# Upper Mark West Watershed Community Wildfire Protection Plan

**November 1, 2018**

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# COMMUNITY WILDFIRE PROTECTION PLAN CERTIFICATION

The Upper Mark West Watershed Community Wildfire Protection Plan was developed in accordance with the guidelines set forth by the Healthy Forests Restoration Act.

This Community Wildfire Protection Plan:

1. Was collaboratively developed. Interested parties in the region of this CWPP have been consulted.
2. Identifies and prioritizes areas for hazardous fuels reduction treatments and recommends the types and methods of treatment to reduce the wildfire threat to values at risk in the area.
3. Recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

The following representatives of the entities required for CWPP approval mutually agree with and approve the contents of this Community Wildfire Protection Plan:

SIGNED COPY ON FILE WITH FIRE SAFE SONOMA

| | |
|---|---|
| Susan Gorin<br>Supervisor, Sonoma County District 1 | Date |
| Mark Heine<br>Chief, Rincon Valley & Windsor Fire District/<br>Sonoma County Fire District | Date |
| Shana Jones<br>Chief, CAL FIRE Sonoma-Lake-Napa Unit | Date |
| Roberta MacIntyre<br>President, Fire Safe Sonoma, Inc. | Date |
| Harriet Buckwalter<br>Co-Chair, Friends of the Upper Mark West Watershed | Date |

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## COMMUNITY WILDFIRE PROTECTION PLAN PLANNING GROUP MEMBERS

The following individuals collaborated on the Upper Mark West Watershed Community Wildfire Protection Plan (UMWW CWPP):

Penny Sirota, Chair, UMWW CWPP Steering Committee (UMWW CWPP SC)

Harriet Buckwalter, UMWW CWPP SC, Co-Chair of the Friend of Mark West Watershed

Chris Schaefer, UMWW CWPP SC, President, Alpine Club

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Caerleon Safford, Executive Coordinator, Fire Safe Sonoma

Ben Nichols, Division Chief, CAL FIRE

Paul Fleckenstein, Battalion Chief, CAL FIRE Battalion 1410

Additionally, the UMWW CWPP SC would like to acknowledge the residents, fire agencies and non-profit organizations who participated in the community collaboration meetings. The ideas and information gathered at these meetings were essential to the development of the projects to make the Upper Mark West Watershed fire safe.

# Disclaimer

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view(s) of any governmental agency, organization, corporation or individual with which the authors may be affiliated.
This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. This Community Wildfire Prevention Plan (the Plan) is a work in progress. Various changes are anticipated throughout the Plan over the next several years.
Readers are urged to consult with their own agencies having jurisdiction regarding the use or implementation of this Plan, as well as their own legal counsel on matters of concern.
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This Plan is not to be construed as indicative of project “activity” as defined under the “Community Guide to the California Environmental Quality Act, Chapter Three; Projects Subject to CEQA.” Because the Upper Mark West CWPP does not legally commit any public agency to a specific course of action or conduct and thus, is not a project subject to CEQA or NEPA.

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

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# EXECUTIVE SUMMARY

Informed by the devastating September 2015 Valley Fire in Lake County, a group of concerned residents of the Upper Mark West Watershed determined there was a need for a Community Wildfire Protection Plan (CWPP) for the area. The need for a CWPP was further reinforced by the catastrophic and deadly fire events of October 2017, the Tubbs and Nuns Fires in Sonoma County, which burned north, west and south of the watershed.

The CWPP, created by the federal Healthy Forests Restoration Act of 2003, has three requirements: 1) it is to be developed collaboratively with input from fire agencies and the community; 2) it is to identify and prioritize treatment areas and mitigation strategies and treatments; and 3) it is to recommend measures to reduce the ignitability of structures.

The Upper Mark West Creek CWPP is unique to other CWPPs in that the project area includes the entire Upper Mark West Watershed. All of the Upper Mark West Watershed is classified State Responsibility Area. The entire watershed is classified as a Wildland-Urban Intermix, where homes and structures are surrounded by wildland fuels. CAL FIRE Fire and Resource Assessment Program (FRAP) has rated the project area as Fire Hazard Severity Zone (FHSZ) as follows: 66% Very High, 27% high, 7% Moderate.

This CWPP provides a general overview and assessment of wildfire risks to the watershed community, using the federal CWPP requirements and the Sonoma County CWPP. Working with this information with fire agencies, landowners and other interested community stakeholders, a set of priority project actions were developed to increase fire resiliency. These actions are intended to reduce the potential loss of human life, property, and natural and cultural resources due to wildfire. This CWPP will also help groups or agencies collaborate and seek funding for these wildfire risk reduction projects.

## Community Profile

The Upper Mark West Watershed is in east Sonoma County in the Mayacamas Mountain Range, and is the watershed for the Mark West Creek, a primary tributary of the Russian River.

The project area is about 12,000 acres of mostly steep terrain, with about 700 residents. Most of the properties are under private ownership. The northern boundary of the CWPP is Porter Creek; the western boundary is Alpine Road; the southern boundary is Plum Ranch Road; and the eastern boundary is the Napa/Sonoma County line on St. Helena Road. St. Helena and Calistoga Roads are the major arteries in and out of the watershed. There are numerous private roads and driveways.

Vegetation in the Upper Mark West Watershed is typical of North Coast Mediterranean vegetation types: mixed evergreen forest, oak woodland, grassland, and chaparral-associated plants. The land uses in the area include agricultural, vineyards, grazing, land conservation and residential.

## Fire Issues

Fire has been used historically in the watershed by the Native Americans for thousands of years to create habitats conducive to food production and hunting  As the watershed became occupied by Europeans, the landscape was modified by grazing and timber harvesting activities.  The landscape was once again modified by decades of fire suppression that has resulted in dense vegetation and fuel build-up, along with the conversion of oak woodlands to Douglas fir and dense chaparral areas.  As more people moved into the watershed, this also placed more homes and structures at risk.

The risk of wildfire typically begins the first of May and ends in November.  The months of August, September and October have the greatest potential for wildfire as the vegetation dries out and humidity levels drop.  Strong and dry northeast "Diablo" winds are most likely to occur in the fall.

While California fire history maps only go back to 1951, newspaper reports describe the *Great Fire of 1870*.  In October 1870, three fires started near the towns of Calistoga and St. Helena. Driven by very high northerly winds, the fires destroyed ranches along the Upper Mark West Creek, and came within three miles of Santa Rosa.

Since that time, several fires have come close to the Upper Mark West Watershed.  The two of greatest significance are the October 2017 Tubbs Fire, currently the most destructive wildfire in California history, and the September 1964 Hanly Fire, which took a similar path as the Tubbs Fire under nearly the same conditions.  Both of these fires occurred during "Diablo" wind events.

## Assets at Risk

Life and safety of the residents of the Upper Mark West Watershed is paramount, with homes, agricultural businesses and critical infrastructure also of importance.  Similar priorities are given to the natural and cultural resources of the watershed.  Upper Mark West Creek is home to the federal and state listed Coho salmon, and has been recognized by several federal, state and local agencies as a high priority stream for preservation and restoration.  There are several ongoing studies focusing on instream flow monitoring and hydrology as well as fish population studies.  The watershed also has several registered archaeological/Native American sites of significance.

## Wildland Fire Hazard Reduction Priorities

The Upper Mark West Watershed CWPP Steering Committee held several community-stakeholder meetings as well as other outreach efforts to determine the concerns and priorities related to wildland fire prevention and defensible space; public safety, education and communication; and ecosystem/watershed resiliency in the age of climate change.

The following reflects some of the unordered major priorities of the fire agencies, community and other stakeholder participants:

- Projects that identify and map all data points that are important to fire agencies, other first responders and the community, including but not limited to evacuation/access routes, water sources, fire breaks, public and private road conditions
- Projects that provide tools for vegetation management, including but not limited to prescribe burn, mechanical treatments, grazing, dedicated chipping program
- Projects that help landowners to harden structures create defensible space, and improve forest health and resiliency
- Projects that educate residents, landowners, renters and visitors about evacuation preparedness, defensible space, and structure hardening.
- Projects that increase the number of water resources for wildland firefighting purposes

**Conclusion**

The intensity and devastation of the October 2017 fires were extremely alarming and a wake-up call. As a result of these fires, concerned residents, landowners, and fire agencies are highly motivated to prepare the Upper Mark West Watershed for any wildfire. The CWPP report sets forth the foundation for the actionable projects identified in the matrices which will help the community move towards successfully achieving fire resiliency for the Upper Mark West Creek. The goal of these projects is to protect life, property and the cultural and natural resources of the watershed. All projects - large or small; fire agency-led, community-led or individual efforts - are important and essential to the successful implementation of the Upper Mark West Watershed CWPP.

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## Section 1 About the Upper Mark West Watershed Community Wildfire Protection Plan

The Community Wildfire Protection Plan (CWPP) was created by the federal Healthy Forests Restoration Act of 2003 with the intention of enhancing collaboration between stakeholders from federal, state and local agencies and community groups as they search for solutions to Wildland/Urban Interface (WUI) wildfire issues. There are three requirements for a CWPP:

- It is collaboratively developed with input from agencies and community members;
- It identifies and prioritizes treatment areas, mitigation strategies and treatments; and
- It recommends measures to reduce the ignitability of structures.

(Source: Sonoma County Community Wildfire Protection Plan, Fire Safe Sonoma, 2016)

Using those CWPP requirements, Fire Safe Sonoma developed a countywide CWPP for Sonoma County. It also informed and encouraged the development of smaller community-based CWPP for incorporation into the County's CWPP. Thus here, we are creating a CWPP for the Upper Mark West Watershed to meet the aforementioned requirements and for public safety, forest health and habitat restoration purposes.

### 1.1 Challenges and Approaches

This document is organized in two parts, each of which can be viewed as a stand-alone document. The first part is this Upper Mark West Watershed CWPP, a general overview relevant to wildland fire risks for the community, which does not typically change over time. The second part consists of multiple appendices that can be modified or amended as needed.

The purpose of the Upper Mark West Watershed CWPP is to help reduce the potential loss of human life and damage to property, natural and cultural resources within the Upper Mark West Watershed due to wildfire. More specifically, the objective is to protect assets at risk through focused pre-fire management prescriptions (such as fuel reduction) that can increase initial fire attack success and reduce home ignitions. A critical component of the plan is to encourage individual citizens to be involved in the coordinated effort of pre-fire planning and fire prevention and protection within his or her respective community.

One of the benefits of the Upper Mark West Watershed CWPP is that groups or agencies with wildfire risk reduction projects for which they are seeking funding can have them included in the CWPP Project List (Appendix B). Projects submitted for inclusion in the Project List can be ranked by a collaborative group on a yearly basis. This project prioritization will help ensure that any grant funds allocated are appropriately targeted, and will help grantors know that projects have been considered collaboratively.

## 1.2 Collaboration and the Upper Mark West Watershed CWPP Development Team

The Upper Mark West Watershed CWPP was developed by:

- Community residents,
- Members of the Alpine Club,
- Friends of the Mark West Watershed

In collaboration with and input from:

- Fire Safe Sonoma,
- California Department of Forestry and Fire Protection (CAL FIRE) Sonoma-Lake-Napa Unit
- Sonoma County Fire District (SCFD),
- Sonoma County Fire and Emergency Services Department
- Sonoma Resource Conservation District

The Upper Mark West Watershed CWPP is a planning tool that will help concerned citizens, planning professionals, Fire Safe Councils, responsible agencies, and other interested parties assess wildfire threats to homes and communities and identify measures that may be taken to reduce risk.

## 1.3 Outreach and Involvement of Community Members

The plan was developed over a series of three community meetings. The first two meetings engaged members from road groups. Notice was given via two separate email lists. Announcements were made at the 2018 Spring Hike and Hoot event as well as in the annual Friends of the Mark West Watershed Newsletter and the Alpine Club Newsletter. Members of the Upper Mark West Watershed CWPP Steering Committee made phone calls to key members in each road group to ensure their involvement in the process. Organizers also emailed and called to invite several wineries in the area as well as the community organizations with interests in the watershed. All of this outreach effort succeeded in bringing in residents from each of the road group areas.

The first two meetings used the Risk Assessment template (Appendix A) to discuss the conditions of specific areas and to draw general conclusions about the watershed as a whole. Road group residents sat together to discuss answers to the questions about their areas. Two similar meetings focused on the risk assessment were held to accommodate all of the stakeholders. The third meeting was a collaborative process to generate, rank/prioritize project ideas (Appendices C, D, E and F) to address four areas of concern:

- Structural Hardening and Defensible Space,
- Human Safety and Access,
- Forest Health and Ecosystem Resilience, and
- Water and Other Infrastructure to Assist Fire Fighters

The Upper Mark West Watershed CWPP Steering Committee, made up of watershed residents, then took all of this input and created the plan. There will be a two week period for additional feedback from the community via an online forum as well as a 2018 summer gathering of the Alpine Club to gather more suggestions which will be incorporated into the final plan.

### 1.4 Stakeholder Groups

The agencies and organizations listed below represent those entities that have some degree of interest in the Upper Mark West Watershed (e.g, human, public safety, ecosystem, socioeconomic).

Federal:

- Natural Resource Conservation District
- National Fish and Wildlife Service
- National Fish and Wildlife Foundation
- National Oceanic and Atmospheric Administration National Marine Fisheries Service
- U.S Geological Survey
- U.S. Army Corps of Engineers
- U.S. Senators
- U.S. Congressional Districts 2 and 5

State:

- CAL FIRE Sonoma-Lake-Napa Unit
- California Department of Fish and Wildlife (CDFW)
- Wildlife Conservation Board
- State Water Resources Control Board
- California Department of Conservation
- California Governor's Office of Emergency Services
- California Department of Parks and Recreation, Bay Area District
- Sonoma State University, Northwest Information Center (part of the California Historical Resources Information Center, and a partner with the State Office of Historic Preservation, California Department of Parks and Recreation)
- University of California Cooperative Extension –Russian River Coho Salmon Captive Broodstock Program
- State Senator District 2
- State Assembly District 2

Regional:

- North Coast Regional Water Quality Board, Region 1

County:

- Sonoma County Regional Parks
- Sonoma County Agricultural Preservation and Open Space District
- Sonoma County Agricultural Commissioner
- Permit Sonoma
- Sonoma County Water Agency
- Sonoma County Economic Development Board
- Sonoma County Office of Recovery and Resiliency
- Sonoma Resource Conservation District
- Sonoma County Fire District
- Mountain Volunteer Fire Department
- Sonoma County Board of Supervisors

Local and Community Organizations:

- Friends of the Mark West Watershed
- Alpine Club
- Audubon Canyon Ranch
- Land Paths
- Pepperwood Preserve
- Russian River Coho Water Resources Partnership
- Sonoma Land Trust
- Monan's Rill Association
- Monan's Rill Institute
- Coast Range Watershed Institute
- Center for Ecosystem Management and Restoration
- California Native Plant Society, Milo Baker Chapter (Sonoma County)
- Sonoma County Community Foundation
- North Bay Conservation Corps

## Section 2 Upper Mark West Watershed Community Profile

### 2.1 Location Within Sonoma County and CWPP Boundaries

The project area for this CWPP is defined by the Upper Mark West Watershed in east Sonoma County. The Upper Mark West Watershed is in the Mayacamas Mountain Range and is the watershed for the Upper Mark West Creek, a tributary of the Russian River.

This area was chosen because of its importance as a critical habitat for federally and state protected coho salmon and steelhead, and the high motivation of local people to do whatever

they can to make their community better adapted to survive wildfire. The October 2017 fires reinforced social networks and neighborhood groups that were already functioning well together.

We utilized the Alpine Club Emergency Preparedness Committee structure of road groups to identify boundaries of the project: Plum Ranch Road creates the southern boundary, Porter Creek creates the northern boundary, the terminus of Alpine Road to the west and the Napa/Sonoma County line at eastern end of St. Helena Road is boundary to the east.

**Boundaries of the Upper Mark West Watershed CWPP:**

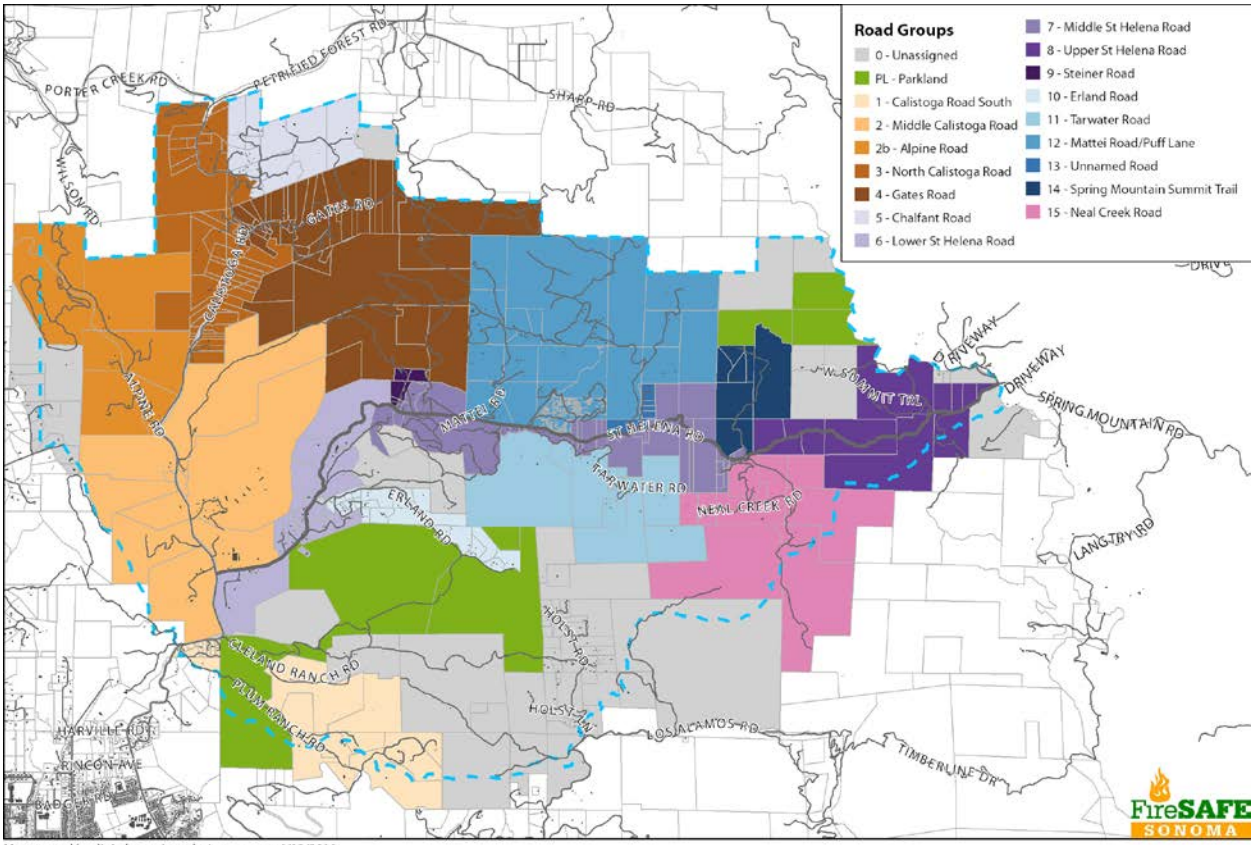
Acres (approximate): 11,728 acres

The project area for this CWPP was developed in consideration of natural social boundaries that are based, to a large extent on road networks. St. Helena and Calistoga Roads provide access to most of the residences in our area via a series of mostly unpaved secondary roads. Because these are private roads, residents who have property in these areas are responsible for collecting the information that was combined for the CWPP's risk assessment and community description.

In total, fifteen road areas were examined during the creation of this CWPP. These road areas define natural boundaries where people know each other and could provide the detailed information necessary for risk assessment and project planning. The road area divisions are:

1. Calistoga Road from Plum Ranch Road to Cleland Ranch Road
2. Calistoga Road from St Helena Road to Alpine Road
3. Calistoga Road from Alpine Road to Porter Creek Road
4. Gates Road
5. Chalfant Road, Circle Ranch Road and Kings Hill Road
6. St. Helena Road (lower) from Calistoga Road to Rancho Mark West (7125)
7. St. Helena Road (7125) to (8470)
8. St. Helena Road (Upper) from Neal Creek Road to Sonoma-Napa County line
9. Steiner Road
10. Erland Road
11. Tar Water Road
12. Puff Lane and Mattei Road
13. Unnamed private road off of St. Helena Road (7905-7945)
14. Spring Mountain Summit Trail (formerly Wappo Road)

15. Neal Creek Road



Map created by digitalmappingsolutions.com on 6/12/2018.

## 2.2 Wildland/Urban Interface-Intermix (WUI) Condition:

The term "WUI" comprises both Wildland Urban Interface and Intermix, but there is a distinction. This plan uses the term Wildland Urban Interface/Intermix as defined in the Federal Register (66:751, 2001) report on WUI communities at risk from fire (USDA & USDI, 2001) as follows:

> *"The **Interface** Community exists where structures directly abut wildland fuels.* There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually 3 or more structures per acre, with shared municipal services. Fire protection is generally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire. An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile."

> *"The **Intermix** Community exists where structures are scattered throughout a wildland area.* There is no clear line of demarcation; wildland fuels are continuous outside of and

within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28-250 people per square mile."

Using this definition, the entire Upper Mark West Community Wildfire Protection Plan area is designated as Wildland/Urban Intermix.

## 2.3 Organizations Already in Place

### 2.3.1 Alpine Club

The Alpine Club is a non-profit, local social benefit club dating back to the 1940's. It includes friends and neighbors living in the Alpine Valley area east of Santa Rosa, California. The Alpine Valley area includes the following roads: Calistoga, St. Helena, Plum Ranch, Cleland Ranch, Erland, Tarwater, Spring Mountain Summit Trail (Wappo), Neal Creek, Steiner, Puff, Mattei, Mayacama, Gates, Chalfant and Alpine. The Alpine Club works to promote the common interests of the neighborhood, as well as celebrating community at least once a year with club gatherings.

### 2.3.2 Friends of Mark West Watershed

Friends of the Mark West Watershed (FMWW) is a watershed community dedicated to preserving, protecting, and restoring the Mark West Creek and its watershed as a natural and community resource. FMWW is a 501(c)(3) non-profit organization that works to engage the community in hands-on ecologically based stewardship projects and educational opportunities. FMWW also collaborates with several other non-profit and governmental agencies invested in the ecological health and sustainability of the Mark West Watershed.

### 2.3.3 Emergency Preparedness Committee

The Emergency Preparedness Committee (EPC) is a joint effort of the Alpine Club and the Friends of the Mark West Watershed. The EPC works to create a communication structure for the community (e.g., automated phone "broadcasting", phone trees), for emergencies (e.g., wildfires, earthquakes, landslides). The EPC also works to improve communications between the community and emergency responders. In addition, the EPC may explore ways to help community members better prepare for emergencies (e.g., how to prepare "safe space" for fire protection, how to prepare for long periods of time without electricity). The EPC also manages the Phone Alert System (PAS) which is a phone communication system activated during crisis situations. The PAS has been

in operation since 2009 and calls resident's phone(s) when there is a local emergency that could impact the safety of residents or their property. This system was used during the 2017 Tubbs fire.

## 2.4 Topography

Topography is steep, and primarily defined by the drainage leading to the Upper Mark West Creek. With a few exceptions, homes are located on slopes, and accesses on steep roads. In the event of wildfire, topography will have a strong influence on fire behavior.

PDF of CalFire Watershed Map

## 2.5 Population

### 2.5.1 Demographics

Demographic data is extracted from 2017 United States Census block data and compiled by ESRI (a mapping software) which applies the demographic data to our boundary area of the Upper Mark West Watershed with the following results:

- Area in Acres: 15,145
- Total Population: 667
- Average Home Value: $836,522

The Upper Mark West Watershed area includes both full and part time residents, absentee landowners, and vacation rental visitors. Part-time residents that have second homes and spend weekends/vacations in the area may represent between 10-20% of the homes in the area. A number of homes have been sold recently as older residents are moving out of the area. Many new residents and visitors are unfamiliar with the wildfire risks they face and lack knowledge to appropriately respond. Most homes in the area are owner occupied, although there are also a number of rentals, most with long term rental tenants. There are also a number of vacation rentals in the Upper Mark West Watershed, operated through AirBnB and VRBO. Follow up research is needed to confirm and better understand this data.

## 2.6 Parcel Sizes

Typical parcel sizes: Most lots, with the exception of the Gates Road project area discussed below, are more than 10 acres with little risk of home-to-home ignition.

**Parcel Size (acres) Upper Mark West Watershed**

| Parcel Size | Number in Watershed |
|---|---|
| 0 – 10 | 441 |
| 10 – 20 | 56 |
| 20 – 50 | 68 |
| 50 - 100 | 34 |
| 100 – 200 | 24 |
| 200 – 500 | 11 |
| > 500 | 1 |
| **TOTAL** | **635** |

(Based on Sonoma County Land Use Records 2018)

## 2.7 Land Uses

Land uses in the area include agricultural, vineyards, grazing, forestland, residential and cannabis. More study is needed to understand the various fire risks. Cannabis operations are a new impact on the watershed and as yet unknown. This is a significant new factor in the watershed. During the fire event of 2017, there were several stories of increased traffic and conflict on the roadways as cannabis operation workers were fleeing the fire and getting their product out of the area. There is a need to coordinate with these new members of the watershed. So far, these new members are disinclined to be involved in community efforts to organize.

## 2.8 Description of Roads

Primary access is provided by two Sonoma County maintained roads: St. Helena Road and Calistoga Road. Both of these roads provide egress in two directions.

Just over 12 miles in length, St. Helena Road starts on Calistoga Road, and goes eastward across the Sonoma-Napa County line where it becomes Spring Mountain road and ends in St. Helena, Napa County. It serves as a main artery between Santa Rosa and St. Helena, and as of March of 2018, it was estimated that over 1,000 cars per day traveled the road. St. Helena Road is a two lane, paved road with limited turnouts and extensive vegetation on both sides of the road. The road has numerous sharp curves, and trucks that are 30 feet or longer are not recommended.

Calistoga Road is a heavily travelled road that goes from Santa Rosa to Calistoga in Napa County. Calistoga Road is also a main artery between Santa Rosa and Calistoga and a commuter route from Santa Rosa to Lake County. It is estimated that over 4,600 cars per day travel along Calistoga Road. During a large-scale evacuation, both of these routes are subject to risks arising from blockages, heavy traffic volume, and surrounding vegetation.

Secondary access for most of the homes in the project area are a series of unpaved, privately maintained roads. Vegetation management on roadsides is a constant and ongoing need. The secondary roads are typically very narrow, with limited turnouts, and limited abilities for fire trucks to pass each other. Evacuating traffic would greatly interfere with access for fire trucks and first responders. Many of the secondary roads have private gates, some without Knox-Boxes (Rapid Entry System used by emergency responders). There are also a number of bridges (many wooden) throughout the area on the secondary roads.

## Section 3 Fire Response to the Upper Mark West Watershed

The entire CWPP project area is in the State Responsibility Area (SRA). State Responsibility Area is a legal term defining the area where the State has financial responsibility for wildland fire protection. The Board of Forestry and Fire Protection, within CAL FIRE, is responsible for classifying land as SRA. Incorporated cities and federal ownership are not included/classified SRA.

In the SRA, CAL FIRE has primary responsibility for command and firefighting operations for wildland fires and fires that pose a threat of spreading into the wildland. CAL FIRE has primary command of SRA fires from time of arrival. CAL FIRE has automatic aid agreements and has designated Mutual Threat Zones within the Rincon Valley/Windsor - Sonoma County Fire District (SCFD). This agreement provides for services, including responses to structure and wildland fires, traffic accidents, rescues and medical aids.

The SCFD is a combination fire department with **9 full time firefighters and 3** overhead staff on duty each day and a volunteer force of approximately 25. The SCFD's **large response area includes areas** south, north and east of the city of Santa Rosa.

Because of the SCFD's boundary interactions with the Santa Rosa Fire Department (SRFD), there is a boundary drop agreement between the SCFD and the SRFD. Because of this agreement it is likely that the SRFD Station 6 on Calistoga Road will be the first engine to respond on scene in the area of the CWPP.

The northern boundary of the CWPP is bounded by the **Mountain Volunteer Fire Department.** This is an all-volunteer fire company which, was part of Sonoma County Fire and Emergency Services Department. Depending on volunteer availability and other dispatched events, units from this department sometimes response into the area of the CWPP. At the time this CWPP was being written, discussions were ongoing regarding consolidation with and/or shared services with the Rincon Valley/Windsor - Sonoma County Fire District and other nearby fire districts. The specifics of how changes will impact local fire response is not yet clear but may involve consolidation of the Rincon Valley/Windsor Fire Protection District, Mountain Volunteer Fire Department and Bennett Valley Fire District. The goal of consolidation is to provide increased and more efficient services to the communities involved.

## Section 4 Natural Community and Wildfires Past

### VEGETATION

| Lifeform (simplified) | Acres | % of Watershed |
|---|---|---|
| Forest | 8,788.1 | 75% |
| Shrub | 1,039.4 | 9% |
| Grassland/Rangeland | 1,486.5 | 13% |
| Cropland; Pasture | 244.7 | 2% |
| Water | 13.2 | 0.1% |
| Developed/Barren | 155.8 | 1% |
| **Total** | **11,727.9** | |

(Source: Sonoma County Vegetation Map 2014)

## 4.1 Vegetation Type and Density

Vegetation in the Upper Mark West Watershed is typical of the North Coast Mediterranean vegetation types. Where temperatures are relatively high and soils are shallow, oak woodlands and chaparral-associated plants predominate. In the cooler and wetter areas, soils are deeper, and mixed evergreen forest and hardwoods such as oaks and tanoaks occur. Redwood and Douglas fir dominate in cooler, moist areas, whereas hardwood evergreens such as tan oak, madrone, live oak and bay occur on well-drained slopes. Northern oak woodland type of vegetation can be observed on southern exposures and the edges of mixed forest. Oregon oak, black oak, and manzanita dominate here. Much of the grassland has developed on lands cleared of hardwoods, where soils are shallow.
(Source: Integrated Watershed Management Plan Sonoma RCD, 2015)

## 4.2 Natural Fire Regimes

Fire has been used historically in this region by the Native Americans for thousands of years to promote the dominance of plant communities. Frequent fires cleared the landscape of fuel loads, created clear areas ideal for acorn harvests and hunting. The frequent fire interval established and encouraged fire dependent and fire adapted plant communities.

For at least 4000 years (some archaeologists believe up to 10,000) Native Americans modified the landscape to promote habitat for and the growth of species needed for their survival. This "tending" of the natural landscape included planting, pruning weeding and the extensive use of managed fire. These management techniques modified the distribution, the density and the age structure of all of the vegetative communities found in the area. Grasslands were dominated by native, deeply rooted, perennial bunch grasses that remained green and more fire resistant later into the dry summers. Chaparral communities were regularly burned to provide fresh browse for deer and other wildlife and to produce young, more supple vegetation for baskets and other implements. Selective, well timed burning within oak woodland communities reduced the invasion by Douglas Firs and promoted those oaks that provided the acorns needed as a basic food source and maintained an open park-like setting that eased both hunting and travel. Redwoods and mature fir forests were confined to the wetter canyons and shaded stream corridors along Upper Mark West Creek and its tributaries and a few locations dominated by major springs.

These stewardship practices were terminated by the Spanish in the early 19th century. Extensive cattle grazing and the accompanying introduction European grasses entirely converted natural grasslands into the highly fire prone grassland landscapes found today. These introduced, mostly annual grasses provide a more dense and easily ignited fuel load that carries fire more quickly and with greater intensity into the chaparral and woodland habitats. The population of Native Americans was decimated by diseases introduced by the Spanish and the survivors were removed from their villages and enslaved at the Pueblos. The

managed burning ended, and the chaparral and woodland communities became quickly overgrown with firs.

Anglo settlers imposed new stewardship practices on the landscape. Mature redwoods and firs were first harvested for lumber in the second half of the 19th century. Subsequent harvests followed, some in the early 20th century, also for lumber, and again in the mid-century when the area supplied trees for pilings for the Napa and Vallejo shipyards during World War Two. Oral history interviews reveal that oaks were harvested early on for charcoal production and then later more heavily to provide fuel for the many hop kilns that operated in the valleys from the 1880's until the 1960's.

As a result, today's oak woodlands are dominated by invading firs. Study of the area's ecological history and fuels management work has revealed the vast majority of the firs today are less than fifty years old with another large cohort approximately ninety years old. Very few firs or redwoods are older than 100 years. Area ranchers reintroduced some managed fire to the area during the first half of the 20th century, conducting slash burns after logging operations and regularly burning chaparral to provide fresh browse and promote deer populations. This local burning ended after the Hanly Fire swept north of the watershed in 1964. As a result, chaparral areas have aged and become dense with dried fuel.

Much of the area was grazed by sheep, cattle and goats during the first half of the 20th century. This grazing of area grasslands has been greatly reduced over the last forty years.

The implications of these changes for wildfire are dramatic. The predominance of young fir trees greatly increases the rate of spread and the intensity of wildfire throughout the area. Ungrazed non-native grasslands are extremely fire prone and aging chaparral communities burn with extreme intensity.

Fuels management and the use of prescriptive fire in the area are therefore among the highest priorities identified by this plan. The activities also can benefit watershed hydrology features such as groundwater recharge and streamflow.

Climate change modeling created by Pepperwood Preserve predicts a more frequent fire return to this area due to drier fuel conditions and more fuels in response to intense rains delivered by intermittent atmospheric rivers. Pepperwood's adaptive management plan takes the factors of climate change and fire adapted plant communities into account:

> " Long term adaptive management strategies need to take into account more frequent fire regimes and the risk of intense burns where fuels have accumulated."
> (Source: Pepperwood Adaptive Management Plan 2017)

### 4.3 Seasonal Weather Patterns

Sonoma County's wildfire season spans the months after the last spring rains have fallen until the first significant fall or winter rains occur. Risk of wildfire begins as early as May and can extend into the early winter. The months of August, September and October have the greatest potential for wildland fires as vegetation dries out and humidity levels fall. Strong and dry north-east "Diablo" winds, which significantly increase likelihood and severity of wildland fires across California and the west, are most likely in the fall months. These extreme winds not only drive fire across the landscape, but also propel burning embers well in advance of the flame front starting spot fires and igniting structures. In October 2017, north-east winds were a primary causal factor for the extreme fire behavior and fire spread in three major wildfires that burned more than 7,000 homes and 100,000 acres and took 47 lives in Sonoma and surrounding counties.

During fire season, the weather is generally warm and dry during the day, with peak summer day temperatures 80° – 100° F, and relative humidity ranging between 20% and 35%. Gradient winds are generally out of the southwest at 5–10 miles per hour (mph), strengthening to 10–15 mph in the late afternoon and diminishing by dark. Coastal onshore flow, often accompanied by fog, frequently prevails after sunset, allowing for good nighttime relative humidity recovery in the warm inland areas. In the inland valleys, fog usually dissipates by 11:00 am. The fog layer depth is usually between 1,000 and 1,500 feet; however, elevations above this often do not experience fog nor do they receive the same nighttime cooling and moisture recovery as lower elevations.

"Red Flag" warnings are issued by the National Weather Service for weather events which may result in extreme fire behavior that will occur within 24 hours. In red flag conditions, low relative humidity, strong winds, dry fuels, the possibility of dry lightning strikes, or any combination of the above could lead to rapid or dramatic increases in wildfire activity. As we saw in 2017, when these critical weather patterns align with the topography, extreme rates of spread can result, especially along exposed ridges and through constricted areas.

## Section 5 Wildfires Past

### 5.1 History of Fire in the Upper Mark West Watershed

In October 2017, the Tubbs Fire, the most destructive wildfire in California history, ignited parts of the Upper Mark West Watershed. Strong north-east winds blowing in excess of 70 mph, pushed down the Mark West Creek canyon which is on the west side of the ridge from Calistoga. The Tubbs Fire destroyed over 5,000 structures and burned over 36,000 acres.

This followed a pattern of wildfires that have had a tremendous impact on this community's history.

On a September night in 1964, 70 mph winds pushed the Hanly Fire through the Mark West Watershed destroying more than 100 homes and burning 52,000 acres. Its path was remarkably similar to the Tubbs Fire, but fewer structures were burned in the Hanly Fire because the area it burned was more sparsely settled in 1964. In October 1996, the Porter Creek Fire ignited close to Calistoga Road, and spread into the Franz Valley Road area, burning 300 acres.

California fire history maps only go back to 1951, but newspaper reports describe the *Great Fire of 1870*. Three fires started near Calistoga and St. Helena on October 13-15, 1870, and, driven by very high northerly winds, they blew out of control and destroyed ranches along Mark West Creek. They came within three miles of the city of Santa Rosa. Other major historic fires impacting the watershed occurred in 1908, the 1920's and in the late 1930's.

History suggests that hot fires are likely to sweep across this area again. Climate change and rising temperatures will increase the frequency and the intensity of these fires.

The most damaging of these fires have started during periods of strong off-shore winds from the north and generally going south and southwest. Diablo Winds create downslope northeast winds that flow over St Helena Mountain and bring humidity down suddenly. They warm and pick up speed as they come downhill reaching 60-70 mph at the surface in Santa Rosa. The Hanly Fire took 24 hours to go from Calistoga to Santa Rosa; the Tubbs Fire took only 4 hours to travel the same path. On-shore winds can also rapidly move fire up canyons and slopes from west to east. Another phenomenon, nocturnal events, occurs when dry nights and dry winds come in from the coast above the marine layer.

Wind corridors are now being mapped and studied. Improved technology may help predict these wind patterns, but the Upper Mark West Watershed community wants to prepare for the inevitable fires that will come.

### 5.2 Impact and Threats from Recent Tubbs and Nuns Fire: Lessons Learned

The 2017 Tubbs Fire had a tremendous impact on this community. Since then, improvements have been made in the evacuation notification and early warning systems, with monthly community meetings held to consider the areas lost, increased social networks, ways residents can help each other, acknowledgement that sometimes residents are "on our own," as well as shared information about sheltering in place and knowing if it is safe to evacuate. A bridge over a stream that provides habitat for federal and state protected species is also of concern. During the 2017 Tubbs Fire, dozens of wooden, existing, non-conforming bridges were

destroyed, leaving many homes/communities completely cut off for egress, rescue or suppression efforts. Even when the fires were considered under control, continued issues with downed power lines, burned or damaged power poles and trees along Calistoga Rd created safety concerns that extended the evacuation period for residents of this community.

While not directly impacting or destroying any properties in the Upper Mark West Watershed, the community learned a number of lessons from the 2017 Nuns fire, which burned 54,000 acres and 1,300 structures in the Sonoma Valley, southwest of the Upper Mark West Watershed:

- Risks of fire can come from multiple directions. Once the risk from the Tubbs fire (from the northwest) had passed for the Upper Mark West Watershed and residents believed they could get back into their homes, the Nuns fire flared up, threatening the community from the southwest, extending the evacuation period.
- Hood Mountain Regional Park and Sugarloaf Ridge State Park provided large areas with few residences where fire agencies could drop fire retardant. Back fires were lit behind wineries that allowed the fires to burn up into the hills and into the Regional and State Park, where fire agencies could use air tankers to fight the fire.
- Communities need to establish evacuation shelters and proactively inform residents of the locations before fires occur. Fire agencies also need to make sure residents are able to receive evacuation notices and updates as the incidents progress, using applications or social media.
- Vineyards and grazing land served as good fire breaks. While the ground cover burned, it didn't contribute to fire spread and none of the structures in vineyards were destroyed by area fires.
- Fire agencies need to work with local organizations to develop large animal rescue resources because people will return to fire areas to rescue them.
- Residents should be prepared to be evacuated for an extended period of time, due to potential danger zones and issues with access.

The Rincon Valley/Windsor/Sonoma County Fire District is already receiving calls from residents in this and surrounding communities about insurance companies sending out "comply or cancel" notices. In some cases, the compliance is not reasonable based on property lines, slope, erosion concerns, building construction type/materials and financial constraints. These notices typically give the homeowner approximately 30-45 days to comply with the outlined demands from the company. These often exceed the State mandated requirements. Residents that cannot comply are left with no other options but to seek high hazard insurance which can be cost prohibitive.

# Section 6 Assets at Risk in the Upper Mark West Watershed

## 6.1 Rural Lifestyle

### 6.1.1 Human Population

- Particularly at-risk (elderly, disabled, children, special needs, homebound) - more information needed to determine who may need extra help during evacuation

### 6.1.2 Pets and Livestock

### 6.1.3 Residential Structures

### 6.1.4 Protecting a Way of Life - why we live here

## 6.2 Environmental Resources

### 6.2.1 Federal and State Protected Species

Mark West Creek has been identified as a high priority stream for preservation and restoration by several federal, state, and local agencies including:

- National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service
- California Department of Fish and Wildlife
- Wildlife Conservation Board
- State Water Resources Control Board
- Sonoma County Water Agency
- Sonoma Resource Conservation District

The significant aquatic resources reflected by the high water quality, significant in-stream and riparian habitat and endangered species occurrence in the area make the Upper Mark West Watershed extremely significant for conservation and protection.

Resource agencies have conducted focused monitoring and fish population studies in the Upper Mark West Watershed, thereby documenting the extensive natural resources in this region. Additionally, the area has been a high priority region for conservation easements and public lands acquisition by both the Sonoma Land Trust and Sonoma County Agricultural and Open Space District; the latter, recognizing the largely intact riparian area as high priority for both fish and wildlife and human needs, chose Upper Mark West Creek for a proposed riparian easement pilot program.

The recovery of federally endangered Coho salmon populations is a primary focus in the Russian River watershed. The Coho Salmon Recovery Strategy prepared by the California Department of Fish and Wildlife (CDFW, 2004) states that during targeted surveys Coho salmon were found in Mark West Creek in 2001, and detected in 1993 and 1994, thus making Mark West Creek one of the few Russian River tributaries where Coho salmon have been recently observed. The Coho Salmon Captive Broodstock Program has identified Upper Mark West Creek as a potential future site for the release of Coho salmon. In addition, in a summary of the recent "Coho Salmon Summer Rearing Habitat Delineation for the Russian River Watershed (Draft, 8/15/07)", NOAA's National Marine Fisheries Service states that based on the final estimate of habitat distribution, Mark West Creek is the only habitat suitable for Coho salmon east of Healdsburg. This is significant in three ways: 1) it is very isolated; 2) it is the only representation of habitat in the inland context; and 3) the loss of this habitat would likely reduce the environmental diversity and potentially genetic diversity of the population.

In 2007, the Mark West Watershed was designated as one of the priority conservation areas in the nine-county Association of Bay Area Governments.

In 2015, as a part of the Governor's Water Action Plan, the California Department of Fish and Wildlife and the State Water Resources Control Board identified Mark West Creek as one of five high priority stream systems statewide to support critical anadromous fish.

### 6.2.2 Significant Tributary to the Russian River

The Upper Mark West Watershed was selected as a keystone watershed for the Sonoma Resource Conservation District Russian River Creek Stewardship and Volunteer Monitoring Program in 1999. The watershed was selected by a multi-agency Technical Advisory Committee due to the significant aquatic resources and the relative interest, awareness and stewardship ethic shown by landowners and residents to restore and protect the watershed.

In addition to the existence of critical wildlife habitat, there are a number of resources that provide critical connections for people in the Upper Mark West Watershed. The significant number of properties with conservation easements in place, coupled with extensive cooperation of the landowners, has allowed this area to be the site of a wide range of outdoor and environmental education opportunities that are offered through the Sonoma Land Trust, LandPaths (the educational arm of the Sonoma County Agricultural and Open Space District), Acorn Soupe, University of California

Cooperative Extension, the Forest Stewardship Group and the Sonoma Resource Conservation District.

## 6.3 Utilities

### 6.3.1 PG&E

- High Tension lines run through watershed to Adobe Road to provide electricity to the community of Oakmont and other communities southward
- PG&E Power Distribution System

### 6.3.2 AT&T

AT&T maintains above ground phone lines that run up Calistoga Road and along St. Helena Road. Primary "telephone line" box at the intersection of Calistoga Road and St. Helena Road. "Repeater" boxes located on Calistoga Road and St. Helena Road.

### 6.3.3 Cell Phone Towers

- That serve this area, even if located out of plan boundaries
- Top of Mt. Barham (red blinking light above Oak Springs Sheep Ranch; sheep ranch located at intersection of Calistoga Road and St. Helena Road
- Verizon cell tower above turkey farm

### 6.3.4 Upper Mark West Watershed Weather Station

- http://www.weatherlink.com/user/vinnysweather/

### 6.3.5 Terrestrial Wireless

- CDS and Rhinobee

## 6.4 Outdoor Education and Recreation

### 6.4.1 Land Paths Programs

Land Paths operates year-round recreational and educational programs at Rancho Mark West. Summer is especially busy with Land Paths as it operates "Owl Camp," which is a camp for children 5-13 years old. Many of the campers are coming from Santa Rosa and surrounding communities, adding to the traffic patterns for the watershed. Owl Camp operates for four weeks in July every summer and is typically filled to capacity with about 50 children, counselors and volunteers per week. In addition to the Owl Camp in the summer, Rancho Mark West also hosts hundreds of *In*

*Our Own Backyard* students each year as well as numerous community events and stewardship opportunities. The Sonoma County Agricultural Preservation and Open Space District holds a conservation easement over the property that limits uses and improvements on the property to preserve and protect its natural, scenic, recreational and educational, and agricultural resources.

### 6.4.2 Saddle Mountain Open Space Preserve

Saddle Mountain Open Space Preserve, acquired in 2006 by the Sonoma County Agricultural Preservation and Open Space District protects 6.5% of the Upper Mark West Creek watershed, including significant portions of Weeks, Alpine, and Van Buren creeks. The Sonoma County Agricultural Preservation and Open Space District is in the process of finalizing a management plan for the preserve, with funding from the State Coastal Conservancy, to restore and enhance sensitive habitats, prevent erosion, and manage invasive species and fuel loading on the Preserve. While currently managed as an open space preserve with limited public access, there may be an opportunity in the future for the preserve to be open for public recreation.

### 6.4.3 Bothe-Napa Valley State Park

A small portion of Bothe-Napa Valley State Park's western "arm" is located in Sonoma County. There is no formal access (e.g., trail, access road) to that portion of the park from the park's front entrance on Highway 29 in St. Helena, thus there is little, if any, hiking in that area. The assets of that portion of the park are its forest ecosystem and wildlife corridor.

## 6.5 Historic and Archaeological Resources

### 6.5.1 Alpine School

### 6.5.2 Rancho Mark West

### 6.5.3 Registered Archaeological Sites Filed with the Sonoma State University, Northwest Information Center (NIC)

The center is the repository of historical and archaeological information that is part of the statewide California Historical Resources Information System (CHRIS). The NIC is one of nine information centers located through the state. CHRIS is a partnership with the State Office of Historic Preservation, California Department of Parks and Recreation and the nine information centers.

## 6.6 Businesses

### 6.6.1 Agriculture

- Beehaven
- Benedetti Turkey Farm
- Cattle grazing operations on Gates and Mattei Roads
- Oak Springs Sheep Ranch
- Mark West Stables

### 6.6.2 Cannabis Operations

### 6.6.3 Health Services

- Child Care Facilities. - none known currently
- Health Care Facilities - none known currently

### 6.6.4 Wineries

- Fisher Winery
- Kings Hill Cellars
- Pride Winery
- Viluko Winery

### 6.6.5 Vacation Rentals

- Vacation Rentals and Bed-and-Breakfasts (particularly those on dead end roads or large accommodations with special evacuation needs)

### 6.6.6 Vineyards

- Berler Vineyard
- Cornell Vineyard
- Fisher Vineyard
- Pride Vineyard
- Viluko Vineyard

# Section 7 Wildfire Risks Moving Forward

## 7.1 Climate Change Modeling

Projected air temperature increases on order of 5-10 degrees F* by 2100, more variable rainfall, more frequent droughts, increased evaporation and climatic water deficits, shifts in

species composition and increased fire risk. (Adaptive Management Plan for Pepperwood Preserve 2017)

An analysis for the Russian River basin showed that projected increase in long-term temperature averages translate to a 10-15-fold increase in the total number of summer days exceeding 95 degrees (Micheli et al. 2016).

Climatic Water Deficit:
Increased temperatures combined with more variable rainfall are expected to cause an overall trend toward more arid conditions. Climatic Water Deficit (CWD) is the difference between potential and actual evapotranspiration. CWD is a measure of drought stress, the difference between the amount of water that vegetation could use and the amount of water actually available. Because higher temperatures increase evapotranspiration rates so much, CWDs are predicted to increase across all future scenarios regardless of whether total precipitation increases or decreases in the Upper Mark West Watershed. (Source: Flint and Flint 2014)

## 7.2 Road System and Access

### 7.2.1 Primary Roads

St. Helena Road and Calistoga Road serve as key travel routes to get residents out and fire fighters into the area. Primary roads need effective shaded fuel breaks created and maintained to assist with fire control and safe evacuations during an event.

As we discovered during the 2017 Tubbs Fire, access and egress were heavily compromised by downed trees and powerlines as well as abandoned vehicles left burning in the roadways. With only two traffic lanes in this area, residents can easily become “landlocked” in both directions when fire debris litters the roadways.

These two roads also serve as primary commute routes to tourism and hospitality jobs in Napa County for workers living in Sonoma County. These two roads are also used for heavy truck deliveries between Sonoma and Napa counties, including gravel trucks, construction equipment and earth moving equipment.

### 7.2.2 Secondary Roads

Many of the secondary roads are problematic as they are narrow, overgrown and tend to be one way in and out. These roads need attention in order to better insure the safe evacuation of residents.

Many of the secondary roads need alternative evacuation routes established for emergency situations.

Most roads will need ongoing roadside fuels management and increased fire-resistant road and address signage.

There is a need for more turnouts, and more road/bridge assessments and surveys, as well as increasing the percentage of gates with fire locks.

The Alpine Road area was heavily impacted by the Tubbs Fire, with 90% of homes destroyed. This area has a higher need for forestry, culverts, erosion control, and continuing efforts to aid recovery.

The Gates Road area has the highest population density in this area. Outreach here is important because of the significant risk of home-to-home ignition and because the road is one lane with only one exit.

### 7.2.3 Need for Evacuation Routes

### 7.2.4 Need for Safe Shelter if Evacuation is Not Possible

In case of a catastrophic firestorm, residents need to plan for safe refuge areas where they can shelter-in-place and will need education about how to best stay alive in that situation.

### 7.2.5 Need for Shaded Fuel Breaks Along Roadways

## 7.3 Communication

### 7.3.1 Messaging During Fire Event

Although there are some emergency communication systems established, there is a need for clear messaging in the case of emergency so that residents know how, when and where to evacuate. There is ongoing work to expand the current communication network.

The AT&T telephone lines have historically had problems over the years and were down for quite some time for some residents following the Tubbs Fire in October 2017.

There are cell towers located within the watershed that could be at risk with another fire.

### 7.3.2 Emergency Preparedness Committee

The Emergency Preparedness Committee (EPC) is a joint effort of the Alpine Club and the Friends of the Mark West Watershed. The EPC also manages the Phone Alert System (PAS) which is a phone communication system activated during crisis situations. The PAS has been in operation since 2009, and calls residents' phone(s) when there is a local emergency that could impact the safety of residents or their property. The organizational structure consists of four Key Communicators, all of which can activate the PAS in need of emergency. The PAS sends out a recorded message, which can be customized, based on available information about the emergency and the potential need to prepare for evacuation. Unfortunately, the PAS depends on phone and power service, so disruptions could occur if power lines or phone lines or cell towers were down. Following the Tubbs and Nuns fires, the EPC decided to be proactive and alert residents by email during Red Flag Warnings, when high winds and hot dry conditions are present. The goal is to make residents more aware of the potential for fire danger and to be more vigilant and better prepared should the PAS be activated. Important lessons learned from October 2017 included reminding residents to have their cell phones charged, volumes turned up and kept nearby, and not silently charging in another room when people were sleeping.

### 7.3.3 Need for Backup Systems

The EPC has discussed the need for backup systems to alert residents of an emergency should the power and phone lines be down. Options have included instructing residents to alert neighbors by honking while they are evacuating, as well as checking on nearby residents when they hear about an emergency. The EPC has also discussed the options of adding a number of sirens placed throughout the watershed that could be manually activated by road captains. This could be a project that could be more closely examined by the CWPP.

## 7.4 Vulnerable Vegetation Areas

### 7.4.1 Need for Fuels Reduction Throughout Region

### 7.4.2 Areas of Chaparral

### 7.4.3 Create Strategic Fuel Breaks

## 7.5 Structural Vulnerabilities

### 7.5.1 Age of Structures

There is a need for increased education and outreach about structure hardening and a need for increased education and outreach about creating and maintaining defensible space.

For homes that survived the 2017 Tubbs Fire, some elderly and/or low-income homeowners need assistance retrofitting and creating defensible space.

### 7.5.2 Access to Structures for Fire Fighting

This area has numerous non-conforming wood bridges for access to homes. Dozens of wooden bridges were destroyed by the 2017 Tubbs Fire throughout Santa Rosa, leaving many communities completely cut off for egress, rescue or suppression efforts. Many established bridges need to be rated.

## 7.6 Water Resources for Fire Fighters

### 7.6.1 Ponds, Water Tanks, et al.

- Make it easier to create ponds and reservoirs
- Add more water tanks, water catchment systems, ponds and/or reservoirs
- Place big water tanks in strategic areas in the watershed