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2019

CALIFORNIA ECONOMIC SUMMIT

CALIFORNIA'S WILDFIRE CRISIS: A CALL TO ACTION

THE CALL

California's cherished forests are imperiled and our well-being is in jeopardy. The extreme wildfires consuming communities and mountainsides are the catastrophic consequence of a century of inadequate land management, boom-and-bust timber harvests, drought, insects, and climate change.

The threat is so massive and growing so rapidly that we must act with urgency and in fundamentally different ways. In addition to the State's efforts to improve emergency preparedness and response, California communities and entrepreneurs need to be fully engaged to implement sustainable forest thinning strategies and put woody material to ecologically sound and economically viable uses.

The Governor and state government have a unique and essential responsibility. The Governor needs to communicate a clear vision for nurturing restoration economies in rural communities, direct state agencies to expeditiously act, and orchestrate cooperation with federal and local partners.

Government agencies at all levels must transform what they do and how they do it – shifting from a limiting regulatory approach to enabling the proactive management required to restore forest and watershed health and increase resiliency to climate change.

All Californians must be prepared to do their part, including providing political support for the financial investments required to save our forests and watersheds.

Unless we take action in true proportion to the crisis, the firestorms will grow. They will be more frequent, more severe, more widespread. They will destroy more lives and property. They will strip the social and economic health of already struggling rural communities. They will damage our water supplies, the air we breathe, and our efforts to adapt to a changing climate. They will transform many of the jewels in California's verdant conifer crown to shrubland.

The wildfire crisis has been rigorously analyzed through commissions, task forces, legislative venues and scientific convenings. California's best minds on wildfires, forest health, climate change, and community well-being have reached conclusive agreement on what needs to be done.

WE MEANS US

In this report, "we" means all Californians – land owners and business owners, entrepreneurs and environmentalists, scientists and educators, investors and philanthropists, housing advocates, health professionals, elected officials, tribal leaders, civil servants, artists, communicators, and volunteers.

A critical leading action is the need to hand and mechanically thin, control burn, and reforest at least 1 million acres a year. While this aspirational goal falls short of the true need, we are nowhere near meeting it. As this report explains, it will take a minimum of $1 billion annually over at least a 10-year horizon to begin creating greater safety and a healthier environment for all.

Importantly, this work must consist of ecologically sound actions that occur within the context of a changing climate. Accelerating progress will require careful attention to the needs of rural communities and economies, and linking forest management work with new wood products industries that convert excess woody materials into biofuels, engineered lumber and other innovative uses. This approach, which can help pay for the removal of fuel and sequester carbon, will require developing forest-based industries in ways that enhance and sustain ecosystems.

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The combined benefits under a restorative economy strategy would be valuable and enduring:

- Safeguard more than 11 million Californians living in harm's way.
- Reduce emergency response and post-fire recovery costs.
- Protect environmental resources that serve all Californians, including water supply, clean air, wildlife habitat, recreation and wilderness experiences.
- Create new businesses that provide living wage and "future proof" jobs, help pay for and mobilize fuel removal, and enhance the economies and well-being of rural areas.
- Produce wood-based materials that can help address the state's housing shortage, infrastructure, and energy needs.
- Protect against the harmful effects of climate change by sequestering carbon in healthy trees and long-lasting forest-based products.

Achieving these results will require an unprecedented action plan that enlists California's ingenuity and resources in the public, private and civic sectors. Communities must be empowered and enabled to integrate ecological and economic activities in their watersheds. Government agencies must work differently and cohesively with one another. And the State must transform traditional regulations and funding streams to assertively support the community-based projects and businesses required to restore forest and community resiliency.

Other western states are facing similar challenges, but California is uniquely positioned to reimagine the danger zone as a solution space with "triple-bottom line" results: A healthier environment, stronger economy, and greater social equity.

When our nation embarked on the Apollo missions to the moon more than half a century ago, the term "moonshot" took hold in our lexicon to describe courageous and seemingly impossible ambitions and achievements. The wildfire crisis in California requires a moonshot, bold and ground-breaking.

A DANGEROUS ERA

"California is moving into an era of more catastrophic wildfires, as climate change, population growth, land use patterns, and inadequate forest management practices converge to put more people and acres at risk."

– Kate Gordon, Director, Governor's Office of Planning and Research,

Final Report, Commission on Catastrophic Wildfire Cost and Recovery, June 17, 2019.

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USDA Photo by Lance Cheung.

THE CASE FOR ACTION

The response to California's wildfire crisis has been heroic: Increasing firefighters and equipment. Building better escape routes and shelters. Cutting firebreaks around communities and detecting fires more quickly.

These are critical efforts, given the dangers. But if we want to get in front of this crisis and stop catastrophic wildfires from spreading in the first place, we need to swiftly pursue a key goal: Treating 1 million acres of fire-prone land every year through hand and mechanical thinning, controlled burns and replanting.[1]

This strategy has been documented by top experts and practitioners.[2] It would take direct aim at a primary cause of wildfires: overgrowth and debris build-up across the landscape. The risk is exacerbated by one in four Californians now living in or near forests, oak woodlands or chaparral.[2]

In recent years, region after region has been hit, from the forests of Yosemite National Park to the wine country of Sonoma and Napa counties, from coastal and inland communities of Southern California to farms and towns in the north. In late 2018, California's grim fire future came into sharp focus with the Camp Fire's destruction of Paradise, the deaths of 86 people, and the sickening fog of smoke that choked the Central Valley and Bay Area for days.

Unless we take aggressive action to thin our forests and wildlands and put extracted materials to good uses, we will only see more of the same.

Treating forests to prevent wildfires will not be easy. It can cost from $300 to $3,000 per acre, depending on the circumstances,[4] and the work is labor intensive. At $1,000 per acre, the "treatment" price tag would come to $1 billion a year, or $10 billion over a 10-year horizon.

That figure is daunting, yet likely not enough. Changing forest conditions and ongoing mainte-

Senior Airman Crystal Housman / U.S. Air National Guard

nance in the face of a changing climate will require greater levels of study and treatment. Forest health activities must be built upon ecologically sound principles with ongoing investments in monitoring to guide needed modifications going forward. Communities will need trained workforces and infrastructure. And state agencies will be tapped to support community-based efforts and to engage private investors.

Despite the high price, the toll will be greater if we fail to act. Consider:

- California's costs for fire suppression and emergency response for fiscal 2018 has been estimated at $750 million to $1 billion.[5]
- Insured losses exceeded a "staggering" $12 billion during the 2018 wildfire season, according to Gov. Gavin Newsom's wildfire "Strike Force" report.[6]
- After wildfires burned Northern California wine country in 2017 and caused record cleanup costs of $1.3 billion for the U.S. Army Corps of Engineers, that figure was eclipsed by three subsequent California fires in 2018, which generated more than $3 billion in cleanup costs.[7]

The full fire picture includes even more: Uninsured losses, falling property values, closed businesses, lost wages and tourism dollars, lost property and sales tax revenues, water cleanup, health care costs due to smoke in places far from fire sites, destruction of recreational and cultural amenities, wildlife devastation, and the loss of potential carbon sequestering opportunities.

When all costs are considered, investing up front in forests and public safety makes sense.[8] A potential $10 billion-plus price tag for aggressive forest management strategies over the next decade could pay off by a multiplier of 10 or more compared with what we will spend to cover wildfire losses under the status quo.

With collaboration and smart investments, wood product industries can help offset the cost of such forest work, as well as revitalize the economies of struggling rural areas.

AT STAKE: THE GIFTS OF THE FOREST

"California is blessed with 33 million acres of forestland and an urban forest canopy that together capture and clean our water supply, provide habitat for countless wildlife, cool our cities, support local economies, and serve as spiritual and cultural centers for indigenous and local communities across the state. Forested lands also are the largest land-based carbon sink with trees and underbrush drawing carbon from the atmosphere and storing it in their cellulosic structure and in forest soils. Growing evidence, however, suggests these lands will become a source of overall net greenhouse gas (GHG) emissions if actions are not taken to enhance their health and resilience and to reduce the threats they face from wildfire, insects, disease, and a changing climate."

– California Forest Carbon Plan, 2018

Anil R. Kizha

COSTS AND RISKS: BY THE NUMBERS

The wrenching human dramas of wildfire victims, firefighting crews and struggling communities are underscored by a grim sea of statistics. What follows is a sampling of these telling snapshots. Countless other outcomes, not cataloged here, echo the story: The future, as presently written, is grave and unsustainable.

Catastrophic Wildfires Are Escalating

- The 2017 and 2018 wildfire seasons were the most destructive in state history. More than 9,000 wildfires ignited in 2017, and nearly 7,600 in 2018 – together burning 2.8 million acres. Tens of thousands of homes and businesses were lost, 139 people perished, and the air across vast portions of the state was poisoned.[9]
- During 2018, the worst fire year on record,[10] 19,000 homes and other structures were damaged or destroyed in one fire alone: the Camp Fire in Butte County. The town of Paradise was nearly obliterated. Among the 86 who perished, many were frail and elderly.

The Danger Zone Is Expanding

- Twin forces are at play in expanding the dangers: The increasingly overgrown conditions of fire-prone landscapes and more people living near them.
    - More than 20 million acres of California wildland are now classified as being under very high or extreme fire threat.[11]
    - Between 1990 and 2010, 33.8 percent of new California housing units (1.1 million homes) were built in the wildland-urban interface.
- Today, 4.5 million homes and 11 million people live and work in this area adjacent to dense flammable vegetation.[12]

Forest-Based Solutions Are Not Keeping Pace

- Experts say at least 1 million acres should be treated annually over a sustained period.[13] But California lacks plans and funding to meet these goals. In 2019, CAL FIRE accelerated 35 priority fuel reduction projects, encompassing 94,000 acres. In its announcement, CAL FIRE acknowledged the chasm between this plan and total needs.[14]
- Over the next five years, the State will spend $1 billion on fuel reduction and public safety, including deploying the National Guard and expanding the California Conservation Corps. While significant, it is not enough. As the Governor's Strike Force explained:

> *Since 2010, California has nearly doubled the number of acres treated annually by fuel reduction, and has tripled the number of acres treated by prescribed burning. However, these efforts – less than 33,000 acres treated in 2017-18 – are dwarfed by the number of acres that require attention. … As the owner of 57 percent of California's forestland, the federal government must do its fair share to reduce fire risk.*[15]

- Developing new wood product industries is critical for making use of the huge volume of woody biomass coming out of forests. Yet, rural communities lack adequate facilities, infrastructure and workforces to be able to handle such production.

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Fire Suppression Costs Keep Climbing

- Conservative estimates put spending from California's emergency fund for firefighting at more than $4.7 billion in the past 10 years.[16]
- CAL FIRE records indicate firefighting costs more than tripled from $242 million in the 2013 fiscal year to $773 million in the fiscal year ending June 30, 2018.[17] Other estimates peg the latest annual costs at $1 billion.[18]
- Those figures don't account for all federal and local expenditures. For example, the U.S. Forest Service spent more than $73 million fighting one fire, the Ferguson Fire, in 2018.[19]

Ryan Schohr

Community Disruptions Are Severe

- In November 2018, more than 1 million students in 180 school districts were sent home due to wildfires. They ranged from the children of Paradise, where most were left homeless, to students across Northern California whose classes were canceled due to heavy smoke.[20]
- In 2017, the Tubbs Fire in Santa Rosa County burned 15 licensed childcare facilities, displacing 444 children in a county already struggling with a shortage of care options.[21]
- Rural areas, where recreation and tourism industries help drive economies, are especially vulnerable. The recreational economy of the Sierra Nevada range is valued at $3 billion to $5 billion annually.[22] During the 2012 Chips Fire, Lake Almanor area businesses lost roughly one-third of summer tourist revenue due to smoke during August of that year. During the 2013 Rim Fire, South Lake Tahoe hotels saw a 20 percent drop in business from smoke from that faraway fire.[23]

Health Impacts Are Far-Reaching

- Wildfires produce black carbon, an airborne pollutant that creates public health risk for cardiovascular and respiratory diseases, cancer and, potentially, birth defects.[24] Fresno County's Department of Public Health, for example, reported a 411 percent increase in emergency room visits for respiratory problems during a three-day period during the 2015 Rough Fire east of Fresno.[25]
- The 2018 Camp Fire made history by blanketing much of the Bay Area 150 miles away in a thick layer of smoke, causing one of the worst periods of hazardous smoke since such records began being kept.[26] Pollution research now suggests that "once heart attacks and respiratory-related deaths are factored in, its soot was even more deadly than its flames."[27]

Water Supplies For The Entire State Are Threatened

- The watersheds that originate in forested areas supply water to the much of the state.[28] Extreme fire events typically result in erosion and alterations to soil chemistry, leading to less capture of snowmelt, water quality degradation, clogging of downstream hydropower facilities, and loss of space in reservoirs.[29]
- Eroded landscapes from the King Fire in 2014 caused so much sediment spill into facilities serving Placer County that water equipment had to be shut down. Clearing reservoirs cost $5 million to $10 million per episode, while the cost of turning off equipment ran up to $200,000 per day.[30]
- The Tubbs Fire in 2017 melted plastic water pipes in Santa Rosa, causing the release of benzene into neighborhood water systems and kitchen taps.[31] The Camp Fire in Butte County left the Paradise community's drinking water "laced with benzene, a volatile compound linked to cancer," with clean-up costs approaching $300 million.[32]

> "It is the order of magnitude of destruction that people just can't quite grasp. [It is] testing every level of government. … The County will not be what it was."
>
> *– Testimony of Shari McCracken, CAO, Butte County, March 13, 2019, Commission on Catastrophic Wildfire Cost and Recovery.*


Sheila Whitmore

Natural Resources And Wildlife Suffer Harm

- Animals experience terrible fates during wildfires. The Rim Fire in 2013 harmed 100,000 acres of winter range and food sources for migratory mule deer and destroyed one-quarter of the areas where spotted owls and goshawks roost and nest. About 26,000 acres of fisher and marten habitat was lost.[33] During the King Fire in El Dorado County a year later, at least 10 established California Spotted Owl sites burned and never recolonized.[34]
- Wildfires can cause whole ecosystems to be extinguished. The Moonlight and Antelope fires in 2007 in the Plumas National Forest "converted a landscape historically dominated by long-lived conifer tree species … to shrublands dominated by montane chaparral species."[35]

Climate and Carbon Balance Goals Are Undermined

- In the face of climate change, forests serve an increasingly important role in the carbon chain. Healthy trees absorb carbon from the atmosphere, called "carbon sequestration." Wildfires are harming this important balance. As many reports have noted, "A single wildfire can spew more pollutants into the air than millions of cars."[36]
- During the Rim Fire in the Sierra, 257,000 acres burned in 2013. This "megafire" released carbon dioxide in an amount equal to the annual emissions of 2.57 million cars.[37] As CO2 builds up in the air, it has a warming effect that is changing the earth's climate.

Residential and Business Sectors Pay Steep Prices

- Wildfire liabilities are not just a burden for utilities. Customers also bear costs. In 2019, for example, Gov. Newsom signed legislation extending for 15 years a $2.50 surcharge, added to utility customer bills after the 2001 energy crisis, to help cover utility wildfire costs.[38]
- When electric providers enact power shut-offs during wildfire high-risk periods, restaurants, businesses and industries experience costly impacts, while the consequences may be dire for people who rely on dialysis, oxygen or other life-sustaining equipment.[39]
- Wildfires generate massive volumes of insurance claims, with ripple effects on customers. After $24 billion in losses from two consecutive wildfire seasons (2017 and 2018), insurers began imposing significant rate hikes or dropping customers altogether in certain areas.[40]
- Insurance and other fire-related consequences are hurting property sales, particularly in rural areas, causing disruptions in real estate markets and the flow of property tax revenues.[41]

SCIENCE SHOULD GUIDE THE WAY

California scientists are increasingly joining their voices together to generate action around forest treatment solutions to the wildfire crisis. Nine authors, who know the forests well, offered clear-eyed advice for the public when they recently explained the scale and impacts of tree mortality patterns and "mass fire" scenarios in the journal, BioScience:

> ***If our society doesn't like the outcomes from recent fires and extensive drought-induced tree mortality in [Frequent-fire] forests, then we collectively need to move beyond the status quo. Working to increase the pace and scale of beneficial fire and mechanical treatments rather than focusing on continued fire suppression would be an important step forward.***[42]

In other words, according to the scientists, we can pay now. Or pay much more later.


U.S. Forest Service

THE CHALLENGES TO ACTION

From the perspective of the CA Economic Summit – public, private and civic sector leaders seeking triple bottom line solutions – Californians should understand the following challenges to resolving the wildfire crisis.

THE PROBLEM IS MASSIVE AND GETTING WORSE.

Our forests are severely overgrown and we currently do not have the ability to extract woody materials in environmentally beneficial ways and put them to economically beneficial uses.

Foresters have documented that native Californians frequently burned the forests to rejuvenate browsing habitat for deer and other game and to propagate culturally important plants. This practice reduced fuel loads and prevented forests from growing too thick to thrive through dry periods.

Early settlers displaced native Californians and began harvesting old growth – and the most fire-resistant – trees. Forest regrowth was left to "nature" and fire suppression became the norm. Timber-cutting regimes ramped up and down with the economy, and then permanently down as environmental concerns restricted access to larger, old-growth trees. In recent years, cheaper lumber from old growth Canadian forests outcompeted many of California's mills and jobs were lost to automation.

From annual harvests of about six billion board feet a year in the 1950s and 1960s, the harvest has fallen to about 1.5 billion board feet.[1] In 2017, California had 77 wood products processing facilities operating, down from 262 in 1968. Employment in California's forest products industry is about half what it was a quarter century ago.[2]

While there are important nuances to this narrative, the general trends explain why most forests in California are denser than they were before the Gold Rush, and certainly denser than can be sustained through droughts and the greater variability associated with climate change. A tree mortality epidemic in recent years deepened the crisis. The five-year drought that began in 2012 left trees weakened and vulnerable to disease and insects. In the Central and Southern Sierra Nevada alone, 129 million trees died in just eight years.[3]

The build-up of flammable material and resulting surge in catastrophic wildfires is driving efforts to reduce "fuel loads" by extracting excess biomass and woody materials in ways that protect wildlife habitat and reintroducing more frequent and lower intensity fire to rejuvenate forests.[4] Overall, forests are still adding more biomass than people and fire are taking out. The potential for wildfire will increase and the health of forests will decline until a new equilibrium is established.

Allowing that balance to be restored by uncontrolled wildfire alone, most researchers agree, would be catastrophic to forests, Californians and the globe. When massive fires severely burn parts of the forest, significant amounts of unburned material are left behind, only to burn hotter in subsequent fires.

The percentage of severely burned areas, especially in catastrophically large fires, is sharply increasing. This regime, coupled with climate change, threatens to transform significant portions of the conifer forests – pines, firs, cedar and spruces – into shrubland.

FORESTS AND WILDLANDS MUST BE MANAGED MUCH DIFFERENTLY

Forested lands are owned by thousands of individuals and entities, the federal government being the largest, which creates management challenges for sustainable forest restoration, fire resiliency and adaptation to climate change.

Nearly all of California's 33 million forested acres are owned by the federal government (19 million acres or 57 percent), private timber companies (five million acres) and private landowners (nine million acres).[5] The State owns less than three percent.

The traditional role of the State and local agencies in managing forests has been limited. On non-federal land, the State regulates activities to minimize environmental harm through permits and mitigation activities. In addition, the State conducts fire suppression on private and State-owned land, and certain local areas. The migration of residents into forests has increased fire threats and complicated the ability to manage land to meet ecological and public safety goals.

Sixty percent of California's dead trees are on federal lands,[6] where resources have lagged. The neglect has created a tinderbox. For many years, the budget to manage timber cutting and restoration in federal forests was diverted to fighting fires.[7] While those budgets are now separate, the


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U.S. Forest Service lacks resources to support the fuel reduction and restoration work required to reduce catastrophic fires and create healthier forests.[8]

At the same time, many owners of small forested parcels struggle with a lack of resources for fuel reduction on their lands, which can cost as much as $2,500 per acre. The California Forest Improvement Program, the State's primary program to assist these owners with unprofitable and labor-intensive forest thinning, has been greatly underfunded and lacks a long-term funding mechanism to expand the pace and scale of urgently needed work. Additionally, these owners generally are not eligible for other funding sources and lack capacity to compete for forest health grants.

New programs, ethics and expectations are needed to turn the crisis around. The required mind shift is about more than money. The old paradigm was to regulate damaging behavior. The new paradigm must be to actively support effective land management and forest-based economic solutions to make use of removed materials. For example, even some of our most valuable environmental regulations will need be adapted to the urgent action now required. A report to the Tree Mortality Task Force made this imperative clear:

> *"Legal challenges arising from the National Environmental Policy Act (NEPA) process constrain national forests' ability to quickly respond to mortality outbreaks. This is problematic for effective dead tree utilization because the economic value of dead trees drops quickly and substantially from quality degradation. Industry contacts consistently reported that significant degradation can occur within just a few months of the tree dying."*[9]

Delays could contribute to additional environmental harm. Evaluations of the Rim Fire and other mammoth wildfires show that subsequent fires often

burn hotter as they consume dead material, fundamentally altering soil, vegetation and the ability of the forest to recover.[10]

With adequate resources and a timely approval process, we can expedite forest management work that is done in an environmentally appropriate manner and level, reduce fire danger, capture the economic value of the wood materials, and sequester carbon in wood-based products.

Importantly, forests can no longer be managed to standards of the past. Instead, it is critical to ensure that fuels are removed with a full understanding of the impacts of climate change on the entire ecosystem. Such management activities must be carefully monitored to allow for proper adaptation to ongoing changing conditions.[11]

GOVERNMENT AND BUSINESS AS USUAL WON'T SOLVE THE PROBLEM.

The expansive range of needs – from fuel reduction and emergency response to ecological restoration and economic development – cannot be managed through traditional bureaucratic silos, fragmented programs, multiple and separate funding streams and adversarial decision-making procedures.

Under the traditional paradigm, governments and advocacy groups often have tended to define and address problems through single-purpose, piecemeal approaches.

However, more integrated "systems" approaches are emerging from stakeholders on the ground and scientists experimenting in forests. The new paradigm requires calculated tradeoffs between habitat now or more habitat later; some smoke from "prescribed fire" or the significant public health risks from uncontrollable wildfire; and strategic economic subsidies or the risk of budget-busting emergency responses and the false hope of recovery.

> "The worsening threats to our forests mean we cannot wait for better information before we act, but must begin acting now and adjust these actions as we learn more over time.
>
> *California Forest Carbon Plan: Managing our Forest Landscapes in a Changing Climate, January 20, 2017.*

Currently, developing and operating a single biomass energy facility, can require scores of actions and commitments by federal, state and local agencies. Projects can take years to be approved. Some won't leave the drawing boards because requirements and incentives don't pencil out. Others won't get through the process because time and uncertainty push them into the red.

An analysis for the Tree Mortality Task Force reveals how disconnected public procedures can undermine desired outcomes:

> *"... lengthy, costly, and complicated air quality permitting processes caused existing forest products manufacturers to decide to not move forward on plans to install biomass boilers for producing heat, power, or both. The result of regulatory constraints is that boilers that could have potentially utilized dead trees, logging slash, mill residues, or ag waste were not installed at existing forest products conversion facilities."*[12]

Will Suckow

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In addition to regulatory refinement and economic incentives, these projects can't thrive without improvements in public infrastructure, workforce development, and community capacity-building, all of which require resources and institutional coordination and management.

In short, at every step, delays, uncertainty and missing elements add costs, reducing the economic viability of projects and discouraging competent and willing entrepreneurs. In many places, such practices reflect decades of policy and cultural conflicts. In some foothill communities, for example, the atmosphere over the years has been marked by distrust flowing to and from courtrooms and the Capitol. The years-long "timber wars" produced episodic and often empty victories for one side or the other.

Importantly, a countervailing wind has emerged: community scale collaborative efforts that can build the trust required to reach agreements and take action. The Sierra Institute for Community and Environment, which has worked to build this new cultural capacity, describes the promise this way:

> *"Despite these challenges, there are a host of communities and groups that have organized to take on the challenge of reducing fire risk, reintroducing fire back onto the landscape, and rebuilding local economies based on sustainable forest management and business development. The millions of dead and dying trees present an opportunity and a supply for launching businesses, creating local jobs, and beginning the task of rebuilding rural forest community economies. Community-scale thinking, investment, and commitment to these outcomes, however, are needed if efforts are to succeed."*[13]

Such collaborative efforts cannot be successful without committed support, particularly from the State. They cannot be expected to navigate or negotiate a plethora of misaligned and unresponsive programs.

To support integrated and collaborative revitalization efforts, the State itself will need to be integrated and collaborative. The scale and scope of a comprehensive strategy – and the organizational requirements to design and execute – are many times larger and more sophisticated than anything we have done in California before.

FOR BETTER OR WORSE, OUR RESPONSE TO WILDFIRES WILL BE A GHG GAME CHANGER.

If left to burn or rot, excess forest biomass is an enormous source of greenhouse gases. If existing uses of biomass and woody materials are scaled and new ones innovated, emissions can be significantly reduced and sequestered.

According to a 2012 study by the U.S. Geological Survey, forests account for almost 70 percent of the total carbon storage in the Western U.S.[14] In California, forested lands are the largest land-based carbon sink. However, "recent trends and long-term evidence suggest that these lands will become a source of overall net greenhouse gas (GHG) emissions if actions are not taken to protect these lands and enhance their potential to sequester carbon."[15]

As wildfires increase in frequency, size and intensity, wildfire emissions increase. Using 1961 – 1990 as the baseline, researchers estimate that wildfire emissions will increase in this century by between 19 and 101 percent, with a median estimate of 56 percent.[16] Without significant improvements in forest management, researchers expect a significant increase in wildfire smoke, with the greatest human health impacts late in the summer when air quality is already at its most hazardous.

In areas that burn severely, GHG emissions are not limited to smoke from fire. In a typical forest wildfire, less than 15 percent of the carbon in a stand is emitted in the plume. In severely burned areas, the remaining 85 percent decays over time or may be consumed in a future wildfire plume. As a result, forests that once sequestered carbon capture much less and the emissions from decaying material can make a stand a net source of GHGs for a decade or more.[17]

Other western states are expanding the use of new manufactured wood products that can be used in many contexts, including commercial and residential

construction. These developments provide multiple benefits, including a market for the wood materials, a means of sequestering carbon, and poverty-busting jobs.

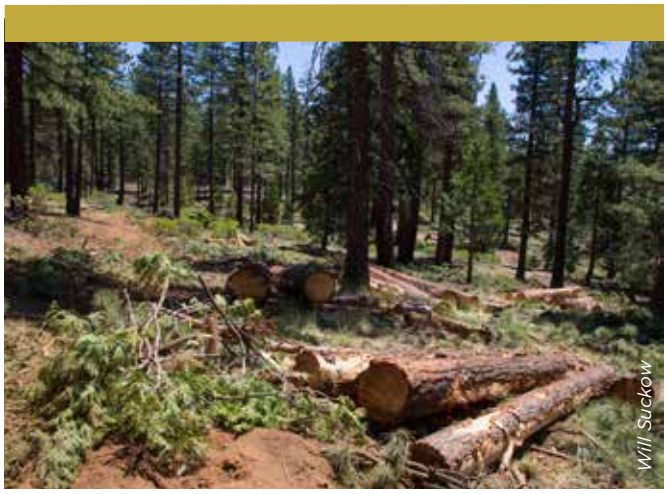
While California is the third largest producer of timber in the nation, the state imports the bulk of lumber and wood products used in-state. Best estimates indicate that imports from other states and countries make up 80 percent of the lumber and 90 percent of all wood products used in California.[19]

A comprehensive approach to the crisis would seek to reduce fuel loads and catastrophic fires and put excess woody materials to ecologically superior uses that help sequester carbon. Low-value material can be used for biofuels, off-setting more carbon-intensive alternatives such as coal, or in the case of biomass utilized close to the source, used for heat and electricity further offsetting fossil fuel use.

WE WON'T MAKE PROGRESS WITHOUT INFRASTRUCTURE AND PEOPLE POWER.

Putting excess woody material in the forests to economically and ecologically beneficial uses will require massive, strategic and coordinated efforts to build infrastructure, production facilities and a skilled workforce.

The former timber towns that often were built in historic mining towns are California's rust belt. Poverty and unemployment run disproportionately high in many of California's mountain communities, where well-paying jobs are harder to find and incomes often below average.[20] California's mountain communities have some of the state's highest concentrations of minimum wage jobs and young adults who are not employed or in school.[21]


Will Suckow

Many mill sites are brownfields. Resources allocated for public infrastructure, including roads, water and sewer systems, have not been adequate to maintain or improve them to meet current standards.

In many places, small businesses that support the timber industry have atrophied. An analysis for the Tree Mortality Task Force, for example, reported that owner-occupied truckers were aging and their numbers dwindling, many of them nudged into retirement by regulations requiring them to replace aging equipment with expensive new trucks that met emission requirements.[22]

Several reports have documented the steps that only government can take to create the conditions that will attract private sector investment.[23] Some of those assessments have come from conservation groups that have become advocates for a balanced and comprehensive approach to forest management that protects ecosystems, such as The Nature Conservancy:

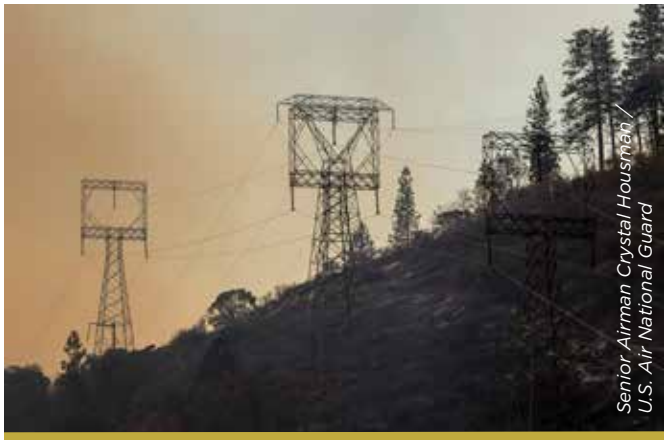
> *"California's current capacity to implement ecological forestry at the scale needed is far short of what is required. Ramping up investments and training could supply jobs in ecological forestry, bio-energy, and small diameter wood products that could revitalize struggling rural communities."*[24]

Without focused action to build infrastructure, a workforce and community capacity, our capacity to process excess woody material from forests into useful products and to sequester carbon will be limited. Many of the actions required of government have been implemented for other industries. In this case, we must sync and scale those actions to the size of the challenge in our forests and wildlands.

LARGE INVESTMENTS ARE NEEDED TO OFFSET EVEN BIGGER COSTS.

Enormous financial investments will be required to restore forests, protect communities, develop a skilled workforce and build public infrastructure and production facilities.

The financial implications of the crisis and needed solutions are complex and multi-faceted. On the private side, homeowners are confronted with escalating insurance bills, declining home values, the costs of "hardening" their homes against firestorms, and reducing vegetation on their properties. For those who have already lost their homes and businesses, the impacts are even more severe.



Senior Airman Crystal Housman / U.S. Air National Guard

PG&E and other utilities are grappling with massive liabilities, as well as costs and challenges to reduce ignition risks, keep communities energized during high wind events, and recover from fires. At the same time, investments are needed to protect public infrastructure such as transportation corridors, water systems, and broadband and telecommunications systems, and to expand capacity to respond to emergencies and recovery efforts.

In addition to public investment, private investment will be critical to build wood utilization infrastructure such as manufacturing facilities and biomass energy plants, purchase extraction and transportation equipment, and help train the needed workforce. Development of new wood product industries offers opportunities for job creation across a wide spectrum, including within higher-skill fields such as professional forestry, silviculture and other sciences, environmental permitting and regulation, facility design and construction, new technologies, and market and product development.

Researchers from the University of California, California State University system and the California Community Colleges are well positioned to help develop the technical and professional skills required to manage forests and operate forest-related businesses.

Some of the necessary public investments – such as workforce development programs – can be met by targeting existing resources and providing additional incentives. Much of the private investment can be spurred by linking existing regulations, market incentives and subsidies, and then strategically filling gaps.

THE PROBLEM IS TOO BIG TO LEAVE TO OTHERS.

These historic challenges – and globally significant opportunities – are not well understood by public, civic and private sector leaders and the public, all of whom are needed as part of the solution.

Wildfires have commanded some of the largest headlines in California in a time frequently defined by tragedies and increasing public discord. A survey by the Public Policy Institute of California during summer 2019 showed that seven in 10 Californians fear the increase of wildfires due to climate change.[25]

With the right response – which will require adequate public support – costs and risks can be reduced, and environmental, social and economic benefits can be increased. This historic lift will require significant political will, which can be best generated by an accurate public understanding of the magnitude and urgency of the problem.

For more than a decade and under three governors, California has prioritized adaptation to climate change. Reducing carbon emissions has required spending an enormous amount of public funding and increasing costs on consumers. A similarly universal and comprehensive approach will be required to address the flammability of our landscape, which, if not embraced can undermine California's other investments in climate resiliency.

Will Suckow

THE COMMITMENT TO ACT

To achieve the "moonshot" needed to address California's wildfire crisis, the CA Economic Summit has identified the following action principles, which are essential to a comprehensive triple-bottom line response.

WE MUST ACT WITH GREATER URGENCY.

California needs to rapidly expand the scale and scope of efforts to protect our landscapes and rural communities, develop economically viable forest-based products, and turn the threat of runaway carbon emissions into climate change solutions.

Wildfire will transform California in catastrophic ways unless we use the circumstances to transform California in beneficial ways. As this report explains, the costs are enormous and will impact all Californians and future generations. Reducing wildfire events will not be enough. California must use the situation to protect forests, watersheds and ecosystems and create a more resilient California.

No one government or sector can accomplish this alone. It will take widespread agreement to define the problems to be solved, the goals and how they will be measured, and the values that will inform smart choices to simultaneously restore forest health, reduce carbon emissions, revive rural communities, and increase economic security.

A comprehensive, focused action plan with concrete goals and deadlines will be paramount to increase the current pace of action. Although more study and analysis will be needed to drive particular projects or efforts, it is important to begin taking action swiftly, building in monitoring and assessments along the way to guide needed adaptations for the future.

If successful, this effort can reduce the risk of forests converting to shrubland, establish a new stewardship paradigm based on a new relationship between people, society and wildlands, and create a model and a standard for others to follow.

ECOLOGICAL AND ECONOMIC SOLUTIONS MUST MATCH, IN SIZE AND SCALE, THE LANDSCAPES AND WATERSHEDS IN PERIL.

Collaborative efforts must be supported and fortified at the landscape or watershed scale to overcome barriers and advance larger scale projects that simultaneously restore forest health, revitalize rural communities, and sequester carbon.

Transformative forest management will require integrated public, private and civic actions at the watershed scale.

For this purpose, "watershed" refers to a geographic footprint that best aligns environmental, political, social and economic attributes. In some cases, that footprint may be a drainage from ridgeline to ridgeline and summit to valley floor. In other areas, it may be a cluster of communities linked by roads and rivers that can work together. In some places, large fires themselves have unified adversaries and galvanized communities to work together in managing "fire-sheds."

The California Forest Carbon Plan asserts that the watershed level is an appropriate organizing unit for analysis and integration of ecological, social and economic systems, and policies and actions to achieve forest health, climate mitigation and community resiliency.[1] A two-year study of Department of Conservation watershed coordinator grants between 2000–2014 by the Sierra Institute for Community and Environment revealed that watershed coordinators on average raised seven times the investment in their salary for watershed and social improvements.[2]

Such "proof" is emerging from a variety of community-based efforts involving residents, landowners, public officials, business leaders and advocates seeking to agree on specific management and development strategies. The projects are generally called "collaboratives" because they seek to reconcile conflicts and align goals, apply scientific findings and experience, share capacity and attract the resources and assets necessary to execute a plan.

California and other states have significant experience with forest collaboratives, with many lessons learned the hard way. Collaboratives are not easy or fool proof. Many struggle with execution and with meeting high expectations to solve for the most difficult challenges. But they represent a promising approach to advancing scientifically sound, economically viable, and socially responsible actions tailored to California's diverse landscapes.

To be successful, watershed-scale collaboratives need support from federal and state government, authentic tribal involvement, and effective engagement with private sector landowners, investors and entrepreneurs. The State has and can continue to support such collaboratives in many ways, including through regulatory alignment, financial resources, and connecting and influencing other governments and the private sector. Some opportunities:

- State regulatory requirements and procedures can be integrated and aligned, without reducing standards, to reduce review times, unnecessary variation across regions and departments, uncertainty, and the cost of compliance.
- State funding streams can be braided to expedite key projects. Aligning regulatory requirements, bundling funding streams and coordinating eligibility requirements can be powerful incentives for local interests to work together.

As one example, the Forest Service is negotiating agreements with the State, local governments and conservation groups to secure access to woody material and enable non-federal resources to be deployed in the forest. The State is in a strong position to build on these experiences to help drive the next generation of agreements that would advance an integrated management strategy – such as housing for workers, training facilities and programs, and research and development campuses.

In turn, private enterprise can be engaged through collaboratives to ensure that economic development results in community development. While partnerships need to be tailored to protect the public interest, in this case the public interest cannot be protected without private capital investments, job creation and market development for products and services that contribute to forest health and community vitality.

Modern forest management opens a new frontier in California's governance evolution. In recent years, more authority – and responsibility for results – has been shifted to conservancies such as the Sierra Nevada Conservancy, non-profits, local governments and other entities. Modern forest manage-

Kelly M. Grow

ment will require the State to partner in new ways with counties, regional conservancies, resource conservation districts, water agencies, workforce boards, community colleges and others. By replacing command-and-control models with collaborative approaches, desired outcomes from public safety to long-term resiliency can be achieved.

FOREST-BASED ECONOMIC ACTIVITIES THAT STRENGTHEN AND SUSTAIN THE ENVIRONMENT AND RURAL COMMUNITIES WILL BE CRITICAL.

California needs to execute a comprehensive action plan to build the infrastructure, production facilities, a skilled workforce and other elements required for vibrant forest-based industries that can contribute to resilient ecosystems and healthy communities.

A comprehensive solution includes a massive constellation of actions that advances scientific knowledge and economic strategies; re-engineers funding streams and regulations; orchestrates on-the-ground actions by public agencies, non-governmental organizations and volunteers; and attracts private sector investment and ingenuity.

California has made significant progress bolstering emergency preparedness, response and recovery. The State's leadership, analysis, legislation and implementation has been strong. All Californians have benefited from these actions.

Equivalent urgency and actions can also advance long-term ecological restoration and community and economic development.

Research has documented the potential for economic development and the challenges that stand in the way. For example, a mass timber analysis completed for the Council of Western State Foresters concluded the demand for cross laminated timber (CLT) products could support doubling the five existing manufacturing facilities. Demand is expected to double every five years through 2035, creating a significant manufacturing opportunity. While more than half of that demand is expected to be in California, none of the currently planned projects are in the state.[3]

At the outset, developing such multi-benefit economic solutions will require new levels of research and analysis to formulate the necessary business models, ecologically sound activities in the face of a changing climate, product and market pipelines, and investments in workforce training, infrastructure, and community capacity to support such industries.

PRIVATE CAPITAL AND ENTERPRISE ARE ESSENTIAL TO THE SOLUTION.

Entrepreneurs, innovators and investors need to be assertively engaged to attract capital and develop new uses, value chains and markets for forest-based industries that can support forest restoration and resiliency.

Government cannot solve the crisis alone. Even at a time of surplus, the State does not have the financial resources for all the actions required. Reducing "fuel loads" without finding ways to productively use that material will not sufficiently address our carbon challenges, and at best may only slow the conversion of California's emerald mountainsides.

While other nations and states have made progress in developing ecologically beneficial economic uses, California has lagged in supporting such opportunities. Some of the caution is attributed to concerns over subsidizing private businesses and a return of historically expansive timber harvests that maximized timber production at the expense of other important forest values.


Susie Kocher

We cannot solve this problem with the resources, capacities and technologies currently available. Without developing new ways for the public and private sectors to work together, California is sidelining some of its greatest assets – technology savvy innovators, public interest entrepreneurs, and social impact investors.

Done carefully, with explicit values and clear goals to restore forest health and revitalize rural communities, cooperation between the public and private sectors can unlock needed resources and drive solutions. Such partnerships are needed to:

- Tap private capital to help pay for the costs of thinning forests and producing products with economic value.
- Create well-paying jobs and small businesses in disadvantaged communities.
- Develop new uses and markets for wood products that will sequester carbon.
- Encourage innovations in renewable energy, fiber technology and new discoveries.

The State, on behalf of us all, can engage with the private sector and watershed and forest collaboratives to understand what will be required for economic activities to proceed in ecologically sustainable and socially responsible ways. Additionally, the State can provide value by proactively integrating regulatory and funding streams for job-creation and innovation projects. By targeting resources and coordinating requirements, the State can encourage and partner with specific, potentially breakthrough projects, which can, in turn, help shape and refine public policies that support more promising enterprises.

The working group established under Senate Bill 859[4] outlined several actions that state regulators and economic development agencies could take that would remove barriers to market development:

> *"A good market environment will appeal more broadly to investors. Facilitating permitting prerequisites, supporting product testing, aligning regulatory requirements, and addressing financing challenges could eliminate some of the real and perceived barriers to investing in and developing wood products manufacturing."*[5]

Specifically, the work called for Cal EPA to lead a team to help permit projects and address liabilities related to the remediation and redevelopment of old mill sites. The Governor's Office of Business and Economic Development was charged with providing financing and business development assistance, helping rural businesses identify financial assistance programs and close funding gaps.

As the SB 859 working group explained:

> *"The long-term success of new wood products innovations could be bolstered by building California's capacity for research and product development and supporting the academic experts and entrepreneurs already leading wood products innovation within the State. New cross-disciplinary partnerships may be needed to ensure that this research and development is relevant to industry partners' needs and is ready for market."*[6]

Such cross-sector innovation and partnerships will be a key means of enabling California to develop a new model for forest health, climate resiliency and community vitality.

GOVERNMENTS MUST WORK IN CLOSE PARTNERSHIP.

Deep partnerships need to be developed among federal, state, local and tribal governments to make the best use of public resources, align capacities, integrate and improve regulatory processes, and set an example for high-level collaboration.

The large footprint of federally owned land in California has required state and federal agencies to work together for more than a century – just as they have managed the two largest water systems in the state and coordinated energy and environmental regulations and programs.

In many places, the two are working closer than ever to deploy state resources to reduce fuel loads on federal lands and the State has taken steps to link federal and state permitting requirements. Those agreements and arrangements need to intensify to reach the State's fuel treatment goals for forested lands.

Counties also play an outsized role, though at times lack the capacity and control required to change how land is managed or what is done with woody materials removed from the forest. Water agencies, which often only own river-associated infrastructure, are becoming increasingly engaged in land management to reduce if not reverse the impact on runoff from climate change and forest conditions.

In developing a more holistic approach, numerous entities have a role to play, including tribal governments, small cities, K-12 school districts, state and private universities, community colleges, University of California Cooperative Extension, resource conservation districts and other special districts.

Watershed collaboratives can be a valuable place to identify specific actions required by government agencies to meet community goals. While the State can align program requirements and incentives, public and civic leaders can contribute by setting high expectations that public agencies will engage and objectives will be achieved.

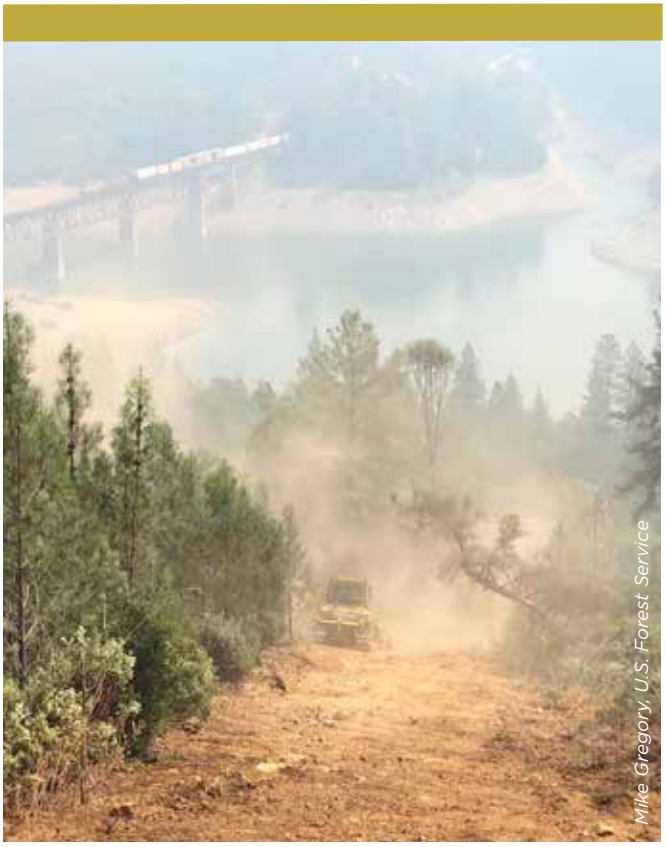
THE STATE MUST LEAD, STEWARD AND PARTNER.

The State's roles and responsibilities are central to the success of this effort. In new and unprecedented ways, agencies will need to coordinate, innovate and partner with one another and with those outside of state government. Transforming our forests will require transformations within and across governments.

While this problem cannot be solved solely by state government, it cannot be solved without state government taking a leadership role that integrates and focuses its authorities and resources, supports necessary partnerships, and influences actions by public, private and civic actors.

Scores of regulations and business practices– those internal such as procurement and personnel and those external such as brownfield remediation – may make sense in isolation but have the impact of unnecessarily slowing or limiting desired projects. These friction points need to be assertively identified and expeditiously resolved. The machinery of government is an essential part of the solution, but it will only be part of the solution when it is refined to produce the desired result. This organizational and management challenge for the State will require incorporating all that has been learned from past experience. Among the factors:

- As the one of the most consequential challenges facing California, the wildfire crisis needs to be a top priority of the Governor as reflected in his vision, goals and expectations for those within government and all Californians.
- This priority should be reflected in the authority and the accountability of the leadership structure. Experience has consistently shown that inter-agency efforts can thrive when coordinated through the agency structure with the secretaries directly responsible for their contributions to the collective effort. The secretaries and the Director of Finance should meet as an executive leadership team as often as necessary to assess progress, make strategic adjustments, solve difficult issues and resolve conflicts.



Mike Gregory, U.S. Forest Service

- Teams of professionals from the agencies and departments need to be assigned to work groups. This assignment should be the highest priority for the professionals involved. Work teams should be accountable for meeting objectives and expected to elevate conflicts or challenges that cannot be resolved within or among work groups.
- Because of the cross-cutting and long-term implications of these actions, the executive leadership team also should be supported by an economic research work team with community-scale understanding that can model scenarios, assess existing programs and develop investment strategies. A similar ecological science work group should advance efforts to date to develop consensus science to guide policymaking and program implementation.

To succeed in this and other emerging challenges, state departments need to build the capacities of staff to redesign services and procedures, partner across sectors to find creative solutions, and use technologies to improve results and communications.

ALL CALIFORNIANS ARE ESSENTIAL TO OVERCOMING THE CRISIS.

The future of our forests cannot be delegated. We must all be part of the solution through a deeper understanding and new stewardship of our forests, watersheds, and other wildlands.

At critical times in our history – when threats were extreme and no real solutions were in sight – we moved forward with all we had, with contributions from all. When drought turned the Great Plains into the Dustbowl during the Great Depression, farmers were trained to be conservationists, and people went to work constructing dams, electrifying rural communities, building trails in national parks, and chronicling the shared struggle in art, literature and music. When war followed, the nation doubled down, echoing a pattern in which significant victories in our history have been predicated on a shared commitment to a common purpose.

California's cherished wildlands are not going to be returned to health and adapted to changing conditions without a similar effort. The forests we inherited will not be the forests we leave our children. The questions are: What will live there and grow there? Will our grandchildren want to play there, be inspired there?

The Little Hoover Commission noted that the work of creating resilient forests will require greater understanding by the public. As the Commission noted:

> *"Often, people aren't aware of the role trees play in the state's overall ecological health, including their drinking water and air quality.*
>
> *Because current generations of Californians have grown up with overcrowded forests and believe them to be healthy, making them understand that healthy forests are less dense will take effort. Similarly, too, many Californians are used to thinking their water comes from the tap without considering from where that water originates. It is important they learn where the headwaters that sustain them are located. Policymakers, too, will need to adjust their thinking when selecting appropriate forest treatments, which could include fire and thoughtful cutting.*
>
> *A cultural shift will require education, investment and a champion from the highest echelons of state government. Education is critical in achieving the buy-in from Californians, and should be strategically planned with measurable indicators and revised if those ventures are not leading to the desired outcome. The Commission sees opportunities to educate the public at large, as well as specific subsets of the population, such as forest owners, water users and policymakers, among others."*[7]

The "will of the people" will be required to demand and then support the difficult policy and funding decisions essential to reducing fuel loads and building economic development systems. This effort will require powerful and novel new relationships between urban and rural areas. It will take a new workforce, volunteers in the forests, and civic organizations becoming educated and then educating their communities. Youth groups and seniors also have a role, for if any cause warrants intergenerational stewardship, this is the cause.

This report was developed through the CA Economic Summit's "Elevate Rural CA" initiative, with input and guidance from Summit partners and stakeholders and support from CA Forward, which seeks Triple Bottom Line solutions to challenges facing the state.

APPENDIX:

PRIOR EFFORTS AND INITIATIVES

California has developed a strong foundation for building forest health and resilience through a variety of research studies, initiatives and institutions at the local, regional and statewide levels. This listing includes some of the more significant reports and initiatives, many offering important recommendations for creating greater public safety and healthier forests and ecosystems.

Consistent and important themes, analyses and recommendations can be found across the numerous studies and initiatives, including: The unprecedented severity of the problem including threats to lives, property, air quality, water supplies and other ecosystem assets; the need to thin and maintain healthier forests and wildlands on a scale far beyond current practices; the need to act with much greater urgency; and the importance of developing new wood product industries to make productive use of excess woody materials improve forest and watershed health, and to help struggling rural economies to thrive.

REPORTS

February 2015

Improving the Resiliency of California's Headwaters – A Framework, Association of California Water Agencies (ACWA)

Background: ACWA is the largest statewide coalition of public water agencies in the country. Its 430 public agency members collectively are responsible for 90 percent of the water delivered to cities, farms and businesses in California.

In Brief: With many of the state's headwaters increasingly at risk of wildfires and other threats, ACWA issued this report to urge that actions be taken to help safeguard California's future water supply reliability and water quality. The report outlined the benefits of healthy headwaters, identified challenges to success, and offered a number of recommendations for improving the resiliency of California's headwaters, including policies and practices to improve the health of forests.

Link: https://www.acwa.com/wp-content/uploads/2017/03/ACWA-Headwaters-Framework-Feb-2015.pdf

March 2015

Estimating the Water Supply Benefits from Forest Restoration in the Northern Sierra Nevada, K. Podolak, et al., The Nature Conservancy (TNC) and Ecosystem Economics San Francisco

Background: With more than 1 million members, TNC is one of the largest environmental nonprofits in the nation.

In Brief: This report emphasizes that large-scale forest and meadow restoration is needed across the Sierra Nevada to reduce the risk of mega-fires and improve ecosystem health. The authors estimated the potential water yield impacts from mechanical thinning to restore a forest's ability to store snow and use water more efficiently. The analysis suggested that, if the current scale of forest restoration is increased three-fold, it could bring up to a six percent increase in the mean annual streamflow for individual watersheds. The study found that the economic benefits from increased hydropower generation and water uses would be sufficient to cover between one-third and the full cost of thinning, assuming a low- or high-water response to forest thinning. Meadow restoration also has the potential to modify downstream water supply, particularly the timing of flows.

Link: https://www.lgc.org/wordpress/wp-content/uploads/2018/11/WATERSUPPLYBENEFITS from-ForestRestorationMarch2015-2.pdf

June 2015 Phase I / December 2015 Phase II

California Assessment of Wood Business Innovation Opportunities and Markets (CAWBIOM), The Beck Group

Background: The Beck Group completed this report for The National Forest Foundation.

In Brief: This project assessed the status of California's forest products industry and identified forest products business opportunities that would help the U.S. Forest Service increase the pace and scale of forest ecosystem restoration. Phase I assessed California's forest products industry and analyzed nearly 50 technologies for converting wood fiber into products, highlighting four with particular potential. Phase II included more detailed technical, market, organizational, and financial feasibility assessments for the four technologies, identified further analysis needs and made policy recommendations.

Link Phase I: https://www.nationalforests.org/assets/pdfs/California-Assessment-Wood-Biomass-Innovation-Interim-Report-June-2015.pdf

Link Phase II: https://www.nationalforests.org/assets/pdfs/Phase-II-Report-MASTER-1-4-16.pdf

January 2017

Economic Development and Wood Utilization in Rural California Communities: A Need and an Opportunity, J. Kusel et al., Sierra Institute for Community and Environment

Background: The Sierra Institute is a nonprofit organization dedicated to addressing a growing array of challenges in rural communities, including natural resources management.

In Brief: This paper addresses many challenges faced by rural forested communities, including the dire need to thin forests to reduce risk of catastrophic wildfire and keep vital watersheds healthy. The paper offers ideas for businesses, some of which require cooperative development in order to create viable businessess, as well as to operate at a scale that will meaningfully reduce the risks and hazards associated with poor forest health.

Link: https://sierrainstitute.us/new/wp-content/uploads/2018/11/Community_Scale_Economic_Develop_Kusel_1.3.pdf

May 2017

Dead Tree Utilization Assessment, CAL FIRE and California Tree Mortality Task Force

Background: The Beck Group completed this report for CAL FIRE and the California Tree Mortality Task Force to determine potential market uses for dead trees.

In Brief: The report explored challenges and opportunities, and concluded that full use of dead trees is improbable because of the large volume, limited funds to subsidize removal and transportation of harvested trees, expected log and wood fiber quality degradation, and limited access including lack of roads to large areas of dead trees. Therefore, the report recommends that removal and utilization efforts should focus on the highest priority areas within Tier 1 and Tier 2 High Hazard Zones.

Link: *https://fmtf.fire.ca.gov/media/2226/beck_group_report_5-1-17.pdf*

September 2017

Improving the Health of California's Headwater Forests, Public Policy Institute of California (PPIC)

Background: PPIC is a nonprofit think tank dedicated to informing and improving public policy in California through independent, objective, nonpartisan research.

In Brief: As this report notes, California's headwater forests are not thriving under current management practices, and changes are needed to make them more resilient to periodic drought and long-term climate change. The report encourages more active management of these lands to improve forest health, reduce the risk of major wildfires and pest infestations, and maintain the flow of benefits provided by this critical natural infrastructure.

Link: http://www.ppic.org/wp-content/uploads/r_0917vbr.pdf

October 2017

SB-859 Wood Products Working Group Report: Recommendations to Expand Wood Products Markets in California: Investing in communities and California's climate resilient future, California Natural Resources Agency

Background: This report was submitted to the California State Legislature in compliance with Senate Bill 859 (2016).

In Brief: The report documents the benefits and also the barriers to expansion of wood products markets in California. The report assessed market and product development conditions, and made numerous recommendations regarding innovations and research around the use of cross-laminated timber and other products, financing, regulatory needs, developing human capital, and infrastructure needs.

Link: http://resources.ca.gov/wp-content/uploads/2014/07/Wood-Products-Recommendations.pdf

October 2017

Ecosystem Services and California's Working Landscapes, Market Mechanisms to Revitalize Rural Economies, D. O'Connell and A. Livingston, Working Landscapes Action Team of the CA Economic Summit and University of California, Agriculture and Natural Resources (UC-ANR)

Background: California Economic Summit Action Teams play a key role in developing a roadmap for promoting triple-bottom-line prosperity in California. UC-ANR connects campus-based researchers with offices, programs, and academics in every county to provide science-based information to people through Cooperative Extension and the Agricultural Experiment Stations.

In Brief: California's working landscapes include farmlands, ranches, forests, wetlands, mines, water bodies and other natural resource lands, both private and public. These landscapes provide essential benefits for California's economy, health and quality of life, including water, food, climate stability and recreation. This report describes the need for greater investment in the natural systems that sustain ecosystem services.

Link: *http://ucanr.edu/files/272736.pdf*

January 2018

Forest Health Initiative, California Forestry Association

Background: The California Forestry Association represents private landowners who manage their forestlands for multiple natural resource benefits.

In Brief: The California Forestry Association issued this report following the destructive 2017 fire year. The document describes a comprehensive approach

for creating healthier forests and includes a summary of proposed actions and a detailed narrative with specific recommendations tied to that narrative.

Link: http://calforests.org/wp-content/uploads/2018/02/2018-Forest-Health-Initiative-1.pdf

February 2018

Fire on the Mountain: Rethinking Forest Management in the Sierra Nevada, Little Hoover Commission

Background: The Little Hoover Commission, formally known as the Milton Marks "Little Hoover" Commission on California State Government Organization and Economy, is an independent bipartisan state oversight agency.

In Brief: The Commission spent a year reviewing crisis conditions in Sierra Nevada forests and listening to suggested remedies, then produced a report documenting challenges and making recommendations for improving the health of the forested areas of the Sierra Nevada. The report noted that success will require willingness to invest more for proactive forest management, including greater use of prescribed burning, and less reliance on reactive firefighting. The Commission called for enhancing public awareness of the role of Sierra Nevada forests in the well-being of California.

Link: https://lhc.ca.gov/sites/lhc.ca.gov/files/Reports/242/Report242.pdf

April 2018

Improving California's California Forest and Watershed Management, Mac Taylor, Legislative Analyst, Legislative Analyst's Office (LAO)

Background: The LAO has provided fiscal and policy advice to the Legislature for 75 years, based on fiscal and programmatic expertise and nonpartisan analyses of the state budget.

In Brief: This report recognizes the statewide benefits of healthy forests and the poor conditions currently characterizing the state's forested lands. It offers policy recommendations, including improving and increasing funding and coordination efforts, revising state policies and practices to facilitate forest health activities, improve landowner assistance programs to increase effectiveness, and expand options for using and disposing of woody biomass.

Link: http://www.lao.ca.gov/Publications/Report/3798

May 2018

California Forest Carbon Plan: Managing our Forest Landscapes in a Changing Climate, CAL FIRE, California Natural Resources Agency and Cal EPA

Background: The Forest Carbon Plan lays out recommended actions to achieve healthy and resilient forests based on what we know today about our forests and how climate change will evolve in California.

In Brief: As the plan notes: "The worsening threats to our forests mean we cannot wait for better information before we act, but must begin acting now and adjust these actions as we learn more over time." The plan explains that current rates of fuel reduction, thinning of overly dense forests, and use of prescribed and managed fire are far below levels needed to restore forest health, prevent extreme fires, and meet the state's long-term climate goals. The plan highlights the need to rapidly ramp up forest treatment to 500,000 acres of nonfederal lands as well as 500,000 acres of federal lands each year.

Link: http://resources.ca.gov/wp-content/uploads/2018/05/California-Forest-Carbon-Plan-Final-Draft-for-Public-Release-May-2018.pdf

November 2018

Priority Policy Solutions for California's Next Governor, Water, Climate and Wildfire, Resources Legacy Fund (RLF) and the UC Berkeley Center for Law, Energy & the Environment (CLEE)

Background: RLF is a nonprofit organization that works with philanthropists to achieve outcomes that lead to the conservation of land, ocean and water resources, climate change resilience, and conservation funding and policies that benefit communities. CLEE relies on the expertise of the faculty, students and staff at UC Berkeley Law to develop creative, pragmatic policy solutions to critical environmental and energy challenges.

In Brief: RLF and CLEE organized a convening with California wildfire and forest management policy leaders to develop recommendations for executive, legislative and regulatory actions that the new governor should take immediately to address the wildfire crisis. Recommendations fall under several categories, including Governance and Planning, Economics and Infrastructure, and Public Education and Understanding.

Link: https://www.law.berkeley.edu/wp-content/uploads/2018/12/CLEE-RLF-Solutions-for-Californias-Next-Governor.pdf

November 2018

Mass Timber Market Analysis, The Beck Group

Background: This report was completed by The Beck Group for the Council of Western State Foresters.

In Brief: This report analyzed the market for mass timber within the Council of Western State Foresters (CWSF) region (17 Western US states and six U.S. affiliated Pacific Islands), with a focus on the likely impact on timber demand in the region. The report noted that the demand for mass timber is large and construction of multi-story buildings is expand-

ing rapidly. More than half of the total projected demand for the CWSF region is in the state of California, thus cross-laminated timber acceptance in California is critical to the overall demand for the region.

Link: https://www.oregon.gov/ODF/Documents/ForestBenefits/Beck-mass-timber-market-analysis-report.pdf

January 2019

Economic Viability Assessment for a Biomass Utilization Facility, *The Beck Group*

Background: This report was completed by The Beck Group for the California Department of Housing and Community Development.

In Brief: This study identifies and assesses several biomass-utilizing businesses that could be developed as biomass utilization facilities in Tuolumne County. The study was done in conjunction with a National Disaster Resilience Competition grant through the U.S. Department of Housing and Urban Development, aimed at helping to restore forest and watershed health, foster local economic development and increase disaster resilience in areas affected by the 2013 Rim Fire.

Link: https://sierranevada.ca.gov/wp-content/uploads/sites/236/2019/01/NDRC-BUF-Feasibility-Study-013019.pdf

March 2019

Wildfires and Forest Resilience: The case for ecological forestry in the Sierra Nevada, The Nature Conservancy (TNC)

Background: With more than 1 million members, TNC is one of the largest environmental nonprofits in the nation.

In Brief: As part of a campaign to promote understanding about solutions to the wildfire crisis, TNC released a briefing paper describing overgrowth conditions in forests, increases in high-severity wildfire, and the dire consequences. This paper makes the scientific case for "ecological forestry," defined as a combination of strategic thinning, prescribed fire, and managed wildfire, as the best solution to the challenges being faced in the forests.

Link: https://www.scienceforconservation.org/assets/downloads/WildfireForestResilience_2019_Kelsey_2.pdf

INITIATIVES AND INSTITUTIONS

1993 – present

Sierra Institute for Community and Environment

Background: The Sierra Institute is a nonprofit organization dedicated to bringing research, education and collaboration skills to rural communities within Plumas County to address a growing array of challenges, including natural resources management and how it relates to community well-being.

In Brief: The Sierra Institute's Rural Community Development Initiative involves nine rural communities working to create markets in bio-energy production and other types of uses for lower value woods. The Institute also is working to develop the multi-phase Plumas Biomass Project involving a network of biomass boilers at institutions with high heat demand, with an affiliated chip processing facility anchored on a wood utilization campus in Crescent Mills.

Link: https://sierrainstitute.us

1996 – present

Sierra Business Council

Background: The Sierra Business Council's mission is to pioneer and demonstrate innovative approaches and solutions to increase community vitality, economic prosperity, environmental quality, and social fairness in the Sierra Nevada.

In Brief: The Sierra Business Council has helped preserve thousands of acres of threatened landscapes throughout the region, with projects focusing on both preservation and restoration of land parcels large and small. Among many active initiatives, the Sierra Business Council is working on the Northern Sierra Biomass Initiative, which seeks to replicate a biomass cogeneration plant acquired and refurbished by American Renewable Power near the City of Loyalton in Sierra County. More information can be found here: *http://sierrabusiness.org/what-we-do/projects/331-northern-sierra-biomass-initiative*

Link: http://sierrabusiness.org/who-we-are/about

2010 – present

Yosemite-Stanislaus Solutions

Background: Yosemite Stanislaus Solutions (YSS) is a collaborative group of diverse interests convened by the U.S. Forest Service.

In Brief: This group has worked collaboratively for more than a decade to assist the United States Forest Service, Bureau of Land Management, and Yosemite National Park and private land managers in achieving healthy forests and watersheds and in developing recovery and restoration plans for the Rim Fire and other areas in need of rehabilitation.

Link: https://yosemitestanislaussolutions.com/

2014 – present

California Forest Watershed Alliance

Background: The California Forest Watershed Alliance (CAFWA) is a nonpartisan, urban-rural coalition representing water interests, local governments, the conservation community, agriculture, and the forestry sector, created to promote the restoration

and improvement of California's forested watersheds. Founding members include ACWA, California Farm Bureau Federation, California Forestry Association, Rural County Representatives of California and The Nature Conservancy.

In Brief: CAFWA has provided state level policy recommendations, including: A comprehensive "all lands" approach to improving forest health, increasing the pace and scale of ecologically based active forest management and prescribed fire, supporting policies to increase the economic feasibility of forest restoration through biomass and innovative wood products, encouraging watershed scale planning and project implementation, and encouraging use of state resources to accelerate forest restoration. A summary document can be found here: ***https://docs.wixstatic.com/ugd/37e2e5_7122ba56ebe04d739d9d21f715e3b442.pdf***

Link: ***https://www.caforestsandwatersheds.org/priorities***

2015 – 2018

Tree Mortality Task Force

Background: The Tree Mortality Task Force was established by Executive Order by Gov. Brown.

In Brief: More than 80 state and federal agencies, local governments, utilities, and other stakeholders worked together to address epidemic levels of tree mortality driven by California's fifth year of drought. The Task Force responded to 19 Executive Order directives and in 2018 became the Tree Mortality Working Group under the newly created Forest Management Task Force.

Link: ***https://fmtf.fire.ca.gov/working-groups/tree-mortality/***

2017 – present

Tahoe-Central Sierra Initiative

Background: The Tahoe-Central Sierra Initiative (TCSI) is a part of the Sierra Nevada Watershed Improvement Program (WIP). This effort is being led by the Sierra Nevada Conservancy and the California Tahoe Conservancy, in partnership with a number of public, private and nongovernmental organizations.

In Brief: The Initiative brings together innovative approaches to increase the pace and scale of restoration work that gets done across the watersheds of the Central Sierra Nevada and Lake Tahoe areas. Building upon several large-scale regional efforts and best available science, the Initiative seeks to accelerate regional scale forest and watershed restoration through ecologically based management actions while creating opportunities to support a forest restoration economy and explore innovative process, investment, and governance tools.

Link: ***http://restorethesierra.org/tahoesierra/***

2018 – present

Forest Management Task Force

Background: The Forest Management Task Force was created pursuant to Gov. Brown's Executive Order B-52-18.

In Brief: The Task Force was organized to protect the environmental quality, public health, and economic benefits that healthy forests provide to California. Goals include increasing the rate of forest treatments, implementing the Forest Carbon Plan, and expanding state wood product markets through innovation, assistance, and investment. Seven working groups function and contribute.

Link: ***https://fmtf.fire.ca.gov***

2018 – present

Joint Institute for Wood Products Innovation

Background: The Joint Institute was established by the California Board of Forestry and Fire Protection pursuant to Executive Order B-52-18.

In Brief: The Joint Institute for Wood Products Innovation is dedicated to providing California forest product information, research, and analysis to increase economic drivers for healthy forests. The Institute is conducting research and support for an expanded forest products sector in California.

Link: ***https://bofdata.fire.ca.gov/board-committees/joint-institute-for-wood-products-innovation/***

2019

California Mass Timber Building Competition

Background: This competition has been facilitated by the California Government Operations Agency (GovOps) and WoodWorks – Wood Product Council.

In Brief: GovOps is awarding $500,000 in grants as part of this statewide competition designed to showcase the architectural and commercial viability of advanced mass timber products in construction. Goals include supporting employment opportunities in rural communities, contributing to the health and resiliency of California forests, and advancing sustainability in the built environment.

Link: ***https://www.govops.ca.gov/2019/01/04/2019-california-mass-timber-building-competition/ww.fs.usda.gov/treesearch/pubs/55621***

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