

3 WILDLAND URBAN INTERFACE ENVIRONMENT AND FIRE HAZARD

3.1 FIRE AND LAND MANAGEMENT POLICY AND RESPONSIBILITY

SRAs are areas in which “CAL FIRE has legal and financial responsibility for wildland fire protections and where CAL FIRE administers fire hazard classifications and building standard regulations” (2013 SHMP, page 246) SRAs are county unincorporated areas, are not federally owned, have wildland vegetative cover, have watershed/range/forest value, and have housing densities not exceeding three per acre (California Governor’s Office of Emergency Services 2013). There are areas in Santa Clara County that are classified SRAs that also are within the boundaries of a fire protection district (e.g., Saratoga, Central, and South Santa Clara County fire protection districts). In these instances, jurisdiction is shared between the fire district and CAL FIRE. Local Responsibility Areas (LRAs) include land within incorporated cities, cultivated agricultural lands, lands not meeting criteria for SRAs or Federal Responsibility Areas. LRA fire protection is usually performed by city fire departments, fire protection districts, county fire departments, or CAL FIRE under contract to local government. LRAs may include flammable vegetation and the WUI. The local government agency has financial and jurisdictional responsibility for improvement and WUI fire protection (California Governor’s Office of Emergency Services 2013).

3.1.1 SANTA CLARA COUNTY FIRESAFE COUNCIL

The Santa Clara County FireSafe Council was chartered in 2001 and works with a variety of partners at the federal, state, and local levels. Communities involved with this work include Stanford, Palo Alto, Los Altos Hills, Cupertino, Saratoga, Monte Sereno, Los Gatos, Lexington Hills, San Jose, Morgan Hill, Gilroy, East Foothills, and Milpitas. Funding is provided by federal, state, and other grants, as well as by the county, cities, fire agencies, and other partners and individuals. The goal is to create a FireSafe Santa Clara County.

3.1.2 STATE OF CALIFORNIA

California Department of Forestry and Fire Protection (CAL FIRE)

CAL FIRE assumes fire protection responsibilities on SRAs⁶. In conjunction with this responsibility, the Santa Clara Unit conducts defensible space (LE-100) inspections to educate and enforce property owners on compliance with Section 4291 of the PRC. Under this section, all structures located with the SRA will have clearance of up to 100 feet of flammable vegetation. Otherwise, the Santa Clara Unit has delegated the enforcement of the latest California Building Code standards (California Code of Regulations Title 24, Part 2) to the local authority.

California Department of Parks and Recreation

The California Department of Parks and Recreation manages 280 units. Two of these units are located in Santa Clara County: Henry W. Coe State Park and Martial Cottle State Park. The Cottle unit comprises 256 acres of farmland; the Coe unit is the largest state park in northern California

⁹ 2013 State of California Multi-Hazard Mitigation Plan

¹⁰ Public Resources Code 4125.

at 89,164 acres. It also contains 22,000 acres of designated wilderness; in September 2007, the wilderness area was burned by the 47,760 Lick fire. Started by burning debris, the fire cost more than \$10 million to suppress and destroyed several structures.

The Coe unit has a highly diverse mixture of vegetation types, ranging from grassland to chaparral to ponderosa pine. Fire is a significant part of the natural history of this area, and in recognition of this, park management has a very active prescribed fire program. For example, in November, 2015, a 630-acre prescribed fire was ignited, with about 300 acres treated within a few days. The prescribed fire was conducted with the support of personnel from California State Parks, CAL FIRE, San Jose City Fire, San Jose State University, and the approval of the Bay Area Air Quality District, illustrating the broad support such programs require.

3.1.3 COUNTY OF SANTA CLARA

Fire

Established in 1947, the Santa Clara County Fire Department has fire and life safety code responsibilities for the communities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Monte Sereno, Saratoga, and all of unincorporated County area. The Fire Chief of the Santa Clara County Fire Department is the County Fire Marshal.

All planned construction projects within the seven cities and towns and the entire unincorporated areas of the County are submitted to the local planning and building departments. Each of these jurisdictions forward the proposed development and building permit applications to Santa Clara County Fire Department's Fire Prevention Division for our review and comments. Prior to the issuance of building permits by the communities served, projects must meet all fire department requirements, including meeting California Building Code Chapter 7A requirements for buildings located in in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland-Urban Interface Fire Area to resist the intrusion of flames or boring embers projected by a vegetation fire. New development also must meet appropriate fire apparatus access and water supply requirements.

Every spring the Santa Clara County Fire Department sends defensible space letters to all residents within the jurisdiction living in locally identified Wildland-Urban Interface Areas and within the SRA of the District. Local engine companies perform field inspections, with follow up inspections from the Fire Prevention Division. Enforcement of defensible space is performed in coordination with each community's code enforcement program.

Parks and Open Space

Santa Clara County Department of Parks and Recreation

Formed in 1956, the Santa Clara Department of Parks and Recreation oversees regional parks usually larger than local neighborhood or community parks, often more than 200 acres. The county park system has expanded to 29 regional parks covering almost 48,000 acres since its first parkland, the 400-acre Stevens Creek County Park, was acquired in 1924.

Santa Clara Valley Open Space Authority

The Santa Clara Valley Open Space Authority is an independent special district and not part of county government. Its purpose is to preserve key portions of the natural environment using a variety of tools, including land and easement acquisition, as well as participating in planning and conservation activities. Established in 1993 by the state legislature and Governor Wilson, its jurisdiction is all of Santa Clara County, except Gilroy and lands and communities within the boundaries of the Midpeninsula Regional Open Space District. The Santa Clara Valley Open Space Authority participates with the cities of Milpitas, Santa Clara, Campbell, and Morgan Hill.

Midpeninsula Regional Open Space District

Founded in 1972, the Midpeninsula Regional Open Space District is a regional greenbelt system, covering over 60,000 acres in 26 open space preserves. The district manages a wide variety of vegetation, including chaparral, oak woodlands, fir and redwood forests, riparian corridors, grasslands, and wetlands. Preserve size ranges from 55 to 18,831 acres, with over 220 miles of trails. The Sierra Azul area southeast of Los Gatos is the largest unit in the district.

3.1.4 WATER PURVEYOR AND WATERSHED MANAGEMENT ORGANIZATIONS

Wildfire can cause serious degradation of both watershed management infrastructure and water quality. Burned watersheds can result in greater runoff, erosion, and sedimentation, with a loss of water quality and increased cost of water treatment. Since heavier amounts of vegetation will burn more severely than lighter wildland fuels, allowing an accumulation of untreated wildland fuels to occur in watersheds and riparian areas can lead to a loss of water quality and significant environmental degradation, which can be very expensive to repair. As is the case with homeowners, risk mitigation is dependent on fuels treatment performed before a wildfire occurs and cannot rely solely on the timely arrival of fire suppression resources.

San Jose Water Company

Founded in 1866, the San Jose Water Company is an investor-owned public utility, serving over one million people in the San Jose metropolitan area. It provides groundwater from more than 100 wells for 40% of its supply and purchases treated water from the Santa Clara Valley Water District for 50% of its supply. An additional 10% of its supply comes from its watershed in the Santa Cruz Mountains, treated at two water treatment plants.

Santa Clara Valley Water District

Founded in 1929, the Santa Clara Valley Water District contains 10 reservoirs that impound water from storm runoff, as well importing water from the Sierra Nevada and pumping water from aquifers. The water district manages about 275 miles of creeks in Santa Clara County, or about one-third of the county's 800 miles of creeks and rivers. In partnership with cities and Santa Clara County, the water district also provides open space and recreational opportunities at many of its reservoirs and creeks.

3.1.5 CITIES

Santa Clara County contains 15 cities (Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale). Most of these communities are also considered to be at risk from wildfire. City fire departments typically work within a mutual aid framework to respond to emergencies in various jurisdictions as the incident evolves. The Milpitas Fire Department, for example, is able to respond to a wide variety of incidents, as well as enforcing fire and life safety codes, similar to the functions of other city fire departments.

3.1.6 VOLUNTEER ORGANIZATIONS

Several volunteer fire departments participate in wildfire activities in Santa Clara County. These include the Uvas Volunteer Fire Department (Morgan Hill), the Casa Loma Volunteer Fire Association, the Spring Valley Volunteer Fire Department (San Jose/Milpitas), and the Stevens Creek Volunteer Fire Department (Cupertino).

3.2 WILDLAND URBAN INTERFACE

3.2.1 FIRE HAZARD SEVERITY ZONES

CAL FIRE developed the FHSZ rating system in 1973 for agency use in determining resource allocation. FHSZ is a science-based system used to assess wildland areas that scores vegetation, topography, weather, crown fire potential, ember production, and probability of fire occurrence. Possible FHSZ ratings are very high, high, or moderate.

There are areas of very high, high, and moderate FHSZs in the SRAs/unincorporated areas of Santa Clara County (Figure 1.1).

In 1981, California law⁷ required formal adoption of FHSZ rankings for all SRAs in order to “reduce the potential intensity of uncontrolled fire that threaten to destroy resources, life or property.” In 1992, following the Oakland Hills Tunnel fire, the FHSZ rating mandate was extended to include LRAs. CAL FIRE performs the rating analysis in LRAs and submits its recommendation to the city. The city can choose to adopt the recommendation, modify it, or reject it. There are very high FHSZ areas within cities in the county. It should be noted that for LRAs, the hazard rating actually adopted by local governments may be different from that recommended by the state. Therefore, three layers of hazard are used in this CWPP: CAL FIRE FHSZ recommended (SRA and LRA), FHSZ adopted (SRA and LRA), and locally identified and adopted WUI.

Additionally, the 2013 State of California Multi-Hazard Mitigation Plan notes that Santa Clara County is designated as a high wildfire hazard ranking in LHMPs (California Governor’s Office of Emergency Services 2013). The document also notes that the county is designated as high to very high for FHSZs for SRAs.

⁷ Public Resources Code 4202

On September 20, 2005, the California Building Standards Commission approved the Office of the State Fire Marshal's emergency regulations amending the California Code of Regulations, Title 24, Part 2, known as the 2007 California Building Code. The following is taken from the California Building Code:

701A.3.2 New Buildings Located in Any Fire Hazard Severity Zone. New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas, any Local Agency Very-High Fire Hazard Severity Zone, or any Wildland-Urban Interface Fire Area designated by the enforcing agency for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all sections of this chapter. New buildings located in any Fire Hazard Severity Zone shall comply with one of the following:

1. State Responsibility Areas.

New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas, for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all sections of this chapter.

2. Local Agency Very-High Fire Hazard Severity Zone.

New buildings located in any Local Agency Very High Fire Hazard Severity Zone for which an application for a building permit is submitted on or after July 1, 2008, shall comply with all sections of this chapter.

3. Wildland-Urban Interface Fire Area designated by the enforcing agency.

New buildings located in any Wildland-Urban Interface Fire Area designated by the enforcing agency for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all sections of this chapter.

Objective of WUI Fire Area Building Standards

The broad objective of the WUI fire area building standards is to establish minimum standards for materials and material assemblies and provide a reasonable level of exterior wildfire exposure protection for buildings in WUI fire areas. The use of ignition-resistant materials and design to resist the intrusion of flame or burning embers projected by a vegetation fire (wildfire exposure) will prove to be the most prudent effort California has made to mitigate the losses resulting from the state's repeating cycle of WUI fire disasters. CAL FIRE and the Office of the State Fire Marshal revised the mandatory effective date for those areas where local government has responsibility for wildland fire protection (LRAs) to July 1, 2008, to enable local government agencies more time to review and accept the FHSZ maps that will be presented to them formally after the new year.

Adopted WUI Zones (SRAs/LRAs)

At the national level, identification of WUI communities was initiated following the establishment of the National Fire Plan in 2000, with federal, state, and local agencies involved with this process. Delineation of the location of the WUI is a basic step in the identification of areas at most risk from wildfire, which can trigger requirements for the mandatory use of codes associated with building materials and defensible space.

This CWPP follows the pattern of using the adopted WUI areas in the plan development. The Croy CWPP notes that it is entirely within WUI, as well as in SRAs. Additionally, all of the Croy CWPP is within a very high FHSZ. Therefore, if development increases in the Croy area WUI, for example, more residences will be exposed to wildfire risk and therefore be in need of targeted hazard reduction activities and code enforcement to mitigate this risk. Conversely, deficiencies in this mitigation process, including the adoption and enforcement of new and existing fire codes, as well as adjustments in the delineation of the WUI as the result of changing vegetation and community development patterns over time, will likely result in the increasing loss of homes. Figure 3.1 shows the designated WUI areas used in plan development.

DRAFT

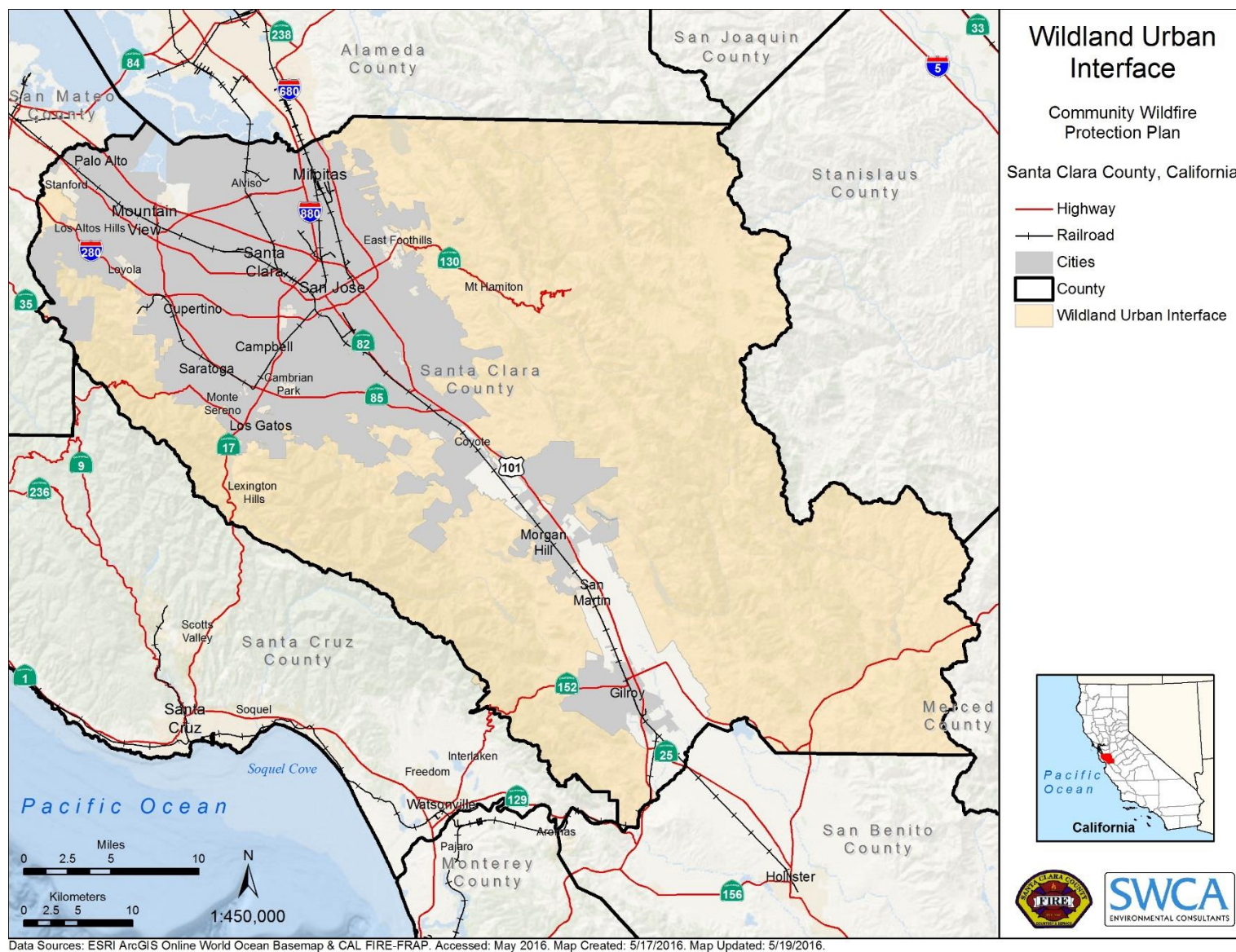


Figure 3.1. Designated WUI areas

3.3 LAWS, ORDINANCES, STANDARDS, AND CODES FOR FIRE PREVENTION

3.3.1 LAND USE PLANNING

The Santa Clara County Department of Planning and Development provides four areas of service: public information, planning, development review, and zoning enforcement. Its primary function is to plan and regulate land use and development within the unincorporated areas of Santa Clara County. It manages the county's General Plan; the Safety Element within this plan is associated with the mitigation of wildfire risk.

In conjunction with the planning process, the Santa Clara County Office of the State Fire Marshal provides education, plan review, inspection, and code enforcement for the county regarding fire issues. The Fire Marshal is also the Chief of the Santa Clara County Fire Department and is responsible for fire prevention activities in most unincorporated areas of the county. The Fire Marshal's office also reviews and inspects applications for burn permits in unincorporated WUI portions of the county.

Authority for the Fire Marshal is derived from Section A33-47 of the County Code and Section 101 of the California Fire Code. The Fire Marshal has the authority to make and enforce such rules and regulations for the prevention and control of fire and fire hazards.

3.3.2 BUILDING CODES

As noted by CAL FIRE, California's building codes have two parts:

- remove flammable vegetation from around the building; and
- construct the building of fire resistant material.

With regard to clearance, the law requires that homeowners conduct fuels modification to 100 feet or to the property line if this distance is less than 100 feet. This provides both defensible space for firefighters in which to work and protection for the home.

With regard to building codes, standards have been developed to improve the resistance of buildings to ignition from airborne embers. New buildings located in any FHSZ within SRAs (building permit submitted after January 1, 2008), in any LRA-very high FHSZ (building permit submitted after July 1, 2008), or in any WUI fire area designated by the enforcing agency (building permit submitted after January 1, 2008) will comply with all sections of California Code of Regulations Title 24, Part 2, 701A.3.2 (New Buildings Located in Any Fire Hazard Severity Zone).

For LRAs, in which local government has responsibility for wildland fire protection, CAL FIRE provides recommendations for very high FHSZs. Local government, in turn, uses these recommendations to designate very high FHSZs within its jurisdiction. Local government may exclude fire protection requirements prompted by the map designation and may adopt, modify, or deny the very high FHSZ recommendation.

Taken together, these building codes are intended to improve the resilience of a building to ignition from either direct flame contact or from airborne embers. In incidents in which the rate of wildfire spread, and the number of homes at risk from the wildfire, exceeds suppression capacity, this resilience may determine whether the building survives.

3.3.3 WILDLAND URBAN INTERFACE DEFENSIBLE SPACE

The definition of defensible space via state and local codes, its maintenance by homeowners, and enforcement by fire agencies as needed is a common part of wildfire risk mitigation. The California State Board of Forestry issued *General Guidelines for Creating Defensible Space* in 2008, following a change in PRC 4291 that expanded defensible space clearance requirements from 30 to 100 feet around buildings and structures in SRAs.

The document notes some aspects about WUI defensible space that are often overlooked:

- Greater defensible space may be needed due to local conditions, such as slope and fuel density.
- Fuel reduction has more to do with disrupting fuel continuity so that the spread of fire is impeded, rather than creating a denuded zone around a home. For example, pruning the lower limbs of trees creates a break between ground fuels and tree canopies, reducing the chances that a fire will move from a ground fire to a crown fire.
- Communities may wish to develop defensible space areas that are greater than 100 feet for even better protection; the code only sets a minimum distance.
- Defensible space also provides a safer environment in which firefighters can work. This environment is more than vegetation clearance; defensible space also involves emergency vehicle access, water supply, and clear street signs and addresses. All of these factors, and many more identified by previous community-level CWPPs, by their presence or absence affects the usefulness of defensible space in structure protection.
- Vegetation fuel reduction projects require compliance with all federal, state, or local environmental protection laws.

3.3.4 FIRE PREVENTION

The prevention of wildfires is a common theme among fire agencies at the federal, state, and local levels. Several methods are generally employed in support of this program, including:

- Vegetation management programs are designed to modify fire behavior, which may involve establishing reduced fuel zones, such as fuel breaks and prescribed fire units, to impede the spread of a wildfire and to facilitate access by suppression resources to threatened areas.
- Analysis identifies historic ignition patterns and causes, combined with public education efforts to encourage more care by the public, such as in the use of campfires and cigarettes.

- Fire danger conditions, such as high, very high, or extreme, are often posted on signs throughout an area (Figure 3.2), as well as announced on local news and other social media methods.
- Measures are taken to prevent, detect, and suppress wildfires as early as possible. During periods of high fire danger, fire organizations typically proactively promulgate strategies to reduce ignitions, such as smoking and campfire bans in specific high hazard areas, and adjust fire agency work schedules to increase patrols and hours or days of coverage.
- Volunteers can be used to augment fire prevention work. CAL FIRE has used the Volunteers in Prevention program since 1980 to enlist citizens in many fire prevention tasks, including delivering classroom presentations, contacting homeowners about the importance of defensible space, and providing information to the public and media during emergencies. All 21 CAL FIRE units employ this program; Santa Clara County was one of the seven counties targeted for this program, with an objective of a reduction of human-caused wildfires by 10%.



Figure 3.2. Fire preparedness signage is already in place in some areas of the County but additional signage is recommended.

3.3.5 PRESCRIBED BURNING/LAND MANAGEMENT STRATEGIES

Although the focus of wildfire risk mitigation is often on the reduction and removal of vegetation, and the prevention and suppression of wildfire, fire under the right circumstances can be not only a useful tool to reduce hazardous amounts of fuel but also an important factor in wildland ecosystems. Many fire and resource management agencies at the local, state, and federal levels include the use of fire in their programs (Figure 3.3).

The use of prescribed fire has several requirements to be successful, including:

- Planning documents include approval authority, burn objectives, preparation requirements, weather and fuels conditions under which the burn will be performed, operational responsibilities, contingency planning in the event of an escape, and post-burn monitoring to document the attainment of burn objectives and other potential fire effects, such as the occurrence of invasive species.
- Specific attention must to be given to smoke management and weather forecasts concerning smoke direction and atmospheric mixing patterns. Review of prescribed burn plans and smoke management techniques need to be performed by the Bay Area Air Quality Management District. Consultation between the agencies involved with the burn and the air district needs to occur early in the planning cycle, especially with regard to identification of suitable weather periods for the burn to be conducted. Conditions suitable for the fire agency may not be suitable from the perspective of the air district.
- Public education and outreach is vital given the frequent concern by the public over smoke, risk of escape, and post-fire appearance of the burn unit. It is unlikely that all of the public will support the prescribed fire program, but outreach conducted through social media and on-site visits to the post-burn areas as they recover can develop a broad base of support, especially if the fire has stimulated the occurrence of desirable species considered to be rare.



Figure 3.3. Prescribed fire being used to reduce grass loads on public open space land in the County

More typically, hazardous fuels are managed with a variety of tools, including goats, disking, hand cutting and piling, herbicides, mowing, and weed whips. As is the case with prescribed fire, the need remains to define the objectives of the treatment, measurement to document that the objectives were met, and follow-up monitoring to discover any unexpected deleterious effects on natural resources.

CAL FIRE also has a longstanding cost share program, the VMP, that can use prescribed fire and mechanical methods to treat wildland fuels. Private landowners can contract with CAL FIRE to use these tools for hazard reduction and resource management objectives.

Santa Clara County possesses many natural and cultural attributes that are highly valued by the communities. Fuels management programs must be planned and conducted to preserve sensitive resource values while mitigating the risk to them and WUI communities. This is especially true for parks and open space areas enjoyed by so many residents, which are home to a wide variety of plants and wildlife.

3.4 FIRE HISTORY

Santa Clara County has experienced large and destructive fires in the last several years. These include the 1985 Lexington fire, which burned 37 homes, 4,200 acres, and caused \$7 million in damage; the 2002 Croy fire, which burned 3,127 acres, 31 homes, caused 13 injuries, and cost \$7.5 million to suppress; the 2008 Summit fire which burned 35 homes, 4,270 acres, caused 16 injuries, and cost \$16 million to suppress; and the 2009 Loma Prieta fire which burned 669 acres, cost 2.7 to suppress, involved 1,742 firefighters, destroyed one residence and caused four injuries . High fire danger conditions that can support very active fire behavior may be relatively uncommon, but when such conditions occur, they have significant destructive potential. For example, The Summit fire spread by high winds even after six inches of rain had occurred twelve days earlier. Figure 3.4 shows the fire history for the project area.

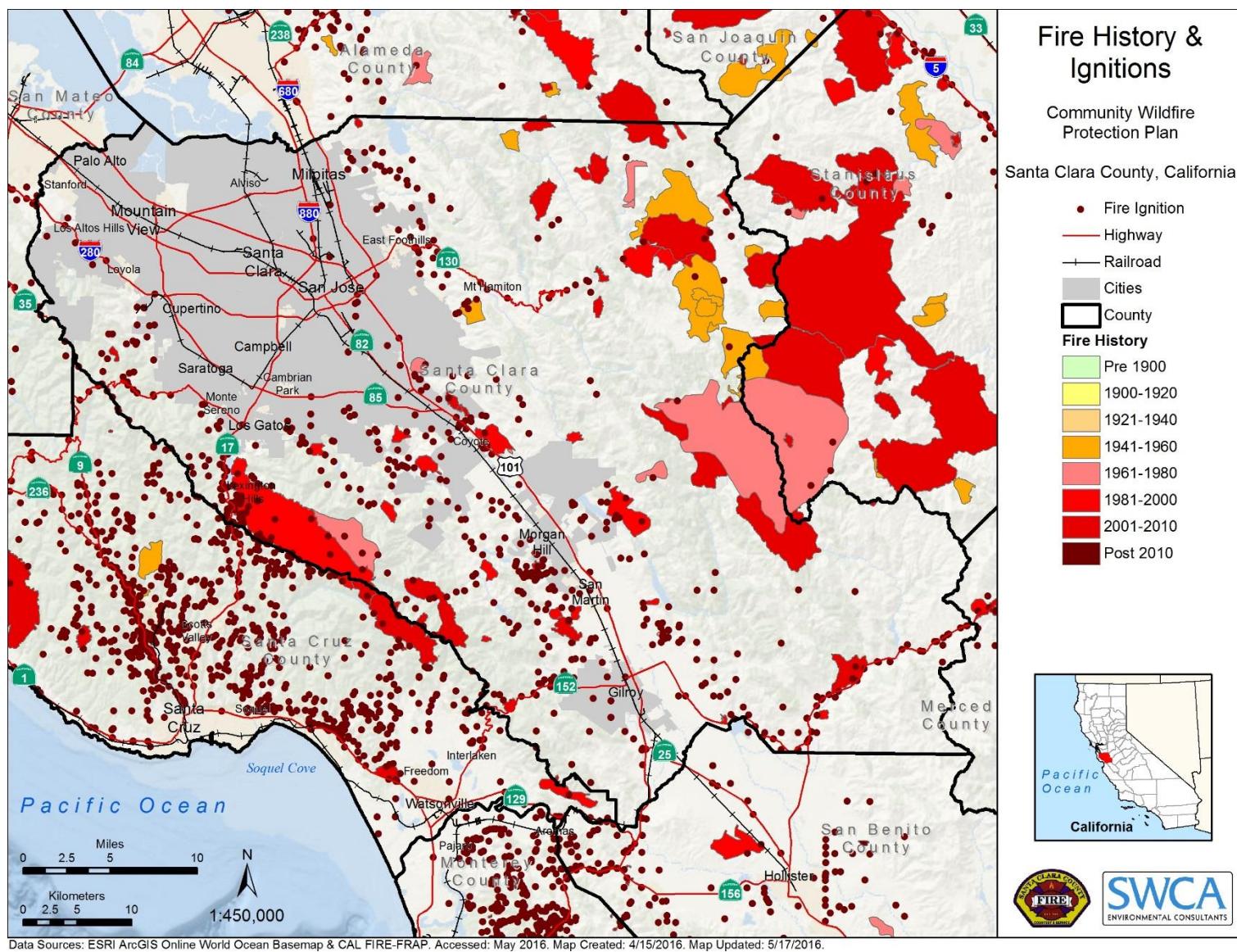


Figure 3.4. Santa Clara County Fire History

3.5 IGNITION HISTORY

An indication of the amount of fire activity in the county relative to the other types of incidents is indicated by the response calls of the Santa Clara County Fire Department. Calls for service in 2015 with regard to fire numbered 540, or 3% of the total. By comparison, Emergency Medical Service calls numbered 10,889, or 62% of the total. Figure 3.4 shows the ignition history for the project area.

3.5.1 LOCATIONS

Because lightning is a rare occurrence in the county, wildfires tend to be associated with human locations. Roadsides, power lines, trails, railroads, and other developments can show a concentrated pattern of ignition locations. Because of this pattern, public education fire prevention work may be focused on both types of ignitions, such as campfires or smoking, as well as at specific locations known to have a history of such ignitions. Although the 1985 fire was arson caused, arson is a relatively small source of ignitions, but given the possibility of individuals setting fires under high fire danger conditions, consequences can be catastrophic.

3.5.2 CAUSE TYPES

The Santa Clara Unit of CAL FIRE, which covers an area greater than Santa Clara County, had 174 fires within its Direct Protection Area in 2014. Several categories (playing with fire, 2% of total ignitions; debris burning, 6%; and smoking, 3%) likely reflect the benefits of public education about wildfire prevention. The largest category (undetermined, 44%) illustrates the uncertainty often associated with determining fire cause.

In 2014, no lightning-caused fires occurred in the county. This is typical of coastal areas, with most wildfires associated with human activity. Two of the larger causes of fire in 2014 were vehicles (15%) and electrical power (11%). The latter is especially problematic during periods of high wind activity, with the co-occurrence of such winds causing downed power lines with arcing and rapid rates of spread from the ignition site. Note: 2008 saw an unprecedented amount of dry lightning in Northern California, including the coastal mountain areas of Santa Cruz. On June 21, 2008 lightning ignited the Hummingbird fire that burned 794 acres southwest of Morgan Hill, west of Gilroy and San Martin and threatened 1200 homes.

3.5.3 EXTREME FIRE BEHAVIOR PATTERNS

The largest wildfires in Santa Clara County, much like other coastal counties such as San Diego, Santa Barbara, and Los Angeles, tend to be associated with east wind conditions, also referred to as Santa Ana winds in southern California and Diablo winds in the Bay Area. Such winds tend to be stronger in southern California, in part because topography and orientation of canyons also channels these winds and increases their strength, but also as they are associated with high pressure systems over Sierras & concurrent lows off the coast.

The presence of very low relative humidity, warm to hot temperatures, and strong winds, along with continuous wildland vegetation and moderate to steep topography, can quickly lead to disastrous wildfire behavior even if conditions persist for only a few hours. Spotting behavior is

especially active because low relative humidity causes extremely dry, receptive fuels to occur, with spot fires often igniting more than a mile in front of the fire itself.

Suppression operations are further complicated in high winds because air tankers cannot fly safely, winds disperse retardant before it hits the ground, and/or smoke obscures the location of the fire. Therefore, while relatively rare, extreme fire behavior patterns can cause the vast majority of damage and cost associated with the fire season. Moreover, failure to plan and prepare for this type of fire behavior leaves virtually no time to correct defensible space or communication deficiencies.

3.6 FIRE REGIMES

Fire regimes are associated with both the fire cycle and fire behavior of various vegetation types, and the nature of these patterns prior to the onset of wildfire suppression as a reference baseline.

For example, yellow pine forests in the Sierra Nevada are considered to have had a relatively frequent fire cycle historically, perhaps less than 10 to 20 years between fires, and fire behavior that tended to thin understory trees but generally leaving mature trees unharmed. The onset of fire suppression has altered the fire regime, as wildland fuels accumulated in the absence of fire; as fires became less frequent, they also became more intense because of accumulated fuels, damaging and killing even the mature trees.

Associated with the fire regime concept is the Fire Regime Condition Class (FRCC), which indicates the degree of departure from historic characteristics. On a scale of 1 to 3, FRCC ratings are assigned to areas, with a rating of 1 indicating that the area's fire regime is considered to be within its historic range, a rating of 2 indicating moderate alteration, and a rating of 3 indicating substantial alteration because of several missed fire cycles due to suppression. Areas with an FRCC rating of 3 may lack the resilience to recover from wildfire because of unnatural fire severity.

The fire regime in Santa Clara County is considered to have had a moderate fire cycle, with woodlands and forests burning more on the order of 30 to 100 years between fires, affected by site factors such as aspect and position on slope (i.e., upper portion of ridge vs. riparian). The county is generally rated as FRCC 2, indicating some effect on the fire cycle due to fire suppression, but not enough to trigger a risk of loss of ecosystem integrity. Woodlands and shrublands, for example, can be expected to recover following fire, although invasive species may pose a threat in specific areas.

Invasive species in particular can cause a significant shift in the pattern and behavior of wildfires (Klinger et. al, 2006). Replacement of woody vegetation by non-native annual grasses, for example, provides a continuous fuel layer of easily combustible fine fuels. This conversion of fuel type, along with other factors such as drought, climate change, and an increasing population which can lead to more human-caused wildfires, can set up a cycle of increasingly frequent wildfires, with a higher risk to public safety, ecosystem integrity, and structures.

3.7 FIRE AND RESPONSE CAPABILITIES

California contains many federal, state, and local fire protection organizations that are well integrated through a variety of mutual aid and fire protection agreements, and are coordinated by organizations such as the California Wildfire Coordinating Group, the Northern and Southern California Geographic Area Coordination Centers, and FIREScope. Agencies such as California Emergency Management, U.S. Forest Service Region 5, and CAL FIRE form the basis for a very substantial wildfire response capacity that can be deployed in wildfire situations throughout the state. California contains what many regard as the strongest wildfire suppression capability in the nation.

3.7.1 RESPONSIBLE WILDFIRE AGENCIES (FEDERAL, STATE, COUNTY, CITIES, DISTRICTS)

- CAL FIRE's Santa Clara Unit covers several counties, including Contra Costa, Alameda, Santa Clara, and the western portions of Stanislaus and San Joaquin Counties. The Santa Clara Unit has auto-aid or cooperative agreements with several local fire protection entities, including the South Santa Clara County Fire District, Santa Clara Fire Department, Gilroy Fire Department, Palo Alto Fire Department, Milpitas Fire Department, San Jose Fire Department, and Morgan Hill Fire Department. The unit is responsible for 1.3 million acres of direct protection area, with a population of 5.5 million people.

There are no federally designated communities at risk within the unit because of the absence of federally managed land. There are, however, 1,327 communities on the California Communities at Risk list, which is managed by the California Fire Alliance. Within Santa Clara County, these include Gilroy, Lexington Hills, Los Altos Hills, Los Gatos, Milpitas, Morgan Hill, Monte Sereno, Palo Alto, San Jose, San Martin, and Stanford.

The unit has 12 fire stations (15 engines), one helitack base (one helicopter), and three bulldozers with transport. Four of the unit's battalions are located in Santa Clara County: Battalion One (Morgan Hill), Battalion Two (San Jose), Battalion Three (West Santa Clara County), and Battalion Seven (South Santa Clara County Fire District and Morgan Hill Fire Department).

- The Santa Clara County Fire Department provides fire protection in the communities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Monte Sereno, Saratoga, and approximately 70 square miles of unincorporated County area. The total response service area covers about 130 square miles with a population of approximately 225,000. The department has 300 employees staffing community education, prevention, investigation, operations, emergency management, maintenance, and administration. County Fire has three battalions consisting of 15 stations, with 20 front-line and 5 reserve engines. In addition, for wildfire response, the department has five type 3, three type 6 engines and one water tender. Daily emergency response staffing consists of 66 employees, augmented with 30 volunteer firefighters. During fire season, the daily staffing is increased by three to staff a type 3 engine in the north battalion. Additionally, depending on weather, burn indices and red flag warnings, daily operational staffing may be increased to 94 personnel as conditions warrant.

- All fire agencies in Santa Clara County participate countywide automatic and/or mutual aid plans for response to incidents outside their own jurisdictions. The County also participates in the California Fire Service and Rescue Emergency Mutual Aid System, which provides a practical and flexible pattern for the orderly development and operation of mutual aid on a voluntary basis between cities, cities and counties, fire districts, special districts, county fire departments, and applicable state agencies.

3.7.2 *MUTUAL AID*

The wildland fire community is well known for its development of mutual aid agreements at the federal, state, and local levels. Such automatic aid agreements allow for closest forces to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted; state resources responding to wildfires on federal lands may have their associated costs reimbursed by the responsible federal agency, and the reverse is true for federal resources suppressing a wildfire on state lands.

An example of mutual aid within Santa Clara County is that provided by the South Santa Clara County Fire District. The District is an all-risk emergency response agency. It has automatic aid agreements with Morgan Hill Fire Department, Gilroy Fire Department, Pajaro Valley Fire Protection District, Hollister Fire Department, and San Jose Fire Department. There are many similar agreements across the United States, providing a network of response capabilities for many types of incidents.

For information on fire-fighting resources, including air attack and hand crew resources, please see Appendix E.

3.7.3 *EVACUATION RESOURCES*

Previous CWPPs developed for communities within the county have noted the difficulty of access and egress of many areas. Terrain, dense vegetation, narrow roads, locked gates, and limited access due to overhanging branches and bridges too weak to support heavy firefighting equipment complicate both planning for emergency response and the actual execution of operations. Since the most dangerous wildfires tend to occur during dry, windy conditions, with rapid fire growth, these factors can cause a dangerous delay in both response by firefighting resources and evacuation by the public, as well as traffic jams on narrow roads.

Under California law, the responsibility for evacuation rests with law enforcement. Close coordination with fire agencies in planning and implementing evacuations is critical. Most frequently the task is under jurisdiction of the sheriff, who also coordinates all law enforcement mutual aid.

Road Systems

Roads vary in characteristics, but are often paved. Private driveways can be mistaken for roads, turnarounds and pullouts are limited, and dead-ends provide particularly dangerous situations for evacuations. Signage can be missing, indistinct, or at risk of combustion. Confusing signage,

impeded access due to narrow roads or overhanging vegetation, and the possibility of long driveways being mistaken for evacuation routes were cited in community CWPPs.

People

The safe and efficient evacuation of people from wildfire requires several factors, including:

- Emergency notification methods: Emergency Alert System, email and telephone, television, and public address systems on emergency vehicles. Specifically, Santa Clara County has recently established AlertSCC to provide information and instructions on incidents such as wildfire, as well as post-disaster information on shelters. The system is offered to residents by Santa Clara County and 15 constituent cities.
- Preplanning by the public about how to evacuate and where to go: Locked gates, poor or missing signage, and conflicts with emergency vehicles driving into the community versus the public trying to leave complicate evacuation. Uncertainty about where to find temporary refuge can cause families to become separated and delay reunions. Some individuals without transportation or with limited mobility may be accidentally left behind.
- Public awareness: These two items will fail to occur throughout communities at risk if the residents are unaware of notification methods, 1) the need for preplanning and 2) what elements preplanning should include. Therefore, public education and outreach on these topics should be part of all efforts conducted by agencies such as fire departments in a wide variety of venues. Given the wide variety of communities, languages, and cultures found within the county, and its broad range of urban to rural settings, a “one size fits all” public awareness program will miss portions of the public.

Horses, Livestock, and Animals

Many rural homes also have horses and other large animals and livestock, and pets are common in homes throughout the county. Evacuation planning often neglects to describe how animals will be evacuated and where they will be taken. The loading of horses, for example, during a fire and smoke situation, and transport of stock vehicles down narrow roads under stressful situations, can be very difficult. Public education could emphasize the need to practice loading horses quickly, for example.

There is also a need to pre-identify where animals can be taken, such as county fairgrounds, for large animal shelter. Similarly, locations where small animals such as dogs and cats picked up in the fire area should also be pre-identified, as well as the lead agencies, such as humane societies, coordinating this work.

The County is fortunate to have the Santa Clara County Large Animal Evacuation Team which is a volunteer resource of the Office of Emergency Services and available upon request by first responders responsible for emergency incidents.

3.7.4 WATER AVAILABILITY AND SUPPLY

Water supply is variable around the county and may be provided by hydrants, wells, cisterns, and reservoirs. However, many fire planning documents developed by various entities in the county

on the wildfire issue commonly cite water availability as a concern. The 2010 Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area, for example, calls for the development of “a coordinated approach between fire jurisdictions and water supply agencies to identify needed improvements to the water distribution system, initially focusing on areas of highest wildfire hazard” (Association of Bay Area Governments, page 1-24). All new structures in the County are required to have a reliable water supply, whether by a water purveyor or private tanks (Figure 3.5).

Compatibility of cistern connections to fire apparatuses and vegetation clearance to allow fire apparatus to access cisterns are other common water supply issues. However, as was noted previously, homes are more likely to survive a wildfire due to existing fire-resistant building materials and designs, and vegetation clearance around the dwelling, than by a reliance on suppression resources. However, it must be noted that a lack of access to water supply, and roads which are too narrow to allow transport of water by fire apparatus to structures threatened by wildfire, will complicate the suppression of wildfire and the protection of structures.



Figure 3.5. Water storage tanks at the Mountain Winery in Saratoga Hills.

3.8 PUBLIC EDUCATION AND OUTREACH PROGRAMS

Santa Clara County has two very active FireSafe Council's- The Santa Clara County FSC and South Skyline FSC that serve at the county and local levels. The websites of the councils contain descriptions of hazard reduction projects accomplished to date, as well as ongoing and future work. The websites do vary in the level of detail provided to the user, as well as the information posted. Some are quite specific on how homeowners can participate in chipping programs, for example. Information on programs such as Ready, Set, Go! to inform homeowners about evacuation preparation also varies among the sites (see www.sccfiresafe.org for an overview).

The fire protection organizations and districts within the county also provide valuable information on fire safety. The CAL FIRE Santa Clara Unit provides public education via school presentations and community meetings, informational flyers, radio and television spots, and one on one contacts with homeowners. Defensible space (LE-100) inspections are conducted by the unit within SRAs to ensure that homeowners are aware of, and comply with, requirements under Section 4291 of the PRC to have a 100-foot clearance of flammable vegetation around all structures.

The Santa Clara County Fire Department provides services to the cities of Campbell, Cupertino, Los Altos, Los Altos Hills County Fire District, Los Gatos, Monte Sereno, and Saratoga. Its Community Education Services provides public assistance with both specific fire safety topics, as well as helping individuals, communities, and organizations connect to other agencies that can help them. Other local fire departments within the county, such as the Gilroy Fire Department, also have public education programs.

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue. One benefit that might be derived from the Santa Clara County CWPP is a comparison of the various messages and methods used to conduct these programs to more commonly use the ones that have been most effective with both general and specific audiences, and to ensure that the quality and quantity of information provided by the various entities meet consistent standards.