

# Appendix A: COMMUNITY WILDFIRE RISK AND HAZARD ASSESSMENT

**This Form Prepared for:**

## **How to Use This Community Wildfire Risk and Hazard Assessment Tool**

These questions are designed to help you understand and assign risk ratings in your community. The ratings sum up the many factors that affect how a hazardous fire might behave in your local Wildland-Urban Interface (WUI).

Your working group will assess a variety of risk factors, including:

- Road infrastructure and access—Can residents and firefighters get in and out during an emergency?
- Construction materials—Are buildings designed or modified to resist ember ignition?
- Defensible space—Do buildings have a 100 foot defensible space radius?
- How available are local fire suppression resources, and what are their capabilities?
- How will local land conditions such as fuel types, fuel loading, and slope impact potential wildfire behavior and severity?

This interactive template will help you examine and rate the risks of each of these factors. After all the questions are answered, results will be automatically tabulated and your calculated hazard ratings will appear on the last page.

In Appendix B, you will identify more specifically where and to what extent risks exist, and present maps that show them. After that, your community, in collaboration with local fire agencies and other stakeholders, can come up with the strategies and projects that can help you to become better adapted to wildfire.

It may seem difficult to know which option to choose. For example, your community may have a wide variety of roads. To use this assessment tool effectively, you should provide a very basic answer to each question. For instance, ask yourself: “Do any of our secondary roads present risks to people trying to evacuate during a wildfire? Yes or No.” For this reason, we suggest that where there are a variety of conditions, use the worst case for the risk assessment.

The procedure for this Community Wildfire Risk/Hazard Assessments was originally developed by the “Living with Fire” program, University of Nevada Cooperative Extension, in conjunction with agency and community stakeholders. It was modified by permission for use in California by Fire Safe Sonoma, in conjunction with California stakeholders. Content for Appendix A was extracted or adapted from the *Nevada Community Wildfire Risk/Hazard Assessment: Washoe County* (Resource Concepts, Inc. 2005).

## 1. Access

Design aspects of roadways influence the hazard rating assigned to a neighborhood. Roads that are steep or less than twenty feet in width often impede two-way movement of vehicles for resident evacuation and access for fire suppression equipment. Hairpin turns and cul-de-sacs with radii of less than 45 feet can cause problems for equipment mobility. Visible, fire resistant, street and address identification and adequate driveway widths also reduce the overall neighborhood hazard rating.

Primary roads are those that most people use to access secondary roads and/or homes. A primary road is typically paved and maintained by the County or the State.

### Primary Roads:

- Two or more primary roads.....1
- One road or loop road (exit possible in two directions).....3
- One road in, one way out (one road, dead end) ..... 5

At the narrowest point, primary roads are

- More than 24 feet ..... 1
- More than 20 feet and less than 24 feet ..... 3
- Less than 20 feet..... 5

Slope:

- Road grades of 5% or less..... 1
- Road grades more than 5% ..... 3

**Secondary Roads** are smaller roads that are used to access homes or neighborhoods. They may or may not be paved or maintained by the County or the State.

At the narrowest point, secondary roads are

- More than 24 feet ..... 1
- More than 20 feet and less than 24 feet ..... 3
- Less than 20 feet..... 5

Secondary road terminus:

- Loop roads or cul-de-sac with outside radius of 45' or greater ..... 1
- Dead-end roads 200' or less in length ..... 3
- Dead-end roads greater than 200'..... 5

Slope:

- Road grades of 5% or less..... 1
- Road grades more than 5% ..... 3

Secondary roads in our area are:

- Mostly paved (more than 80%-100%) ..... 1
- Some are paved (50%-79%) ..... 3
- Few are paved (less than 50%) ..... 5

**Accessibility:** Fire trucks are very large, and can be difficult to maneuver. Can a large two-wheel drive truck drive up the road? Can two trucks pass each other side by side? Are there sufficient turnout spots where trucks can turn around? Hint: Think of UPS trucks.

- o Two-wheel drive trucks can easily handle road surface and slope and can pass each other side-by-side without pulling over ..... 1
- o Narrow road surface and/or roadside vegetation make it difficult for vehicles to pass side by side, but vehicles don't have to back up for more than twenty five feet for turnaround ..... 3
- o Narrow road surface and/or roadside vegetation with limited turn arounds (vehicles have to back up more than 150') ..... 5

**Bridges & Gates:**

Some fire departments will not drive over a bridge that has not been rated for weight.

- No bridges ..... 0
- All bridges in the area are rated for heavy vehicles..... 1
- There are a few unrated bridges ..... 3
- Most bridges are unrated ..... 5

Wood bridges can burn in wildland fires, rendering them impassible.

- No wood bridges ..... 0
- All bridges have non-combustible surface and structure.....1
- Some secondary road bridges have wooden surfaces or structure ..... 3
- Some primary roads have wooden surfaces..... 5

**Gates:**

- No gates ..... 0
- Gates are equipped with fire dept access systems or no gates.....1
- Most gates are equipped with fire department access systems..... 3
- Locked gates will impede emergency access ..... 5

**Roadside Vegetation 10 feet from usable road edge :**

Grasses are mown to less than 4 inches, trees and brush are trimmed to provide 10' of horizontal clearance, and 15' of vertical clearance..... 1

- o Roadside vegetation is mostly well maintained, but some areas need improvement ..... 3
- Tall grass, brush and trees border and overhang the roadway ..... 5

## Signage

Street and home address signs should be metal with reflective numbers on non-combustible posts. Signs need to be visible from any point of entry and not obscured by vegetation. Signs made from combustible materials won't survive the wildfire!

### Street signs

Present 90-100% .....	1
Present 75-89% .....	3
Present less than 75% .....	5

### Address signs (house numbers)

Present 90-100% .....	1
Present 75-89% .....	3
Present less than 75% .....	5

## 2. Built Environment

When paired with good defensible space, appropriate home construction and maintenance can help homes survive wildfire ignition. Vulnerable points on homes include roofs, gutters and eaves, venting, attachments such as decks and fences, windows, and siding. Chapter 7A of the California Building Code applies to new construction in designated wildfire-prone (WUI) areas. In addition to noncombustible and ignition-resistant materials, Chapter 7A uses State Fire Marshal–approved standard test methods that provide a way to evaluate and compare the performance of exterior-use construction materials. Homes built after 2007, when California adopted the WUI Building Code, will have many important features to help prevent home ignition. You can learn more about home hardening at on the [Insurance Institute for Business and Home Safety](#) website.

### Percentage of buildings in your area constructed or modified after 2007:

90-100% .....	1
75-89% .....	3
Less than 75% .....	5

### Roofing materials

Non-combustible covering 90-100%.....	1
Non-combustible covering 80-90% .....	5
Non-combustible covering 70-80% .....	8
Non-combustible less than 70% .....	10

### Siding materials

Non-combustible siding more than 75% .....	1
Non-combustible siding less than 75% .....	5

### Unenclosed features (decks, wooden attachments such as fences, etc.)

Less than 25% .....	1
25-50% .....	3
More than 50% .....	5

### 3. Utilities

Overhead power lines can be a potential ignition source for wildfires. PG&E should regularly maintain vegetation near poles, and beneath power lines and transformers, as fires have been known to start from arcing power lines during windy conditions. If you are concerned about vegetation that may pose a risk to electrical lines, call PG&E at 1-800-PGE-5000.

Utility ignition risk

- o All utility lines are underground..... 0
- o Utility lines all above ground..... 3

### 4. Defensible Space

Fuels are simply anything that can burn. All plants, from grasses to redwood trees, are fuels. It is also important to remember that the human-built environment of homes are part of the fuels component in your area. The type, density, and condition of vegetation, the homes themselves, the presence of other combustible materials (for example wood piles, wooden fencing) together influence the ease of ignition, intensity, and duration of the fire. Defensible space is one of the factors that homeowners can modify in order to improve the chances that a home or other property avoids damage from a wildfire.

Average lot size

- 10 acres or larger ..... 1
- 1 to 10 acres ..... 3
- Less than 1 acre ..... 5

Defensible space

- 70% or more adequate ..... 1
- 30-70% adequate ..... 3
- Less than 30% adequate ..... 5

### 5. Fire Protection

Knowledge of the capabilities or limitations of the fire suppression resources in a neighborhood can help municipality officials and residents take action to maximize the resources available. Factors considered in the assessment include:

- A. Availability, Number, and Training Level of Firefighting Personnel. When a fire begins in or near a neighborhood, having the appropriate firefighting personnel available to respond quickly is critical to saving structures and lives. Whether there is a local paid fire department, volunteer department, or no local fire department affects how long it takes for firefighters to respond to a reported wildland fire or to a threatened neighborhood.
- B. The Quantity and Type of Fire Suppression Equipment has an important role in minimizing the effect of a wildfire on a neighborhood. Wildland firefighting requires specialized equipment.
- C. Availability of Water Resources is critical to fighting a wildland fire. Whether there is a community water system with adequate fire flow capabilities, or whether firefighters must rely on local ponds or other drafting sites, affects how difficult it will be for firefighters to protect the neighborhood.

Water source	
o 500 gpm hydrants within 500' of structures .....	1
o 500 gpm hydrants or draft source within 1000' of structures .....	2
o Water source 20 minutes away roundtrip .....	5
o Water source 45 minutes away roundtrip .....	10
Fire department/protection district within 15 minutes	
o Career Department .....	1
o Combination Career/Volunteer .....	3
o Volunteer with Seasonal Staffing .....	5
o All Volunteer Department .....	7
o No Organized Department or extended response times .....	10

## 6. Fire Behavior

Physical conditions include slope, aspect, topography, typical local weather patterns, wind patterns, fuel type, and fuels density. With the exception of changes to the fuel composition, the physical conditions in and around a neighborhood cannot be altered to make the neighborhood more fire safe. Therefore, an understanding of how these physical conditions influence fire behavior is essential to planning effective preparedness activities such as fuel reduction treatments. Physical conditions considered in the assessment include:

- A. Slope, Aspect, and Topography. In addition to local weather conditions, slope, aspect, and topographic features are also used to predict fire behavior. Steep slopes greatly influence fire behavior. Fire usually burns upslope with greater speed and longer flame lengths than on flat areas. Fire will burn downslope; however, it usually burns downhill at a slower rate and with shorter flame lengths than in upslope burns. East aspect slopes may experience afternoon downslope winds that may rapidly increase downhill burn rates. West and south facing aspects are subject to more intense solar exposure, which preheats vegetation and lowers the moisture content of fuels. Canyons, ravines, and saddles are topographic features that are prone to higher wind speeds than adjacent areas. Fires pushed by winds grow at an accelerated rate compared to fires burning in nonwindy conditions. Homes built midslope, at the crest of slopes, or in saddles are most at risk due to wind-prone topography in the event of a wildfire.
- B. Fuel Type and Density. Vegetation type, fuel moisture values, and fuel density around a neighborhood affect the potential fire behavior. Areas with thick, continuous, vegetative fuels carry a higher hazard rating than communities situated in areas of irrigated, sparse, or non-continuous fuels. Dry weather conditions, particularly successive years of drought, in combination with steep slopes or high winds can create situations in which the worst-case fire severity scenario can occur.

CAL FIRE Fire and Resource Assessment Program (FRAP) Maps: California Department of Forestry and Fire Protection (CDF) has mapped areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. All of the State Responsibility Areas in California have been mapped as moderate, high or very high Fire Hazard Severity Zones. You can view maps for your area on the FRAP website at [frap.fire.ca.gov/](http://frap.fire.ca.gov/).

FRAP Fire Hazard Severity Zone: Please download the FRAP maps from [frap.fire.ca.gov](http://frap.fire.ca.gov) or ask CAL FIRE personnel for a copy. If you have GIS mapping capability, determine the percentage of each FHSZ that you have in the project area. If you can't do it by GIS, an approximation is fine.

Enter the percentages of the FHSZs below, then use those values to choose a value.:

Very High FHSZ.....	%
High FHSZ.....	%
Moderate .....	%
Predominant FSHZ	
Moderate FHSZ.....	3
High FHSZ.....	5
Very High FHSZ.....	7

Slope

- 8% or less ..... 1
- 8% - 20% ..... 4
- 20% - 30% ..... 7
- More than 30% ..... 10

Predominant aspect

- North ..... 1
- East ..... 3
- West ..... 7
- South ..... 10

Fuels

- Light density ..... 1
- Medium density ..... 3
- High density ..... 5

Fire behavior situations

- Situation #1 - Fine and/or sparse fuels surround structures; infrequent wind exposure; flat terrain with little slope and/or north aspect. No large wildland fire history and/or moderate fire occurrence. .... 3
- Situation #2 - Moderate slopes; broken moderate fuels; some ladder fuels; composition of fuels is conducive to torching and spotting; conditions may lead to moderate suppression success; some fire history and/or moderate fire occurrence. .... 7
- Situation #3 - Continuous fuels in close proximity to structures; composition of fuels is conducive to crown fires or high intensity surface fires; steep slopes; predominately south aspects; dense fuels; heavy duff; prevailing wind exposure and/or ladder fuels that may reduce suppression effectiveness; history of some large fires and/or moderate fire occurrence. .... 10

**7. Contributing Risk Factors**

Please select the contributing risk factors on the table on Page 8.

**8. Risk and Hazard Assessment Summary**

Based on the inputs entered into Sections 1 through 7, the community's risks and hazards are summarized in the "Ignition Risk and Hazard Assessment Overview."





Use this chart to consider which projects might be tackled, and how. Some Green colored risks could potentially be tackled by neighborhood groups for little or no cost. The risks in the yellow category may need considerable planning and perhaps funding, but are modifiable. The Orange risks are physical features or infrastructure that are not easily modified. Risks in this area will be better modified by education and planning.

<b>Risks that can probably be modified</b>	<b>Mitigation Strategies Include:</b>	
<b>Access</b>		
Gates	Evacuation Planning, install "Knox Keys"	
Roadside vegetation	Fuels Management, education, funding	
<b>Signage</b>		
Street	Education, outreach, funding	
House	Education, outreach, funding	
<b>Home Hardening/Construction</b>		
Roofing	Education, outreach, retrofit, funding	
Siding	Education, outreach, retrofit, funding	
Unenclosed Features	Education, outreach, retrofit, funding	
<b>Defensible Space</b>		
Defensible Space	Education, outreach, funding, inspections	
<b>Risks that possibly can be modified</b>	<b>Mitigation Strategies Include:</b>	
<b>Access: Bridges</b>		
Unrated Bridges	Evacuation Planning, modification	
Wood Bridges	Evacuation Planning, modification	
<b>Water and Fuels</b>		
Water Sources	Develop further sources.	
Fire Behavior (strategic fuel breaks)	Planning, funding, education, outreach	
Fuels Density (fuels modification)	Planning, funding, education, outreach	
<b>Risks that cannot likely be modified</b>	<b>Mitigation Strategies Include:</b>	
<b>ACCESS</b>		
Primary Roads out	Evacuation Planning	
Primary Road width	Evacuation Planning	
Primary Road Slope	Evacuation Planning	
Secondary width	Evacuation Planning	
Secondary Terminus	Evacuation Planning	
Secondary Slope	Evacuation Planning	
Secondary Surface	Evacuation Planning	
<b>Utilities</b>		
Underground	Education, outreach, report issues	
<b>Fire Behavior</b>		
Fire Hazard Severity Zones	Education, outreach, planning	
Slope	Education, outreach, planning	
Predominant Aspect	Education, outreach, planning	