies (including CAL FIRE and the USFS) will maintain and expand prescribed fire workforces, even during resource-intensive wildfire seasons. Since fire is an important element in resource management, state and federal recruitment and retention strategies will focus on people with career goals in fire and natural resource management to fill prescribed fire-related roles. Retention efforts will focus on pay disparities between roles and housing issues.

1.3 Create Incentives for Agency Staff: CAL FIRE and the USFS will develop targets and performance measures for planning and implementation of prescribed fire projects by agency staff.

1.4 Increase Cooperative Efforts: CAL FIRE and the USFS will continue expanding cooperation on specific burns to leverage available staff and equipment, using tiered agreements to the statewide Cooperative Fire Management Agreement for individual operating units. They will also work to develop programmatic tools for resource sharing and ordering on prescribed fire projects that more closely resemble the wildfire mutual aid system. Agencies will also work to integrate and coordinate with the

private prescribed fire workforce where possible.

1.5 Increase Diversity: Fire and land management agencies and nongovernmental organizations will focus recruitment, training, retention, and contracting strategies to ensure that the state's prescribed fire workforce better reflects the diversity of the California population, including racial, ethnic, gender and social-economic diversity. Recruitment, training, and retention strategies will also be further developed to engage previously incarcerated individuals.

1.6 Increase and Improve Training: Fire and land management agencies, nongovernmental organizations, and other institutions will increase the quantity and quality of prescribed fire training opportunities for their personnel and other stakeholders as needed to meet increasing demand. Training should include prescribed fire operations, science-based ecological restoration principles, fire effects monitoring, air quality and smoke management, public communication, and cultural awareness, as well as fire safety, and should be scheduled to avoid conflicts with likely burn windows. *[Implementing Action Plan 1.25]*





WOMEN IN FIRE

Just as biodiversity is central to ecological resilience, social diversity is critical to building a more robust and resilient prescribed fire culture in California. We know that diverse perspectives beget innovation, and this time of fire-focused change and progress in California is an opportune moment to seek out and integrate people with different backgrounds, experiences, and approaches.

As a whole, the fire management system has been dominated by white men. Nationally, women make up only around 10 percent of the fire workforce, and far fewer women ascend to fire leadership positions. People of color and other minorities are even less represented. Efforts have been made to recruit women and people of color into fire careers, but challenges remain, especially when it comes to retaining them.

An increased emphasis on diversity, equity, and inclusion will be vital as California works toward new solutions and approaches to prescribed fire. Efforts to build prescribed fire capacity should focus not only on the numbers of jobs created or qualifications gained; rather, capacity should reflect movement toward a more diversified fire workforce in California, and a new focus on bringing more women, tribes, and other underrepresented groups into fire management decisionmaking. California has everything to gain from more meaningful engagement with these groups: diverse perspectives will yield new ideas, new strategies, new partnerships, and unforeseen possibilities for a more fire-adapted and fire-resilient California.

- Lenya Quinn-Davidson, University of California Cooperative Extension

EMPOWER THE PRIVATE SECTOR

Private lands comprise approximately 40 percent of the state's forest and wildlands. While state and local agencies have developed significant programs to implement prescribed fire projects on these lands on behalf of landowners, private fire practitioners must play a key role to significantly expand the scope and scale of prescribed fire. These practitioners face unique challenges because of the state's strict liability standard and the difficulty in obtaining insurance.

Goal #2: The state and its partners will encourage and effectively leverage private landowner interest in prescribed fire as a land management tool.

Work Underway

- Through the CCI Grant Program, CAL FIRE funds prescribed fire and other forest health projects that increase carbon storage and sequestration, protect ecological integrity, and improve water supply and quality. DOC's Regional Forest and Fire Capacity Program is expanding cooperative and grassroots prescribed fire initiatives at the local and regional levels, training and mobilizing hundreds of non-governmental fire practitioners each year.
- CAL FIRE's Vegetation Management Program allows CAL FIRE and landowners to cooperatively use prescribed fire (along with other mechanical and hand crew treatments) to address wildfire fuel hazards and other resource management issues on private lands within the SRA. Landowners apply to CAL FIRE with specific projects, which are then implemented by CAL FIRE based on regional priorities and resource availability. In recent years, the Vegetation Management Program burned approximately 15,000 acres per year. Recent legislative changes to this program, which eliminate the cost-share portion of the program for landowners and cooperators and enable greater liability sharing, are anticipated to expand its use.
- The Natural Resources Conservation Service's (NRCS) Environmental Quality Incentives Program (EQIP) provides financial and technical incentives to forest managers, cultural fire practitioners, and other landowners to plan and implement prescribed fire and cultural burning. NRCS has also worked to expand its capacity through qualification of third-party Technical Service Providers, who can work with enrolled private landowners to plan and lead burns.
- Prescribed Burn Associations, community based mutual aid networks that help private landowners put "good fire" on their land, are expanding across California. Twelve are in operation and at least 14 more are in development. Likewise, Range Improvement Associations help ranchers use fire to improve working lands.
- The Governor recently signed SB 332 (Dodd), which modifies the liability standard for CAL FIRE's fire suppression costs from simple negligence to gross negligence. This change will better protect public purpose burners and cultural fire practitioners from financial liability in the rare event suppression support is needed.

Key Actions

2.1 Expand Capacity of Private Prescribed Fire

Workforce: State and federal agencies will continue to develop, empower, and support the private prescribed fire workforce through grants, resource sharing, training, certification programs, and cooperative agreements, including those that offer liability coverage for public purpose burning. For instance, DOC's Regional Forest and Fire Capacity Program will invest \$3 million in capacity building, training, and coaching of Prescribed Burn Associations.

2.2 Promote Burn Boss Program: The state will continue to support the state-certified Burn Boss program to develop a well-qualified and robust private sector to help private landowners and burn practitioners implement prescribed fire programs.

2.3 Provide Technical Assistance: The University of California Cooperative Extension, in partnership with other cooperators, will provide a range of training, technical support, financial assistance, and peer networking to aspiring state certified burn bosses and Prescribed Burn Association leaders from across the state, with the goal of supporting the ongoing development of approximately 10 to 20 high-functioning Prescribed Burn Associations. Likewise, California State Universities, such as CSU Chico, Resource Conservation Districts, and other community-based organizations will continue to support training opportunities and other actions to support private and cultural burning.

2.4 Establish Pilot Claims Fund: The State will develop a Prescribed Fire Liability Pilot Program, which will support coverage for losses from permitted prescribed fires by

non-public entities, such as tribes, private landowners, and nongovernmental entities. The state recently set aside \$20 million to establish the fund. The pilot program will also enable the state to collect data about prescribed fire activities, including the rate and scope of losses, which may encourage insurers to reenter the market. [*Implementing Action Plan 1.22*]

2.5 Address Liability: Depending on the effectiveness of SB 332 and the Prescribed Fire Claims Fund in expanding private burning activities, the Task Force's Prescribed Fire Work Group may recommend further modifications to California's prescribed fire liability laws to support broader insurance availability and better protection for public purpose burners and cultural fire practitioners from financial liability in the rare event a fire causes unintended damage or harm.

2.6 Private Resource Sharing: Nonprofit organizations, Prescribed Burn Associations, tribes, and other cooperators will establish novel regional resource-sharing tools and partnerships to ensure adequate resources are available for multiple, complex and/or high consequence burns, to capitalize on variable burn windows as they shift across regions, to diversify high-quality training opportunities, and to make sure the right resources are available in the right place at the right time for burning on private lands and across complex ownerships and jurisdictions.

EXPAND CULTURAL BURNING AND TRIBAL ENGAGEMENT

Native Americans extensively shaped ecosystems with fire, using it to rejuvenate the land, sustain tribal culture, regulate fuels, recycle nutrients, manage plant and wildlife habitat for resources, provide community protection, control pests, diseases, and pathogens, modify vegetation structure, and engage in ceremony. With colonization, however, this practice was significantly limited. Both the Spanish government and later the state and federal governments prohibited or criminalized cultural burning practices, and forcibly removed Native people from their lands, resulting in ongoing barriers to land access and stewardship. California Native American tribes nevertheless retain their Traditional Ecological Knowledge related to cultural burning and have continued to refine Native burning practices. Tribes, tribal organizations and cultural fire practitioners are now working to revitalize cultural burning across their ancestral territories as part of a broader shift toward self-governance, self-determination, and tribal leadership.

Goal #3: The state and its partners will support and enable the expansion of cultural burning and better integrate California Native American tribes, tribal organizations, and cultural fire practitioners into other forms of beneficial fire across California.





Work Underway

- Tribal interest in and public support for cultural burning is considerable. For instance, the Indigenous Peoples Burning Network (created by the Yurok, Hoopa and Karuk Tribes) is an intertribal support system to revitalize the implementation of cultural burns in native communities, through the sharing of Traditional Ecological Knowledge and the protection of rights. The Cultural Fire Management Council has brought fire back to the ancestral territory of the Yurok people to ensure the continuance of traditional lifeways. The Amah Mutsun Tribal Band has re-established cultural burning on the central coast through the creation of a Native Stewardship Corps, in collaboration with and funding from California State Parks. Across the state, other tribes and cultural fire practitioners are expanding their use of cultural burning.
- In some places, tribes and cultural fire practitioners are working closely with non-tribal partners or collaborators. For instance, through the Western Klamath Restoration Partnership, the Karuk Tribe has worked with the USFS and other public and private stakeholders to develop a comprehensive plan for restoring fire resilience, including through cultural burning, across a 1.2 million-acre landscape. Likewise, Miwok practitioners are engaged with BLM, the California Department of Fish and Wildlife, the Governor's Office of Emergency Services, and others on tribally initiated burns on the Cosumnes River Preserve, focusing on rare ecosystem conservation.
- Federal agencies have authority to engage federally recognized tribes in co-management of federal lands. For instance, the Tribal Forest Protection Act allows tribes to propose specific projects to the USFS or BLM, if such projects address fire threat on federal lands adjacent to tribal communities. Likewise, the Good Neighbor Authority authorizes tribes to implement cultural burns and other restoration projects on USFS or BLM lands, if certain conditions are met. The Traditional Gathering Policy for lands managed by the USFS and BLM also supports collaboration with tribes and traditional practitioners to restore and enhance traditionally important plant resources.
- In September 2020, Governor Newsom issued a [Statement of Administrative Policy](#) directing all state agencies, departments, boards, and commissions to support tribal co-management of and access to natural lands owned by or under the jurisdiction of the state and within ancestral territories. Co-management may include opportunities for implementing cultural burns on state-owned lands.
- The state Legislature recently passed AB 642, which includes definitions of cultural burning and cultural fire practitioner. SB 332 and the Prescribed Fire Liability Pilot Program also include specific provisions to encourage and enable cultural burning.



Key Actions

3.1 Respect Tribal Sovereignty: State and federal agencies will evaluate mechanisms to ensure that regulatory structures related to cultural burning do not infringe on, and instead respect, tribal sovereignty. These agencies will seek to allow tribes, tribal organizations, and cultural fire practitioners to engage in cultural burning.

3.2 Invest in Cultural Burning: Using a portion of the \$20 million allocated to tribal forest health grants in SB 170, and other available funding, the state will invest in both capacity-building activities and cultural burning implementation via a grant program developed with input from tribes, tribal organizations, and cultural fire practitioners. If feasible, the state will consider block grant options that would allow the funding program to be implemented by a Native-led intertribal organization, such as the Intertribal Indigenous Stewardship Project. Funding programs will consider the unique status of tribes, including their sovereignty, when developing grant guidelines and agreements. [*Implementing Action Plan 1.20*]

3.3 Include Tribes in Planning: When planning prescribed fires and fires managed for resource benefit located within the ancestral territories of tribes, land managers will strive to consult with tribes to determine how Traditional Ecological Knowledge, Indigenous expertise and cultural objectives may be incorporated

into the project and whether opportunities for cultural burning can be afforded in conjunction with prescribed fire or fire managed for resource benefit. Land managers will take care to avoid appropriation or extraction of such Traditional Ecological Knowledge and Indigenous expertise and will instead work to provide opportunities for tribal leadership and implementation.

3.4 Improve Co-Management: When supporting co-management of public lands, land management agencies will adopt strategies that provide tribal partners with significant discretion, authority, and resources to implement cultural burning and other Native management techniques. Co-management activities shall be implemented with the informed consent of both the land manager and the tribal partner. Successful co-management structures and best practices will be shared.

3.5 Support Indigenous Fire Workshops: The state and its partners will support establishment of Indigenous fire workshops or other training opportunities led by tribes, tribal organizations, and cultural fire practitioners. Such workshops, which will include active cultural burning, are intended to share knowledge with both Indigenous and non-Indigenous people and bring Indigenous fire practices to the forefront of burning in California.

NATIVE AMERICAN CULTURAL BURNING

Indigenous people have been burning for thousands of years. Our ancestors lived in a spiritually balanced relationship with the land and fire was a critical part of maintaining this balance. In order to meet their sacred obligation to care for the land, and the plants and animals that live there, fire was used to methodically burn all fuel types, including mixed conifer-hardwood forests, oak woodland savannah, prairies and shrubs. They burned at all altitudes from the coastline to the high country. The land was a mosaic of fire treated land at different stages of growth. Each family, each Tribe took personal responsibility for maintaining the land with fire.

Native Americans have an intimate connection to the land and intricate knowledge of the elements that affect the use of fire. So much so, they were able to burn year-round. It was not uncommon to burn into a summer storm or take advantage of a few days of good winter weather and the cold winter nights to burn up to the snow line. Families burned their own hunting and gathering areas. Prairies were burned annually to discourage conifer encroachment, maintain hospitable habitat for deer and elk, and encourage optimal output of grain and potatoes. Oak trees, which bear nutritious acorns, benefit greatly when treated with fire in the fall. Hazel, which the Yurok people use for the frame of their baskets, was burned every 3-5 years in either the spring or fall.

The first people of this land are very aware of the symbiotic relationship we have with nature and with fire. Fire is a natural part of the ecosystem, and we as humans are part of nature. It is our privilege and responsibility to use fire as a tool for the health of the land, water, animals, and people. Fire improves animal habitat, the biochar left in its wake makes the soil more fertile, purifies the water, and sequesters carbon in the soil. A by-product of traditional burn practices is wildfire prevention.

The cultural lifeways of many tribal people are fire dependent. Traditional food, medicine, cordage, and basket weaving materials all benefit from fire, some vegetation is fire dependent. Fire is also an integral part of ancient ceremonies. As one Karuk man said, "We send our prayers up with smoke, and they are answered with fire."

It is time to reinstate traditional burn practices, adapted to a modern context. The landscape has changed, become densely loaded with fuel, and the climate is warming, yet the ancient fire technology deeply embedded in the DNA of Native Americans is still relevant. It is time that we merge this ancient knowledge with western science to work with the natural cycles of nature. It is time for tribes, government agencies, NGOs, and private landowners to work together to restore the land to health and reduce the likelihood of future mega fires. Taking our cue from the original land stewards, landscape level burns are possible with proper training and favorable conditions. We need to take advantage of every burn window. Every day is a good day to burn.

– Margo Robbins, Cultural Fire Management Council

IMPROVE REGULATORY EFFICIENCY

California has a robust regulatory framework intended to ensure that all prescribed fire activities—regardless of the identity of the burner—are completed in a safe and effective manner. However, this complex framework, which includes air quality permits, burn permits, and environmental review, can be cumbersome and time consuming, particularly for less resourced or infrequent burners. Some regulations and policies, including CARB’s smoke management guidelines, are outdated and do not match current practice. The state will recalibrate its efforts to streamline the permit and regulatory process to facilitate the increased use of beneficial fire while continuing to protect public health and safety.

Goal #4: The state will reduce regulatory barriers for beneficial fire while continuing to ensure public safety, minimize environmental impacts, and protect public health and property.

Work Underway

- In 2019, the Board of Forestry and Fire Protection certified its California [Vegetation Treatment Program Programmatic Environmental Impact Report](#) (CalVTP). The CalVTP provides a consistent approach for state and local agencies undertaking California Environmental Quality Act (CEQA) review of vegetation treatments, including prescribed fire. It also streamlines permits required by the California Department of Fish and Wildlife and the State Water Resources Control Board. In addition, lead agencies may still use existing categorical exemptions from CEQA review for smaller or lower complexity burns or tier from the 1981 Chaparral Management Plan Programmatic Environmental Impact Report.
- The USFS is in the midst of reforming its National Environmental Policy Act (NEPA) policies and procedures to reduce the time and cost of environmental analysis and decision making processes and to produce efficient, effective, and high quality land management decisions, through the [Environmental Analysis and Decision Making](#) (EADM) effort. If the state or other stakeholders partner with the USFS to implement these projects on federal lands, no additional environmental review is required under CEQA.⁵

⁵ This part of the Public Resources Code, however, is currently scheduled to sunset on January 1, 2023.

Key Actions

4.1 Best Practices and Procedures Work Group:

Air quality managers, including CARB, CAPCOA, and air pollution control districts, will develop and implement policy-level changes to further improve efficiencies and collaboration in prescribed fire planning, permitting, monitoring and reporting, including collaboration with CAL FIRE and the USFS, by the first quarter of 2022.

4.2 Review Smoke Management Program

Requirements: CARB, in coordination with the Task Force and CAL FIRE's Office of the State Fire Marshall for Burn Permits, will evaluate and make recommendations on whether statutory or regulatory changes are necessary to significantly expand the use of beneficial fire while protecting public health and safety, building on Action 4.1. These changes could include recommendations addressing whether prescribed fire should continue to be regulated as "agricultural burning" under state law; the need to support greater consistency among the state's burn management units and air pollution control districts in reviewing, approving, and tracking smoke management plans and reporting prescribed fire activities; the potential to further maximize or increase allowable burn days or beneficial fire permitting; the need for additional state and local resources; the treatment of cultural burning; and other issues. The review will include representatives of federal, state, local, and tribal entities, as well as organizations concerned with beneficial fire and public health.

4.3 Establish Online Permitting System: CAL FIRE, in cooperation with CARB and the air districts, will launch an online prescribed fire permit system for private

burners through a web-based portal. The statewide system is also intended to provide consistency in the review and issuance of prescribed fire permits.

4.4 Increase Private Landowner Assistance:

State and local agencies will expand technical assistance to private landowners to facilitate compliance with regulatory requirements (including a library of sample CEQA docs, Burn Plans, Smoke Management Plans, archaeological and biological surveys examples, and project field design), particularly at the local or regional level. [*Implementing Action Plan 1.11*]. Specifically, the Board of Forestry and Fire Protection and CAL FIRE will continue to train and educate staff and the public in the use of the CalVTP, to streamline and standardize environmental review.

4.5 Invest in Environmental Planning: The USFS and other federal agencies will increase their investments in preparing NEPA documents for prescribed fire across larger landscapes and/or administrative units, potentially including the use of programmatic NEPA review or the use of adaptive management standards.

4.6 Invest in New Technology: The state and federal governments will continue to invest in fire behavior and smoke management model development and applications to provide better information and decision support to air quality managers, and to train air quality managers on the use of such technology. The focus of these efforts will be to increase allowable burn days based on greater certainty about potential smoke impacts.

PROTECT PUBLIC HEALTH

To protect public health and safety as the state expands the pace and scale of beneficial fire activity, land and fire management agencies must reduce smoke to the extent feasible, and seek to reduce potential exposure through clear communication and mitigation strategies. Likewise, these agencies must develop strategies to minimize the impacts of smoke on frontline workers, who can be exposed to both acute and long-term risks.

Goal #5: The state will monitor, assess, and mitigate the potential adverse public health impacts associated with beneficial fire smoke.

Work Underway

- The state's comprehensive smoke management program, largely administered by CARB and the state's air pollution control districts, was established to protect public health, minimize air quality impacts, and reduce exposure to smoke from beneficial fires. Because exposure to fine particulate matter and other components of smoke can have serious negative health consequences, the smoke management program restricts prescribed burning when wind and weather would expose the public to smoke from nearby burns. The federal Clean Air Act, State Implementation Plans, and other state and local regulations seek to ensure that smoke from beneficial fires will not result in a non-attainment designation for applicable air quality standards for key pollutants, including fine particulate matter.
- Through its Prescribed Burning Monitoring and Reporting Program, CARB has invested \$2.4 million in new smoke monitoring equipment and systems to increase data collection and situational awareness statewide. CARB has also awarded \$3.6 million to local air districts for training, planning, and operations to expand their smoke management planning and public education programs.
- CARB is building upon and adapting its Incidental Air Monitoring Program to monitor and analyze prescribed fire smoke impacts. Likewise, the U.S. Environmental Protection Agency's (USEPA) Smoke Ready campaign may provide communication tools and mitigation strategies that can be adapted for beneficial fire.
- Local air districts regularly inform the public about both the benefits of and potential impacts from prescribed fire. For example, air districts in the Sierra Nevada have established programs to educate the public about both the benefits of beneficial fire and mechanisms to avoid incidental smoke exposure.
- The California Department of Public Health (CDPH) is undertaking a study of the public health impact of prescribed fire smoke, including an assessment of the health burden of smoke exposure from prescribed fire activity and wildfire activity. CDPH is also collecting community engagement data to better guide communications and mitigation strategies, particularly with medically vulnerable populations. The research is supported by a CAL FIRE Forest Health Research grant.

- Researchers at the Sean N. Parker Center for Allergy and Asthma Research at Stanford University are also conducting research on the comparative impacts of wildfire and prescribed fire smoke.
- The Karuk Tribe and community/academic partners have established a HEPA Filter checkout program for sensitive receptor groups within the Karuk Aboriginal Territory. HEPA filters are available during wildfires, prescribed fires and cultural burning activities. Research is currently being

done on the differences between indoor and outdoor particulate concentrations and related public exposure levels. This study includes data on indoor spaces with and without HEPA filtration. Smoke Ready Community programs are starting to replicate and adapt these concepts throughout California.

Key Actions

5.1 Increase Outreach to Sensitive Populations:

Air districts will enhance partnerships with public health agencies and private healthcare providers to identify and inform sensitive populations (elderly, very young, pregnant, those with respiratory or cardiac conditions) about the potential impacts from beneficial fire smoke. These outreach efforts will focus on populations with higher incidences of underlying conditions or other air pollution exposures, including people of color and low-income communities.

5.2 Develop Innovative Mitigation Strategies:

Air districts and fire practitioners will continue to develop and deploy innovative and advanced mitigation strategies to directly reduce impacts to smoke sensitive populations (e.g., public air purifier lending programs, air purifier rebates, clean air refuges), in consultation with such communities. Mitigation in low-income and other under-resourced communities will be prioritized. Air quality managers will continue to promote appropriate mitigation strategies

to reduce potential exposure, such as staying inside, investing in HVAC systems and air purifiers, or using masks.

5.3 Protect Frontline Workers: The Prescribed Fire Work Group, in coordination with CAL FIRE, the USFS, and Prescribed Burn Associations, will develop, distribute, and regularly update best practices for protecting prescribed fire professionals from smoke impacts.

5.4 Deploy Smoke Spotter App: CARB's Smoke Spotter mobile application launched in June 2021. It provides the public with information on nearby prescribed fires and cultural burns, hourly data gathered from permanent and portable air monitors, and personalized alerts. CARB will continue to promote, deploy, and improve Smoke Spotter by offering a 24-hour smoke forecast, better information on wildfires, and educational content to help people prepare for smoke events related to prescribed fire.

BUILD PUBLIC SUPPORT

Recent studies indicate strong support for beneficial fire programs where the public is aware of their benefits and familiar with land managers and fire practitioners. Frequent and effective communication is therefore necessary, especially within local communities and with segments of the public that may have less knowledge of or exposure to forest and wildland management.

Goal #6: The state and its partners will effectively educate the public on the benefits of and scientific support for the use of beneficial fire.

Work Underway

- The Fire MOU Partnership Outreach and Communications Working Group has developed a comprehensive fire communication plan for use by Fire MOU members.
- As a result of increased collaboration and relationship building, some air and land managers have begun releasing joint press releases and other communications materials for prescribed fire projects. These coordinated efforts increase credibility, provide unified messaging, and are more likely to gain public attention than individual agency efforts.
- The USFS, USEPA, CARB, and Placer County Air Pollution Control District, together with other collaborators, have formed a Smoke Communication Working Group to further develop public education strategies on the potential smoke impacts from prescribed fire. This group has prepared a Frequently Asked Questions document on wildfire emissions, which includes an extensive discussion of the growth and importance of prescribed fire. The Air and Land Managers group is working on a similar communication document.
- For complex or larger burns, land managers engage dedicated communications professionals as part of the burn team, similar to Public Information Officers and Air Resources Advisors used by CAL FIRE and the USFS during wildfires.

Key Actions

6.1 Create Dedicated Web Portal: CAL

FIRE will partner with the Task Force to develop a dedicated public web portal for beneficial fire education and outreach. The site will highlight the uses of beneficial fire, management of risks and impacts, and the diversity of public benefits.

6.2 Manage Prescribed Burn Association

Website: The University of California Cooperative Extension and its cooperators will continue to manage and update the California Prescribed Burn Association website (calpba.org), which provides communications tools and resources for Prescribed Burn Association leaders. Prescribed Burn Associations and

the Fire Adapted Communities Learning Network will also continue to educate the public about the role of prescribed fire in hazard reduction and ecosystem resilience.

6.3 Develop Media Toolkit: The University of California Cooperative Extension and its cooperators will develop a media and public communications toolkit (with template press release, social media, and talking points) for public agencies and prescribed fire practitioners to increase consistency across different agency, cooperative, and community-led efforts, while acknowledging regional differences. Messaging will include education on the comparative risks of wildfire and beneficial fire, as well as beneficial fire's role in reducing the risks of catastrophic wildfires and associated emissions. It will emphasize ongoing efforts to protect public health while affirming the need to reintroduce California's historic fire regimes. The toolkit will include specific strategies to reach underrepresented communities, non-English speakers, consumers of non-traditional media, those without reliable internet access, and elected officials.

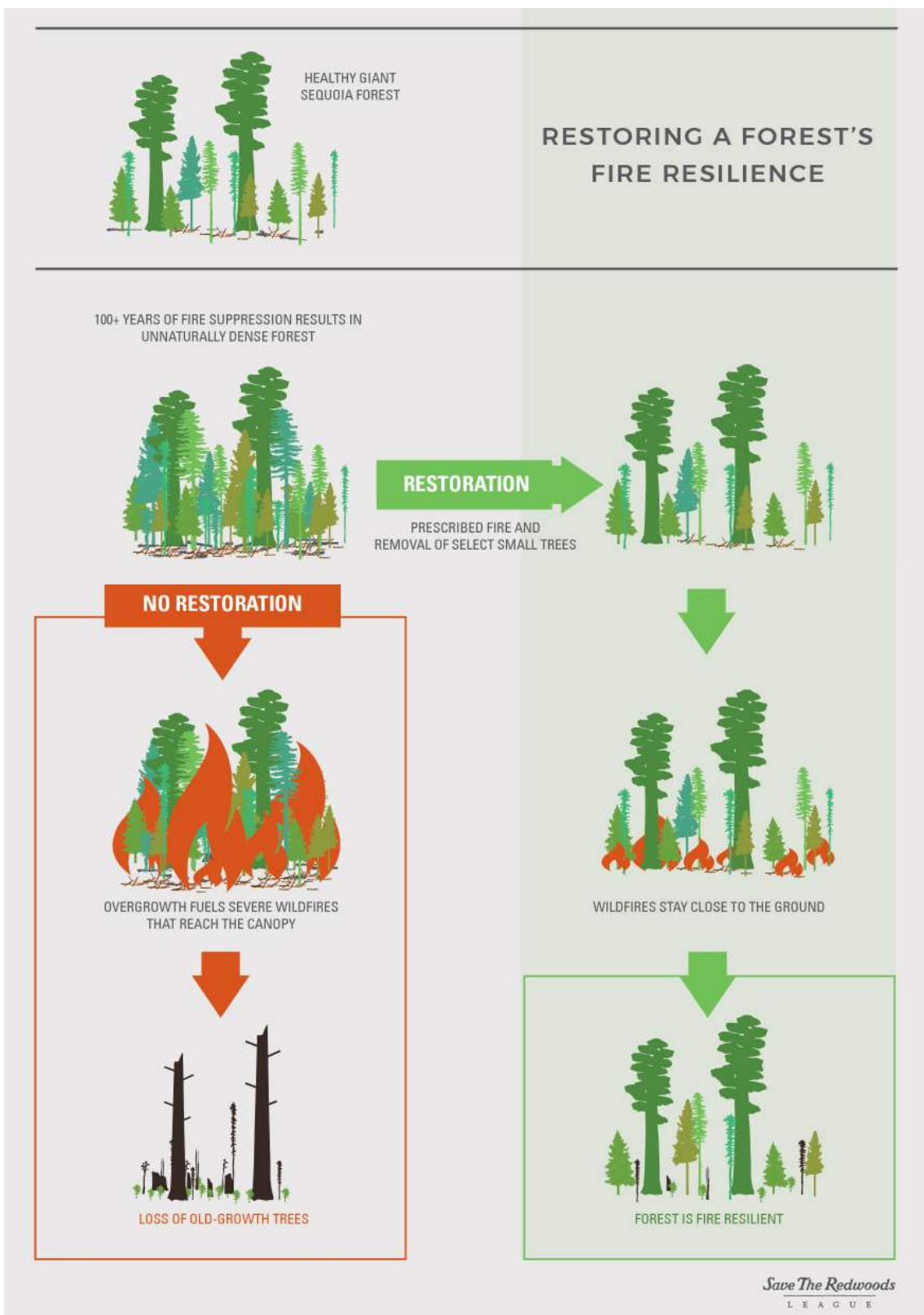
6.4 Develop Case Studies and Success Stories: CAL FIRE, the USFS, and other land managers and organizations (such as Prescribed Burn Associations and Rangeland Improvement Associations) will regularly share "after-burn" summaries and success stories with the public to increase public knowledge and acceptance of prescribed fire using multi-media formats (e.g., story maps) and other techniques. Where feasible, elected

officials and members of the public will be provided opportunities to observe fire activities or post-treatment landscapes. Some case studies and success stories will be coordinated and promoted on California's Adaptation Clearinghouse, managed by the Governor's Office of Planning and Research.

6.5 Track and Evaluate Outreach, Public Awareness, and Perception: Fire managers will continue to measure public awareness and perception of beneficial fire (both informally and in conjunction with academic researchers) to better understand public acceptance of the state's efforts to expand burning, and to help improve and adjust their strategies.

6.6 Communicate Effectively Regarding Escaped Burns: CAL FIRE and the USFS will develop plans to alert the public about prescribed fires that inadvertently cause damage or loss. The plans should describe how to provide unified communications (including ongoing support for prescribed fire programs) during and immediately after the burn, and how to report on any after-action report developed by the agencies.

6.7 Partner with Fire Safe Councils and homeowners associations: State agencies will engage with local partners, including planning departments, Fire Safe Councils, homeowners associations, and other community leaders, to promote understanding of the long-term need for beneficial fire at the local level.



Example public messaging graphic. Source: Save the Redwoods League.

FACILITATE LARGER AND STRATEGICALLY LOCATED BURNS

The ambitious acreage targets in this Strategic Plan cannot be reached without increasing the size of beneficial fire projects. Projects that are currently tens or hundreds of acres must expand to encompass thousands of acres, when conditions are favorable. Larger and longer burn projects are likely to require significant advanced planning and preparation across jurisdictions and agencies.

Goal #7: A greater percentage of beneficial fire projects in California will be conducted over larger landscapes.

Work Underway

- State, federal, and local land managers, tribes, and private landowners are working collaboratively to facilitate larger, cross-jurisdictional planning and burning. A successful example is the CAL FIRE (Fresno-Kings Unit), USFS (Sierra National Forest-High Sierra Ranger District) and Southern California Edison partnership in the Shaver Lake area east of Fresno, which has worked collaboratively across jurisdictions on numerous fire projects for years.
- Collaborative planning efforts have been financially supported by the DOC's Regional Fire and Forestry Capacity program, which is aimed at building the capacity of regional collaboratives and partnership initiatives for wildfire resilience.
- Through its Good Neighbor Authority and broader cooperative agreement authorities, the USFS has entered into agreements with state agencies, tribes, counties, and nonprofit organizations to implement prescribed fire and other critical forest management work on federal land and adjacent parcels.
- The National Wildfire Coordinating Group's [Interagency Prescribed Fire Planning and Implementation Procedures Guide](#) provides consistent interagency guidance, promotes common terms and definitions, and provides standardized procedures to help federal, state, tribal, and local partners better plan and implement prescribed fire across jurisdictions. Likewise, NWCG's [Smoke Management Guide for Prescribed Fire](#) provides consistent guidance on smoke management techniques, monitoring, and communication.



Key Actions

7.1 Establish Pilot Projects: The Fire MOU Partnership will identify and seek to implement two to three landscape-scale prescribed fire projects. These pilot projects may involve programmatic environmental review, cross-jurisdictional agreements, advanced smoke mitigation strategies, preparatory site work (including implementation of pyrosilvicultural techniques to pair prescribed fire with mechanical thinning), more flexible permitting, maintenance burning, and the sharing of crews, resources, and liability coverage. The Fire MOU Partnership will facilitate the sharing of best practices and lessons learned from the implementation of these pilot projects.

7.2 Invest in Weather and Smoke Prediction Tools: Agencies and cooperatives such as the California and Nevada Smoke and Air Committee will continue to invest in development of weather and smoke prediction technology to facilitate longer

burn windows needed for larger or more complex prescribed fires.

7.3 Strategically Deploy Wildfire Footprints: As part of post-wildfire assessments and recovery planning, fire managers and their cooperators, including tribes and cultural fire practitioners, will evaluate both the need for maintenance beneficial fire within recent wildfire footprints, and the potential for using the burn footprint and control lines to anchor adjacent beneficial fires across the landscape. The evaluation will be shared with willing landowners and managers for incorporation into prescribed fire and other project planning where appropriate.

7.4 Plan for Expanded Burn Windows: Fire managers will continue to evaluate and use additional periods for beneficial fire activities, including evening and nighttime hours and winter months with unusually low precipitation.

USE FIRE MANAGED FOR RESOURCE BENEFIT WHERE AND WHEN APPROPRIATE

While many unintentional ignitions require full fire suppression efforts (including ignitions located in proximity to communities and other assets or under adverse weather conditions), some ignitions can be managed in a way to achieve ecosystem and other resource benefits without undue risk to public safety or significant impacts to public health or the environment. This practice, referred to here as “fire managed for resource benefit” or “managed fire” is already in use by the USFS and other public land managers where land management plans allow, especially in Wilderness Areas on the Inyo, Sequoia, Sierra, and Klamath National Forests. CAL FIRE, which has fire protection responsibility on most private lands, is also exploring ways to modify suppression tactics to restore fire to certain ecosystems [Action Plan 1.23]. Under appropriate weather and safety conditions, where infrastructure, private property, and public safety are not at immediate risk, where adequate resources are available, and in agreement with landowner objectives, fire managed for resource benefit can serve as a useful, cost-effective, and efficient tool for reintroducing fire and achieving broad-scale management goals.

Goal #8: Where feasible, appropriate, and planned, fire management agencies will work with land managers and owners to manage unintentional ignitions for community protection, biodiversity, forest resilience, and other benefits.

Work Underway

- The NPS has long managed wildfire within its jurisdiction to improve the health and resilience of its lands. For instance, Yosemite National Park has managed unintentional ignitions in the Illilouette Creek Basin over the last four decades. Research has documented that the ecosystem now experiences self-limiting fires, greater ecosystem heterogeneity and resilience, and decreased water demand.
- The Inyo National Forest and Lake Tahoe Basin Management Unit recently revised their Forest Plans to explicitly permit the use of fire managed for resource benefit, pursuant to the federal 2009 Guidance for Implementation of Federal Wildland Fire Management Policy. For example, the Inyo Forest Plan identifies large wildfire restoration and maintenance fire management zones where unplanned ignitions can be used to restore and maintain ecosystem resilience when conditions are favorable. The Sequoia, Sierra, and Tahoe National Forests are nearing completion of new Forest Plans that contain similar wildfire restoration and maintenance zones. The plans for fire managed for resource benefit in the Inyo, Sierra, and Sequoia alone would more than triple the current restoration treatment rate.



- The USFS has identified Potential Operational Delineations (PODs) – areas where natural ignitions can be contained within identified or planned fuel breaks such as roads, ridge tops, water bodies, or

fire footprints – in several National Forests. PODs are used for diverse fire management activities, including both fire suppression and fire managed for resource benefit. *[Implementing Action Plan 1.3]*

Key Actions

8.1 Invest in Spatial Fire Management Planning:

The USFS, the NPS, and other land managers will continue to invest in spatial fire management planning, including advanced planning to identify pre-fire landscapes where wildfires may be managed for resource and other benefits, taking into account public safety, smoke management, protection of private lands, infrastructure and resources, and ecological benefits. Land managers will work with tribes, local communities, and other stakeholders in these planning efforts.

8.2 Implement On-the-Ground Projects to Facilitate the Use of Unplanned Ignitions:

Land managers will identify and implement advanced on-the-ground projects to facilitate the subsequent use of fire managed for resource benefit, such as strategically placed fuel breaks, grazing, and mechanical thinning. Land

managers will engage tribes, local communities, and other stakeholders in this work.

8.3 Modify Suppression Tactics on State

Land: CAL FIRE will partner with state land managers (including State Parks, California Department of Fish and Wildlife, and Conservancies) and large landowners (such as land trusts, ranchers, and timber owners) to evaluate landscapes where modified suppression techniques may be implemented. Where appropriate and authorized by the state Legislature, CAL FIRE will use plans and agreements with land managers and landowners in order to allow unintentional ignitions to burn under predetermined and carefully prescribed conditions, utilizing planned infrastructure for accomplishing resource benefits similar to prescribed fire. *[Implementing Action Plan 1.23]*

IMPROVE DATA COLLECTION AND UTILIZATION

Beneficial fire activities in California span state, federal, local, and tribal entities as well as private organizations, practitioners, and landowners. While this decentralized approach is necessary given the state's diverse ecosystems and land ownership, it has also made it difficult to effectively track, monitor, and share information about beneficial fire. Improved coordination is necessary to guide the expansion of the practice throughout the state. Best-available science firmly establishes the need to re-establish beneficial fire in many of California's ecosystems, but more research is needed to guide management activities, especially in ecosystems where relatively little research has been completed (e.g., foothill and valley ecosystems).

Goal #9: The state and its partners will support the effective and efficient gathering, synthesis, and communication of beneficial fire data, to improve transparency, accountability, and adaptive management.

Work Underway

TRACKING BENEFICIAL FIRE ACTIVITY

- CARB manages the Prescribed Fire Information Reporting System (PFIRS), which is intended to capture most significant prescribed fire activity in the state, including projects conducted by federal agencies (USFS, NPS, BLM, Bureau of Indian Affairs, U.S. Fish and Wildlife Service), state agencies (CAL FIRE, State Parks, and Conservancies), local agencies, tribal entities, and private burners.⁶
- CAL FIRE's new online burn permitting system will significantly improve prescribed fire burn information. CAL FIRE and CARB are working to ensure that the PFIRS and CAL FIRE permitting systems are coordinated and to avoid duplication.
- The USFS tracks beneficial fire activity in National Forests using its Forest Activity Tracking System. CAL FIRE tracks its prescribed fire activities in CalMAPPER.

⁶ Most prescribed fires that do not meet Title 17 criteria (i.e., smaller than 10 acres or 1 ton of PM₁₀ emissions) or that are not reported to local Air Districts are not currently included.



MONITORING PRESCRIBED FIRE IMPACTS AND EFFECTS

- The California Prescribed Fire Monitoring Program (CPFMP) is a joint project between CAL FIRE and UC Davis that monitors prescribed fire effectiveness and effects on lands of all jurisdictions. Since 2019, the CPFMP has conducted monitoring at 17 sites, characterizing more than 5,000 treated acres across 50 individual burn units. Project sites sampled to date are located on properties managed by 14 entities, including federal and state agencies, county and local agencies, universities, nongovernmental organizations, corporations, and private landowners.
- With funding provided pursuant to SB 1260, CARB has purchased and deployed 60 mobile air quality monitors (E-BAMS) for use by local air districts and fire practitioners during beneficial fire activities. The monitors provide information on air quality impacts over the course of fire activities and verify of air quality modeling activities.
- CARB, together with University of Nevada, Reno, CAL FIRE, and the USFS, is creating a tool based on remote sensing to better quantify the carbon impacts of beneficial fire and other forest stewardship activities.
- The USFS maintains the Fuel Treatment Effectiveness Monitoring System, which requires land and fire managers to evaluate and report on any instance where wildfires interact with previous prescribed fire and other treatments.
- The USFS Region 5 Ecology Program and University of California partners have conducted fuels treatment effects and effectiveness monitoring on many fires across California, resulting in numerous reports and publications.

ENABLING PRESCRIBED FIRE RESEARCH

- The Science Advisory Panel and the Monitoring, Assessment, and Reporting Work Group of the Task Force are developing a Forest Data Hub, which will provide public access to data sets relevant to beneficial fire developed by a variety of agencies and organizations.
- The CCI Forest Health Research Program is providing significant funding for scientific research specifically related to beneficial fire.

- The national Joint Fire Science Program, a consortium of federal agencies, provides funding to a network of regional and state fire science and extension groups, including the California Fire Science Consortium. The

California Fire Science Consortium hosts events and highlights research on multiple fire topics, including prescribed fire, cultural burning, communication, and air quality.

Key Actions

9.1 Develop Interagency Beneficial Fire Tracking System:

CALFIRE, the USFS, and other partners will develop a publicly available treatment tracking database, which will include comprehensive information about beneficial fire activity and other treatments throughout the state.

9.2 Update PFIRS: By 2023, CARB will update and enhance PFIRS to improve data collection and ease-of-use by local air districts and fire practitioners. The update will include spatial data, links to CAL FIRE's online prescribed fire permit system, and other enhancements to track and evaluate burn day utilization and impediments to burning. *[Implementing Action Plan 1.39, 2.32].*

9.3 Assess and Document Public Health Impacts:

Using data gathered from mobile air quality monitors and other sources, CARB will lead, with contributions from other agencies, entities, and academic researchers, an analysis of potential public health impacts of prescribed fire smoke compared to wildfire smoke. Particular attention will be paid to impacts on disadvantaged communities and climate vulnerable communities. *[Implementing Action Plan 1.39]*

9.4 Establish Metrics: Land managers and fire scientists will evaluate options for moving beyond simple acreage targets to communicate the impacts of specific beneficial fire activity on forest resilience, carbon stability, community safety, and biodiversity. The Fire MOU Partnership

and/or Prescribed Fire Work Group of the Task Force will propose a new framework for quantifying outcomes of beneficial fire across the full range of values for use in future goals and targets. The metrics will align the framework for quantifying the benefits of beneficial fire with the WFR Action Item to Develop Performance Measures for community wildfire risk reduction and adaptation. *[Implementing Action Item 2.2]*

9.5 Increase Monitoring Efforts: State and federal agencies will expand their financial and logistical support to monitoring efforts that track prescribed fire and fire managed for resource benefit efficacy and effects. These will include expanding the CPFMP to include off-season monitoring crews for off-season burning, adding other state and federal agencies to the CPFMP agreement, developing an interagency managed wildfire monitoring protocol and infrastructure, and leveraging remote sensing and other technological advancements.

9.6 Beneficial Fire Summits: : In coordination with the Prescribed Fire Councils, the California Fire Science Consortium, tribes, and other organizations, the Fire MOU Partnership will connect land managers and fire practitioners with fire scientists and other researchers through beneficial fire summits, in order to disseminate the best available scientific and cultural information.



MOVING FORWARD

As described in this Strategic Plan, California's prescribed fire, cultural burning, and fire managed for resource benefit programs are led by a broad and diverse set of state, federal, local, tribal, and private organizations, often facing competing and overlapping mandates. A key goal of the Prescribed Fire Work Group has been to coordinate and integrate these disparate efforts into a comprehensive state framework.

To maintain momentum and track the progress of this Strategic Plan, the Prescribed Fire Work Group will meet frequently to review the key actions and coordinate implementation among participants and stakeholders. To assure transparency and accountability and to help implement annual reporting requirements enacted by SB 456, the Prescribe Fire Work Group will provide updates to the Task Force on an annual basis.



SUCCESS STORIES

Caples Fire/South Lake Tahoe Treatments

The Caples Ecological Restoration Project, located in the Caples Creek drainage in the Eldorado National Forest, is expected to treat nearly 9,000 acres. In 2019, 3,600 acres were treated using hand thinning, pile burning, and prescribed fire.

When the explosive Caldor Fire reached the 2019 footprint, the fire noticeably slowed. “When you’re on Highway 88 looking south, there is a large area that seems relatively unburnt,” Chris Anthony, the CAL FIRE Assistant Deputy Director of Cooperative Fire Protection, Training, Safety, and EMS said. “That is really interesting because even above the ecological restoration project, when you get up towards Caples Lake, all of it is burned, even the areas that are surrounded by granite.”

Likewise, numerous prescribed burns and other forest treatments surrounding Meyers, Christmas Valley, and South Lake Tahoe are credited with their protection. Firefighters were able to use the fuel treated areas, which are less dense with vegetation and less risky to defend, to “take a stand against the fire,” Anthony said.





Indigenous Peoples Burning Network

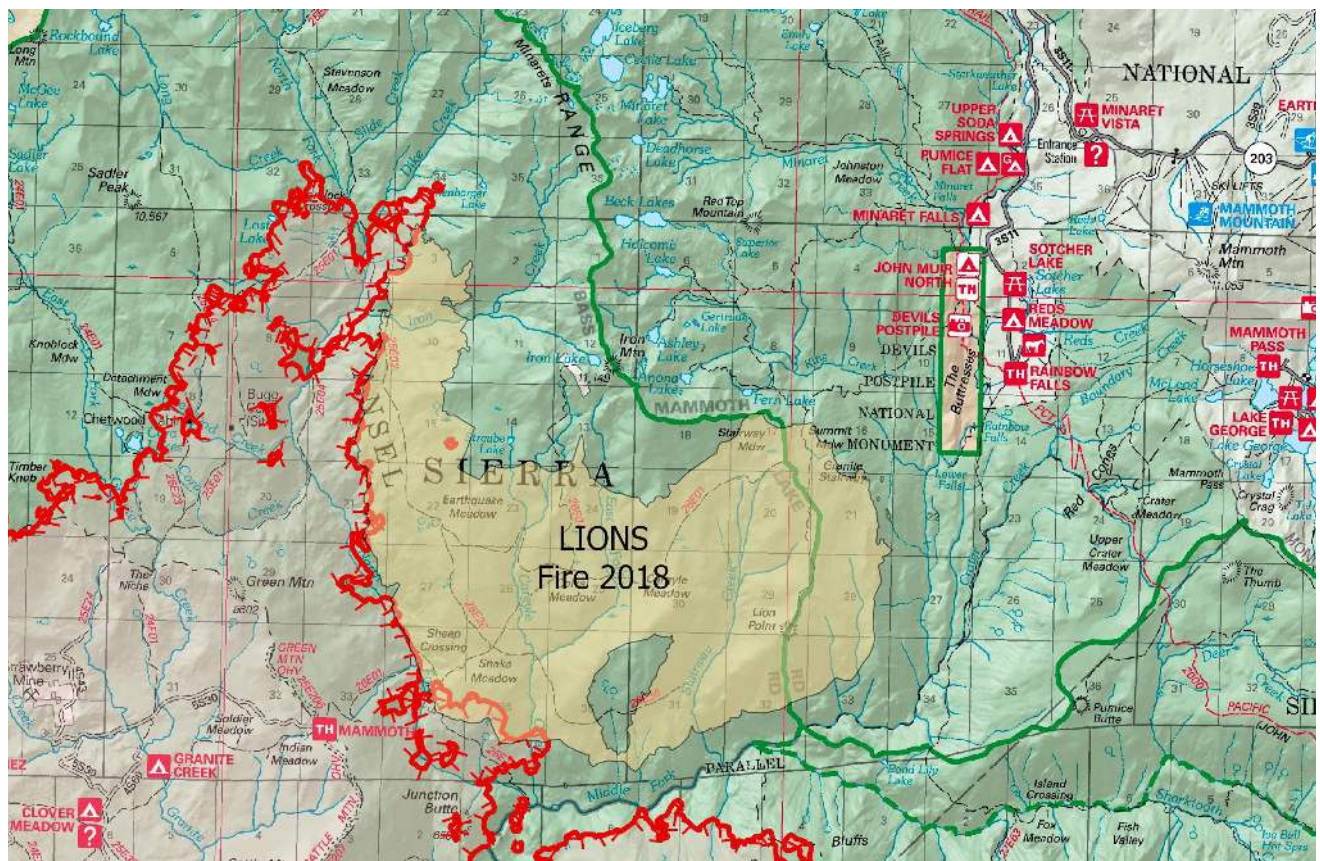
Since 2015, the Indigenous Peoples Burning Network has collaborated on ways to support cultural burning on the territories of the Karuk, Yurok, and Hoopa people through facilitating the establishment of a Healthy County Plan. Specific activities have included developing the Klamath River and Yurok Prescribed Fire Training Exchanges (Trex), facilitating cultural fire practitioner demonstration burns, and building capacities of tribal fire departments, tribal/partner organizations, and cultural fire practitioners. All this is being done to support family-based cultural burning, enhance traditional food, fiber and medicinal plants, increase biodiversity, protect local communities from high severity wildfire, and more. Bill Tripp, Karuk tribal member and Director of Natural Resources and Environmental Policy for the Karuk Tribe, noted the growing interest in the program: “People are excited to be revitalizing our Indigenous knowledge, practice, and belief systems. It’s great to have such broad support for restoring good fire back to this important landscape at meaningful scales.”

Lions Fire

In 2018, Sierra National Forest and Inyo National Forest managed the Lions Fire as a lightning fire managed for multiple objectives. Ultimately, the Lions Fire burned about 13,000 acres, removing significant fuel loading, since there was a notable amount of dead and down red fir caused by a wind-event. The Lions Fire was managed in a year with high snowpack, so the fire effects were within the normal range, mostly low intensity with pockets where the fire burned more intensely. The fire created a wonderful mosaic on the landscape. The Lions Fire did, however, create significant smoke for the Town of Mammoth Lakes and certainly some anxiety for community members as well. It is understandable that a wildfire burning near the community is a concern for residents.

Little did the Inyo National Forest realize how quickly that mosaic would be put to use. In 2020, the Creek Fire burned towards the Eastern Sierra and the Lions Fire footprint held the Creek Fire in check for about four to six weeks. The Creek Fire eventually burned around the Lions Fire mosaic right as winter and snow finally returned. It provided incredible protection for the Town of Mammoth Lakes and allowed fire suppression agencies to focus on the western perimeter of the Creek Fire, where there was significant need.

Debra Schweizer, Public Affairs Specialist for the Inyo National Forest, summed it up: “We in no way want to underrepresent how traumatic the Creek Fire was for many communities and recreationists in the Western Sierra. However, we are grateful that the Lions Fire helped protect the Town of Mammoth Lakes.”



BIBLIOGRAPHY

- Anderson, M.K., 2005. *Tending the Wild*. University of California Press, Berkeley.
- Anderson, M.K. and J.E. Keeley, 2018. Native peoples' relationship to the California chaparral. In *Valuing Chaparral*. Springer, Cham.
- Barnett, K., S.A. Parks, C. Miller, and H.T. Naughton. 2016. Beyond fuel treatment effectiveness: Characterizing interactions between fire and treatments in the US. *Forests* 7: art237.
- Biswell, H., 1989. *Prescribed Burning in California Wildlands Vegetation Management*. University of California Press, Berkeley.
- Boisramé, G.F.S., S. Thompson, B. Collins, S. Stephens. 2016. Managed wildfire effects on forest resilience and water in the Sierra Nevada. *Ecosystems* 20: 717-732.
- Boisramé, G.F.S., S. Thompson, M. Kelly, J. Cavalli, K.M. Wilkin, and S.L. Stephens. 2017. Vegetation change during 40 years of repeated managed wildfires in the Sierra Nevada, California. *Forest Ecology and Management* 402: 241–252.
- Boisramé G.F.S., S.E. Thompson, C. Tagu, and S.L. Stephens. 2019 Restoring a natural fire regime alters the water balance of a Sierra Nevada catchment. *Water Resource Research* 55:5751–69.
- Burke, M. and S. Heft-Neal. 2020. Indirect mortality from recent wildfires in CA. *Global Food, Environment, and Economic Dynamics (G-FEED)*. Available at: <http://www.g-feed.com/2020/09/indirect-mortality-from-recent.html>.
- Dove, N.C., H.D. Safford, G.N. Bohlman, B.E. Estes, and S.C. Hart. 2020. High-severity wildfire leads to multi-decadal impacts on soil biogeochemistry in mixed conifer forests. *Ecological Applications* 30: e02072
- Hankins, D.L. 2013. The effects of indigenous prescribed fire on riparian vegetation in central California. *Ecological Processes* 2: 24.
- Hankins, D.L. 2015. Restoring indigenous prescribed fires to California oak woodlands. Pp. 123-129 in: Standiford, R.B. and K.L. Purcell, tech. coords. *Proceedings of the Seventh California Oak Symposium: Managing Oak Woodlands in a Dynamic World*. USDA Forest Service, Pacific Southwest Research Station. PSW-GTR-251
- Hiers, J.K., J.J O'Brien, J.M. Varner, et al. 2020. Prescribed fire science: the case for a refined research agenda. *Fire Ecology* 16: art11.

- Hurteau, M., A. Westerling, C. Wiedinmyer, and B. Bryant. 2014. Projected effects of climate and development on California emissions through 2100. *Environmental Science and Technology* 48: 2298-2304.
- Jones, G.M., H.A. Kramer, H. S.A. Whitmore, et al. 2020. Habitat selection by spotted owls after a megafire reflects their adaptation to historical frequent-fire regimes. *Landscape Ecology* 35: 1199–1213.
- Kane, V., B. Bartle-Geller, M. North, J. Kane, M. Lydersen, S. Jeronimo, B. Collins, M. Moskal. 2019. First-entry wildfires can create opening and tree clump patterns characteristic of resilient forests. *Forest Ecology and Management* 454: 117659.
- Keeley, J.E., A. Pfaff, A.C. Caprio. 2021. Contrasting prescription burning and wildfires in California Sierra Nevada national parks and adjacent national forests. *International Journal of Wildland Fire* 30: 255-268.
- Kolden, C.A. 2019. We're not doing enough prescribed fire in the Western United States to mitigate wildfire risk. *Fire* 2: art 30.
- Liu, X., L.G. Huey, R.J. Yokelson, et al. 2017. Airborne measurements of western U.S. wildfire emissions: Comparison with prescribed burning and air quality implications. *Journal of Geophysical Research: Atmospheres* 122: 6108-6129.
- Long, J.W, L.W. Tarnay, and M.P. North. 2018. Aligning smoke management with ecological and public health goals. *Journal of Forestry* 116: 76-86.
- Long, J.W., F.K. Lake, R.W. Good. 2021. The importance of Indigenous cultural burning in forested regions of the Pacific West, USA *Forest Ecology and Management* 500: 119597.
- Martin, R. and D. Sapsis. 1992. Fires as agents of biodiversity: Pyrodiversity promotes biodiversity. Pages 150-157 in: *Proceedings of the Symposium on Biodiversity of Northwestern California*. University of California Cooperative Extension, Berkeley.
- Miller, J. and H. Safford. 2012. Trends in wildfire severity: 1984 to 2010 in the Sierra Nevada, Modoc Plateau, and Southern Cascades, California, USA. *Fire Ecology* 3: 41-57.
- Miller, J.E.D., H.T. Root, and H.D. Safford. 2018. Altered fire regimes cause long-term lichen diversity losses. *Global Change Biology* 24: 4909-4918.
- Miller, R.K., C. Field, and K.J. Mach. 2020. Barriers and enablers for prescribed burns for wildfire management in California. *Nature Sustainability* 3:101-109.
- National Wildfire Coordinating Group. 2020. NWCG Smoke Management Guide for Prescribed Fire. PMS 420-3, NFES 001279.

North, M., B.M. Collins, and S. Stephens. 2012. Using fire to increase the scale, benefits, and future maintenance of fuels treatments. *Journal of Forestry* 110: 392-401.

North, M., A. Brough, J. Long, B. Collins, P. Bowden, D. Yasuda, J. Miller, and N. Sugihara. 2015. Constraints on mechanized treatment significantly limit mechanical fuels reduction extent in the Sierra Nevada. *Journal of Forestry* 113: 40-48.

North, M.P., R.A. York, B.M. Collins, *et al.* 2021. Pyrosilviculture needed for landscape resilience of dry western United States forests. *Journal of Forestry* 119: 520-544.

Prunicki M., R. Kelsey, J. Lee, X Zhou, E. Smith, F. Haddad, J. Wu, and K. Nadeau. 2019. The impact of prescribed fire versus wildfire on the immune and cardiovascular systems of children. *Allergy* 74: 1989-1991.

Quinn-Davidson, L.N. and J.M. Varner. 2011. Impediments to prescribed fire across agency, landscape and manager: an example from northern California. *International Journal of Wildland Fire* 21: 210-218.

Rengers, F.K., L.A. McGuire, J.W. Kean, D.M. Staley, M. Dobre, P.R. Robichaud, and T. Swetnam. 2021. Movement of sediment through a burned landscape: Sediment volume observations and model comparisons in the San Gabriel Mountains, California, USA. *Journal of Geophysical Research: Earth Surface* 126: e2020JF006053.

Richter, C.J., M. Rejmánek, J.E.D Miller, J. Weeks, K.R. Welch, and H.D. Safford. 2019. The species diversity x fire severity relationship is hump-shaped in yellow pine and mixed conifer forests. *Ecosphere* 10: e02882

Ryan, K.C., E.E. Knapp, and J.M. Varner. 2013. Prescribed fire in North American forests and woodlands: History, current practice, and challenges. *Frontiers in Ecology and the Environment* 11: e15-e24.

Safford, H.D., D.A Schmidt, and C. Carlson. 2009. Effects of fuel treatments on fire severity in an area of wildland-urban interface, Angora Fire, Lake Tahoe Basin, California. *Forest Ecology and Management* 258: 773-787.

Safford, H.D., J.T. Stevens, K. Merriam, M.D. Meyer, and A.M. Latimer. 2012. Fuel treatment effectiveness in California yellow pine and mixed conifer forests. *Forest Ecology and Management* 274: 17-28.

Schweizer, D.W. and R. Cisneros. 2016. Forest fire policy: Change conventional thinking of smoke management to prioritize long-term air quality and public health. *Air Quality, Atmosphere & Health* 10: 33-36.

Schweizer, D., R. Cisneros, S. Traina, T. Ghezzehei, and G. Shaw. 2017. Using national ambient air quality standards for fine particulate matter to assess regional wildland fire smoke and air quality management. *Journal of Environmental Management* 201: 345-356.

- Steel, Z.L., M.J., and H.D. Safford. 2018. The changing landscape of wildfire: Burn pattern trends and implications for California's yellow pine and mixed conifer forests. *Landscape Ecology* 33: 1159-1176.
- Steel, Z.L., A.M. Fogg, R. Burnett, L.J. Roberts, and H.D. Safford. 2021. When bigger isn't better – implications of large high-severity wildfire patches on avian diversity and community composition. *Diversity and Distributions* DOI: 10.1111/ddi.13281 (In press).
- Stephens, S., R. Martin, and N. Clinton. 2007. Prehistoric fire area and emissions from California's forests, woodlands, shrublands, and grasslands. *Forest Ecology and Management* 251: 205-216.
- Stephens S. and S.S. Frederick. 2020. Interactions between fire and climate in the California Sierra Nevada: Research Synthesis. *California Fire Science Consortium*. Available at calfiresci.org (last accessed 18 October 2021).
- Stephens, S., S. Thompson, G. Boisramé, et al. 2021. Fire, water, and biodiversity in the Sierra Nevada: A possible triple win. *Environmental Research Communications* 3: art081004.
- Stephenson, N. and C. Brigham. 2021. Preliminary estimates of sequoia mortality in the 2020 Castle Fire. National Park Service Natural Resource Report series. DRAFT 25 June 2021 (online at nps.gov).
- Stevens, J.T., H.D. Safford, and A.M. Latimer. 2014. Wildfire-contingent effects of fuel treatments can promote ecological resilience in dry mixed conifer forests. *Canadian Journal of Forest Research* 44: 843-854.
- Stevens, J.T., H.D. Safford, S.P. Harrison, and A.M. Latimer. 2015. Forest disturbance accelerates thermophilization of understory plant communities. *Journal of Ecology* 103: 1253-1263.
- Syphard A., R. Scheller, B. Ward, W. Spencer, and J. Strittholt. 2011. Simulating landscape-scale effects of fuels treatments in the Sierra Nevada, California, USA. *International Journal of Wildland Fire* 20: 364-383.
- Toman, E., M. Stidham, B. Shindler, and S. McCaffrey. 2011. Reducing fuels in the wildland-urban interface: community perceptions of agency fuels treatments. *International Journal of Wildland Fire* 20: 340-349.
- Toman, E., B. Shindler, S. McCaffrey, and J. Bennett. 2014. Public acceptance of wildland fire and fuel management: Panel responses in seven locations. *Environmental Management* 54: 557-570.
- Zhou, X., K. Josey, L. Kamareddine, M. Caine, T. Liu, L. Mickley, M. Cooper, and F. Dominici. 2021. Excess of COVID-19 cases and deaths due to fine particulate matter exposure during the 2020 wildfires in the United States. *Science Advances* 7: eabi8789.

APPENDIX A: RECENT PRESCRIBED FIRE LEGISLATION (STATE)

AB 2551 (Wood, Ch. 638, Stats 2018) *Forestry and fire prevention: joint prescribed burning operations.* Allows the Director of CAL FIRE to enter into agreements with landowners to conduct joint prescribed fire operations, and requires CAL FIRE to provide advances to landowners of the Department's cost share for work agreed to through the California Forest Improvement Program.

SB 901 (Dodd, Ch. 626, Stats 2018) *Wildfires.* Directs that \$35 million be made available for CAL FIRE from the GGRF through Fiscal Year 2023-24 for prescribed fire and other fuel reduction projects.

SB 1260 (Jackson, Ch. 624, Stats 2018) *Fire prevention and protection: prescribed burns.* Authorizes federal, state, and local agencies to engage in collaborative forestry management, creates new opportunities for public and private land managers to mitigate wildfire risks, and creates presumption of due diligence for permitted prescribed fire activities.

SB 332 (Dodd, Ch. 600, Stats 2021) *Civil Liability: prescribed burning operations: gross negligence.* Modifies the liability standard for state fire suppression costs resulting from escaped prescribed fires from simple negligence to gross negligence if certain conditions are met.

AB 642 (Friedman, Ch. 375, Stats 2021) *Wildfires.* Requires appointment of a cultural burning liaison within CAL FIRE, development of an automated system for issuing burn permits. Defines cultural burning and cultural fire practitioner.

SB 170 (Skinner, Ch. 240, Stats 2021) *Budget Act of 2021.* Establishes a \$20 million Prescribed Fire Claims Fund to support coverage for losses from prescribed fires by non-public entities, such as Native American tribes, private landowners, and nongovernmental entities.

SB 456 (Laird, Ch. 387, Stats 2021) *Fire Prevention: wildfire and forest resilience: action plan: reports.* Requires Wildfire and Forest Resilience Task Force to provide annual reports to the appropriate policy and budget committees of the Legislature regarding progress on the Action Plan.



California's Strategic Plan for Expanding the Use of Beneficial Fire
March 2022