

Diamond Mountain neighborhood Community FireWise Evaluation

A. Introduction

Because Diamond Mountain FireSafe Council (FSC) is located in the interface between wildlands and developed areas, fire hazard is a special concern. Fires may spread from wildlands to the homes, possibly damaging structures or even threatening lives. Conversely, wildlands are subject to increased ignition potential from elevated levels of human activities, and most fires in the coastal mountains are human-caused.

This evaluation serves as a platform for recommendations for projects to: minimize threat to life safety and damage from wildfire to homes and natural resources. It is based on a review of the terrain, weather, fuels and fire history of the area, compared to the values at risk, and likely scenarios of fire ignition and spread.

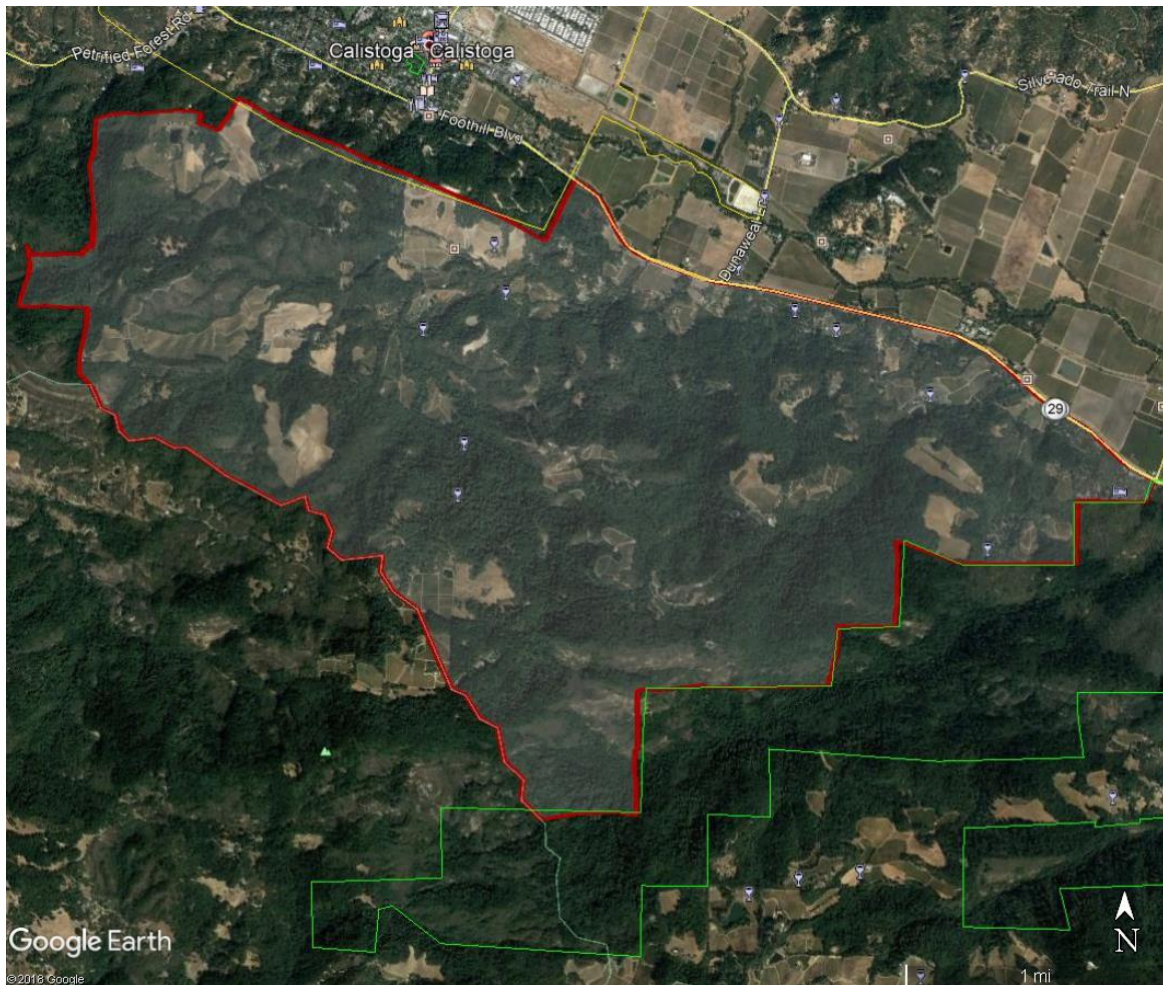


Figure 1. Area of Interest – Diamond Mountain neighborhood Community

B. Values at Risk

The most important values at risk are life safety, then improvements to property (residents and vineyards) then natural resources. Because all the evacuation routes are long and involve poor road conditions, the threat to human life is significant.

Obviously homes in the Diamond Mountain Firesafe Council are at risk from wildfire. Structures in Diamond Mountain neighborhood are generally older, dating before the requirement for ignition resistant construction. Most roofs are less flammable, however, wood siding, decks, and unprotected vents that are part of most homes all make the buildings prone to ignition.

Homes: Residential structures are mostly made of wood because of their age. They have wood porches and decks, though wood fences are a rarity. The presence of ignition-resistant construction is closely related to the age of the structures; structures built after 1996 have features that prevent ignition such as non-flammable roofs, double-paned windows, and stucco siding. Many older structures have been remodeled and a few property owners have installed personal fire suppression systems involving various water sprinkler strategies.

Large wineries (Castella di Amoroso and Schramsberg) and vineyards are located in the FSC and constitute a value at risk. Castella di Amoroso is ignition resistant due to its construction material and defensible space, whereas structures on the Schramsberg property are made of wood and are surrounded within a heavily vegetated canyon setting.

While vineyards may moderate the fire behavior and increase survivability of nearby structures, wildfire is a not-so-obvious risk to vineyards. Vineyards are at risk from smoke taint in the summer, when the possibility of a fire is highest. The edges of vineyards that abut wildlands are apt to be damaged; this is especially where patches of brush and woodlands break up the vineyards.

C. Topography

Topographic features - such as slope aspect (orientation with respect to sun and wind) and the overall form of the land - have a profound effect on fire behavior. Topography affects a wildfire's intensity, direction, and rate of spread. An area's topography also affects local winds, which are either "bent" or intensified by topographic features. Topographic features can also induce daily upslope and downslope winds. The speed, regularity, and direction of these winds (and other winds) directly influence the direction of wildfire spread and the shape of the flame front.

For example, fires burning on flat or gently sloping areas tend to burn more slowly and to spread more horizontally than fires burning on steep slopes. This makes ridgetop positions more vulnerable than those at the bottom of a slope.

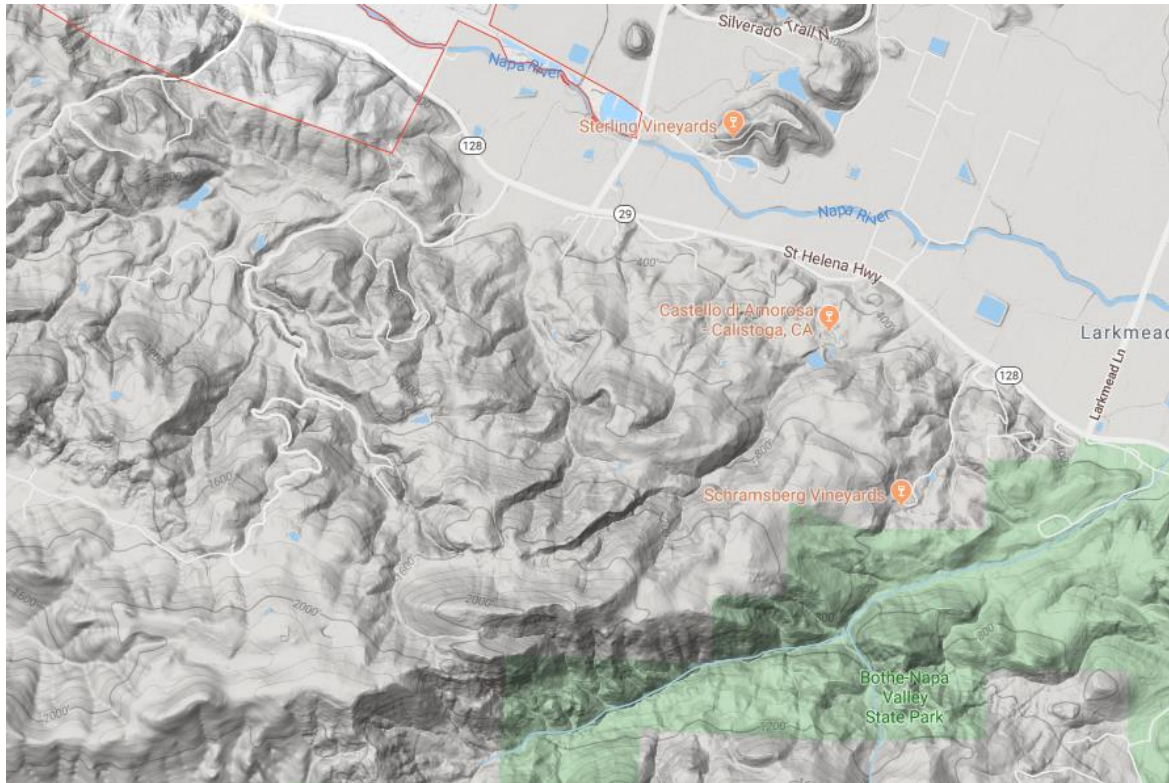


Figure 2 Topography and watershed delineation. From maps.google.com

Diamond Mountain Firesafe Council and its environs rise from the valley floor to the western county boundary along a high north-south trending ridge, from approximately 322 to 2150 ft in elevation. The topography is crenulated, with deep, narrow canyons. Most slopes are quite steep, but some broad plateaus are located and almost all have vineyards on it.

Orientation of the canyons

- Kortum Canyon is an east-west-running canyon
- Diamond Mountain Canyon starts from the valley floor and rise to the southwest. It splits into two canyons, one running southwesterly and another southeasterly.
- Napa Bothe State Park straddles a long, pronounced east-west running canyon, with steep south-facing slopes leading to the top residences at the end of Diamond Mountain Rd.
- Tucker Farms clings to the east-facing slope, but does not extend far west from the valley floor. Some short ravines exceed 100% slopes.

More details of the terrain follow in the discussion of weather.

C. Weather

Weather conditions significantly impact both the potential for ignition and the rate, intensity, and direction in which fires burn. The most important weather factors used to predict fire behavior are wind, temperature, and humidity.

1. Temperatures and Humidities

Summer days are usually comfortable; temperatures normally range from lows in the 40's and to highs in the 90's, with an occasional high reaching a maximum of 105 degrees Fahrenheit. Humidities can drop to the single digits in the summer and fall.

Portions of Diamond Mountain neighborhood lie in a relatively protected area and would be subject occasional episodes of several still, stagnant air formed by stationary highs during summer months. This overall weather pattern -- characterized by continuous high temperatures and low relative humidities -- enhances the possibilities of ignition, extreme fire behavior and extreme resistance to fire control.

2. Winds

The most important influence on fire behavior is wind. Wind can greatly affect the rate of fire's spread and the output of a fire. Wind increases the flammability of fuels both by removing moisture through evaporation and by angling the flames so that they heat the fuels in the fire's path. The direction and velocity of winds can also control the direction and rate of the fire's spread. Winds can carry embers and firebrands downwind that can ignite spot fires ahead of the primary front. Gusty winds cause a fire to burn erratically and make it more difficult to contain.

Wind will tend to follow the pattern of least resistance and is therefore frequently deflected and divided by landforms. Canyon slopes produce pronounced daily up-canyon and down-slope winds caused by differential heating and cooling of air during the day. This occurs Napa Valley-wide and on a local scale.

Regional westerly winds are blocked by the ridge on the western county border; only the canyon that is located within the Napa State Park is oriented such that westerly winds would easily flow to the Napa Valley.

The winds that create the most severe fire danger typically blow from the north, usually in October. Winds from the east and north bring low humidities and elevated fire danger and can wreak havoc in the Napa Valley, causing fire to spread to the south. These winds are the same ones that blew on the largest fires in Napa history; the Silverado Fire in 1983 and the 1964 Hanly Fire occurred under this type of event. These events generally last from 15 to 35 hours, but in 2000, 2003, 2005, 2017, 2018, 2019, these events in October and November lasted for 5 to 14 days. This type of wind could "push" a fire from the vineyards on the valley floor to the lower portions of the Diamond Mountain Firesafe Council area.

The east-facing aspect of the Diamond Mountain Firesafe Council and its placement above the vine-covered valley floor moderates its risk from the Diablo winds. This is because these foehn or subsiding winds accelerate with decreasing elevation, and conversely, slow when moving upslope. So, while communities on the east side of the Napa Valley face greater risk during northeasterly wind episodes, communities on the western slopes are less at risk.

D. Vegetation

There are a few types of vegetation on the Diamond Mountain neighborhood. These include:

- Oak Woodland
- Coniferous Forest (Redwood Forest)
- Brush
- Vineyards
- Landscaping

Each vegetation type burns differently, based on the amount of biomass available to burn, the distribution of biomass in the vegetation, as well as the moisture and oil content of the foliage and dead material.

Oak Woodlands: Approximately a third is oak woodlands, which occur in fragments of about 20 to 60 acres in size.

Dense canopies, with little or no grass or shrubs under the canopies, typify Woodlands. The tree canopy in the lower reaches of the drainages is dominated by coast live oak, but also includes California bay, madrone, California buckeye, Douglas fir and occasional pines.

Fire intensity, flame lengths, and scorch heights are usually low in oak woodlands. Slow-burning surface fires (approximately two-feet per minute) that are carried in the compact leaf litter layer. Low flame heights (less than one foot) are the rule. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards in this vegetation type.

Leisurely spread rates, combined with the relatively short flame lengths of the predicted fire behavior produce a manageable, moderate fire hazard.

However, when shrubs are allowed to develop under the hardwoods, these fuels would pose fire hazards under severe weather conditions, e.g. those conditions involving high temperatures, low humidities, and high winds. If the shrubs develop under oaks, torching is likely to occur because of the ladder fuels that allow a fire to burn from the shrub to the tree crowns. Foliage of both bay and coast live oak can be very flammable when fire reaches the crowns.

Redwood Forests: Only a small strip running southwest from Castello di Amoroso was mapped as coniferous forests.

Douglas fir forests are common along Kortum Canyon Rd. and Diamond Mountain Rd., and within the oak woodlands. Redwood forests are common in the canyons following Diamond Mountain Rd.

These forests pose a moderate hazard under most conditions, but when hot, dry weather occurs, these forests burn with great intensity. Of all the vegetation types in Diamond Mountain neighborhood the dense the coniferous forests are most likely to burn as a crown fire. The fire reaches tree crowns, embers are distributed throughout adjacent areas (including vulnerable residential neighborhoods). Dead material from dying oaks increases fire intensity.

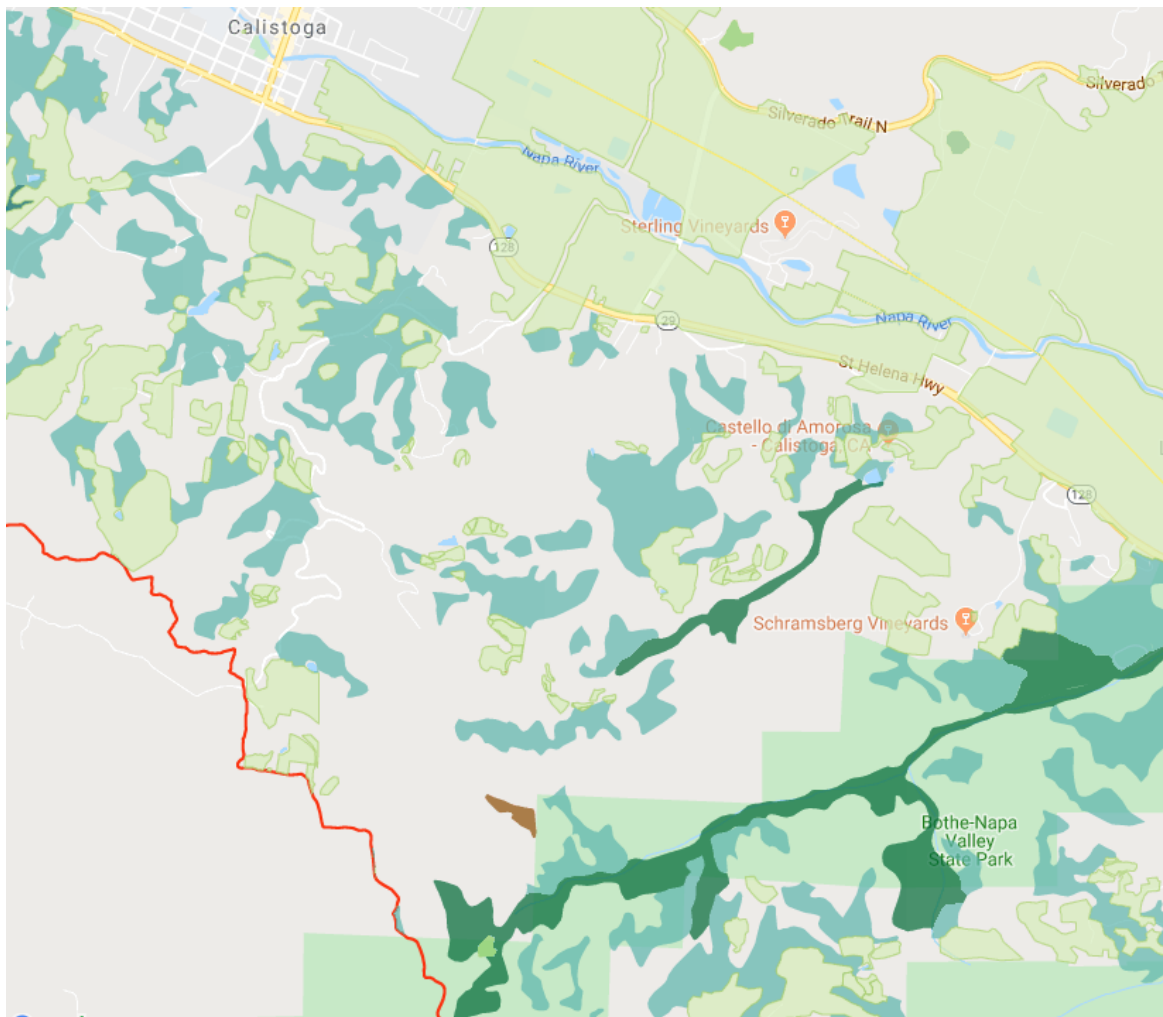


Figure 3. Distribution of vegetation types. Dark blue-green = coniferous forest, olive green = woodland, light green = vineyards, aqua = riparian woodlands, and brown = brush. No grass was mapped. From <http://www.napawatersheds.org>

Brush: A very small patch is mapped as brush, in the southwest portion of firesafe council. However, more acreage was observed as brush when conducting on-site observations. These unmapped areas were along South Fork of Diamond Mountain Rd.

Brush produces severe fire behavior, with flames longer than 20 feet in length. Intense, fast-spreading fires in chaparral burn the foliage as well as the live and dead fine woody material in the brush crowns. The foliage is highly flammable and dead woody material in the stands significantly contribute to increased fire intensity.

This fuel type constitutes the highest hazard. Direct attack is not possible, and containment efforts would need to rely on backfiring or suppression strategies other than line building because the perimeter of the fire is likely to grow faster than a line could be built. In addition, spotting is likely in chaparral which will present even more challenges to suppression efforts.

Vineyards: About half the land in the Diamond Mountain Firesafe Council is mapped as vineyards. These occur in large patches, located

- West and north of Tucker Farms (Schramsberg)
- The Castello di Amaroso
- North of lower Diamond Mountain Rd.(1510, 1520 Acquisition LLC and Brownstein)
- Top of Diamond Mountain Road (Dongyi)
- North of Kortum Canyon (Jackson Family)

Fires are usually benign in vineyards. The biomass is concentrated in live vines, with a mowed or bare soil surface. A fire can spread quickly through the vineyard where a ground cover. However, this situation is rare. Vineyards were instrumental in stopping the Howell Mountain fire in 1983, formed the edges of fires in the Tubbs, Nunns, and Kincade Fires, but were part of the contagion in the Cavedale Fire in Sonoma in 1996. Vineyards often have access roads on the perimeter and within the interior, further aiding containment.

Landscaping: Small patches of the area were mapped as urban, which indicates the low-density pattern of development. The largest urban patch as 17 acres.

Landscaped areas -- being closest to homes -- may make the greatest impact on survivability of a house during a fire arising in wildlands. Landscaped areas either (1) are moist, thus will not burn; (2) contain large amounts of fuel which will burn with great intensity; or (3) are landscaped with fire resistant plants, and only burn slowly with little heat release.

While research results regarding fire resistance of landscape plants are meager, several important generalities have surfaced. First, the overall volume of biomass as well as the spacing and design of the garden is more critical than the species

selected. Horizontal spaces between planting masses and the house are important components of a fire safe landscape. Similarly, vertical spacing between tree branches, shrubs, ground cover and the structure (particularly windows) are also part of a well-designed garden.

Maintenance of landscaped areas is necessary to remove dead material and to maintain vertical and horizontal spaces. Neglect of landscape maintenance can lead to a significant worsening of the fire hazard closest to the structure.

Luckily, landscaping in the Diamond Mountain Firesafe Council is generally consistent with fire safety principles. A few residences in each neighborhood have abundant vegetation that can endanger adjacent and nearby residents if they are within a few hundred feet of each other.

E. Predicted Fire Behavior

Flame lengths are expected to be long because of the combination of heavy fuels, especially in the chaparral, and in especially dry conditions, in the redwood forests. Where a well-developed understory is present under the oak canopies, fires are also expected to burn with high intensity.

Fires can also be expected to burn fast when they are propelled by dry grass and chaparral. Vineyards can moderate both the fire intensity and fire spread, but would not provide good suppression opportunities for safe evacuation because few abut the road.

The distribution within an area of expected flame lengths can be predicted using public-domain software and data. FlamMap was used to model fire behavior using a nation-wide dataset called LandFire.

Predicted flame lengths

Long flame lengths can be expected in coniferous and oak forests where understory is present. Vineyards and areas of well-maintained defensible space can be expected to burn with low intensity even under the most extreme conditions. Flame length most directly relates to the ability of a firefighter to safely attack a fire; flames longer than eight feet prevent safe, effective direct attack. Flame length is also most closely related to structural damage – the higher the flame length, the more likely a structure loss.

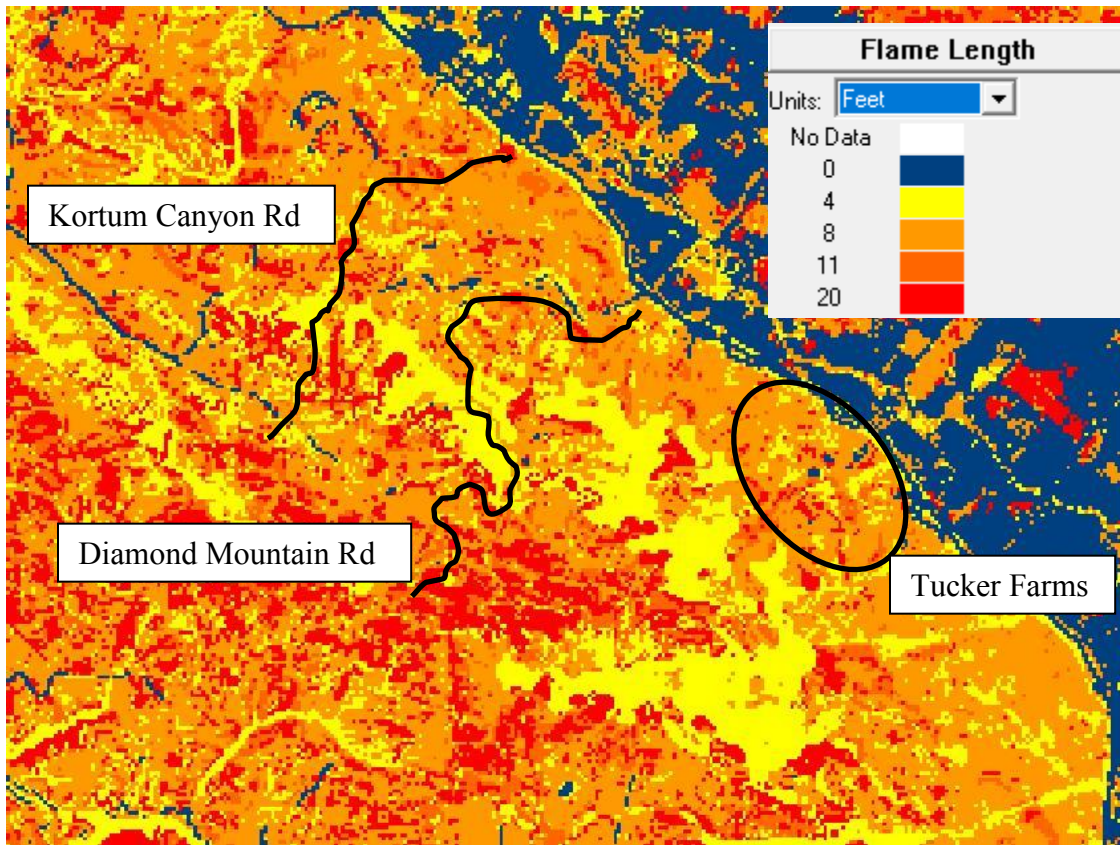


Figure 4. Predicted flame lengths using LandFire data of slope fuels and extreme weather

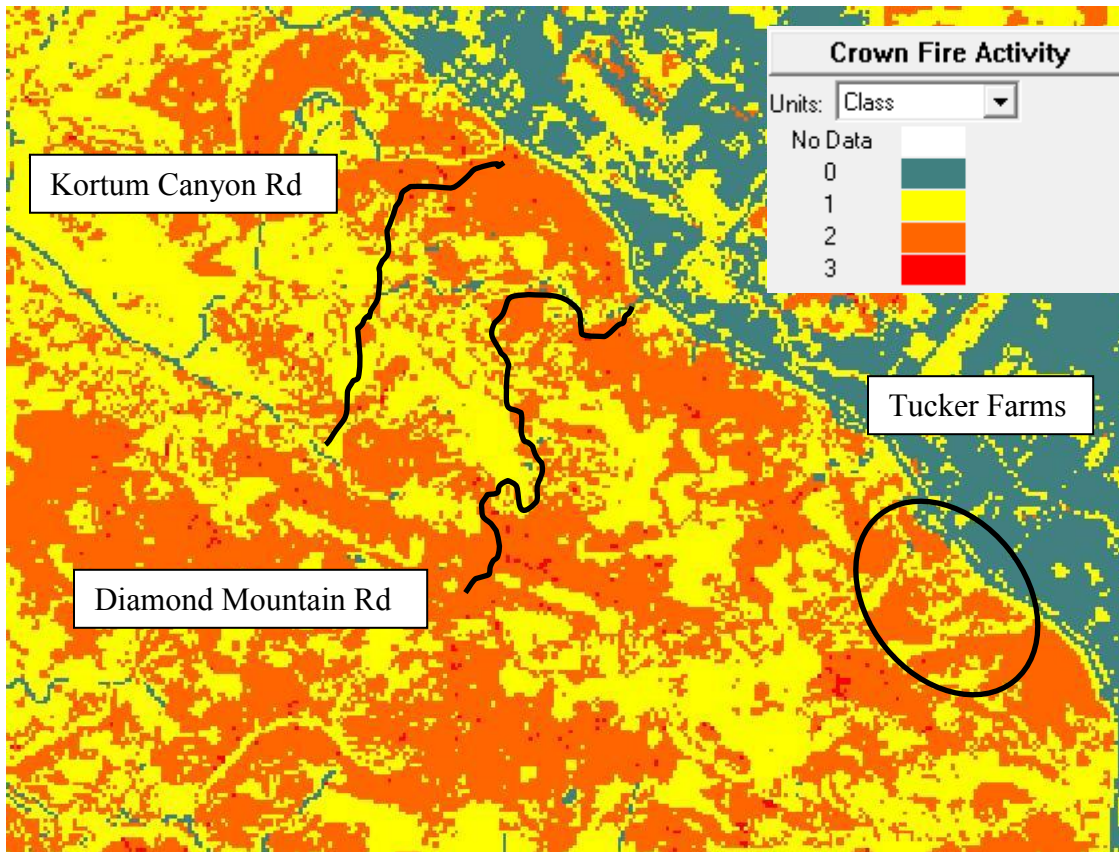


Figure 5 Predicted crown fire activity using Landfire data of slope fuels and extreme weather. 0 = no fire, 1 = surface fire, 2 = torching, 3 = crown fire spread

While both the coniferous and oak forests can torch, hardwoods are less likely to have fire reach to the tree crowns, unless vegetation is burning underneath. Crowning potential is crucial because when fires spread into crowns thousands of embers are produced and lofted into ignitable fuels, often overwhelming fire suppression personnel.

Very few areas are predicted to have fire spread within the tree canopy (tree-to-tree), which is actually pretty rare and virtually un-heard of in hardwoods. Areas with higher density of coniferous forests are most at risk to torching and to crown fires.

F. Fire History of the Area

There is no recorded fire history, and fuels have accumulated for decades.

The Napa Valley has a recurring history of large fires (over 10,000 acres in size), which typically burn for several days. The typical period between such large fires is approximately 20-30 years. Like much of California, fires in Napa County are almost entirely caused by human-caused accidental ignitions.

In the past, fires did not involve large numbers of structures because of the historic rural nature of Napa County; however, structures are now a common concern whenever wildland fires of any size occur.

Most recently, northern Napa County has experienced devastating wildfires. Most recently, the 77,758 acre 2019 Kincadee Fire burned nearby, up to Petrified Forest Road. The 2017 Tubbs fire was the nearest fire that approached the area encompassed by the Diamond Mountain Firesafe Council and caused the area to be evacuated. The Valley Fire burned over 60,000 acres and destroyed several hundred structures in Lake and Napa County and caused one fatality. The Butts Canyon Fire in 2014 burned 4300 acres on the northern county border.

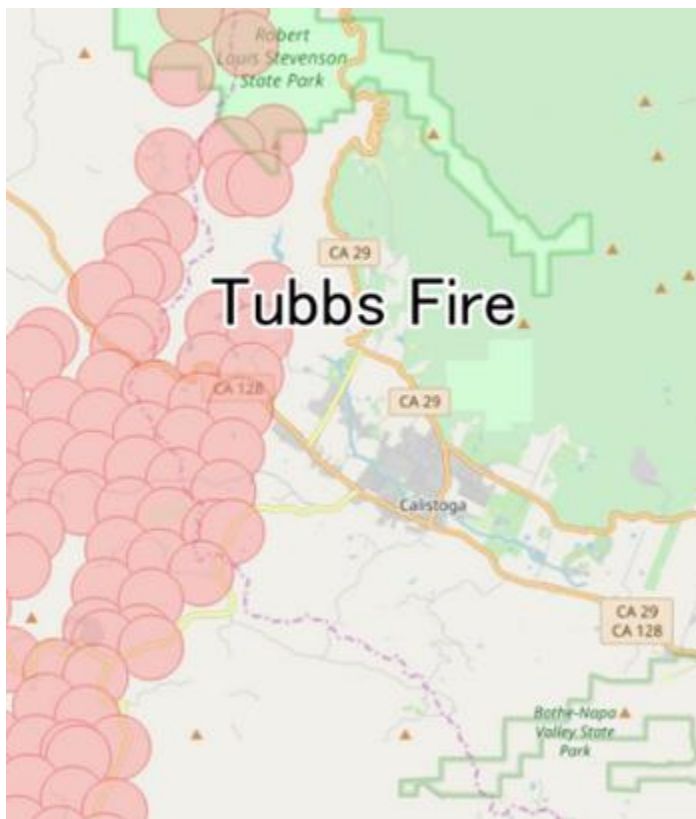


Figure 6. Location of Tubbs Fire in relation to Diamond Mountain Firesafe Council.
From https://fsapps.nwcg.gov/afm/data_viirs/fireptdata/viirsfire_2017_conus_last7.htm

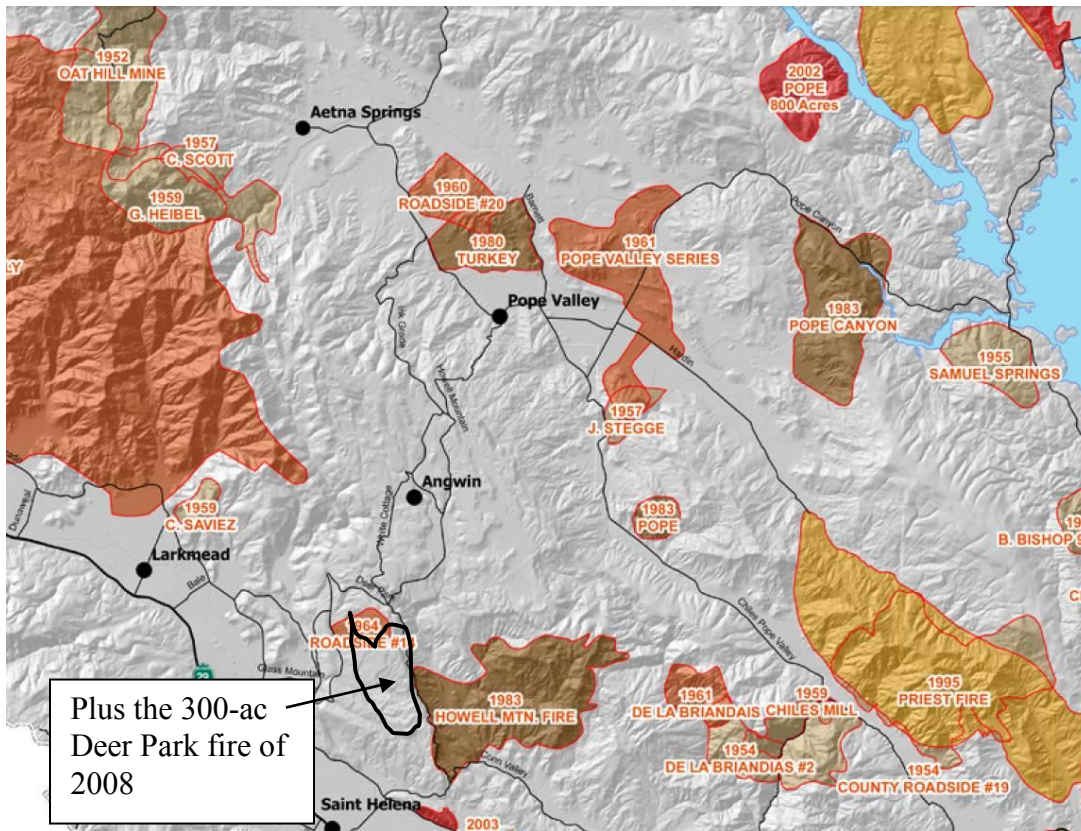


Figure 7. Areas of fires burning in Napa Valley until 2017. From http://www.mtveederfiresafe.org/pdfs/Napa_Fire_History_large.pdf

The cause of over 99% of the fires in Napa County is human activity. For example, almost a quarter of the most wildfires reported were of undetermined or miscellaneous cause. Almost one-third of the fires were caused by equipment use -- such as workers abating weeds for fire hazard reduction which accidentally cause fires. Vehicles caused 17% of the fires; arson caused 3%. Other causes such as smoking, electrical power lines, and debris burning caused the remaining fires. Historically, 80% of wildland fires in California have started within 10 ft from a road.

F. Access

Access to and from, and within the Diamond Mountain Firesafe Council is a serious concern. All neighborhoods within the Firesafe Council are accessed by Highway 29. All roads within the firesafe council lead down to Highway 29. Thus congestion on this two-lane road is expected to be significant during an evacuation.

Access in all neighborhoods is challenged by topography. Most lengths of the road are barely two lanes with no shoulders. Pavement (road surface) is generally in good shape, some curves are simultaneously sharp and steep.

Tucker Farms neighborhood is an arc with two ways leading in and out to Highway 29. Diamond Mountain Road is a long road that connects to Sonoma County via Sharp Rd, which can serve as another route out in an emergency. Unfortunately, Sharp Rd is dirt, where it connects with Diamond Mountain Rd., fairly steep and traverses through unmanaged vegetation to Calistoga Road.

Kortum Canyon Rd leads west to its end and also connects to Sharp Road, albeit further north. The road is passable by most 2WD vehicles.

Driveways in all neighborhoods are generally long. Some residences are served by long shared driveways behind locked gates. Locked gates are common and can further delay emergency response. Locked gates also discourage/prevent inspection by local fire authorities.

Regardless of the condition of the roadbed, access can be blocked by its roadside vegetation. Trees can fall, blocking passage or vegetation can burn with such intensity that emergency response and evacuation cannot occur.

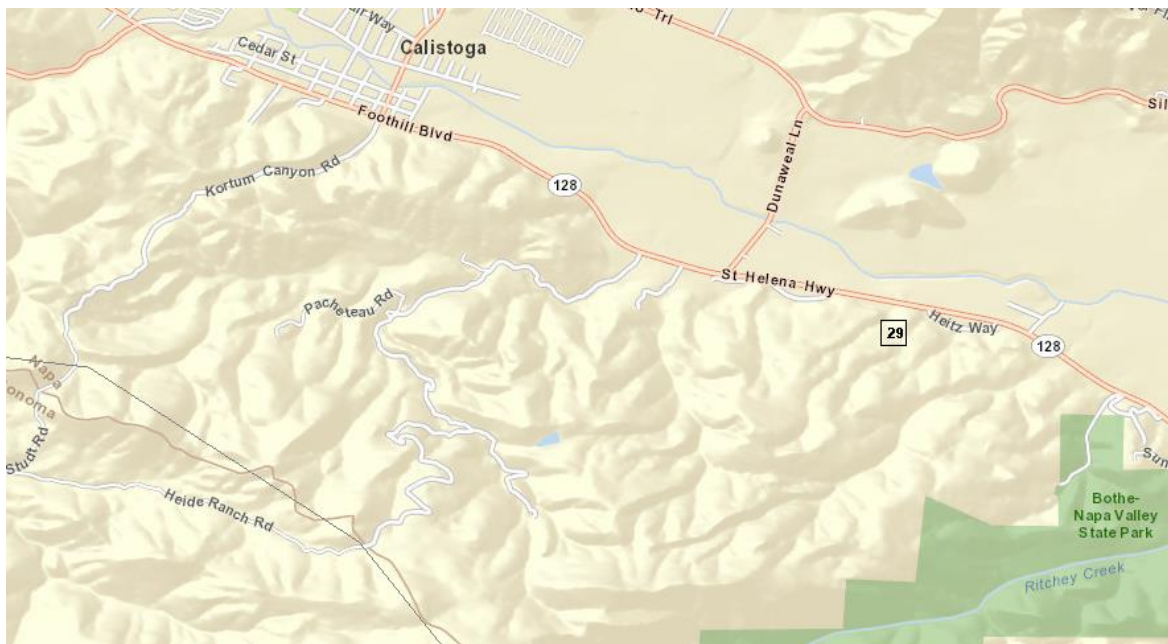


Figure 8. Access and terrain of Diamond Mountain FireSafe Council. from maps.google.com

Most roadsides have abundant roadside vegetation. This vegetation could block the road while burning, and after, as trees_fall (a common event during a fire). Roadside vegetation has been maintained throughout many lengths of roads, however, one blockage would be significant.

G. Hazard Ranking

The vast majority of Diamond Mountain neighborhoods are categorized as in a Very High Fire Hazard Severity Zone. The bottom few parcels on Diamond Mountain Road west of Highway 29 are categorized as moderate. Similarly, the bottom few parcels of Kortum Canyon Road are designated by the City of Calistoga as Very High Fire Hazard. Tucker Farm is categorized as being located in a Moderate fire Hazard Severity

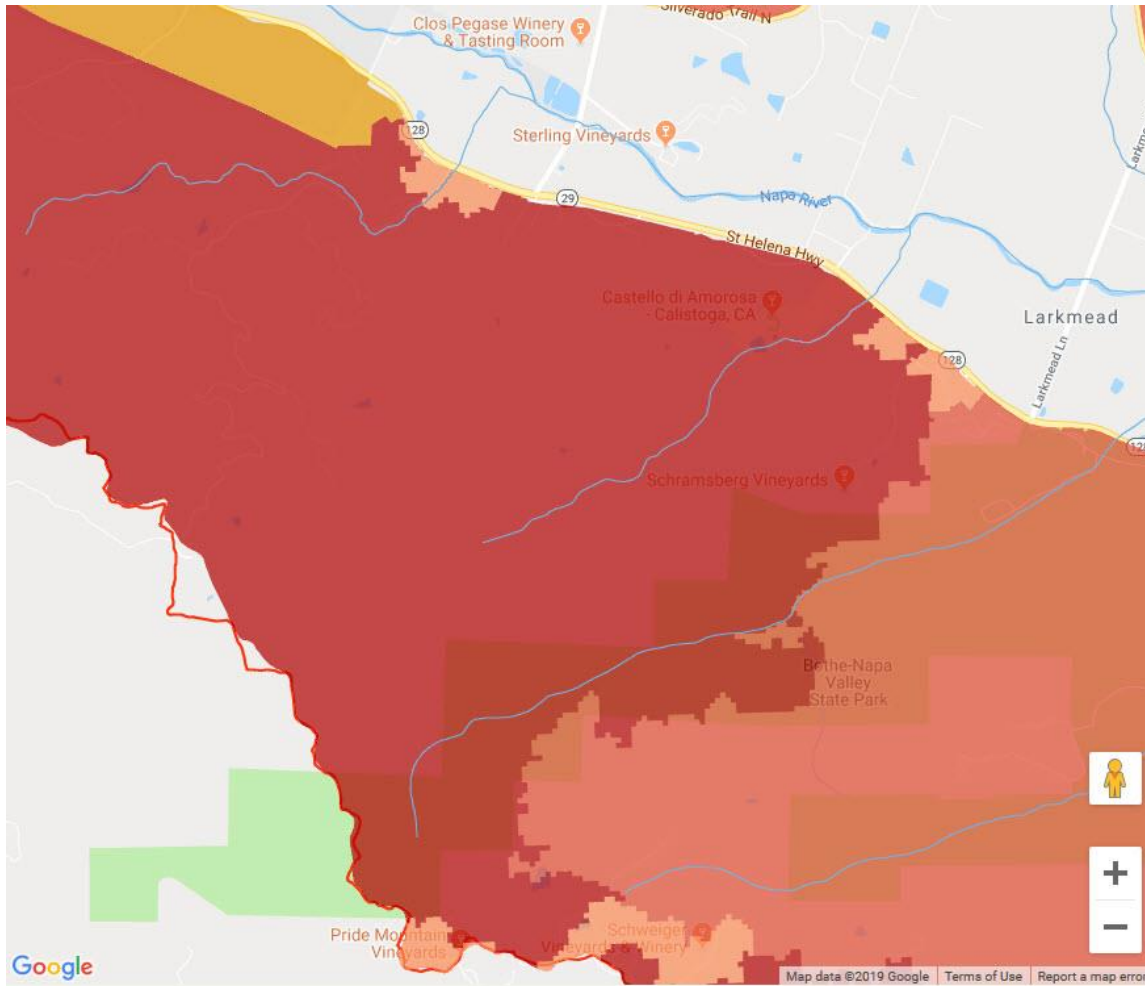


Figure 9. Distribution of areas of high fire hazard. Peach is Moderate, dark red is Very High. Yellow is Local Response Area, Very High fire hazard. From <http://www.napawatersheds.org>

H. Land Use Distribution & Neighborhoods

Residential development, on large lots is generally scattered following the winding road network. Vineyards are located among residences, and some are newly developed large lots on the edge of the community.

There is a surprisingly large commercial component to Diamond Mountain FSC. This includes a stable and vineyards, tasting rooms and wineries.

Vineyards cover approximately one-third of the acreage in the Diamond Mountain neighborhood area outside the core residential and commercial areas. Undeveloped wildlands abut the FSC on the south and western sides. Land to the south of the firesafe council is unlikely to be developed as it is owned by the California Department of Parks and Recreation. However, all other lands are privately held and could change land use, likely to either residential or vineyards. Changes in land both would likely improve the fire safety of the area (assuming the new residential area is constructed with ignition-resistant practices and landscaping is maintained).

Most parcels are large enough that the landowners can influence fire behavior to protect their structures; structures are rarely are within 100-ft of the neighboring parcel. The exception to this is Tucker Farms, where lots are narrow and one neighbor's action will influence the risk of fire to another neighbor.

Large landowners such as Schramsberg and Castello de Amoroso that abut residential properties typically have managers that maintain a relatively fire-safe condition on adjacent lands. However, the California State Parks has a distinctly different mission for their lands and does not manage for the fire safety of adjacent landowners. The residents of Tucker Farms that have structures nearer than 100-ft from Napa Bothe State Park should contact the Cal St Parks to request a fuel modification zone on DPR property to protect a non-DPR facility if all mitigations on the facility owner's property have proven to be inadequate. Department policy on fuel modification is designed to minimize damage to natural and cultural resources (DOM Section 1105.6).

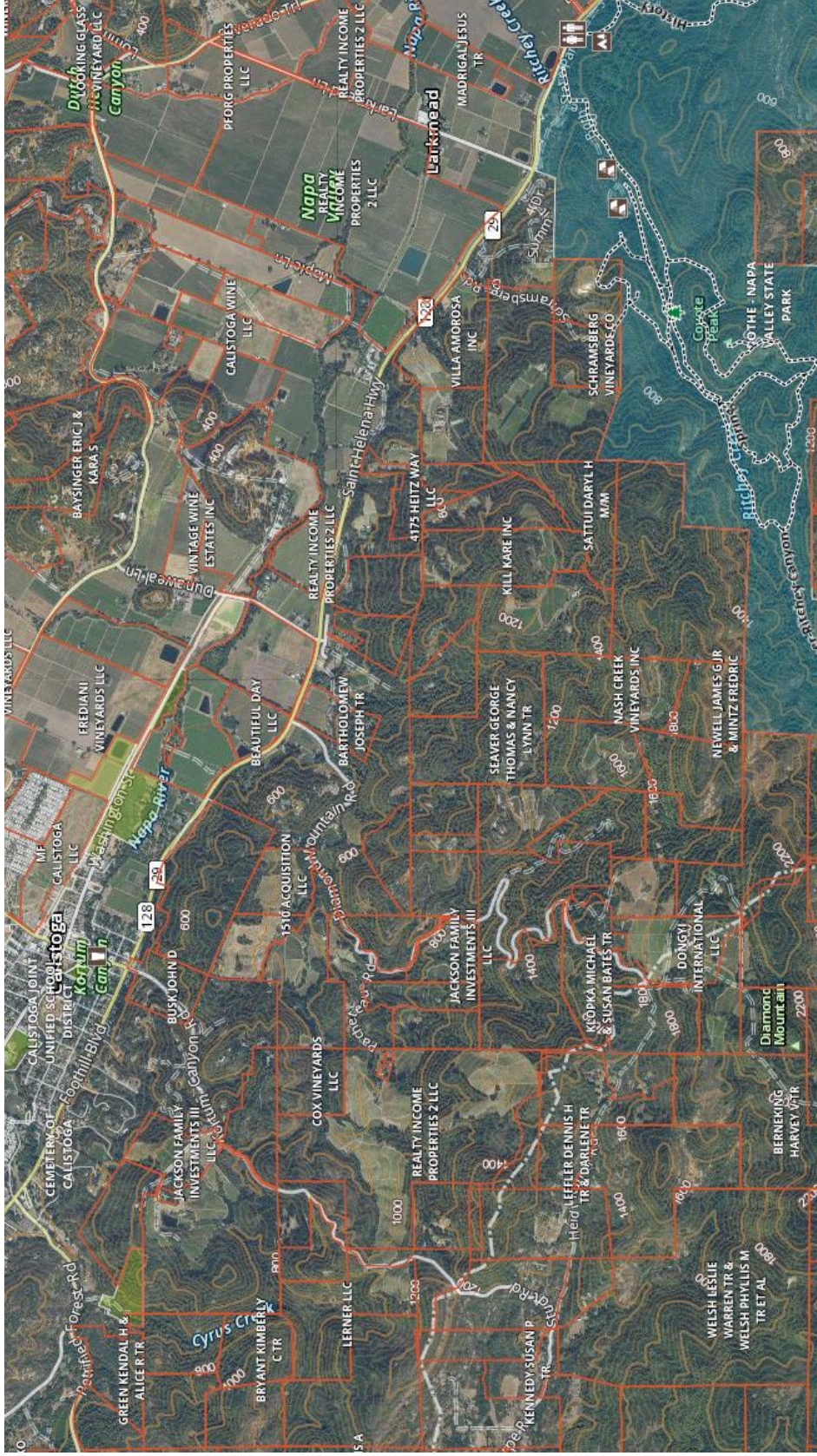


Figure 10. Land ownership of larger parcels (from <https://webmap.onxmaps.com/map.html>)

J. Recommended Projects

Several projects were recommended to enhance the fire safety of Diamond Mountain FSC.

Some span the entirety of the firesafe council area, while others are specific to a neighborhood. Those projects that are common to all neighborhoods are not described in the neighborhood-specific description of projects.

There are 13 recommended projects. These projects include actions as installation of compliant signs, widening roads in places to create turnouts, establishing alternative evacuation routes, establishing a communication system, and identifying temporary refuge areas for residents along the main roads. One projects targets increasing education about fire safe landscaping and retrofitting options. The other eight projects projects are distributed in six of the seven neighborhoods. The Castello di Amoroso and the West Highway 29 neighborhoods do not have a project located in its boundary. The following spreadsheet indicates the justification of treatments in terms of specific goals, spanning Assist Evacuation and Emergency Response, Reduce Ignition Potential, Reduce Property Damage, and Assist Fire Containment. Of the projects, most projects are aimed at helping evacuation and emergency response, and supporting fire containment.

PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
Project 1	Locate temporary refuge areas, obtain agreements for use during emergencies, practice gathering and evacuating	X				Kortum Canyon, Diamond Mountain
Area	Selected vineyards adjacent to Kortum Canyon Rd., Diamond Mtn Rd.					
Goal	Allow emergency responders to respond and follow directions based on addresses					
Actions	FSC to approach vineyard owners to gain approval and liabilities releases, discuss maximum capacity, exact location, additional fuel reduction work that could be advised					
Participants	Vineyard owners, FSC					
Schedule	Now, any time					
Project 2	Install knock-box facilities at base of roads, using Diamond Mountain's as an example	X		X	X	All
Area	At base of Kortum Canyon Rd., Tucker Rd.					Kortum Canyon, Tucker Farm
Goal	Allow emergency responders to respond and follow directions using aerial observations					
Actions	FSC to purchase box and knob-box, and deliver to Napa Co FD					
Participants	Willing members of Kortum Canyon and Tucker Farm neighborhood					
Schedule	Now, any time					

PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
Project 3	Develop alternative routes for evacuation: Improve road from Kortum Canyon to Sharp Road	X		X	X	Kortum Canyon
Area	Intersection of Kortum Canyon Rd and Sharp Rd					
Goal	Allow emergency responders to respond and Kortum Canyon residence to evacuate safely					
Actions	Obtain funds to support Napa County Public Works to improve Sharp Rd., establish scope of work					
Participants	Willing members of FireSafe Council					
Schedule	Now, any time					
Project 4	Develop alternative routes for evacuation: Extend road from Kortum Canyon to Lerner Road	X		X	X	Kortum Canyon
Area	Ranch road from 350 Kortum Canyon Rd to western end of Lerner Rd.					
Goal	Allow emergency responders to respond and Kortum Canyon residence to evacuate safely					
Actions	Re-grade existing ranch roads					
Participants	Property owners, +/- vendors for machinery					
Schedule	Best in the fall, OK anytime but avoiding nesting season and red flag days					

PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
Project 5	Develop alternative routes for evacuation: Obtain approval for use of vineyard roads in emergency	X		X	X	Kortum Canyon, Diamond Mtn, Tucker Farms, Schramsberg
Area	Selected vineyards along Kortum Canyon Rd, Diamond Mtg Rd., and in Shramsberg vineyards					
Goal	Enable passage of evacuees and emergency vehicles without using main road					
Actions	FSC to approach vineyard owners to gain approval and liabilities releases, discuss maximum capacity, exact location, additional fuel reduction work that could be advised					
Participants	Vineyard owners, FSC					
Schedule	Now, any time					
Project 6	Develop alternative routes for evacuation: Obtain approval for use of vineyard roads in emergency	X		X	X	Tucker Farms, Schramsberg
Area	Selected vineyards in Shramsberg vineyards					
Goal	Enable passage of evacuees and emergency vehicles without using main road					
Actions	FSC to approach vineyard owners to gain approval and liabilities releases, discuss maximum capacity, exact location, additional fuel reduction work advised					
Participants	Tucker Farms, Schramsberg					
Schedule	Now, any time					

PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
Project 7	Remove hazard trees along roads	X	X	X	X	Kortum Canyon, Diamond Mtn, Tucker Farms, Schramsberg
Area	Selected area of low fire hazard (by reservoir, vineyards, wide valley of low vegetation, intersection of roads)					
Goal	Provide a place of refuge for people (and responders) when road is blocked					
Actions	Encourage / promote vegetation management by County to remove hazard trees along roads					
Participants	Willing members of FSC					
Schedule	Now, any time					
Project 8	Call 'em All/Nixel Sign-up	X				All
Area	Throughout FSC					
Goal	Alert community members of emergencies, and communicate disconcerting non-emergencies					
Actions	Obtain phone numbers of volunteers, subscribe to service					
Participants	Every resident					
Schedule	Now, any time					

		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL						
Project 9	Create shaded fuelbreak south of Tucker Farms	X		X	X	Tucker Farms
Area	Southern border of Tucker Farms					
Goal	Calm fire behavior adjacent to structures					
Actions	Request permit from CA St Parks and perform approved fuel management on State Parks lands					
Participants	Selected parcel Owners of Tucker Farm					
Schedule	Best in the fall, OK anytime but avoiding nesting season and red flag days					
Project 10	Expand roadside turnouts	X		X	X	Kortum Canyon, Diamond Mtn
Area	Bottom half of Kortum Canyon Rd, wherever possible on Diamond Mountain Rd.					
Goal	Provide opportunities for simultaneous evacuation and emergency response, and/or passage past disabled vehicles during evacuation					
Actions	Re-grade roadside, consult with County Public Works					
Participants	Property owners, +/- vendors for machinery					
Schedule	Best in the fall, OK anytime but avoiding nesting season and red flag days					

PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
Project 11	Schramsberg Rd Roadside Treatments	X	X	X	X	Jensen
Area	30-ft both sides of Schramsberg Road					
Goal	Enable passage of evacuees and emergency vehicles					
Actions	In wildlands, chip all dead material, remove (cut, pull and/or spray) understory shrubs, prune lower branches of trees					
Participants	Hand crews (CDC), property owners, +/- vendors for machinery					
Schedule	Best in the fall, OK anytime but avoiding nesting season and red flag days					
Project 12	Hold educational presentations or provide material regarding defensible space and fire-resistant landscaping choices, and retrofit options		X	X	X	All
Area	Throughout FSC					
Goal	Guide vegetation to be more fire-safe (see also Project #13), provide residents resources for more ignition-resistant structures					
Actions	Identify residents information gaps, gather already-existing material, organize material, publish					
Participants	1-3 volunteers					
Schedule	Now, any time					

		Help Evacuation, Access	Reduce Ignitions	Reduce Property Damage	Assist Containment	Neighborhood
PROJECTS FOR DIAMOND MOUNTAIN FIRESAFE COUNCIL						
Project 13	Shift forest species composition to woodland from conifer		X	X	X	All
Area	Wildland areas with conifers					
Goal	Modify fuel characteristics of forest to burn with less intensity					
Actions	Plant oak trees (with funding from NCRS), thin Douglas fir trees					
Participants	Private landowners, private contractors, volunteers					
Schedule	Plant oaks in early winter when soil is saturated, thin trees best in fall, but anytime, avoiding nesting season and high fire danger					

NEIGHBORHOOD CHARACTERISTICS OF THE FIRESAFE COUNCIL

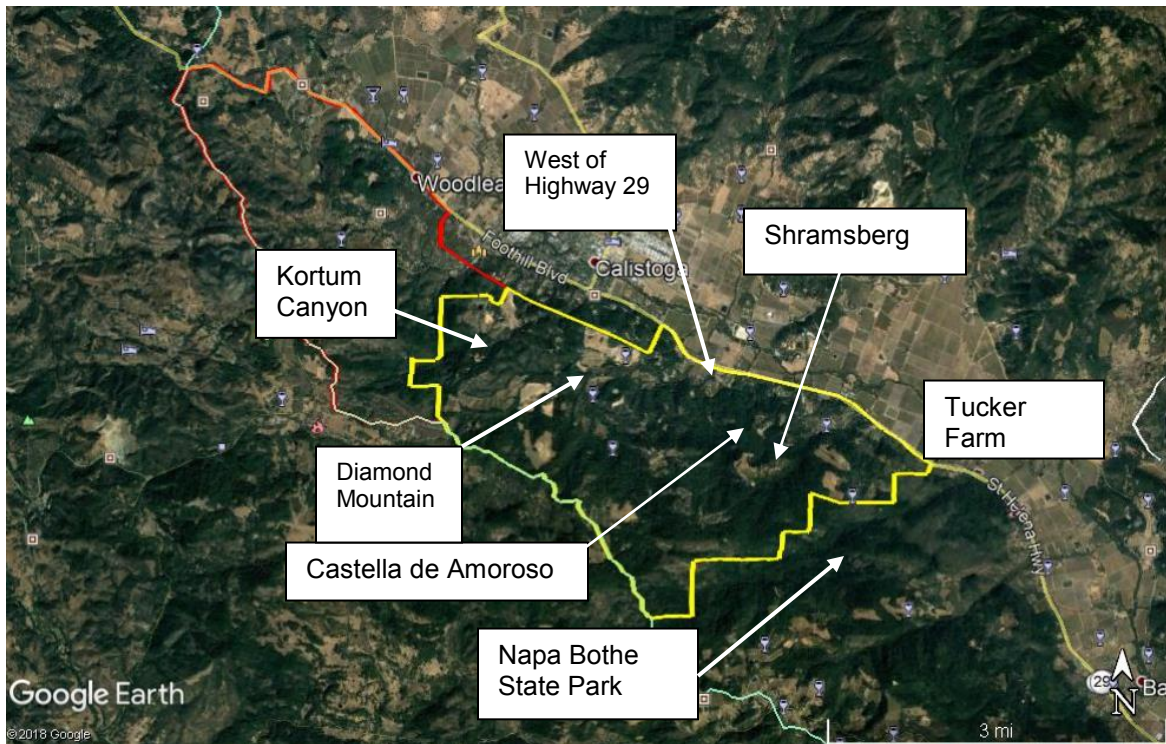


Figure 11. Neighborhoods within the Diamond Mountain neighborhood community assessment

This analysis delineated four neighborhoods based on the development pattern (lot size, street width, age of construction, land use) and roadways. These are:

1. Kortum Canyon
2. Diamond Mountain Rd.
 - a. Upper
 - b. Lower
3. Tucker Farm
4. Schramsberg
5. Castella di Amoroso
6. West of Highway 29

Neighborhood #1: Kortum Canyon



Figure 12. Kortum Canyon Vicinity

Pattern of development and how it relates to fire safety: This neighborhood consists of approximately 20 structures in residential parcels ranging from one to 20 acres in size, with smaller parcels located on the western portion of the neighborhood. Each parcel is large enough to influence fire behavior around the structure. Vineyard parcels range from 40 to 120 acres, large enough for possible temporary refuge areas.

Access This neighborhood is served by one long road, with a spur to the south. Long driveways are the rule, except for a few on the southern spur. Some residences are accessed via shared driveways. About half have locked gates. The main road is two lanes but has no turnouts; this is problematic at the eastern portion of the road, where there are steep drop-offs in narrow oak-forested canyons. Kortum Canyon Road ends in the commercial district of the City of Calistoga, which is likely to be congested and could block exits during evacuation events.

Terrain: The east-west running canyon is steepest at the lower portions, with more flat, rolling hills further west. Northeast winds are likely to travel quickly up Kortum Canyon.

Defensible Space conditions: Some residential yards are exemplary. Most residents are in compliance with fire safety regulations regarding defensible space.

Adjacent fuels: Vegetation beyond 100 feet from structures are either vineyards or Douglas fir forest with varying levels of understory trees and shrubs. The vineyards comprise a fire safe condition, whereas the Douglas fir forests could fuel an intense fire under extreme weather conditions.

Unusual wind conditions, cause, likely spread: Kortum Canyon is aligned with northeast winds, and would like funnel dry winds, embers and heat up the canyon to the west.

Possible Projects for Napa FireWise: This neighborhood would benefit from working to provide alternative access, both to the west to Sharp Rd and to the north to Lerner Rd. Both would avoid the intersection of Kortum Canyon Rd and Highway 29.

Access would also be improved by widening areas for turnouts wherever possible. There is an ample turnout at the intersection of Kortum Rd and Kortum Canyon Rd. The foot of many driveways could similarly be expanded. This is especially important on the lower portion of Kortum Canyon Rd.

Linking Kortum Canyon Rd to Lerner Rd could be possible with minor grading and agreement between neighbors.

Recognizing evacuation to a fire-safe situation may be challenging, establishment of Temporary Refuge Areas (TRAs) is recommended. The interior of a large vineyard, such as on the Jackson property is suitable. If agreement with the landowner is achieved, the neighborhood should practice evacuating and meeting at the TRA on an annual basis.

Neighborhood #2: Diamond Mountain Rd.



Figure 13 Lower Diamond Mountain Rd.



Figure 14. Upper Diamond Mountain Rd.

Access: Diamond Mountain Road is an extremely long (3.7 miles), steep road (an average of 8% grade) that is 1.5 – 2 lanes, with sharp curves, few turn-outs, and steep drop-offs. For example there are four hairpin turns that would preclude easy access by emergency response vehicles, and would definitely prohibit simultaneous emergency access and evacuation. Long driveways service residential parcels behind locked gates. Access is bolstered by perimeter and interior vineyard roads within the vineyards located throughout the neighborhood. These roads connect parcels away from Diamond Mountain Rd. Some vineyard roads are in better condition than many stretches of Diamond Mountain Rd.

Diamond Mountain Road splits in a few locations – to Pacheteau lower down, an unnamed spur to the north, near Dyer Straights Wine, then into the South Fork and North Fork of Diamond Mountain Road. At the top, Diamond Mountain Road connects Sharp Road on an informal basis. Unfortunately, where it connects, Sharp Road is dirt, fairly steep and traverses through unmanaged vegetation to Calistoga Road.

A few locations are access by an unrated bridge.

All access information is placed in a box with a knox-type key accessible by firefighters at the base of Diamond Mountain.

Terrain: The terrain on Diamond Mountain is consistently steep, generally crenulated, with a few plateaus. The elevation of the community near on the valley floor is 345, rising to 1782 feet at the county line, near the top of Diamond Mountain.

The slope faces northeast, with two major drainages on the top half of the slope. The drainages are steep-sided, which challenges vegetation management.

Unfortunately, these canyons are also aligned with wind directions during a northeasterly wind (a Diablo wind). Under these conditions, an ignition a lower elevation would burn faster in these canyons and be fanning to side slopes on the upper part of the community.

Defensible Space conditions: Most landowners have done exemplary jobs of creating and maintaining defensible space. CAL FIRE address signs are often installed at the driveway/roadway intersection; some have identified fire suppression support features.

Pattern of development and how it relates to fire safety:

This neighborhood consists of approximately 50 parcels; the daytime population (and traffic) is higher due to a large number of vineyard workers. The daily commute traffic on difficult access roads increases the possibility of ignition. The large lots support vineyards, a stable, forests and big yards. Structures are a mixture of old and new construction – a mix of ignition resistant and vulnerable features.

Adjacent fuels: Redwood forests, oak woodlands, pose both a potential for crown fires, ember distribution, they also constitute a falling hazard along nearly the entirety of Diamond Mountain Rd. On the other hand, the vineyards interspersed in the neighborhood act as a buffer from fire within the neighborhood and between the structures. The greatest flame lengths can be expected from the unmanaged chaparral.

Unusual wind conditions, cause, likely spread: Car accidents is a likely cause of ignition along Diamond Mountain Rd.

Daily up-canyon and down-canyon winds are likely to affect fire spread (especially up-canyon winds in the morning). Normally westerly winds will hit the top of the plateau, and can flow unimpeded along Ritchie Creek in the Napa Bothe State Park. Any fire in the Napa Bothe State Park can be expected to spread to the southern end of Diamond Mountain neighborhood.

Possible Projects for Napa FireWise:

Recognizing evacuation to a fire-safe situation may be challenging, so establishing Temporary Refuge Areas (TRAs) is recommended. The interior of a large vineyards along Diamond Mountain Rd, such as on the Wallis, Jackson and Dongyi properties is suitable. If agreement with the landowner is achieved, the neighborhood should practice evacuating and meeting at the TRA on an annual basis.

Access would also be improved by widening areas for turnouts wherever possible. The foot of many driveways, could similarly be expanded. This is especially important on the upper portion of Diamond Mountain Road.

Diamond Mountain neighborhood should lobby the County of Napa to remove hazardous trees along the roadside.

Neighborhood #3: Tucker Farms

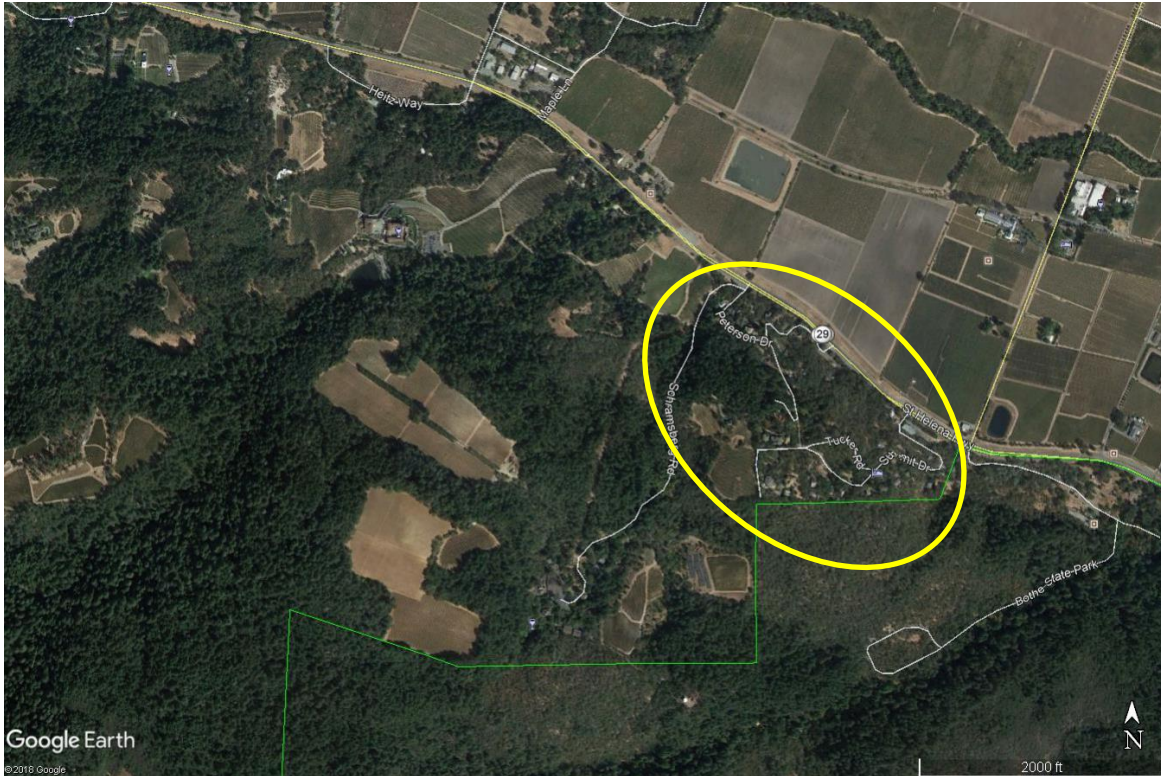


Figure 15. Tucker Farms Neighborhood

Access: All roads lead down to Highway 29. The Tucker Farms neighborhood roads form an arc with two ways leading in and out to Highway 29. Almost all homes are situated close to the road, with short steep driveways.

The names of the roads change; the neighborhood has done a good job of marking the change.

Terrain: While the roads and structures are relatively gentle slopes the edges of the neighborhood are defined by steep slopes falling down to Conn Creek and its tributaries.

Defensible Space conditions: Many lots are well tended with few exceptions. Most landowners are actively reducing fuel loads around both the roadways/ driveways and structures. However, large back yards on the southern portion of Tucker Farms grade into wildlands and abut the State Park below. A few lots have bamboo as privacy screens; this is an easily-ignited, highly flammable landscaping choice. The Tucker Farm Center is in need of work in order for it to be compliant with defensible space regulations.

Pattern of development and how it relates to fire safety: While this is the smallest neighborhood, it has the greatest population, at 53 lots, and 35 residences. Because most of the homes were built several decades ago, they are mostly comprised of wood siding, with wood decks. All have non-combustible roof, and many have remodeled to include ignition-resistant features such as double-paned windows and covered vents. New structures were built for ignition-resistant construction as required. The Tucker Farm Center is a large ignitable building.

Adjacent fuels: Vineyards provide a safe buffer to the northeast, but the surrounding unmanaged shrublands and woodlands pose significant threat to the neighborhood.

Unusual wind conditions, cause, likely spread: Winds from the south and west, like those that help spread the 1983 Howell Mountain Fire would push the fire into the neighborhood from Conn Valley. The sharp and deep canyon to the south will funnel heat to the area.

Possible Projects for Napa FireWise: Tucker Farms could expand evacuation options by connecting through existing vineyard roads and/or improving connections with minor grading.

The residents of Tucker Farms with structures nearer than 100-ft from Napa Bothe State Park should contact the Cal St Parks to request a fuel modification zone on DPR property to protect a non-DPR facility if all mitigations on the facility owner's property have proven to be inadequate. Department policy on fuel modification is designed to minimize damage to natural and cultural resources (DOM Section 1105.6).

Even-more obvious signage regarding the road name change and addresses along the road is a worthwhile project. Green CAL FIRE signs for street names and addresses should be installed at driveway-road intersections. In a related project, Tucker Farms could install a box accessible by firefighters via a knox-type key with all access information at the base of Tucker Rd.

Treatments to create a shaded fuelbreak west of Tucker Farms on the vineyards and wildlands would be a boon to the safety of that neighborhood.

Educational materials and presentations regarding fire-resistant landscaping and retrofit options would be an additional project suited for Tucker Farms.

Neighborhood #4: Schramsberg Rd



Figure 16. Vicinity of the Schramsberg Neighborhood

Access: Access to the winery and vineyards is provided via a narrow winding road. Two other dirt roads leave the main compound and lead to areas potentially safe to shelter in place. No other easy access to main compound from off site.

Terrain: Access and the main facility is near the bottom of a drainage with high humidity. The riparian area adjacent to the creek limits fuel management. Most of the property has a northern exposure with some exposed eastern and western slopes. Slopes are not steep below the buildings, with a maximum of 20% drop into the riparian area. Slopes above are gentle in some areas, but reach 40% on west side of compound area

Defensible Space conditions: The inner area is well-vegetated with irrigated landscape species, and also has large and small blue gum eucalyptus, as well as both planted and container palm trees.

Pattern of development and how it relates to fire safety: The site consists of numerous buildings and appurtenances confined to about five acres in the center of a 217-acre parcel. All buildings (some historical) have wooden siding and composite roofs within a compound with good mobility and parking. The parcel is approximately 180 acres, and forms the western boundary of Tucker Farms. As such, the management of this property directly influences the fire safety of this neighborhood, especially if a fire spreads from the west with a westerly wind.

Adjacent fuels: Dense brush is located in some areas with eucalyptus in others. Forested area is hardwood woodland being overtopped by Douglas fir overstory. Substantial ladder fuels are present with large dead fuels in abundance.

Unusual wind conditions, cause, likely spread: There are localized upslope, up canyon winds in the afternoons as the land heats. Westerly winds usually prevail in the afternoons but local land features influence direction.

The traffic and visitors, as well as winery operations (involving machineries) are a heightened ignition risk.

Power poles following the roadway may be an additional ignition risk.

Possible Projects for Napa FireWise: Working with Tucker Farms, agreements allowing residents to travel west to the vineyards would be a valuable project.

Additional roadside treatments to support evacuation of visitors and workers is also advised, to respond to the risk of ignition from both traffic and power poles.

Treatments to create a shaded fuelbreak west of Tucker Farms is a boon to the safety of that neighborhood.

Neighborhood #5: Castelle de Amoroso



Figure 17. Vicinity of Caselle di Amoroso

Access: One wide road provides access to the Castelle facility. The grade is not excessive and easily handles two-way traffic. A spur road within a couple hundred of feet from Highway 29 leads to an operation center. Operational roads on the perimeter of the vineyards provide additional emergency access.

Terrain: The terrain is not challenging; vineyards cover the more gentle slopes, while forested land is steeper. South of the vineyards, Nash Creek flows westward to the valley floor.

Defensible Space conditions: Defensible space is admirable. Italian Cypress trees lining the roadway is the only highly-ignitable landscaping observed.

Pattern of development and how it relates to fire safety: This large tourist destination includes a winery and parking. The structure is quite ignition-resistant.

Adjacent fuels: Vineyards straddle the main road on the topographic knoll while Douglas fir forests cover the north-facing slopes south of the structures and vineyards.

Unusual wind conditions, cause, likely spread: No particular exposure.

Possible Projects for Napa FireWise: No particular projects are identified.

Neighborhood #6: East of Highway 29

Access: Short streets, including Quail Mountain Lane, W Donweal Lane, Azalea Springs Way and Heitz Way lead off Highway 29. Each serve four to six parcels that are at the toe of Diamond Mountain. Driveways tend to be shorter. These residences face less severe access challenges getting to Highway 29, but would face the same congestion on Highway 29 during an evacuation. Almost all parcels are reached through a locked gate.

Terrain: Terrain is generally moderate, with shallow canyons among the wooded slopes.

Defensible Space: Properties further up the hill tend to have greater defensible space, while those properties near Highway 29 retain vegetation for privacy.

Vegetation beyond 100 feet from parcels is a mixture of oak woodland, Douglas fir and vineyards. Vineyards comprise roughly a third of the land in this neighborhood.

No particular projects are proposed for this neighborhood at this time.