2020 CALAVERAS COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

CALAVERAS COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

AMENDMENTS LOG

DATE	Section Number / Title Updated	PAGE #'s	Update Description	UPDATED BY

Disclaimer

This CWPP is not a legal document and is not intended to be an all-encompassing document in regards to fire planning and management in Calaveras County. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view(s) of any governmental agency, organization, corporation or individual with which the authors may be affiliated.

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. The Calaveras County Community Wildfire Prevention Plan (the Plan) is a work in progress. Various changes are anticipated throughout the Plan over the next several years.

Readers are urged to consult with their own agencies having jurisdiction regarding the use and implementation of this Plan, as well as their own legal counsel on matters of concern.

While the authors have used their best efforts in preparing this Plan, they make no representations or warranties with respect to the accuracy or completeness of the contents and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by receiving this publication. The advice and strategies contained herein may not be suitable for your specific situation. The publisher, sponsors and authors shall not be liable for any loss of profit or any other damages, including but not limited to, special incidental and/or consequential damages.

This Plan is not to be construed as indicative of project “activity” as defined under the “Community Guide to the California Environmental Quality Act, Chapter Three; Projects Subject to CEQA.” Because the Calaveras County CWPP does not legally commit any public agency to a specific course of action or conduct and thus, is not a project subject to CEQA or NEPA.

However, if and once grant funding is received from state or federal agencies and prior to work performed pursuant to this Calaveras County CWPP or a local CWPP, or prior to issuance of discretionary permits or other entitlements by any public agencies to which is a project under CEQA or NEPA. If the lead agency makes a determination that the proposed activity is a project subject to CEQA or NEPA, the lead agency must perform environmental review pursuant to CEQA or NEPA.

CONTENTS

EXECUTIVE SUMMARY

Background Of A CWPP

This 2020 Community Wildfire Protection Plan (CWPP) updates the 2016 Calaveras Community Wildfire Protection Plan developed by the Calaveras Foothills Fire Safe Council (CFFSC), and much like the previous plan, relies on input from CAL FIRE and local fire agency personnel, as well as federal and state agency stakeholders, private property owners and community members.

The purpose of this plan is to identify the risks and hazards associated with wildland fires in the Wildland-Urban Interface (WUI) areas of Calaveras County. The WUI is commonly described as "the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels" (*2009, Guidance for Implementation Federal Wildland Fire Management Policy and Fire Management Board Memorandum 19-004*).

The CWPP also identifies recommendations aimed at preventing and reducing both infrastructure and ecosystem damage associated with wildland fires. As many residents of Calaveras County have experienced firsthand, wildfire can threaten and impact lives, property, community assets, and natural resources. There are preventative measures that can be taken to help protect communities from the devastating losses that may result from wildfire. However, individual implementation of such measures can be prohibitive in terms of both cost and time, especially when neighboring properties do not participate. In this respect, a CWPP can be a very empowering tool, providing communities with the opportunity to influence where and how fuel reduction projects are implemented.

The Community Wildfire Protection Plan (CWPP) was conceived in the Healthy Forests Restoration Act of 2003 (https://www.congress.gov/bill/108th-congress/house-bill/1904) with the intention of enhancing collaboration between stakeholders from federal, state, and local agencies and community groups as they seek solutions to wildland-urban interface wildfire issues.

There are three requirements for a CWPP: (1) it be collaboratively developed with input from state and local agencies and community members; (2) it identify the WUI and prioritizes treatment areas, mitigation strategies and treatments; and (3) it recommend measures to reduce the ignitability of structures.

This is an adaptable and adjustable "living" document that provides a framework for future collaboration that can be used to identify, prioritize, implement, and monitor wildfire hazard reduction endeavors throughout the county. The fuel reduction projects identified in an approved CWPP may also receive priority status for state and federal funding.

This Community Wildfire Protection Plan supports the current CAL FIRE TCU Strategic Fire Plan (https://osfm.fire.ca.gov/media/11555/2020_tcu_fireplan.pdf); the statewide CAL FIRE California Fire Plan (https://www.fire.ca.gov/about-us/strategic-plan/) and the Alpine County CWPP targeting the greater Bear Valley area of western Alpine County (https://drive.google.com/drive/folders/12KJhwZWmHaZ-ma5K2qsYT5NLqg8JWwCn). The Calaveras County CWPP encourages the creation of more focused plans for wildfire protection at the neighborhood, town, and community levels.

This plan affords communities the opportunity to participate in partnership with organizations such as the Calaveras Foothills Fire Safe Council (CFFSC), the Calaveras Resource

Conservation District (RCD) and federal and state partners. Because there are numerous government jurisdictions with differing interests, the discussions and recommendations in this CWPP have remained general in nature, as to not conflict with site-specific stakeholder interests. Because this plan is a flexible planning tool, rather than a blueprint, general guidelines allow a project proponent to develop the most appropriate methods available for fuels treatment.

Additionally, a CWPP encourages neighborhoods to coordinate efforts on wide ranging projects, rather than individual activities that may be completed in isolation. By contributing local knowledge to a CWPP, citizens assist in developing and validating a strong, living, and collaborative community plan.

Collaboration and Community Outreach

The Calaveras County CWPP provides a strategic and holistic approach to fire safe planning and project development. Under normal circumstances, building a CWPP would involve direct input from and collaboration with members of our community. In the past this has included a series of public meetings, held in multiple locations throughout the county, for the purpose of educating the community and seeking their input. These meetings normally allow for productive discussions, ideas, and project proposals to be presented by any and all concerned. Concerned residents that attend gain a better understanding of wildfire risks and how they might address specific issues, while agency personnel learn the issues that local residents were concerned most with.

Throughout 2020, during the production of this CWPP, the COVID19 pandemic was presenting a new and different kind of safety threat to our Calaveras County communities. As a result of the associated state and local health department mandates and recommendations designed to prevent the transmission of the virus, public meetings typical of CWPP projects could not be held during 2020 in a manner that would ensure the safety of participants.

The Wildland-Urban Interface

Research from Headwaters Economics, published in November 2020 concludes: “From 2005 to (November) 2020, wildfires (nationally) have destroyed 89,210 structures, including homes and businesses. Across the country, the most damaging wildfire seasons have been in recent years, including 2017, 2018, and 2020, accounting for 62% of the structures lost over the last 15 years. By far, the most structure losses have been in California, with eight of the top 10 most destructive wildfires and more than half of all U.S. wildfire losses - nearly 60,000 structures - occurring in the state. In 2018, the Camp Fire burned more than 18,800 structures and resulted in 88 fatalities. Together with the Woolsey and Carr fires, more structures were lost to wildfires in 2018 - 22,867 structures in California and 24,488 total in the country - than in any other year in reported history.” The non-profit Headwaters Economics research organization has built a user friendly interactive data base tallying the number of structures, by state, destroyed by wildfires from 2005 to 2020; located here: https://headwaterseconomics.org/natural-hazards/structures-destroyed-by-wildfire/

The combination of wild landscapes and structural development creates the Wildland-Urban Interface. WUI zones throughout the state and within Calaveras County present tremendous risks to life, property and infrastructure while simultaneously posing one of the most dangerous and complicated situations firefighters face in wildfire control.

CAL FIRE has defined and mapped three Wildland-Urban categories:

1) Wildland-Urban **Interface**: dense housing development adjacent to vegetation that can burn in a wildland fire.

2) Wildland-Urban **Intermix**: housing development interspersed within an area dominated by wildland vegetation subject to wildfire.

3) Wildland-Urban **Influence Zone**: wildfire susceptible vegetation up to 1.5 miles from Wildland-Urban Interface and/or Intermix areas.

Approximately two-thirds Of Calaveras County's 44,828 (*2015 United States Census*) residents reside in a Wildland-Urban Interface, Intermix or Influence Zone (WUI).

For discussion purposes within this CWPP document all three WUI categories have been combined and will be referred to simply as the WUI.

One important goal of the CWPP is to identify and depict WUI locations throughout the county. Identifying these geographic areas contributes to project prioritization and planning efforts, and can help validate requests for grant funding. (see the map on page 18)

This plan uses CAL FIRE's Fire and Resource Assessment Program (FRAP) data and WUI categories in depicting Calaveras County WUI areas. FRAP's WUI data was produced within their 2015 Forest And Rangelands Assessment project, and uses four unique data sets in combination to produce the geographic WUI designations: housing density, undeveloped parcels, vegetation coverage and Fire Hazard Severity Zones.

Fire Issues in Calaveras County's Wildland-Urban Interface

California ranks number one as the most wildfire-prone western U.S State for high to extreme wildfire risk as of 2019 (*Insurance Information Institute Inc., 2020*). During the production of this CWPP in 2020, California was once again suffering from the latest "worst fire season ever". While Calaveras County suffered a handful of moderately significant wild fires, several major fires elsewhere: set new records for numbers of individual fire acres burned and seasonal total of acres burned on both State and Federal jurisdiction lands; caused tens of thousands of residents to evacuate and destroyed thousands of homes, businesses and outbuildings; and as of early October 2020, 32 fatalities have been attributed to California wildfires, including 4 firefighters and 28 civilians. The totals and dollar values are still being tabulated as of this writing.

Although fire has played an important role in California's natural environment for millennia, a number of factors have changed the natural fire regimes, creating the "perfect storm" of wildland fire disaster threats.

Pre-historic fires ignited by lightning and Native American agricultural burning were rarely suppressed, creating over time, a high frequency of fire return that created a mosaic of multi-aged vegetation classes with predominantly light fuels, over time resulting in low-intensity surface fires. Today, with over 150 years of fire exclusion using efficient suppression techniques, a dense accumulation of vegetation has created a dramatic negative effect on the ecosystems of Calaveras County and a growing threat of significant wildland fire.

Today, although there are more firefighting resources and equipment than ever before, and many lessons have been learned, there appears to be an increasing number of mega-fires

season after season, and with them, growing potential for loss of life and devastating property loss throughout California. Analysis by fire experts identify a hotter and drier climate, long-term droughts, extended fire seasons, historically high accumulations of dry vegetation and widespread tree mortality due to bark beetle infestations as the environmental variables contributing to this unprecedented wildfire threat

It is crucial then that residents of Calaveras County understand the importance of making individual homes and entire communities able to withstand the passage of a wildfire without suffering high numbers of home ignitions. To withstand wildfire, structural elements that increase vulnerability to ignition need to be modified, and fuels (vegetation) reduced or eliminated within defensible space zones of at least 100 feet from structures and more broadly on a landscape scale around whole communities.

The number of homes burned each year in the United States continues to grow as more people are moving into fire-prone areas bordering wildlands (2003, *National Interagency Fire Center*) where fire exclusion remains the dominant goal. The primary responsibility for ensuring preventive steps are taken to protect homes against wildfires lies with homeowners and state and local governments, not the federal government. Many decades of successful fire suppression in combination with the conversion of forest and grazing lands to residential use has had dramatic effects on virtually all of Calaveras Counties' ecosystems. In the absence of regularly occurring fires, and reduced grazing and logging, vegetation has become denser and fire fuel loads have greatly increased. Increasing population in WUI areas also means that more homes and lives are at risk from wildfire. Concurrent to this, fire seasons on average are getting longer and more severe.

Returning thousands of acres of wildland to healthier conditions is a daunting prospect. The costs of manual or mechanical clearing and/or prescription burning are prohibitive for many landowners. Well planned and prioritized grant funded vegetation management projects will aid in reducing fire fuel loads.

However, it is important that residents and agencies emphasize the importance of small scale projects, such as homeowners creating defensible space and eliminating structural elements that make their homes vulnerable to ignition in wildfires. Actions homeowners take within 100 feet of their homes can be more valuable to individual home survival than large-scale vegetation management projects.

The residents of Calaveras County's WUI zones are highly concerned about wildfire, as are the firefighters who serve them. To meet the challenges of protecting homes and lives in this current era of increased risk, the most important programs will be those that help residents safely coexist with fire. Fuel management programs are critical, as is education in creating defensible space and reducing structural vulnerabilities. The challenges ahead are considerable, but the work is crucial.

CHAPTER 1

CALAVERAS COUNTY OVERVIEW

Native Americans have inhabited Calaveras County for thousands of years. Calaveras County's more recent tribe is the Mi-wok. The Mi-wok territory stretched from the San Joaquin Valley edge to the high elevations of the Sierra Nevada.

In 1808, the Mexican explorer and soldier, Captain Gabriel Moraga, is credited with coining the name eventually applied to Calaveras County when he called the river he and his troops rode along the *Río de las Calaveras* or "River of the Skulls". Historic reports cite that this originated from a substantial number of human bones he observed along the banks of the Calaveras River. Moraga speculated that he had come upon an ancient battle-ground of a conflict over hunting and fishing grounds between two tribes of Native Americans or that they had died from famine. In fact, the human remains were of the native Mi-wok people killed by Spanish soldiers after they banded together to rise against Spanish missionaries. (https://digitalassets.lib.berkeley.edu/anthpubs/ucb/text/ucar016-007.pdf)

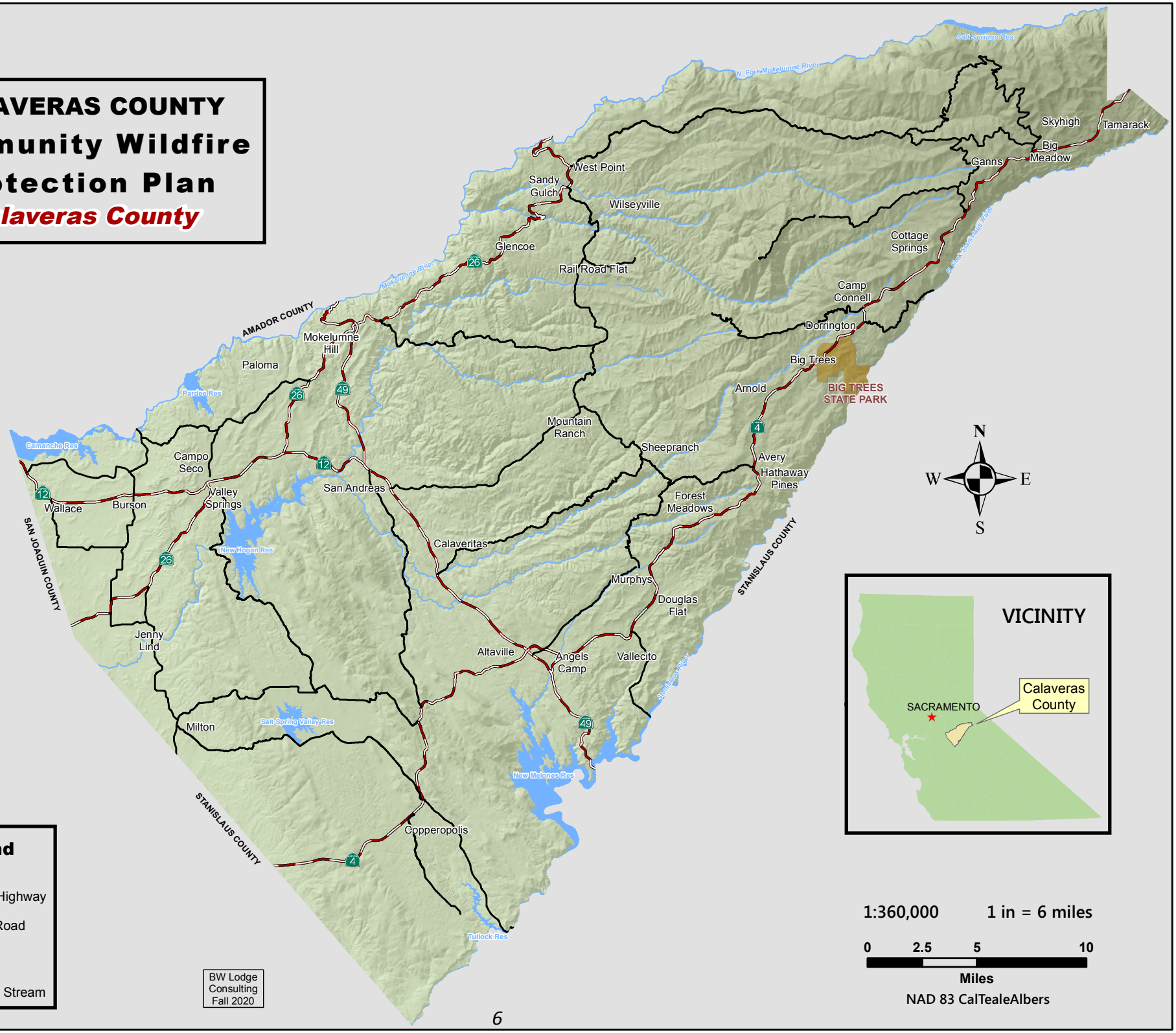
As one of the original 27 counties of California, Calaveras County originally included portions of Amador, Alpine, and Mono Counties until in 1854, by an act of the Legislature, the county boundaries were separated from Amador by the Mokelumne River. By 1866 the town of San Andreas had become the county government seat.

Calaveras County is located in the Central California region known as the "Mother Lode", an area following Highway 49, so named for its rich gold deposits. The discovery of gold in the mid-19th century was unquestionably the most important development of the modern history of the County. Gold mining stimulated a strong economy and drove the formation of the towns, many of which are still present. As mining camps diminished by 1860, various forms of agriculture, including an active timber industry, quickly became the County's new and flourishing economic industries.

Changes in land use after the end of the Gold Rush were relatively minor, until the growth of outdoor recreation beginning in the 1960's. Visitors seeking open space to live and recreate created major changes in the area's economy and land use patterns. The rapid growth of individual homes and subdivisions in the wildland-urban interface since then, including both seasonal and permanent homes, has resulted in creating a steady increase each year to home construction in Calaveras County. Full and part-time residents and visitors from around the world enjoy a beautiful and diverse landscape of lakes, rivers, oak-scattered foothills, magnificent forests and vineyards.

Calaveras County today is approximately 660,522 acres, or nearly 1,032 square miles (2019 Calaveras County General Plan). (see map page 6) The Sierra Nevada Mountain Range runs north-south through the eastern part of the county. The county shares borders with Amador, Tuolumne, Stanislaus, San Joaquin and Alpine counties and is bounded by the Mokelumne River to the north and the north-fork Stanislaus River to the south. Both rivers run predominantly east-west flowing from the Sierra Nevada. The county contains numerous small reservoirs and larger lakes including Lake Camanche, Pardee Reservoir, New Hogan Reservoir, New Melones Reservoir, Spicer Reservoir, Lake Tullock Reservoir, Salt Springs Reservoir in northeast Calaveras County and Salt Springs Valley Reservoir near Milton.

CALAVERAS COUNTY
Community Wildfire Protection Plan
Calaveras County



The County elevation ranges from below 250 feet near the western boundary and towns of Wallace and Milton to an altitude of nearly 8,000 feet east and north of the town of Tamarack on State Highway 4.

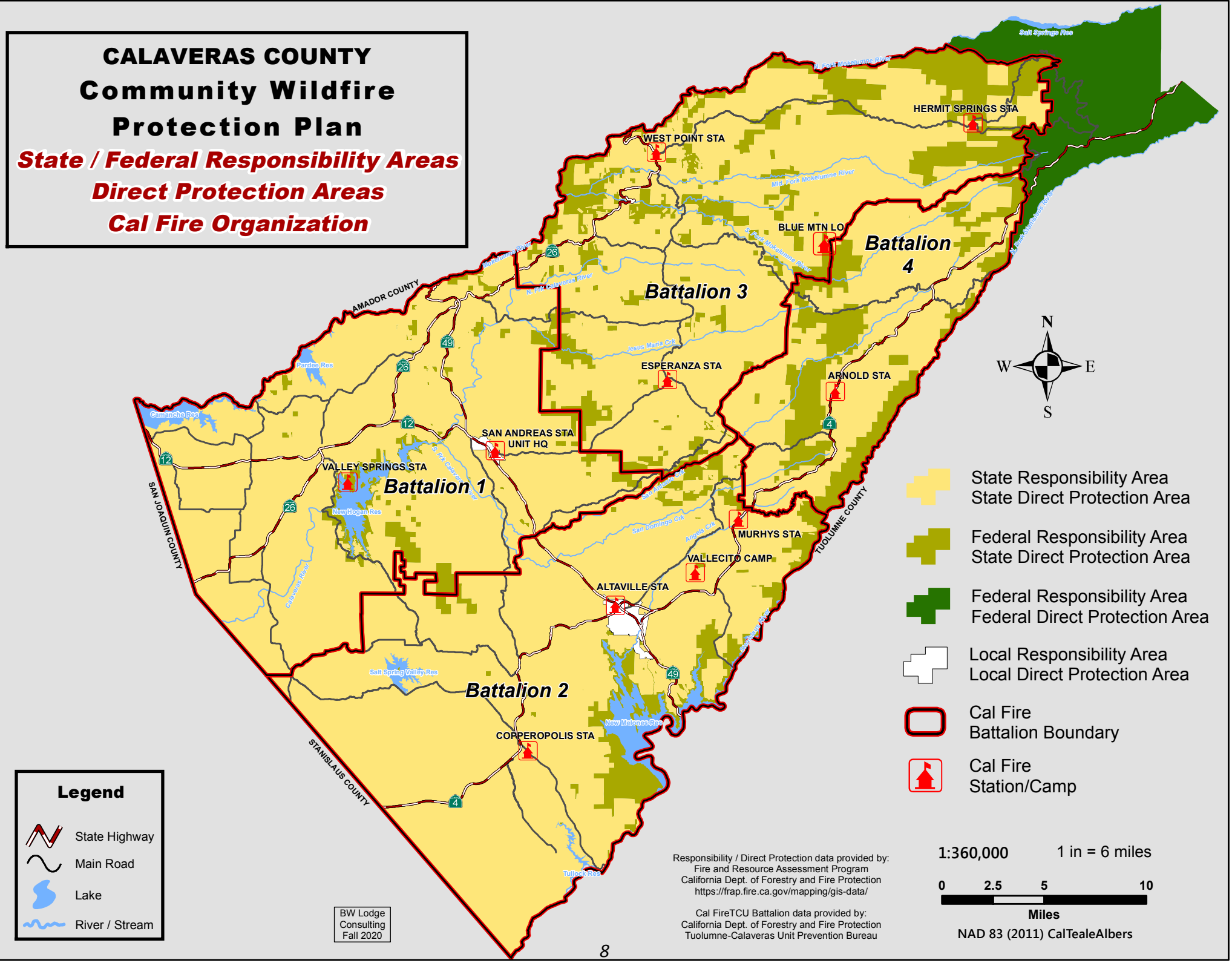
The United States Forest Service (USFS) manages approximately 78,067 acres of Calaveras County's land base, while approximately 35,464 acres are managed by the federal Bureau of Land Management (BLM). Various State agencies own and manage approximately 3,975 acres in Calaveras County, including the California Parks and Recreation Department's Calaveras Big Trees State Park. The largest private property owner is Sierra Pacific Industries, which owns and manages 71,791 acres of forest lands in Calaveras County.

The vast majority of the county's population of approximately 44,742 reside in the unincorporated rural areas. The only incorporated city within the county is Angels Camp, which has a population of approximately 3,820 covering approximately 4 square miles (2019; https://www.census.gov/quickfacts/calaverascountycalifornia).

1.1 STATE AND LOCAL RESPONSIBILITY AREA – DIRECT PROTECTION AREA

Wildland fire protection in California is the responsibility of either the Federal, State or local government fire agencies (see map page 8). State laws contained in the California Public Resources Code sections 4125 - 4127 give the State of California specific wildland fire prevention and suppression responsibilities on privately owned lands. Legislation designating these **State Responsibility Area** (SRA) lands was enacted into law around 100 years ago. State Responsibility Area classification was originally intended as and remains a means of protecting valuable statewide watershed lands, in order to protect the sources of domestic, agricultural and commercial water supplies throughout the State; whether they be rangeland, brushlands, timberlands or any combination thereof. With rare exceptions the State of California does not have wildland fire protection responsibilities on rural lands dedicated to agriculture (the Central Valley and the adjacent lowest foothills for instance), nor lands within the boundaries of incorporated towns and cities. These private lands are designated by state law (CA PRC again) as **Local Responsibility Areas (**LRA). As such, wildland fire prevention and protection responsibilities rest with the local governments. US federal government retains wildland fire prevention and suppression responsibility on all Federal lands, including those owned and managed by the US Forest Service, US Bureau of Land Management and National Park Service. All Federal lands, regardless of administering agency, are classified within the CA PRC as **Federal Responsibility Area** (FRA) lands wherein the federal government maintains responsibility for prevention and suppression of wildland fires.

Initial response to all fire, medical, and similar emergencies is the responsibility of the ten local fire departments within Calaveras County. As per the CA Public Resources Code, CAL FIRE has primary command of wildland fires in the SRA as soon as their units arrive on the scene. In Local Responsibility Area (LRA) areas, local agencies have primary command responsibility and may choose to request support from CAL FIRE. The federal government provides protection on all Federal Responsibility Area Lands (FRA). The map on the previous page depicts the Federal, State and Local Responsibility Area boundaries.


CALAVERAS COUNTY
Community Wildfire
Protection Plan
State / Federal Responsibility Areas
Direct Protection Areas
Cal Fire Organization
HERMIT SPRINGS STA
WEST POINT STA
BLUE MTN LO
Battalion 4
Battalion 3
ESPERANZA STA
ARNOLD STA
SAN ANDREAS STA
UNIT HQ
VALLEY SPRINGS STA
Battalion 1
MURHYS STA
VALLECITO CAMP
ALTAVILLE STA
Battalion 2
COPPEROPOLIS STA
AMADOR COUNTY
SAN JOAQUIN COUNTY
STANISLAUS COUNTY
TUOLUMNE COUNTY
N
W
E
S
State Responsibility Area
State Direct Protection Area
Federal Responsibility Area
State Direct Protection Area
Federal Responsibility Area
Federal Direct Protection Area
Local Responsibility Area
Local Direct Protection Area
Cal Fire
Battalion Boundary
Cal Fire
Station/Camp
Legend
State Highway
Main Road
Lake
River / Stream
BW Lodge
Consulting
Fall 2020
Responsibility / Direct Protection data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/
Cal FireTCU Battalion data provided by:
California Dept. of Forestry and Fire Protection
Tuolumne-Calaveras Unit Prevention Bureau
1:360,000
1 in = 6 miles
0
2.5
5
10
Miles
NAD 83 (2011) CalTealeAlbers

To increase the efficiency of initial attack operations and to reduce fire protection costs, CAL FIRE and federal land management agencies have entered into various agreements that define **Direct Protection Areas** (DPA) for each agency. An agency's DPA is the geographic area for which the agency is directly responsible for providing wildland fire protection, regardless of SRA/FRA designation. As an example, a plot of private land (SRA by definition) well within the National Forest boundary (FRA by ownership) may receive Direct Protection by the USFS due to the closer proximity of USFS fire control resources. Thus this plot of SRA is designated part of the federal DPA. Similarly, USFS land (FRA within SRA lands) may be provided Direct Protection by CAL FIRE due to its proximity to CAL FIRE resources. Thus this FRA parcel is included in the state DPA. On a statewide basis, CAL FIRE and the federal agencies attempt to balance the acreage totals of these trade-offs so that no single agency is protecting significantly more of the other agencies land than the reciprocating agency. Where agency jurisdictions abut, such as the Stanislaus National Forest lands in the greater Arnold area, is where the majority of DPA acreage swaps have been agreed to. This process is guided by the Master Cooperative Wildland Fire Management Agreement (CFMA) also known as "Balancing of Acres" agreements among agencies. Through this agreement the Tuolumne Calaveras Unit and the Stanislaus National Forest provide direct wildland fire protection on some of each other's responsibility areas (*2019 CAL FIRE TCU Strategic Fire Plan*).

1.2 CAL FIRE TUOLUMNE-CALAVERAS UNIT

The California Department of Forestry and Fire Protection (known as CAL FIRE) Tuolumne-Calaveras Unit (TCU) is subdivided geographically into 6 Battalions, 4 of which make up the North or Calaveras County Division (see map page 8). Each Battalion area is discussed further in the final chapter of this CWPP (see chapter 8); including details regarding community assets, fire agencies that serve there, proposed fuels modification projects and specific concerns. For the purpose of organizing and identifying operational areas within Calaveras County, this CWPP uses the existing Cal Fire battalion boundaries and numerical identifiers throughout.

Within Calaveras County, Cal Fire operates 8 fire stations; an inmate fire crew camp; and its Unit headquarters complete with administrative offices, dispatch center, automotive shop and logistics center. Being a portion of the whole Tuolumne-Calaveras Unit means that the county has near immediate access to the TCU firefighting resources in Tuolumne County, including from: 8 fire stations, 1 inmate fire crew camp, the aerial firefighting assets based in Columbia, and the newly established (2020) FF1 hand crews based in Sonora.

For decades Calaveras County citizens have benefitted from the long term close cooperative working relationships between Cal Fire staff and our local government fire department personnel.

1.3 LOCAL GOVERNMENT FIRE AGENCIES

In addition to the Cal Fire presence, Calaveras County has nine local government fire districts and one city fire department that together combine to provide fire protection for the entire county. (see map page 11) The ten fire departments are the West Point Fire Protection District, Central Calaveras Fire and Rescue Protection District, Mokelumne Fire Protection District, San Andreas Fire Protection District, Murphys Fire Protection District, Ebbetts Pass

Fire District, Altaville-Melones Fire Protection District, Calaveras Consolidated Fire Protection District, the Copperopolis Fire Protection District and the City of Angels Fire Department. In addition, the Bear Valley Fire Department covers Western Alpine County immediately adjacent to the far eastern most county boundary and the Ebbetts Pass FD. See Appendix 1, at the rear of this CWPP, for information on staffing, apparatus, and equipment for these fire service agencies.

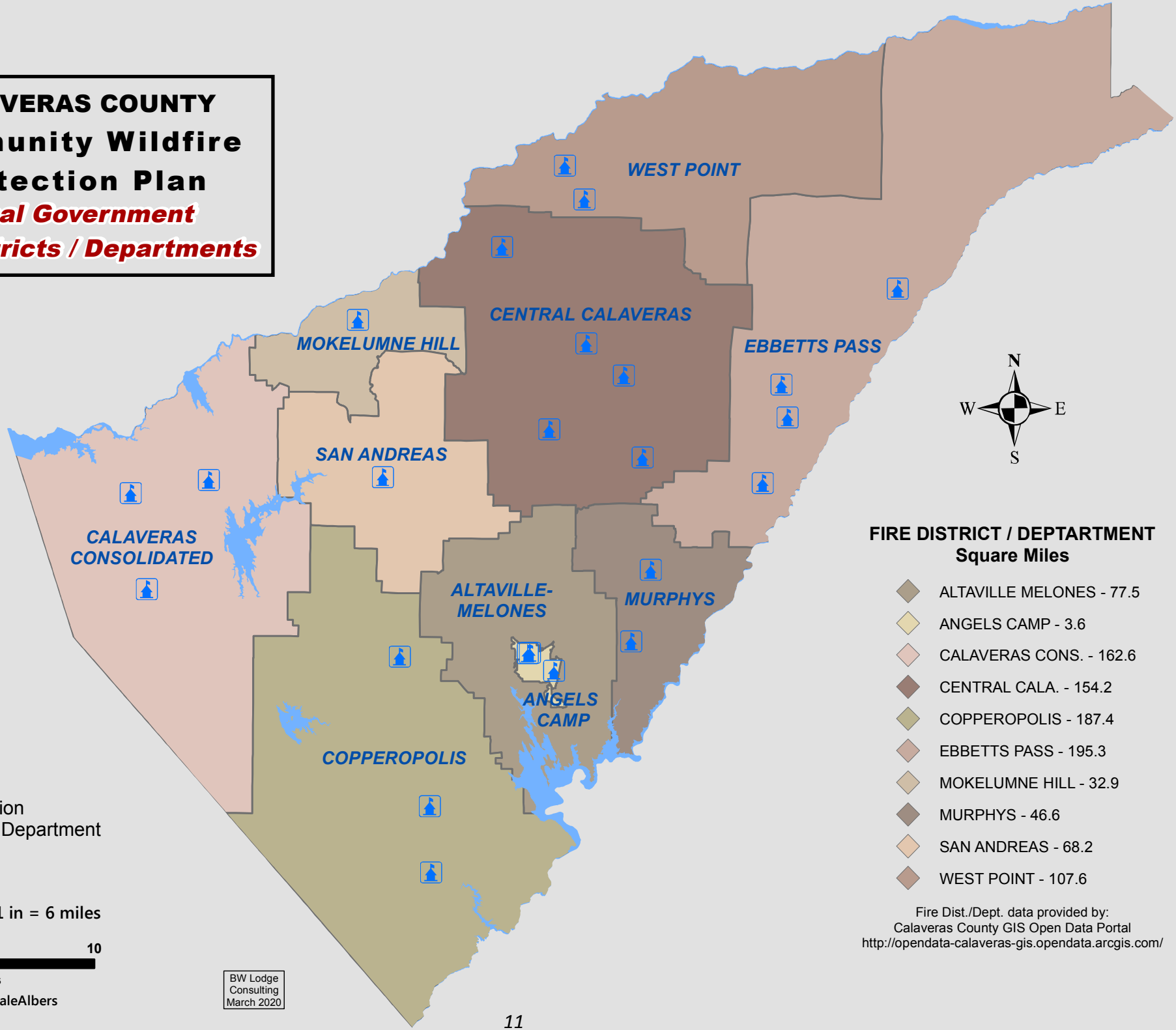
Whether local or state, paid or volunteer, all fire agencies in Calaveras County are classified as All Risk agencies. Meaning they respond to every type and size of emergency incident: structure, vegetation and vehicle fires; all manner of medical emergencies; vehicle accidents; hazardous materials incidents; lake and river incidents; industrial accidents; storm and flood incidents, electrical power related incidents; as well as all types of requests for non-emergency public assistance.

In decades past it was common for rural volunteer fire departments to function as much as social clubs as they did proficient emergency first responders. In today's modern era of emergency services, paid and volunteer firefighters alike spend hundreds of hours in training before they are ever allowed to respond to emergencies, and must continue to meet local, state and federal training and certification requirements throughout the course of their service. As a result, both paid and volunteer department personnel function as professional firefighters who serve their communities with dedication and professionalism. One essential difference between agencies however is that "volunteer" fire departments often do not have the funding to staff their fire engines and rescue apparatus with firefighters 24/7. They must often rely on interns and other trained but relatively inexperienced firefighters to commit to station coverage shifts during which they earn something akin to a stipend; while additional staff are expected to respond to incidents from their homes, or jobs.

Lacking the funding required to hire full time firefighters at a living wage, most Calaveras County fire departments are experiencing increasing challenges attracting new staff and retaining those already in service. It has become difficult to attract local young people seeking a career in the fire service to sign on with a local department. In part because after spending up to a year attending hundreds of hours of training and certification classes, they discover after serving on the line that they are unable to earn a living wage here. Often they end up seeking employment with Cal Fire or other fire agencies whose pay and benefits surpass that which our local departments can offer, and ultimately leave their positions in Calaveras County departments. Funding and staffing will continue to be a challenge for our local fire departments until such time as property tax and parcel/service fee revenues increase.

To a greater or lesser degree, all fire agencies rely on property taxes for operational capital. Property taxes are tied to real estate values, and so the market devaluation such as occurred as a result of the recession starting back in 2008, caused significant reduction in income for most fire districts. Additional funding challenges were encountered in the wake of the 2015 Butte fire which destroyed over 500 homes resulting in lower property tax assessments and associated reductions in county and fire district revenues. Many paid departments have

CALAVERAS COUNTY
Community Wildfire Protection Plan
Local Government
Fire Districts / Departments



FIRE DISTRICT / DEPTARTMENT
Square Miles

- ALTAVILLE MELONES - 77.5
- ANGELS CAMP - 3.6
- CALAVERAS CONS. - 162.6
- CENTRAL CALA. - 154.2
- COPPEROPOLIS - 187.4
- EBBETTS PASS - 195.3
- MOKELUMNE HILL - 32.9
- MURPHYS - 46.6
- SAN ANDREAS - 68.2
- WEST POINT - 107.6

Fire Station
District / Department

1:360,000 1 in = 6 miles

0 2.5 5 10
Miles

NAD 83 CalTealeAlbers

Fire Dist./Dept. data provided by:
Calaveras County GIS Open Data Portal
http://opendata-calaveras-gis.opendata.arcgis.com/

BW Lodge Consulting
March 2020

faced cutbacks and funding reductions in recent years. Running any fire department is expensive. Even when revenues decline, the costs of running a fire department continue to increase. Purchasing and maintaining vehicles, first aid supplies, firefighter gear, communications equipment, tools, and motor fuel gets more expensive every year. Overall, while local agencies continue to efficiently serve their communities' emergency service's needs, if fire department incomes continue to decline, or fail to keep up in the future, there will be concern for their ability to maintain adequate levels of service to Calaveras County residents.

State and local government Calaveras County firefighters, like their counterparts nationwide, have excellent "initial attack success", extinguishing 98 percent of wildfires at less than 25 acres (*2019 TCU Plan*). However, every year, fires start when weather conditions, topography, and fuels combine to make it impossible for firefighters to put out the fire during initial attack. The two percent of fires that "get away" generally overwhelm local resources very quickly and have great potential to cause large scale structure losses.

The new reality of reduced or inadequate funding, coupled with personnel recruitment and retention challenges, makes it critical to encourage and educate local residents to become increasingly "fire safe" relative to their homes and property. That is, to do everything they can to protect their homes far in advance of a fire. There are thousands of more homes in Calaveras County then there are fire engines to protect them. In the event of a catastrophic fire, the steps that county residents take to "fire safe" their properties - thinning and maintaining vegetation, and decreasing structural ignition potential from windblown embers, have a far greater potential to save homes and lives than relying solely on the efforts of firefighters during a fire. This has always been true, but never more so as we face system-wide economic difficulties in conjunction with the increasing wildfire potential due to changes in the climate.

1.4 AGENCY COORDINATION

All local Fire Districts coordinate closely with CAL FIRE. The local Fire Districts have the primary responsibility for all emergency incidents within their boundaries, except wildland fires. Exceptions to this are the San Andreas Fire Protection District and the City of Angels Fire Department which retain LRA wildland fire jurisdictions. Through long-standing agreements, local fire agencies and CAL FIRE adhere to the concept of "closest available resource" (*2019 TCU Plan*) to assure the appropriate numbers and types of emergency resources are operated for every emergency. During the months that CAL FIRE has engines and stations fully staffed, these state engines respond to all incidents throughout Calaveras County and likewise CAL FIRE relies on local District and City resources to augment their wildland fire response. Known as Mutual Aid, these agreements among emergency responders provide assistance across jurisdictional boundaries to supplement the resources of any fire agency during a period of actual or potential need. Calaveras County does not have any county-wide agreements - however, the individual districts have mutual aid agreements with each other. Assistance-By-Hire agreements are typically maintained by CAL FIRE with each fire district. There is a county-wide disaster plan maintained by the Calaveras Office of Emergency Services (*2020; Jeff Stone Asst. Chief, Central FRPD; personal communication*).

The CAL FIRE Tuolumne-Calaveras Unit provides 911 emergency dispatch services. The Unit Level Command and Control center, located in San Andreas, is called the Emergency Command Center (ECC). The ECC provides dispatch services to Tuolumne, Calaveras, and Alpine counties. The San Andreas ECC is staffed with a Battalion Chief, three or more Fire Captains and Communications Operators to provide 24/7 year-round coverage. There is always an officer of Fire Captain rank or higher on duty to serve as the shift supervisor and unit duty officer. CAL FIRE uses an intergraded Computer Aided Dispatch (CAD) system using the latest technology, to direct the closest available resources to all emergency incidents.

The responsibilities of the Unit ECC include, but are not limited to:

- Receive and process emergency and non-emergency calls for service
- Dispatch CAL FIRE and contracting agency resources and personnel
- Serve as the Incident Commander until the arrival of qualified personnel
- Receive, generate and process requests for resources from incidents, cooperating agencies, other Units, Contract Counties, and Region Operations Coordination Center (OCC)
- Coordinate the movement of Unit resources
- Gather and disseminate incident and resource status
- Coordinate and allocate the use of radio frequencies
- Process notifications between the Unit and Region
  (*2020; Chris Adams, Battalion Chief, CAL FIRE; personal communication*)

1.5 POPULATION DEMOGRAPHICS AND POPULATION FLUX

According to the 2019 Calaveras General Plan, the population of Calaveras County is approximately 44,742. Population projections estimate growth to 47,626 by 2035 and 48,038 by 2040, an increase of 3,296 people. Overall population growth in the county has declined for several years. However, in rural areas it can be difficult to collect census or building data, so these data may not truly be reflective of how many people are living in remote areas of the county. Most Calaveras County communities and populated areas, are spread along the historic transportation routes. State Highways 49 and 12 include the communities of Mokelumne Hill, San Andreas, Valley Springs, and the city of Angels Camp at the junction of Highway 4. State Highway 4 also connects the towns of Copperopolis, Murphys and Arnold (*2019 Calaveras County General Plan Land Use Element*).

The demographic trends for Calaveras County suggest the County's population is aging, a trend which will have direct impacts in the WUI areas of the County. The senior population often finds it increasingly difficult to maintain vegetation and fire safety standards on their properties. Social science research indicates the elderly are not only more vulnerable to disasters than the general public, but have an increased risk of dying in a fire (https://www.usfa.fema.gov/prevention/outreach/old_eradults.html). As of the last census over 27.5% of Calaveras County is over 65 years old

(https://www.census.gov/quickfacts/calaverascountycalifornia). This trend may have been originally driven by so-called Baby Boomers seeking a rural lifestyle in the 1960s and 1970s. They and subsequent generations often find that Calaveras County provides a number of communities offering a desirable retirement environment and lifestyle.

The county is becoming more diverse with a growing portion of the population of Hispanic or Latino descent. In 2019 12.4% of the population was of Hispanic or Latino heritage (2019; https://www.census.gov/quickfacts/calaverascountycalifornia). Spanish or bilingual preparedness and mitigation outreach programs will be increasingly important to efficiently reach the Spanish speaking population.

Other vulnerable groups are People with Disabilities. According to the U.S. Census Bureau demographic tables, 14.8% of Calaveras residents under 65 years of age have a disability (mobility, visual, hearing, speech and cognitive). The National Fire Protection Association (NFPA) provides information and an Evacuation Planning Guide for People with Disabilities planning checklist to assist this population group to create a personalized evacuation plan (https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Specific-groups-at-risk/People-with-disabilities).

Another important consideration from a fire planning and emergency response perspective is the tourist population and temporal shifts in the transient population during the summer fire season, particularly in the historic town of Murphys and large percentage of second homes in the greater Arnold area. Throughout the summer, and particularly on holiday weekends, the transient tourist population can nearly double the county population as people come to the county's historic towns, parks, and recreation areas. There is often heavy traffic on roadways especially along Highway 49 and State Highway 4. Consideration of the tourist population flux is important for planning evacuation routes, strategic fuels treatment projects, reducing potential ignition sources, and allocating emergency response personnel (*2016 Marin County CWPP*)

1.6 CULTURAL RESOURCES

Cultural resources include buildings, prehistoric archaeological sites, structures, objects and districts that are unique and important to local, state and/or national history. Prehistoric villages and occupation sites, prehistoric and historic artifact features, debris, mining remains, ranching and agricultural remnants, wooden water ditches, holding reservoirs, and transportation relics of roads, trails, and railways are just a few of the diverse resources of the past that have been preserved for future generations.

There are 15 structures in Calaveras County listed by the National Park Service on the National Register of Historic Places and 12 structures and buildings recognized by the California Register of Historic Resources, Historical Landmarks, Points of Historical Interest (*2019 Calaveras County General Plan Land Use Element*). The loss of any of these prehistoric and historic cultural sites and objects due to wildfires would be a permanent and irreplaceable loss to the people of Calaveras County, the State of California and the Nation.

1.7 NATURAL RESOURCES AND BIODIVERSITY

Calaveras County has a wide variety of native plants including several rare or locally endemic species. The landscape provides a range of elevations, aspects, soil types, and

moisture levels that support grasslands, oak woodlands, chaparral, mixed conifer forests, meadows and wetlands vegetation types and their associated plant and wildlife species.

The native plants and animals of Calaveras County have evolved to live in a fire-prone landscape. Wildfires change the environment. Depending on the severity of the fire, the long-term effects of fire on plants and animals can be positive or negative. It is clear that some fragile ecosystems can be adversely affected by large fires, with endangered or threatened species, local stream riparian habitats, and mature forests often at the highest risk.

Fires can also have positive effects on the environment. Many shrubs and trees in Calaveras County have evolved to re-sprout after fires, and many specie's seeds lay dormant until a fire burns over them, breaking their seed coat. Birds, deer and other wildlife can take advantage of new re-growth for nutrient-rich forage, and trees that have perished in fires create new snags for cavity nesting birds.

Rare, threatened, endangered, fully protected or special status species (both plant and animal) and plant communities are present in Calaveras County. The Big Tree Forest and the Ione Chaparral are two rare native plant communities located in Calaveras County. The Big Tree Forest consist of groves of giant sequoias (*Sequoiadendron giganteum*) and associate plant and animal species. The Calaveras grove is the North Grove in Calaveras Big Trees State Park. The larger, South Grove Preserve, is in Tuolumne County but accessed from Calaveras County. There are occurrences of Ione Chaparral in the foothills of the County, one population near Mokelumne Hill, one along the north fork of Murray Creek, and one population north of Valley Springs Peak.

The county has suitable habitats for the following lists of special-status or locally rare plant and animal species. This is only a partial list of species in Calaveras County that may be considered under the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA) and/or the federal National Environmental Protection Act (NEPA) review:

Wildlife**:** *California tiger salamander, foothill yellow-legged frog, California red-legged frog, northern goshawk, tri-colored blackbird, great gray owl, valley elderberry longhorn beetle, fisher, California spotted owl, western pond turtle, western mastiff bat, olive-sided flycatcher.*

Plants**:** *Delta button-celery, Stebbin's lomatium, three-bracted onion, Ione manzanita, Fresno ceanothus, Henderson's bent grass, Hoover's calycadenia, Red Hills soaproot.*

For a species list and coordination with jurisdictional land agencies on project review see Appendix 2 for links and contact the appropriate agency for consultations.

Challenges to Calaveras County's biodiversity include controlling and eliminating invasive plant species that can displace native plants and can change ecosystem functions. The California Invasive Plant Council (Cal-IPC) defines invasive plants as: "…plants that are not native to an environment, and once introduced, they establish, quickly reproduce and spread, and cause harm to an environment, economy or human health" (https://www.cal-ipc.org/)

Some invasive plants generate higher fuel loads than native plants. Invasive shrubs can form a dense understory beneath forest canopies creating "ladder" fuels altering fire behavior

and severity. Some invasive plants in Calaveras County include eucalyptus trees, French broom, Himalayan blackberry, Scotch broom, Spanish broom, bull thistle, yellow star thistle, pampas grass, Italian wildrye grass, medusahead grass, rattlesnake grass, and wild oats.

1.8 WATERSHEDS AND WATER AGENCIES

Four water districts serve Calaveras County. These are the Calaveras County Water District (CCWD), Calaveras Public Utilities District (CPUD), Union Public Utilities District (UPUD), and Valley Springs Public Utilities District (VSPUD). All draw water from one or more of the major river systems within the county.

There are three major river watersheds in Calaveras County: The Mokelumne, Calaveras, and Stanislaus Rivers. The large reservoirs are Pardee, Camanche, New Hogan, Salt Springs, Tulloch, New Melones, and Salt Springs Valley. The county additionally has numerous smaller streams, tributaries, diversion canals, small lakes, and ponds.

Pardee Reservoir is owned and managed by the East Bay Municipal Utility District (EBMUD) and provides drinking water for 1.4 million customers in Alameda and Contra Costa Counties. Pardee and Camanche Reservoirs are fed by the headwaters of the Mokelumne River and are a source of water for agriculture and municipal purposes as well as flood control. The New Hogan dam on the Calaveras River forms the New Hogan Reservoir which has a small hydroelectric plant at its base. It is operated by the United States Army Corps of Engineers for flood protection, domestic use, electricity, and irrigation. Tullock Lake in Copperopolis is operated by the Oakdale and South San Joaquin Irrigation Districts as part of the Tri Dam Project. Water from this reservoir provides downstream drinking water and electricity and is the only reservoir with private shoreline homes. New Melones Reservoir was built in 1979 as part of the United States Bureau of Reclamation Central Valley Project. This reservoir built on the Stanislaus River provides irrigation water, 283 megawatts of hydropower and flood control. The Salt Springs Valley Reservoir dam was built in the 1850s across Rock Creek in the Bear Mountains of Calaveras County and is solely for recreation uses. All of these reservoirs provide the county residents and visitors with high quality recreational opportunities including swimming, wildlife viewing, fishing, boating, and camping facilities.

1.9 CALAVERAS COUNTY'S WILDLAND-URBAN INTERFACE

According to CAL FIRE's Forest and Resource Assessment Program (FRAP) data, over 362,869 acres of Calaveras County is considered Wildland-Urban Interface (combining Wildland-Urban Interface, Wildland-Urban Intermix and the Wildland-Urban Influence zones). These high risk wildfire areas present a series of complex challenges to all who live and work in the County.

Approximately two-thirds Of Calaveras County's 44,828 (*2015 United States Census*) residents reside in a Wildland-Urban Interface, Intermix or Influence Zone (referred to throughout this document collectively as the WUI). (see map page 18)

The highest potential for home loss is in the Wildland-Urban Interface. In the case of a large moving fire, there are typically more homes under threat than there are firefighting resources available to defend them. Also, many rural homes in the WUI are located in areas far from firefighting resources and poorly identified from the road, so response times can be extended

for homes located far out on dirt roads. In addition to human or lightning caused wildfires, a structure fire within a WUI building lacking sufficient defensible space can easily spread into the wildland, where it could potentially burn thousands of acres and threaten hundreds of structures.

Many rural homes are older, some with untreated wood roofs, non-fire resistive siding, decks or windows. WUI homes often suffer from limited access via narrow gravel roads, are located within steep terrain, and have inadequate water supplies. All of which contribute to the potential for greater loss of life and property destruction.

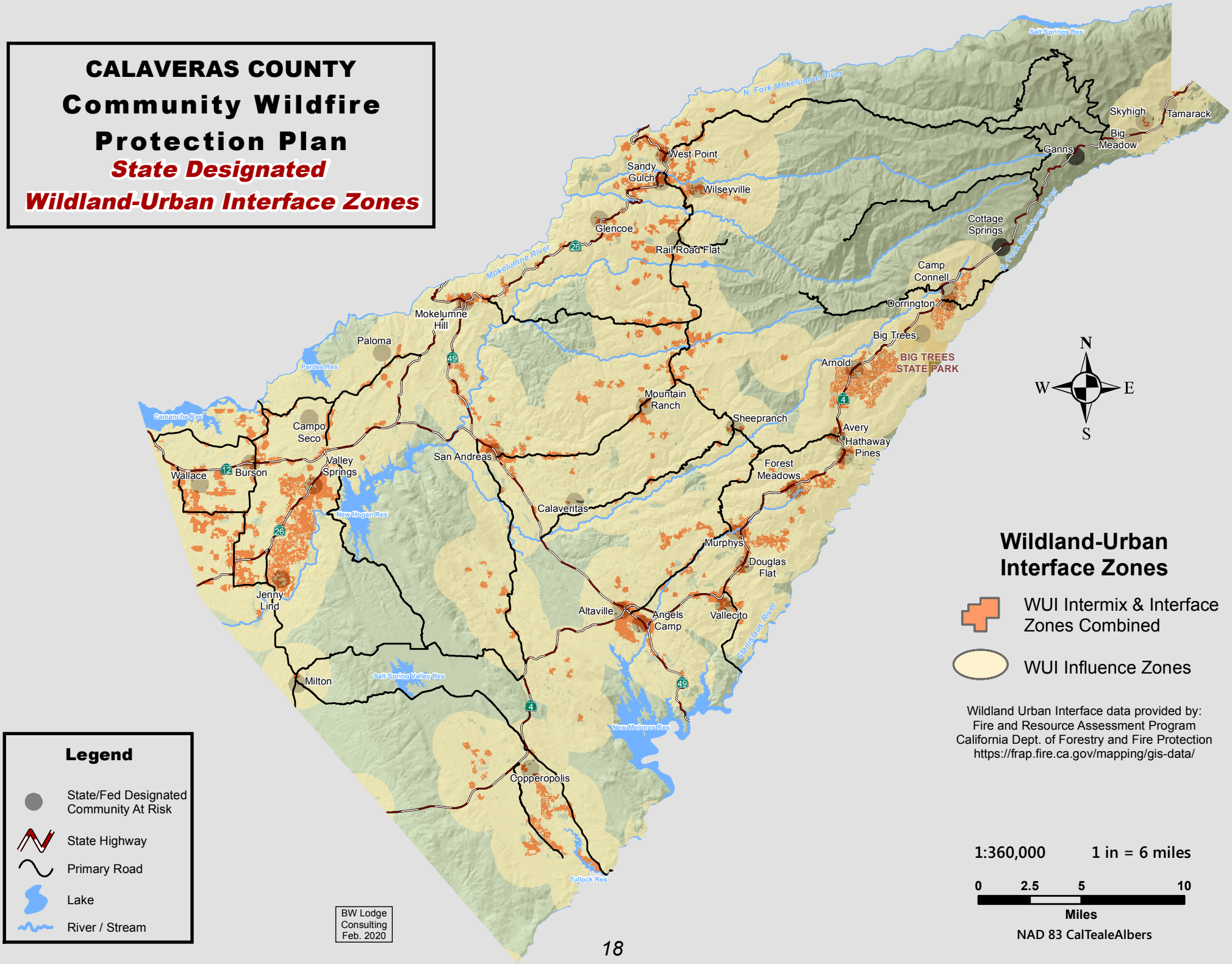
Calaveras County has had a number of significant fires in the past, within WUI areas throughout the County. The most recent major fire was the most devastating; the Butte Fire in September 2015 in Calaveras County burned over 70,868 acres, destroyed 961 structures including 550 homes, and caused 2 fatalities. As of November 2020 the Butte fire ranks 18th on the top 20 list of Most Destructive California Fires. (*Cal Fire*) This fast moving fire burned through designated WUI areas at an estimated 50 acres per minute at its height.

Other notable, relatively recent large fires within the WUI were the Pattison fire in early September 2004, which burned over 2,400 acres and destroyed 13 homes and dozens of outbuildings in the greater Valley Springs area; the Darby Fire in September 2001, which consumed over 14,000 acres, much of it within the WUI areas along the Hwy 4 corridor, and destroyed a portion of a water agency flume; and the August 1992 Old Gulch Fire that burned 40 homes and over 47 buildings and businesses within the WUI, while consuimg nearly 18,000 acres.

Because of the mix and density of structures and natural fuels combined with absent or compromised access and egress routes, fire management becomes more complicated and multifaceted in WUI environments. In Calaveras County, many of the access roads and driveways within the WUI are narrow, winding, steep and often overgrown with highly flammable vegetation making it even more difficult and costly to reduce fire hazards, fight wildfires, and defend homes and humans living in these areas. And despite decades of education, inspections and encouragement, many structures still are not incompliance with State PRC 4291 Defensible Space requirements.

In general, a WUI is that area where homeowners and communities should be aware of the risks posed by wildfire. They must understand the importance of creating and maintaining defensible space as well as how to make structures less vulnerable to ignition during a wildfire. Additionally, fuel reduction work should be performed at the landscape scale to protect communities, infrastructure and watersheds from wildfire.

CALAVERAS COUNTY
Community Wildfire Protection Plan
State Designated
Wildland-Urban Interface Zones



Wildland-Urban Interface Zones

- WUI Intermix & Interface Zones Combined
- WUI Influence Zones

Wildland Urban Interface data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

1:360,000 1 in = 6 miles

0 2.5 5 10
Miles

NAD 83 CalTealeAlbers

Legend

- State/Fed Designated Community At Risk
- State Highway
- Primary Road
- Lake
- River / Stream

BW Lodge Consulting
Feb. 2020

THIS PAGE LEFT BLANK INTENTIONALLY

CHAPTER 2

THE WILDFIRE ENVIRONMENT

The mix of weather, diverse vegetation and fuel characteristics, complex topography, and land use and development patterns in Calaveras County are all important contributors to the fire environment. Very hazardous fire conditions can develop from a combination of hot weather, an accumulation of vegetation, low humidity and low fuel moisture. These conditions, especially when combined with high winds and years of drought, increase the potential for catastrophic wildfire to occur. The overwhelming majority of wildland fires are human caused. Thus it makes sense that the populated areas that make up the Wildland-Urban Interface are where the greatest risk of wildfire is present. A fire within this Wildland-Urban Interface can result in major losses of property and structures. Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel (vegetation), topography, and weather.

2.1 WILDFIRE ECOLOGICAL ROLES

Wildfire is a natural part of California's ecology. Low intensity fires are historically a necessary component for forest health. For millennia, an inestimable number of fires have burned across the landscape with beneficial results, including reducing fuel loads by removing small diameter trees and brush thus reducing competition for water and nutrients. Low intensity fires can also help to provide a check on insect and disease infestations, offer various minerals to the surviving trees, and in some plants and trees provide the heat to release seeds and to clear the forest floor to mineral soil for seed germination. Before humans moved into California around 13,000 years ago, fires were caused by natural events such as lightning.

With the arrival of humans, fire frequency increased as the First People used fire to increase food production and make harvest easier, causing even more frequent low-intensity fires. Anthropologists and ethnobotanists today dispel the concept that California's prehistoric indigenous people were merely hunter-gatherers, but were instead active agents of environmental change and stewardship by manipulating the ecosystems using thinning and pruning methods, sowing, transplanting, and above all, burning. The native people of Calaveras County have used fire as an adaptable and sophisticated tool, burning the lower elevation grassland, oak woodlands and chaparral to stimulate new plant growth, seed proliferation and bulb multiplication. Before the coming of the settlers, whole landscapes were set fire to thin brush for access, to drive game and to maintain healthy regrowth that yielded more berries, seeds, acorns, and forage for game. Thousands of years of these burning practices, added to the natural ignitions from summer dry lightning, created the fire-adapted plant communities we live within today (*2013: M. Kat Anderson, Tending the Wild: Native American Knowledge and the Management of California's Natural Resources*). Some Native American fire practices were continued in modified forms by the early European settlers and into the 20th century by sheep and cattle ranchers, to clear their land of brush to enhance livestock grazing.

Today, due to modern suppression methods, oak woodlands and conifer forests are far denser with many more trees per acre and greater buildup of dead wood on the ground than would have been true when frequent, low-intensity fires were still common. This means that when fires do burn, they burn with greater intensity, are much more challenging and expensive to control, get much larger, and can cause long-term and even irreversible damage to wildland ecosystems.

Rapid wildland fire suppression is critical to prevent small fires from becoming large uncontrolled firestorms that become increasingly difficult to contain. Since the beginning of the 20th Century, as forest/firefighting agencies have grown, and the tools in the firefighter's hands increased, fire agencies have become more successful at putting out both natural and human-caused fires. However, the last century of fire suppression has led to significant shifts in forest composition, structure, and function, resulting in fires that are uncharacteristically intense and lethal. Even so, nationwide, firefighters currently suppress 98% of wildfires before they reach 25 acres. (*2015, Sonoma County CWPP*)

Wildland fires are a part of a natural cycle in Calaveras County, and many people are realizing the positive use of fire in natural areas. Planned or prescribed burns are a tool used by a number of resource agencies and private entities to manage wildfire risk by mimicking the natural burn cycles and burning surface fuels and small brush before they build up to unsafe levels. Wildfire management programs must balance respect for the region's natural cycle with protecting the way of life of county residents.

2.2 VEGETATION AND FUELS CHARACTERISTICS

Vegetation is known as fuel when related to wildland fires, and plays a major role in shaping the characteristics of fire behavior. Fuel is the material that feeds a fire and is generally classified by type and by volume. Fuel types are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses, leaves and needles burn quickly and serve as a catalyst for fire spread. In addition, ladder fuels - fuels that bridge the gap between the ground cover fuels and the lower tree foliage, can spread a surface fire up through brush and into tree canopies, leading to devastating crown fires that burn in the overhead foliage canopy and cannot be controlled. Maps depicting local vegetation fuel types and their extent are included in the individual Battalion sections found in Chapter 8. Cal Fire - FRAP provides a detailed statewide map of vegetation types here:
https://frap.fire.ca.gov/media/10311/fveg_19_ada.pdf

The volume of available fuel is described in terms of fuel loading. The fuel load is the amount of flammable material on any given plot of ground and is usually measured by tons per acre. A small fuel load will cause a fire to burn less intensely and spread relatively slowly. If the fuel load is high, the fire will burn more intensely, causing it to spread faster and be more resistant to control. A fuel's composition, including moisture level, chemical make-up, and density, determines its degree of flammability. Of these, fuel moisture level is the most important variable. Generally, live trees, shrubs and plants contain a higher amount

of moisture, while dead vegetation contains very little. The moisture content and distribution of fuels define how quickly a fire can spread and how intense or hot it may become. High moisture content will inhibit ignition and the burning process, since heat from the fire must first eliminate moisture from the fuel. A fuel's chemical makeup determines how readily it will burn. Some plants, shrubs and trees such as chamise, yerba santa and eucalyptus contain natural oils or resins that promote combustion, causing them to burn more easily, quickly, and intensely.

South and west facing slopes are hotter and dryer thus the fuels upon them are typically drier and will burn more readily in wildfires. North and east facing slopes are typically moister and cooler micro environments that inhibit fire behavior to a small degree. However, with drought conditions and or a wind event, the fuels on north and east facing slopes can also burn readily due to lowered fuel moistures and high fuel loading. These conditions were observed during the 2015 Calaveras County Butte Fire.

California's plant communities evolved with fire in the landscape. Many native plants either can survive fire or need fire to propagate. Most native plants burn readily but some are more fire-prone than others. When fires take place in environments with fire-adapted plant species which have not burned for many years, extreme fire behavior can be the result, with far more destructive effects to the environment than would have been the case if regular low-intensity fires had taken place. With its varied elevation from valleys to foothills to mountain ranges, Calaveras County contains diverse vegetative communities including; grassland, chaparral and shrub, oak-woodland, hardwood forest, mixed- conifer forest, riparian, aquatic, and two rare natural plant communities, the Big Tree Forest and the Ione Chaparral. Information regarding California's plant communities is available from the California Native Plant Society, here: http://vegetation.cnps.org/

2.2.1 Grasslands: The Grassland communities of Calaveras County contain a mixture of native and non-native annual, perennial grasses and forbs but were once predominantly covered with native perennial bunch grasses. The introduction of annual grasses began in the late 1700's with the Spanish bringing livestock into California. Annual grasses were brought in with everything from cattle feed to adobe bricks and in time these annual grasses out-competed the native perennial grasses. Today it is estimated that 90% of California's perennial grasses have been eliminated. Perennial bunch grasses have taproots that penetrate down as far as 18 feet, taking advantage of permanent groundwater enabling them to maintain their moisture and stay green. This influx of annual grasses has changed wildfires in the lower elevations by burning hotter and faster as the fuels are continuous, unlike perennial grasses that grew in separated clumps with open soil in between. Grassland fires are dangerous even without extreme fire weather scenarios, due to the rapid rate of fire spread; in some cases, fires spread so quickly that large areas can burn before response resources are able to arrive.

2.2.2 Brush: Brushy fuel models such as the chaparral and shrub communities extend from the lower elevation foothills to the crest of the Sierra Nevada. Four chaparral and shrub communities - chemise, chaparral, mixed chaparral and montane chaparral are found within Calaveras County. These brush communities host an incredibly rich and diverse number of animal, insect and plant species and are vital ecosystems. However, brushy ecosystems left unburned and unmaintained for many years will burn with incredible intensity. Homeowners who live in or near brushy fuels need to be aware of the risks and take appropriate mitigation

strategies around homes.

2.2.3 Oak Woodlands: Oak Woodland communities are the dominant community that covers most of the lowlands below 3,000 feet in the western portion of the county. These woodlands occur on well-drained soils and include valley oak, blue oak and grey pine dominated ecosystems. Surface fuels in Oak Woodland communities often have a mix of open expanses of annual grass with brushy plant species components, making them a mix for firefighting and homeowner mitigation tactics.

2.2.4 Conifer Forest: Conifer forest communities form the dominant vegetation type for Calaveras County above the 3,000 foot elevation, which accounts for most of the eastern half of the county. Because of the large area covered by these forests and the range of environmental factors affecting this area, the conifer forest in Calaveras County is further divided into five distinct types: Ponderosa pine forest, Sierra mixed conifer forest, White fir forest, Lodge Pole pine forest and Red fir forest. Forested landscapes have wide variability in their fire potential, depending on species composition, and forest condition. Unmanaged overly dense forests with lower ladder fuels growing under taller trees and lots of dead wood littering the forest floor and dead tree snags mixed within the canopy will burn far more intensely than a properly managed forest that is less dense and healthy.

2.2.5 Hardwood Forest: Hardwood forest communities include the montane hardwood and montane hardwood- conifer mix forest along drainages of the major rivers and streams at middle elevations on the west slope of the Sierra Nevada; and the aspen forests at high elevations. These montane forests include a mix of Sierra conifers with black oak, canyon live oak, live oak and various montane woody shrub species such as whitethorn, gooseberry and Sierra plum. These forest communities tend to have access to the most ground moisture and have higher live fuel moisture, making them less likely to burn as intensely as the other vegetation communities, but are interspersed within the other plant communities with changing fuel loads and compositions.

2.2.6 Riparian: Riparian communities are present along all watercourses and are one of the most important wildlife habitats in California. Typically found below 8,000 feet elevation, this diverse plant community can be found along all perennial streams and most intermittent streams. Lake and reservoir shore lines also have some riparian vegetation. In the higher elevations below 8,000 feet elevation riparian forests and meadows are present and associated with shallow lakes, ponds, seeps and meadows.

2.2.7 Aquatic: Aquatic plant communities such as are found in rivers, streams, ponds and lakes, occur in every community previously described above for Calaveras County. Water bodies found in Calaveras County vary from small natural ponds and man-made stock-ponds, to large constructed reservoirs like New Melones Lake and New Hogan Reservoir and may contain algae and vegetation such as duckweed or pondweed.

2.2.8 Rare and/or Endangered: The Big Tree Forest and the Ione Chaparral are the two uncommon and rare natural plant communities, listed by the California Department of Fish and Wildlife, located in Calaveras County. The Big Tree Forest fuel category consists of stands of giant sequoias that are present in isolated groves along the west slope of the Sierra Nevada. There is one occurrence of Big Tree Forest in Calaveras County - the North Calaveras Grove in the Calaveras Big Trees State Park. The Ione Chaparral category

is located in the Sierra foothills with three occurrences of Ione Chaparral in Calaveras County - near Mokelumne Hill, along the north fork of Murray Creek, and north of Valley Springs Peak. See Appendix 2 for a comprehensive plant list and links to agencies.

2.2.9 Agricultural / Ornamental: In addition to the natural vegetative plant communities, the county contains several categories of "man-made" vegetation. These include farm crops, rangeland and WUI domestic landscaping. Vineyards are growing in number and size in the Burson, San Andreas and Murphys regions of the county. Christmas tree farms and orchards near West Point and Murphys are another example. A variety of farm / orchard crops are present northeast of Salt Springs Valley Reservoir and generally in the low western section of the county within proximity to the county line. The western third of the county is dominated by cattle range. Often dismissed as "just grass", rangeland and the cattle industry it supports, is a major component of the Calaveras County agricultural economy. Domesticated / ornamental vegetation is prevalent throughout the county developed WUI areas in the form of non-native shade trees, lawns and decorative flowers and shrubs, surrounding structures.

2.3 VEGETATION DISEASES AND TREE MORTALITY

The combined effects of decades of effective fire suppression, past and current land and vegetation management practices, increased rural development and ongoing climate change have led to a dramatic increase in vegetation fuel loads throughout many fuel classifications. Without the cleansing effect of periodic low intensity naturally caused or man applied fire several fuel categories have become old, overgrown and unhealthy. Resulting in the potential for more dangerous and harder to control fire behavior. The increase in volume per acre and / or stand age also leaves forests and brush fields susceptible to insect infestations, disease and death due to lack of resources. In the case of conifer forests, we are now confronted with greatly increased forest stand density (the number of trees per unit area). With more trees on the landscape the competition for the limited available water, light and nutrient resources becomes a cause of stress. This biological stress weakens trees overall, including their ability to defend against disease and insect infestation

2.3.1 Vegetation Diseases: Insect infestations and plant diseases can increase and threaten to change the structure and overall health of native plant communities in Calaveras County. Various bark beetles, under favorable forest stand and climate conditions, are the most destructive group of insects in coniferous forests of California. For most conifer species there is at least one native bark beetle species that is capable of killing the tree under the right conditions. Bark beetles that attack live trees are opportunistic and usually require their hosts to be under some form of physiological stress for colonization to be successful.

Common destructive bark beetles in Calaveras County include the Western Pine Beetle (*Dendroctonus brevicomis*), Mountain Pine Beetle (*Dendroctonus ponderosae*), the Fir Engraver (Scolytus ventralis), the Pine Engraver Beetles (Ips spp.) and the Jeffrey Pine Beetle (*Dendroctonus jeffreyi*); all of which can kill the tree they attack. Other insects that can defoliate or otherwise weaken and predispose trees to other more aggressive insects or diseases include the Red Turpentine Beetle (Dendroctonus valens), Pine-feeding

Needleminers (*Coletechnites* spp.), Budworms (*Choristoneura* spp.), Douglas-fir Tussock moth (*Orgyia pseudotsugata*) and White-fir Sawflies (*Neodiprion abietis*).

Caused by a specialized group of fungi known as obligate parasites, rust diseases in Calaveras County include the White Pine Blister Rust (*Cronartium ribicola*) which affects 5-needle pines including sugar pine, white-bark Pine and western white pine. Rust fungi can infect foliage, twigs, branches or stems and severe infections kill individual trees and stands of trees.

Comprehensive information on forest insects and diseases is available here: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_046410.pdf

2.3.2 Tree Mortality: Drought is the "trigger" for increased bark beetle activity. Between 2010 and 2017, California saw a historically severe drought with a staggering tally of over 149 million trees dead in its aftermath. In a normal California year, around 1 million confers may succumb to insect attacks. The longer and more extreme the drought, the higher the likelihood of large scale, beetle-caused tree mortality. Trees rely on pitch production to resist bark beetle attacks. When water stressed, a tree's ability to produce pitch is diminished and bark beetles are able to successfully attack and kill weakened trees (*USDA Drought and Tree Mortality in the Pacific Southwest Region, 2017*).

On October 30, 2015 California's Governor Brown issued a Proclamation of a State of Emergency on Tree Mortality and cited the risks to public safety due to falling trees, fire, and insufficient county or municipality resources to address the problem. In order to comply with the order a State Tree Mortality Task Force and individual county task forces were initiated. Calaveras County's Tree Mortality Task Force was activated in 2015 and although it is now suspended, the County Task Force's lead Forester continues to coordinate removal of beetle-killed trees. The State Task Force has changed its name to the California Forest Management Task Force.

In the 2019 United States Department of Agriculture Forest Service R5 Aerial Detection Survey, 141,000 dead trees were recorded across 22,000 acres. Over 82% of the tree mortality recorded in California were red fir and white fir trees; (https://www.fs.usda.gov/detail/r5/forest-grasslandhealth/?cid=fseprd658624).

Although more dead trees within the forest do not always immediately lead to more or larger fires as several recent scientific studies have suggested, scientists do predict that the "scale of present tree mortality is so large that greater potential for "mass fire" exists in the coming decades, driven by the amount and continuity of dry, combustible, large woody material that could produce large, severe fires" (*Stephens et al, 2018*).

Besides the additional dry fuel added to our forests, millions of standing dead trees have increased the difficulty in firefighting and compromised the safety of firefighters by way of increasing the potential for falling limbs and trees. For more information on tree mortality please see the following links;

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

https://treemortality.calaverasgov.us/#gsc.tab=0 https://frap.fire.ca.gov/frap-projects/tree-mortality/

https://www.fs.usda.gov/detail/r5/forest-grasslandhealth/?cid=fseprd658624

2.4 TOPOGRAPHY

Topography characterizes the land surface features of an area in terms of elevation, aspect, and slope. Calaveras County is topographically diverse, with flat areas, rolling hills, valleys, ridges, and deep steep-sided canyons. An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation across a hillside can also contribute to increased fire activity on slopes. Fuel loads tend to increase significantly as the topography becomes more rugged. In the lower elevation of Calaveras County near the Central Valley, the flat valley bottom and rolling hills are generally dominated by grass and oak woodlands and fire behavior is generally wind driven short duration fires. As the terrain approaches the upper foothills, the vegetation changes dramatically to brush and tree dominated fuel types. These areas are generally steeper and longer sloped which will tend to cause more fuel and topography dominated fire behavior. Heavier fuels over steeper slopes cause marked increases in fire intensity and fire size; this combination makes firefighting efforts increasingly more difficult. Higher elevation areas of Calaveras County are typically steeper than that of the upper foothill region. Fuels are generally Sierra Mixed Conifer which is made up of heavy timber and significant loads of accumulated dead fuels. Fire spread is typically fuel and slope driven, but winds can cause long range spotting.

Aspect is the compass direction that a slope faces, which can have a strong influence on surface temperature and fuel moisture. Generally, southern aspects receive more solar radiation than northern aspects: the result is that soil and vegetation on southern aspects is warmer and dryer than soil and vegetation on northern aspects.

On the rolling hills in the west and the ridge tops throughout the county bulldozers supported by fire engines and hand crews can produce a great deal of fire control line in a relatively short period of time. But as the slopes get steeper and the canyons get deeper, the more difficult it is to bring on-the-ground fire control tactics to bear. Fire engine mobile attack methods are eliminated, and mountain slopes quickly exceed the safe operational range of bulldozers. Fire line construction is relegated to hand crew firefighters with support from on foot engine crews installing long hose lays – the so called "boots on the ground". Add dense fuels and hot weather to steep slopes and fire control becomes a formidable challenge.

2.5 WEATHER AND CLIMATE CHANGE

Weather is one of the key factors in fire behavior. The weather in Calaveras County consists of hot, dry summers and cool, wet winters. April typically sees the end of the rainy season. Any month from May thru September has the potential to present high temperatures in the 90's or 100's accompanied by humidity in the teens or less. The weather in the fall moderates temperature wise but can bring dangerous wind events. While these general weather conditions are fairly representative of the typical Calaveras County weather, complex topography, annual variability of weather patterns, and less frequent and transient weather patterns are important influences the local fire danger conditions**.**

2.5.1 Fire Season: Calaveras County's wildfire season spans the months after the last spring rains have fallen - typically by mid-April; until the first significant fall rains occur - in mid to late October historically. The lower elevations of the western county experience the hottest daytime summer temperatures; commonly in the mid 90's to low 100's. Progressing east bound and upslope temperatures moderate as elevation increases, resulting in temperatures in the low to mid 80's at the 4,000 foot elevation level. The canyons and ridges that slice through the county have a significant local effect on wind patterns which can play a significant role in fire spread rates and direction. Typically the months of August, September and October bring the greatest potential for large damaging fires as by then fuel moistures are at their seasonal lowest and the potential for dry north / north-east wind events is high. Decades worth of weather records indicate that "severe fire weather" conditions are present on 35% of fire season days.

Routinely, high pressure systems will dominate Northern California in the summer months bringing extremely hot and dry conditions over much of the region. As these systems develop, they will tend to yield near the Delta and Sacramento areas bringing some marine influence to the county. This influence brings slightly milder afternoon temperatures and increases in overnight relative humidity- the downside however, is the winds that typically accompany these patterns. These winds are generally capable of overriding any benefit that may come from the marine air. This type of wind will typically subside after sundown causing fire behavior to drop off dramatically. Other critical wind patterns for the county can be very difficult to predict and often times are forecasted only the day before. Northerly or easterly winds, common in the fall months, bring warmer and significantly drier air into the region than is typical of daily norms during the usually more mild months of the fall. These foehn winds are warmed and accelerated due to air compression as they pass over and through the mountains of the southern Cascades and northern Sierras. If the seasonal return of the rainy season in mid to late October is delayed, these fall wind events provide the perfect environment to contribute to increased fire intensity and large fire growth when combined with the severely dry fuel conditions associated with the fall months. The Camp fire of November 2018 in Butte County is a recent example of the potential for devastation when a foehn wind event coincides with a period of annual seasonal drought extending deep into the fall.

2.5.2 Climate Change: In the last few decades there has been a pronounced trend of larger and more frequent wildland fires across the west. While the causes are still debated, a number of scientific studies indicate that the firefighting season has lengthened across the entire western United States, and that global climate change has contributed to this phenomenon. Information regarding climate change is available from the US Environmental Protection Agency, here: https://www.epa.gov/climate-research According to the Union of Concerned Scientists, by century's end, we may see up to 55 percent larger wildfires if we fail to make significant cuts in global warming emissions. If average statewide temperatures rise to the medium warming range (5.5 to 8 F), the risk of large wildfires in California is expected to increase about 20 percent by mid-century and 50 percent by the end of the century. This is almost twice the wildfire increase expected if temperatures are kept within the lower warming range. The risks have additionally gone up because vegetation is further desiccated and is easily ignited. Research by scientists with the Scripps Institution of

Oceanography and the University of Arizona, published in the journal “Science,” point to climate change, not fire suppression policies and forest accumulation, as the primary driver of recent increases in large forest fires. Researchers linked rising seasonal temperatures and the earlier arrival of spring conditions with the increase in wildfire activity. The EPA’s Climate Change website indicates as well that wildfires are increasing and are likely to intensify in areas with warmer temperatures, drier summers, and longer growing seasons

2.5.3 Weather Monitoring: A network of Remote Automatic Weather Stations, aka RAWS, are deployed within Calaveras County and throughout the State of California and the nation. These stations monitor the weather and provide weather data in real time to wildland fire, land management, and water and air quality management agencies to assist in many projects, such as: general weather forecasting; determining fire danger ratings; measuring air quality conditions; monitoring stream flows for flood prediction; supporting civilian and commercial aviation; and miscellaneous climate research, among others.

RAWS units collect, store, and forward data to a computer system at the National Interagency Fire Center (NIFC) in Boise, Idaho, via the Geostationary Operational Environmental Satellite (GOES). The GOES is operated by the National Oceanic and Atmospheric Administration (NOAA). The data are automatically forwarded to several other computer systems including the Weather Information Management System (WIMS) and the Western Regional Climate Center (WRCC) in Reno, Nevada.

Fire managers use these data at the local, regional and state level to predict current fire behavior potential and short and long term trends. Which in turn helps agency administrators manage and coordinate the numbers and locations of staff, crews and fire equipment. Within Calaveras County, current real time weather observations are collected by RAWS and disseminated twice daily to fire agencies via a common radio network.

RAWS monitored by the USFS Stanislaus National Forest and Cal Fire Tuolumne-Calaveras Unit and specifically associated with NIFC and the National Fire Danger Rating System are strategically located throughout Calaveras, Tuolumne and neighboring counties. Generally speaking, they are located at lower, middle and higher elevations amid fuel communities representative of that elevation - at Campo Seco in Calaveras County and Green Springs in Tuolumne County, representing the lower elevation grass dominated communities; at Banner Rd, in Calaveras, and Mt. Zion in Amador, representing mid-elevation brush and oak woodland dominated communities; at Blue Mountain and Cottage Springs in Calaveras and Mt. Elizabeth in Tuolumne, representing the higher elevation conifer forest communities.

El Dorado Weather provides a user friendly website featuring a comprehensive list of northern California RAWS unit links that provide current real time data at the click of a mouse, located here: https://eldoradoweather.com/current/norcal-noaa-mesomap.html

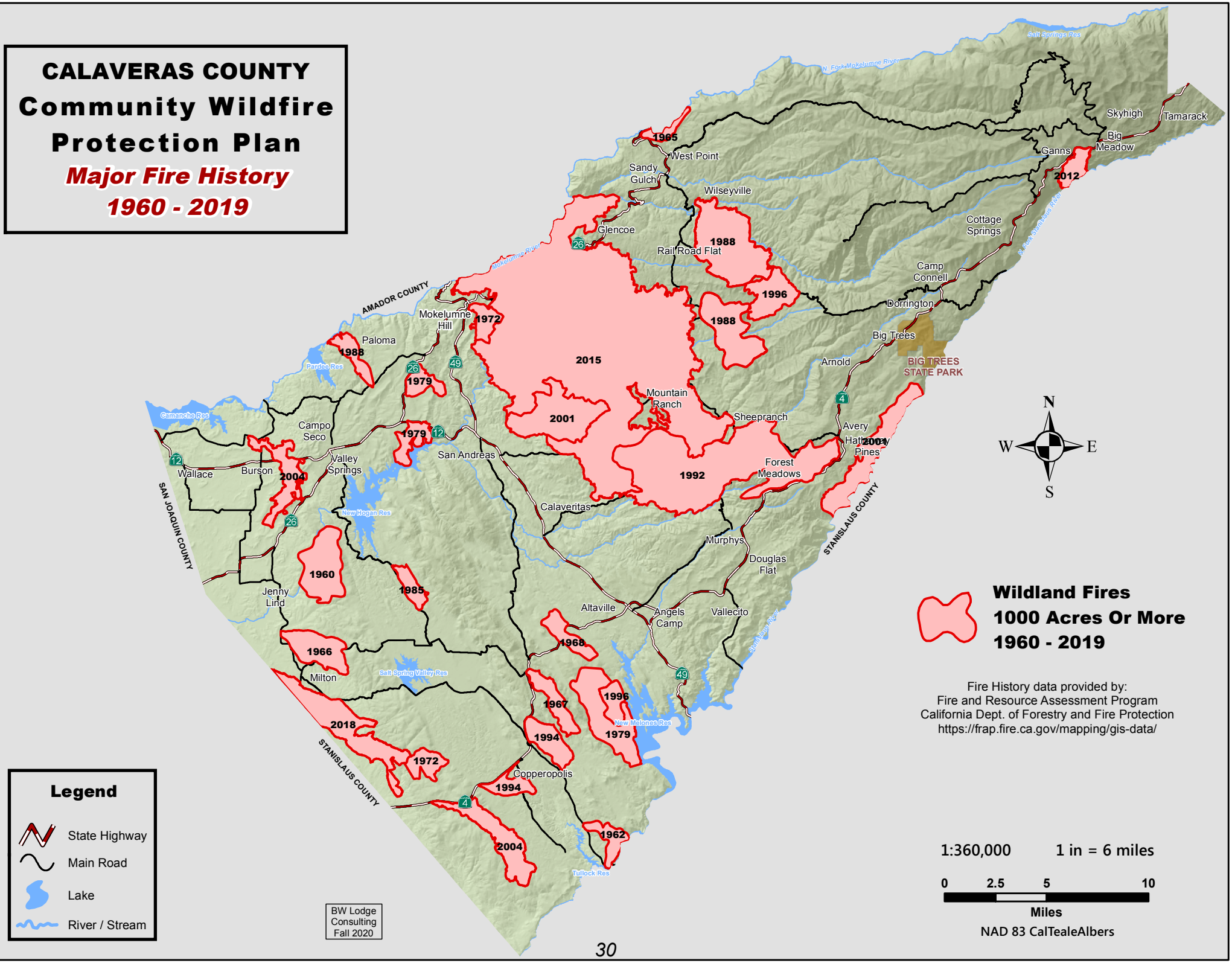
The National Oceanic and Atmospheric Administration / National Weather Service provides a wide range of weather related products and services to the wildland fire control effort throughout the country, through their Fire Weather division, located here: https://www.weather.gov/fire/

2.6 CALAVERAS COUNTY MAJOR FIRE HISTORY

As described above, it is clear that Calaveras County features fuels, weather and topography conducive to large damaging wildfires. And in fact Calaveras County has a history of significant fires within the county's WUI areas. (see map page 30) The map depicts fires which burned 1000 acres or more; as shown in the table below.

YEAR	AGENCY JURISDICTION	UNIT OF ORIGIN	FIRE NAME	FIRE START DATE	ACRES
2018	CDF	TCU	WAVERLY	2018-06-29	11,760
2015	CDF	AEU	BUTTE	2015-09-10	70,847
2012	USF	STF	RAMSEY	2012-08-11	1,137
2004	CDF	TCU	HWY 4 #2	2004-08-06	3,445
2004	CDF	TCU	PATTISON	2004-09-03	2,483
2001	CDF	TCU	LEONARD	2001-08-19	5,188
2001	CDF	TCU	DARBY	2001-09-05	14,281
1996	CDF	TCU	LIGHTNING #12	1996-08-12	1,141
1996	CDF	TCU	LIGHTNING #14	1996-08-12	2,647
1994	CDF	TCU	COPPER #1	1994-06-29	1,143
1994	CDF	TCU	COPPER #8	1994-06-29	1,914
1992	CDF	TCU	GULCH FIRE	1992-08-16	17,419
1988	CDF	TCU	PARDEE	1988-06-28	1,209
1988	CDF	TCU	MASON	1988-07-21	4,050
1988	CDF	TCU	BRIDGE	1988-07-21	6,690
1985	CDF	TCU	GANN	1985-07-04	1,004
1979	CDF	TCU	BRUNSWICK	1979-06-08	1,353
1979	CDF	TCU	FOWLER PEAK	1979-06-11	5,237
1979	CDF	TCU	GOLDEN GATE	1979-06-12	1,116
1972	CDF	TCU	CHILI GULCH	1972-06-14	1,118
1972	CDF	TCU	SNOW RANCH	1972-05-14	1,266
1968	CDF	TCU	BURNS	1968-06-22	1,422
1967	CDF	TCU	TISCORNIA #3	1967-08-13	1,677
1966	CDF	TCU	MILTON	1966-06-18	2,678
1962	CDF	TCU	O'BYRNES FERRY ROAD1	1962-06-02	1,257
1960	CDF	TCU	MEYER	1960-08-20	3,801

CALAVERAS COUNTY
Community Wildfire Protection Plan
Major Fire History
1960 - 2019



Wildland Fires
1000 Acres Or More
1960 - 2019

Fire History data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

Legend

- State Highway
- Main Road
- Lake
- River / Stream

BW Lodge Consulting Fall 2020

1:360,000 1 in = 6 miles

0 2.5 5 10

Miles

NAD 83 CalTealeAlbers

While this list depicts “major fires” of 1000 acres or more, it is important that local government officials and the population at large understand what Calaveras County fire agencies already know and are prepared for. What they know is that almost any wildland fire ignition in Calaveras County has the potential to result in a fire that burns structures; whether it is ultimately controlled at 1 acre, 100 acres, or over a thousand acres. The widespread development of homes and businesses deep into historic wildlands means any fire can be classified as a “major fire” in the eyes of the person whose home it destroys, regardless of fire size.

Firefighting resources available in the 21st Century are vastly superior to those in the 1960s. We have access to far more firefighters, firefighting apparatus, and air resources than were available in the past. However, the 2015 Butte Fire, and the 2018 Camp fire in Butte County should serve as reminders to the residents of Calaveras County that wildfires sometimes just cannot be stopped within hours or even a few days, and may well burn into residential and even urban areas. It is imperative that Calaveras County Fire Agencies continue to improve outreach to Calaveras County WUI residents to teach them how to make homes and landscapes more wildfire compatible, encourage them to take responsibility for compliance with State PRC clearance laws, and promote projects that reduce wildland fuel hazards and help residents make structures more ignition resistant.

2.7 FIRE IGNITION HISTORY

Humans are the cause of the overwhelming majority of wildland fires. From year to year, the most common specific causes are debris burn escapes, equipment use and vehicles. Whether it’s the backyard burn pile lacking the required clearance and left unattended, the lawn mower blade that strikes a rock, the rancher repairing a gate with a welder, or the vacationer whose tow hitch safety chain is left hangin to the pavement, almost all human caused fires are preventable. Preventing the ignition prevents injury and death of people, and damage and destruction to natural resources, community infrastructure and structures.

State, local and federal agencies compile a wide range of wildfire related data. Cal Fire releases their report of Wildfire Activity Statistics annually, in their publication known as the “Redbook”. 10 years’ worth of Redbooks, current year-to-date statistics and a wide variety of wildfire related reports, and tables are located here: https://www.fire.ca.gov/stats-events/

Knowing the cause of fire ignitions is vital to developing programs, policies and procedures designed to educate, prevent and respond to human caused fires. Cal Fire’s State, Region and Unit level prevention bureaus are staffed by highly trained Prevention Officers / Fire Investigators. All Cal Fire officers - Fire Captains & Fire Apparatus Engineers, receive significant training in fire cause investigation. Local fire districts & city departments also maintain highly trained investigators. State and local agency investigators in Calaveras County work in close collaboration, sharing personnel, expertise and equipment, in an effort to determine the cause of every fire. Despite the high degree of expertise throughout the ranks and agency collaboration, determining a fire cause is a challenging task. While some causes are quite obvious - such as an escaped debris burn, others are far more difficult to determine due to the inherent ability of fire to destroy the evidence of its cause.

Cal Fire assigns fire causes to one of 12 categories (*Cal Fire annual Wildland Fire Activity Statistics / Redbook – Glossary*):

- UNDETERMINED – A fire that has been investigated or is under investigation and has insufficient information to classify further, or a fire that has not been investigated.
- DEBRIS BURNING – Outside fire for vegetation, waste, or trash disposal.
- EQUIPMENT USE – Fire ignited by the use or failure of mechanical or electrical equipment. Does not include fire ignited by powerlines.
- ELECTRICAL POWER – Fire ignited by electrical power distribution or transmission.
- VEHICLE – Fire ignited by mobile property which include: Passenger automobile, bus, school bus, off road recreational, motor home, travel trailer, camping trailer, mobile home or office designed to be towed, motorcycle or scooter.
- MISCELLANEOUS – Fire ignited by events or activities that are not classified as arson, campfire, debris burning, equipment use, lightning, playing with fire, powerline, railroad, smoking, vehicle, or undetermined.
- CAMPFIRE – Outside fire used for cooking, warmth, lighting, ceremonial or aesthetic purposes.
- ARSON – To unlawfully and intentionally damage, or attempt to damage, any real or personal property by fire or incendiary device.
- LIGHTNING – Fire ignited by lightning discharge.
- SMOKING – Fires ignited by smoking tobacco or other smoking material; includes matches, lighters, or other heat sources used in smoking.
- PLAYING WITH FIRE (P-W-F) – Fire ignited unintentionally by children while playing or experimenting with fire or fire-causing devices.
- RAILROAD – Fire ignited by rail transport vehicles or fire ignited on or near railroad right-of-way.

See the following page for Calaveras County ignition statistics 2014-2018 (latest available data at time of CWPP preparation). Historically, of those fires whose ignition cause has been determined, debris burning, equipment use, electrical power and vehicles always rank among the top causes, year after year. These human caused fires start where people live and work, the Wildland-Urban Interface. Given the density of the human population and the associated structural development it is easy to understand that any given fire, regardless of the cause, can and will threaten to damage or destroy structures, often within minutes of ignition. As ignitions rise or fall from year to year one thing remains stable… the need to affect change on the landscape that will help to mitigate the risk of wildland fire damage in the WUI.

CALAVERAS COUNTY - NUMBER OF FIRES BY CAUSE

YEAR	TOTAL	DEBRIS BURNING	UNDETERMINED	MISC	EQUIPMENT USE	ELECTICAL POWER	VEHICLE	LIGHTNING	CAMP FIRE	PLAYING w FIRE	ARSON	SMOKING
2018	134	32	31	19	23	9	9	2	5	2	2	0
2017	130	34	25	18	17	19	6	5	3	0	1	2
2016	94	22	21	12	14	9	9	0	3	2	1	1
2015	122	32	26	21	13	7	10	8	1	1	2	1
2014	100	17	13	17	17	12	7	9	3	3	1	1
5 YEAR TOTAL	**580**	**137**	**116**	**87**	**84**	**56**	**41**	**24**	**15**	**8**	**7**	**5**

CALAVERAS COUNTY - ACRES BURNED BY CAUSE

YEAR	TOTAL	DEBRIS BURNING	UNDETERMINED	MISC	EQUIPMENT USE	ELECTICAL POWER	VEHICLE	LIGHTNING	CAMP FIRE	PLAYING w FIRE	ARSON	SMOKING
2018	583	27	122	46	47	14	322	0	4	0	1	0
2017	516	27	143	9	120	189	25	1	1	0	0	1
2016	1,453	13	92	8	540	344	456	0	0	0	0	0
2015	293	36	17	5	26	49	151	8	0	1	0	0
2014	322	10	45	14	218	13	9	7	1	4	1	0
5 YEAR TOTAL	**3,167**	**113**	**419**	**82**	**951**	**609**	**963**	**16**	**6**	**5**	**2**	**1**

CALAVERAS COUNTY - DOLLAR DAMAGE VALUE BY CAUSE

CAUSE	2018	2017	2016	2015	2014	5- year total
EQUIPMENT USE	$11,801	$163,612	$286,300	$13,000	$77,450	**$552,163**
UNDETERMINED	$70,625	$45,895	$24,786	$64,643	$23,575	**$229,524**
VEHICLE	$58,020	$0	$90,156	$15,416	$28,202	**$191,794**
ELECTRIC POWER	$1,260	$28,726	$1,400	$8,625	$30,100	**$70,111**
DEBRIS BURNING	$860	$1,021	$1,270	$19,600	$980	**$23,731**
MISCELLANEOUS	$144	$1,609	$1,077	$10,110	$500	**$13,440**
LIGHTNING	$1,000	$0	$0	$8,000	$2,025	**$11,025**
PLAYING WITH FIRE	$0	$0	$0	$100	$620	**$720**
CAMPFIRE	$400	$0	$0	$0	$112	**$512**
SMOKING	$0	$100	$20	$0	$25	**$145**
ARSON	$0	$0	$0	$0	$0	**$0**
ANNUAL TOTAL	**$144,110**	**$0**	**$405,009**	**$139,494**	**$163,589**	**$852,202**

CHAPTER 3

COLLABORATION

This Community Wildfire Protection Plan was developed by the Calaveras Foothills Fire Safe Council with guidance and support from CAL FIRE and numerous local fire agencies. A key requirement when developing a CWPP is stakeholder and community involvement and collaboration. A completed "living" CWPP provides an ongoing mechanism for obtaining community input, promotes widespread community education and enables the ongoing identification of evolving fire hazards, high risk areas, and potential mitigation projects within those areas of concern identified by the community and fire agencies alike.

3.1 COMMUNITY, COOPERATOR AND STAKEHOLDER INPUT

Throughout 2020, during the production of this CWPP, the COVID19 pandemic was presenting a new and different kind of safety threat to our Calaveras County communities. As a result of the associated state and local health department mandates and recommendations designed to prevent the transmission of the virus, public meetings typical of CWPP projects could not be held during 2020 in a manner that would ensure the safety of participants. As a result public input was hindered to some degree.

Previous iterations of this CWPP (2016) engaged private home, business and property owners, neighborhood groups, civic organizations, professional organizations, and environmental groups, in a series of public meetings conducted in at least one community within each Cal Fire battalion. The meetings were publicized through local fire agencies, the Fire Safe Council website, print and digital media, and email invitations.

Most if not all the issues identified in 2016 remain in play in 2020 and into the near future. For this 2020 update input was sought from and provided by local community groups and industry and agency stakeholders through more casual means than in years past. As a result the information contained in this plan remains a reflection of the ongoing collaboration between county stakeholders and the public, working together to develop a living document that can be used over the next 5 to 10 years to implement the plan recommendations found in Chapter 7.

The public meetings held in 2016 achieved three major goals. First, they were educational, and featured a brief (approximately 20 minute) information presentation conducted by members of the CWPP team, and included an overview of the purpose of preparing a CWPP, the CWPP process, and Calaveras County wildfire history. Second, CAL FIRE battalion chiefs and local fire chiefs spoke directly to residents about their concerns and suggested solutions. Third, local residents were provided the opportunity to identify the community assets that they most value and want protected from harm.

Additionally, community members voiced their concerns about wildfire risk, their ideas for potential solutions, and projects they would like to see take place in their communities. The end of the meetings included a 60 minute question and answer session managed by the CWPP team to ensure that participants had an opportunity to seek answers relative to their concerns. The input provided during the public meetings was captured in meeting notes and subsequently became a significant contribution to the Community Wildfire Protection Plans of 2016 and carried through to 2020.

The goal of this effort was to create an accessible and functional tool that will be a valuable resource in assisting residents and public agencies as they work to mitigate wildland fire hazards that threaten their homes, businesses and communities.

3.1.1 Calaveras Foothills Fire Safe Council: The mission of the Calaveras Foothills Fire Safe Council is to maintain the quality of life for residents (human as well as local animal and vegetation species) as we coexist within each Wildland-Urban Interface (WUI) Zone in the Council's sphere of influence within Calaveras County and portions of Western Alpine County to achieve effective fire protection through education, guidance, and planning as we:

- Maintain a healthy forest
- Reduce hazardous vegetation
- Create defensible space
- Facilitate public education on fire hazards and fire behavior

The primary purpose of the Calaveras Foothills Fire Safe Council is to help protect our citizens, their property, and our natural resources from the effects of catastrophic wildland fire within Calaveras and adjacent counties. The intent of the Council is to:

- Educate the public about fire threat and fire prevention measures
- Serve community and neighborhood fire safety needs
- Coordinate a fire plan, with the cooperation of local fire agencies
- Improve air and water quality
- Reduce the potential for fire loss damage
- Improve fire safety by reducing dangerous fire fuel loads
- Reduce the vegetation waste stream to land fills
- Promote a healthy forest

This mission is accomplished through interagency and community coordination, along with a strong public and private partnership focusing on public education, exchanging of information, and fostering fire prevention and fire safety to make homes, neighborhoods, and communities fire safe within Calaveras and adjacent counties.

The Calaveras Foothills Fire Safe Council operates through in-kind donations and financial contributions and is organized and operated exclusively for charitable and educational purposes within the meaning of Section 501(c)(3) of the Internal Revenue Code.

Projects of all types facilitated by the Calaveras Foothills FSC are funded by significant investments through CAL FIRE Grants, PG&E Grants, other state and federal grants and private donations. This 2020 CWPP project is funded through a CAL FIRE California Climate Investments (CCI) 2019-2020 Fire Prevention Grant to the Calaveras Foothills Fire Safe Council.

3.1.2 Local Fire Agencies and CAL FIRE: To engage local fire agencies in the CWPP Process, a Strategic Pre-Fire Planning survey was shared with local fire department officers to gather concerns and project needs within jurisdictional areas (see Appendix 3). For the purpose of mitigating Wildland-Urban Interface fire threats many fire agencies in the county are engaged in ongoing collaborative efforts with community stakeholders, including homeowners associations, Sierra Pacific Industries, federal, state and local land and water management agencies and local governments.

3.1.3 Land Management Agencies: Land management agency personnel were contacted and asked to provide information regarding areas of concern and hazard mitigation projects within their jurisdictions. This information was processed for use in developing this CWPP and attached maps. The land management agencies within Calaveras County work to reduce fire hazards as directed by their management and planning documents. Planning is driven by the goals of protecting natural habitat and special species, while controlling the growth of invasive species. Management strategies can be challenging and require interagency cooperation and collaboration in fuel break and fuel reduction areas. Emphasis during fuel treatment planning will need to consider how to minimize the introduction, spread, and removal of invasive species. Agencies within Calaveras County include: The United States Forest Service (USFS), the Bureau of Land Management (BLM), and California State Parks, among others.

3.1.4 Sierra Pacific Industries: SPI is a family-owned and managed company based in Anderson, California. The company owns and manages over 2 million acres of timberland in California and Washington, and is among the largest lumber producers in the United States. With over 72,000 acres of commercial timberland within Battalions 3 and 4, SPI ranks as the single largest private property owner in Calaveras County. SPI has a long history of collaboration with fire agencies and public and private land owners within Calaveras County, and is committed to managing its lands in a responsible and sustainable manner to protect the environment while providing quality wood products and renewable power for consumers. For information on Sierra Pacific Industries, start here: https://www.spi-ind.com/Home/AboutUs

3.1.5 Blue Lake Springs Homeowners Association: Located on Hwy 4 east of downtown Arnold, Blue Lake Springs is a large 1500+/- lot residential development that exemplifies the very definition of Wildland-Urban Interface. BLSHOA is the only Homeowner's Association in the county that employs a Fire Prevention Coordinator. In collaboration with Cal Fire and the Ebbetts Pass Fire District, the BLSHOA sponsors a Volunteers In Prevention program that deploys as many as 30 trained citizen volunteers

to conduct annual 4291 Defensible Space compliance inspections throughout the subdivision. BLSHA also achieved and maintains certification as a FIREWISE Community through the National Fire Protection Association and Firewise USA. BLSHOA fire prevention information is available here: http://www.blsha.com/volunteers-in-prevention-program/

3.1.6 Forest Meadows Owners Association: The Forest Meadows subdivision is located on Hwy 4 east of Murphys, overlooking the Stanislaus River canyon. FMOA employs a maintenance supervisor and a small crew whose responsibilities include maintenance of the fuelbreak bordering the subdivision. Forest Meadows has achieved and maintains certification as a FIREWISE Community through the National Fire Protection Association and Firewise USA. Here you can find Information regarding FMOA's fire and emergency issues: https://www.fmowners.com/owner_documents.html

3.1.7 Big Trees Village Property Owners Association: Bordering the north and east sides of Calaveras Big Trees State Park, the 2400+/- residences in Big Trees Village subdivision define it as a quintessential Wildland-Urban Interface community. In collaboration with Cal Fire and the Ebbetts Pass Fire District, the Property Owners Association sponsors a Volunteers In Prevention program that deploys trained citizen volunteers to conduct annual 4291 Defensible Space compliance inspections throughout the subdivision. Big Trees Villiage has achieved and maintains ceritification as a FIREWISE Community through the National Fire Protection Association and Firewise USA. Big Trees State Park, Sierra Pacific Industries, the US Forest Service and Cal Fire all have ongoing collaborations with the community to establish and maintain fuel breaks around its perimeter. Fire and emergency related information provided by BTVPOA is available here: https://www.bigtreesvillage.org/fire-prevention-resources

3.1.8 Calaveras County Resource Conservation District; The Calaveras County Resource Conservation District's (RCD) mission is to "commit to protect, improve, and restore the natural resources of Calaveras County". Formed in 2016, the RCD was the last rural county in California to establish an RCD. An RCD is a local, grassroots government special district that aims to assist the county landowners with educational programs and field projects. The focus is on projects that enhance and highlight private lands; however they also work with other resource agencies to plan and implement conservation practices on public lands if those activities improve resource conditions in Calaveras County. For information start here: http://www.calaverasrcd.org/ .

3.1.9 Calaveras-Amador Forestry Team: (CalAm Team): This team of volunteers integrated in 2014 to provide expertise and effort towards improved land management for the benefit and protectionof Amador and Calaveras County residents. With a diverse background in natural resources, they (1) Develop and secure grant funding; (2) Provide planning and coordination of strategic fuels reduction projects; (3) Deliver consulting serrvices to Counties / FSCs / RCDs / HOAs / Water Agencies; (4) Affect public education and outreach; and (5) Build capacity-train local grant writers, fund the John Hofmann Memorial Scholarship.

3.1.10 Calaveras Healthy Impact Product Solutions (CHIPS): Calaveras Healthy Impact Product Solutions (CHIPS) is a local 501 (c)(3) non-profit California corporation based in Amador and Calaveras Counties. Founded in 2004, the organization's goal is to put people in economically depressed communitities back to work. CHIPS performs a variety of work, including forest and meadow restoration, watershed stewardship, cultural site work, fire-safe fuel reduction, and fuel break construction in the wildland-urban interface. Their information is available here: http://www.calaveraschips.org/

CHAPTER 4

RISK ASSESSMENT

Risk is the chance or probability that a person, place or thing will be harmed or experience an adverse effect if exposed to a hazard. Wildfire is a significant hazard within Calaveras County.

Nearly all buildings and infrastructure systems in Calaveras County are at risk from wildland fire; particularly those located in the county's more rural and limited accessibility areas. This chapter intends to identify, in broad terms, those Calaveras County assets at risk. Once identified, the community and emergency services organizations can better plan mitigation efforts.

Rapid wildland fire suppression is critical to prevent small fires from becoming large uncontrolled firestorms that become increasingly difficult to contain. Inadequate firefighting resources and communications systems can contribute to fire-spread. The greatest potential for a catastrophic wildland-urban interface fire in Calaveras County would result from multiple fire ignitions during a severe weather siege where wildland fires were burning out of control in several locations around the state and mutual aid resources were stretched beyond capacity. Identifying and subsequent mitigation of wildfire risk has a positive effect on the ability of limited firefighting resources to be successful in their efforts to keep fires small and the defense of community assets.

4.1 ASSETS AT RISK

In the context of wildland fire, "Assets At Risk" are defined as structures, government and private infrastructure and natural resources that are susceptible to or can be destroyed by wildland fire. Privately owned assets in Calaveras County include homes, commercial businesses, healthcare facilities, utility generating and distribution infrastructure, broadcast and landline communications infrastructure, lands in agricultural production, and industrial timberlands. Government and public entity assets include, office buildings, public safety facilities, emergency communication facilities and equipment, roads and bridges, schools, outdoor recreation facilities and infrastructure, and a wide variety of water system elements including: dams, wastewater facilities, and above ground flumes, pipes, and storage tanks. Natural resources include: all undeveloped land, both private and government owned, that serves as watershed and habitat for native plants and animals; protected state and federal parks and wilderness areas, national forest lands, and river drainage systems.

4.1.1 Homes and Businesses: There are approximately 15,000 Living units in the Very High Fire Hazard Severity Zones of Calaveras County (*Calaveras County General Plan, 2019*). As with many homes in the county that are located in the WUI, if a major wildland fire were to result in the loss of many homes, as in the 2015 Butte Fire, there is a high probability of having both short and long-term negative impacts on individuals, communities, as well as the county's overall economy and property tax base.

4.1.2 Schools: Public schools in California are designed to high fire safety and resistance standards, but these construction methods are intended to protect against small structure fires, not a major wildfire; additionally many of the county's schools were built in the 1960s

and 1970s, before today's more stringent wildland fire safety related fire codes and regulations were enacted. Nearly all public and private day care facilities, pre, elementary, middle and high schools in the county are located in designated Wildland Urban Interface/Intermix/Influence zones.

4.1.3 Healthcare Facilities: Calaveras County is served by Mark Twain Medical Center (MTMC) in San Andreas. MTMC operates five family medical centers providing outpatient care in Angels Camp, Valley Springs, Arnold, San Andreas and Copperopolis. MTMC also has specialty centers providing orthopedic, cancer and gastroenterology services. Sonora Regional Medical Center operates a family medical center, a prompt-care facility and provides physical and occupational therapy services in Angels Camp (*2019 Calaveras County General Plan*). A number of privately-run physical and occupational therapy service offices are also provided throughout the county, along with a large number of private practice medical offices.

4.1.4 Public Safety Facilities: The Calaveras County Sheriff's Office is the law enforcement agency for the unincorporated county. The Sheriff's Office provides services to 95% of the county's population. The Angels Camp Police Department serves the incorporated City of Angels Camp. The Calaveras County Sheriff's Office and County Jail are located in San Andreas at the Government Center as part of the new Calaveras County Law and Justice Center, which was completed in 2014. Five Sheriff's substations are located county-wide in: Valley Springs, Copperopolis, West Point, Mountain Ranch and Arnold. The Sheriff's Office also operates the emergency communications system consisting of four communications towers (*2019 Calaveras County General Plan*). All these offices and infrstructure are located within designated WUI zones.

Local, State and Federal fire agencies operate from 31 sations and one camp within Calaveras County. All, of course, are located within designated WUI areas. As such all can be threatened by wildland fire. During the 2015 Butte fire, for example, all 5 stations operated by the Central Calaveras Fire and Rescue Protection District were threatend at one point in time or another.

4.1.5 Watersheds, Water Storage and Delivery Infrastructure: Wildfire presents a threat to county water systems from several angles. The multiple and diverse watersheds throughout the county are at serious risk of loss of vegetation cover and riparian habitat due to wildfire. The resulting silt and mud runoff erosion from watershed lands in the wake of a wildland fire can inundate water storage and delivery systems.

Several above ground water delivery and storage systems face significant risk from wildland fire including: open water conveyance ditches and wooden flumes, storage tanks, ponds, reservoirs, and pumping facilities. Any can be damaged or rendered out of service by direct fire exposure. Since 2001 there are two examples of wildland fires damaging primary water delivery systems: the Darby Fire in 2001 destroyed a significant portion of a wood flume in the North Fork Stanislaus River canyon that supplies water to the community of Angels Camp; and the Pattison Fire in 2004, which destroyed a large capacity community storage tank in the Valley Springs area (*2019 TCU Plan*).

The loss of electrical power, either purposefully to prevent the occurrence of hazardous conditions for firefighters, or as a result of direct fire damage, can put the power grid out of service, shutting down water systems.

Even the demands of firefighters themselves engaged in the fire fight can overwhelm the ability of a local public or private water system to provide the needed supply.

4.1.6 Energy and Communication Facilities: Pacific Gas & Electric (PG&E) and Alpine Natural Gas are the primary providers of natural gas and electric services respectively, countywide. PG&E natural gas pipelines are located in the northwestern portion of the County. Their electrical delivery system within Calaveras County includes many miles of high voltage transmission lines integral to the statewide grid and hundreds of miles of distribution lines supplying the entire county with power. The PG&E above ground distribution system is at particular risk from wildland fire as the wooden poles are easily damaged by wildland fire. Substations and structural facilities are also at risk from wildfire. Downed power lines and damaged poles threaten the safety of firefighters and evacuees alike. In addition, above ground lines become a fire threat themselves when wind events bring down trees or branches into wires and into flammable vegetation.

There are nine hydroelectric power plants in Calaveras County. Included is the Northern California Power Authority power generating facility on the Stanislaus River, which provides power to member cities and utilities outside Calaveras County and the state-wide power grid.

Several AT&T facilities are located in WUI zones, as are nearly all above-ground telephone, data and cable TV lines serving the population. All are at risk from wildland fire. Several cellular telephone antennae towers, owned by various companies, are also located in WUI areas. If these communications structures are burned, as they did during the 2015 Butte Fire, it contributes to poor telephone functionality for both civilians and emergency responders in various parts of the county.

4.1.7 Tourist and Recreational Areas: Numerous lakes, campgrounds, parks, and RV parks offer many recreational options to locals and visitors. Calaveras Big Trees State Park is a major attraction throughout the year. Wineries offering tasting and live music, community street fairs, the Frog Jump County Fair, local outdoor music festivals, and rodeos are just some of the popular activities. Hunting, fishing, off-highway vehicle sports, hiking, bicycling, motorcycle touring, lake and river water sports, along with many other activities are Calaveras County recreational opportunities. The summer fire season period often coincides with a vast influx of people into the county with the intention of enjoying these opportunities, especially on holiday weekends. They all are easily disrupted by wildland fire (*2019, TCU Plan*)

4.1.8 Agricultural Lands: Calaveras County reports 198,000 acres of rangeland, and 663 active farms in the county, for a total of 212,140 acres dedicated to agribusiness. Agriculture reports show revenue of just over 30 million dollars in 2018. The timber industry is the leading commodity with over 8.9 million dollars in revenue. Cattle and calves are the number two commodity with revenue of over 7.8 million dollars. Wine grapes are the number three county commodity with revenue of over 3.3 million dollars in revenue. Poultry, Walnuts, Nursery Product, miscellaneous livestock, Almonds, and Apiary's follow in revenue. Losses of timber and grazing land, and damage to vineyards and orchards from wildfire affects the

growers and communities that rely on these commodities and substantial revenues in Calaveras County.
(https://ema.calaverasgov.us/Portals/EMA/Documents/Ag/ProdReports/2018_Crop_Report.pdf)

4.1.9 Forest and Timberlands: Calaveras County contains over 245,000 acres of forest lands, approximately 84,700 of which are publicly owned (U.S. Forest Service, Bureau of Land Management, State of California) and over 161,000 of which are privately owned. Much of these forest lands are also commercial timberlands, which means they produce forest products on a regular and sustainable basis. The largest example of this is Sierra Pacific Industries, which owns over 73,000 acres of commercial timberlands in the county. Commercial timber production provides employment, affordable forest products to consumers, and a significant and consistent tax base.

These lands are important to the economy of the conty - indeed, timber is often listed as the first or second most valuable agricultural commodity output yearly by the county Agricultural Commissioner. But commercial forest products are not the only value these forestlands provide. They also serve an important function as healthy watersheds, wildlife habitat, open space, and recreational areas. Even more important as the climate warms because of increasing CO2, so long as these forests remain safe from wildfire, they act as critical carbon sinks because of their ability to sequester CO2 through photosynthesis.

4.1.10 Air Quality: A warmer and drier climate is expected to lead to more frequent and more intense fires near or within populated areas. Widespread burning in summertime - and even springtime - is rapidly becoming the “new normal” in the American West. Wildfires release large amounts of carbon dioxide, black carbon, brown carbon, and ozone precursors into the atmosphere. Wildfires also emit substantial amounts of volatile and semi-volatile organic materials and nitrogen oxides that form ozone and organic particulate matter. Direct emissions of toxic pollutants can affect first responders and local residents alike. (*National Oceanic and Atmospheric Administration, CSD 4*)

Calaveras County is located in the Mountain Counties Air Basin and is under the jurisdiction of the Calaveras County Air Pollution Control District (CCAPCD), a special district governed by the Calaveras County Air Pollution Control Board. CCAPCD manages the county’s air quality through education and enforcement of CCAPCD rules and California Air Resources Board (CARB) measures and regulation. Populations more sensitive to poor air quality include children, the elderly, the acutely ill, and the chronically ill. Facilities occupied by these sensitive populations are considered sensitive receptors. In Calaveras County, sensitive receptors include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics distributed throughout the county.

4.1.11 Roads and Highways: Numerous county, state and federal roads and highways pass through the WUI and undeveloped areas of the county; as do hundreds of private roads and driveways. Wildland fire destroys signage and guardrail systems as well as asphalt itself in severe instances. Many old public and private road bridges, built of heavy wood timbers and planking, are also at risk. Any of these roads could be temporarily closed if a fire is burning in its vicinity. Road damage becomes an immediate safety threat to evacuees during public evacuation efforts, and can hamper access of emergency responders. Longer term road closures due to fire damage can cause personal and commercial transportation

challenges and negative economic effects. Larger highways in high wildfire risk areas are the biggest concern, due to the amount of traffic they carry. State highways in the county that pass through high wildfire risk areas include Highways 4, 12, 26, and 49. Wider roads can act as fuel breaks for fires, stopping or temporarily slowing their spread. Large wildfires, however, are not stopped by roads and have been known to jump distances of up to a mile, particularly when winds are high and blowing embers great distances.

4.1.12 Evacuees: When confronted with a rapidly growing wildland fire in the WUI, the evacuation of civilians is a public safety priority. Large numbers of people retreating from homes and businesses are themselves often threatened by the fire. Harrowing video captured by civilians evacuating the town of Paradise Ca. during the 2018 Camp fire graphically depicts the danger and chaos involved. Timely evacuation orders and an orderly response by civilians is crucial to saving lives.

In conjunction with CAL FIRE, Calaveras County OES, and the Calaveras County Sheriff's Office, a new **Emergency Evacuation System** has been created. This system is designed to alert the public in the event of both large scale and smaller localized emergency evacuation events. During an emergency, the (online) viewer will display important information defining that event. The county has been divided into 60 grid pages and further divided into 307, 2 mile by 2 mile evacuation zones. These zones are used to identify areas determined to be under an active evacuation. It is strongly suggested that residents review the application and take note in which zone they reside. Residents should also familiarize themselves with local streets to determine the quickest and safest route out of their area in the case of an emergency" (*Calaveras County OES website*). Please click the following link to the OES website and then click on "Public Evacuation Application":
https://oes.calaverasgov.us/#gsc.tab=0

4.2 COMMUNITIES AT RISK

To help protect people and their property from potential catastrophic wildfire, the National Fire Plan directs funding to be provided for projects designed to reduce the fire risks to communities. A fundamental step in achieving this goal was the identification of communities that are at high risk of damage from wildfire. These high risk communities identified within the Wildland-Urban Interface, the area where homes and wildlands intermix, were published in the Federal Register in 2001. At the request of Congress, the Federal Register notice only listed those communities neighboring federal lands. The list represents the collaborative work of the 50 states and five federal agencies using a standardized process, whereby states were asked to submit all communities within their borders that met the criteria of a structure at high risk from wildfire, regardless of whether it was adjacent to Federal lands. As such California's list of Communities At Risk includes communities far removed from Federal lands. The California State Forester (aka CAL FIRE Director) has the responsibility for managing the list.**"** (*State of California, Cal Fire / Office Of The State Fire Marshal at:* https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/fire-plan/communities-at-risk/)

The following table presents those Calaveras County communities designated by the State and Federal government as “Communities At Risk”. (see map page 46)

Calaveras County Communities At Risk

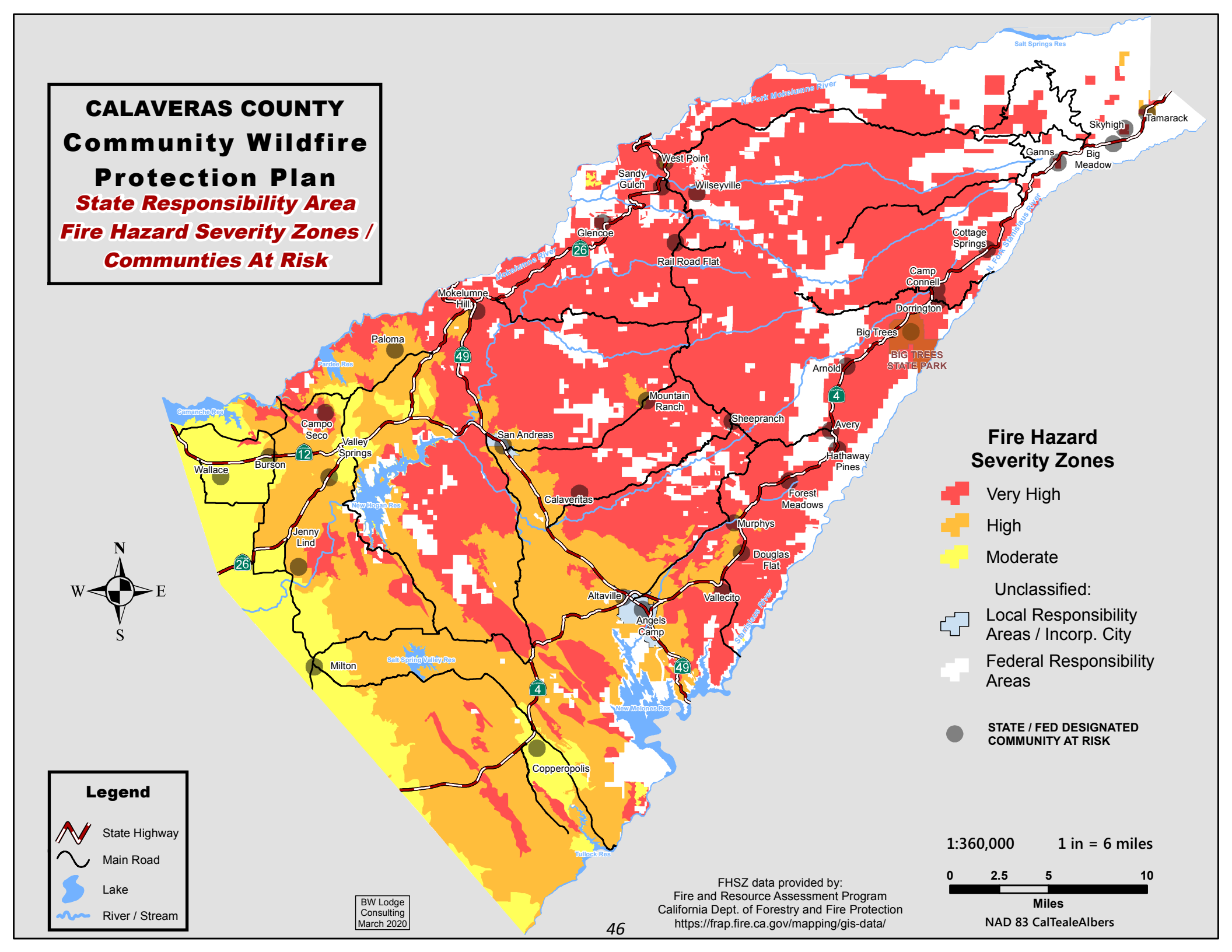
Altaville	Battalion 2	Jenny Lind	Battalion 1
Angels Camp	Battalion 2	Milton	Battalion 1
Arnold	Battalion 4	Mokelumne Hill	Battalion 1
Avery	Battalion 4	Mountain Ranch	Battalion 3
Big Meadows	USFS DPA	Murphys	Battalion 2
Big Trees	Battalion 4	Paloma	Battalion 1
Burson	Battalion 1	Railroad Flat	Battalion 3
Calaveritas	Battalion1	San Andreas	Battalion 1
Camp Connell	Battalion 4	Sandy Gulch	Battalion 3
Campo Seco	Battalion 1	Sheep Ranch	Battalion 3
Copperopolis	Battalion 2	Sky High	USFS DPA
Cottage Springs	Battalion 4	Tamarack	USFS DPA
Dorrington	Battalion 4	Vallecito	Battalion 2
Douglas Flat	Battalion 2	Valley Springs	Battalion 1
Forest Meadows	Battalion 4	Wallace	Battalion 1
Ganns	USFS DPA	West Point	Battalion 3
Glencoe	Battalion 3	Wilseyville	Battalion 3
Hathaway Pines	Battalion 4		

4.3 FIRE HAZARD SEVERITY ZONES

Wildfire threat can be defined as the result of an analysis of potential fire behavior and the likelihood of fire to occur relative to the assets (or communities) at risk. CAL FIRE is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), influence how people construct buildings and protect property to reduce risk associated with wildland fires. Refer to the map on page 46.

The California Building Code (CBC)-Chapter 7A (see chapter 6) was implemented specifically for application within all levels of Fire Hazard Severity Zone and with the intent to specifically address the wildland fire threat to structures within the associated Wildland-Urban Interface. The map on the following page depicts the level and extent of Fire Hazard Severity Zones in Calaveras County.

CALAVERAS COUNTY
Community Wildfire Protection Plan
State Responsibility Area
Fire Hazard Severity Zones / Communties At Risk



Fire Hazard Severity Zones

- Very High
- High
- Moderate

Unclassified:

- Local Responsibility Areas / Incorp. City
- Federal Responsibility Areas

STATE / FED DESIGNATED COMMUNITY AT RISK

Legend

- State Highway
- Main Road
- Lake
- River / Stream

1:360,000 1 in = 6 miles

0 2.5 5 10

Miles

NAD 83 CalTealeAlbers

FHSZ data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

BW Lodge Consulting March 2020

CHAPTER 5

PRE-FIRE MITIGATION STRATEGIES AND TACTICS

The pre-fire management strategies presented in this section focus on mitigation strategies, vegetation management, pre-fire planning, statutes and regulations, and information and education.

This CWPP provides county-scale planning information but also recognizes and supports more focused fire planning efforts to address specific city, community, neighborhood and regional scale needs. This CWPP provides guidance for localized plans prepared for more site-specific issues, fuels treatment options, specific vegetation prescriptions, refined or redefined community and WUI boundaries, emergency preparedness, and other issues important to community wildfire safety. Localized plans have priority and authority over county-level recommendations.

- Calaveras County fire agencies take a holistic approach to pre-fire and fuels management by implementing a variety of practices and programs focused around the WUI where there is the greatest wildfire threat to human life and property. Calaveras County's wildfire programs include:
- Building and vegetation management codes that consider building materials, as well as construction, engineering, and vegetation management standards.
- Hazardous fuel reduction at both the county and community level. At the county level, this includes working with private landowners and county agencies to maintain and create strategic fuel reductions zones; maintain fuel breaks and fire roads; and implementing other types of fuel reduction projects. At the community level, fire agencies work with property owners and homeowners associations to create more fire safe communities (i.e. Ready, Set, Go and Firewise community programs) and to address issues related to road and property access to provide safe evacuation routes and emergency vehicle entry during a wildfire event.
- Public outreach and building awareness of the wildfire threat in Calaveras County.
- A network of fire detection cameras and Fire Lookouts. Click the following link to see the Sierra Nevada and Foothills locations of live fire detection cameras: http://www.alertwildfire.org/sierra/index.html?v=81e003f . During wildfire season, local fire lookout towers - Blue Mountain in Calaveras County and Mt. Zion in Amador County, are staffed as funding and/or volunteer availability allow; most often during and after lightning storms and forecasted north/east wind events.

Hazard reduction priorities for Calaveras County include:

- Projects that help wildland-urban interface residents reduce fire fuels in the defensible space zone of homes, and along important egress and access routes.
- Projects that help residents reduce structural ignitability.

- Projects that serve to educate residents about fire, fire risks, vegetation management, ecosystem and forest health, structural vulnerability, and how to most efficiently reduce risks.
- Projects that increase community safety through planning and wildfire pre-attack maps and plans.
- Strategic fuel breaks that can help firefighters stop the advance of wildfires, thus protecting homes, communities and natural resources. In addition to reducing wildfire threats, fuel breaks should also serve to improve ecosystem health.
- Projects that help highly motivated and organized community groups achieve their fire safety goals.
- Projects that consider demographic trends of residents such as age, language, and disabilities.
- Projects that allow large land holding managers and nearby residents to achieve mutually acceptable strategies for fuels management.
- Projects that improve conditions and health in a variety of fire-prone ecosystems, especially in areas impacted by tree diseases, pathogens or insects, or in areas where native species are at risk because of changing conditions.
- Projects that address fire-prone invasive plant species including but not limited to brooms, medusa head, yellow star thistle, Italian thistle, and eucalyptus.
- Projects that make use of woody biomass and other emerging technologies.
- Projects that support and aid fire agencies in achieving their missions

This Calaveras County CWPP's priorities are in alignment with the priorities as outlined in the Tuolumne-Calaveras Unit Strategic Fire Plan, 2020. CAL FIRE priorities are:

1. Continue assessment of values at risk including life, property, and our natural resources. Actively partner in the promotion and support of fire wise land use planning.
2. Look for opportunities to contribute and collaborate with local, county and regional leaders in the development of fire protection plans.
3. Maintain an active Public Information Team committed to the promotion of current and future projects/actions that reduce identified hazards and risks.
4. Continue integration with all stakeholders to develop a seamless implementation of the plan across the unit.
5. Provide for a continued evaluation and mitigation strategy for all of the resources (personnel, equipment and facilities) to provide the best possible level of service for the hazards and risks identified.
6. Adopt site-specific plans to address post-fire recovery. https://osfm.fire.ca.gov/media/11555/2020_tcu_fireplan.pdf

5.1 MITIGATION STRATEGIES: Reduce structure loss from wildfire

Since the 1960s, researchers and firefighters have analyzed the causes of structure loss to wildland fires. Their work has clearly indicated that to effectively reduce residential losses, residents must treat BOTH the VEGETATION surrounding the structure and the STRUCTURE itself.

State law puts the responsibility on individual property owners for vegetation removal on privately owned parcels adjacent to structures. No state law mandates the creation of community focused fuel reduction projects. However, community members themselves voluntarily take on that responsibility through coordinated efforts of local fire departments, Fire Safe Councils, a variety of grass roots level community organizations, and state and federal land managers. These local groups work collaboratively to develop projects within their WUI communities based on the specific fire threat and needs of engaged stakeholders. The type and size of community focused fuel reduction projects are determined on a project by project basis. This Calaveras County CWPP document is intended to encourage and facilitate that process.

In the late 2000's, the State of California enacted new building code requirements specifically requiring new structures in the SRA to meet fire resistant construction standards designed to minimize structure loss due to wildfire. Given that this new building code only targets new structures built during or after 2008, the wildland fire threat remains high for hundreds of thousands of previously existing structures throughout the SRA Wildland Urban Interface regions of California, including Calaveras County. (see chapter 6)

5.1.1 Treating the Vegetation - Defensible Space At Structures: Property owners living in State Responsibility Areas (SRA) are required by Public Resource Code (PRC) 4291 to maintain clearance of flammable vegetation around their homes and other structures. A property owner's clearance responsibility is limited to 100 feet from his or her structure/s or to the property line, whichever is closer, and is limited to their own lands. However, coordination with adjacent landowners to achieve maximum defensible space is strongly encouraged. Similar constraints have been developed for areas outside the SRA, within and adjacent to the WUI. Creating and maintaining a defensible space radius of at least 100' around homes and other structures is crucial for three reasons:

- Helps protect the lives of residents and firefighters alike
- Reduces the likelihood of fires starting in the structure escaping into the wildland
- Reduces the likelihood of structure damage or loss due to wildfire

Reducing vegetation helps protect structures by ensuring that intense radiant heat from burning vegetation is far enough away from the sides of buildings that the heat doesn't ignite the structure. It also reduces or eliminates the possibility of direct flame contact with a structure. And it provides a safer workspace for firefighters engaged in structure defense operations at the structure/s. For these reasons, California Public Resource Code 4291 requires that homeowners in Wildland-Urban Interface areas create 100' feet of defensible space.

For specific requirement information contact your local Cal Fire or local fire district office; review your Defensible Space inspection form, or review California Public Resource Code 4291 information available at the following link.
https://www.fire.ca.gov/programs/communications/defensible-space-prc-4291/

5.1.2 Supporting First Responder Access: Addressing And Driveways: Ensuring firefighter access to your WUI home is an element of PRC 4291 regulations. To safely defend homes and structures in the face of an oncoming wildland fire, firefighters first need to be able to find your home, and second need to be able to safely access it by vehicle. Prominent and visible addressing aids firefighters in locating your home. Maintain adequate and visible address numbers on structures, and at the mouth of driveways and/or private roads. Typically, 3 inch lettering contrasting with the background on a reflective surface is preferred. Finding an address during a Wildland Urban-Interface fire in a timely manner can make a significant difference between structure survival and structure loss.

Once firefighters identify the likely location of a home they must assess if the private road or driveway offers safe vehicle access to the home. Private WUI roads and driveways are often narrow and feature dense brush and/or forest vegetation along the edges or overhanging the road. Safe egress by resident evacuees and safe access by firefighters requires roads and driveways be protected from fire the same as homes are - they require defensible space to assure safe use. Owner / occupants must be encouraged to turn their private roads and driveways into fuel breaks (see section 5.1.4 below).

5.1.3 Treating the Vegetation - Fuel Modification / Reduction: Calaveras County fire officials, agency land managers and community groups work to reduce the threat posed by wildfires in the WUI using a variety of fuel/vegetation modification or reduction strategies. Fuel breaks and wide area fuel reduction projects are the most common means of minimizing the fire threat, and are created by a variety of fuel “treatment” methods.

In addition to minimizing a fire threat, fuel reduction projects of any variety can accomplish non-fire related environmental goals: discourage invasive species; encourage healthy habitat for native species; suppress establishment and spread of tree diseases and damaging insects; and create an overall improvement in forest health. Treatments can be carried out through mechanical means, with hand tools, or by prescribed burns.

5.1.4 Fuel Breaks: Two versions of fuel break are available, depending on the site specifics and nature of the fire threat**.** A “standard fuel break” is most commonly a linear feature where all, or the overwhelming majority, of vegetation has been removed. These resemble a fire control line, but do not include the removal of all flammable material down to the mineral soil, as would be done during fire control operations. These are often created along ridgetops some distance from populated areas.

The “shaded fuel break” version is characterized by less vegetation removal - a significantly reduced number of appropriately spaced individual specimens of trees and/or large brush species are left in place; while the vast majority of ground level vegetation (aka “ladder fuel”) is removed. This thinning and separation of the tree canopy combined with near total removal of ladder fuels, results in a “park like” environment that is both effective as a fuel break and more visually appealing. These are typically created in close proximity to populated areas due to their more visually appealing character.

Less fuel/vegetation is removed in the creation of a shaded fuel break, and as such the shaded fuel break tends to have less of a negative impact on sensitive natural resources and on the landscape in general. In addition, shaded fuel breaks are often easier to maintain because the shaded landscape discourages regrowth.

The primary goal of both fuel break types is to modify wildland fuels with the result of reducing flame length, fire spread rate and high energy output from wildfire. The effective width of a fuel break on the ground varies depending on the slope and the vegetation type/s. Minimal widths are generally required in grasses (approximately 150 feet) and greater widths are required on forested sites (approximately 300 feet). Typically, regardless of specific fuel type, the steeper the slope the wider the fuel break requires. (*CAL FIRE FUEL BREAKS AND USE DURING FIRE SUPPRESSION, March 21, 2019*).

The reduction in flame lengths, intensity and spread rates is caused by the near total reduction of fuels and/or the wide separation of foliage canopy within a fuel break. This reduction and separation encourages a fire spreading thru adjacent tall brush or treetop foliage and into the fuel break to “drop” to the ground among the lighter flammable materials of grass, leaves and small woody debris. A ground level fire features lower flame lengths and reduced fire intensity which can be key to allowing fire crews to defend structures and property from the fire.

Fuel breaks are not designed nor intended to stop fire spread. In fact they are useless in the face of strong winds when fire brands can be blown across these linear features, up to and beyond a half mile or more in extreme scenarios. However, fuel breaks do provide opportunities for firefighting success under less extreme fire weather conditions. The decreased fire intensity caused by fuel breaks: increases the effectiveness of fire retardant; provides firefighters safer direct access to the fire front; serves as a safe starting point for both handcrew and bulldozer fire control line construction; provides a safe starting point for fire engine hose lays; and provides low fuel volume areas from which back fires can be used. Fuel breaks paralleling roads provide safer conditions for evacuees and incoming firefighting resources. (*CAL FIRE FUEL BREAKS AND USE DURING FIRE SUPPRESSION, March 21, 2019*)

5.1.5 Wide Area Fuel Reduction: In some locations, fuel reduction is determined to be neccessary over a broad expanse of landscape rather than as a linear feature; such as an entire hillside adjacent to a subdivision, or entire undeveloped parcels within a developed area. Typically these fuel reduction projects feature the same end result as a shaded fuel break: minimal or no ladder fuels/vegetation and widley spaced treetop foliage. The effects on an encroaching fire will be the same: lower intensity ground level fire creating the same opportunties to the firefighting efforts.

5.2 FUEL TREATMENT METHODS

A variety of options exist to carry out fuel reduction projects. All require manual labor to some degree. Heavy equipment, prescribed fire, even livestock are also viable, effective, common methods.

Per acre cost for the various methods varies considerably. Whether manual labor, mechanized equipment, burning or livestock are used the cost of treatment will increase with fuel density, difficulty of access and steeper terrain. The cost of treatment method is the primary driver of overall project cost, and could rise as demand for labor rises with the growing demand for fuel reduction project implementation locally.

5.2.1 Manual Labor aka Handcrews: To carry out these fuel reduction projects several work crew options are available: California Department of Corrections & Rehabilitation (CDCR) inmate fire crews, trained and supervised by Cal Fire; private forestry contract crews; newly established Cal Fire FF1 handcrews; other local crew resources including local government and non-profit programs.

Chainsaws and other tools are used to cut trees and brush. The resulting material can be handled in a variety of ways: "lopped & scattered" (manually cut into small pieces and left on the ground); mechanized chipping with the resulting chips spread on site or hauled away by truck; piled in place and prepared for burning during the winter months.

California Department of Concretions & Rehabilitation (CDCR) crews from the local Vallecito Conservation Camp have historically been the primary source of fuel reduction project labor within Calaveras County. One challenge involved with CDCR crews is that they are firefighting crews first and therefore are often not routinely available during the prime project work months of summer. In recent years the number of CDCR crews has been declining due to budget reductions, legislation changing state and county incarceration programs, and the COVID 19 outbreak in 2020; further reducing the availability of these crews. These crews have historically be an inexpensive provider of labor; but with declining availability other sources of manpower are needed to fill the demand.

As CDCR crews have suffered from declining numbers and availability, private forestry contract crews have become bigger players. In addition, the Calaveras County based Calaveras Healthy Impacts Product Solutions nonprofit organization (aka CHIPS) is fielding fuel reduction crews. In Tuolumne County, the San Joaquin County Office of Education is operating a branch of their Greater Valley Conservation Corps, fielding fuel reduction work crews. Industry and non-profit crews cost more typically, but may offer greater year around availability and therefore timelier project completion.

5.2.2 Mechanical: Using large machines like masticators, grinders and chippers, standing trees and brush can be taken down and chipped on site. Chips can be disposed of by broadcasting, or removal for disposal or reuse off site (firewood, chips for cogeneration, finished wood products, etc). Mechanical treatment can only be used when conditions allow for road access to the site; winter rain and snow hinders the use of heavy mechanized equipment due to soft muddy ground. Costs per acre for mechanical means of treatment vary considerably according to type, size and capability of the equipment. Costs are also influenced by the ease of difficulty of site access, the type and density of fuels, and the

degree of slope encountered. Sensitive natural and cultural resources must be considered when using mechanical means. Many mechanically treated fuel types also require the use of manual labor crews to “clean up”, trim remaining trees and handle chip piles.

5.2.3 Grazing: Properly managed grazing of domestic livestock such as sheep, goats and cattle can be an efficient and cost effective means to control grasses and brush and can greatly benefit soil health and the ecosystem. Grazing animals can browse noxious plants such as poison oak that are difficult to manage and greatly reduce fuels on slopes too steep for easy maintenance. The available of for-hire goat herds has varied over the years due in part to the changing viability of the business model.

5.2.4 Prescribed Fire / Burning: Prescribed burning is the intentional introduction of fire into a landscape to accomplish predetermined management objectives. In addition to removal of heavy concentrations of threatening vegetation, prescribed burns can also, at relatively low cost, protect trees from future fires, disease, and insects; prepare a seedbed for the future forest, and manage competing vegetation to improve the habitat for wildlife and native plants.

Whether used as a means of initial fuel reduction treatment, or applied as maintenance of an existing treatment area, prescribed fire can be a very effective and relatively time efficient means of fuel management. However, the windows of opportunity for carrying out a prescribed burn are narrow. Calaveras County’s “Mediterranean” climate features wet winters and very hot dry summers, which limit the opportunities to burn effectively to very short weather and fire danger windows in the late spring and late fall. Spring burns must be timed to catch the fuels dry enough to result in a burn that meats consumption goals, before summer weather influences burning conditions to the point of being dangerous. In order to take advantage of late season dry fuels, fall burns must be timed for after the most threatening summer weather, around the common fall season wind events, and before the rains start in earnest. While burning is a relatively quick technique to carry out on the ground, it requires significant staff time and effort to write the burn prescription, gain the administrative approvals, and coordinate the personnel and equipment needed to conduct a burn. Air quality concerns by the public and management agencies continue to be a limiting factor, as is the availability of CAL FIRE and local fire crews to conduct and monitor the burns. And of course, the prospect of a prescribed fire escaping its bounds, regardless of the season, is at the forefront of planning and implementation concerns.

California’s ecosystems evolved with fire, and it can be one of the most efficient and beneficial tools for reducing fire fuels and improving the health of long unburned landscapes. Educating firefighters, agencies and the public about the potential benefits and cost efficiency of prescribed burns helps make more use of this valuable tool. (*Sonoma CWPP*).

5.2.5 Selecting and Maintaining Firewise Plants for Landscaping: Selecting landscape plants based on their flammability can be challenging for homeowners and landscapers, as few existing plant guides list fire safe plants or rank plants by their flammability. However, by considering several key plant characteristics that are known to influence flammability, homeowners can make informed decisions about which plants to select when creating an area of defensible space or how to modify existing plants to prevent the spread of wildfire.

The movement of a wildfire is influenced primarily by the flammability of the plants that are present and how those plants are arranged, both vertically and horizontally.

Although no plant is fire “proof”, firewise plants tend to have the following qualities:

- Broad-leaf deciduous trees
- Size and shape of leaves tend to be larger, wider, flat
- Shrubs that are low growing (<2 feet) with minimal dead material
- Sap is water like, not milky, and typically does not have a strong odor, oils, resins or waxes in leaves or branches.
- Plants have an open and loose branching and sparse leaves

Homeowners can contact the local county extension agent or local nursery for assistance in selecting appropriate plants for the range of conditions in their yard. Balancing the above characteristics with plants that are well suited for our environment is important as plants that require more resources, such as water and fertilizer, may become stressed or diseased leading to a higher percentage of dead leaves and branches, which significantly increases their flammability.

Similar to individual plants, the flammability of groups of landscape plants is influenced significantly by their vertical and horizontal spatial arrangement. Often, the arrangement of groups of plants around a house is more important in determining wildfire hazard than the flammability of any individual plants. In general, the flammability of a landscape increases with greater connectivity or continuity of fuels (primarily leaves and small branches), both vertically and horizontally. Therefore, the primary objective when landscaping for fire safety is for a fire resistant landscape to have vertical and horizontal separation between all major fuel sources within the area of defensible space. To maintain vertical separation, all ladder fuels should be cleared from this area and horizontally, groups of plants or landscape beds should be separated by nonflammable areas, such as gravel, stone pathways, bare ground, or a well-maintained lawn. For more information on firewise landscaping, click on the following links:

https://urbanforestrysouth.org/products/fact-sheets/fire-in-the-interface-fact-sheets/selecting-and-maintaining-firewise-plants-for-landscaping/

https://www.srs.fs.fed.us/compass/issue7/lotoolbox.htm

https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/fire-resistant-landscaping/

https://ucanr.edu/sites/mg-plumas-sierra/Plumas-Sierra_Gardening_Info/Firewise_Landscaping/

https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5284578.pdf

https://www.firesafemarin.org/plants

5.3 PROTECTING HOMES THROUGH BETTER DESIGN AND MATERIALS

While fuel breaks on the landscape and Defensible Space around structures are effective in minimizing structural ignitions due to direct flame contact or radiant heat, building construction techniques and materials are crucial elements in the defense against structure ignition due to firebrands. Landscape fuel reduction, Defensible Space and building construction techniques and materials need to go hand-in-hand to maximize structure survivability in the Wildland-Urban Interface.

Buildings must be constructed using materials that can withstand the multiple threats of wildfire without igniting. Reducing the question of structural ignition to its simplest possible terms - a house won't burn in a wildfire if it doesn't ignite in the first place. The major ignition threat is firebrands - burning embers that can be carried for miles on the wind to fall on or near the house. This threat is addressed by treating the house so that even if firebrands land on it, it is much less likely to ignite. Homes can be constructed or modified to greatly increase their chances of surviving a wildfire with minimal damage. (See Chapter 6)

For a comprehensive guide to making your home or business better able to survive a wildfire please click on the following link to the California Edition of the "Protect Your Property from Wildfire" guide by the Insurance Institute for Business & Home Safety https://disastersafety.org/wp-content/uploads/2019/03/Wildfire-Retrofit-Guide-California_IBHS.pdf This guide was created specifically for Californians and considers appropriate building styles and construction materials, common topographical features, and other factors. While reducing the vulnerability of your home or business to wildfire begins with you, a community-wide approach to fire protection will be the most effective, so please share this guide with friends and neighbors. This guide will provide information that will help your home or business and your community prepare for and survive a wildfire.

5.4 PUBLIC EDUCATION

Coordinated pre-fire management efforts occur continuously throughout the county and across fire agencies. These activities include business and home inspection programs, land development plan reviews and construction inspections, fire alarm and suppression systems and reviews, fire investigations, reviews of Vegetation Management Programs (VMPs), and building codes and standards development. The Healthy Forest Restoration Act stipulates that Community Wildfire Protection Plans such as this one address the means of reducing structural ignitability in a manner accessible to the public. Public education is an essential component to help Calaveras County Communities become wildfire compatible and is repeatedly requested by residents themselves.

5.4.1 Wildfire Information and Education: The wildfire information and education programs administered throughout Calaveras County are coordinated efforts supported by Cal Fire, the Calaveras Foothills Fire Safe Council, local fire agency personnel and other cooperators including the Calaveras Sheriff's Office, Calaveras County OES, the Calaveras County Fire Chief's Association, and the United States Forest Service.

5.4.2 Public Information: During wildfire events, the public information function is covered 24 hours a day by Incident Command System qualified Public Information Officers (PIO), the Calaveras County OES Office, and by Calaveras County's Emergency Command Center personnel. The overall goal of this function is to keep the people of Calaveras County informed by providing timely and accurate information.

5.4.3 Educational Outreach: Annually, thousands of Calaveras County residents attend community events, such as fire station pancake breakfasts, community fairs where local fire departments sponsor exhibits, cardiopulmonary resuscitation (CPR) training classes, Community Emergency Response Teams (CERT) training classes, "Ready, Set, Go!" and "Ready for Wildfire" classes. Fire departments across the county also give presentations to the public that include disaster and wildfire event preparedness home safety, fire safety, defensible space, and vegetation management information. The Calaveras Foothills Fire Safe Council, County OES, and local fire department web sites provide public education links to CAL FIRE wildfire preparedness literature and other fire prevention programs.

5.4.4 Calaveras Alert Emergency Notification Program: The Calaveras County Office of Emergency Services, in partnership with Everbridge, offers, and highly encourages the public to sign up for the Calaveras Alert Emergency Notification Program (CAENP). The Calaveras Alert Emergency Notification Program provides a number of ways in which Calaveras County Office of Emergency Services (OES) can quickly communicate to the public direction and information in the event of emergencies such as: wildfires, floods, urgent law enforcement operations, urgent public health issues, and other issues of high importance. The CAENP will alert participating residents and businesses by telephone, cell phone, text message, email and social media when there is a threat to the health or safety of Calaveras County residents. To sign up visit the Calaveras County Website, click on the Office of Emergency Services link, then click on Emergency Alerts for directions. Please click here to access the program: https://oes.calaverasgov.us/Notifications

5.4.5 Ready, Set, Go: At the community level, fire agencies work with individuals and homeowners associations to create more fire safe communities through programs such as the Ready, Set, Go! Program and the "Firewise Community" program. The "Ready, Set, Go!" Program is managed by the International Association of Fire Chiefs. Launched nationally in March 2011, the program helps fire departments teach individuals who live in high risk wildfire areas and the wildland-urban interface how to best prepare themselves and their properties against fire threats. See the following link to learn more and access exceptional wildfire preparation information. There are also resources in Spanish as well; https://www.readyforwildfire.org/prepare-for-wildfire/ready-set-go/

5.4.6 The Firewise Communities Program is managed by the National Fire Protection Association (NFPA) and co-sponsored by the U.S. Department of Agriculture Forest Service, the U.S. Department of the Interior, and the National Association of State Foresters. The program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire. Firewise is a key component of Fire Adapted Communities, a collaborative approach that connects all those who play a role in wildfire education, planning, and action with comprehensive resources to help reduce risk. The Firewise Communities program teaches people how to adapt to living with wildfire

and encourages neighbors to work together and take action to prevent losses. Please see the following link to connect to the Firewise webpage and available information; (https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA).

5.4.7 Pacific Gas & Electric: PG&E also has a number of wildfire resources available. Signing into their notification system with your contact information allows PGE to alert you to Public Safety Power Shutoffs (PSPS) when high winds and high risk fire weather threatens electrical infrastructure and intensifies fire risks. Update your contact information at: https://www.pge.com/en_US/residential/your-account/account-management/manage-your-account/alerts-and-notifications/update-your-contact-information.page?WT.mc_id=Vanity_mywildfirealerts If you receive a PSPS alert, visit https://pgealerts.alerts.pge.com/updates/ to find out more information regarding your address and impacts. To access more safety and preparedness resources including wildfire webinars and Community Wildfire Safety Programs please see the following link to the PG&E website: https://www.pge.com/en_US/residential/outages/planning-and-preparedness/safety-and-preparedness/safety-and-preparedness.page

CHAPTER 6

STRUCTURAL IGNITABILITY

There are thousands of structures found throughout Calaveras County. These structures reflect a wide variety of building materials and construction types. Consistent with the era during which they were built. Many homes were built prior to the development of fire resistant home construction techniques. The county has always known the threat of wildfire, however, due to current fuel conditions, weather patterns, and increased human activity in wildland areas, its occurrence has become more of a danger in recent years. In the event of a large wildfire, typically there are not enough emergency responders and equipment to protect each and every home. In some cases, because of the size, speed, fire intensity, and/or home construction materials and surrounding vegetation, homes can ignite and potentially be destroyed before emergency responders can arrive.

In the WUI where natural fuels and structures are intermixed, fire behavior is complex and difficult to predict. Research based on modeling, observations, and case studies in the WUI indicates that structure ignitability during wildland fires depends largely on the characteristics and building materials of the home and the fuel conditions of its immediate surroundings.

Establishing and maintaining defensible space around the home is an important first-step practice in the defense of existing structures. Compliance with Defensible Space laws reduces the threat of structure ignition by way of radiant heat or direct flame impingement from burning vegetation in close proximity to a structure. Defensible space also provides a safe buffer space within which firefighters can engage in defensive tactics; and as such is a key factor in the decision making process of a limited number of on scene firefighters tasked with choosing, from among large numbers of structures, which can be safely defended with a reasonable likelihood of success.

The California Building Code (CBC)-Chapter 7A specifically addresses the wildland fire threat to structures by requiring that structures located in state or locally designated WUI areas be built of fire resistant materials, and incorporate hardware elements that resist fire intrusion into interior spaces. (https://up.codes/viewer/california/ca-building-code-2016/chapter/7A/sfm-materials-and-construction-methods-for-exterior-wildfire-exposure#7A)

These State requirements only apply to new construction in the years since the code went into effect in 2008; and do not address existing structures, or new additions and remodels to existing structures. Chapter 7A can however serve as a guide to the materials and equipment available for use in the voluntary retrofitting of existing buildings.

Of primary concern within Chapter 7A is the threat of structure ignition caused by flying embers. When flying embers inundate a pre-7A home, they can enter the structure through openings such as soffit, attic and crawlspace vents, due to outdated and inadequate screens that allow embers to pass thru. Buildup of embers on wooden decks can cause ignition of decking and siding. Embers can ignite vegetation in non-existent or poorly maintained defensible space zones. Burning brush, wooden decks, firewood piles and even deck furniture can result in radiant heat capable of shattering glass in windows and doors, allowing even easier interior access to flying embers. Ember intrusion into interior spaces will ignite living-space furnishings. Chapter 7A requirements are intended to prevent these sources of

ember caused ignitions. For these reasons, it is important that structures in the WUI be built, or retroactively “hardened”, in accordance with CBC Chapter 7A to reduce the likelihood of ignition by ember dispersion, direct flame contact, and radiant heat.

CHAPTER 7

PLAN RECOMMENDATIONS

This CWPP is intended to provide a foundation for continued multi-agency collaboration and cooperation for fire protection planning efforts in Calaveras County. This is considered a living document which will be reviewed and revised periodically as needed. The following recommendations were developed based on the goals and objectives of Calaveras County's fire agencies for reducing wildland fire hazard and ensuring continued stakeholder input. The recommendations set forth are aimed at achieving five key goals:

1. Continue to identify and evaluate wildland fire hazards and recognize life, property, and natural resource assets at risk, including watershed, wildlife habitat, and other values of functioning ecosystems.
2. Articulate and promote the concept of county-wide land use planning related to fire risk and individual landowner objectives and responsibilities.
3. Support and continue to participate in the collaborative development and implementation of wildland fire protection plans and other local, county, and regional plans that address fire protection and landowner objectives.
4. Increase awareness, knowledge, and actions implemented by individuals and communities to reduce fatalities and property loss from wildland fires, such as defensible space and fuels reduction activities, and fire prevention through fire safe building standards.
5. Integrate fire and fuels management practices with landowner priorities and multiple jurisdictional efforts within local, state, and federal responsibility areas.

The following actions are recommended to move toward achieving these five goals.

7.1 IDENTIFY AND EVALUATE WILDLAND FIRE HAZARDS

- Establish and maintain an accessible online portal for the purpose of storing and distributing jurisdiction-specific current and future Pre-Attack Plans/Maps and associated data developed under CWPP-coordinated projects.
- Collect, analyze, maintain and make available, GIS information and modeling for use in future CWPP-coordinated projects related to hazard mitigation and pre-fire planning.
- Develop ways to improve the coverage of the fire detection cameras.
- Develop ways to use drone technology for fire protection.

7.2 ARTICULATE AND PROMOTE THE CONCEPT OF LAND USE PLANNING RELATED TO FIRE RISK

- Promote the concept of land use planning as it relates to fire risk and landowner responsibilities; identify key minimum elements necessary to achieve a fire safe community and incorporate these elements into community outreach materials and programs.
- Continue to implement the structural ignitability activities outlined in Chapter 6.
- Coordinate with county and local government staff to integrate the Firewise Program approach into planning documents and ordinances.
- Develop methods to increase the number of WUI properties receiving PRC4291 Defensible Space compliance inspected each year.
- Consider ways to make the tree removal process less cumbersome and less expensive.

7.3 MAINTAIN ONGOING PARTICIPATION IN THE COLLABORATIVE DEVELOPMENT AND IMPLEMENTATION OF COMMUNITY WILDFIRE PROTECTION PLANS

- Work collaboratively with county, local, and regional agencies and landowners to develop fuel reduction priorities and strategies based on this CWPP, other more localized CWPPs, and/or other regional plans.
- Support the development and implementation of local-scale CWPPs. Provide a collaboration mechanism between private property owners (and Home Owners Associations) and large land owners.

7.4 INCREASE COMMUNITY AWARENESS OF ACTIONS NEEDED TO REDUCE FATALITIES AND PROPERTY LOSS FROM WILDFIRES

- Expand inter-agency coordination within Calaveras County's fire service community in their efforts to maintain and grow a visible community presence through the development and distribution of public information regarding fuel reduction efforts within their jurisdictions.
- Continue and expand efforts to educate landowners, residents, and businesses about the risks and personal responsibilities of living in the Wildland-Urban Interface, including applicable regulations, prevention measures and preplanning activities.
- Continue to partner with, educate and prepare communities through of the "Ready, Set, Go!" and/ or "Firewise Community" programs.
- Create and support the means by which individual community members can be actively involved in local Fire Safe Councils and Community Emergency Response Teams.

- Continue to increase education and awareness about structural ignitability and defensible space; develop and distribute educational materials to vendors and contractors who sell or install fire resistant materials, and make these materials available at local home improvement stores.
- Consider providing grant-funded financial assistance for senior citizens for the purposes of creating and maintaining defensible and preventive structural ignitability retrofits.
- Develop the means to emphasize the education of absentee property owners on PRC4291Defensible Space regulations and compliance.
- Acquire, develop and distribute more information about fire resistant landscaping.

7.5 INTEGRATE FIRE AND FUELS MANAGEMENT PRACTICES

- Identify and implement vegetation management projects in priority WUI communities throughout the county. (see appendix 4 page 118)
- Take advantage of available State, Federal and industrial grant programs to fund the necessary vegetation management projects and fire hazard education and enforcement activities submitted under the Calaveras County CWPP and/or TCU Strategic Fire Plan.
- Assess the need for and subsequently implement fuel reduction and user education efforts along highly-traveled roadways and pedestrian access points into all public lands, in order to minimize ignitions and reduce the threat from wildland fire.
- Use existing local model/s to expand and implement programs addressing the need for fuel reduction on vacant residential properties within established neighborhoods and subdivisions.
- Maintain and expand vegetation reduction efforts along roadways that are key evacuation routes into or out of all neighborhoods.
- Create transition zones to extend shaded fuel breaks between developed residential areas and open space areas.
- Work to reduce regulatory barriers that limit hazardous fuels reduction activities (e.g. tree removal process).
- Consider grazing as a fuel reduction strategy.

CHAPTER 8 BATTALION PLANNING AREAS

8.1 BATTALION 1 - San Andreas Battalion

CAL FIRE Battalion Chief: Kevin Bohall

OVERVIEW

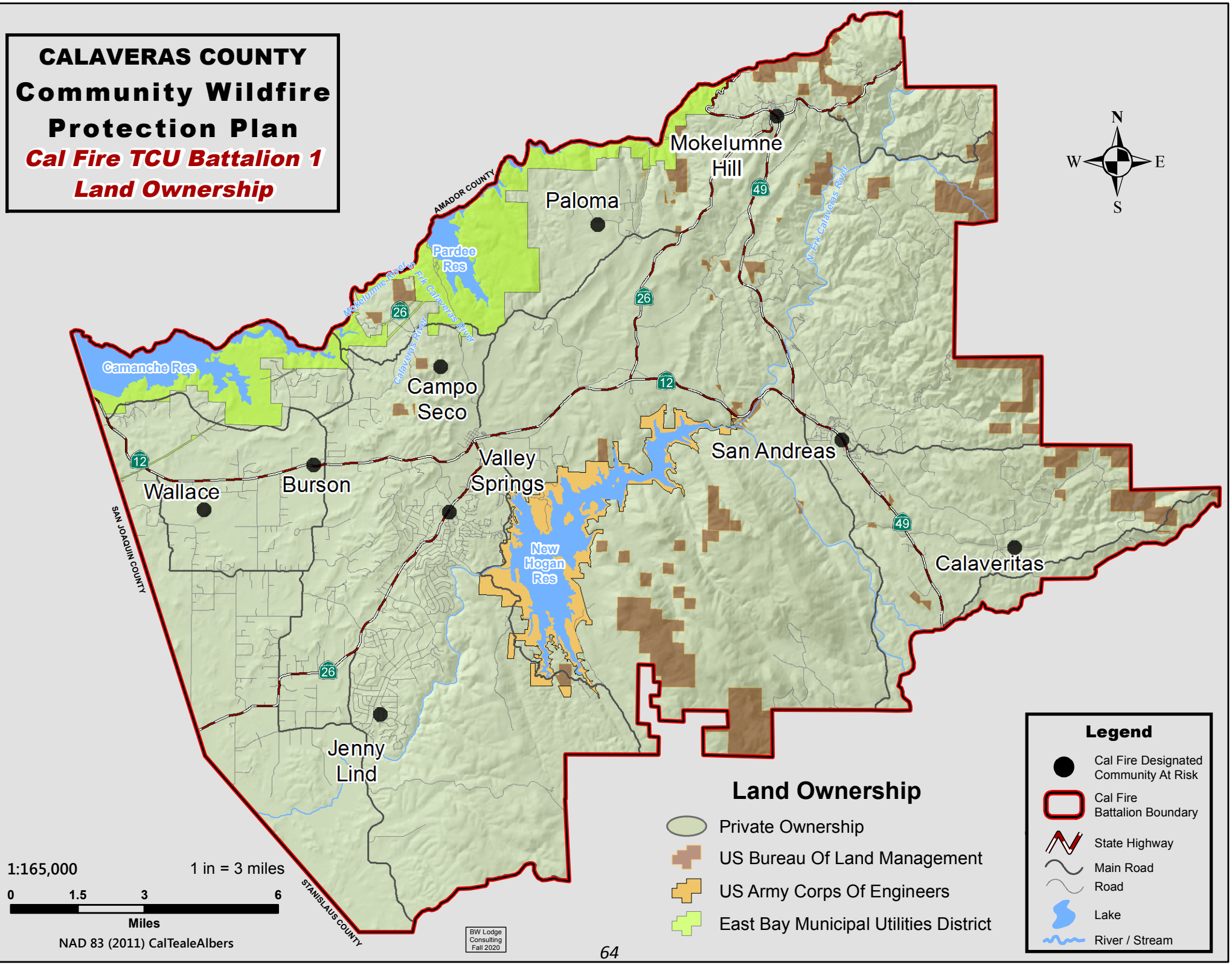
The San Andreas Battalion consists of 229,486 acres, stretching across the general area of Highways 12, 26 and 49 in Northwestern Calaveras and Eastern San Joaquin Counties. The elevation ranges from around 200' elevation in the western plains to near 2500' elevation in the eastern foothills. The eastern third of the Battalion is bisected by multiple east-west drainages that have a history of supporting fire spread. The western two-thirds of the Battalion is bisected by a set of unique geographic features, two prominent ridgelines that run north-south: the northern half of the Hogback Mountains, and the less prominent northern extent of Gopher Ridge.

8.1.1 Fire Protection: Cal Fire is the primary provider of wildland fire protection. (see map chapter 1 page 8) Their organization is comprised of two CAL FIRE Forest Fire Stations: the San Andreas / Unit / Battalion Headquarters station - a two engine station, located on the grounds of the TCU headquarters in San Andreas; and Valley Springs station - a one engine station located adjacent to the Valley Springs community, near New Hogan Reservoir.

Primary local government fire protection is provided by three Fire Protection Districts: Calaveras Consolidated (greater Valley Springs Area), San Andreas, and Mokelumne Hill Fire Protection District; along with a small contingent of fire control personnel with the East Bay Municipal Utilities District (EBMUD) at Lake Comanche. (see map chapter 1 page 11)

8.1.2 Population Centers: The Battalion fire control resources protect the communities of Wallace, Burson, Campo Seco, Paloma, Valley Springs, Jenny Lind, San Andreas, Mokelumne Hill, Calaveritas and the northern reaches of Milton in the southwest corner of the Battalion (all of which are depicted in the Battalion 1 related maps). The most populated area in the Battalion is that large triangular swath of territory between Hogan Reservoir in the east, Comanche Reservoir in the north and the Calaveras/San Joaquin County line in the west; including Valley Springs, Campo Seco, Wallace, Burson and Jenny Lind. All communities are designated Communities At Risk.

8.1.3 Ownership And Responsibility Designations: The entire Battalion is State Responsibility Area (see map chapter 1 pg 8) with two exceptions: the San Andreas Fire District is designated as Local Response Area, and the Federal holdings noted below. Landownership is primarily small private holdings. The Battalion lacks the large federal and/or private land holdings seen in Battalions 3 and 4. (see map page 64) However there are some relatively small Federal holdings scattered around the Battalion: Bureau of Land Management in the Bear Mountains, eastern foothills and straddling the Battalion 1 and 3 boundary; and Army Corp of Engineers lands along the shores of Hogan Lake. All Federal lands are Federal Responsibility Area lands, designated as State Direct Protection Areas due to proximity to State fire control resources. The East Bay Municipal Utilities District owns large tracks of land in the northern portion of the Battalion, bordering Comanche and Pardee Reservoirs and along stretches of the Mokelumne River.


CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 1
Land Ownership
N
W
E
S
AMADOR COUNTY
SAN JOAQUIN COUNTY
STANISLAUS COUNTY
Mokelumne Hill
Paloma
Pardee Res
Camanche Res
Campo Seco
Valley Springs
San Andreas
Wallace
Burson
New Hogan Res
Calaveritas
Jenny Lind
N. Frk Calaveras River
Mokelumne River
Calaveras River
26
12
49
Land Ownership
Private Ownership
US Bureau Of Land Management
US Army Corps Of Engineers
East Bay Municipal Utilities District
Legend
Cal Fire Designated Community At Risk
Cal Fire Battalion Boundary
State Highway
Main Road
Road
Lake
River / Stream
1:165,000
1 in = 3 miles
0
1.5
3
6
Miles
NAD 83 (2011) CalTealeAlbers
BW Lodge Consulting Fall 2020

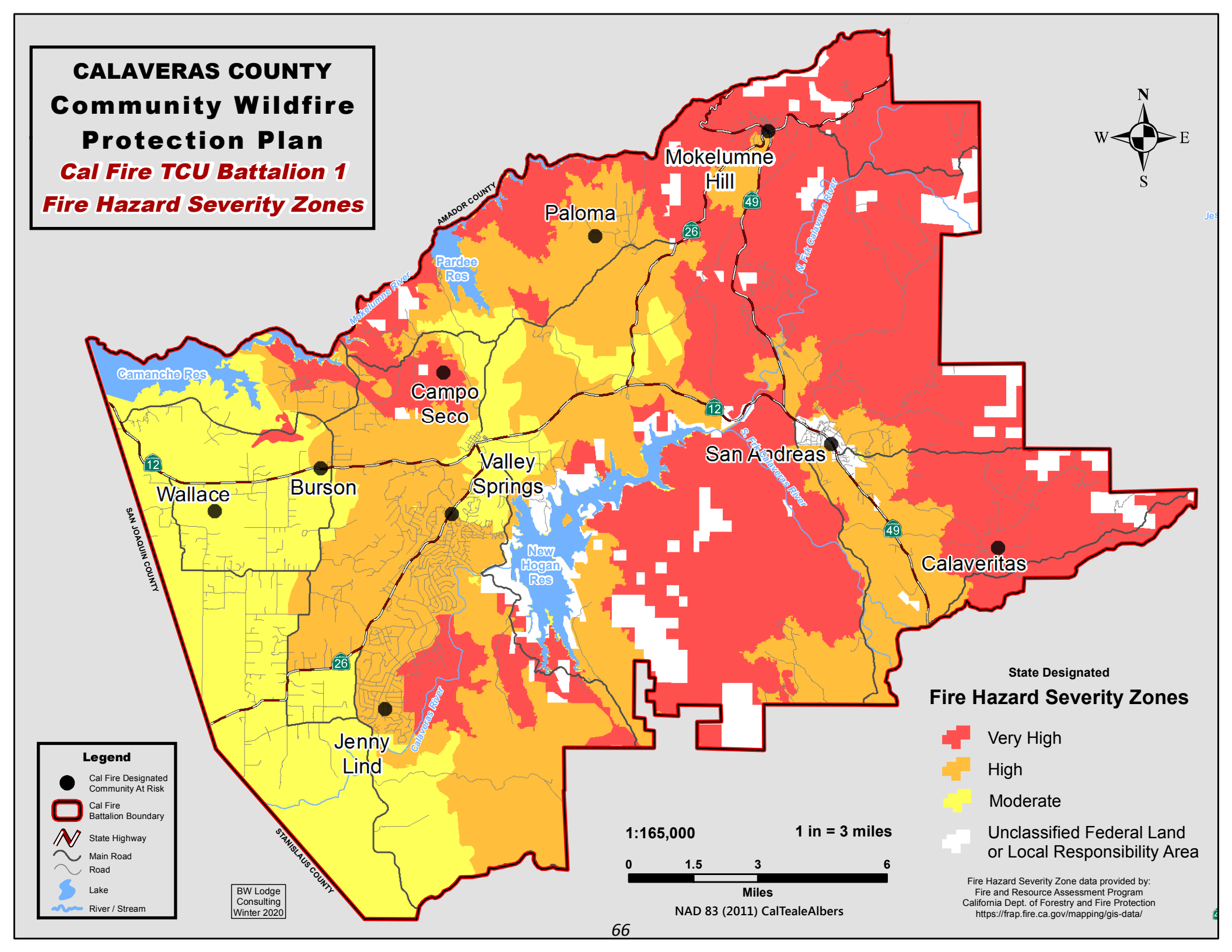
8.1.4 Fire Hazard Severity Zones: The majority of the eastern third of the Battalion has been designated by CAL FIRE as *Very High Fire Hazard Severity* Zone lands. The western two-thirds features Zones designated *Moderate, High,* and *Very High* with the *Moderate* designation dominating. (see map page 66)

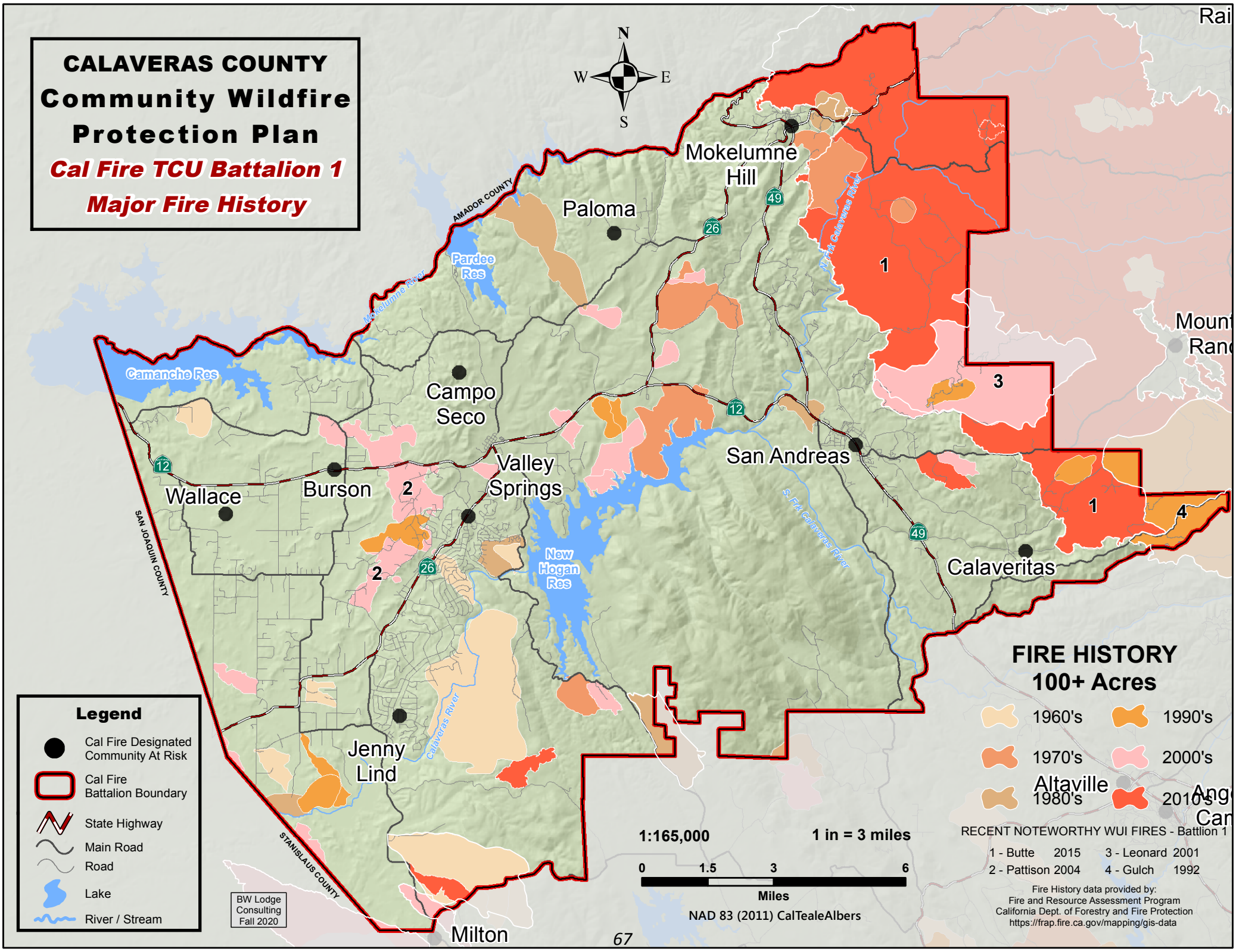
8.1.5 Fire Weather: Typical fire season temperature patterns range from lows in the upper 50's to highs in the 90's to the 100's. Periods of triple digit highs, 100-110 degrees, are not uncommon, and can last from a couple days to a couple weeks. Relative humidity runs in the mid-teens to mid-twenties during daylight hours, often with poor overnight recovery. Periods of extreme heat are occasionally accompanied by single digit humidity. Prevailing wind is generally from the north along the Hwy 49 corridor, from west to northwest in the area west of Hogback Mountain on the western plains and west/up canyon during the day in the drainages of the eastern portion of the Battalion. Overnight, a strong down-canyon wind across the ridge tops adjacent to the Mokelumne River drainage is common. August and September often bring the threat of thunderstorm activity, but it is not unusual to experience thunderstorms at any time throughout the summer season. As is the case throughout the Sierra Nevada front country, the typical summer weather is ideal for intense burning conditions associated with wildland fire.

8.1.6 Fire History: Historical fire data on large damaging fires within Battalion 1 reflect two unique fire scenarios: (1) those fires occurring at the lower end of drainages located in the upper (eastern) Battalion, east of Hwy 49, that follow the terrain and fuels, burning up slope/up drainage into the western portions of Battalions 3 or 4; and (2) low country fires in the western grass dominant fuel beds that are spread by the typical north/northwest prevailing winds. (see map page 67) Those wind-driven grass fires in the lower western-most grassland areas of the Battalion, noted as scenario #2 above, typically occur in the lightly populated agricultural areas of the far west. However, in 2004 the Pattison Complex added a new dimension to this history by starting and burning within that densely populated area between Highways 12 and 26, west of Valley Springs. Pushed by 20 mph winds, the Pattison Fire grew at extreme rates of spread through a variety of fuel models, stressed local fire resources to their limits and destroyed seventeen homes on its way to a final size of 2,483 acres.

The Butte fire of September 2015 contradicted both common scenarios. It started on September 9, 2015 in southern most Amador County outside Jackson, and within a matter of hours jumped the Mokelumne River canyon and raced southward deep into Calaveras County. Primarily due to weather and extreme fuel loads, the fire burned a total of 70,868 acres, approximately 67,000 acres of it in Calaveras County, including a large swath of the eastern foothills of Battalion 1. The Butte fire destroyed 534 residences and 4 commercial buildings in the process, and serves as a clear example of the potential for large damaging wildfires throughout Calaveras County, due to a combination of heavy fuel loading, weather conditions and extreme topographic influences. This fire in particular behaved much differently than previous fires in this area, making a strong progression from north to south, instead of the more common west to east movement. Fire behavior was so extreme, it is estimated that fire growth on September 11, 2015 was 32,754 acres in a single day. Like with most fires that have occurred in this area, containment occurred primarily due to

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 1
Fire Hazard Severity Zones




CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 1
Major Fire History
N
W
E
S
Mokelumne Hill
Paloma
Pardee Res
Mokelumne River
AMADOR COUNTY
Camanche Res
Campo Seco
Valley Springs
Wallace
Burson
San Andreas
New Hogan Res
Calaveras River
S. Fk Calaveras River
Calaveritas
Jenny Lind
Altaville
Milton
SAN JOAQUIN COUNTY
STANISLAUS COUNTY
1
2
3
4
12
26
49
Legend
Cal Fire Designated Community At Risk
Cal Fire Battalion Boundary
State Highway
Main Road
Road
Lake
River / Stream
BW Lodge Consulting Fall 2020
FIRE HISTORY
100+ Acres
1960's
1970's
1980's
1990's
2000's
2010's
RECENT NOTEWORTHY WUI FIRES - Battlion 1
1 - Butte 2015
2 - Pattison 2004
3 - Leonard 2001
4 - Gulch 1992
Fire History data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data
1:165,000
1 in = 3 miles
0 1.5 3 6
Miles
NAD 83 (2011) CalTealeAlbers

changes in fuels continuity, and weather; which offers fire suppression resources opportunities to attack the head and flanks of the fire. The Butte Fire is the single largest and most damaging fire occurring in Calaveras County to date.

8.1.7 Fuels: The primary fuels within this Battalion include the chaparral species manzanita, chamise, and toyon, a number of oak species, gray pine and various annual and broad expanses of perennial grasses. Throughout much of the area, brush fields are over-mature and exceed six feet in height. In the field, no individual fuel type is 100% homogeneous across its geographic distribution. Fuel types do not have well defined boundaries separating types. Fuel types intermix and overlap. Fuel loading in much of the upper (eastern) portion of the Battalion is heavy. Historical data indicates that fires in the upper portions of this Battalion, with this type of fuel loading, are difficult to contain and exhibit potential for large and damaging fires - as was seen in the Butte Fire. The lower elevations of this Battalion have a combination of chaparral brush, oak woodland, gray pine, and grass. Though the fuel loading is generally lower here, the population density is greater, thus increasing the threat to life and property. Many of the chaparral fuel beds in the lower elevations are broken up by the road systems, small agricultural plots, and swaths of the wild grasslands and/or pastures found throughout this area. (see map page 69)

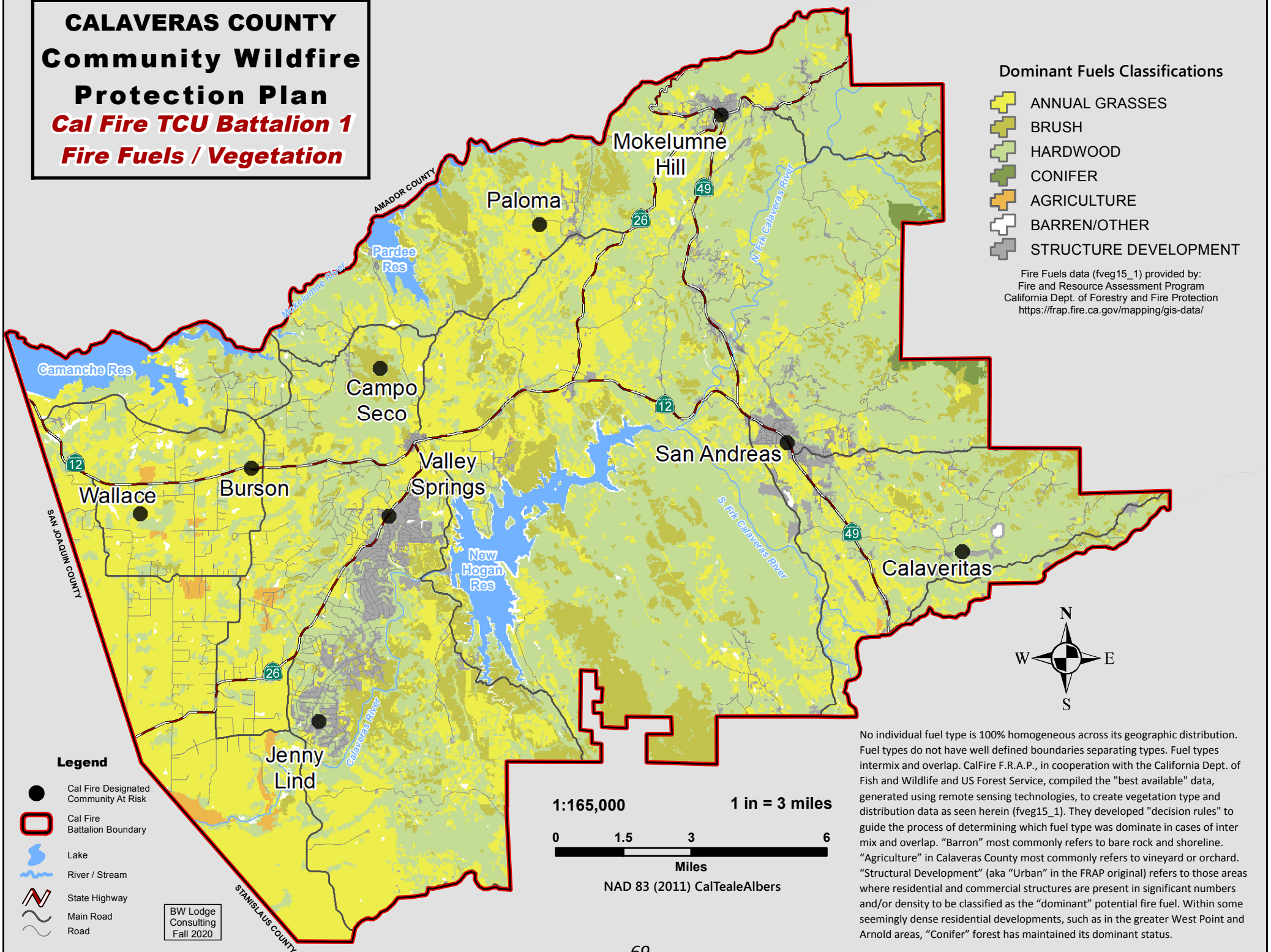
8.2 ASSETS AT RISK

8.2.1 Watershed Values: The major watershed in the Battalion is the Calaveras River and its primary tributaries: Jesus Maria, Murray, Willow, Calaveritas and San Antonio Creeks - the primary sources for New Hogan Reservoir. The south side of the Mokelumne River drainage and the two major reservoirs it supplies, Comanche and Pardee, is also under the Battalion's protection. The value of these watersheds reaches far beyond the boundaries of the Battalion and the County. Watershed protection and enhancement is key in developing a sufficient water supply for human consumption. The Mokelumne River watershed is the water source for Pardee and Comanche Reservoirs and provides 90% of the water that goes to East Bay Municipal Utility District (EBMUD) customers. EBMUD's water system serves approximately 1.3 million people in a 331-square-mile area of Alameda and Contra Costa Counties, including the major cities of Oakland and Berkeley and east to Walnut Creek and the San Ramon Valley. New Hogan Reservoir is operated by the Federal Army Corps of Engineers, providing flood protection for the greater Stockton area as well as agricultural and domestic use supply, and hydroelectric power generation.

8.2.2 Agricultural Values: The large cattle ranches in the western portion of the Battalion depend on the annual grass crop to feed their livestock. Horse ranches are a growing component of the local agriculture industry also at risk from wildland fire. In recent years, legal cannabis production has become a growing influence in the agricultural realm; in terms of land use, economic impacts and jobs.

8.2.3 Recreational Values: Tourism and recreation is an important element of the economy threatened by wildfire within the Battalion. The reservoirs mentioned above, along with the primary watersheds supporting them, include significant recreational opportunities: Army Corps of Engineer campgrounds and boating facilities; privately owned RV parks

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 1
Fire Fuels / Vegetation



No individual fuel type is 100% homogeneous across its geographic distribution. Fuel types do not have well defined boundaries separating types. Fuel types intermix and overlap. CalFire F.R.A.P., in cooperation with the California Dept. of Fish and Wildlife and US Forest Service, compiled the "best available" data, generated using remote sensing technologies, to create vegetation type and distribution data as seen herein (fveg15_1). They developed "decision rules" to guide the process of determining which fuel type was dominate in cases of inter mix and overlap. "Barron" most commonly refers to bare rock and shoreline. "Agriculture" in Calaveras County most commonly refers to vineyard or orchard. "Structural Development" (aka "Urban" in the FRAP original) refers to those areas where residential and commercial structures are present in significant numbers and/or density to be classified as the "dominant" potential fire fuel. Within some seemingly dense residential developments, such as in the greater West Point and Arnold areas, "Conifer" forest has maintained its dominant status.

primary watersheds supporting them, include significant recreational opportunities: Army Corps of Engineer campgrounds and boating facilities; privately owned RV parks campgrounds; hiking, equestrian and mountain bike trails; fisheries and hunting areas, among others.

8.2.4 Community Infrastructure: Various community infrastructure, both public and private, includes: water storage and delivery systems (see watershed above); electrical distribution equipment and telecommunications systems; transportation networks; schools; and health care facilities.

Electric power distribution systems are ubiquitous throughout the Battalion, and a critically important asset. Power lines and equipment are unique among assets as being both a potential cause of wildland fire and a threat to firefighting operations. Most every wildland fire has some potential to damage this equipment; the biggest fires present the most serious threat. Disruption of the power distribution system is likely to have a significant impact on lives and the economy.

Telecommunications is another critical element of the infrastructure present within the Battalion. Several government agencies and private communications companies take advantage of the topography within the Battalion for the location of communications system facilities. These installations are by necessity placed in threatened locations atop ridges and mountains.

Transportation infrastructure ranks as a critical asset in need of protection. Thousands of miles of county and private roads spread throughout the Battalion, and portions of three State Highways bisect the Battalion: Highways 12, 26, and 49. While road surfaces themselves are only rarely damaged by wildfire, the supporting infrastructure, including bridges, guardrails and signage, can easily be damaged. Even when no physical damage is suffered, the disruption of traffic caused by fire control operations can cause a range of negative impacts from short delays to significant disruptions to the economy. Protection measures are also required to support safe evacuee egress.

Given their location within WUI communities, schools are at risk in the same way as the rest of the community is. The importance of school facilities as being prime choices for use as evacuation centers makes them doubly important in the event of a significant wildland fire.

Health care facilities, including Mark Twain Dignity Health Hospital in San Andreas, are at risk in the same way as the rest of the community, given their WUI locations

8.2.5 Residential and Commercial Development: The areas with the highest density of population and residential development are located in the lower areas of the Battalion - the 7 mile wide swath straddling highways 12 and 26 as noted previously. The towns of San Andreas and Mokelumne Hill also feature significant development. The entire Battalion was predominantly ranch land before development started to increase in the open areas over the last 60+ years. The oldest rural residential development dates from the 1940s - 1960’s and is often on multi-acre parcels. As a result, outdated design features such as shake roofs, wood siding, wood decks, and large single pane windows are common in these areas. Rapid development over the last 30+ years has led to the addition of many new homes throughout the Battalion, either in a subdivision style configuration or as individual ranch-style homes

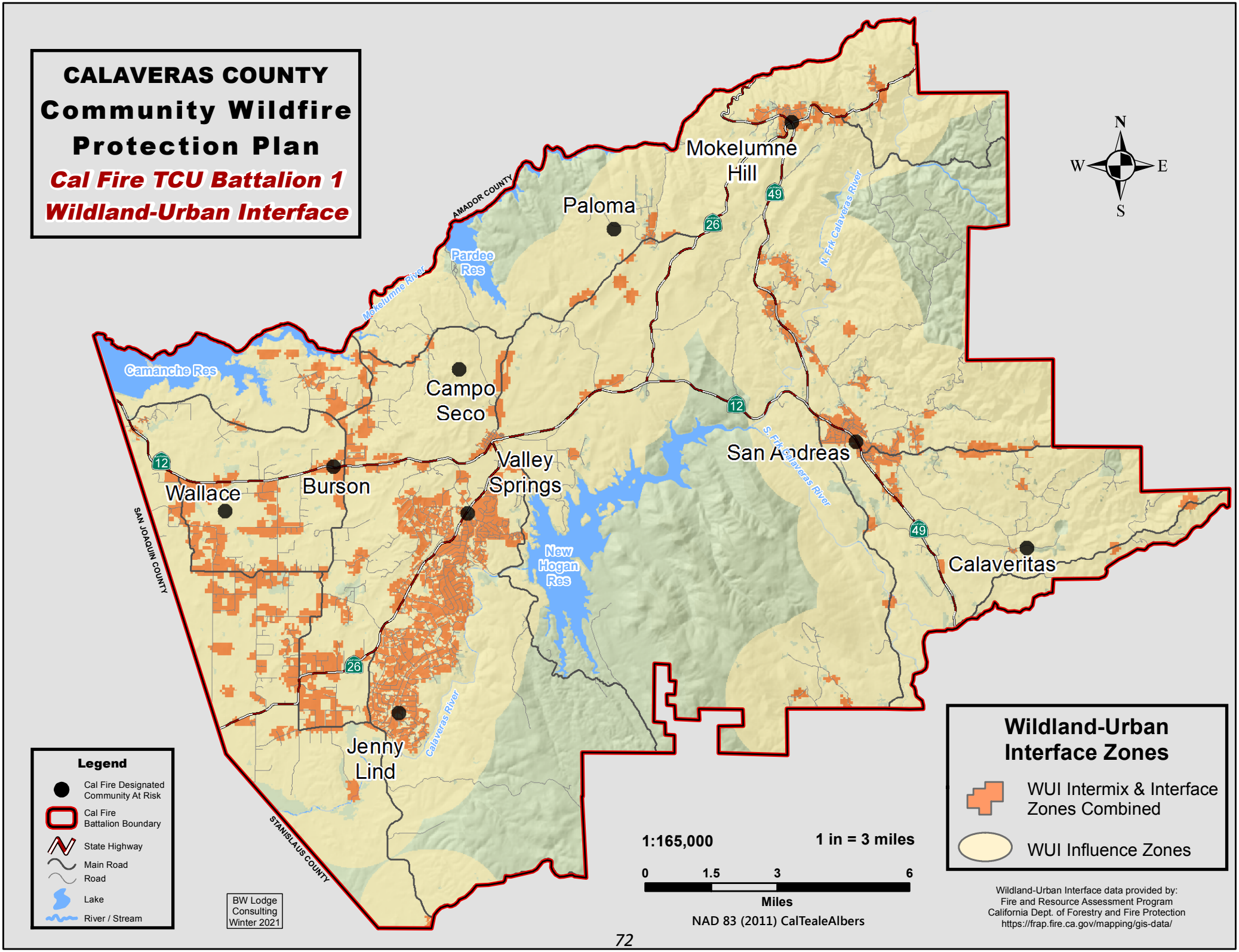
scattered throughout. The newer subdivision style developments, closer to the community centers, typically feature higher density development on small lots similar to those found in more urban environments. Though these newer subdivisions in the lower Battalion feature newer materials such as stucco or concrete siding, tile roofing and double pane windows, they are still at risk, often being sited in hazardous locations. This rate and kind of development is expected to continue into the future, but will incorporate the latest Chapter 7A building codes, resulting in more ember resistant/fire safe structures. Fricot City and the greater Mokelumne Hill area are two communities located on terrain directly above major drainages. As such they face a significant threat from wildland fire. Each has evacuation challenges relating to population density and poor road systems. Neither has seen a significant amount of new residential development in recent years.

8.3 WILDLAND-URBAN INTERFACE:

The greatest potential for structure loss is, by definition, within the Wildland-Urban Interface. This structural development within designated Fire Hazard Severity Zones results in a severe fire threat to our communities. This was shown to be true in the devastation wrecked by the Butte fire.

A review of the WUI map (see map page 72) reveals that the overwhelming majority of Battalion 1 has earned some level of Wildland-Urban Interface designation, because of the combination of structural development, and the fire threat generated by the combination of fuels, weather and topography.

All communities within Battalion 1 are designated “Communities at Risk”: Milton, jenny Lind, Wallace, Burson, Campo Seco, Valley Springs Paloma, Mokelumne Hill, San Andreas and Calaveritas. It is fair to say then that with only a couple notable exceptions, the combination of fuels, weather and topography presents a significant risk to any and every populated area within the Battalion, with or without an official WUI designation.


CALAVERAS COUNTY
Community Wildfire
Protection Plan
Cal Fire TCU Battalion 1
Wildland-Urban Interface
N
W
E
S
Mokelumne Hill
Paloma
Pardee Res
Mokelumne River
AMADOR COUNTY
N. Fork Calaveras River
Camanche Res
Campo Seco
Valley Springs
San Andreas
S. Fork Calaveras River
Wallace
Burson
SAN JOAQUIN COUNTY
New Hogan Res
Calaveritas
Calaveras River
Jenny Lind
STANISLAUS COUNTY
12
26
49
Legend
Cal Fire Designated Community At Risk
Cal Fire Battalion Boundary
State Highway
Main Road
Road
Lake
River / Stream
BW Lodge Consulting Winter 2021
1:165,000
1 in = 3 miles
0
1.5
3
6
Miles
NAD 83 (2011) CalTealeAlbers
Wildland-Urban Interface Zones
WUI Intermix & Interface Zones Combined
WUI Influence Zones
Wildland-Urban Interface data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

8.4 BATTALION 2 - Copperopolis Battalion

CAL FIRE Battalion Chief: B.J. Imlach

OVERVIEW

Battalion 2 extends over 289,904 acres of the southwest and south-central portions of Calaveras County. From the topographically jumbled lands at the San Joaquin County line in the west averaging around 400' elevation, and stretching east approximately 48 miles into the Sierra Nevada foothills up to around 2500' elevation. In its eastern third, the Battalion is bisected by multiple east-west drainages that have a history of supporting fire spread. In the western two-thirds the Battalion is bisected by a set of unique geographic features that run north-south: the southern end of the Bear Mountain range west of Angels Camp, and the bulk of Gopher Ridge, west of Copperopolis. Also bisecting the Battalion are State Highway 4 west to east, and State Highway 49, north to south.

8.4.1 Fire Protection: Cal Fire is the primary provider of wildland fire protection. (see map chapter 1 page 8) Their organization is comprised of three CAL FIRE Forest Fire Stations: Copperopolis FFS – a one engine station in the west; Altaville FFS - the Battalion Headquarters, a two engine and one bulldozer station serving the center of the Battalion; and Murphys FFS - a one engine station in Murphys, on Hwy 4, in the east. Also located within the Battalion boundaries, but not part of the Battalion administrative organization, is Vallecito Conservation Camp, located just off Hwy 4 in the Vallecito area, about midway between Angels Camp and Murphys. Battalion responsibilities also include maintenance of Fowler Lookout, located atop Bear Mountain, west of Angels Camp.

Primary local government fire protection is provided by six Fire Protection Districts and one city department. Angels City provides service within the city limits of Angels Camp. The Copperopolis FPD, the largest district in the Battalion, includes everything west of the Bear Mountains to the Stanislaus County line with the exception of a chunk of territory protected by Calaveras Consolidated Fire. The Altaville-Melones FPD provides services in the heart of the Battalion surrounding Angels Camp City. In the east, the Murphys FPD protects Murphys and a large swath of territory south to the County line, and north to the Battalion 3 boundary. Very small portions of the eastern most perimeter of Battalion 2 are protected by the Ebbetts Pass FPD and Central Calaveras FPD. (see map chapter 1 page 11)

8.4.2 Population Centers: The major communities in the Battalion are positioned on or in close proximity to the Hwy 4 corridor, including; the greater Copperopolis area; Angels Camp (the only incorporated city); Vallecito; Douglas Flat; Murphys and its adjacent subdivisions. Additional high concentrations of population are found in the subdivisions along the shore and north of Lake Tullock's north shore, south of Copperopolis. All communities are designated Communities At Risk.

8.4.3 Ownership And Responsibility Designations: With the exception of the city of Angels Camp (designated Local Responsibility Area), the entire Battalion is SRA/State DPA comprised of relatively small private holdings - not no large commercial timber lands for instance. (see map chapter 1 page 8) There are some relatively small Federal holdings: Bureau of Land Management (BLM) and Bureau of Reclamation (BOR) along the shores of

New Melones Reservoir and the Stanislaus River; BLM north of Murphys extending across the Battalion 2/3 boundary. All federal lands are designated State DPA. (see map page 75)

8.4.4 Fire Hazard Severity Zones: Approximately half of the Battalion has been designated *High Fire Hazard Severity Zone (FHSZ)*: the majority of the territory west of the Bear Mountains; and the central region centered on greater Angels Camp. The eastern third, most of the Bear Mountains, and along Gopher Ridge are designated as *Very High FSHZ's*. The far west, from Milton south to Hwy 4, along the Stanislaus County line, and the greater Copperopolis area are designated *Moderate FSHZ's*. (see map page 76)

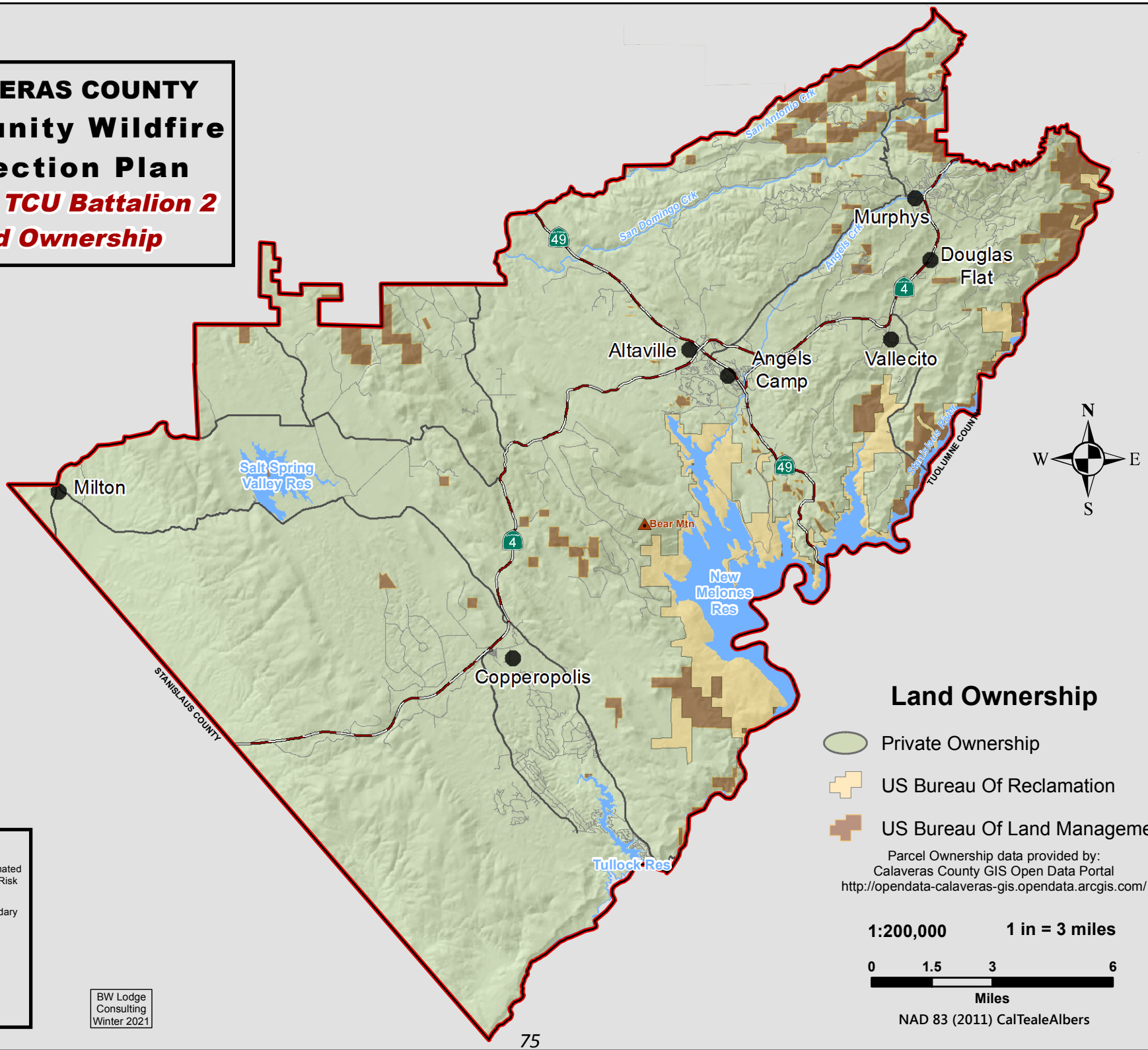
8.4.5 Fire Weather: Typical fire season temperature patterns in the Battalion reflect lows in the 50's and highs in the 90's to the 100's. Periods of triple digit highs, 100-110 degrees, are not uncommon, and can last from a couple days to a couple weeks. Relative humidity runs in the mid-teens to mid-twenties during daylight hours often with poor overnight recovery. Prevailing wind is generally from the west. West of the Bear Mountains west to northwest winds are also common; and significant north wind events arise in the spring and fall. Late August and September bring the threat of thunderstorm activity and it is not uncommon for dry lightning to occur over the Bear Mountain Range and Gopher Ridge. Overnight, a strong down-canyon wind across the ridge tops adjacent to the Stanislaus River drainage is common. As is the case throughout the Sierra Nevada front country, the typical summer weather is ideal for intense burning conditions associated with wildland fire.

8.4.6 Fire History: Large fires in the Battalion have historically occurred in the grass and oak woodlands of the west half of the Battalion - west of the Bear Mountains; often driven by north wind events. (see map page 77) The Butte fire of 2015 spread into the northeast corner of the Battalion. Fires are relatively common along the western segment of the Hwy 4 corridor and within the adjacent subdivisions in the greater Copperopolis area.

8.4.7 Fuels: Approximately 75% of the Battalion features grass and oak woodland fuels; almost everything west of Hwy 48; the exception being the mosaic of brush fields on the slopes of Gopher Ridge and the Bear Mountains. In the field, no individual fuel type is 100% homogenous across its geographic distribution. Fuel types do not have well defined boundaries separating types. Fuel types intermix and overlap. The grass and oak-woodland dominated west transitions to a brush dominated fuel model as one climbs east from Hwy 49. As one moves further into the eastern portions of the Battalion the brush begins to mix with stands of oak and conifers, eventually becoming dominated by the mixed forest model along the eastern Battalion boundary. (see map page 78)

Throughout the conifer stands ranging from the mid-slope elevations east and upslope to the tree line, the bark beetle outbreak of the last decade killed large numbers of conifers, creating standing dead timber and ground level accumulations of dead fuels. Both have the ability to increase fire intensity, long range spotting and overall resistance to control.

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 2
Land Ownership



Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

BW Lodge Consulting Winter 2021

Land Ownership

- Private Ownership
- US Bureau Of Reclamation
- US Bureau Of Land Management

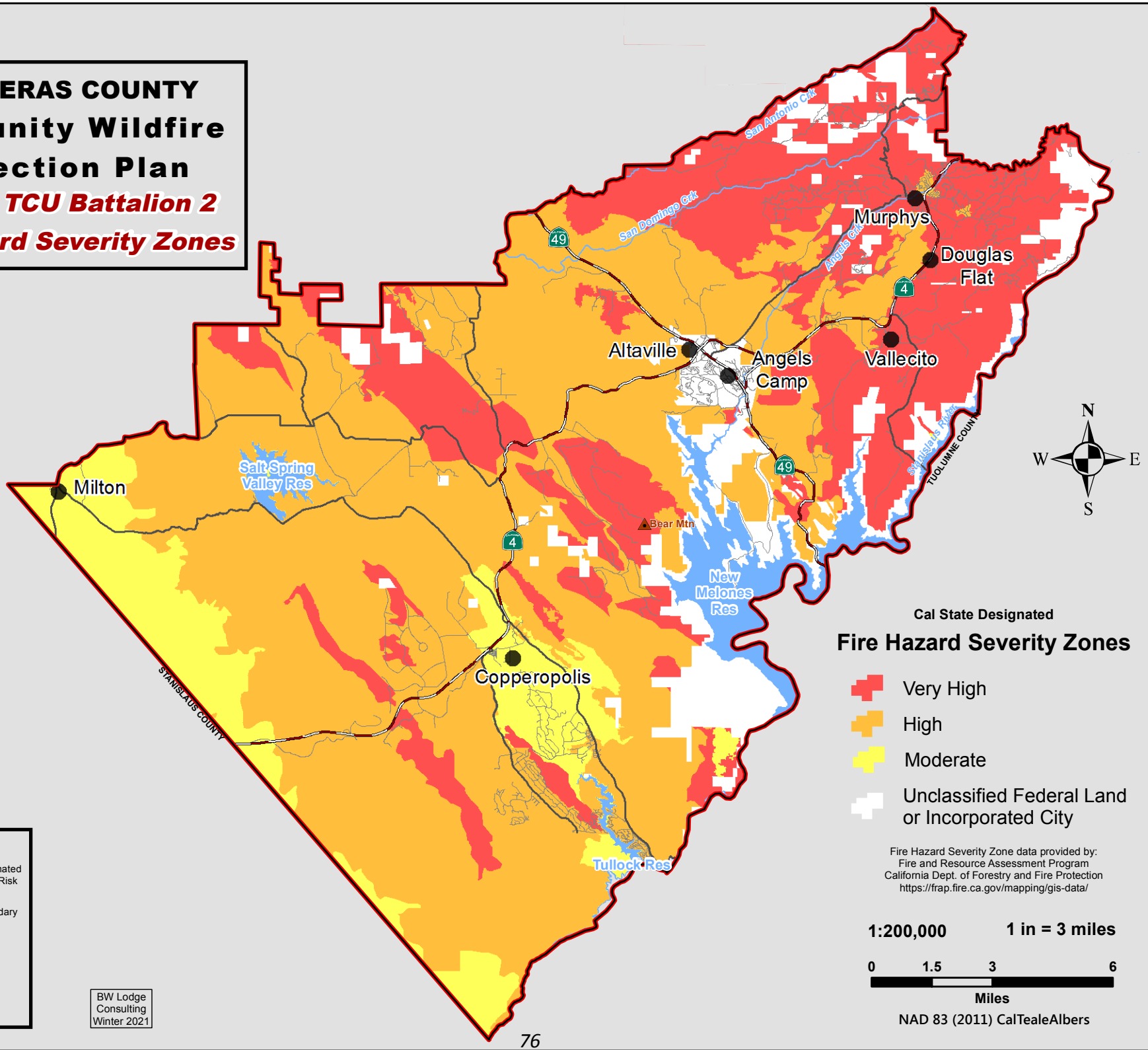
Parcel Ownership data provided by:
Calaveras County GIS Open Data Portal
http://opendata-calaveras-gis.opendata.arcgis.com/

1:200,000 1 in = 3 miles

0 1.5 3 6
Miles

NAD 83 (2011) CalTealeAlbers

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 2
Fire Hazard Severity Zones



Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

BW Lodge Consulting Winter 2021

Cal State Designated

Fire Hazard Severity Zones

- Very High
- High
- Moderate
- Unclassified Federal Land or Incorporated City

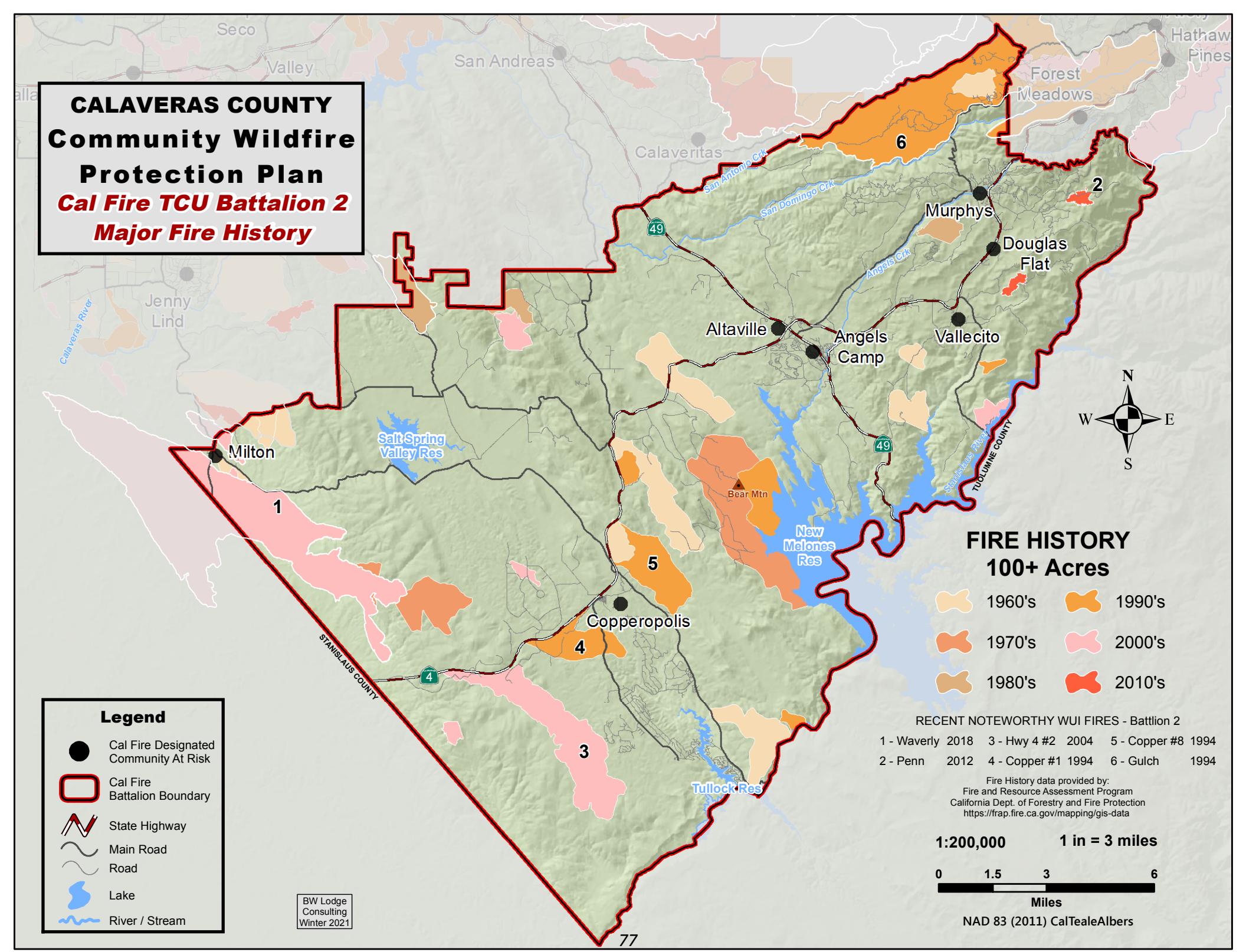
Fire Hazard Severity Zone data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

1:200,000 1 in = 3 miles

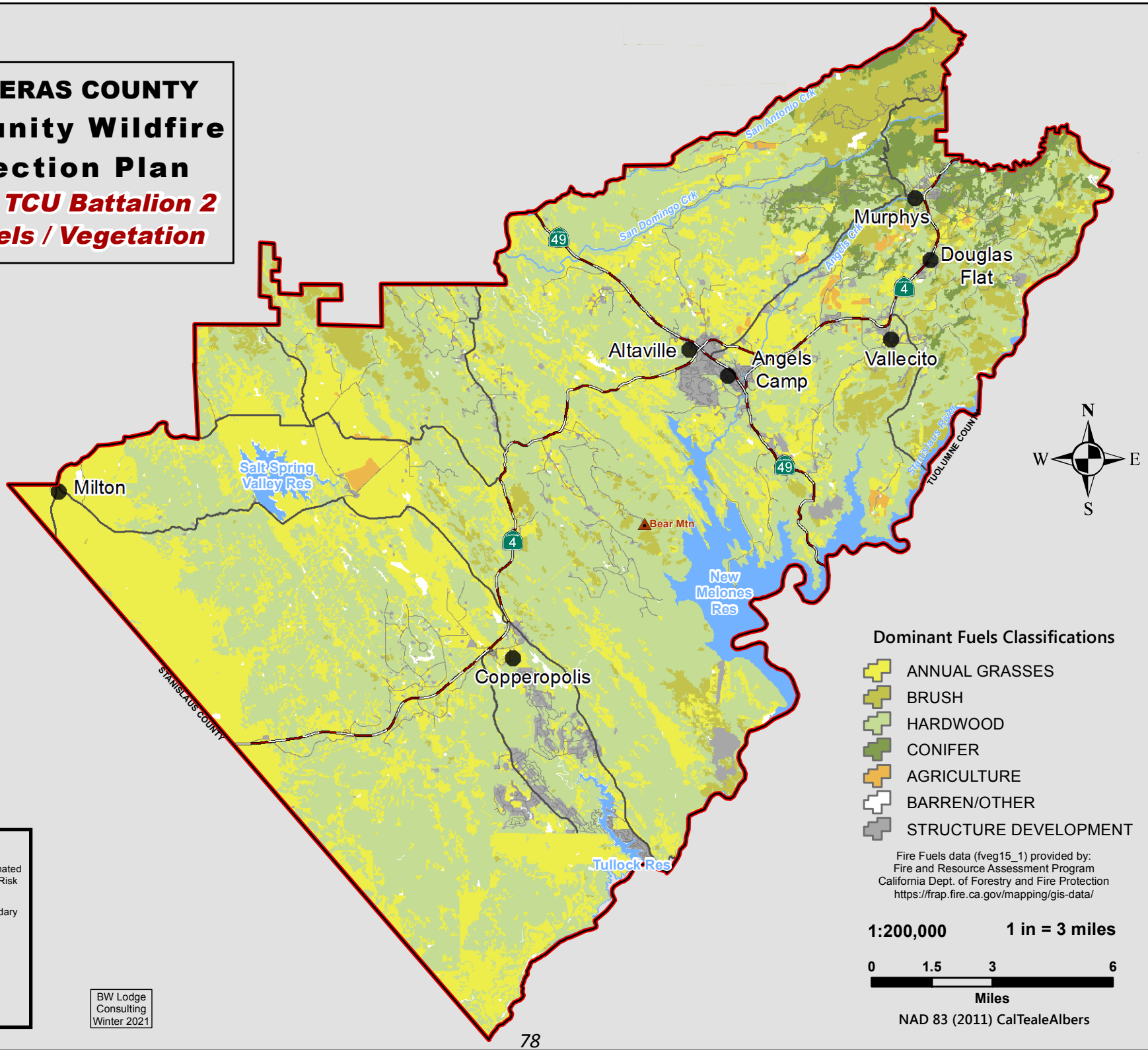
0 1.5 3 6

Miles

NAD 83 (2011) CalTealeAlbers


CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 2
Major Fire History
Seco Valley
San Andreas
Calaveritas
Hathaw Pines
Forest Meadows
Jenny Lind
Calaveras River
San Antonio Crk
San Domingo Crk
Angels Crk
Murphys
Douglas Flat
Altaville
Angels Camp
Vallecito
Milton
Salt Spring Valley Res
Bear Mtn
New Melones Res
Stanislaus River
TUOLUMNE COUNTY
STANISLAUS COUNTY
Copperopolis
Tullock Res
1
2
3
4
5
6
49
4
N
W
E
S
FIRE HISTORY
100+ Acres
1960's
1970's
1980's
1990's
2000's
2010's
RECENT NOTEWORTHY WUI FIRES - Battlion 2
1 - Waverly 2018
2 - Penn 2012
3 - Hwy 4 #2 2004
4 - Copper #1 1994
5 - Copper #8 1994
6 - Gulch 1994
Fire History data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data
1:200,000
1 in = 3 miles
0 1.5 3 6
Miles
NAD 83 (2011) CalTealeAlbers
Legend
Cal Fire Designated Community At Risk
Cal Fire Battalion Boundary
State Highway
Main Road
Road
Lake
River / Stream
BW Lodge Consulting Winter 2021

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 2
Fire Fuels / Vegetation



Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

BW Lodge Consulting Winter 2021

Dominant Fuels Classifications

- ANNUAL GRASSES
- BRUSH
- HARDWOOD
- CONIFER
- AGRICULTURE
- BARREN/OTHER
- STRUCTURE DEVELOPMENT

Fire Fuels data (fveg15_1) provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

1:200,000 **1 in = 3 miles**

0 1.5 3 6
Miles

NAD 83 (2011) CalTealeAlbers

8.5 ASSETS AT RISK

8.5.1 Watershed Values: The broad spectrum of watershed values noted elsewhere may be less obvious, but are none the less important within and far beyond the Battalion boundary.

The major watershed in the Battalion is the Stanislaus River and its northern tributaries - the primary source for New Melones Reservoir and Tulloch Lake. Important smaller watersheds include San Antonio and San Domingo Creeks, both tributaries of the Calaveras River system, supporting New Hogan Reservoir in Battalion 1; and Angels Creek which supports New Melones Reservoir. Many small, mostly seasonal creeks, originating in the Bear Mountains and along Gopher Ridge provide water to Salt Spring Valley Reservoir in the west and Tullock Lake in the South. Protection of these watersheds provides benefits that reach far beyond the boundaries of the Battalion.

8.5.2 Agricultural Values: The large cattle ranches in the western portion of the Battalion depend on the annual grass crop to feed their livestock. Vineyards, orchards and horse ranches are a growing valuable component of the local agriculture industry also at risk from wildland fire. In recent years, legal cannabis production has become a growing influence in the agricultural realm; in terms of land use, economic impacts and jobs. Despite the loss of some acres to development, agriculture remains an economically significant asset.

8.5.3 Recreational Values: Tourism and recreation is an important element of the economy threatened by wildfire within the Battalion. The large reservoirs previously mentioned, along with the primary watersheds supporting them, include significant recreational values - everything from developed Bureau of Reclamation campgrounds and boating facilities, to hiking and mountain bike trails, fisheries and hunting grounds. Wine tasting and wildflower and wildlife viewing are growing in popularity. BLM lands, inherently important as watershed, are also utilized for their recreational opportunities; hunting and fishing being two of the most common.

8.5.4 Community Infrastructure: Various community infrastructure, both public and private, includes: water storage and delivery systems; electrical distribution equipment; telecommunications systems; transportation networks; schools and health care facilities.

Domestic and agricultural water collection and distribution systems including the Calaveras County Water District, and the Stockton East Water District (SEWD), are critical assets. These systems rely on a significant system of ditches and flumes to transport water throughout the Battalion.

Electrical distribution systems are ubiquitous throughout the Battalion, and a critically important asset. The watersheds in the Battalion supply water to several local, regional and state-wide power generation systems, including the Calaveras Public Utility District, and Northern California Power Authority. Power distribution lines and equipment are unique among assets as being both a potential cause of wildland fire and a threat to firefighting operations. Most every wildland fire has some potential to damage this equipment; the biggest fires present the most serious threat. Disruption of the power distribution system is likely to have a significant impact on lives and the economy. The Northern California Power

Authority operates a hydroelectric project on the Stanislaus River east of Murphys. Their high voltage power lines split the center of Battalion 2, running west past Murphys, over the Bear Mountains and adjacent to Hwy 4 west bound past Copperopolis into Stanislaus County and beyond, to tie into the statewide grid.

Telecommunications is another critical element of the infrastructure present within the Battalion. Several government agencies and private communications companies take advantage of the topography within the Battalion for the location of communications system facilities. These are expensive installations that are, by necessity, placed in threatened locations atop ridges and mountains. The most noteworthy may be the multiple installations on Fowler Peak in the Bear Mountain Range overlooking Angels Camp.

Transportation infrastructure ranks as a critical asset in need of protection. Portions of two State Highways bisect the Battalion: Highways 4 and 49. Thousands of miles of county and private road also spread throughout the Battalion. Hwy 4 serves as the primary citizen evacuation route out of the WUI communities in the eastern half of the Battalion. While road surfaces themselves are only rarely damaged by wildfire, the associated infrastructure, including bridges, guardrails and signage can easily be damaged. Even when no physical damage is suffered the disruption of traffic caused by fire control operations can cause a range of negative impacts from short delays to significant disruptions to the economy.

Given their location within threatened WUI communities, schools are at risk in the same way as the rest of the community is. Their importance as one of the prime choices for use as evacuation centers makes them doubly important in the event of a significant wildland fire.

Health care facilities, also located within threatened WUI communities, and the services provided are essential to the long term viability of any community.

8.5.5 Residential and Commercial Development: The areas with the highest density of population and residential development are the towns of Angels Camp and Murphys and the Hwy 4 corridor between them represent areas with the highest population density. The County General Plan and zoning laws have allowed several large, modern, high density subdivisions such as Greenhorn Creek and Saddle Creek, as well as several less dense developments such as those in Pennsylvania Gulch, Copper Cove and the Bar XX, Circle XX, and the Diamond XX subdivisions. Several of the older developments date back to the 1940's through 1960's and are often on multi-acre parcels. As a result, outdated design features such as shake roofs, wood siding, wood decks, and large single pane windows are common in these areas.

8.6 WILDLAND-URBAN INTERFACE:

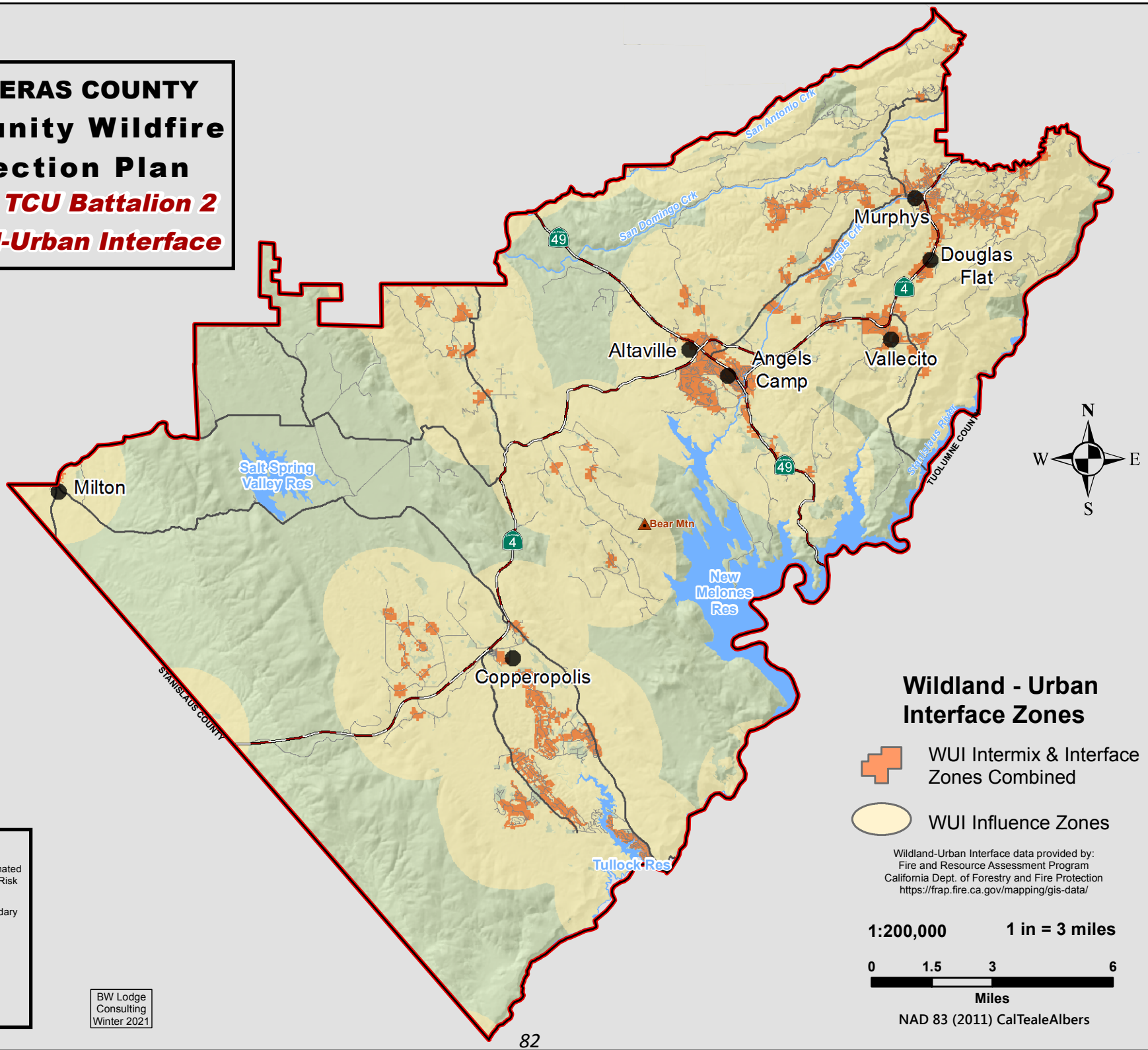
The greatest potential for structure loss is, by definition, within the Wildland-Urban Interface. This structural development within designated Fire Hazard Severity Zones results in a severe fire threat to our communities. This was shown to be true in the devastation wrecked by the Butte fire.

A review of the WUI map (see map page 82) reveals that the overwhelming majority of Battalion 2 has earned some level of Wildland-Urban Interface designation, because of the

combination of structural development, and the fire threat generated by the combination of fuels, weather and topography.

All communities within Battalion 2 are designated “Communities At Risk” by State and Federal authorities: Altaville, Angels Camp, Copperopolis, Douglas Flat, Milton, Murphys, and Vallecito. It is fair to say then that with only a couple notable exceptions, the combination of fuels, weather and topography presents a significant risk to any and every populated area within the Battalion, with or without an official WUI designation.

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 2
Wildland-Urban Interface



Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

BW Lodge Consulting Winter 2021

Wildland - Urban Interface Zones

- WUI Intermix & Interface Zones Combined
- WUI Influence Zones

Wildland-Urban Interface data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

1:200,000 1 in = 3 miles

0 1.5 3 6
Miles

NAD 83 (2011) CalTealeAlbers

8.7 BATTALION 3 - West Point Battalion

CAL FIRE Battalion Chief: Mario Torrez

OVERVIEW

The West Point Battalion consists of approximately 175,979 acres located in the northeast portion of Calaveras County. The Battalion ranges in elevation from 1,600 feet in the west to 6,800 feet at its eastern boundary. It is bordered on the north by the Mokelumne River / Amador County line and is bisected by multiple east-west river drainages.

8.7.1 Fire Protection: Cal Fire is the primary provider of wildland fire protection. (see map chapter 1 page 8) Their organization is comprised of three Forest Fire Stations: West Point FFS, the two-engine Battalion Headquarters station located in the community of West Point; Esperanza FFS, a one-engine station, is located 1 mile east of the community of Mountain Ranch; and Hermit Springs FFS, a one-engine station, located 18 miles east of West Point at 6,000 foot elevation on Sierra Pacific Industries (SPI) land, at the Battalions eastern DPA boundary adjacent to the Stanislaus National Forest (SNF).

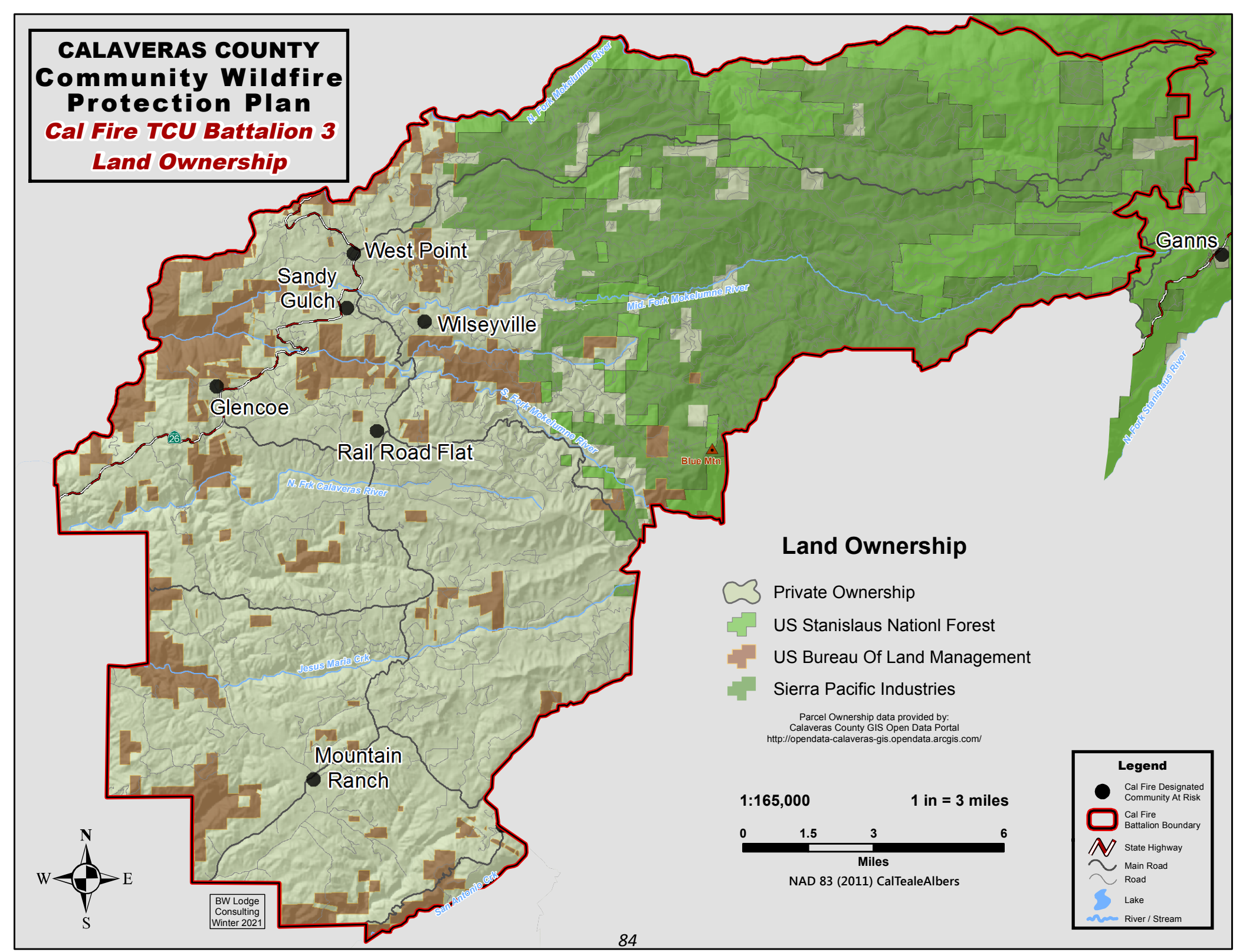
Primary local government fire protection within the Battalion is provided by three fire districts. The Central Calaveras Fire and Rescue Protection District serves the western half of the Battalion including the communities of Mountain Ranch, Glencoe, Railroad Flat and Sheep Ranch. West Point Fire District protects the north and central areas of the Battalion including the communities of West Point, Wilseyville, Lily Valley and Upper Blue Creek. The Ebbetts Pass Fire District is responsible for the mostly unpopulated eastern portion of the Battalion. (see map chapter 1 page 11)

8.7.2 Population Centers: The Battalion fire control resources protect the communities of West Point, Wilseyville, Glencoe, Railroad Flat, Mountain Ranch and Sheep Ranch. These population centers are located in the western half of the Battalion. There are no incorporated towns, and these community centers are relatively small, with most of the Battalion's population spread across a wide expanse of territory.

8.7.3 Ownership And Responsibility Designations: The overwhelming majority of the Battalion is private property designated as State Responsibility Area (SRA) lands. (see map chapter 1 page 8) There are significant federal land holdings within the Battalion too, all designated as State Direct Protection Area's, due to proximity to State fire control resources. Sierra Pacific Industries owns close to a third of the Battalions lands east of West Point / Wilseyville - all designated SRA (see map page 84) The U.S. Forest Service Stanislaus National Forest has scattered holdings adjacent to the SPI lands east of Wilseyville and a large swath of territory at the eastern most end of the Battalion - all State DPA. The U.S. Bureau of Land Management has significant holdings north of Glencoe and in the greater Wilseyville / West Point area, and along the western Battalion boundary with Battalions 1 and 2 - all State DPA.

CALAVERAS COUNTY Community Wildfire Protection Plan

Cal Fire TCU Battalion 3 Land Ownership



Land Ownership

- Private Ownership
- US Stanislaus Nationl Forest
- US Bureau Of Land Management
- Sierra Pacific Industries

Parcel Ownership data provided by:
Calaveras County GIS Open Data Portal
http://opendata-calaveras-gis.opendata.arcgis.com/

1:165,000 1 in = 3 miles

0 1.5 3 6
Miles

NAD 83 (2011) CalTealeAlbers

Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

N W E S

BW Lodge Consulting Winter 2021

(downtown West Point and the orchards at the west end of Spink Road - both designated *Moderate*). Federal lands haven been categorized as having an equivalent *High* Fire Hazard rating by the United States Forest Service (USFS). (see map page 84)

8.7.4 Fire Hazard Severity Zones: Cal Fire classifies all SRA lands within the Battalion as *Very High Fire hazard Severity Zones*. Federal lands haven been categorized as having an equivalent *High* Fire Hazard rating by the United States Forest Service (USFS). (see map page 87)

8.7.5 Fire Weather: When normal Central Valley summer heat waves begin to subside, Battalion 3 eventually receives the beneficial effects from the "Delta Breeze" about 24 hours after its heat dampening effects are felt in the northern San Joaquin Valley and the lower elevations of the County. This extend s the effects of high hazard fire weather patterns a full day longer than the lower elevations typically experience.

In the upper elevations of the Battalion, it is not uncommon to experience relative humidity in the low teens to the single digits from the middle of September thru the fall. Correspondingly, the 10-hour fuel moistures can stay below 5% for much of the fall season. Battalion 3 frequently experiences east and north wind events at the higher elevations. During these dry wind events, high winds coupled with low humidity may develop with little or no warning. The Mokelumne River drainages typically come under the greatest influence from these events. A late season, east wind driven fire event most likely represents the greatest threat for major timber fire growth in the Battalion. The Power Fire of 2004 is an example of the potential for devastating fire in Battalion 3. It erupted on the north side of the Mokelumne River drainage (Amador County) on the El Dorado National Forest and burned approximately 13,000 acres destroying a large area of both public and private timberland during a fall east wind event.

8.7.6 Fire History: As with all Battalions in Calaveras County, the West Point Battalion has had its share of large and damaging wildfires including; the Butte Fire in September of 2015, the largest and most damaging fire in Calaveras history at over 70,000 acres; the Leonard Fire in 2001 that burned over 5,188 acres; the Old Gulch Fire in 1992 that burned south of Mountain Ranch burning over 17,419 acres; and the Railroad Flat Complex Fire of 1989 burning a total of 10,740 acres. (see map page 88)

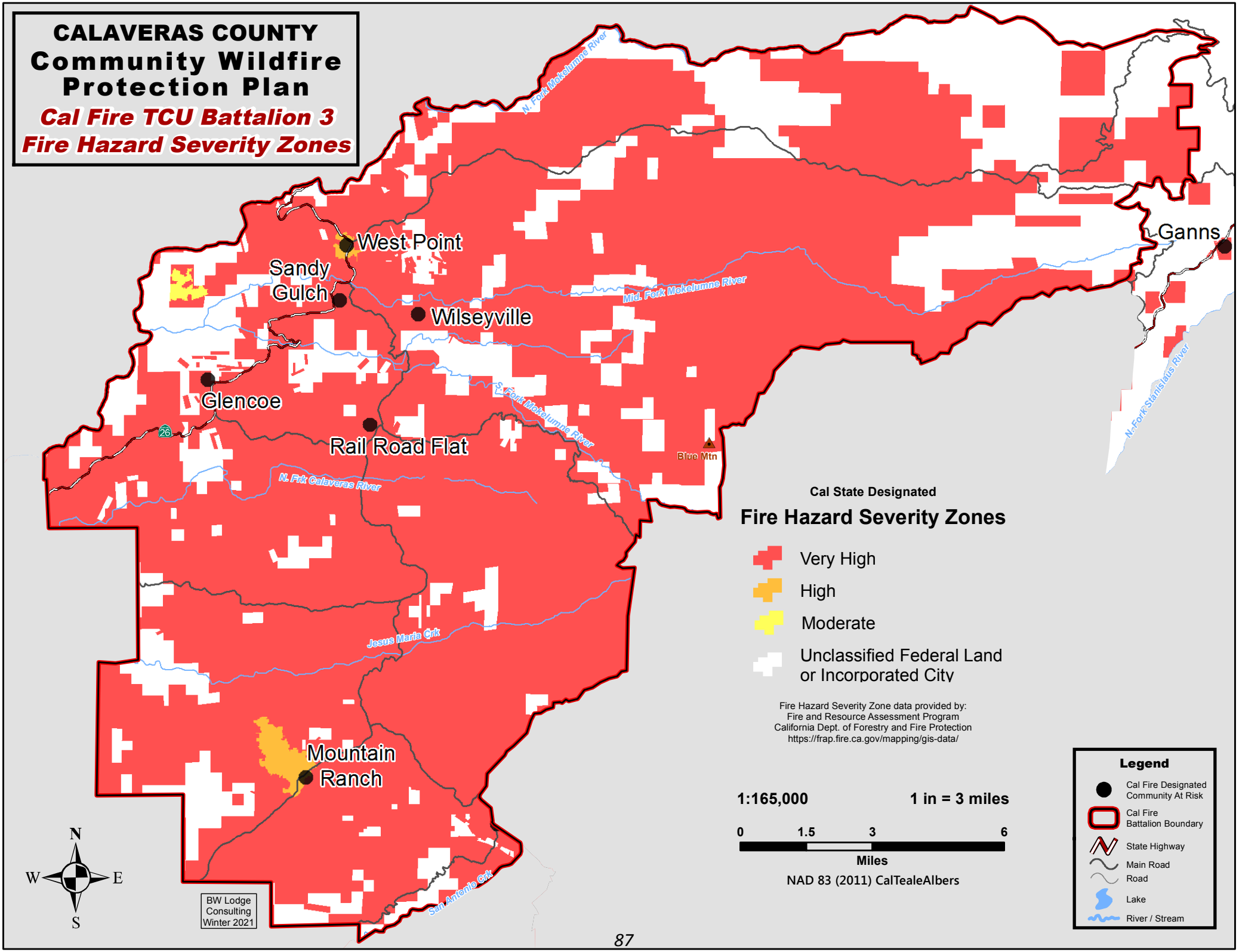
8.7.7 Fuels: The dominant fuel type in the Battalion is conifer forest. Almost every other classification is represented, but in smaller areas. In the field, no individual fuel type is 100% homogeneous across its geographic distribution. Fuel types do not have well defined boundaries separating types. Fuel types intermix and overlap. (see map page 89)

At the lowest elevations of the Battalion, there is a mix of brush, grass and oak woodlands. There are timber fuel models with heavy brush understory at the mid and higher elevations. This mixture of fuels - grass with an over story of brush, and brush with an over story of timber, creates a highly volatile fuel situation. The grass and brush fuel models act as the primary ladder fuels that carry fire vertically into the over story. The high potential for vertical fire spread that is caused by the increased understory fuel loading, increase both fire intensity and spotting potential.

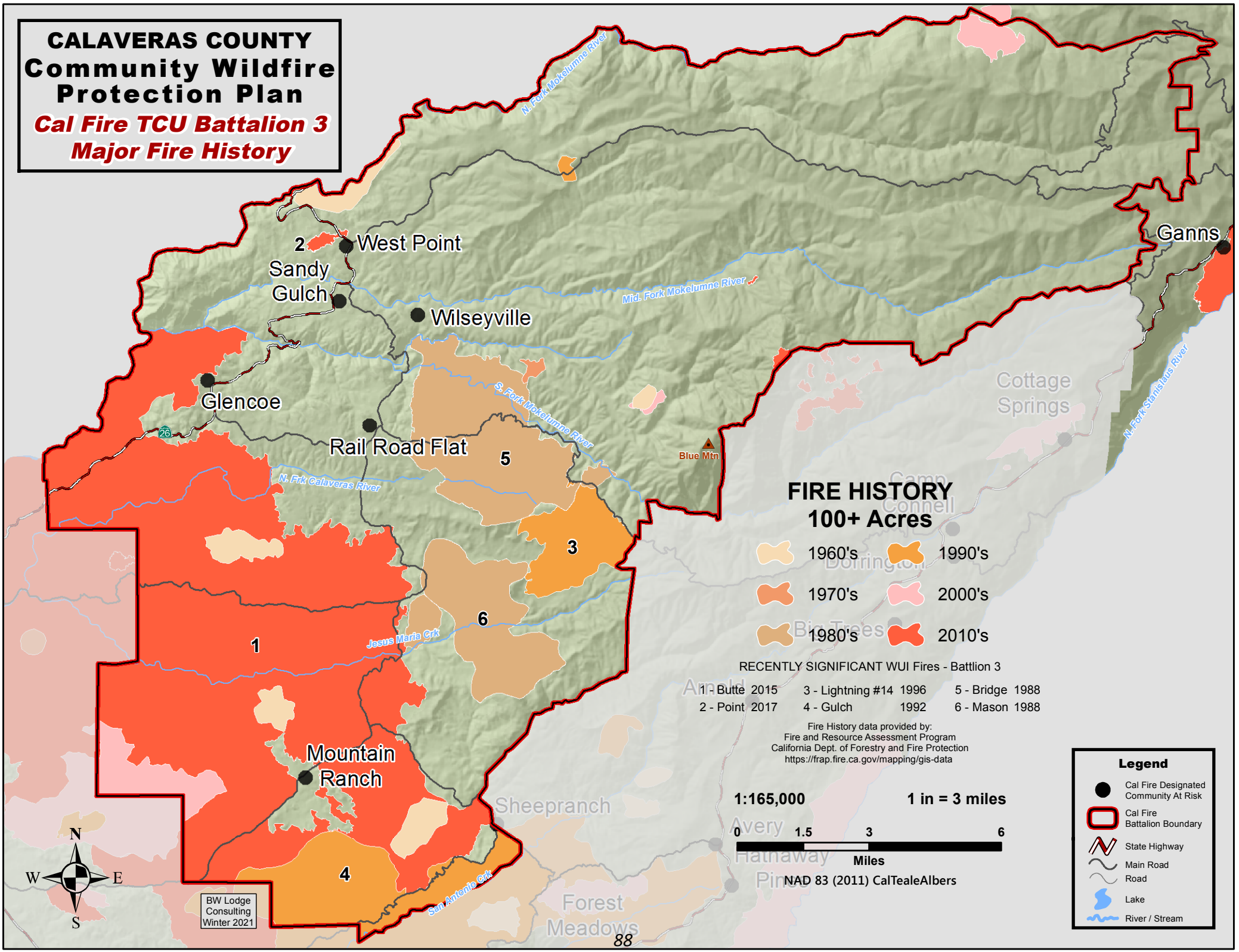
The drought motivated bark beetle outbreak of the last decade killed large numbers of conifers, leaving in its wake thousands of standing dead trees and large ground level accumulations of dead tree debris throughout the Arnold Battalion landscape. Both have the ability to increase fire intensity, long range spotting and overall resistance to control; significantly increasing the risk of a catastrophic wildfire.

The wet winter of 2016-17 slowed the spread and momentum of the beetle outbreak; and concurrent programs initiated by County, State and corporate stakeholders have removed thousands of dead trees within populated areas. Tens of thousands of dead trees remain in unpopulated areas within the Battalion.

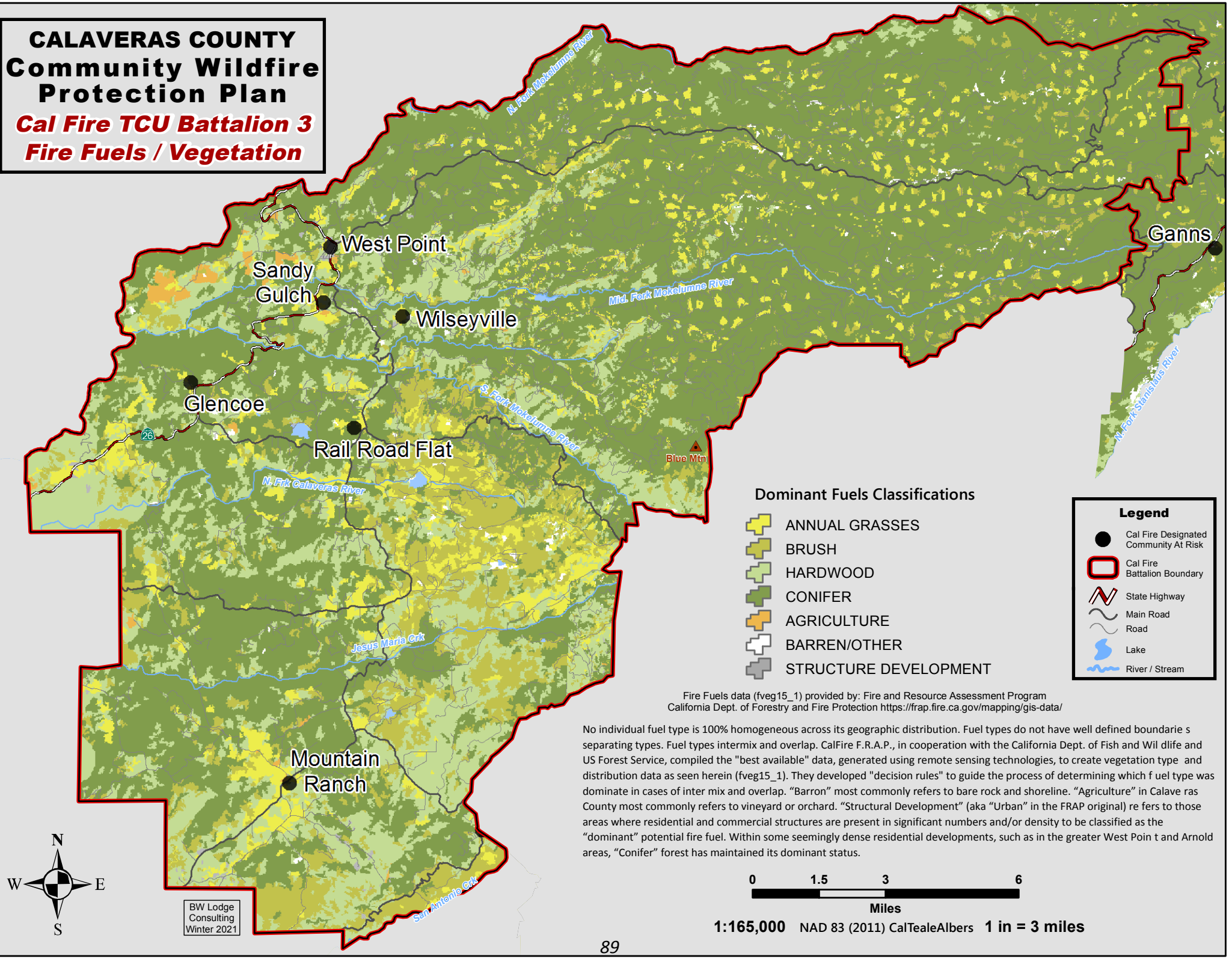
CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 3
Fire Hazard Severity Zones



CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 3
Major Fire History



CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 3
Fire Fuels / Vegetation



Dominant Fuels Classifications

- ANNUAL GRASSES
- BRUSH
- HARDWOOD
- CONIFER
- AGRICULTURE
- BARREN/OTHER
- STRUCTURE DEVELOPMENT

Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

Fire Fuels data (fveg15_1) provided by: Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection https://frap.fire.ca.gov/mapping/gis-data/

No individual fuel type is 100% homogeneous across its geographic distribution. Fuel types do not have well defined boundarie s separating types. Fuel types intermix and overlap. CalFire F.R.A.P., in cooperation with the California Dept. of Fish and Wil dlife and US Forest Service, compiled the "best available" data, generated using remote sensing technologies, to create vegetation type and distribution data as seen herein (fveg15_1). They developed "decision rules" to guide the process of determining which f uel type was dominate in cases of inter mix and overlap. “Barron” most commonly refers to bare rock and shoreline. “Agriculture” in Calave ras County most commonly refers to vineyard or orchard. “Structural Development” (aka “Urban” in the FRAP original) re fers to those areas where residential and commercial structures are present in significant numbers and/or density to be classified as the “dominant” potential fire fuel. Within some seemingly dense residential developments, such as in the greater West Poin t and Arnold areas, “Conifer” forest has maintained its dominant status.

0 1.5 3 6
Miles

1:165,000 NAD 83 (2011) CalTealeAlbers **1 in = 3 miles**

BW Lodge Consulting Winter 2021

8.8 ASSETS AT RISK

8.8.1 Watershed Values: The Mokelumne River system drains the entire eastern two thirds of the Battalion via the South, Middle, Licking and North Forks of the Mokelumne River. This Mokelumne watershed is the primary water source for Pardee and Camanche Reservoirs located downstream in Battalion 1; and provides 90% of the water that goes to the East Bay Municipal Utility District (EBMUD). EBMUD's water system serves approximately 1.3 million people in a 331-square-mile area of Alameda and Contra Costa Counties, including the major cities of Oakland and Berkeley and east to Walnut Creek and the San Ramon Valley.

This watershed also provides electric power generation through the Tiger Creek Reservoir damn and related infrastructure on the Mokelumne North Fork, as a component of Pacific Gas and Electric's (PG&E) hydro-electric distribution system.

The watersheds in Battalion 3 also supply water to the Amador Water Agency, Stockton East Water District, Calaveras Public Utility District and the Calaveras County Water District.

The South Fork and Licking Forks of the Mokelumne River are the primary water sources for the Calaveras Public Utilities District (CPUD), with their intake just south of the confluence of the South and Licking Forks. Water is pumped into Jeff Davis Reservoir located in the Railroad Flat area.

The western third of the Battalion is drained by the Calaveras River system. The North Fork Calaveras River is a primary water source for New Hogan Reservoir. Calaveras County Water District (CCWD) and the Stockton East Water District (SEWD) utilize New Hogan for water storage and delivery. Calaveras County Water District utilizes the Bear Creek and Forest Creek Drainages.

8.8.2 Agricultural Values: Much of the high elevation timberland in the eastern half of the Battalion is used via lease agreements as summer range by low country cattle ranchers. In the wake of the 2015 Butte fire, cannabis cultivation within Battalion 3 exploded. As Calaveras county government has struggled with issues surrounding legalization, permitting, environmental monitoring, and law enforcement, cannabis production, legal and otherwise, has become a growing influence in the agricultural realm; in terms of land use, economic impacts and jobs.

8.8.3 Recreational Values: Natural resource and recreation values are important resources that go hand in hand. Hunting, fishing, hiking, cycling and OHV activities are active during the summer season when both public lands and private SPI lands are accessible to the public. Jamboree type concert, barbecue and RV group events occur regularly on several large private ranches within the SRA in various locations in the Battalion.

Bureau of Land Management lands on the main stem of the Mokelumne River are earmarked for development as part of the Mokelumne Coast To Crest Trail. In the Battalion's far east, on USFS lands, the Crest terminus segment of the trail is open and in use. When the BLM segments are completed in the years to come they will tie into other completed segments along the Battalion 1 stretch of the Mokelumne River. In June 2018, 37 miles of the North Fork and the main stem of the Mokelumne River were protected as California's 15th State designated Wild and Scenic River.

8.8.4 Community Infrastructure: Various community infrastructure, both public and private, includes: water storage and delivery systems; electrical distribution equipment; telecommunications systems; transportation networks; schools and health care facilities.

Water delivery systems within the Battalion are critical assets. Calaveras County Water District services the West Point and Wilseyville area. Calaveras Public Utilities District services the communities of Railroad Flat and Glencoe. The community of Mountain Ranch has a single storage tank and 2 hydrants located in the center of the community, near Senders Market. The balance of the Battalion is serviced by individual wells.

Electrical distribution systems are ubiquitous throughout the Battalion, and a critically important asset. The watersheds in the Battalion supply water to several local, regional and state-wide power generation systems, Power distribution lines and equipment are unique among assets as being both a potential cause of wildland fire and a threat to firefighting operations. Most every wildland fire has some potential to damage this equipment; the biggest fires present the most serious threat. Disruption of the power distribution system is likely to have a significant impact on lives and the economy.

Telecommunications is another critical element of the infrastructure present within the Battalion. Several government agencies and private communications companies take advantage of the topography within the Battalion for the location of communications system facilities. These are expensive installations that are, by necessity, placed in threatened locations atop ridges and mountains.

Battalion 3 is served by multiple primary transportation corridors in the western third of the Battalion: State Highway 26 in the northwest corner of the Battalion; Rail Road Flat Road in the heart of the populated center of the Battalion; Mountain Ranch Road connecting Mountain Ranch to San Andreas in Battalion 1; Jesus Maria Road connecting Railroad Flat to Mokelumne Hill in Battalion 1; and Winton Road running east from West Point, connecting to the vast network of logging roads serving SPI and USFS lands. Throughout the Forest Service and Sierra Pacific Industry timber lands a dense network of “logging roads” provide access for recreation, industrial operations and fire control.

The Battalion also benefits from several long, intact and contiguous historic sections of the Ponderosa Way, which runs from north to south through the western portion of the Battalion from the main stem Mokelumne River all the way to Calaveritas Creek. The Ponderosa Way section, which crosses the North Fork of the Calaveras River, is accessible from both Calaveras and Amador Counties, but can no longer be crossed by vehicle.

While road surfaces themselves are only rarely damaged by wildfire, the associated infrastructure, including bridges, guardrails and signage can easily be damaged. Even when no physical damage is suffered the disruption of traffic caused by fire control operations can cause a range of negative impacts from short delays to significant disruptions to the economy.

Given their location within threatened WUI communities, schools are at risk in the same way as the rest of the community is. Their importance as one of the prime choices for use as evacuation centers makes them doubly important in the event of a significant wildland fire.

Health care facilities, also located within threatened WUI communities, and the services provided are essential to the long term viability of any community.

8.8.5 Residential and Commercial Development: The western half of the Battalion is characterized by a handful of small communities that function as the hubs for a widely dispersed population. The eastern half, being private and federal timberland, is sparsely populated. The communities of West Point, Railroad Flat and Mountain Ranch may be considered the locations with the highest population density. But all the primary roads feature large populations. Officially designated "Communities at Risk" in the Battalion include West Point (including the Lily Valley and Blue Creek Subdivisions), Wilseyville, Glencoe, Railroad Flat, Mountain Ranch, and Sheep Ranch. The Butte fire in 2015 destroyed 961 structures including 550 homes. The majority of those losses were suffered within the boundaries of the Central Calaveras Fire and Rescue District / Battalion 3. Very few of the lost homes have been replaced as of this publication date. Remaining development within the Battalion can generally be classified as rural and older with the majority of the development dating back to the 1940's through the 1960's. As a result, outdated design features such as shake roofs, wood siding, wood decks, and large single pane windows are common in Battalion 3. As homes and utility buildings are replaced the State's Chapter 7A building codes will require a wide array of building techniques and materials designed to harden homes against encroaching wildfire, ultimately making a large portion of the Battalion much more resilient than it has been over previous decades.

8.8.6 Commercial Timber Values: Sierra Pacific Industries (SPI) own large tracts of valuable commercial timber land within the SRA in the eastern half of the Battalion. The Stanislaus National Forest also owns a large swath of forest managed for commercial timber and multiple uses by the general public.

The Forest Service and SPI timberlands within in the Battalion have supported an active logging industry for decades and continue playing a vital role in the local and state economy. Logging on SPI lands continues to play that part today.

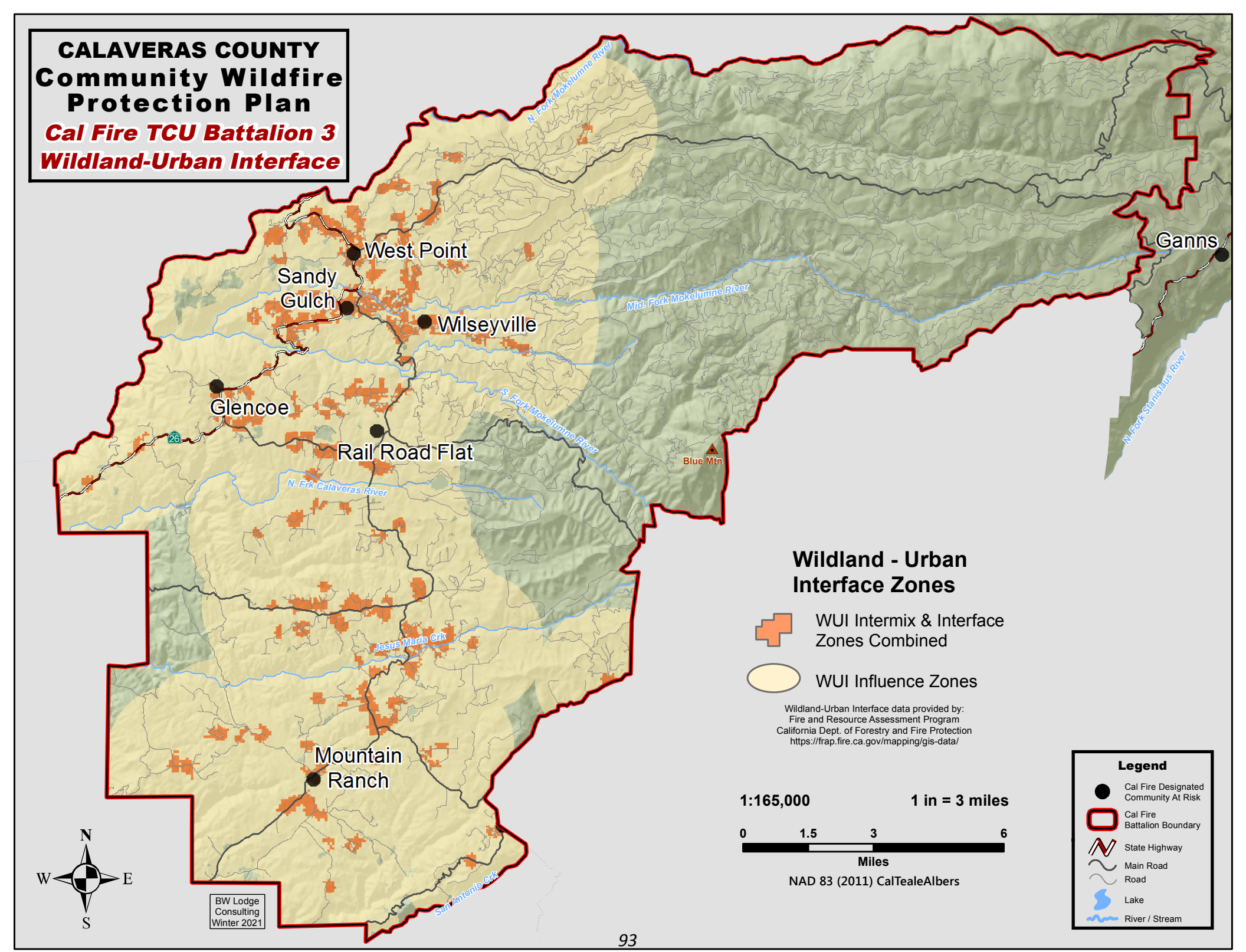
8.9 WILDLAND-URBAN INTERFACE:

The greatest potential for structure loss is, by definition, within the Wildland-Urban Interface. This structural development within designated Fire Hazard Severity Zones results in a severe fire threat to our communities. This was shown to be true in the devastation caused by the Butte fire.

A review of the WUI map (see map page 93) reveals that the entirety of Battalion 3 has been designated Very High Fire Hazard Severity Zone, according to Cal Fire, due to the nature of structural development, and the fire threat generated by the combination of fuels, weather and topography.

All communities within Battalion 3 are designated "Communities At Risk" by State and Federal authorities: Glencoe, Railroad Flat, Mountain Ranch, Sandy Gulch, Sheep Ranch, West Point, Wilseyville. It is fair to say then that with only a couple notable exceptions, the combination of fuels, weather and topography presents a significant risk to any and every populated area within the Battalion, with or without an official WUI designation.

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 3
Wildland-Urban Interface



BW Lodge Consulting
Winter 2021

8.10 BATTALION 4 - Arnold Battalion

CAL FIRE Battalion Chief: Brenton Brown

OVERVIEW

The Arnold Battalion consists of approximately 136,520 acres and covers the upper Highway 4 corridor from the Forest Meadows subdivision east of Murphys at about 1,500' elevation; to Tamarack deep within the Stanislaus National Forest at nearly 7000'evelevation. Battalion 4 is geographically oriented around multiple east-west major river drainages, including portions of the North Fork Stanislaus and South-Fork Mokelumne Rivers, and smaller, yet significant, drainages including San Antonio, O'Neil, Angels, Love, Big Tree, and Moran Creeks. Highway 4, a State designated Scenic Byway, runs west to east through the Battalion; serving as the primary transportation corridor and population anchor.

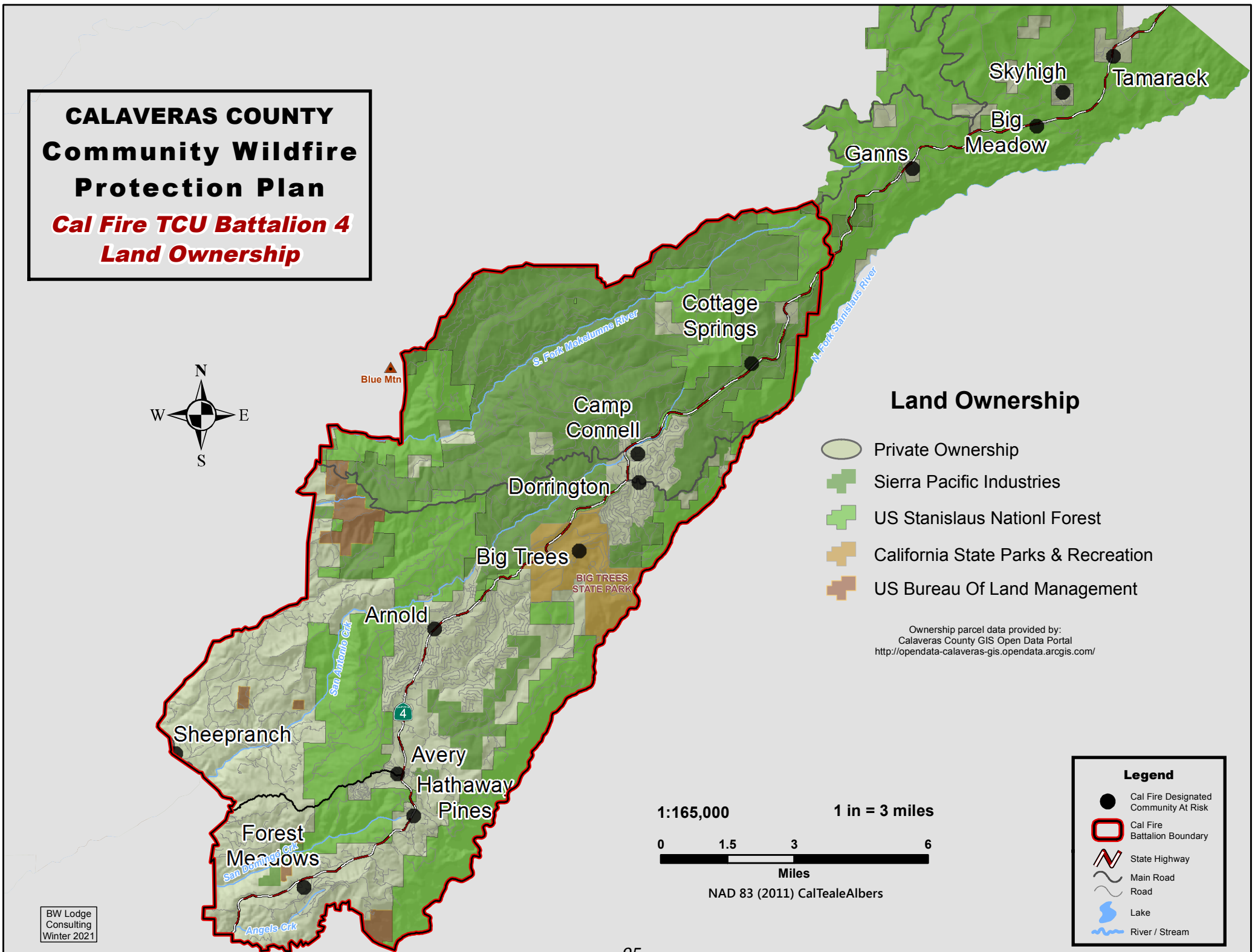
8.10.1 Fire Protection: Cal Fire is the primary provider of wildland fire protection. (see map chapter 1 page 8) TCU Battalion 4 is the only TCU Battalion to straddle the Calaveras/Tuolumne County line. In Calaveras County, Battalion 4 maintains one Forest Fire Station and one Fire Lookout: Arnold FFS, a two-engine Battalion headquarters station located in the community of Arnold; and Blue Mountain Lookout, located approximately six miles as the crow flies north of Arnold. The Stanislaus National Forest maintains a single one-engine forest fire station on Hwy 4 east of Dorrington.

Primary Local Government fire protection is provided by the Ebbetts Pass Fire District based in Arnold. Established in 1965 EPFD, features a full-time professional staff providing the full array of fire, medical, rescue and prevention services, from 4 stations. Both the Central Calaveras FRPD and the West Point FD service small portions of Battalion 4 along its norther boundaries with Battalions 2 and 3. (see map chapter 1 page 11)

8.10.2 Population Centers: The Battalion fire control resources protect the communities of Arnold, White Pines, Forest Meadows, Avery, Hathaway Pines, Blue Lake Springs, Big Trees Village, Dorrington, Camp Connell, Cottage Springs, and portions of Sheep Ranch. With the exception of Sheep Ranch, nearly the entire population is located along the Hwy 4 corridor. Upwards of 45% of dwelling units within the greater Arnold area are vacation homes. As of the 2010 census, Arnold's population was listed as between 3800-4000 people. (https://en.wikipedia.org/wiki/Arnold,_California) Its status as a vacation/recreation hub community results in dramatic fluctuations in the population of greater Arnold, nearly doubling during holiday weeks/weekends, weekends during the winter ski season, and any given day during the summer vacation season.

8.10.3 Ownership And Responsibility Designations: The majority of the Battalion is private property designated as State Responsibility Area (SRA) lands. (see map chapter 1 page 8) The Stanislaus National Forest holds large tracts of land abutting the densely populated greater Arnold area. Sierra Pacific Industries also owns large swaths of land, mostly in the San Antonio Creek and S. Fork Mokelumne River drainages. (see map page 95) The U.S. Bureau of Land Management also has holding; in the headwaters of O'Neil Creek along the Battalion's northern border. All federal lands are designated State Direct Protection Areas.

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 4 Land Ownership



BW Lodge Consulting
Winter 2021

8.10.4 Fire Hazard Severity Zones: Cal Fire classifies all SRA lands within the Battalion as *Very High Fire hazard Severity Zones*. Federal lands haven been categorized as having an equivalent *High* Fire Hazard rating by the United States Forest Service (USFS). (see map page 98)

8.10.5 Fire Weather: Summer (fire season) weather in the Battalion is features average temperature highs ranging from 75 in June to 82 in August and 65 in October. Relative humidity ranges from 18-30%. During "heat wave" events high temps can climb into the low to mid 90's while humidity falls into the lower teens, for several days running. As the normal summer heat waves begin to subside, the Battalion receives the beneficial effects from the San Joaquin Delta breeze about 24 hours after its effects are felt in the San Joaquin Valley and the lower elevation portions of the County. This extends the effects of high hazard weather patterns one day longer than the lower elevations experience. In the upper elevations of the Battalion, it is not uncommon to experience relative humidity in the low teens from the middle of September until the rainy season. Correspondingly, 10-hour fuel moistures can stay below 5% for much of the fall. The Battalion frequently experiences east and north wind events at the higher elevations during the fall. During these events, high winds coupled with low humidity may develop with little or no warning. The Mokelumne and Stanislaus River drainages typically come under the greatest influence from these events as is evident by a number of large fires that have occurred after the official close of fire season in the fall.

8.10.6 Fire History: Despite the relatively low number of ignitions and acres burned on an annual basis, the Arnold Battalion has a history of large and damaging wildfires - most recently the Ramsey (1,136ac, 2012), Armstrong #2 (880ac, 2004), Sourgrass (635ac, 2002), Darby (14,280 ac, 2001), and Old Gulch (17,419 ac, 1992) fires. (see map page 96) In some cases, these fires originated in low country Battalions (Old Gulch and Darby) and spread eastward up the drainages that dominate the topography. These types of fires have been terrain and fuel driven and containment has occurred primarily due to changes in fuels and topography or moderation in weather conditions. In other instances, large and damaging fires have occurred in response to wind events in the Mokelumne and Stanislaus River canyons. Several of these fires have occurred after the close of fire season (*2019 TCU Fire Plan*).

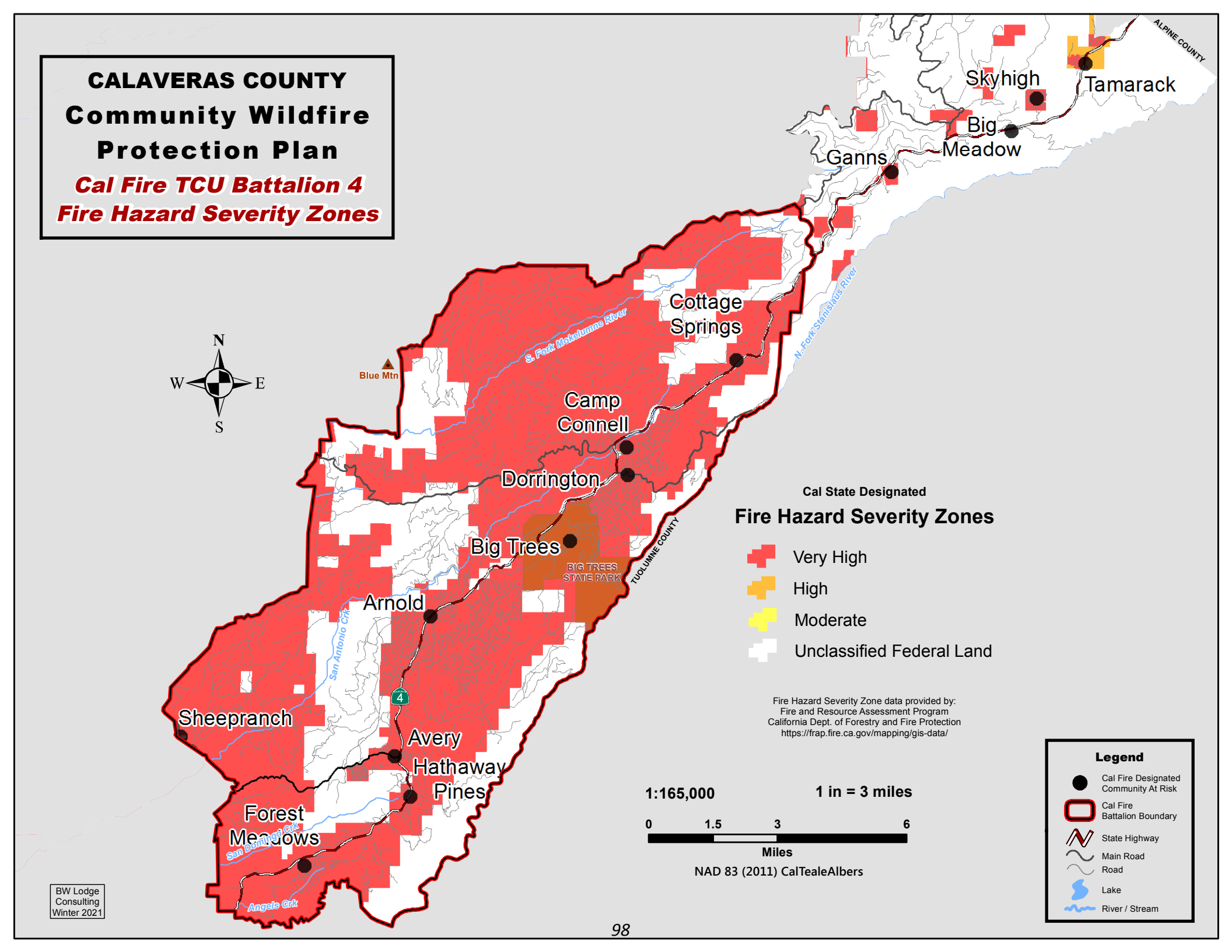
8.10.7 Fuels: Fuels in the Battalion range from dense stands of mature brush mixed with oak woodlands at the lower elevations, mixed conifer forests dominated by ponderosa pines in the mid-range elevations and fir and lodgepole pine dominated stands at the upper elevations. Fuel Models 1 (grass), 2 (oak woodland), 4 (heavy brush), 6 (medium brush), and 10 (heavy timber) are all present. (see map page 89) In the field, no individual fuel type is 100% homogeneous across its geographic distribution. Fuel types do not have well defined boundaries separating types. Fuel types intermix and overlap. This variety of fuels coupled with the rugged topography increases a highly volatile fire environment that has promoted extreme fire behavior on several occasions over past decades

The drought motivated bark beetle outbreak of the last decade killed large numbers of conifers, leaving in its wake thousands of standing dead trees and large ground level accumulations of dead tree debris throughout the Arnold Battalion landscape. Both have the

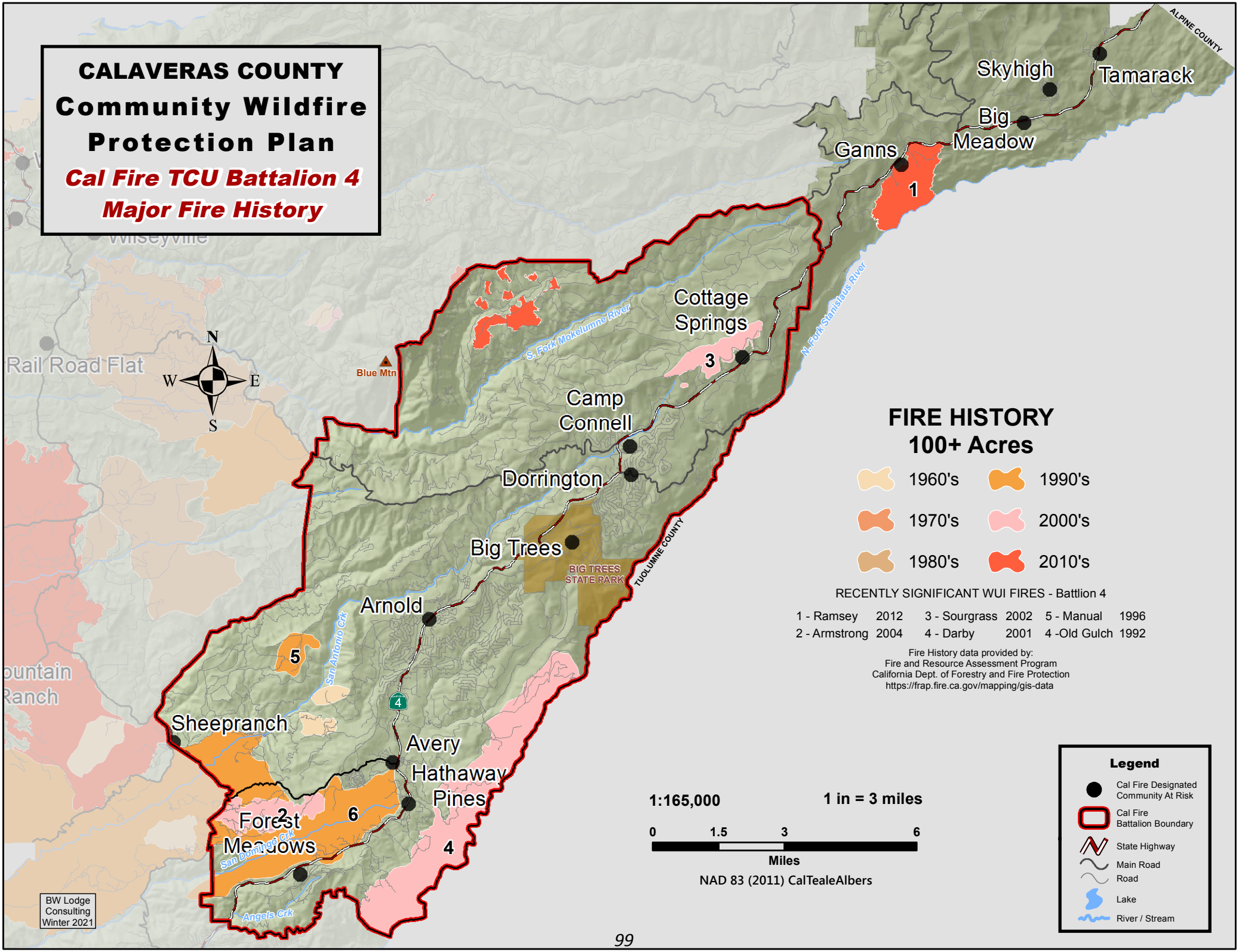
ability to increase fire intensity, long range spotting and overall resistance to control; significantly increasing the risk of a catastrophic wildfire.

The wet winter of 2016-17 slowed the spread and momentum of the beetle outbreak; and concurrent programs initiated by County, State and corporate stakeholders have removed thousands of trees within populated areas; many tens of thousands of dead trees within the battalion.

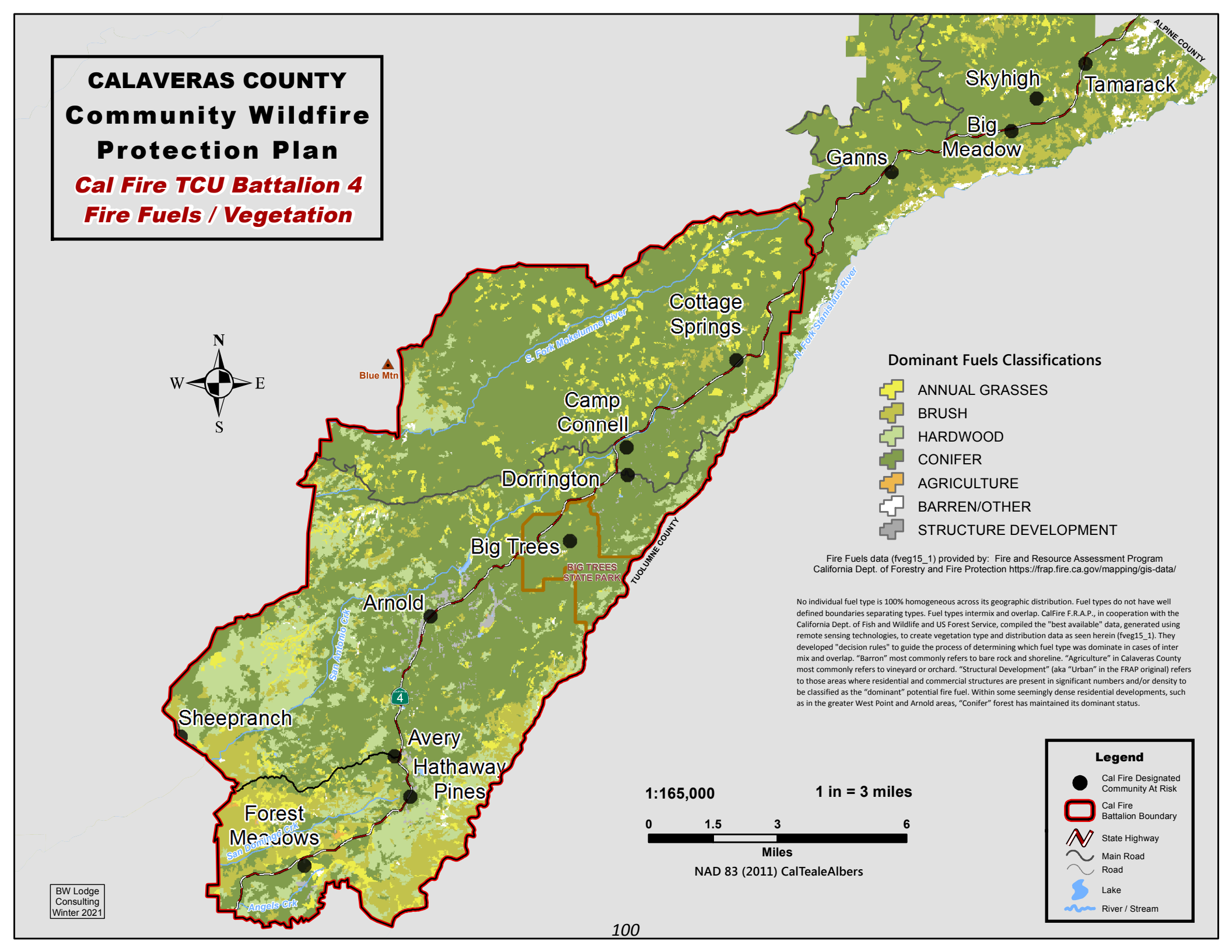
CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 4
Fire Hazard Severity Zones



BW Lodge Consulting
Winter 2021


CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 4
Major Fire History
Skyhigh
Tamarack
Big Meadow
Ganns
1
Cottage Springs
3
Camp Connell
Dorrington
Big Trees
BIG TREES STATE PARK
Arnold
5
Sheepranch
Avery
Hathaway Pines
2
6
4
Forest Meadows
Blue Mtn
Rail Road Flat
S. Fork Mokelumne River
N. Fork Stanislaus River
San Antonio Crk
San Domingo Crk
Angels Crk
ALPINE COUNTY
TUOLUMNE COUNTY
N
W
E
S
FIRE HISTORY
100+ Acres
1960's
1970's
1980's
1990's
2000's
2010's
RECENTLY SIGNIFICANT WUI FIRES - Battlion 4
1 - Ramsey 2012
2 - Armstrong 2004
3 - Sourgrass 2002
4 - Darby 2001
5 - Manual 1996
4 -Old Gulch 1992
Fire History data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data
1:165,000
1 in = 3 miles
0 1.5 3 6
Miles
NAD 83 (2011) CalTealeAlbers
Legend
Cal Fire Designated Community At Risk
Cal Fire Battalion Boundary
State Highway
Main Road
Road
Lake
River / Stream
BW Lodge Consulting Winter 2021

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 4
Fire Fuels / Vegetation



Dominant Fuels Classifications

- ANNUAL GRASSES
- BRUSH
- HARDWOOD
- CONIFER
- AGRICULTURE
- BARREN/OTHER
- STRUCTURE DEVELOPMENT

Fire Fuels data (fveg15_1) provided by: Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection https://frap.fire.ca.gov/mapping/gis-data/

No individual fuel type is 100% homogeneous across its geographic distribution. Fuel types do not have well defined boundaries separating types. Fuel types intermix and overlap. CalFire F.R.A.P., in cooperation with the California Dept. of Fish and Wildlife and US Forest Service, compiled the "best available" data, generated using remote sensing technologies, to create vegetation type and distribution data as seen herein (fveg15_1). They developed "decision rules" to guide the process of determining which fuel type was dominate in cases of inter mix and overlap. "Barron" most commonly refers to bare rock and shoreline. "Agriculture" in Calaveras County most commonly refers to vineyard or orchard. "Structural Development" (aka "Urban" in the FRAP original) refers to those areas where residential and commercial structures are present in significant numbers and/or density to be classified as the "dominant" potential fire fuel. Within some seemingly dense residential developments, such as in the greater West Point and Arnold areas, "Conifer" forest has maintained its dominant status.

Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

1:165,000 1 in = 3 miles

0 1.5 3 6

Miles

NAD 83 (2011) CalTealeAlbers

BW Lodge Consulting Winter 2021

8.11 ASSETS AT RISK

8.11.1 Watershed Values: The major watersheds provide drinking water, agriculture irrigation, fisheries habitat, and power to areas within Calaveras County, as well as to distant population centers. The Battalion provides protection to critical watersheds including the South Fork Mokelumne River headwaters, the South Fork Calaveras River headwaters consisting of the San Antonio and San Domingo Creeks, and the North Fork Stanislaus River. The South Fork Mokelumne River supports New Hogan Reservoir. The North Fork Stanislaus River watershed supplies water to New Melones Reservoir and Tulloch Reservoir. The watersheds all support assets important to an area far beyond the Battalion and Unit boundaries, including water storage for local and regional domestic use, industrial and agricultural use, recreational opportunities, power generation, and wildlife habitat.

8.11.2 Agricultural Values: The dominant form of agriculture within Battalion 4 is commercial timber production. Sierra Pacific Industries (SOI) owns large tracts of valuable commercial timber land within the Battalion. The Stanislaus National Forest also owns a large swath of forest managed for commercial timber and multiple uses by the general public. In addition to commercial timber, these public and private forest lands support the cattle industry, via seasonal grazing permits held by low-country cattle ranchers.

In the wake of the 2016-17 Butte fire, cannabis cultivation within Battalion 4 exploded. As a Calaveras County government has struggled with issues surrounding legalization, permitting, environmental monitoring, and law enforcement, cannabis production, legal and otherwise, has become a growing influence in the agriculture realm; in terms of land use, economic impacts and jobs.

Although not as numerous or significant as in the lower elevation battalions, agriculture related assets, including orchards and vineyards are present and economically important.

8.11.3 Recreational Values: The scenic and aesthetic beauty of the Highway 4 Scenic Byway area supports a vibrant year-round tourism industry that caters to all types of outdoor enthusiasts. Fishing, hunting, motor sports, hiking, biking, horseback riding, and other activities are having an increasingly positive effect on the local economy. During winter ski season, hundreds of skiers pass through on any given weekend, while thousands reside in and around Arnold on winter weekends and over summer weekends and holidays.

The world renowned Calaveras Big Trees State Park, located a short distance east of Arnold, dedicated to preserving magnificent groves of giant sequoias (*Sequoiadendron gigantium*), old-growth sugar pines (*Pinus lambertiana*) and outstanding stands of mixed conifer forests, draws thousands of visitors annually.

Another high value recreation asset is the Arnold Rim Trail (ART); located on public and private lands surrounding the core Arnold community. A non-motorized trail system designed for hikers, mountain bikers and equestrians, provides a unique recreational opportunity and also draws thousands of visitors. The ART is a work in progress projected to be 35 miles long when completed.

8.11.4 Community Infrastructure: Various community infrastructure, both public and private, includes: water storage and delivery systems; electrical distribution equipment; telecommunications systems; transportation networks; schools and health care facilities.

There are a variety of critically important water delivery systems within the Battalion, including a major flume operated by Utica Power Authority. The Calaveras County Water District and the Blue Lake Springs Mutual Water Company also operate facilities within Battalion 4.

Electrical distribution systems are ubiquitous throughout the Battalion, and a critically important asset. The North Fork Stanislaus River watershed supplies water to the Northern California Power Authority's power generating facility. Power distribution lines and equipment are unique among assets as being both a potential cause of wildland fire and a threat to firefighting operations. Most every wildland fire has some potential to damage this equipment; the biggest fires present the most serious threat. Disruption of the power distribution system is likely to have a significant impact on lives and the economy.

Telecommunications is another critical element of the infrastructure present within the Battalion. Several government agencies and private communications companies take advantage of the topography within the Battalion for the location of communications system facilities. These are expensive installations that are, by necessity, placed in threatened locations atop ridges and mountains.

The primary transportation asset is Highway 4, a designated State Scenic Byway, and a vital transportation link, providing access for commerce, tourism and recreation within the Battalion and beyond. Throughout the Forest Service and Sierra Pacific Industry timber lands a dense network of "logging roads" provide access for recreation, industrial operations and fire control.

While road surfaces themselves are only rarely damaged by wildfire, the associated infrastructure, including bridges, guardrails and signage can easily be damaged. Even when no physical damage is suffered the disruption of traffic caused by fire control operations can cause a range of negative impacts from short delays to significant disruptions to the economy.

Given their location within threatened WUI communities, schools are at risk in the same way as the rest of the community is. Their importance as one of the prime choices for use as evacuation centers makes them doubly important in the event of a significant wildland fire.

Health care facilities, also located within threatened WUI communities, and the services provided are essential to the long term viability of any community.

8.11.5 Residential and Commercial Development: The Battalion 4 communities include a wide variety of residential development: dense modern subdivisions featuring mid-sized homes on small urban-sized lots; large modern luxury homes on multi-acre lots within a subdivision or individually located in a purely rural setting; mobile and manufactured homes in parks and/or on multi-acre rural parcels; and widely scattered 50+ year old homes.

There are several large, densely-populated subdivisions that are at risk to large catastrophic fires, including Forest Meadows, Blue Lake Springs, Lakemont, Pinebrook, Big Trees Village and Grizzly Ridge.

Given the long history of development, a wide variety of building materials and design features are present. The oldest structures in the Battalion are often at significant risk due to

hazardous locations and non-fire safe construction practices and materials. Mid-slope, chimney and ridge-top locations and outdated design features such as shake roofs, wood siding, wood decks, and large single pane windows are common. Newer developments feature many improvements in construction materials (double pane windows and fire resistant roofs and siding for example), but often remain at significant risk due to dense concentrations of structures on small parcels carved out of dense forest and brush fields, often on steep terrain. Both newer and older residential communities feature many steep and narrow roads and driveways. Development will undoubtedly continue in the WUI interface, but will incorporate the latest Chapter 7A building codes, resulting in more ember resistant and fire safe structures.

8.11.6 Commercial Timber Values: The majority of commercial timber resources within these watersheds is owned and managed by one of two significant entities. Sierra Pacific Industries owns large holdings between the North and Middle Forks of the Stanislaus River, historically known as the Standard Block, this area was considered the most valuable stand of virgin sugar pine in the world during the middle of the last century. The USFS Stanislaus National Forest owns and manages an equally significant number of forest land acres within the Battalion; much of which butts up against private, densely developed / populated subdivisions. In recent years Sierra Pacific Industries and the Forest Service have cooperated in creating several shaded fuel breaks abutting several of these large subdivisions of Arnold and Dorrington.

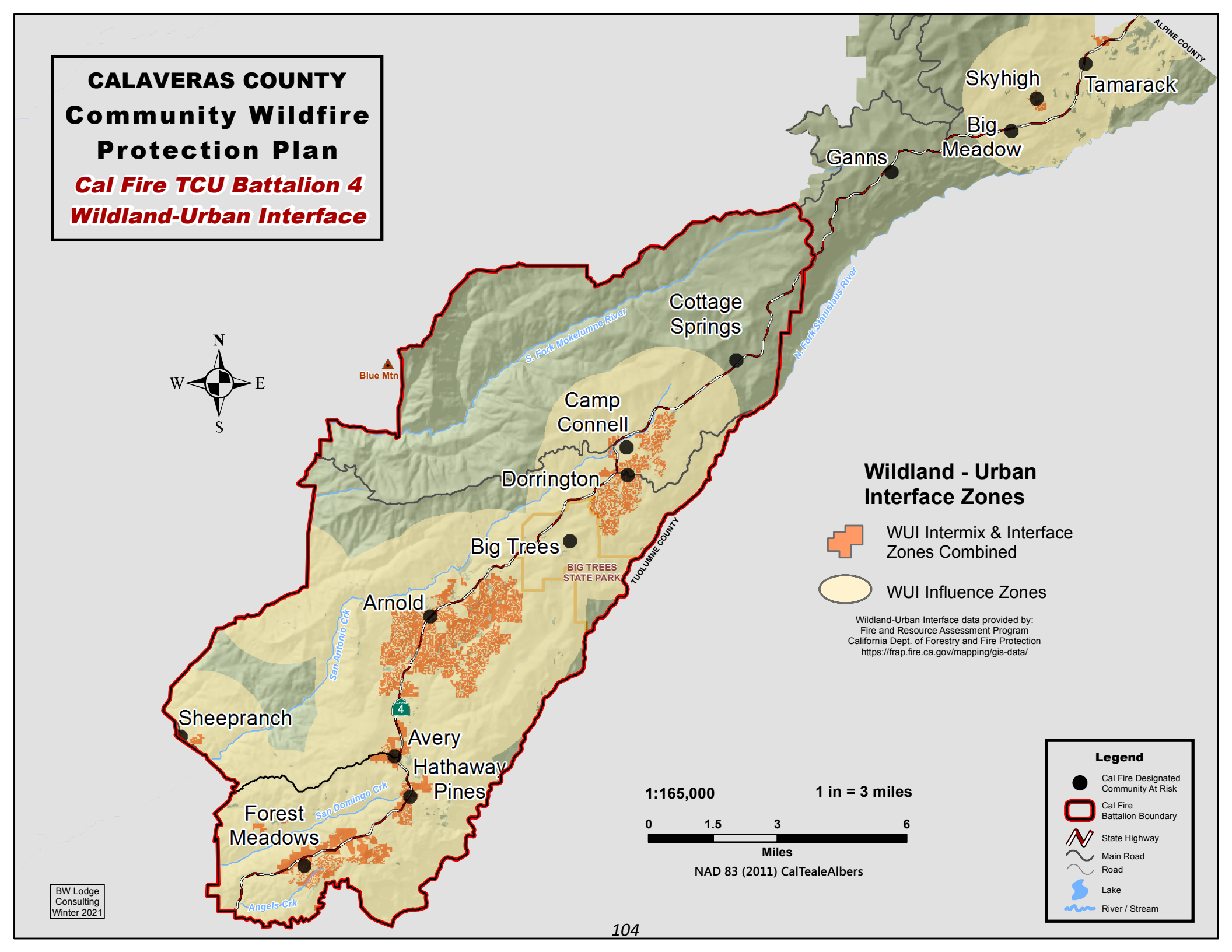
8.12 WILDLAND-URBAN INTERFACE:

The greatest potential for structure loss is, by definition, within the Wildland-Urban Interface. This structural development within designated Fire Hazard Severity Zones results in a severe fire threat to our communities. Some of the densest residential development is found along the Hwy 4 corridor in the greater Arnold area; creating significant Wildland-Urban Interface concerns. The devastation of the Butte County town of Paradise by the 2018 Camp fire exemplifies the potential faced by the communities in Battalion 4.

A review of the WUI map (see page 104) reveals that the entirety of Battalion 4 has been designated a *Very High Fire Severity Zone*, according to Cal Fire, due to the nature of structural development, and the fire threat generated by the combination of fuels, weather and topography.

All communities within Battalion 4 are designated “Communities At Risk” by State and Federal authorities: Arnold (including White Pines), Avery, Big Meadow, Big Trees Village, Camp Connell, Cottage Springs, Dorrington, Forest Meadows, Ganns, Tamarack and Hathaway Pines. It is fair to say then that the combination of fuels, weather and topography of Battalion 4 presents a significant risk to any and every populated area within the Battalion, with or without an official WUI designation.

CALAVERAS COUNTY
Community Wildfire Protection Plan
Cal Fire TCU Battalion 4
Wildland-Urban Interface



Wildland - Urban Interface Zones

- WUI Intermix & Interface Zones Combined
- WUI Influence Zones

Wildland-Urban Interface data provided by:
Fire and Resource Assessment Program
California Dept. of Forestry and Fire Protection
https://frap.fire.ca.gov/mapping/gis-data/

1:165,000 1 in = 3 miles

0 1.5 3 6

Miles

NAD 83 (2011) CalTealeAlbers

Legend

- Cal Fire Designated Community At Risk
- Cal Fire Battalion Boundary
- State Highway
- Main Road
- Road
- Lake
- River / Stream

BW Lodge Consulting Winter 2021

Appendix 1 Local Government Fire Agency Staffing and Equipment

Effective March 2020

AGENCY	PAID / FULL TIME STAFF [1]	VOL/PART TIME STAFF [2]	OTHER STAFF [3]	TYPE 1 [5] ENGINE	TYPE 2 ENGINE	TYPE 3 ENGINE	TYPE 5/6 ENGINE	WATER TENDER	COMMAND VEHILCE	UTILITY VEHICLE	OTHER [4]
ALTAVILLE - MELONES FPD		20		1	1	1	1		2	1	
ANGELS CITY FD	2	15		1	1	1	1	2	4		
CLAVERAS CONSOLIDATED FPD	7	25	3	3		3		2	3	1	
CENTRAL CALAVERAS FRPD	2	30	4	1		1	2	3	3	5	1
COPPEROPOLIS FPD	5	16	29	1		3		1		2	4
EBBETTS PASS FPD	23		15	5		1		1	3		6
MOKELUMNE HILL FPD	Not Reported	Not Reported	Not Reported	2		2	1	1	1		
MURPHYS FPD	9	16	2	1	1	2	1	2	5	2	
SAN ANDREAS FPD	10	19		2	1	2	2	1	3	3	1
WEST POINT FPD	6	6		1	1	1		1	2	1	
BEAR VALLEY FD	4	10		1		1	1				1

1 = Firefighters, all ranks
2 = Firefighters/Medics, all ranks
3 = Interns/Reserves/Administrative/CERT
4 = ALS-BLS Medical/CERT/BA Support/Other
5 = See next page for Type details

continued >>

APPENDIX 1 cont. FIRE ENGINE TYPING

Within the structure of the Incident Command System (ICS) fire equipment is categorized by its intended use and functional capabilities. Mobile equipment is assigned a Type number determined by the type, size and amount of the equipment it carries, along with the specifications of its water tank and pump system and a minimum number of crew persons. Type 3 is the most common wildland fire engine used in California. Types 5 or 6 may be the second most common. A wide variety of vehicle designs and configurations are similarly typed; physical size and shape are not among the typing criteria used.

Engine ICS Typing

	Engine Type						
	Structure		Wildland				
Requirements	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Tank minimum capacity (gal)	300	300	500	750	400	150	50
Pump minimum flow (gpm)	1,000	500	150	50	50	50	10
@ rated pressure (psi)	150	150	250	100	100	100	100
Hose 2½"	1,200	1,000	–	–	–	–	–
1½"	500	500	1,000	300	300	300	–
1"	–	–	500	300	300	300	200
Ladders per NFPA 1901	Yes	Yes	–	–	–	–	–
Master stream 500 (gpm)	Yes	–	–	–	–	–	–
Pump and roll	–	–	Yes	Yes	Yes	Yes	Yes
Maximum GVWR (lbs.)	–	–	–	–	26,000	19,500	14,000
Personnel (min)	4	3	3	2	2	2	2

Appendix 2 CALIFORNIA RARE AND ENDANGERED PLANTS

California Native Plant Society, Rare Plant Program, 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). http://www.rareplants.cnps.org/							
Scientific Name	**Common Name**	**Family**	**Lifeform**	**Blooming Period**	**CA Rare Plant Rank**	**State Rank**	**Global Rank**
Agrostis hendersonii	Henderson's bent grass	Poaceae	annual herb	Apr-Jun	3.2	S2	G2Q
Allium sanbornii var. sanbornii	Sanborn's onion	Alliaceae	perennial bulbiferous herb	May-Sep	4.2	S3S4	G4T3T4
Allium tribracteatum	three-bracted onion	Alliaceae	perennial bulbiferous herb	Apr-Aug	1B.2	S2	G2
Arctostaphylos myrtifolia	Ione manzanita	Ericaceae	perennial evergreen shrub	Nov-Mar	1B.2	S1	G1
Bolandra californica	Sierra bolandra	Saxifragaceae	perennial herb	Jun-Jul	4.3	S4	G4
Botrychium ascendens	upswept moonwort	Ophioglossaceae	perennial rhizomatous herb	(Jun)Jul-Aug	2B.3	S2	G3G4
Botrychium crenulatum	scalloped moonwort	Ophioglossaceae	perennial rhizomatous herb	Jun-Sep	2B.2	S3	G4
Botrychium minganense	Mingan moonwort	Ophioglossaceae	perennial rhizomatous herb	Jul-Sep	2B.2	S3	G4G5
Brasenia schreberi	watershield	Cabombaceae	perennial rhizomatous herb (aquatic)	Jun-Sep	2B.3	S3	G5
Brodiaea pallida	Chinese Camp brodiaea	Themidaceae	perennial bulbiferous herb	May-Jun	1B.1	S1	G1

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Brodiaea rosea ssp. vallicola	valley brodiaea	Themidaceae	perennial bulbiferous herb	Apr-May(Jun)	4.2	S3	G5T3
Calochortus clavatus var. avius	Pleasant Valley mariposa lily	Liliaceae	perennial bulbiferous herb	May-Jul	1B.2	S2	G4T2
Calycadenia hooveri	Hoover's calycadenia	Asteraceae	annual herb	Jul-Sep	1B.3	S2	G2
Carex davyi	Davy's sedge	Cyperaceae	perennial herb	May-Aug	1B.3	S3	G3
Ceanothus fresnensis	Fresno ceanothus	Rhamnaceae	perennial evergreen shrub	May-Jul	4.3	S4	G4
Chlorogalum grandiflorum	Red Hills soaproot	Agavaceae	perennial bulbiferous herb	May-Jun	1B.2	S3	G3
Clarkia australis	Small's southern clarkia	Onagraceae	annual herb	May-Aug	1B.2	S2	G2
Clarkia virgata	Sierra clarkia	Onagraceae	annual herb	May-Aug	4.3	S3	G3
Claytonia parviflora ssp. grandiflora	streambank spring beauty	Montiaceae	annual herb	Feb-May	4.2	S3	G5T3
Crocanthemum suffrutescens	Bisbee Peak rush-rose	Cistaceae	perennial evergreen shrub	Apr-Aug	3.2	S2?	G2?Q
Cryptantha mariposae	Mariposa cryptantha	Boraginaceae	annual herb	Apr-Jun	1B.3	S2S3	G2G3
Cryptantha spithamaea	Red Hills cryptantha	Boraginaceae	annual herb	Apr-May	1B.3	S2	G2

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Cryptantha spithamaea	Red Hills cryptantha	Boraginaceae	annual herb	Apr-May	1B.3	S2	G2
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	Ranunculaceae	perennial herb	Mar-May	4.2	S3	G4T3
Diplacus pulchellus	yellow-lip pansy monkeyflower	Phrymaceae	annual herb	Apr-Jul	1B.2	S2	G2
Eriophyllum confertiflorum var. tanacetiflorum	tansy-flowered woolly sunflower	Asteraceae	perennial shrub	May-Jul	4.3	S2?	G5T2?Q
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Eryngium pinnatisectum	Tuolumne button-celery	Apiaceae	annual / perennial herb	May-Aug	1B.2	S2	G2
Eryngium racemosum	Delta button-celery	Apiaceae	annual / perennial herb	Jun-Oct	1B.1	S1	G1
Erythranthe inconspicua	small-flowered monkeyflower	Phrymaceae	annual herb	May-Jun	4.3	S4	G4
Erythranthe marmorata	Stanislaus monkeyflower	Phrymaceae	annual herb	Mar-May	1B.1	SX	GXQ
Horkelia parryi	Parry's horkelia	Rosaceae	perennial herb	Apr-Sep	1B.2	S2	G2
Iris hartwegii ssp. columbiana	Tuolumne iris	Iridaceae	perennial rhizomatous herb	May-Jun	1B.2	S1	G4T1
Jepsonia heterandra	foothill jepsonia	Saxifragaceae	perennial herb	Aug-Dec	4.3	S3	G3
Juncus leiospermus var. ahartii	Ahart's dwarf rush	Juncaceae	annual herb	Mar-May	1B.2	S1	G2T1

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Lagophylla dichotoma	forked hare-leaf	Asteraceae	annual herb	Apr-May	1B.1	S2	G2
Lathyrus sulphureus var. argillaceus	dubious pea	Fabaceae	perennial herb	Apr-May	3	S1S2	G5T1T2Q
Lilium humboldtii ssp. humboldtii	Humboldt lily	Liliaceae	perennial bulbiferous herb	May-Jul(Aug)	4.2	S3	G4T3
Lomatium congdonii	Congdon's lomatium	Apiaceae	perennial herb	Mar-Jun	1B.2	S2	G2
Lomatium stebbinsii	Stebbins' lomatium	Apiaceae	perennial herb	Mar-May	1B.1	S2	G2
Lysimachia thyrsiflora	tufted loosestrife	Myrsinaceae	perennial herb	May-Aug	2B.3	S1?	G5
Monardella candicans	Sierra monardella	Lamiaceae	annual herb	Apr-Jul	4.3	S4	G4
Navarretia eriocephala	hoary navarretia	Polemoniaceae	annual herb	May-Jun	4.3	S4?	G4?
Navarretia myersii ssp. myersii	pincushion navarretia	Polemoniaceae	annual herb	Apr-May	1B.1	S2	G2T2
Navarretia paradoxiclara	Patterson's navarretia	Polemoniaceae	annual herb	May-Jun(Jul)	1B.3	S2	G2
Orthotrichum holzingeri	Holzinger's orthotrichum moss	Orthotrichaceae	moss		1B.3	S2	G3

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Perideridia bacigalupii	Bacigalupi's yampah	Apiaceae	perennial herb	Jun-Aug	4.2	S3	G3
Piperia colemanii	Coleman's rein orchid	Orchidaceae	perennial herb	Jun-Aug	4.3	S4	G4
Scopelophila cataractae	tongue-leaf copper-moss	Pottiaceae	moss		2B.2	S1	G3G4
Stellaria longifolia	long-leaved starwort	Caryophyllaceae	perennial rhizomatous herb	May-Aug	2B.2	S2	G5

APPENDIX 2 cont. PLANT AND WILDLIFE INFORMATION AND CONTACTS

- California Department of Fish and Wildlife (CDFW) Species of Special Concern (SSC): https://wildlife.ca.gov/Conservation/SSC

- CDFW Fully Protected: http://www.dfg.ca.gov/wildlife/nongame/t_e_spp/fully_pro.html

- CDFW threatened and endangered animal and plant lists; CESA protected: https://wildlife.ca.gov/Conservation/CESA

- CDFW California Natural Diversity Database: https://wildlife.ca.gov/Data/CNDDB

- Bureau of Land Management (BLM) Sensitive: https://www.blm.gov/programs/fish-and-wildlife/threatened-and-endangered/state-te-data/california

- United States Forest Service (USFS) Sensitive: https://www.fs.usda.gov/main/r5/plants-animals

- United States Fish and Wildlife Service (USFWS) Endangered plant and animal lists: https://www.fws.gov/endangered/

- California Department of Forestry and Fire Protection: https://www.fire.ca.gov/programs/resource-management/

Appendix 3 CALAVERAS FOOTHILLS FIRE SAFE COUNCIL
2019 CALAVERAS COUNTY STRATEGIC PRE-FIRE PLANNING SURVEY

The information below was provided to the Calaveras Foothills Fire Safe Council by representatives of each of the listed Fire Agencies and Districts. The intent of this product is to share with interested parties the concerns and project needs relating to potential future damaging wildland fires, as provided by fire department officers. It is understood that this list does not reflect all concerns and project needs within the jurisdictional areas listed.

AGENCY NAME	CATEGORY	DESCRIPTION
CALAVERAS CONSOLIDATED FPD	Concern	Fuels reduction projects that are not followed up with herbicide trreatment. Many of the past project have reverted back to their natural state, due to insufficient maintenance.
	Concern	Insufficient evacuation corridor for Gold Creek Estates, a large subdivision with one-way route of ingress/egress, across a two-lane bridge.
	Concern	Need for a data mapping program based upon model used by Central Calaveras Fire Protection District
	Project Priority	Hogan VMP-The objective of this project is to reduce the brush (chamise) component in areas adjacent to the La Contenta Subdivision. This to be accomplished by mechanical piling/burning and broadcast burning.There are undeveloped parcels totaling approximately 500 acres on this project. The project is bordered by Hogan Dam Rd and Silver Rapids Rd. The area was last treated in 2002. The brush component was reduced by a single broadcast burn. One wildland fire last year burned 2 acres and one this year burned 1 acre on this site. Both of these fires occurred in May. Late summer fires would have been more difficult to control.
	Project Priority	Ross Fuels Reduction Project - The primary objective of this project is to reduce the brush (chamise) adjacent to Hillville Estates and affecting Olive Orchard Estates. Fuels reduction to be accomplished by mechanical and hand crew removal and burning. This is a large project with numerous undeveloped parcels. Completion of this project will allow for lower fireline intensity and better opportunities to contain wildland fires burning through this area. Ross Drive is the main artery that is on a ridge with several streets that end on spur ridges. The slopes are relatively steep with heavy brush in the draws. Past fire activity in this area includes the Pattison Fire (2004) that started in Burson and burned through the area, over the top of Ross Drive. 17 homes and structures were lost. Fire was contained to 2100 acres. Additionally, a radio repeater for the Sheriffs Dept. is located at the end of Ross Drive and surrounded by dense brush.
	Project Priority	Rancho Calaveras Fuels Reduction Project - This is an ongoing large scale fuels reduction project. The current objective of this project is the reduction of fuel loading in the choked draws below homes in the areas of McAtee Street and Sparrowk Rd.
CENTRAL CALAVERAS FRPD	Concern	Standing dead trees from bug kill and Butte Fire located along private roadways may impede ingress/egress during emergency operations
	Concern	Downed trees from bug kill and Butte Fire creating excessive surface fuel loading that may impact suppression efforts on future wildland fires
	Concern	There is a significant lack of water sources located within the central parts of the District
	Project Priority	Jesus Maria Rd - Establish and maintain a fuel break, develop an adequate evacuation plan for the road systems along this corridor
	Project Priority	Whiskey Slide/Ponderosa Rd - Establish and maintain a fuel break, develop an adequate evacuation plan for the road systems along this corridor

AGENCY NAME	CATEGORY	DESCRIPTION
CENTRAL CALAVERAS FRPD continued	Project Priority	Sheep Ranch Community -Establish and maintain a fuel break, reduce fuel loading in surrounding area
	Additional Information	Need to continue fuels reduction work around Glencoe, need to investigate/establish adequate stream crossing at the N. Fork Calaveras River (Bridge crossing lost during Butte Fire)
SAN ANDREAS FPD	Concern	Spring Hills Subdivision and road right-of-way - excessive fuel loading
	Project Priority	Create a data mapping program for San Andreas Fire Protection District, based upon model used by Central Calaveras Fire Protection District
	Project Priority	Spring Hills Subdivision Fuels Reduction and road right-of-way Fuels reduction project planning, funding and implementation
	Project Priority	Fuels Reduction/defensible space project north and west of Calaveras High School/Gold Strike High School - planning, funding and implementation
	Additional Information	CalFire Performing Animals Welfare Sanctuary (PAWS) - broadcast burn in planning stage
WEST POINT FPD	Concern	Barney Way - Limited ingress/egress
	Concern	Lilly Valley - Limited ingress/egress
	Project Priority	Create a data mapping program for West Point Fire Protection District, based upon model used by Central Calaveras Fire Protection District
	Project Priority	Barney Way and Lilly Valley Circle - establish an alternate route of ingress/egress
	Project Priority	Stockton Box Rd - Tree Mortality Removal
	Additional Information	Need to continue support for the Woodhouse Mine Road fuels reduction project, need to continue to improve evacuation notification process
MOKELUMNE HILL FPD	Concern	Following the Butte Fire, returning fields of brush and dead standing trees in the areas of Buckeye Road and Boston Gulch present a significant fire hazard
	Concern	Lack of fuels reduction activities on local BLM lands presents a significant fire hazard to the community
	Concern	Old Toll Road choked with vegetation and possibly blocked
	Project Priority	Continuation of easement clearing along the River Ranch road system
	Project Priority	Maintenance of the existing Mokelumne Hill Fuel Break
	Project Priority	Fuels reduction project along Old Toll Road
CAL FIRE BATTALION 3 - WEST POINT	Project Priority	Summit Level Fuel Break - Utilizing existing Butte Fire contingency lines, create a fuel break from McCarthy Reservoir to Highway 4 corridor
	Project Priority	Ridge Road Fuel Break - Create a fuel break extending from McCarthy Reservoir across to Highway 26, along Ridge Road corridor
	Project Priority	Highway 26 Fuel Break - Create a fuel break system along the rim of the Mokelumne River drainage, connecting Mokelumne Hill Fuel Break to the Sandy Gulch Fuel Break

AGENCY NAME	CATEGORY	DESCRIPTION
CAL FIRE BATTALION 1 - SAN ANDREAS	Concern	Ross Drive Fuels Reduction Project - Need for funding source with potential release (spraying)
	Concern	Mokelumne Hill Fuel Break - Need for funding source with potential release (spraying)
	Concern	Rancho Calaveras Fuels Reduction Project - Need for funding source
	Project Priority	Performing Animals Welfare Sanctuary (PAWS) - broadcast burn in planning stage, currently seeking categorical exemption for the Ark 2000 Property
	Project Priority	River Ranch Rd Fuels Reduction (phase I) and Mokelumne Hill Fuel Break Maintenance Project
	Project Priority	Phase II River Ranch Road Fuels Reduction Project - Donya Drive to River Ridge Drive, scheduled to begin Fall of 2019
	Additional Information	River Ranch Road Fuels Reduction (phase I) and Mokelumne Hill Fuel Break Maintenance Project ongoing, New Hogan VMP to host HFEO Academy field activities 2020,
EBBETTS PASS FPD	Concern	Need for better process of notification of evacuation orders and established evacuation plans for communities within jurisdictional boundaries
	Concern	Need for more pre-planning/information sharing regarding designated high threat areas in need of fuels treatment
	Concern	Roadway easement clearance inadequate, need clarification regarding property owners right to clear easement(s) on their property, inadequate road clearance activities
	Project Priority	Remove flammable vegetation within easements along county road systems throughout District
	Project Priority	Maintenance of existing fuel breaks within District and construction of planned fuel breaks
	Project Priority	Removal of flammable vegetation within easements along State Highway 4
	Additional Information	Would like to see more integration of local government resources and overhead involvement in management and suppression of wildland fire(s)
MURPHYS FPD	Concern	Need for better process of notification of evacuation orders and the lack of established evacuation plans for communities within jurisdictional boundaries
	Concern	Insufficient strategic planning for fuel break locations as they relate to fire history
	Concern	Excessive fuel loading in areas of San Domigo Drainage pose a direct threat to associated communities, one of which is the community of Murphys Pines
	Project Priority	Establish a better process of notification of evacuation orders and develop valid evacuation plans for communities within jurisdictional boundaries
	Project Priority	Completion of Ponderosa, Murphys and Forest Meadows fuel break projects
	Project Priority	Identify and establish fuels reduction projects for at risk communities within the District
	Additional Information	The heavy fuel loading within Murphys Fire Protection District poses a threat of extreme fire behavior impacting communities within the District. Heavy fuel loading above Camp 9 has created a hazard to the communities of Penn Gulch, Skunk Ranch and others. Lack of adequate fuels reduction along road systems within the District poses a threat to ingress/egress during wildland fires.

AGENCY NAME	CATEGORY	DESCRIPTION
ANGELS CAMP FIRE DEPARTMENT	Concern	Need for better process of notification of evacuation orders and the lack of established evacuation plans for communities within jurisdictional boundaries
	Concern	Inadequate program to reduce fuel loading in easement areas along road systems in various parts of the District
	Concern	Need for better coordination between entities managing large fires and local fire district as it relates to movement of fire resources in and out of Frogtown and within the general area of Angels Camp
	Project Priority	Create a data mapping program for Angels Camp Fire Department, based upon model used by Central Fire Protection District
	Project Priority	Reduce fuel loading in and around high density areas and infrastructure
	Project Priority	Obtain mechanical fuels reduction equipment (i.e. Skid Steer) that could be utilized by trained personnel on fuels reduction projects within the District
ALTAVILLE - MELONES FPD	Concern	Need for better process of notification of evacuation orders and the lack of established evacuation plans for communities within jurisdictional boundaries
	Concern	Excessive fuel loading in areas within the District that pose a direct threat to associated communities
	Concern	Lack of planning for destinations for citizens trapped by fire or under evacuation order (established safe refuge areas)
	Project Priority	Establish a better process of notification of evacuation orders and develop valid evacuation plans for communities within jurisdictional boundaries
	Project Priority	Create a data mapping program for Altaville Melones Fire Protection District based upon model used by Central Fire Protection District
	Project Priority	Identify and establish fuels reduction projects for at risk communities within the District, including the community of Murphys Pines
	Additional Information	There is a need to develop valid traffic plans and safe refuge areas for evacuees, additionally, there is a need to develop routes of travel for ingress and egress to fireline assignments as evacuations occur
COPPEROPOLIS FPD	Concern	Need for better process of notification of evacuation orders and the lack of established evacuation plans for communities within jurisdictional boundaries
	Concern	Ingress and egress to communities of Bar XX, Circle XX and Diamond XX is inadequate, due to fuel loading along roadways
	Concern	Excessive fuel loading along roadway easements
	Project Priority	Need to establish a better defensible space program that includes proper clearance information, public education and possible mass mailings of program specific materials to public
	Project Priority	Establish valid temporary refuge areas for the communities of Bar XX, Diamond XX and Circle XX
	Project Priority	Remove flammable vegetation within easements along road systems throughout the District
	Additional Information	There is a need to identify and improve private roads that could provide opportunities to make access to remotely located fires

AGENCY NAME	CATEGORY	DESCRIPTION
USFS CALAVERAS DISTRICT	Concern	Need to identify opportunities to educate public on pre-fire activities, fire prevention measures and fire safety steps
	Concern	Need to maintain completed fuels reduction projects throughout the USFS Calaveras District
	Concern	Ability to maintain and repair the vast fire access road system within the USFS Calaveras District
	Project Priority	Completion of ongoing and planned fuels reduction projects in and around the communities of Arnold, Avery and Big Trees
	Project Priority	Continue to develop and complete fuel breaks that cross jurisdictional boundaries, utilizing collaborative efforts with adjoining jurisdictional agencies
	Project Priority	Complete ongoing fuels reduction projects in and around Cabbage Patch, Black Springs and Lilly Gap
	Additional Information	Further develop and build upon collaborative efforts with cooperators working to establish and complete landscape scale fuels reduction projects that cross jurisdictional boundaries
CAL FIRE BATTALION 4 - ARNOLD	Concern	Need to reduce excessive fuel loading throughout many areas of the Battalion
	Concern	Need to address gaps between planned and existing fuel breaks within the Battalion
	Project Priority	Create a fuel break from the end of the planned Fullen Road Fuel Break along the north side of Highway 4, east to the USFS planned fuel break system north of Hathaway Pines. This proposed fuel break to utilize existing contingency dozer line put in place during the Butte Fire.
	Project Priority	Initiate and complete broadcast burns on the SPI-South Park VMP
	Project Priority	Complete broadcast burns on the Big Trees State Park Project
	Additional Information	Other ongoing and needed projects to consider are reestablishing the Darby fire control lines as fuel breaks and completing the Summit Level Road fuel break.
CAL FIRE BATTALION 2 - ALTAVILLE	Concern	Fuel loading and gaps between planned and existing fuel breaks within the Battalion
	Concern	Ability to maintain the vast system of fuel breaks within the Battalion and the County
	Concern	The need to maintain and utilize control lines from past fires that could be utilized as fuel breaks
	Project Priority	Complete Murphys Fuel Break
	Project Priority	Complete Donavan Fuel Break
	Project Priority	Complete Ponderosa Fuel Break

Appendix 4 PROPOSED PRE-FIRE FUELS MITIGATION PROJECTS

Proposed By	Contact Name	CAL FIRE Batt	Project Name	Project Type / Treatment	Est. Acres
Cal Dept Parks and Recreation	Heather Reith	4	Giant Sequoia Forest Resilience Project	Prescribed Burning	222
Cal Dept Parks and Recreation	Heather Reith	4	Giant Sequoia Forest Resilience Project	Fuel Reduction (Thinning & Pile Burning)	199
Cal Dept Parks and Recreation	Heather Reith	4	Northwest Corner Omnibus Forest Management (Upper San Antonio Unit)	Fuel Reduction (Thinning & Pile Burning) & Rx Burning	103
Cal Dept Parks and Recreation	Heather Reith	4	Northwest Corner Omnibus Forest Management (West Moran/Hwy 4 Unit)	Fuel Reduction (Thinning & Pile Burning) & Rx Burning	25
Cal Dept Parks and Recreation	Heather Reith	4	Northwest Corner Omnibus Forest Management (5000'/Hwy 4 Unit)	Prescribed Burning	50
Cal Dept Parks and Recreation	Heather Reith	4	Northwest Corner Omnibus Forest Management (Moran Creek Unit)	Fuel Reduction (Thinning & Pile Burning) & Rx Burning	263
Cal Dept Parks and Recreation	Heather Reith	4	Northwest Corner Omnibus Forest Management (Love Creek Unit)	Fuel Reduction (Thinning & Pile	133
Cal Dept Parks and Recreation	Heather Reith	4	Northwest Corner Omnibus Forest Management (Big Tree Village Unit)	Fuel Reduction (Thinning & Pile Burning) & Rx Burning	158
Calaveras County RCD	Sid Beckman	2	Big Flat	Fuelbreak constr., area treatments	530
Calaveras County RCD	Sid Beckman	4	Mill Woods	Fuelbreak Maintenance	30
Calaveras County RCD	Sid Beckman	2 & 4	Murphys/Forest Meadows	Fuelbreak Maintenance	700
Calaveras County RCD	Sid Beckman	2 & 4	Highway 4 Corridor Roads	Roadside Brushing Maintenance	15
Calaveras County RCD	Sid Beckman	3	Middle Fork Moke Roads	Roadside Brushing Maintenance	15
Calaveras County RCD	Sid Beckman	1	Central Calaveras Roads	Roadside Brushing Maintenance	15
Mokelumne Hill Sani Dist	Pat McGreevy	1	Mokelumne Hill Sanitation District	Maintenance	50.00
CAL FIRE	TCU	1	Mokelumne Hill Perimeter FB	Maintenance	10.00

Proposed By	Contact Name	CAL FIRE Batt	Project Name	Project Type / Treatment	Est. Acres
Cala-Ama ForestryTeam	Pat McGreevy	1	Buckeye Gulch/Boston Yale	Butte Fire Restoration	189.00
Cala-Ama ForestryTeam	Pat McGreevy	3	Ponderosa Road (Hwy 26-CC Bridge)	Butte Fire Restoration	233.00
Cala-Ama ForestryTeam	Pat McGreevy	3	Indian Gulch	Butte Fire Restoration	649.00
Cala-Ama ForestryTeam	Pat McGreevy	3	Alabama Hill	Butte Fire Restoration	1,244.00
Cala-Ama ForestryTeam	Pat McGreevy	3	SF Mokelumne Watershed Restoration BLM	Maintenance	500.00
Cala-Ama ForestryTeam	Pat McGreevy	3	SF Mokelumne Watershed Private Property	Fuels Reduction/Forest Restoration	300.00
Cala-Ama ForestryTeam	Pat McGreevy	3	West Point Wastewater Treatment Plant	Fuels Reduction/Forest Restoration	112.00
Cala-Ama ForestryTeam	Pat McGreevy	3	Bummerville BLM Forest Restoration	Fuels Reduction/Forest Restoration	450.00
Cala-Ama ForestryTeam	Pat McGreevy	3	Decommissioned CCWD West Point Wastewater Plant	Fuels Reduction/Forest Restoration	10.00
Cala-Ama ForestryTeam	Pat McGreevy	3	CCWD Winton Regulatory Resevoir	Fuels Reduction/Forest Restoration	15.00
Cala-Ama ForestryTeam	Pat McGreevy	3	Lily to Tiger Cr Power House	Fuels Reduction/Forest Restoration	51.00
Cala-Ama ForestryTeam	Jan Bray	3	Pine Ridge FB (McCarty Res to Summit Level)	Maintenance	110.00
Cala-Ama ForestryTeam	Jan Bray	4	Arnold Wastewater Treatment Plant	Maintenance	92.00
Calaveras Foothills FSC	Bill Fullerton	2	Murphys Area Fuels Reduction Project	Fuel Break	250
Calaveras Foothills FSC	Bill Fullerton		MFPD Pre-Fire Mapping Project	Map	N/A
Calaveras Foothills FSC	Bill Fullerton	3	WPFD Pre-fire Mapping Project	Map	N/A
Calaveras Foothills FSC	Bill Fullerton		Calaveras County Seniors and Disabled Defensible Space Project	Defensible Space Clearing	N/A
Calaveras Foothills FSC	Bill Fullerton		Calaveras County Door-to-Door Chipping Program	Chipping	N/A
Calaveras Foothills FSC	Bill Fullerton	1	Rancho Calaveras Fuels Reduction Project Phase 2	Fuel Break	125
Calaveras Foothills FSC	Bill Fullerton	4	Love Creek Fuels Reduction Project	Fuel Break	400
Calaveras Foothills FSC	Bill Fullerton		Ridge Road Fuel Break	Fuel Break	180
Calaveras Foothills FSC	Bill Fullerton		The Wildfire Next Time Educational Video	Public Education	N/A
Calaveras Foothills FSC	Tim Tate	3	Mountain Ranch Fuel Break	Fuel Break	50

Proposed By	Contact Name	CAL FIRE Batt	Project Name	Project Type / Treatment	Est. Acres
BLM Mother Lode Field Office	Jerry Martinez	3	BLM Lily 1 & 2	Maintenance	410.00
Davies Ranch	Mary Fowler	4	Last Chance Fuel Break, Davies Ranch	Fuels Reduction/Forest Restoration	250.00
Cala. Healthy Impact Product Solutions	Regine Miller	4	Arnnold Avery Hazardous Fuel Reduction and Fuel Break	Fuel break maintenance and	940
Blue Lake Springs HOA	Tony Abila	4	Blue Lake Springs Debris Removal: Rocky Ridge/Summit	Connect to fuel break/remove debris	40
Blue Lake Springs HOA	Tony Abila	4	Blue Lake Springs Debris Removal: Moran	Thin Canopy, remove Vegetation/debris	8
Blue Lake Springs HOA	Tony Abila	4	Blue Lake Springs Debris Removal: Del Paso	Thin Canopy, remove Vegetation/debris	4
Blue Lake Springs HOA	Tony Abila	4	Blue Lake Springs Debris Removal; Greensboro	Thin Canopy, remove debris, clear WLPZ	18

GLOSSARY

Apparatus: The technical equipment or machinery needed for a particular activity or purpose. In the fire service often used for fire vehicles and fire equipment.

Baby Boomers: The generation is generally defined as people born from 1946 to 1964, during the post-World War II baby boom.

Biodiversity: The enormous variety of life in the world or in a particular habitat or ecosystem. Biodiversity refers to every living thing, including plants, bacteria, animals, and humans.

Broadcast Burning: A controlled burn, where the fire is intentionally ignited and allowed to proceed over a designated area within well-defined boundaries for the reduction of fuel hazard after logging, for site preparation before planting and/or for ecosystem restoration.

Canopy: The top layer of a forest, tree, or lower-growing stand of shrubs, which is formed by leaves, needles, and branches creating a continuous cover.

Chaparral: vegetation composed of broad-leaved evergreen shrubs, bushes, and small trees usually less than 8 feet tall; together they often form dense thickets. Chaparral is found in regions with a climate similar to that of the Mediterranean area characterized by hot, dry summers and mild, wet winters.

Chimney: A vertical cleft in topography, which may increase the intensity and/or speed of a fire.

Chip: To cut up slash materials into small pieces, or chips.

Chipping Program: A program where several individuals or communities share the resources associated with processing debris from fuel-reduction activities, including the chipper (the machine that creates the chips), staff, insurance, etc.

Chunk: To complete the pile-burning process by turning in or placing the unburned woody material ends into the fire ring.

Closed Canopy: Occurs when the tops of trees or shrubs touch and blend together sufficiently to prevent direct sunlight from reaching the ground in most or all places.

Collaborative: An open, inclusive process that assumes all participants have valuable knowledge and opinions.

Compact: To pack closely or tightly together, as in the fragments of soil being compacted by heavy equipment, thereby limiting the ability of oxygen or water to pass through freely.

Composite Decking: Deck boards manufactured from wood fiber and plastic to form a profile that requires less maintenance and generally has a longer lifespan than natural wood.

Composition: The percentage of each species that together comprise the life present in a given area.

Condition Class: This landscape designation is based on a relative measure describing the degree of departure (low, moderate, or high) from the historical natural fire regime.

Containment: The process of completely surrounding a fire with natural or man- made fuel breaks.

Contour Falling: Cutting and placing trees along the slope contour. This is a treatment that utilizes positioned logs to help control erosion from water flow. Logs are offset on the slope contour to slow water by creating a meandering travel path.

Control: The act of managing a fire, which generally entails a completed control line around the fire.

Controlled Burning (or Prescribed Fire): A vegetation management practice that uses fire to improve habitat and/or reduce hazardous fuels. A plan for the prescribed burn must be written out and approved by fire department authorities, and specific requirements must be met before commencing burning.

Convection Column: Heat generated from a fire rises in a column to varying heights above the flames, depending on the size of the burn.

Cover: Any plants or organic matter that holds soil in place and/or grow over and create shade that provides wildlife with an area to reproduce and find protection from predators and weather.

Crop: The amount of fruits or seeds that a group of plants of one species yields in one growing season.

Crown Density: A measurement of the thickness or density of the foliage of the treetops (crown) in a stand.

Crown Fire: A fire that spreads through the top of the vegetative canopy and is characteristic of hot fires and dry conditions. Crown fires are generally more complex to control than surface fires.

Crown Scorch: When a fire or a convection column burns a portion or the entire crown of a tree or shrub.**Crown Structure:** The arrangement of the uppermost branches and foliage of a tree or shrub.

Dappled Light: When the vegetative canopy has small openings, filtered sunrays project through the treetops onto the ground.

DBH: Diameter at Breast Height, a measurement of a tree's diameter at the level of an adult chest (approximately)

Decay Classes: Rotting wood is categorized based on the level of decomposition, broken into five classes. For example, decay class 1 is structurally intact (with bark attached) ranging to decay class 5, which is very soft, disintegrated wood.

Defensible Space: An area around a home/structure where flammable materials have been reduced to act as a barrier between wildfires and property, thereby decreasing the risk of damage or loss. This space is currently defined as 100 feet around a structure in California.

Defensible Space Zone: The 100-foot zone around the home or other structure.

Demographic trends: A term for any measurable change in the characteristics of a population over time- e.g., increased or decreased concentration of a particular ethnic group, sex ratio, etc.

Disturbance: Various activities that disrupt the normal state of the soil, such as digging, erosion, compaction by heavy equipment, etc.

Diurnal: Belonging to or active during the day (opposite of nocturnal).

Doghair (Doghair thicket): An excessively dense stand of trees. An example is an acre with 35,000 trees, all smaller than 7 inches DBH.

Dominant: The species or individual that is the most abundant or influential in an ecosystem. For example, a dominant tree is one that stands taller than the rest and receives full sun, or the shrub species most abundant in the local understory.

Downed Woody Debris: The remains of dead trees, branches, and various woody brush that sit on the ground; generally refers to trunks of downed trees.

Draft: Using the forces of suction to draw water from ponds, swimming pools, or other bodies of water. This technique utilizes a partial vacuum formed by a suction pump and atmospheric pressure. The water is then moved where it is needed.

Draw: A topographic channel that is generally shallower than a ravine.

Drip Torch: A hand-held device used to ignite fires by dripping flaming liquid fuel on the materials to be burned.

Drip Line: The boundary of a tree's canopy, generally estimated by the extent of the tree's outermost limbs and the circular moisture line formed when rainfall drips from the limb tips.

Drip-Line Thinning: Clearing ladder fuels under the drip-line circumference of a leave-tree.

Duff: A layer on top of the soil made up of mostly fine (small) decomposing organic matter such as leaves, needles, and small branches.

Ecosystem: A community of organisms (including plants, animals, and fungi and the non-living aspects of the physical environment) that makes up a specific area. Examples of ecosystem types include a pond or a forest.

Ecosystem Functions: The processes and interactions that occur between organisms and the physical environment.

Ember Attack: Sparks and small flaming bits blown by the wind during a firestorm. These can accumulate at intersections between horizontal and vertical members on the outside of a house, igniting debris and combustible materials. Embers can also enter into openings (e.g. attic vents and other wall openings), igniting debris on the inside of the home.

Ember Interceptors: An ignition-resistant object or plant, such as coast live oak, that interrupts the flight of embers during a firestorm, often slowing their descent long enough for them to burn out before reaching surface fuels below. In some wildfires this process appears to have resulted in reduced frequency of ignitions of urban fuels (homes) beneath ember interceptors (mature oaks that had been cleared of dead wood).

Embers: Small glowing or smoldering pieces of wood or other organic debris, often dispersed ahead of a fire (also known as firebrands).

Endemic: A plant or animal that is native to a certain limited area and found nowhere else.

Endangered Species: A population of organisms classified as such by the state or federal government as being at risk of becoming extinct because it is few in number and/or threatened by changing environmental or predation parameters.

Engine Strike Team: A specified number and type of fire engine assembled for a tactical assignment on an emergency.

Environmental Compliance: To meet the environmental regulations, laws, standards, and requirements enacted.

Environmentally Sensitive Habitat Area (ESHA): An area protected from human activities or development due to the existence of rare or especially valuable and/or vulnerable plants, animals, and habitats.

Ephemeral: Meaning short duration or life, as in an ephemeral stream that only flows after a rainstorm or during the rainy season.

Epicormic Branching: Branches of a plant that shoot sporadically from the main stem rather than from the top. May be caused by disturbance.

Erosion: The removal of soil over time by weather, wind and/or water, such as rain or water runoff from roads.

Escape Route: A path or road that has been preplanned for getting out of harm's way in a fire situation. The route should be well understood in advance of crisis by all participants. If there is any unclear direction, the path should be marked.

Escapes: Wildfires that cannot be contained with the first attempts at suppression.

Excessive Stems: Stems (tree or shrub main trunks) in high density.

Extinction Moisture: The moisture level in fuels at which fires tend to stop burning.

Feather or Feathering: A process that reduces the appearance of change between treated and untreated sites by gradually softening the transition (gradually doing less and less manual work on an area as one moves away from the primary treatment site).

Federal Responsibility Area (FRA): An area where fire protection responsibility and liability is federal.

Firebrand: A piece of wood or a coal that is hot and glowing from fire activity, often dispersed by wind ahead of a fire. Also called *embers.*

Firebreak: A strip of land that has been cleared of vegetation to help slow or stop the spread of wildfire. It may be a road, trail, or path cleared of vegetation or other burnable materials. A stream could also serve as afirebreak. *See Fuelbreak for the difference between the two.*

Fireline Intensity: The heat energy released by the fire at the forefront of the fire.

Fireshed: An area or areas with similar fire management, fire history, and risk of wildland fire issues.

Fire-Adapted: The ability of organisms or ecosystems to make long-term genetic change for the most advantageous response to fire-prone environments.

Fire-Adapted Ecosystem: A local mix of mature natural vegetation (ideally native species but often found in combination with exotic species) that maintains its ability to survive and regenerate, and perhaps even to thrive, with regular disturbance from wildfire. Opportunistic species benefit from fire and the openings it can create in a woodland; this is part of their adaptation.

Fire-Adapted Vegetation: Vegetation that has adapted to fire as a disturbance factor and can generally survive wildfire. In the case of chaparral vegetation, survival depends on fires occurring only every 25 years or more, and it is not adapted to more frequent fire.

Fire Behavior: The combination of fire spread, heat output, flame length, intensity, etc., as a fire responds to weather, topography, types of fuels, etc.

Fire Climax: The stage of vegetation that is sustained with frequent fire.

Fire-Dependent: Plant communities and specific habitat types that have evolved to rely on fire in order to exist and/or thrive.

Fire-Dependent Vegetation: Vegetation that depends on some fire for its long-term survival.

Fire Ecology: The study of fire and its relationship to the physical, chemical, and biological components of an ecosystem.

Fire Flow: The flow rate of a water supply, measured at 20 pounds per square inch (PSI) (137.9kPa) residual pressure that is available for firefighting. When water supply tanks are approved for use, the flow rate of a water supply may be at draft.

Fire Followers: Plants that flourish after a fire; seeds from long-lived seedbanks typically germinate abundantly in ashy soils.

Fire-Free Zone: A 5-foot minimum zone around the home that is free of all fuels.

Fire Hazard: The amount, condition, and structure of fuels that will burn if a fire enters an area.

Fire Ignition: The act of setting on fire or igniting a fire.

Fire Intensity: A measurement of the heat released in an area during a specific amount of time (BTU/ft/sec). Intensity has a large influence on an ecosystem's recovery from fire.

Fire Prevention: Actions taken by homeowners and community members to lessen wildfires and damage caused by wildfires. Includes education, enforcement, and land management practices.

Fire Protection (a.k.a. Fire Suppression): Fire-fighting tactics used to suppress wildfires. Fire-fighting efforts in wildland areas require different techniques, equipment, and training from the more familiar structure fire- fighting found in populated areas.

Fire Regime: The characteristic patterns of fire in a given ecosystem. May include fire behavior, distribution, frequency, size, and season.

Fire Resiliency: The ability of an ecosystem to maintain its native biodiversity, ecological integrity, and natural recovery processes following a wildland fire disturbance.

Fire-Resilient Landscape: A natural landscape featuring plants that have adapted to local wildfire conditions, or a domestic outdoor space where appropriate actions have been taken to make it less vulnerable to wildfire and certainly less prone to causing one.

Fire-Resistant: A material, substance, or structure that is difficult to ignite by fire and burn.

Fire-Resistant Building Materials: Construction materials that are resistant to ignition when exposed to radiant heat or flames. Examples include clay tile roofs, metal roofing, and stucco siding.

Fire-Return Interval: A period of time between fires in a specific region or area.

Fire Risk: The combination of vegetation, topography, weather, ignition sources, and fire history that leads to fire potential and danger in a given area.

Fire Safe Council: Public and private organizations that comprise a council intended to minimize the potential for wildfire damage to communities and homeowners, while also protecting the health of natural resources. Goals are achieved by distributing fire prevention materials, organizing fire safety programs, implementing fuel-reduction projects, and more. www.firesafecouncil.org.

Fire-Safe Practices: Activities such as creating defensible space, firebreaks, access, fire-resistant landscapes, changes to a home in terms of material and design, etc., that make the home/property safer in wildfire situations.

Fire Safe or Fire Safety: The act of preparing something—a home, neighborhood, or community—to survive a wildfire; the ability of an object to survive fire.

Fire-Sensitive: A species of tree that is more susceptible to fire damage. Sensitivity may be due to thin bark or easily ignitable foliage.

Fire Severity: A qualitative indicator of the effects of fire on an ecosystem. Fire severity reflects the amount of heat released by a fire, and therefore it is also dependent on fuels and fire behavior.

Fire Weather: The various types of weather that affect how a fire ignites, behaves, and is controlled.

Flame Length: The span of the flame from the tip to the base, irrespective of tilt.
Flammable: A quality of a substance that makes it likely to catch fire, be easily ignited, burn quickly and/or have a fast rate of spreading flames.

Flanks: Slope areas on both sides below a ridgetop.

Flashy: An adjective that when applied to fuel means that it ignites readily and is consumed rapidly when dry.

Flashy Fuels: Fine fuels, such as grass, leaves, pine needles, ferns, moss, and some kinds of slash, which ignite readily and are consumed rapidly when dry.

Foëhn Events: A wind that blows warm, dry, and generally strong, creating extremely dry fuel and dangerous fire potential.

Fuel: All burnable materials including but not limited to living or dead vegetation, structures, and chemicals that feed a fire.

Fuelbreak: A strategic area where fuel volumes have been intentionally reduced to slow down a fire and reduce its flame length and intensity; as distinguished from a *firebreak,* where all fuels are removed to bare mineral soil for fire suppression.

Fuel Bed Height: A measurement of the height of fuel composition on the ground.

Fuel Complex: The volume, type, condition, arrangement, and location of fuels.
Fuel Continuity: The amount of continuous fuel materials in a fire's path that allows the fire to extend vertically toward the crowns of trees or horizontally into other fuels.

Fuel Ladder: A ladder of vegetation from the ground into the canopy (or upper branches) of the trees that allows fire to climb upward.

Fuel Levels: Amount of all burnable materials including but not limited to living or dead vegetation, structures, and chemicals that feed a fire.

Fuel Model: A standardized description of fuels available to a fire based on the amount, distribution, and continuity of vegetation and wood. Fuel models distinguish among vegetation (such as tall and short chaparral, or timber with and without an understory), as well as describe the arrangement and amount of vegetative fuels. Fire managers use fuel models within the Fire Behavior Prediction System to analyze the wildfire environment.

Fuel Management: The management of fuels for fire safety or ecosystem health. Examples include prescribed burns and creation of firebreaks.

Fuel Moisture: The amount of water in vegetation, typically expressed as a percentage, and having a large effect on the rate of spread of fires.

Fuel Reduction/Treatment: The act of removing burnable materials to lower the risk of fires igniting and to lessen the likelihood of damage to property and communities. Treatments may include creating a defensible space, developing fuel breaks, initiating prescribed burns, and thinning vegetation.

Fungi or Fungus: Any of a group of spore-producing organisms feeding on organic matter, including molds, yeast, mushrooms, and toadstools.

GIS (Geographic Information System): A program for storing and manipulating geographical information on a computer; very useful for landscape-level planning efforts.

GPS (Global Positioning System): A hand-held navigational device that uses satellites to determine positions on the Earth.

Green Islands: Patches of live tree and plant communities retained within a mosaic thinning prescription.

Ground-Disturbing Activities: Actions that interrupt the natural condition of the ground, such as digging and compaction from heavy equipment.

Ground Fuels: The layer of combustible materials that exists below the layer of surface litter. This layer includes plant roots, duff, etc. These materials can combust and burn without direct contact with a flame when embers drop from above.

Growth or Vigor: The ability of plants to exhibit healthy natural growth and survival.

Habitat: An ecological or environmental area that is inhabited by a particular species of animal(s), plant(s), or other type of organisms.

Habitat Conditions: The conditions needed by local wildlife to survive, including food, water, cover, and nesting sites.

Hand Pile Burning: Hazardous fuels are piled by hand for burning in a manner that will not damage surrounding trees or soil.

Hardening/Harden Homes: This term refers to improving a building's resistance to fire, such as updating a roof with noncombustible roofing material; the goal is to make the structure survivable in fire.

Hazardous Fuels: All burnable materials including but not limited to living or dead vegetation, structures, and chemicals that feed a fire.

Headwall: Steep upper sides of a drainage where fire can move quickly.

Heat Output: The total amount of heat that a fire releases in a specific area during the passing of the flaming front.

Heat Per Unit Area: The amount of heat produced by burning fuels in a given unit area through the entire duration of a fire.

High Pruning: Cutting of both dead and live branches 10 to 15 feet up from the base of the tree. This is done on larger trees to separate the fuel connectivity from the ground to the crown of a tree.

Historic Natural Condition: The climax environmental condition of a property/area that occurred in the past, before fire suppression and industrial activities. Old photos, settlers' journals, elders' oral history, and clues on the property (such as old stumps) may be helpful in identifying the historical natural condition of an area.

Home Ignition Zone: The home and the area out to approximately 100 feet, where local conditions affect the potential ignitability of a home during a wildfire.

Home-to-Home Ignitions: The event of combustion initiation that creates fire as embers pass from one home to another. The action of one home igniting adjacent homes.

Ignitions: The event of combustion initiation that creates fire.

Ignition Specialist: A trained professional whose expertise is ignition and prescribed-fire techniques and management. Ignition specialists are certified

through the National Wildfire Coordinating Group and have years of experience in wildland fire suppression and prescribed fire use. They have met all necessary requirements to perform firing applications.

Ignition Zone: The place where combustion is initiated.

Ingress-Egress: Roads and other avenues to enter and leave a property. Also refers to the act or right to come in or go through, as in entering a property (ingress), and the act or right to depart or go out, as in exiting a Property (egress).

Initial Attack: An aggressive action to put the fire out by the first resources to arrive, consistent with firefighter and public safety and values to be protected.

Initial Entry: The first stage of vegetation and tree thinning performed in a fuel-reduction treatment.

Initial Site Assessment: The preliminary steps of an evaluation of a piece of property to determine fuel hazards and health conditions. Information is gathered to help plan a fuel hazard-reduction treatment.

Invasive Weeds: Undesirable plants that are not native and have been introduced to an area by humans. These plants generally have no natural enemies and are able to spread rapidly throughout the new location. Some examples include Himalayan blackberries, English ivy, arundo, tamarisk, and Scotch broom.

Jackpots: Generally, small pockets of dense fuels, which could allow a fire to flare up and burn more intensely.

Knox-Box: A small safe typically mounted on a wall or post that holds the keys to a building or gate for firefighter or EMT use in emergency situations.

Ladder Fuel Continuity: The presence of connected or adjacent fuel materials in a fire's path that allow the fire on the ground to extend in a vertical direction toward the crowns of trees.

Ladder Fuels: Materials such as shrubs, low branches, or small trees connecting the ground to the tree canopy or uppermost vegetation layer. In forests, this allows fire to climb upward into trees.

Landscape: The visible features of an area of land, including topography, water bodies, vegetation, human elements such as land uses and structures, and transitory elements such as lighting and weather conditions.

Landing: In logging or fuel-reduction work, a place where logs and branches are taken in order to be processed by a chipper.

Layout: In this case, defining and designating forest operations for a specific location.

Leading Edge: The foremost part of a fire that is guiding the fire in the direction of travel.

Leave-Trees: Trees that have been selected to remain standing in an area of thinning or harvesting.

Leave-Patches: Swaths or clusters of trees or other vegetation that have been selected to remain standing in an area of fuel treatment.

Limb Up: To remove the lower branches from a woody plant to create a defined space between the forest floor and the canopy.

Limbing: Removing selected branches of a standing or fallen tree or shrub.

Live Crown Percentages: The proportion of the height of the tree or shrub on which live branches and foliage are present.

Local Responsibility Areas (LRA): An area where fire protection is provided by local sources such as city fire departments, fire protection districts, and counties. Legal responsibility is at a local level, not at the state or federal level.

Lop and Scatter: The act of cutting and evenly spreading branches over the ground to reduce fire hazard and erosion potential, while promoting the decomposition of branches via their close proximity to the ground.

Mastication: The grinding, shredding, chunking, or chopping of vegetation by heavy machinery.

Meadows and Seeps: Areas of more or less dense grasses, sedges, and herbs that thrive, at least seasonally, under moist or saturated conditions. They occur from sea level to treeline and on many different substrates. They may be surrounded by grasslands, forests, or shrublands. A seep is an area where water rises from an underground source to the surface and creates a wet area.

Merchantable: Timber that is viable for sale under the current economic situation. This is generally determined by the part of the stem (trunk) that is suitable for timber products.

Modify Fire Behavior: Using fire-safe practices such as fuel treatments, thinning, creating firebreaks, etc., to change the way a fire will behave, with a goal of slowing it down and/or suppressing it more easily.

Moisture Content: The dry weight of a material, such as wood or soil, compared to the wet weight of the same material. It is not unusual for live material to have moisture content greater than 100% because it could contain more water than solid material by weight.

Monitor: To watch, keep track of, or check regularly for changes—in this case, to the environment.

Montane: A mountainous region of moist, cool, upland slopes that occurs below the treeline and is predominantly composed of evergreen trees. It is also described as the lower vegetation belt on mountains that is composed of montane plants and animals.

Mosaic Thinning: A style of vegetative thinning that creates openings and patches of vegetation to reduce fuel connectivity and increase the potential variety of habitat types.

Mosaic Thinning Regime: A system of thinning to create patches and openings that emulate the structural composition created by a wildfire.

Mulch: A material (such as decaying leaves, bark, or compost) spread around or over a plant to keep invasive weeds down, to reduce moisture loss and/or to enrich and insulate the soil; as a verb, the application of such material. In the Santa Monica Mountains, only native vegetation should be used as mulch.

Mutual Aid: An agreement among emergency responders to lend assistance across jurisdictional boundaries. This may occur due to an emergency response that exceeds local resources, such as a disaster or a multiple- alarm fire.

Natural Disturbance: Disruptions, like fire and floods, which occur in the environment without the intervention of humans.

Natural Place Community: A simple term describing a specific type of ecosystem.

Natural Range of Conditions: The normal assortment of circumstances under which an organism or group can survive.

Niche: A species or population's role and/or function within an ecosystem. Includes resource use, interactions, etc.

Nurse Log: A tree that has fallen, died, and started to decompose. The decaying log is rich in moisture and nutrients and provides a germination spot for plants, as well as habitat for insects.

Obligate Parasites: A parasitic organism that cannot complete it life-cycle without exploiting a suitable host. If an obligate parasite cannot obtain a host it will fail to reproduce.

Offshore Flow: The flow of wind blowing from the land to the water, or in other words, wind blowing offshore.

One-Way Transport Route: A hauling trail used during tree extraction activities where one entry pass is made.

Overstory: The topmost trees in a forest that compose the upper canopy layer; compared to the understory, which is the lower woody or herbaceous layer underneath treetops.

Overstory Trees: Trees that form the uppermost layer of the canopy in a forest.

Permeability: In this case, a condition whereby fire can spread through a community with minimal negative impact.

Photo-Point Monitoring: By utilizing a specific, identifiable point on a property from where photos are taken over time, it's possible to use the same view to compare and monitor changes.

Pilot Ignition Piles: Small piles of primarily small fine fuels such as branches, dead materials, and organic matter.

Pole-Sized: Generally younger trees with a trunk diameter between 4 and 8 inches.

Pre-Fire Plan: A plan to address fire issues before ignition, including fire prevention actions such as
hazardous fuel reduction. Occasionally these plans may extend into the suppression phase of fire protection and detail such items as evacuation routes, fuelbreaks, and fire-fighting strategies.

Prescribed Fire (or Controlled Burn): A management practice that uses fire to improve habitat or reduce hazardous fuels. A plan for the prescribed burn must be written out and approved by the local fire department, or CAL FIRE, depending on the location, and specific requirements must be met before commencing burning.

Present Condition: The environmental conditions that occur on a property/area at the present time.

Productive: A term used for land or forests that are growing efficiently and in a vigorous manner.

Pruning: The act of cutting back the unwanted portions of a plant, or cutting for the purpose of enhancing growth.

Rate of Spread: The speed of an advancing fire. May be measured by the growth in area or by the speed of the leading edge of the fire.

Regeneration: The renewal of trees or forests by planting seedlings, or direct seeding by humans, wind, birds, or animals after large disturbances like fire. “Regeneration” also refers to young trees that were naturally seeded or planted.

Registered Professional Forester (RPF): A person licensed in California to manage state or private forestlands and advise landowners on management of their forests.

Relative Humidity: A measure of moisture in the air. If the humidity is 100%, the air is completely saturated with moisture. If the humidity is less than 20%, the air is very dry. When the air is dry, it absorbs moisture from the fuels in the forest, making them more flammable.

Release: Using thinning techniques to free a tree or group of trees from competition for nutrients, sunlight, and water by removing the competing small trees and shrubs.

Residence Time: How long the flaming front of a fire burns in any one location.

Resilient/Resiliency: The ability of an ecosystem to return to its balanced state after a disturbance.

Riparian: A strip of land along the bank of a natural freshwater stream, river, creek, or lake that provides vast diversity and productivity of plants and animals.

Risk Assessment: The process of identifying and evaluating assets at risk.

Salvage Logging: Logging and removing merchantable trees after a fire to capture economic potential. This is a very controversial subject.

Saturated: The broad meaning is “full.” Saturated soil refers to the point at which the soil is so full of water that no more water can get into (be absorbed by) the soil, and therefore must run off.

Scalping: The act of removing the surface layer to expose the bare mineral soil.
Scratch Line: An incomplete control line in the beginning stages of fire suppression that is constructed as an emergency backup for spreading fires.

Sediment: Particles of topsoil, sand, and minerals that come from soil erosion or decomposing plants and animals. Wind, water, and ice carry these particles; when excessive sediment collects in waterways it can destroy fish and wildlife habitat.

Sensitive Species: A plant or animal species that can tolerate a small range of resources and environmental situations, or habitat. These species raise concerns about population numbers and may be recognized locally as rare, or listed as Threatened or Endangered by the state or federal Endangered Species Act.

Sequential Entries: Working in a given area several times over the course of years to spread out the impacts of treatments.

Shade-Tolerant: Attribute of a species that is able to grow and mature normally in and/or prefers shaded areas.

Shaded: Blocked from light.

Shaded Fuelbreaks: A fire-suppression technique using fuelbreaks in forested areas. Vegetation is reduced and/or modified to reduce fire risk, but an adequate amount of crown canopy remains intact, thus inhibiting weedy undergrowth.

Shape: The act of pruning a tree to a desired form or appearance.

Sheltered Connectivity: Contiguous areas within a thinning treatment that are retained for wildlife cover and to support wildlife movement.

Silvicultural: The practice of caring for forest trees in a way that meets management objectives. For example, foresters may control the composition and quality of a forest stand for goods such as timber and/or benefits to an ecosystem.

Site-Specific: Applicable to a specific piece of land and its associated attributes and conditions (e.g. microclimate, soils, vegetation).

Size Class: The division of trees by the size of their diameter, sometimes split into three categories— seedlings, pole, and saw timber—or by diameter in inches.

Slash: The wood debris left on the ground after pruning, thinning, or vegetative clearing—may include branches, bark, chips, or logs.

Slash Paper: Paper used to cover slash piles before ignition with the intention of keeping the slash dry or allowing it to dry. Paper is more environmentally appropriate than plastic.

Slope: A percentage or degree change in elevation over a defined distance that measures the steepness of a landscape.

Slope Stability: The degree to which a slope is susceptible to erosion and slides, or the measure of its overall stability.

Snag: A standing dead tree that has usually lost most of its branches. Snags offer essential food and cover for a host of wildlife species.

Soil Crust: A hard crust forming on exposed soils, usually found in semiarid and arid environments.

Soil Type: Refers to the different combinations of soil particles and soil composition. Soil can vary greatly within short distances.

Spatial Distribution: The manner in which plants are arranged throughout an area.

Species Composition: The combination of species found in a particular site.

Spot Fire: A smaller fire outside the boundary of the main fire (usually ahead of the direction the fire is traveling), started by airborne sparks or embers.

Spur: A road branching off the main road to provide access to a designated area.

Stacking Functions: The act of accomplishing several goals with one activity.

Stand: A group of trees or shrubs with similar species composition, age, and condition that makes the group distinguishable from other trees in the area.

Stand-Replacing Fires: A fire that kills the majority of the dominant aboveground vegetation in an ecosystem and encourages the start of regrowth.

Stand Structure Model: The spatial arrangement of the forest stand, describing the density and connectivity of the understory, mid-story, and overstory vegetation.

State Responsibility Area (SRA): An area that has fire protection provided at the state level. Incorporated cities and federal land do not fall in this area. Legal responsibility is at a state level.

Stem and Poles: The trunk of a tree or a piece of wood that is long and slender.

Stemwood: The wood of the main stem or trunk of a plant.

Stocking Levels: The density and calculation of tree seedlings, saplings, and poles in a given area.

Strip Patch: In prescribed burning, a narrow section or area where the fuel is burnt while the surrounding area is left untreated.

Stroke Size: In this case, the minimum required inch width (3/8) of the brush used for letters, numbers, and symbols for street and road signs.

Structural Ignitability: The ease with which a home or other structure ignites.

Structural Protection Zone: Immediate 30-foot buffer zone around the home.

Structure: The composition of a forest or vegetation, specifically looking at the density, cover, size or diameter, and arrangement.

Stump Sprout: The ability of a tree to resprout from its cut stump.

Submerchantable: Trees that cannot be sold for timber products due to disease, deformities and/or size.

Subsidence: Settling of the Earth's surface downward, creating a sinking motion.

Surface Fire: A fire at the ground level that consumes debris and smaller plants.

Surface Fuels: Materials on the ground like needles or low-growing shrubs that provide the fuel for fires to spread on the ground. Surface fuels are generally considered all fuels within 6 feet of the ground.

Surface or Crown: The distinguished location that a fire burns. "Surface" refers to the forest floor, while "crown" refers to fires in the top of trees.

Suspended Dead Material: Typically composed of pine needles that are draped on living brush. Made up of dead fuels not in direct contact with the ground, consisting mainly of dead needles, foliage, twigs, branches, stems, bark, vines, moss, and high brush. In general these fuels easily dry out and can carry surface fires into the canopy.

Swamper Burning: A method of prescribed fire where fuel is added gradually and continually to a burning pile over the course of a day.

Thermal Cover: Vegetation cover that modifies unfavorable effects of weather for animals. For example, deer may move into riparian areas with 70% canopy to avoid very hot weather.

Thicket: A dense area of brush containing close-growing plants. Provides habitat to wildlife but may be difficult for humans to pass through.

Thinning: The act of removing a percentage of vegetation to encourage an open space and healthy growth for the remaining vegetation.

Thinning Away Contiguous Fuels: The practice of cutting back fuel loads from the edge of a desired leave- tree or patch in an effort to separate fuel connectivity.

Thinning From Below: Silvicultural practice where smaller understory trees are selectively removed below overstory trees. This method is also called “low thinning.”

Threatened Species: Any species including animals, plants, fungi, etc., that is vulnerable to extinction in the near future, and is so classified by the state or federal government.

Tillering: The process by which new aerial shoots emerge from the base of the plant. To send forth shoots from the base of grass, for example.

Tip-Sprout: The ability of a shrub to resprout from a cut limb.

Torching: A rapid and intense burning of a single or small group of trees/shrubs, causing the upward movement of fire; a.k.a. crown fire initiation or flare-up.

Touch-Off: A controlled burning (or prescribed fire) operation performed by a forestry or fire crew, where large quantities of forest treatment slash are arranged in hand piles and ignited with drip torches simultaneously by multiple crew members.

Treatment: An action or controlled technique that is applied in a specific process. Refer to “Fuel Treatment” for a more specific definition.

Type Conversion: The unintended replacement of native plant communities due to various disturbances such as more frequent and unnatural fires. Typically replacement is by invasive or non-native plants.

Underburn: A prescribed-fire method where burning is conducted in the understory of the forest, below the dominant trees.

Understory: Generally herbaceous or shrubby vegetation that makes up the plant layer under the tree canopy layer.

Uneven-Aged Treatment: A treatment that deals with three or more age-classes of trees.

Unstable: Land that is lacking stability, or liable to change with activity, such as in the case of steep slopes or crumbly soils.

Untreated: Not altered from a natural or original state; unprocessed, e.g. no fuel- reduction or defensible- space activities.

Urban Fuels: Any flammable materials within a landscape as a result of urban development. Examples include urban structures, landscaping, and urban debris such as wood piles, trash dumps along roadsides, and die-back from weedy invaders.

Variable-Density Thinning: Thinning or selectively cutting trees or shrubs in a manner to restore repeating variability or redundancy in an ecosystem. This technique ensures diversity in stand density and canopy cover.

Variable Density Treatment: Silvicultural thinning practice where some portions of a stand are left lightly or completely un-thinned ("skips"), providing areas with high stem density, heavy shade, and freedom from disturbance; while other parts of the stand are heavily cut ("gaps"), including removal of some dominant trees to provide more light for subdominant trees and understory plants. Intermediate levels of thinning are similarly applied in a typical variable-density prescription. This practice is also known as "free thinning."

Vernal Pool: Seasonal amphibious environments dominated by annual herbs and grasses adapted to germination and early growth under water. Spring desiccation triggers flowering and fruit set, resulting in colorful concentric bands around the drying pools.

Vertical and Horizontal Structure Diversity: Describes the configuration of trees within a forest stand that create a variation of structure where trees stand straight up and down (vertical) or grow at an angle (horizontal).

Vertical Fuels: Those fuels (brush, small trees, decks, etc.) that provide a continuous layer of fuels from the ground up into the top fuel layers (i.e., tree canopy).

Viewscape: The line-of-sight from one location to another in its entirety or a portion of it.

Viewshed: The landscape or topography visible from a geographic point, especially that having aesthetic value.

Watershed: All of the land that drains water runoff into a specific body of water. Watersheds may be referred to as drainage areas or drainage basins. Ridges of higher elevation usually form the boundaries between watersheds by directing the water to one side of the ridge or the other down to the low point of the watershed.

Weed-Eater: A hand-held tool that utilizes a gas or electric motor and a rotating nylon string or metal blade to cut down vegetation. Using this tool is called “weed- eating,” “weed-whacking,” or “weed-whipping.” **Wick:** A combustible material that allows fire to travel along a confined path to larger fuel sources. An example would be a wooden fence connected to your home.

Wildfire/Fire Risk: The combination of vegetation, topography, weather, ignition sources, and fire history that leads to the probability that something will ignite and/or burn.

Wildland-Urban Interface (W.U.I.): The area where wildlands and communities converge, often assumed to be at high risk of wildfire, which can be due to increased sources of human-caused ignitions.

Wildlands: An area of land that is uncultivated and relatively free of human interference. Plants and animals exist in a natural state, thus wildlands help to maintain biodiversity and to preserve other natural values.

Winds Aloft: Upper winds that occur in the atmosphere above the surface level, generally 2,000 feet and higher.

Windthrow: Trees that are uprooted by wind events. Formerly protected stands whose edges are opened up become vulnerable to this effect.

Yarding: A technique for moving felled trees, limbs, and brush by hauling them to the road or landing with a cable and tractor.