California Society of American Foresters
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California's Wildfire Emergency

A Position of the California Society of American Foresters

Originally adopted on May 17, 2019. This position will expire in 2024 unless, after subsequent review, it is further extended by the CA SAF board of directors.

Position

Of all types of natural disasters, wildfires and earthquakes pose the greatest threats to the lives, health, property, and natural environment of Californians. Catastrophic wildfire has rapidly become the most important forest management issue in California. Wildfire risks and hazardous fuels and opportunities to ameliorate them should be primary considerations when planning forest management actions. Extensive knowledge of wildfire behavior has been gained in recent decades by fire ecologists, foresters, and their allied professionals. This expertise must be used to design and implement forest management activities to protect urbanized forest areas and increase the fire resilience of our forest landscapes.

A useful model of California's wildfire hazard problem considers a series of zones extending outward from towns and cities in flammable landscapes. Beyond the town is the wildland-urban interface (WUI); beyond that are "gateway" forests through which wildfires would likely burn as they approach residential developments; and beyond that relatively remote forestlands. Forest communities and wildland-urban interface (WUI) developments must be better protected from wildfire by creating defensible space throughout the WUI and by reducing fuels in surrounding gateway wildlands, for example by creating fuelbreaks. To protect lives and structures, WUI areas should be our highest priority for reducing hazardous fuels. In relatively remote wildlands, fire

resilience should be restored to by applying mechanical treatments, prescribed fire, and/or managed wildfire to overcrowded stands.

WUI residents should cooperatively develop and implement practical solutions for reducing fire risks at the local level. Some WUI residents' hazardous fuels pose serious risks to themselves and their neighbors, risks that the community can ill afford. Local jurisdictions should consult with local firesafe councils to determine if ordinances are required to compel residents to abate hazardous fuels.

Local jurisdictions should carefully consider fire hazards before permitting new developments proposed in WUI areas. Forest towns and WUI communities should adopt and inform residents about emergency evacuation plans and should implement effective warning systems to notify residents of evacuation orders in a timely manner.

Wildland fire services should take advantage of emerging technologies to ensure that all wildfire ignitions are rapidly detected, assessed as to risk of break out, prioritized for response, and controlled, especially on days of very high or extreme fire danger.

To reduce damages from catastrophic wildfires, equally important to treating hazardous fuels are features that reduce the likelihood that a structure would be ignited by a shower of embers. Roofs, exterior sidings, and decks made from fireproof materials are critical to structural fire resistance, as is screening of openings through which embers can enter the structure.

Powerlines have become a frequent source of catastrophic wildfires and should be protected by clearing all trees within striking distance in very high fire severity zones. Similarly, trees adjacent to highways should be cleared in very high fire severity zones to ensure emergency evacuation routes remain open during wildfires.

Issues

Over the past 150 years, forests that were formerly characterized by a diverse mosaic of vegetation types and structures inherently resistant to rapid spread of fire have become dominated by vast areas of unnaturally dense, small, highly flammable trees highly conducive to rapid wildfire spread. Wildfires have burned into towns and cities with increasing frequency, killing dozens of residents and

destroying the homes and property of thousands of residents annually. Projected climate changes mean conditions conducive to intense, rapidly spreading wildfires will occur more often.

A large population resides in areas at risk of wildfire. Many forest areas approved for development by local jurisdictions are inherently risky due to heavy fuel loads, inadequate road capacity and alternative evacuation routes, and limited emergency water supplies. Many WUI residents have not created or maintained adequate defensible space, and some landowners decline to participate in community hazardous fuel reduction projects, thus undermining the effectiveness of the entire project. Many forest communities and rural subdivisions lack adequate means to notify residents of rapidly approaching wildfires, or adequate roads to enable timely evacuations.

Insurance companies have increased fire insurance premiums, terminated individual policies based on assessed wildfire risks, and generally reduced the availability of fire insurance for increasing numbers of WUI residents. When WUI properties become uninsurable for fire, their market value can decline substantially, thus diminishing the wealth and financial security of WUI landowners.

Large wildfires emit enormous volumes of carbon, thus converting forests from one of the state's largest stores of sequestered carbon to one of its largest sources of atmospheric carbon, which in turn accelerates change toward an even more fire-prone climate. Smoke from wildfires annually imposes unhealthy air quality and large health-care costs on metropolitan, as well as rural, regions.

Although on average less than 2% of wildfire ignitions escape initial attack, the extent and intensity of the relatively few fires that do escape have increased substantially in recent decades. Emerging technologies offer promising opportunities for more effective early detection of and response to wildfire ignitions.

Some environmental organizations routinely oppose all mechanical fuel treatments, and erroneously disparage their effectiveness by equating them with historic logging practices.

Historic declines in forest product manufacturing capacity have converted hazardous trees from valuable natural resources to enormous solid waste

disposal liabilities and reduced the economic feasibility of projects intended to restore fire resilience to forests.

Powerlines have become a frequent source of catastrophic wildfire ignitions, often when strong winds blow adjacent trees into powerlines, including trees that display no visible signs of weakness. Highways, including interstate highways, have been closed for extended periods due to surrounding wildfires.

Background

The Emerging Wildfire Menace

Fifteen of the 20 most destructive wildfires in California's history have occurred in the last two decades, burning 3,388,771 acres, destroying 26,643 structures, and causing 106 deaths (Cal Fire 2019). The increased frequency of catastrophic wildfires is partly due to more residents and assets located near abnormally flammable wildlands.

Forest management practices in California have historically helped create the dangerously high fuel loads that cover much of our forestland. The remarkable diversity of vegetation types and structures that historically characterized our forestlands and imparted substantial resistance to the uncontrolled spread of wildfires has been replaced by relatively uniform expanses of overcrowded, highly flammable trees (Hessburg 2017). This transition resulted primarily from cessation of native American burning; overgrazing that removed much of the herbaceous vegetation that enabled frequent, low-intensity fires; commercial logging that targeted the largest, most fire-resistant trees; and effective wildfire suppression programs that allowed extensive development of dense understory vegetation. Given the state's long dry season and fire-adapted vegetation types, the fact that millions of people live near unnaturally flammable forests increases the likelihood that catastrophic wildfires will reoccur relatively frequently.

Communities At Risk

In 2017 California had an estimated 2.2 million housing units in WUI areas, comprising 16.3% of the state's total housing stock (Cal Fire 2017; California Department of Housing and Community Development 2017). As recent wildfires have shown, however, wildfires are not only a threat to WUI residents, but also to residents of urban areas in wildland landscapes. A total of 2.0 million Californian households, or roughly 15% of the population, are at high or extreme

wildfire risk (Insurance Information Institute 2019), and 1,338 communities are classified as communities at risk of wildfire (Cal Fire 2017). California's Fire Hazard Severity Zone Maps (Cal Fire 2007) provide an excellent tool for spatial assessment of wildfire risks.

In addition to the towns and WUI areas at direct risk of burning, wildfire imposes growing costs on all state residents primarily due to increased costs of fire suppression and the harmful air-quality and public health effects of smoke generated by wildfire (Cascio 2018). Similarly, nearly all Californians share the costs of wildfire impacts on ecosystem services, such as reduced opportunities to enjoy pristine landscapes, impaired water quality from sediment-laden runoff from burned areas, and destroyed habitat for sensitive species. Carbon emissions from uncontrolled wildfires contribute to climate change that also affects all state residents.

Section 4290 of the public resources code and pursuant regulations set out fire safety standards for new residential developments in State Responsibility Areas, which comprise much of the state's WUI areas, including standards for roads and driveways, signage, and emergency water supplies. Two weaknesses of these regulations are they do not apply to developments predating 1991, and they do not require multiple evacuation routes out of new subdivisions. Section 4291 and its regulations set standards for defensible space in wildlands by requiring partial clearance of flammable vegetation within 100 feet of structures, or to the property line if less than 100 feet from the structure. Two weaknesses of these regulations are that hazardous fuels can be nearer than 100 feet from structures if on a neighbor's property, and they do not address hazardous fuels on undeveloped parcels.

In recognition of California's wildfire emergency, some local jurisdictions, including Los Angeles, Placer, and Nevada Counties, have adopted hazardous vegetation abatement ordinances that go beyond state law to compel landowners to remove fuels that pose wildfire threats to their neighbors (Todd pers. comm.; Placer County 2019; Nevada County 2019).

Emergency warning systems are inadequate in many areas threatened by wildfire. Emergency services agencies have adopted systems based on cellphone, broadcast, and internet communications, but these efforts have so far not been highly effective. In 2017, many Santa Barbara County residents received no warning of the approaching Thomas Fire or its mandatory evacuation order (McGreevy 2018). S.B. 833, adopted in 2018, requires the state Office of

Emergency Services to develop voluntary guidelines for alerting and warning the public of an emergency by July 2019 (California Legislative Information 2018).

Scientific Consensus on the Efficacy of and Need For Fuel Treatments

We now have convincing empirical evidence that specific fuel treatments effectively reduce wildfire intensity and tree mortality when they intersect (Kennedy et al. 2019; Cal Fire 2017; Kalies and Kent 2016; Skinner et al. 2004). A separate question is whether or to what extent progressively treating the landscape for hazardous fuels reduces wildfire damages over the entire landscape over the long term. A growing body of evidence obtained from rigorously-tested simulation models strongly suggests that, as the share of a forest landscape that has received fuel treatment increases, opportunities to control wildfires increase and the portion of the landscape burned intensively decreases substantially over the long term (Nechodom 2010; Syphard et al. 2011; Tubbesing et al. 2019). Unfortunately, a few environmental organizations continue to erroneously disparage the effectiveness of fuel treatments by equating them with historical logging practices (Center For Biological Diversity 2019).

The U.S. Forest Service and the state of California have each set targets of 500,000 acres of fuel treatments per year on federal and private lands in California, respectively (USDA Forest Service 2019; Jacobson 2018). These targets far exceed historic rates of fuel treatment accomplishment and will require unprecedented resource allocations and levels of public-private cooperation to achieve or even approach this goal.

Help For Communities and Forest Landowners

State government recognizes that California is in a wildfire emergency (Office of Governor Gavin Newsom 2019) and is implementing programs to help landowners and communities respond appropriately. Senate Bill 901, which became law in 2018, authorizes $200 million per year for the next five years for Cal Fire to fund forest health and fire prevention programs. Much of this money will take the form of grants to firesafe councils and related non-profit organizations to conduct community hazardous fuel reduction projects, although local agencies and private entities may also be eligible for grants.

An alternative means of financing hazardous fuel treatments that reduces the need for public subsidies is using revenues from sales of logs and wood chips produced by the treatments. Harvesting of trees for solid wood products is covered by the Z'Berg-Negedly Forest Practice Act, and usually occurs pursuant to an approved timber harvesting plan (THP). Over the years as planning standards have become more rigorous and additional protections have been codified for public trust resources, THPs have become so expensive that their costs can exceed the potential revenues from timber harvests, especially on smaller forest parcels. To address this issue, the legislature has adopted various THP exemptions and other mechanisms that allow commercial harvesting without an approved THP, provided conditions are met that ensure the avoidance of significant environmental impacts. The most recent of these exemptions is the small timberland owner exemption, which applies to parcels up to 60 acres in coastal areas or 100 acres in interior areas "for the purpose of reducing flammable materials and maintaining a fuelbreak" (California Board of Forestry and Fire Protection 2019). The working forest management plan is another mechanism recently adopted to streamline the planning process for harvesting on ownerships up to 10,000 acres.

Trees too small to be utilized for lumber can often be chipped and delivered to biomass energy facilities for conversion to electric power without a THP. Recently adopted subsidy programs to enable more hazardous fuel removal and conversion to biomass energy include the California Public Utilities Commission's Bioenergy Renewable Auction Mechanism, which provides above-market prices for qualifying biomass energy, and the non-profit organization My Sierra Woods's Forest Biomass Transportation Incentive, which subsidizes hauling costs for deliveries of chips from land located more than 30 miles from a biomass energy facility.

Inadequate Forest Products Manufacturing Capacity

Statewide capacity to manufacture wood products and biomass energy has been declining for decades. For example, between the late 1980s and 2012, sawmilling capacity in the state declined by 70% from 6 billion board feet to 1.8 billion board feet per year (McIver et al. 2015). Similarly, the statewide capacity of active biomass energy facilities declined by 38% from approximately 900 megawatts in the mid-1990s to 560 megawatts in 2018 (Morris 2000; University of California Division of Agricultural and Life Sciences 2018). As manufacturing

facilities close, opportunities to sell forest products decline and more forestland becomes uneconomical to manage. The lack of manufacturing capacity is most acute in southern California, where there are no sawmills and almost no opportunities to sell forest products, and productive timberland is relatively scarce among the various flammable landscapes. Along with providing direct subsidies for fuel treatments and forest-resilience restoration projects, federal and state governments could provide incentives to invest in new and existing wood products manufacturing facilities, which could increase returns to landowners implementing hazardous fuel reduction and forest restoration projects.

Detection and Response: Historic Improvements Are Insufficient

In the late 19th and early 20th centuries, many American towns located in logged landscapes were destroyed by wildfires, sometimes with terrible loss of life. Governmental wildfire services developed in response to these tragedies and gradually succeeded in controlling most wildfires. By the late 1900s, fewer than 2% of wildfire ignitions escaped detection and initial attack in a typical year. For example, in 2016, only 70 of 6,959 reported wildfires in California exceeded 300 acres (Cal Fire 2016). However, as hazardous fuels proliferated and more people occupied wildlands, the relatively few fires able to escape initial attack increased in extent, severity, and destructiveness. Reducing loss of life and property to wildfire can be addressed as a quality control problem the objective of which is to reduce the frequency of outlier events represented by wildfires that escape initial attack and grow to catastrophic scale. The strategy for solving this problem includes improving ignition detection and initial response effectiveness.

Several emerging technologies have promising potential to increase rapid detection of wildfire ignitions, including systems based on use of satellites, drones, and infrared sensors, often in combination with conventional aircraft. Advances in artificial intelligence and geographic information systems could enable more reliable predictions of locations where fires are most likely to ignite on a given day, and assess how likely an ignition is to grow rapidly, thus allowing wildfire services to more efficiently focus their detection and response efforts. Other emerging technologies could improve the effectiveness of initial attacks, for example by equipping firefighters with global positioning system devices that upload continuously-updated fire maps generated by drones deployed to monitor the fire's progress. Considering the hundreds of millions of dollars in

damages associated with each megafire, increasing public subsidies for developing and implementing such technologies represents a sound long-term investment.

Powerlines and Highways

Powerlines have become a leading source of catastrophic wildfires. In 2015, electrical equipment was the cause of fires that accounted for 51% of the total acreage burned in California (Cal Fire 2015). Powerlines owned by Pacific Gas and Electric Company were recently determined to have caused the 2018 Camp Fire, the most destructive fire in state history. Wildfires often ignite when strong winds blow trees into adjacent powerlines, including trees that display no apparent signs of weakness. High winds can also blow powerlines into contact with each other, another common source of catastrophic wildfires. To reduce risks of catastrophic wildfire and protect critical utility infrastructure, all trees located within striking distance of powerlines should be cleared in very high fire severity zones.

Burning trees can also result in highway closures, either when falling trees block the roadway or when the fire creates conditions too hazardous for traffic to drive through. The consequences of roadside fires are greatest when the affected road is a critical evacuation route. However, even when the affected road is not an evacuation route, the costs of closing highways can be large. For example, in September 2018 the Delta Fire caused a 50-mile segment of Interstate 5, the most important north-south thoroughfare on the west coast, to close for five days (Medina 2018), adding at least several hours of travel time for affected motorists. Highway roadsides should be cleared of trees in very high fire severity zones.

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