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JOINT LEGISLATIVE COMMITTEE ON EMERGENCY MANAGEMENT
CHRISTY SMITH, CHAIR

INFORMATIONAL HEARING

TUESDAY, MAY 14, 2019, 9:30 AM, ROOM 4202

THE 2019 WILDFIRE SEASON: ARE WE PREPARED?

Briefing Document

The Committee will be looking into California's preparation for the "new normal" of fighting wildfires in 2019. Wildfire response is not solely the responsibility of the State of California; it must involve a concerted effort from the federal government, state government, local governments, private landowners, businesses and our citizens. Only when all of these groups work together in partnership will we have a better outcome for the 2019 wildfire season. After two years of disastrous fire seasons, the State of California, under the leadership of Governor Gavin Newsom, has committed to funding and creating an expanded overall strategy of fire preparation, mitigation, additional crews and equipment, better forest management and other efforts. The Governor's 2019-20 budget plan includes a total of $654 million of proposed new spending across numerous state departments to continue and expand recent efforts related to wildfires. The state is embracing a new way of fighting the new normal of wildfires by investing in safety. This follows action in May of 2018, when former Governor Jerry Brown called for doubling the amount of forest land treated each year in California by 2023. As a result the state significantly increased the money it was spending on those efforts, with the Legislature earmarking $1 billion over five years in funds generated by the state's carbon trading program.

This hearing will ask how can we make California safer and what can we and our partners do in fighting wildfires to make this happen?

Background

The state's fire season is now almost year round. More than 25 million acres of California wildlands are classified as under very high or extreme fire threat. Approximately 25 percent of the state's population – 11 million people – lives in that high-risk area.

Wildfires are not only more frequent but are far more devastating. Fifteen of the 20 most destructive wildfires in the state's history have occurred since 2000; ten of the most destructive fires have occurred since 2015.

At the same time that our climate is changing and fueling the devastating force of wildfires, increased development in the wildland-urban interface (WUI) has placed more residents in the potential path of destruction. Today, approximately 25 percent of the state's population (over 11 million people) lives in high fire-risk areas, including the WUI.

The 2018 wildfire season in California was the deadliest and most destructive wildfire season on record with over 7,600 fires burning an area of 1,893,913 acres (2,959 sq. miles). This is the largest amount of burned acreage ever recorded in a fire season in California. The California Department of Insurance has reported that insured losses from the 2018 wildfires exceeded over $12 billion. This amount is for insured losses only and does not reflect damage to property that was not insured or the costs of fire suppression. Total property losses have been estimated at over $16.5 billion. The California Department of Forestry and Fire Prevention (CAL FIRE) reports that Emergency Fund Fire Suppression Expenditures totaled $947.4 million in fiscal year 2017-18 and are estimated to be $676.8 million for 2018-19

More than half of the acres of forestland that burned in the state over the past two years were on federal land (1.54 million acres burned) with the rest (1.38 million acres burned) being a mix of private, county and state lands. The acreage burned in California during the 2018 fire season accounted for 21% of all acres of forestland burned in the United States.

In looking at how we protect our state from wildfires it must be remembered that the Federal Government owns or manages the majority of California's forestland. There are 33 million acres of forest in California, including:

• 58 percent (19 million acres) owned and managed by federal agencies (including the US Forest Service, Bureau of Land Management, and National Park Service).

• 3 percent (700,000 acres) owned by state and local agencies, including CAL FIRE, local open space, park and water districts and land trusts.

• 39 percent (13.3 million acres) privately owned, including individuals/families, Native American tribes, and companies.

A Look Back at 2018 Wildfires

The Mendocino Complex

First reported on July 27, 2018, the Mendocino Complex Fire was the largest recorded fire complex in California history. It resulted from the combination of two wildfires, the River Fire and Ranch Fire, which burned in Mendocino, Lake, Colusa, and Glenn Counties, with the Ranch Fire being California's single-largest recorded wildfire. Both fires burned a combined total of 459,123 acres before they were collectively 100% contained on September 18, 2018. The Ranch

Fire alone burned 410,203 acres surpassing the Thomas Fire to become the single-largest modern California wildfire.

The Camp Fire

Started on November 8, 2018, the Camp Fire became the deadliest and most destructive wildfire in California history. It is also the deadliest wildfire in the United States since the Cloquet fire in 1918, and is the sixth-deadliest wildfire overall in United States history. It has been described as being the world's costliest natural disaster in 2018.

Named after Camp Creek Road, its place of origin, the fire started in Butte County, in Northern California. After exhibiting extreme fire behavior through the community of Concow, an urban firestorm formed in the densely populated foothill town of Paradise. The fire caused at least 85 civilian fatalities, injured 12 civilians, two prison inmate firefighters, and three other firefighters. It covered an area of 153,336 acres (almost 240 sq. miles), and destroyed 18,804 structures, with most of the damage occurring within the first four hours. The fire reached 100 percent containment after seventeen days on November 25, 2018.

The Carr Fire

Reported on the afternoon of July 23, 2018, the Carr Fire was a large wildfire that burned in Shasta and Trinity Counties. The fire burned 229,651 acres (359 sq. miles), before it was 100% contained late on August 30, 2018. The Carr Fire destroyed at least 1,604 structures (at least 1,077 were homes) while damaging 277 others, becoming the seventh most destructive fire in California history and the seventh-largest wildfire recorded in modern California history.

At its height, the fire engaged as many as 4,766 personnel from multiple agencies. The fire began at the intersection of Highway 299 and Carr Powerhouse Road, in the Whiskeytown district of the Whiskeytown–Shasta–Trinity National Recreation Area. The fire was started when a flat tire on a vehicle caused the wheel's rim to scrape against the asphalt, creating sparks that set off the fire.

On July 26, the fire jumped the Sacramento River, making its way into the city of Redding, causing the evacuation of 38,000 people. Evacuations also took place in Summit City, Keswick, Lewiston, Shasta Lake City, Igo, Ono, and French Gulch. Eight people died in the fire, including three firefighters.

The Woolsey Fire

The Woolsey Fire was a destructive wildfire that burned in Los Angeles and Ventura counties. The fire ignited on November 8, 2018 and burned 96,949 acres of land. The fire destroyed 1,643 structures, killed three people, and prompted the evacuation of more than 295,000 people. It was one of several fires in California that ignited on the same day. The fire started in Woolsey Canyon on the Santa Susana Field Laboratory property, a complex of industrial research and development belonging to Boeing, in the Santa Susana Mountains above the Simi Valley near the boundary between Los Angeles and Ventura counties. The Santa Ana winds, which are often

a factor for Southern California fires, pushed the fire in a southerly direction throughout the first day. The Ventura freeway between the San Fernando Valley and the Conejo Valley was closed as the fire crossed and headed into the rugged Santa Monica Mountains.

The fire raced through chaparral-covered steep canyons and hundreds of homes in Malibu were destroyed or damaged on both sides of Pacific Coast Highway. Firefighters successfully protected Pepperdine University to the south while the entire portion of the Malibu coast west to the community of Solromar suffered damage from the fire.

Wildfires - Growing More Dangerous and Destructive

Wildfires in California's forestlands, grasslands, and brushlands have increased in ferocity and scale over the past decade. These conflagrations have escalated drastically in severity getting larger, more unpredictable, more destructive and more deadly. They often burn so hot that they create their own weather system, creating a fire storm that includes devastating winds and blow torch temperatures

These devastating blazes are now exhibiting extreme behaviors — they are wind-driven ember storms that create spot fires far beyond defensive lines and, in the case of the Carr fire, created a "fire tornado" that ignited objects lifted into the air.

The National Weather Service in looking at the Carr Fire estimated that the maximum wind speeds in the vortex of the fire storm were in excess of 143 mph. That would make it equivalent to a twister with a rating of EF-3 out of a maximum of 5 on the Enhanced Fujita scale. This giant, powerful spinning vortex was a tornado-like condition that lasted an hour and a half and was fueled by extreme heat and intensely dry brush.

In wildfire's "new normal" another weather driven wildfire complication is the high winds that frequently exist in California. Southern California experiences the Santa Anas which are hot dry winds that typically hit in late fall. Northern California will experience similar wind conditions that are termed Diablo winds.

Many of California's biggest and deadliest wildfires have been propelled by hot Santa Ana and Diablo winds that can gust to 100 mph, a wind speed that makes containing these fires nearly impossible. The only thing that can be done with some wind driven fires is to try to control the path of the fire and keep it away from people and homes. Stopping a fire when the wind is blowing at 50, 60, or 70 miles per hour is almost not possible. They will burn into anything that's in their path and has been referred to as "trying to stop a freight train."

High wind fire situations often mean that helicopters and airplanes can't drop water or flame retardants because the gusts blow the liquids away or turn them into an ineffective mist before they can reach the ground. High winds will also ground aircraft because of safety concerns in flying in such conditions. Hot, dry winds also dry out trees, shrubs and grasses, turning them into tinder which in turn helps to spread the blaze. High winds will spread embers and fan the fire making the fire burn fast and hot.

Northern and Central California also face wind conditions similar to Santa Ana winds. A Diablo wind is a name that has been occasionally used for the hot, dry wind from the northeast that typically occurs in the San Francisco Bay area of Northern California, during the spring and fall. This same wind pattern also affects other parts of California's coastal ranges. The term "Diablo wind" first appeared shortly after the 1991 Oakland firestorm that killed 25 people. The Diablos develop as the wind flows from high pressure over Nevada to lower pressure areas along the central California coast. These winds create extreme fire conditions.

Examples of recent wind driven fires include: The Cedar Fire which burned 273,246 acres in San Diego County in October 2003. It destroyed 2,820 structures and killed 15 people. Powered by winds, the blaze jumped a major highway and temporarily stopped incoming flights to San Diego International Airport and Los Angeles International Airport.

In October of 2007, Santa Ana winds also drove the Witch Fire in San Diego County, which charred 197,990 acres, destroyed 1,650 buildings and killed two. That same month, there were seven other blazes pushed by Santa Ana winds. CAL FIRE dubbed it the 2007 Fire Siege.

Blowing at speeds of up to 79 mph, winds pushed fires in October, 2017 that charred parts of Napa and the surrounding areas. The Tubbs Fire in Napa alone destroyed 5,643 structures. It was, at the time, the most destructive wildfire in California history. By the time of its containment the fire was estimated to have burned 36,810 acres and it killed 22 people. High wind conditions pushed the fire into a residential area of the City of Santa Rosa where it destroyed 5 percent of the city's housing stock.

Climate Change and Environmental Factors Play a Role in California's Devastating Fires.

Experts state that among other factors, there are three primary reasons why California wildfires are becoming more catastrophic. These include: (1) the effects of climate change causing the weather to become warmer; (2) more people are living in places where wildfires are occurring; and (3) there is more fuel available for fires to burn.

Scientists indicate that climate change is a central factor in creating the atmospheric ingredients that make wildfires more extreme. Warmer global temperatures driven by greenhouse gas emissions have led to droughts, as well as more extreme heat waves that are lasting longer. As the climate warms, the fuel conditions on the ground and increasing warm spells create greater opportunities for fire.

A recent federal tree mortality count estimated that 18 million trees have died in the past year in California wildlands and on private property; many of them the victim of recent droughts, bark beetle infestations and disease. In total, more than an estimated 147 million trees have died in California since the start of the state's drought years in 2010. Even though California has experienced a wet 2018-19 winter season, this coming wildfire season could be exacerbated when grasses and shrubs that have flourished begin to dry out and become added fire fuel. This occurred during the disastrous 2017 wildfire season that followed a wet 2016-17 winter season.

Not only are our fires more destructive and deadly, they are occurring almost throughout the year. The fire season in California has grown at the front end by approximately 30 days and extended at the back end by about another 30 days. One study has estimated that the length of a fire season across the Sierras has increased by 75 days. It is essentially no longer a fire season but almost a fire year.

Who Fights California Fires?

The responsibility for fighting fires in California is based upon responsibility areas and is distributed between the federal government, California State government and local firefighting entities. The United States Forest Service (USFS) is the agency of the U.S. Department of Agriculture that administers the nation's 154 national forests and 20 national grasslands, which encompass 193 million acres. Major divisions of the agency include the National Forest System and State and Private Forestry. Managing approximately 25% of federal lands, it is the only major national land agency that is outside the U.S. Department of the Interior.

The federal government is responsible for the fire response on federal lands in California including those that fall under the USFS, National Park Service, Bureau of Land Management, and the Bureau of Indian Affairs. When a fire starts on National Forest land the USFS will generally take the lead for the incident.

CAL FIRE is the California state agency responsible for fire and emergency response on over 31 million acres of "privately-owned" wildlands in California. Referred to as State Responsibility Areas or SRA, these lands do not include lands under the responsibility of the federal government or areas that are under the jurisdiction of local agencies where city or county fire departments are tasked with fire response. Areas under the jurisdiction of these local agencies are referred to as being in a Local Responsibility Area or LRA. There are overlaps between SRA and LRA where agreements or contractual arrangements have been made.

Via cooperative agreements, CAL FIRE will respond with crews and equipment to assist when requested by the federal or local governments, and vice a versa. This occurs frequently when there are a number of major fires burning in the state. The agency with originating jurisdiction is most commonly the lead and has command and control over all aspects of the incident. That includes being the lead in disseminating information concerning the incident, including fire information phone numbers, media interviews and providing Incident websites. At times when a large fire burns through more than one jurisdiction, a joint command will occur.

During large fire incidents it is not uncommon to see fire engines and crews from CAL FIRE, City and County fire departments, the USFS, and even engines and crews from other states responding. In some instances crews from other countries might participate. California has developed a robust mutual aid system that will utilize personnel and assets from a great a many sources when the need arises.

This Map shows areas designated according to responsibility areas.

CAL FIRE's jurisdiction extends the length and breadth of the State, and the heart of its emergency response and resource protection capability is a force of approximately 6,100 full-time fire professionals, foresters, and administrative employees; 2,600 seasonal firefighters; 105 California Conservation Corps (CCC) firefighters; 600 Volunteers In Prevention (VIP); and 3,500 prison inmates and wards. For the coming 2019 fire season Governor Newsom has redirected the California National Guard from duties at the California-Mexico border and has tasked them with assisting CAL FIRE with fire service duties.

In a typical year CAL FIRE responds to nearly 6,000 wildland fires that burn on average over 260,000 acres each year. The past two fire years have been the exception as the number of fires and acreage burned has increased dramatically. Through cooperative agreements, mutual aid, and the State's Emergency Plan, CAL FIRE personnel respond to more than 450,000 incidents annually, including structure fires, automobile accidents, medical emergencies, swift water rescues, civil disturbances, search and rescues, hazardous material spills, train wrecks, floods, and earthquakes.

California Is Taking the Lead in Efforts to Prepare For the 2019 Fire Season

Governor's Newsom's Executive Orders

On January 9, 2019, Governor Gavin Newsom issued Executive Order N-05-19. This Executive Order directed the California Department of Forestry and Fire Protection (CAL FIRE), in consultation with other state agencies and departments, to recommend immediate, medium and long-term actions to help prevent or mitigate destructive wildfires. With an emphasis on taking necessary actions to protect vulnerable populations, and recognizing a backlog in fuels management work combined with finite resources, the Governor is pursuing a strategic approach to take necessary actions focused on California's most vulnerable communities in order to reduce risk to life and property.

Spurred by recent fires where many elderly, low-income and socially-isolated individuals found themselves without the means to escape, Governor Newsom directed state agencies to consider risk management by factoring in socioeconomic concerns and community wildfire risks. Agencies were asked to identify geographic areas with populations that are particularly at risk during natural disasters. Paired with traditional natural risk factors, this data paints a more accurate assessment of the real human risk and will guide preventative action to help prevent loss of life. The executive order also announced a new "California for All" campaign for community resiliency that will be established and funded with $50 million. Funding for this campaign will include local grants focusing on community engagement and public education in high-risk areas with an emphasis on public health and safety. This program is designed to build resiliency among vulnerable populations at the highest risk for natural disasters through grant funding.

Executive Order N-05-19 required CAL FIRE, in coordination with other state agencies, to report to the Governor within 45 days with their recommendations to prevent and mitigate wildfires, including the deployment of personnel and resources, propose policy changes for rapid fuels management, and a methodology to assess at-risk communities.

A second executive order (N-04-19) was signed to modernize the way the state contracts for technology systems, and the order's first application was directed at fire detection. Instead of government prescribing specific technology solutions, an Innovation Procurement Sprint allows an agency to specify to the private sector what problems it is trying to solve. It allows agencies to convene outside experts to source innovative solutions and systems. In fire detection technology, this new process comes with the goal of having cutting-edge technology in the hands of emergency responders by the next fire season. This allows the state to develop a new approach to procurement with the goal of deploying new innovative solutions to the state's wildfire crisis by spring of 2020. This executive order is intended to speed up the use of new technologies.

The Governor's 2019-2020 Proposed Budget to Address Wildfires

In January, 2019 Governor Newsom proposed extensive appropriations in his budget proposal for fiscal year 2019-20 to address wildfires. These include an investment in new emergency planning funding, fuel reduction and forest health, funding for surge capacity to add five new Conservation Corps crews and 13 new engines which will be pre-deployed across the state in red flag areas, new C130 aircraft, additional funding for mutual aid to support local government prepositioning, funding for a communications strategy including local and regional grassroots strategies for evacuation and emergency preparedness, 100+ new infrared cameras and remote sensor equipment for our forestlands.

These proposals are currently making their way through the budget process.

Joint Letter to President Trump from the Governors of California, Oregon and Washington

On January 8, 2019, Governor Newsom signed a joint letter to President Trump with Washington Governor Jay Inslee, and Oregon Gov. Kate Brown requesting a partnership between state and federal governments on forest management.

The letter urges the President to direct the Department of Interior, Department of Agriculture and US Forest Service to double investments made in managing federal forestlands in the three states. The governors praised the Trump Administration for his Executive order 13855, which calls for better management of federal lands, including forest and brush, to address wildfire concerns and enhance overall conditions. The three governors also affirmed that more funding is needed to ensure that the executive order is able to achieve its aims. They added that without significant additional federal investment, these partnerships will have too little impact on changing the catastrophic reality of the wildfire season on the West Coast.

The letter from the three governors went on to cite the amount of money each state spends toward forest management, which includes partnering with private landowners, applying the latest technology, exploring new approaches to large-scale forest management projects and working with communities that abut wilderness areas to increase public safety. The portion of the letter pertaining to California stated, "California has committed to a five-year, $1 billion forest plan, and has already invested $111.3 million on Forest health since 2017, of which 49

percent was spent on managing federally owned land, while the state doubled the size of its actively managed lands to half a million acres."

The letter goes on to state, "In contrast to all our state efforts, the U.S. Forest Service has seen its budget cut by more than $2 billion since 2016." CAL FIRE has indicated that the U.S. Forest Service budget has decreased from $7.1 billion in 2016 to $4.8 billion in 2019.

Community Wildfire Prevention and Mitigation Report

As directed by Governor Newsom's Executive Order N-05-19, CAL FIRE on February 22, 2019, issued the Community Wildfire Prevention and Mitigation Report, also referred to as the "45 Day Report." CAL FIRE and other agencies were tasked with recommending immediate, medium and long-term actions to help prevent or mitigate destructive wildfires. In this report CAL FIRE identifies priority fuel reduction projects that can be implemented almost immediately to protect communities that are vulnerable to wildfire. This effort not only considered fire risk it also considered socioeconomic characteristics of the communities that would be protected, including data on poverty levels, residents with disabilities, language barriers, residents over 65 or under five years of age, and households without a car (See Page 26 for project parameters).

In this report CAL FIRE identifies 35 priority projects (See Page 33) that can be implemented immediately to help reduce the public safety risk from fire for over 200 communities. Projects include the removal of hazardous dead trees, vegetation clearing, creation of fuel breaks and community defensible spaces, and the creation of ingress and egress corridors. The Governor in an Emergency Proclamation authorized these projects to proceed without CEQA approval and state administrative contracting regulations.

These 35 projects are not meant to be an annual process but a fast start to mitigate specific community fire risks for the 2019 wildfire year. CAL FIRE is in the process of adopting a Vegetation Treatment Program Environmental Impact Report (VTPEIR) project that will speed up the CEQA process for future projects and is continuing to work with local partners to increase fire safety.

During the 45 Day Report, CAL FIRE worked with over 40 entities including government and nongovernment stakeholders to identify administrative, regulatory and policy actions that can be taken in the next 12 months to begin systematically addressing community vulnerability and wildfire fuel buildup through rapid deployment of resources.

Other recommendations are intended to put the state on a path toward long term community protection, wildfire prevention, and forest health. The report states, "The recommendations in the "45 Day Report," while significant, are meant to be only part of the solution. Additional efforts around protecting lives and property through home hardening and other measures such as enforcing defensible space must be vigorously pursued by government and stakeholders at all levels concurrently."

The report states that California is currently facing a massive backlog of forest management work. There are an estimated 23 million acres in the state's responsibility area could benefit from fuel reduction; "Millions of acres are in need of treatment, and this work— once completed—must be repeated over the years. Also, while fuels treatment such as forest thinning and creation of fire breaks can help reduce fire severity, wind-driven wildfire events that destroy lives and property will very likely still occur."

Governor Newsom Proclaims State of Emergency on Wildfires to Protect State's Most Vulnerable Communities

On March 22, 2019 Governor Gavin Newsom declared a state of emergency on wildfires designed to expedite forest-thinning projects and other programs. In this proclamation the Governor directed his administration to immediately expedite forest management projects that will protect 200 of California's most wildfire-vulnerable communities. This action followed the release of the "45 Day Report" by the California Department of Forestry and Fire Protection (CAL FIRE), which identified 35 priority fuel-reduction projects that can be implemented immediately to help reduce the public safety risk for wildfire.

This emergency proclamation provides time-saving waivers of administrative and regulatory requirements in order to protect public safety and allow for action to be taken in the next 12 months, which will begin to systematically address community vulnerability and wildfire fuel buildup through the rapid deployment of forest management resources.

The 35 priority projects were identified by geographic areas with populations that are particularly at risk during natural disasters. Paired with traditional natural risk factors, this data paints a more accurate assessment of the real human risk and can help guide preventative action to help prevent loss of life — especially for vulnerable groups.

Currently forest treatment projects must obtain approvals under the California Environmental Quality Act (CEQA). This process can take a year or more to get projects approved and local government has stated that the environmental review process typically uses 10 to 15 percent of the grant funds that local fire agencies receive for forest management projects. The Executive Order has waived CEQA and state regulatory contracting requirements for the chosen 35 projects.

The state has been working since 2010 on the Vegetation Treatment Program Environmental Impact Report or VTPEIR; a process that would cover all vegetation treatments in California under one overarching environmental document. It would identify environmentally sound processes for various natural landscapes. Then, if a project were proposed that met the guidelines for its landscape, it could be approved through a "checklist" scenario. Some projects will not fit the EIR template and would require additional review. The checklist template is designed to get projects approved and moving forward in a matter of weeks instead of years. CAL FIRE indicates that they have a goal of completing this new process by the end of the year.

Some environmental groups continue to favor the CEQA process saying that state officials are pursuing the wrong path altogether and that CAL FIRE should place more focus on making

communities more fire resistant and not on clearing vegetation. They believe California has a "home ignition problem, not a vegetation control problem" and that the state should spend some of the vegetation control dollars on structure fireproofing measures like ember-resistant vents and fire resistant rooftops.

Governor Newsom's Strike Force Report – Wildfires and Climate Change: California's Energy Future

On April 12, 2019 Governor Gavin Newsom released the findings of a strike force that he charged with examining California's catastrophic wildfires, climate change and our energy future. Most of the recommendations contained in this report are outside the focus of this hearing and will require further legislative investigation and study. The report states:

> "The strike force report sets out steps the state must take to reduce the incidence and severity of wildfires, including the significant wildfire mitigation and resiliency efforts the Governor has already proposed. It renews the state's commitment to clean energy. It outlines actions to hold the state's utilities accountable for their behavior and potential changes to stabilize California's utilities to meet the energy needs of customers and the economy."

The 52-page report from a "strike force" of government officials recommended making changes to a legal doctrine in California that defines the liability of investor owned utilities for damages that they cause. The state's three investor-owned utilities have complained that the current liability standard makes them particularly vulnerable to financial ruin; while power company critics have insisted it is essential to ensure utilities properly maintain their equipment and uphold safety procedures.

California and only one other state recognizes a legal doctrine known as "inverse condemnation" in which power companies can be held strictly liable for damages should their equipment spark a wildfire, even if the utilities have followed applicable safety rules. Companies can recover those costs from ratepayers but only if they prove to the California Public Utilities Commission that their conduct was prudent. The Strike Force recommended studying a fault-based standard that would modify California's strict liability standard to one based on fault to balance the need for public improvements with private harm to individuals.

The Strike Force suggested evaluating a liquidity-only fund that would provide liquidity for utilities to pay wildfire damage claims pending CPUC determination of cost recovery potentially coupled with modification of cost recovery standards. It also suggested the creation of a catastrophic wildfire fund coupled with a revised cost recovery standard to spread the cost of catastrophic wildfires more broadly among stakeholders.

The report states, "These concepts should be publicly debated, as each has impacts, tradeoffs, and consequences that must be addressed. Some concepts rely on voluntary contributions from utility investors, who in exchange will demand more clarity in the regulatory standard for cost recovery from ratepayers.

Other report recommendations:

• Expand fire prevention activity by improving forest and vegetation management, accelerating fuel reduction projects on both public and private land, training the workforce needed to scale up these projects, investing in new technologies to model and monitor fire risk, and strengthening utility oversight so that they invest more in safety.

• Make communities more resilient by considering updating codes that govern defensible space, encouraging cost-effective hardening of homes, strengthening evacuation, encouraging other emergency planning, and improving land use practices to reduce the damage to life and property from wildfires.

• Invest in fire suppression and response by investing in new fire engines and aircraft, re-deploying National Guard personnel from the border to support fire suppression initiatives, purchasing detection cameras to provide advanced data to firefighters, and investing in a statewide mutual aid system to pre-position resources in high-risk areas.

• Call on the Federal Government to Better Manage Federal Forest Land. As the owner of 57 percent of California's forestland, the federal government must also do its fair share to reduce fire risk. Specifically, the Governor has joined the governors of Washington and Oregon to call for the federal government to double the investment in managing federal forestlands in our states due to the high risk of wildfires.

Specific Recommendations Include:

- Create Incentives for Fuel Reduction on Private Lands.
- Develop Methodology to Better Assess At-Risk Communities.
- Jumpstart Workforce Development for Forestry and Fuel Work.
- Develop a Mobile Data Collection Tool for Project Reporting.
- Develop Models and Best Management Practices for Evacuation Planning. The state should partner with local government to encourage updates to local emergency plans, to increase resident awareness of those plans, and to otherwise improve emergency prevention and response efforts.
- Encourage local governments to adopt recently issued guidelines to improve communications during an emergency.
- Invest in Technology and Innovation: New technologies, including weather stations, drones, and artificial intelligence have tremendous potential as tools to more effectively prevent, detect and respond to wildfires.
- Prioritize Building In Less Fire-Prone Areas: The strike force recommends that at the regional level, governments and planners incorporate CAL FIRE's fire risk projections and the fire projection information in the Adaptation Clearinghouse and Fourth Climate Assessment into short- and long-term planning, and consider how to encourage more urban and lower-risk regions in the state to provide an alternative for those otherwise shut out of the state's housing market.
- Local General Planning: The strike force recommends that the safety element of local general plans be strengthened in high-risk areas, specifically for local governments to include fire

risk projections into general and specific plans, including through zoning and design standards. Additionally, the state should prioritize providing technical assistance support to these communities, many of which are rural and lack planning resources.

- Cost-Effective Home Retrofits: While California has stringent building standards and requirements for defensible space, the intensity of the wildfire threat in California now warrants higher levels of fortitude.
- CAL FIRE should consider options to encourage cost-effective home hardening to create fire resistant structures within the WUI and with a focus on vulnerable communities.
- The Forest Management Task Force should work with the Department of Insurance to seek input from the insurance industry on potential rebates or incentives for homeowners.
- CAL FIRE and the Department of Housing and Community Development should develop a list of low-cost retrofits that provide comprehensive fire risk reduction to protect structures from fires spreading from adjacent structures or vegetation and to prevent vegetation from spreading fires to adjacent structures.
- Consideration should be given to implementing a funding mechanism to assist individuals with cost-effective home retrofits. The model used by the California Earthquake Authority provides an example of such a mechanism.
- Defensible Space and Forest and Rangeland Protection: Compliance and enforcement is key to ensure that defensible space standards are met. CAL FIRE should review and make recommendations to increase defensible space.

The Task Force report is a comprehensive review of wildfire issues that face the state, local government, utilities, businesses and private citizens. Some of these proposals are controversial and many will require further debate, study and the introduction of legislation to enact

BACKGROUND: WILDFIRES – Other Factors

The continued expansion of human development into previously undeveloped land has played a significant role in the destructiveness and deaths of recent wildfires. As the state's population grows, ignition opportunities grow. On average, 95 percent of fires in California are caused by some form of human activity, such as: vehicle sparks, lawn mowers, faulty residential electrical connections, power lines, target shooting, fireworks, cigarettes, debris burns, campfires, and power equipment.

When people build houses close to forests or other types of natural vegetation, wildfires become harder to fight and letting natural fires burn becomes impossible.

CAL FIRE employs several different tools and measurements to assess wildfire danger and risk.

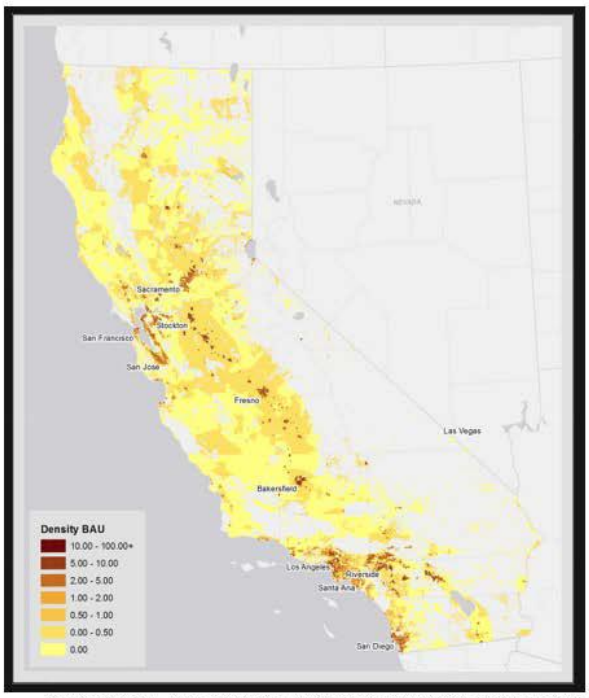
One of these is termed the Wildland-Urban Interface or WUI (See Map – Page 19). This is an area where houses and wildland vegetation meet or intermingle, and where wildfire problems are most pronounced. WUI includes three main components: human presence, wildland vegetation, and a distance that represents the potential for effects (e.g., wildland fire and human activity) to extend beyond boundaries and impact neighboring lands.

One-third of homes in the United States have been built in WUI areas, and is the fastest-growing land use type. WUI in the US grew rapidly from 1990 to 2010, in terms of new houses (from

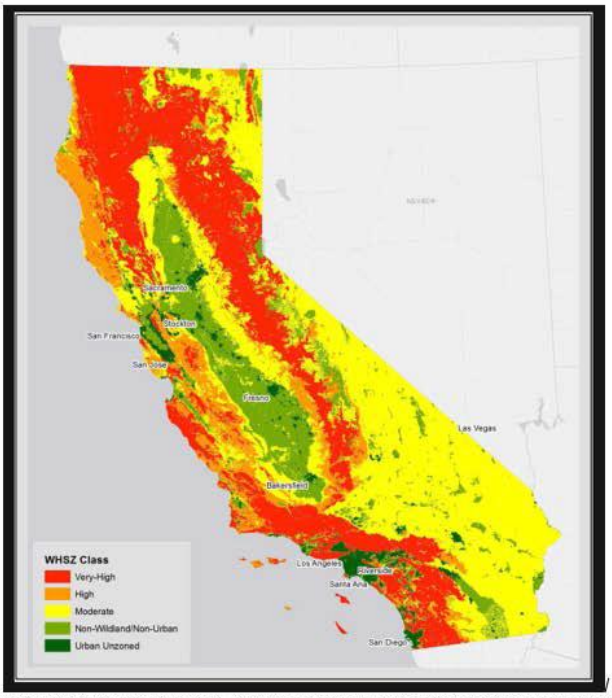
30.8 to 43.4 million, or 41 percent growth) and land area (from 224,325 to 297,000 square miles). The vast majority of new WUI designated areas were the result of new housing and were not related to an increase in wildland vegetation.

California's WUI zone grew 20 percent from 1990 to 2010, according to US Forest Service data. The number of housing units in our WUI area went from 3.3 million in 1990 to 4.4 million in 2010. New California building codes that addressed fire safety were not effective until 2008 so the great majority of these structures are not fire hardened and are at increased risk of burning during a wildfire. Structure hardening is a key component in determining whether a home burns or survives during a wildfire. A Sacramento Bee news article published on April 14, 2019 reported that 51% of homes built in the City of Paradise after 2008 survived the Campfire, while only 18% built before 2008 escaped.

Housing Density in Business As Usual (BAU) Scenario *



Fire Hazard Severity Zones of California **



Source: Michael L. Mann, Peter Berck, Max A. Moritz, Enric Batllori, James G. Baldwin, Conor K. Gately, D. Richard Cameron, "Modeling residential development in California from 2000 to 2050: Integrating wildfire risk, wildland and agricultural encroachment," Land Use Policy, Volume 41, November 2014, Pages 438-452.

* Map of forecast change in housing density (2000–2050) for the business as usual scenario. Darker shades of maroon indicate a greater increase in the housing density for this period. Grey areas represent protected or otherwise undevelopable areas.

** FHSZ represent risk to housing due to the areas fuel rank and probability of wildfire event.

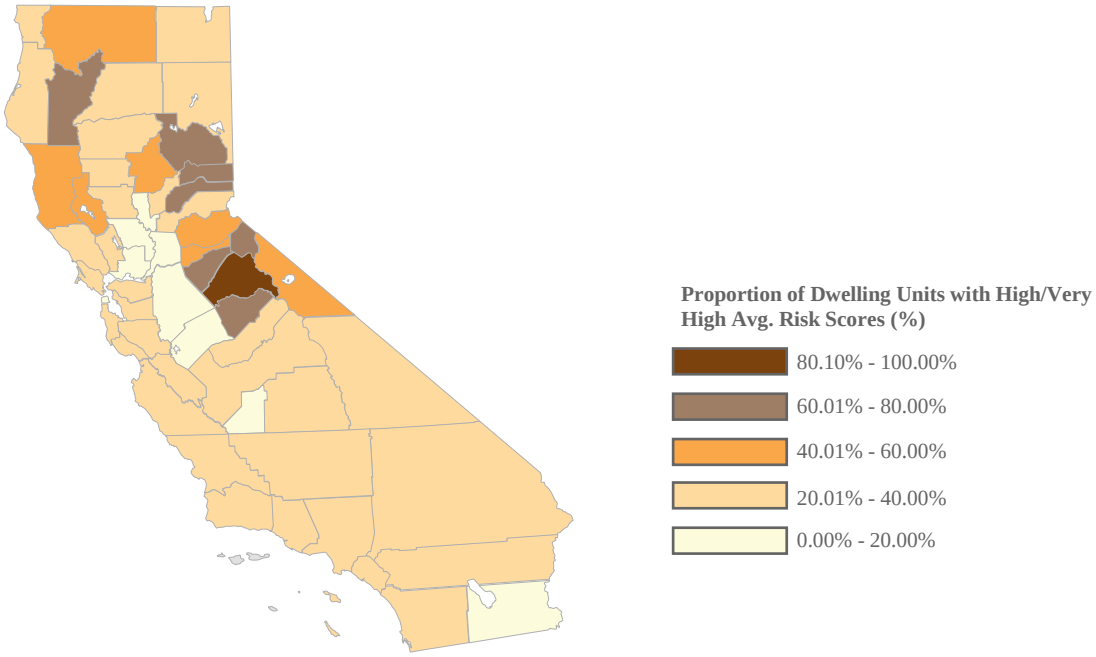
The maps above show a side-by-side view of housing density in the state with fire hazard severity zones.

Demographic trends do not suggest slower future WUI growth. Climate change projections indicate that conditions favorable for wildfire will occur more frequently in the future and continued building of homes in fire risk areas will increase risks.

Over the past 50 years, humans have been expanding the WUI. Although the areas that experienced the Camp Fire and Tubbs Fire have seen massive fires before, neighborhoods and cities were not as prevalent, or in some cases even present, decades ago. More development

means higher chances of ignition, as well as more homes and people to defend. The more that people live in flammable places with lots of vegetation, the more fires there are. According to a UCLA study, an estimated one million new homes are expected to be built in California's high-risk wildfire zones by 2050.

Proportion of Dwelling Units with High / Very High Average Risk Scores[1]



CAL FIRE's Increased Efforts in Fire Prevention.

CAL FIRE provides resource management and wildland fire protection services. CAL FIRE operates 234 fire stations and also staffs local fire departments when funded by local governments. CAL FIRE contracts with county agencies in six counties to provide wildland protection services.

The department has significantly increased its efforts in fire prevention in recent years. CAL FIRE's resource management and fire prevention programs include: forest and vegetation treatments, wildland pre-fire engineering, land use planning, education and law enforcement. The purposes of these activities are to reduce the number of fire starts, create more fire resistant and defendable communities, and reduce the overall intensity of wildfire. Typical projects include: forest thinning, vegetation clearance, prescribed fire, defensible space inspections, emergency evacuation planning, fire prevention education, fire hazard severity mapping, and fire-related law enforcement such as fire cause investigation and civil cost recovery for negligently started fires.

Since 2011, CAL FIRE has conducted over one million defensible space inspections. In the last five years, California has treated about 250,000 acres annually of state and private wildlands through forest management activities.

Since 2015, CAL FIRE has approved approximately 500 grants totaling about $242 million in fire prevention, forest health, and tree mortality grants to stakeholders across the state aimed at restoring health and fire resilience.

The Fire Prevention Program grants emphasize the following:

• Protection of habitable structures
• Number of people benefited
• Wildfire reduction benefits
• Community support

The Forest Health Program grants emphasize projects that:
• Are landscape scale
• Provide multiple benefits (carbon, fire resilience, water, pest resistance, wildlife habitat)
• Provide community benefits – in low income and disadvantaged communities
• Focus on project readiness
• Result in permanence

According to the LAO, in 2017-18, CAL FIRE allocated about half (52 percent) of the Forest Health Program funding for projects on forestlands that are part of the SRA, with nearly all of the balance allocated for projects on federally owned land. Improving the health on neighboring federal forestlands can reduce the threat of wildfire on – and thereby provide benefit to – adjacent SRA lands.

Local Considerations

Any property owners within the SRA are required to follow certain rules and regulations including maintaining 100 feet of defensible space from a structure, meeting Chapter 7A building standards for new construction (including ignition resistant roofs, under eves, siding, windows, and decking), following the BOF's regulations implementing minimum fire safety standards, and following specified fire hazard local planning requirements. CAL FIRE either directly enforces all of these requirements or reimburses the six contract counties to do so.

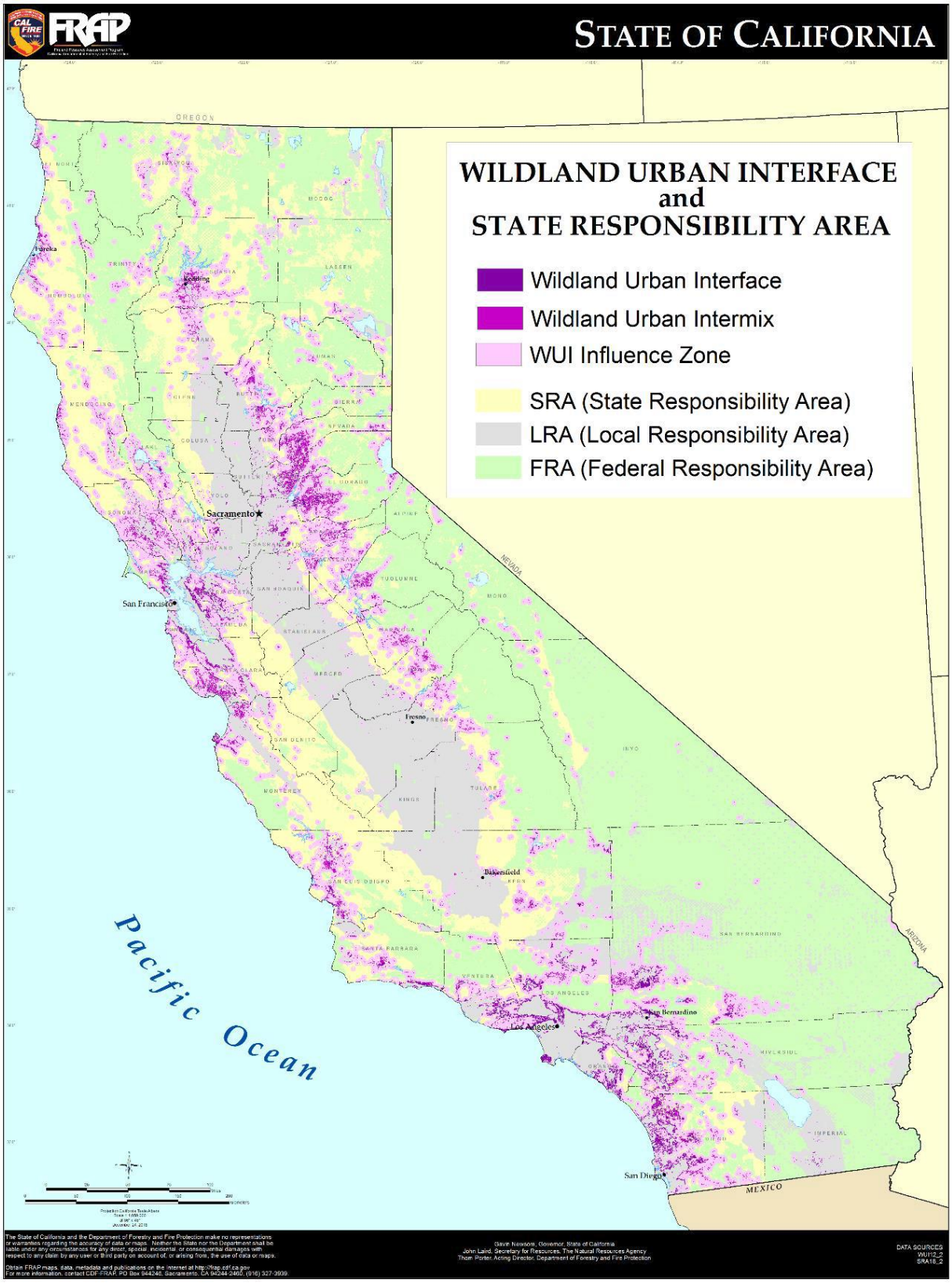
In addition to the SRA, the Director of CAL FIRE is required to identify areas where local governments are primarily responsible for fire suppression and prevention of wildfires that are very high fire hazard severity zones (VHFHSZ) based on fuel loading, slope, fire weather, and other relevant factors including winds. The local agencies with the VHFHSZs are required to adopt an ordinance that will enforce the 100 foot defensible space requirements in the VHFHSZ. VHFHSZs also must meet Chapter 7A building standards for new construction, follow the BOF's regulations implementing minimum fire safety standards, and follow specified fire hazard local planning requirements. Local agencies often enforce these requirements.

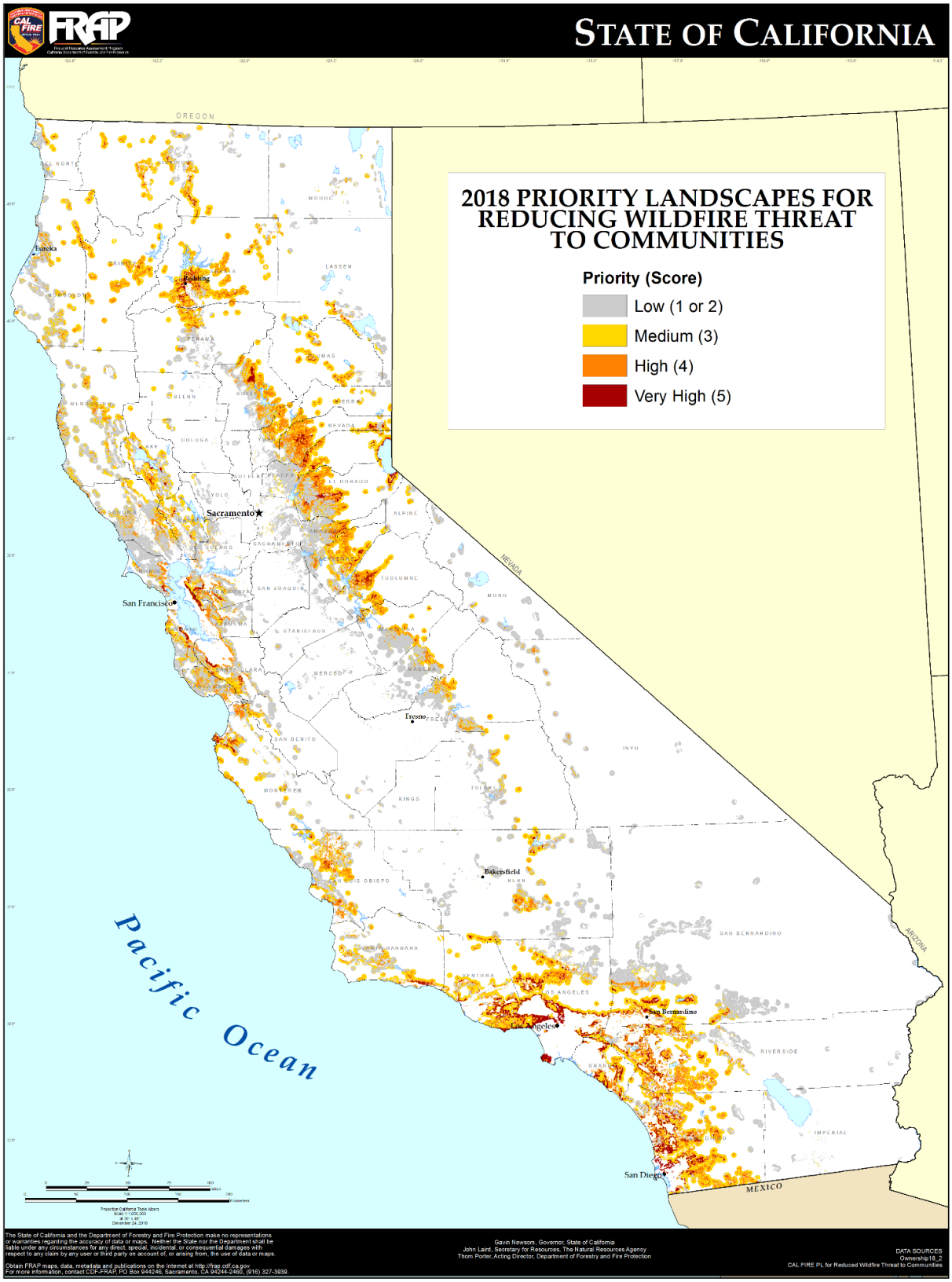
Cities and counties are required by law to adopt a safety element, as part of a comprehensive general plan, for protection of the community from unreasonable risks associated with various hazards, including wildfires. The safety element, at certain intervals, must be reviewed and updated as necessary to address the risk of fire for land classified as an SRA and land classified as a VHFHSZ. As part of the safety element update, cities and counties must also take into account the most recent advice contained in OPR's "Fire Hazard Planning" technical guidance document, as well as fire hazard severity maps from CAL FIRE, historical data on wildfires, information about wildfire hazard areas available from the United States Geological Survey, and the general location and distribution of existing and planned uses of land in VHFHSZs and SRAs. They must also consider local, state and federal agencies with responsibility for fire protection, including special districts and local offices of emergency services, and then create a set of goals, policies, and objectives based on this information for the protection of the community from the unreasonable risk of wildfire. Cities and counties must craft a set of feasible

Wildfires: Conclusion.

As stated by researchers and scientists, it is not a question of if the fires come again – but rather when the fires come again. California spends a significant amount of money for immediate, emergency responses to, and consequences of, wildfires. It is now making a large financial commitment this year and in future years to increase these capabilities. By investing more in forest management and improving land use planning, the state has an opportunity to proactively reduce not only destruction and deaths but the costs of wildfire suppression and recovery.

This commitment, dedication and investment must be matched by our federal and local partners. It also requires private property owners to do their part in making their own lands fire resilient and fire safe.


FRAP
STATE OF CALIFORNIA
WILDLAND URBAN INTERFACE
and
STATE RESPONSIBILITY AREA
Wildland Urban Interface
Wildland Urban Intermix
WUI Influence Zone
SRA (State Responsibility Area)
LRA (Local Responsibility Area)
FRA (Federal Responsibility Area)
OREGON
NEVADA
ARIZONA
MEXICO
Pacific Ocean
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Bernardino
San Diego
Eureka
Redding
DATA SOURCES
WUI12_2
SRA18_2


FRAP
STATE OF CALIFORNIA
2018 PRIORITY LANDSCAPES FOR REDUCING WILDFIRE THREAT TO COMMUNITIES
Priority (Score)
Low (1 or 2)
Medium (3)
High (4)
Very High (5)
OREGON
NEVADA
ARIZONA
MEXICO
Pacific Ocean
Eureka
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Bernardino
San Diego
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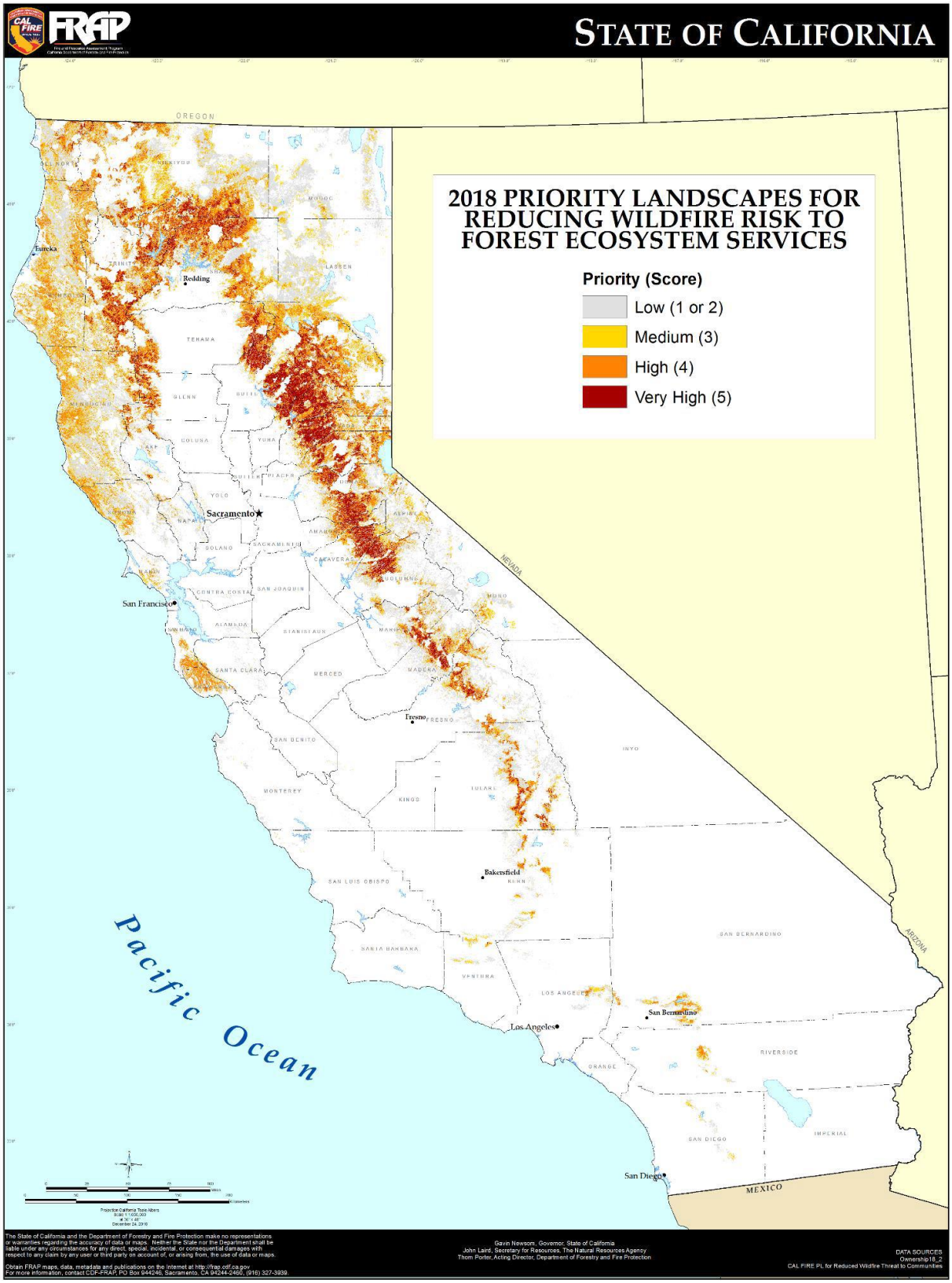
Gavin Newsom, Governor, State of California
John Laird, Secretary for Resources, The Natural Resources Agency
Thom Porter, Acting Director, Department of Forestry and Fire Protection
DATA SOURCES
Ownership18_2
CAL FIRE PL for Reduced Wildfire Threat to Communities


FRAP
STATE OF CALIFORNIA
2018 PRIORITY LANDSCAPES FOR REDUCING WILDFIRE RISK TO FOREST ECOSYSTEM SERVICES
Priority (Score)
Low (1 or 2)
Medium (3)
High (4)
Very High (5)
OREGON
NEVADA
ARIZONA
MEXICO
Pacific Ocean
Eureka
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Bernardino
San Diego
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DATA SOURCES
Ownership18_2
CAL FIRE PL for Reduced Wildfire Threat to Communities

2018 Wildfire Legislative Package

Last year, the Legislature and Governor enacted a package of wildfire and forestry bills, including:

- SB 465 (Jackson), expands, until January 1, 2029, Property Assessed Clean Energy (PACE) financing to allow cities and counties in very high fire hazard severity zones to authorize contractual assessments for property owners to finance wildfire safety improvements.

- SB 901 (Dodd), Chapter 626, Statutes of 2018, which addressed numerous issues concerning wildfire prevention, response and recovery, including funding for mutual aid, fuel reduction and forestry policies, wildfire mitigation plans by electric utilities, and cost recovery by electric corporations of wildfire-related damages.

- SB 821 (Jackson), Chapter 615, Statutes of 2018, authorizes counties to enter into an agreement to access the contact information of resident accountholders through the records of a public utility, as specified, for the sole purpose of enrolling county residents in a county-operated public emergency warning system.

- SB 917 (Jackson), Chapter 620, Statutes of 2018, provides that if loss or damage results from a combination of perils, one of which is a landslide, mudslide, mudflow, or debris flow, an insurer shall provide coverage if an insured peril is the efficient proximate cause of the loss or damage and coverage would otherwise be provided for the insured peril; provides that this is declaratory of existing law.

- SB 1260 (Jackson), Chapter 624, Statues of 2018, which was an omnibus fire prevention and forestry management bill intended to promote long-term forest health and wildfire resiliency. SB 1260 authorized federal, state, and local agencies to engage in collaborative forestry management, created new opportunities for public and private land managers to mitigate wildfire risks, and enhanced CalFire's role in identifying wildfire hazards as local governments plan for new housing and neighborhoods.

- AB 2126 (Eggman), Chapter 635, Statutes of 2018, which required the California Conservation Corps to establish a forestry corps program.

- AB 2518 (Aguiar-Curry), Chapter 637, Statutes of 2018, which directed CalFire, in collaboration with the Board of Forestry and Fire Protection, to identify barriers to in-state production of mass timber and other innovative forest products. Also, AB 2518 required other entities to develop recommendations for siting of additional wood product manufacturing facilities in the state.

- AB 2911 (Friedman), Chapter 641, Statutes of 2018, which made changes to local planning processes, provided for new building standards based on data from the 2017 fire season, provided for new vegetation management guidance, defensible space authorizations, and re-vegetation requirements in order to improve fire safety, and provided that utilities may be liable for damages removing vegetation not within their easements.

2019 Legislation

- Senate Bill 46 (Jackson) expands last year's SB 821 (Jackson, Ch. 615, Stats. 2018) by allowing cities and universities to automatically enroll residents, students, and employees in locally-operated emergency alert systems while preserving their ability to opt-out. SB 46 clarifies that alerting authorities may use wireless telephone subscriber data for the sole purpose of emergency notification, and allows local governments to identify residents with access and functional needs for the purpose of sending them specialized emergency alerts. This bill also requires telecommunications operators to provide data annually concerning the performance of wireless infrastructure used to send emergency alerts.

- SB 160 (Jackson) requires a county to integrate cultural competence into its emergency plan, upon the next update to its emergency plan, and requires counties to provide a forum for community engagement in geographically diverse locations in order to engage with culturally diverse communities, as specified.

- SB 167 (Dodd) requires electrical corporations to include impacts on customers enrolled in specified programs as part of the protocols for deenergizing portions of their electric distribution system within their wildfire mitigation plans filed at the California Public Utilities Commission (CPUC). As part of utility fire safety plans they will be shutting power down in high wind, high fire situations. This bill requires utilities to consider customer impacts.

- SB 182 (Jackson) reduces the risk of catastrophic wildfire damage to California's communities by strengthening local planning requirements and guidelines for permitting development in very high fire hazard areas, and directing local governments to develop comprehensive retrofit strategies for structures in their communities that are in need of fire hardening.

- SB 190 (Dodd) requires the State Fire Marshal (SFM) to develop a model defensible space program, as specified and would require the SFM to develop a Wildland-Urban Interface (WUI) Fire Safety Building Standards Compliance training manual. This bill provides that if a defensible space program is adopted, the local agency for enforcement of this program shall have the authority to recover the actual cost of abatement and shall have the authority to place it as a special assessment or lien on the property.

- SB 209 (Dodd) establishes the California Wildfire Warning Center (CAWWC), as specified, and requires the Center to have various responsibilities relating to fire-threat weather conditions, including a statewide fire weather forecasting, monitoring, and threat assessment system.

- SB 247 (Dodd) requires the CAL FIRE to oversee the vegetation management of electrical corporations, including identifying the list of trees to trim. This bill also requires that all costs associated with the electrical corporation's vegetation management are recovered from ratepayers through a specified mechanism called a two-way balancing account.

- SB 462 (Stern) requires the Chancellor's Office of the California Community Colleges (CCCs), in collaboration with the Academic Senate for the CCCs, to establish a model curriculum for a forestland restoration workforce program that could be offered at the community colleges.

- AB 38 (Wood) creates wildfire-related advisory bodies and a $1 billion revolving loan and rebate fund for the fire hardening of buildings. Specifically, this bill: 1) Creates the State Wildfire Preparedness Board (Preparedness Board), which consists of designated members, to: (a) convene a meeting to provide technical assistance, review best practices and receive reports; (b) seek opportunities for interagency collaboration and efficiencies; (c) review and approve wildlife protection plans prepared by each regional wildfire prevention district; and, (d) create a statewide fire preparedness public education campaign. 2) Designates 18 regional wildfire prevention districts (Prevention Districts) to advise the Preparedness Board as well as engage in specified activities, including developing a region-specific wildlife prevention and preparedness plans and promoting implementation of regional community fire evacuation drills. Creates the Fire Hardened Homes Revolving Loan and Rebate Fund (Loan and Rebate Fund) to provide specified financing assistance or rebates to eligible building owners for fire- hardening costs. This bill transfers $1 billion from the General Fund (GF) to the Loan and Rebate Fund for this purpose. Requires, starting on July 1, 2025, a seller of a building located in a very high fire hazard severity zone to provide the buyer a certificate that shows evidence of low-cost retrofits.

- AB 1516 (Friedman) makes various changes to improve defensible space requirements, electrical transmission or distribution line vegetation clearance requirements, and the Department of Forestry and Fire Protection (CAL FIRE) local government technical assistance requirements with the intent to improve the fire safety of California communities. Specifically, in areas affecting utility infrastructure, this bill: 1. Prohibits, on and after January 31, 2021, a landowner in, a high fire treat district (HFTD) as identified by the California Public Utilities Commission (CPUC), or in the state responsibility area (SRA) from planting vegetation near electrical transmission and distribution lines and towers that could encroach within ten feet of overhead conductors. 2) Requires CAL FIRE and the CPUC, in consultation with owners of electrical transmission or distribution lines, to develop a guidebook of tree and shrub species that will not encroach within ten feet of overhead conductors and recommendations for native vegetation to plant in the vicinity of electrical transmission and distribution lines and towers that provide habitat benefits. 3) Authorizes CAL FIRE, CPUC, and owners of any electrical transmission or distribution line, after

providing notice and an opportunity to be heard to the land owners, to access properties in which vegetation has been planted, on or after January 31, 2021, that will grow into the conductors for purposes of removing that vegetation at the landowner's expense. 4) Requires CAL FIRE to explore opportunities to use dedicated fuel reduction crews for areas in proximity to common ignition sources, including, but not limited to, roadways, electrical infrastructure, and campgrounds.

- AB 1144 (Friedman) requires the California Public Utilities Commission (CPUC) to allocate 10% of the 2020 funds from the Self Generation Incentive Program (SGIP) for the installation of energy storage and other eligible distributed energy resources (DERs) at facilities that provide critical infrastructure to communities in High Fire Threat Districts (HFTD) to support community resiliency.

Appendix A – Methodology to assess vulnerable communities

Summary

The 2018 Strategic Fire Plan for California[9], and the National Cohesive Wildland Fire Management Strategy[10] provide a set of goals and strategies that includes: fire adapted communities, safe and effective wildfire response, and resilient landscapes. Despite recent accelerated investment and resources, the vast amount of work and time required to achieve strategic goals necessitates an approach that best protects lives and property in the **near-term**, while simultaneously working over the **long-term** to create more resilient communities and landscapes that will allow Californians to live sustainably in the State's fire-prone landscapes. **Near-term needs include increasing the pace of fuel reduction in and near communities at risk, improving compliance with defensible space requirements, and improving fire resistance of both existing and new structures in the WUI**. In the longer term, a landscape-scale approach that marries forest health treatments with targeted community protection activities will be needed to fully address the scope of fire management issues in California.

Living sustainably in the fire-prone landscapes of California will require broad recognition of the inevitability of fire, which will in turn necessitate enhanced investment in and novel approaches to risk evaluation, fuel management, forest health, land use planning and community adaptation. As we move headlong through the 21st century, fire managers and landowners in California are challenged to effectively utilize available resources and tools to create resilient landscapes, reduce loss of life and property, and stem rising management costs, while enhancing our compatibility with the fire environment in which we live. Applying limited resources necessitates identification of the most vulnerable communities in which to begin this work.

Methods for assessing vulnerable communities

The following section provides a general description of the methods used to incorporate both wildfire risk and socioeconomic conditions of the communities that fuel reduction projects are designed to reduce

The overall goal of the analysis was to construct a framework that provides an assessment of wildfire risk and populations at risk from wildfire impacts. The

[9] 2018 Strategic Fire Plan for California.
http://cdfdata.fire.ca.gov/fire_er/fpp_planning_cafireplan
[10] National Cohesive Wildland Fire Management Strategy.
https://www.forestsandrangelands.gov/strategy/thestrategy.shtml

methodology consists of three main steps: a) identification of priority fuel reduction projects; b) evaluation of wildfire risk within the proposed project area; and c) evaluation of the socioeconomic characteristics of communities that projects are intended to protect.

For the initial step, CAL FIRE Units were asked to identify priority fuel reduction projects for their Units that would reduce wildfire risk to nearby communities. Project boundaries were incorporated into a GIS database for analysis.

Socioeconomic Analysis

Socioeconomic factors were based on evaluating conditions that are associated with populations at risk to wildfire. Some populations may experience greater risk to wildfire based on socioeconomic factors that lead to adverse health outcomes and their ability to respond to a wildfire. The factors chosen for this analysis were previously identified in CAL FIRE's Forest and Range Assessment and through a study conducted by Headwater's Economics (Table 1). Data for each socioeconomic variable was from the U.S. Census Bureau's American Community Survey (ACS) and organized by census tract.

Table 1. Socioeconomic variables considered to represent populations at risk to wildfire impacts

Socioeconomic Variables	**Description**
Families in poverty	Percentage of families in the census tract living below the poverty line
People with disabilities	Percentage of people in census tract estimated to have a disability; based on self-reporting
People that have difficulty speaking English	Percentage of people in the census tract estimated to have difficulty speaking English
People over 65	Percentage of people in the census tract over the age of 65
People under 5	Percentage of people in the census tract under the age of 5
Households without a car	Percentage of families in the census tract without a car

Data Sources: American Community Survey (ACS); California Building Resilience Against Climate Effects (CalBRACE) Project (2016).

For each project, the number of nearby communities was identified, represented by communities that were within a 5-mile buffer of each project boundary. For each community within the buffer, census track data was averaged for each of the socioeconomic variables. This resulted in a table that

provides a description of the socioeconomic characteristics of each community that is associated each proposed project. In addition, a composite socioeconomic index was generated that represented the average across all socioeconomic variables. The socioeconomic index ranges from 0 to 100.

Wildfire Risk Analysis for Proposed Projects

Wildfire risk was then characterized by intersecting the Unit proposed fuel reduction projects with the following spatial data layers:

- SRA – State Responsibility Areas
- WUI – Wildland Urban Interface (WUI Interface, WUI Intermix, and WUI Influence Zone)
- CAL FIRE Priority Landscape for Reducing Wildfire Risk to Ecosystems
- CAL FIRE Priority Landscape for Reducing Wildfire Threat to Communities

Each of these data layers is described in greater detail below.

An overlay of project boundaries was done to determine the percentage of the project area in State Responsibility Area (SRA) and within WUI. WUI was represented by varying degrees of housing density that are associated with WUI Interface, WUI Intermix, and WUI Influence zones.

The proposed project boundaries were then intersected with CAL FIRE's Priority Landscape for Reducing Wildfire Risk to Ecosystems ("Ecosystems PL"). The Ecosystems PL combines resource assets (water supply, carbon storage, standing timber, site quality, and large trees) with a set of threats (fire threat – fuel hazard and fire probability and Fire Return Interval Departure). This PL prioritizes watersheds for potential treatment to reduce wildfire risk based on threats and assets to forested lands. The ranking varies from 1 (least risk) to 5 (greatest risk). Lands such as conifer woodlands (e.g. juniper and pinyon-juniper), oak woodlands (blue oak woodland, valley oak woodland, coastal oak woodland, etc.), shrublands, grasslands, were not included. In addition, only forested lands with a fire return interval departure (FRID) of class 2 or greater were included. This ensures that the areas most in need of treatment to restore natural fire regimes and improve ecological functions are prioritized. For this analysis, only ranks 3, 4, and 5 were used to designate high priority areas for reducing wildfire risk to ecosystems. Each proposed project was overlaid with the Ecosystems PL to determine the percent of each project area that was associated with high wildfire risk to ecosystem services.

Next the proposed projects were intersected with CAL FIRE's Priority Landscape for Reducing Wildfire Risk to Communities ("Communities PL"). The Communities PL identifies where communities (people and associated infrastructure) are at

greatest risk from wildfire. Housing density within the Wildland Urban Interface is used to represent community assets. Areas with lower housing density receive a lower value and areas of higher housing density receive a higher value. The threat to communities is derived from CAL FIRE's Fire Hazard Severity Zones. Combining asset and threat rankings produces a priority landscape where areas with higher housing density and higher fire hazard receive the highest score. For this analysis, only ranks 3, 4, and 5 were used to designate high priority areas for reducing wildfire risk to communities. Each proposed project was overlaid with the Communities PL to determine the percent of each project area that was associated with high wildfire threat to communities.

A composite Wildfire Risk Index was also generated that represented the average across all wildfire risk variables (WUI, Ecosystems PL, and Communities PL). The wildfire risk index ranges from 0 to 100. Results characterizing wildfire risk for each proposed project are described on the CAL FIRE website.

Detailed Data Layer Information for Methodology to Assess Communities at Risk

This appendix provides detailed information on the sources, selection and construction of each of the data layers used in this analysis.

State Responsibility Area

CAL FIRE has a legal responsibility to provide fire protection on all State Responsibility Area (SRA) lands, which are defined based on land ownership, population density and land use. For example, CAL FIRE does not have responsibility for densely populated areas, incorporated cities, agricultural lands, or lands administered by the federal government.

Wildland Urban Interface (WUI)

Wildland Urban Interface (WUI) –The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels[11].

CAL FIRE Priority Landscape for Reducing Wildfire Threat to Communities

This Priority Landscape (PL) prioritizes lands where communities (people and associated infrastructure) are at risk from wildfire to direct efforts at reducing wildfire risk in these areas.

[11] http://www.nwcg.gov/pms/pubs/glossary

Ranking

The ranking varies from 1 (least risk) to 5 (greatest risk). Housing density derived from FRAP's WUI layer is used to rank assets. Threat is determined using California Fire Hazard Severity Zones.

Assets

The asset to be protected in this PL is communities, which are defined by housing densities. Less dense areas receive lower value and higher densities receive higher value. The classes of density are:

- 0 = No houses
- 1 = 0 - 0.05 housing unit per acre
- 2 = 0.051 - 0.200 housing unit per acre
- 3 = 0.201 - 1 housing unit per acre
- 4 = greater than 1 housing unit per acres

Threats

The threat to the communities is Fire Hazard Severity, derived from CAL FIRE's Fire Hazard Severity Zones. The zone ranking is:

- 1 = moderate severity
- 3 = high severity
- 5 = very high severity

Final Ranking:

The ranked asset and ranked threat were combined to derive the final ranked priority landscape. The results were ranked from the lowest risk of 1 to the highest risk of 5.

CAL FIRE Priority Landscape for Reducing Wildfire Risk to Forest Ecosystem Services

This Priority Landscape (PL) prioritizes watersheds for potential treatment to reduce wildfire risk based on threats and assets to forested lands.

Ranking

The ranking varies from 1 (least risk) to 5 (greatest risk). Lands such as conifer woodlands (e.g. juniper and pinyon-juniper), oak woodlands (blue oak woodland, valley oak woodland, coastal oak woodland, etc.), shrublands, grasslands, were not included. In addition, only forested lands with a fire return interval departure (FRID) of class 2 or greater were included. This ensures that the areas most in need of treatment to restore natural fire regimes and improve ecological functions are prioritized.

Assets

Surface water value: Watersheds (HUC12s) were ranked based on surface drinking water value from the USDA Forest Service's Forests to Faucet data, https://www.fs.fed.us/ecosystemservices/FS_Efforts/forests2faucets.shtml

Carbon storage: Estimated amount of carbon in the forest that is in living trees above the ground was spatially imputed into a GIS layer from Forest Service FIA data by Wilson et al. (2013) using a gradient nearest neighbor (GNN) technique. See Wilson, B.T., C.W. Woodall, and D.M. Griffith, *Imputing forest carbon stock estimates from inventory plots to a nationally continuous coverage.* Carbon Balance and Management, 2013. 8(1): p. 15.

Standing timber: Shows the estimated commercial timber volume on lands available for harvesting. Standing Timber was primarily derived from LEMMA Structure Maps (https://lemma.forestry.oregonstate.edu/data/structure-maps) that also used Forest Service FIA data and a GNN methodology (2012 vintage). LEMMA commercial timber volume was reduced for areas of high fire severity burns through 2017 (from FRAP), BAER imagery for areas of high severity wildfires that have occurred in 2018 from: https://fsapps.nwcg.gov/afm/baer/download.php), and Aerial Detection Survey data of areas of high tree mortality (also subsequent to 2012). Lands not available for timber harvest were removed, including southern California and South Central Coast counties with no viable timber processing facilities.

Site quality: This shows the productivity of timberland, based upon potential volume of wood (i.e. cubic feet) that can be produced per acre in a year. Site Class GIS data was produced by Wilson from Forest Service FIA data (using the same methods as for the Carbon storage layer), based upon FIA attribute SITECLCD – site productivity class code. It shows the potential timber volume produced at culmination of mean annual increment, in the standard classes used by the USFS.

Large trees: Derived from FRAP vegetation layer FVEG15 (WHRSIZE), which in turn (for this attribute) came from CALVEG data of the USFS. Tree size class scores were 1 = (6-11" DBH); 3 = (11-24" DBH); and 5 = (over 24" DBH).

Threats

Fire Threat: FRAP fire threat data (fthrt18_1) was derived from a combination of FRAP surface fuels data and large fire probability from the Fire Simulation (FSim) system developed by the US Forest Service Missoula, Montana Fire Sciences Laboratory.

Fire Return Interval Departure (FRID): FRID shows the deviation from historic averages of fire occurrence. FRID from USFS Region 5 was used to prioritize areas most in need of treatment. FRID scores of 2, 3, and 4 were assigned scores of 1, 3, and 5 respectively.

Composite Ranks

All assets were combined and the result ranked from 1 to 5 to derive a composite asset. Likewise, all threats were combined the results ranked from 1 to 5 to create a composite threat. The composite asset layer and composite threat ranks were then combined and classified to a final priority landscape rank for each 30m pixel.

Appendix C – CAL FIRE Priority Fuel Reduction Project List

#	Project Name	CAL FIRE UNIT	Acres	Number of Communities	Affected Population	Socio-economic Score (SES)	Fire Risk Score (FRS)	Final Summary Score
1	Hwy 44 Fuel Break	SHU	1,124	3	8,833	90	86	88
2	Kings Mountain Roadside	CZU	467	18	271,096	88	84	86
3	Rush Creek	FKU	181	1	2,973	71	99	85
4	San Juan Canyon Fuel Reduction	BEU	2,277	4	54,067	116	53	85
5	Martin Ranch Fuel Break	LMU	57	4	3,957	69	98	83
6	Santa Barbara Foothill Community Defensible Space	SBC	1,960	5	127,516	98	64	81
7	Musick Fuel Break	FKU	393	5	12,677	62	95	79
8	Bridgeville FR	HUU	18	1	4,143	66	87	76
9	North Orinda Fuel Break	SCU	1,760	30	561,223	96	56	76
10	West Redding Fuels Reduction	SHU	3,091	7	114,607	84	67	75
11	Guatay Community Fuel Break	MVU	128	15	221,282	85	66	75
12	China Gulch Fuel Break	SHU	530	8	88,610	84	66	75
13	Forbestown Ridge	BTU	1,673	8	14,950	92	58	75
14	North Fork American River Fuelbreak	NEU	4,373	13	77,319	65	84	74
15	Shaver Springs	FKU	78	4	12,677	62	86	74
16	El Granada Quarry Park Fuel Break	CZU	250	10	100,433	85	62	73
17	Blue Rush Fuel Break	FKU	82	1	2,973	71	75	73
18	State Route 17 Fuel Break	SCU	454	8	72,462	58	88	73

#	Project Name	UNIT	Acres	Number of Communities	Affected Population	Socio-economic Score (SES)	Fire Risk Score (FRS)	Final Summary Score
19	Painted Cave Community Defensible Space	SBC	1,742	7	84,232	79	66	73
20	Willits Fuels Reduction	MEU	11,965	3	13,120	88	55	72
21	San Marcos Pass	SBC	3,096	7	84,342	79	62	70
22	Grist Fuel Break	MMU	102	3	13,097	79	60	69
23	Crest Community Fuel Break	MVU	60	3	5,278	71	66	68
24	Beal Fuel Break	FKU	728	6	12,677	62	74	68
25	Aptos, Buzzard, Hinkley Ridgetop and Roadside	CZU	1,036	16	112,505	73	58	66
26	Ukiah Fuels Reduction	MEU	26,541	10	39,195	95	34	65
27	Lake Shastina Fuels Treatment	SKU	759	3	7,231	87	36	62
28	Ponderosa West Grass Valley Defense Zone	NEU	1,238	9	54,776	67	56	61
29	Big Rock Prescribed Burn	LAC	431	8	44,440	52	66	59
30	Metcalf Gap	MMU	44	4	10,131	79	37	58
31	Palo Colorada Fire Access Roads	BEU	6,843	4	9,556	77	37	57
32	Laurel Springs-Hennicksons Ridge	BEU	4,368	1	5,933	64	48	56
33	Elk Creek Fuel Break	TGU	953	2	4,868	98	3	50
34	Palo Corona Fuel Reduction	BEU	10,428	9	59,585	82	11	46
35	Highway 41 Vegetation Management Plan	MMU	4,621	7	28,737	84	4	44

Just The Facts: California Forest Management

The Federal Government Owns and Manages the Vast Majority of California's Forestland

- Federally-Owned: 58 percent
- Privately-Owned: 39 percent
- State-Owned: 3 percent

More Federal Land than State Land has Burned in California Over the Past Two Years

- Federal Land Burned: 1.54 million acres
- State Land Burned: 1.38 million acres

California is Investing Unprecedented Resources into Improving Forest Management, Combating Tree Mortality and Increasing Carbon Capture in Forests.
Over the past year the state has:

- Invested $160 million into the California Climate Investments Forest Health Grant Program to restore forest health and nearly $100 million into implementing key Forest Carbon Plan initiatives, including creating dozens of new positions for prescribed fire and fuel reduction, restoring forests within the state parks system, providing grants to local entities for watershed improvement and establishing programs to encourage markets for wood products.
- Committed to doubling the land actively managed through vegetation thinning, controlled fires and reforestation from 250,000 acres to 500,000 acres.
- Launched new training and certification programs to help promote forest health through prescribed burning.
- Boosted education and outreach to landowners on the most effective ways to reduce vegetation and other forest-fire fuel sources on private lands.
- Streamlined permitting for landowner-initiated projects that improve forest health and reduce forest-fire fuels on their properties.
- Supported the innovative use of forest products by the building industry and expanded grants, training and other incentives to improve watersheds.
- Issued executive orders directing state agencies to consider risk management through an added socioeconomic lens to better support vulnerable populations during before, during and after natural disasters and modernize the way the state contracts for technology systems, including fire detection.

The Federal Government Continues to Cut the US Forest Service's Budget

- 2019 = $4.8 billion
- 2018 = $5.2 billion
- 2017 = $6.3 billion
- 2016 = $7.1 billion

California is Even Helping the Federal Government Manage Its Forests

- Over the past two fiscal years, the state made more than $100 million available to treat forest lands, 49 percent of which are federally owned.

January 2019

California Department of Forestry and Fire Protection

Emergency Fund
Fire Suppression Expenditures

Fiscal Year	Expenditures
1979—1980	$11,978,000
1980—1981	$21,178,000
1981—1982	$12,582,000
1982—1983	$8,619,000
1983—1984	$12,358,000
1984—1985	$16,847,000
1985—1986	$35,510,000
1986—1987	$14,799,000
1987—1988	$56,769,000
1988—1989	$57,983,000
1989—1990	$39,345,000
1990—1991	$70,825,000
1991—1992	$22,524,000
1992—1993	$85,591,000
1993—1994	$65,679,000
1994—1995	$69,858,000
1995—1996	$60.4 million
1996—1997	$107 million
1997—1998	$47.7 million
1998—1999	$43.8 million
1999—2000	$178.5 million
2000—2001	$114 million
2001—2002	$166 million
2002—2003	$135 million
2003—2004	$252 million
2004—2005	$170 million
2005—2006	$117 million
2006—2007	$206 million
2007—2008	$524 million
2008—2009	$499 million
2009—2010	$274+ million
2010—2011	$90.1 million
2011—2012	$140 million
2012—2013	$310 million
2013—2014	$242 million
2014—2015	$402 million
2015—2016	$608 million
2016—2017	$534 million
2017—2018	$947.4 million
2018—2019**	$676.8 million (EST)

December 2018
www.fire.ca.gov

**E-fund expenditures for FY 2018-19 are estimates. Numbers are updated at the beginning of each month.

Top 20 Most Destructive California Wildfires

	FIRE NAME *(CAUSE)*	DATE	COUNTY	ACRES	*STRUCTURES*	DEATHS
1	**CAMP FIRE** *(Under Investigation)*	November 2018	Butte County	153,336	**18,804**	85
2	**TUBBS** *(Electrical)*	October 2017	Napa & Sonoma	36,807	**5,636**	22
3	**TUNNEL - Oakland Hills** *(Rekindle)*	October 1991	Alameda	1,600	**2,900**	25
4	**CEDAR** *(Human Related)*	October 2003	San Diego	273,246	**2,820**	15
5	**VALLEY** *(Electrical)*	September 2015	Lake, Napa & Sonoma	76,067	**1,955**	4
6	**WITCH** *(Powerlines)*	October 2007	San Diego	197,990	**1,650**	2
7	**WOOLSEY** (Under Investigation)	November 2018	Ventura	96,949	**1,643**	3
8	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity County	229,651	**1,614**	8
9	**NUNS** *(Powerline)*	October 2017	Sonoma	54,382	**1,355**	3
10	**THOMAS** *(Powerline)*	December 2017	Ventura & Santa Barbara	281,893	**1,063**	2
11	**OLD** *(Human Related)*	October 2003	San Bernardino	91,281	**1,003**	6
12	**JONES** *(Undetermined)*	October 1999	Shasta	26,200	**954**	1
13	**BUTTE** *(Powerlines)*	September 2015	Amador & Calaveras	70,868	**921**	2
14	**ATLAS** *(Powerline)*	October 2017	Napa & Solano	51,624	**783**	6
15	**PAINT** *(Arson)*	June 1990	Santa Barbara	4,900	**641**	1
16	**FOUNTAIN** *(Arson)*	August 1992	Shasta	63,960	**636**	0
17	**SAYRE** *(Misc.)*	November 2008	Los Angeles	11,262	**604**	0
18	**CITY OF BERKELEY** *(Powerlines)*	September 1923	Alameda	130	**584**	0
19	**HARRIS** *(Undetermined)*	October 2007	San Diego	90,440	**548**	8
20	**REDWOOD VALLEY** *(Powerline)*	October 2017	Mendocino	36,523	**546**	9

**"Structures" include homes, outbuildings (barns, garages, sheds, etc) and commercial properties destroyed.
***This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

3/14/2019

Top 20 Deadliest California Wildfires

	FIRE NAME *(CAUSE)*	DATE	COUNTY	ACRES	*STRUCTURES*	DEATHS
1	**CAMP FIRE** *(Under Investigation)*	**November 2018**	**Butte County**	**153,336**	**18,804**	**85**
2	**GRIFFITH PARK** *(Unknown)*	October 1933	Los Angeles	47	0	**29**
3	**TUNNEL - Oakland Hills** *(Rekindle)*	October 1991	Alameda	1,600	2,900	**25**
4	**TUBBS** *(Electrical)*	October 2017	Napa & Sonoma	36,807	5,643	**22**
5	**CEDAR** *(Human Related)*	October 2003	San Diego	273,246	2,820	**15**
6	**RATTLESNAKE** *(Arson)*	July 1953	Glenn	1,340	0	**15**
7	**LOOP** *(Unknown)*	November 1966	Los Angeles	2,028	0	**12**
8	**HAUSER CREEK** *(Human Related)*	October 1943	San Diego	13,145	0	**11**
9	**INAJA** *(Human Related)*	November 1956	San Diego	43,904	0	**11**
10	**IRON ALPS COMPLEX** *(Lightning)*	August 2008	Trinity	105,855	10	**10**
11	**REDWOOD VALLEY** *(Powerline)*	October 2017	Mendocino	36,523	544	**9**
12	**HARRIS** *(Undetermined)*	October 2007	San Diego	90,440	548	**8**
13	**CANYON** *(Unknown)*	August 1968	Los Angeles	22,197	0	**8**
14	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity County	229,651	1,614	**8**
15	**ATLAS** *(Powerline)*	October 2017	Napa & Solano	51,624	781	**6**
16	**OLD** *(Human Related)*	October 2003	San Bernardino	91,281	1,003	**6**
17	**DECKER** *(Vehicle)*	August 1959	Riverside	1,425	1	**6**
18	**HACIENDA** *(Unknown)*	September 1955	Los Angeles	1,150	0	**6**
19	**ESPERANZA** *(Arson)*	October 2006	Riverside	40,200	54	**5**
20	**LAGUNA** *(Powerlines)*	September 1970	San Diego	175,425	382	**5**

** Fires with the same death count are listed my most recent. Several fires have had 4 fatalties, but only the most recent are listed.
***This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

2/13/2019

Top 20 Largest California Wildfires

	FIRE NAME *(CAUSE)*	DATE	COUNTY	*ACRES*	STRUCTURES	DEATHS
1	**MENDOCINO COMPLEX** *(Under Investigation)*	July 2018	Colusa County, Lake County, Mendocino County & Glenn County	**459,123**	280	1
2	**THOMAS** *(Powerlines)*	December 2017	Ventura & Santa Barbara	**281,893**	1,063	2
3	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
4	**RUSH** *(Lightning)*	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
5	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
6	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
7	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity County	**229,651**	1,614	8
8	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
9	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
10	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
11	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
12	**LAGUNA (POWERLINES)**	September 1970	San Diego	**175,425**	382	5
13	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
14	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0
15	**STATION** *(Human Related)*	August 2009	Los Angeles	**160,557**	209	2
16	**CAMP FIRE** *(Under Investigation)*	November 2018	Butte	**153,336**	18,804	85
17	**ROUGH** *(Lightning)*	July 2015	Fresno	**151,623**	4	0
18	**McNALLY** *(Human Related)*	July 2002	Tulare	**150,696**	17	0
19	**STANISLAUS COMPLEX** *(Lightning)*	August 1987	Tuolumne	**145,980**	28	1
20	**BIG BAR COMPLEX** *(Lightning)*	August 1999	Trinity	**140,948**	0	0

*There is no doubt that there were fires with significant acreage burned in years prior to 1932, but those records are less reliable, and this list is meant to give an overview of the large fires in more recent times.
**This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

3/14/2019