REPORT

COMMUNITY WILDFIRE RISK ASSESSMENT

City of Agoura Hills

PREPARED FOR

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Executive Summary

The Community Wildfire Risk Assessment (CWRA) for the City of Agoura Hills provides a science-based and data-driven approach to better understand potential wildfire hazards, risks and vulnerabilities across the city and neighboring communities. This assessment is the first step in the development of a Community Wildfire Protection Plan (CWPP) to help increase the city's resiliency across a range of perspectives (e.g., technical, social, environmental, economic) to future wildfire threats. The development process for the CWPP is anticipated to begin upon completion of the CWRA, in Sept 2025.

The CWRA was developed through a collaborative process involving the City of Agoura Hills, Los Angeles County Fire Department (LACoFD), Los Angeles County Office of Emergency Services (LACo-OES), CA State Parks, National Park Service (NPS), other county-, state-, and federal-land management agencies, HOAs, community groups and the general public.

Wildfires have historically been a major part of the Agoura Hills' natural ecosystem. The climate, surrounding topography, suburban-rural landscapes and fire-adapted vegetation creates an environment for periodic burns. This is made more dangerous by the abundant risks associated with a resident population of 19,474, being identified as a Community-at-Risk (CAR) by CAL FIRE, areas of over-grown vegetation, limited access/egress, increasing effects of changing climate (e.g., increasing frequency and severity of droughts, extreme storms, flooding, increased number of fire danger days, etc.).

To better understand, assess and develop recommended actions for the unique set of hazards, assets-at-risk and vulnerabilities across the city, the CWRA was developed using the latest tools, resources, best practices, and guidance on wildfire planning and preparedness, particularly at the wildland-urban-interface (WUI). This includes science and engineering-based hazard, risk and vulnerability assessments using high resolution data (e.g., topography, fuels, weather, and values), as well as an understanding of firefighting operations, urban fire safety and land-use planning. The assessment was focused on identifying areas of concern throughout the city and identifying priority areas where wildfire threat potentials create the greatest risk to communities. As part of the future development of the CWPP, hazard and risk mitigation efforts and other action items will be specifically tailored to address the unique issues in the areas of greatest concern using a range of strategies, including:

+ Pre-fire planning.
+ Wildfire preparedness using holistic urban fire safety and wildland fire safety principles and strategies for protecting life, property, natural resources, and other communities' assets.
+ Public education and outreach to promote and increase wildfire awareness, action and mitigation activities.
+ Vegetation management and fuel reduction at the community level, including the enforcement of defensible space standards on private lands.
+ Reducing structure ignitability by promoting and enforcing building codes & standards, ordinances, and statutes.

As such, this document provides a framework that can be used to identify, prioritize, implement, and monitor hazard and risk reduction activities throughout the Planning Area as part of the CWPP development process. This document is also intended to support the California Fire Plan and the 2021 LA County Fire Department Strategic Plan.

Revision Record Summary

Revision	Revision Summary
0A	Draft issued to Client
0B	Draft issued for Public Comment

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Acronyms

AHFSC	Agoura Hills Fire Safe Council
AHJ	Authority Having Jurisdiction
CAL FIRE	California Department of Forestry and Fire Protection
CAR	Community at Risk
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CWPP	Community Wildfire Protection Plan
ESHA	Environmentally Sensitive Habitat Areas
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
FRA	Federal Responsibility Area
FRAP	Fire and Resource Assessment Program
GIS	Geographic Information System
HFRA	Healthy Forest Restoration Act
HVRA	High Valued Resources and Assets
HIZ	Home Ignition Zone
HOA	Homeowners' Association
IBHS	Insurance Institute for Business and Home Safety
LACoFD	Los Angeles County Fire Department
LACo-OES	Los Angeles County Office of Emergency Services
LANDFIRE	Landscape Fire and Resource Management Planning Project
LRA	Local Responsibility Area
MRCA	Mountains Recreation & Conservation Authority
MTT	Minimum Travel Time
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIMS	National Incident Management System

NPS	National Park Service
OES	Office of Emergency Services
PRC	Public Resources Code
RAWS	Remoted Automated Weather Station
SMMC	Santa Monica Mountains Conservancy
SMMFSC	Santa Monica Mountains Fire Safe Council
SRA	State Responsibility Area
WFDSS	Wildland Fire Decision Support System
WIMS	Weather Information Management Systems
WUI	Wildland Urban Interface

1.0 Introduction

Agoura Hills and surrounding areas have an extensive history of large wildfires that have caused substantial impacts to human health and life safety, the built environment, local economies, the natural environment, and cultural/historical resources. Impacts from wildfire have also included numerous other short and long-term costs to social capital, human psychology, vulnerable groups, and recovery capacities. While government agencies can play an important role in developing and implementing a range of wildfire hazard and risk mitigation activities, programs, and policies, wildfires are not fully preventable. Thus, it is critical that the whole community works collectively to build individual and societal capacities to prevent, prepare for, respond to, and recover from major wildfire incidents. As wildfires are an inevitable part of life in Agoura Hills and surrounding cities (e.g., Calabasas, Westlake Village), it is not a question of if a wildfire will occur, but when it will burn and how prepared and resilient the community will be to minimize potential impacts.

The 2025 Community Wildfire Risk Assessment (CWRA) for the City of Agoura Hills considers all areas within city limits. The planning area is bounded by Oak Park to the north, Westlake Village to the west, the Santa Monica Mountains to the south and Calabasas to the east.

The results of this CWRA are intended to inform the City's understanding of wildfire hazards, risks and vulnerabilities to potential wildfires originating in and around the Planning Area. The results will help identify the most at-risk geographic area(s) across the City, as well as help inform the future development of the Agoura Hills Community Wildfire Protection Plan (CWPP), associated technical and programmatic needs, as well as prioritization of an action plan.

1.1 PURPOSE OF THE RISK ASSESSMENT

This CWRA provides the technical analysis used to understand potential wildfire hazards, risks and vulnerabilities across Agoura Hills. It is not a Community Wildfire Protection Plan (CWPP), which is a strategic planning document that is based on the outcomes of the CWRA. The CWRA serves as the basis for government agencies, community organizations, residents and other stakeholders to develop targeted mitigation activities, programs and policies to help increase resiliency to wildfire threats in future. The CWRA is typically the first step in developing a Community Wildfire Protection Plan (CWPP).

1.2 DEVELOPMENT TEAM

This section identifies the agencies, parties and other organizations who were involved and/or provided input into the development of this CWRA. The roles and responsibilities are indicated in

Table 1 below.

Table 1. CWRA Project Roles and Responsibilities.

CWRA Development Entities	Roles/Responsibilities
Lead Organization: City of Agoura Hills	+ Manage day-to-day CWRA project and consultants + Coordinate Agency Stakeholder Working Group + Coordinate Core Project Team and public outreach + Provide guidance and support for CWRA + Distribute media releases about CWRA

CWRA Development Entities	Roles/Responsibilities
	+ Conduct direct outreach + Coordinate with neighboring jurisdictions + Identify and obtain grant funding for CWRA and future CWPP
Stakeholder Working Group: 7 members See Section 3.2.2 for full list of members	+ Represent a range of relevant agencies, organizations, and entities in and around the city + Approve CWRA goals and objectives + Provide general feedback, expertise, and local context for CWRA development and associated products + Identify gaps in CWRA development process + Support public outreach activities + Support site visits + Develop and implement CWRA recommendations
General Public and Other Interested Parties	+ Attend public workshops + Provide responses to online survey + Provide input on values to protect, areas of concerns, community projects and ongoing grass-roots initiatives
CWRA Consultant: Jensen Hughes	+ Support the development of the CWRA + Provide fire science, engineering and subject matter expertise, data analysis and guidance on current wildfire research, best practices and firefighting operations + Facilitate and support stakeholder outreach and engagement + Provide supporting materials and content for public outreach activities (e.g., CWRA development page, public survey)

1.3 NEXT STEPS – CWPP DEVELOPMENT

The next step following this CWRA is the development of a Community Wildfire Protection Plan (CWPP). A CWPP is a collaborative process where community stakeholders assess the wildfire threat, identify community values at risk, and ultimately develop prioritized mitigation measures and actions to increase community resilience to wildfire threats. The language in the 2003 Healthy Forest Restoration Action (HFRA) provides maximum flexibility for communities to determine the substance and detail of their CWPP action plan and the procedures they use to develop it. The CWPP planning process provides communities with the opportunity to develop locally relevant plans that influence where and how federal agencies implement fuel treatment activities on federal land and the distribution of federal funds for projects on non-federal lands. In addition, the development of a CWPP positions communities to access other funding sources from State and Local resources for wildfire mitigation projects.

The CWPP planning process brings together broad and diverse local interests to holistically identify common concerns and values related to public safety, sustainability of environmental and natural resources, and long-term resiliency and sustainability of the whole community. The process should provide a positive, solution-oriented environment in which to address the challenges of living in a community at risk to wildfire. Because not all community members will attend workshops or meetings, it is important to provide multiple opportunities for the whole community to provide input, voice issues and concerns, and participate in the process of developing a CWPP.

1.4 GLOSSARY OF TERMS

A glossary of terms can be found in Appendix A.

3.0 CWRA Development Process

3.1 OVERVIEW

The CWRA was developed over a 12-month period in collaboration with a broad set of government and non-government stakeholders to better understand and identify the potential hazards, risks and vulnerabilities to wildfires in and around the City of Agoura Hills. Figure 1 shows the timeline for the CWRA development process and various key milestones for the analysis, stakeholder engagement activities, interim checkpoints and final deliverables.

Figure 1. CWRA Development Process and Timeline

3.2 COLLABORATIVE APPROACH

The CWRA was developed collaboratively with the City of Agoura Hills, the Agency Stakeholder Working Group (i.e., Los Angeles County Fire Department, County Sheriff's Department, the Agoura Hills Fire Safe Council, other county-, state-, and federal-agencies), community organizations and the general public. The various CWRA coordination and development groups, as well as public outreach plan were designed to reinforce existing relationships, as well as integrate ongoing mechanisms to obtain community input, promote widespread community education and enable the ongoing monitoring and evaluation of the ever-evolving wildfire risk landscape (e.g., impacts of changing climate, changes in development, impacts of mitigation activities etc.).

3.2.1 Core Project Team

The CWRA core project team was formed at the start of the project (August 2024), and was composed of a smaller group of key representatives from:

+ City of Agoura Hills
+ Fire Consultant: Jensen Hughes
+ County of Los Angeles Fire Department

This group was responsible for the day-to-day development of the CWRA, organizing the engagement and participation of a broad range of stakeholders, agencies, organizations, and individuals (i.e., federal/state/local government agencies, fire authorities, landowners and stewards, community groups, residential/commercial owners, infrastructure, general public), forming the Agency Stakeholder Working Group, monitoring project progress, facilitating public outreach, and reviewing key documents and project deliverables.

The group considered input from all relevant plans, community groups, agencies, and local organizations. The objective was to facilitate city, county, state, and federal participation to work cooperatively to help protect life, property, and natural resources from wildfires.

3.2.2 Agency Stakeholder Working Group

The Agency Stakeholder Working Group (SWG) was identified and formed at the start of the project in August/September 2024. The group included representatives of relevant local-, state- and federal-government agencies, community groups, non-profit organizations and other entities (see below). The SWG served as an advisory group to provide local context and subject matter expertise, identify gaps, support public outreach activities (as needed), support site visits, and provide general feedback on the CWRA development process and CWRA products (as requested).

Members:

- County of Los Angeles Fire Department (LACoFD) – Division 7
- County of Los Angeles Fire Department (LACoFD) – Forestry Division
- County of Los Angeles Sheriff's Department
- Mountain Recreation & Conservation Authority (MCRA)
- Santa Monica Mountain Conservancy (SMMC)
- State Parks Services (Angeles District of Parks)
- National Park Service
- Agoura Hills Fire Safe Council (AHFSC)
- Southern California Edison (SCE)

The SWG met four times over the course of the project. Key meetings included a kickoff meeting (held November 14, 2024), a 1-day site visit (held March 7, 2025), prior to the draft CWRA (June 24, 2025) and when the final CWRA is produced (Aug/Sept 2025).

3.2.3 Stakeholder Engagement and Coordination

In addition to the SWG, participation and engagement of a broad range of community stakeholder groups was a critical component throughout the development of the CWRA. As such, multiple efforts were planned to engage project partners and other stakeholders throughout the CWRA development process. This was intended to encourage a sense of ownership and a vested interest in the future safety and well-being of individuals, families, businesses, agencies, community groups, and other interested parties across the city to wildfires.

The primary goals and objectives of the outreach process were as follows:

(1) Provide various opportunities for community stakeholders and the general public to participate, collaborate and engage throughout the CWRA development process.

(2) Gather feedback on a broad range of concerns regarding wildfire hazards, risks, and vulnerabilities at various scales (e.g., city, neighborhood, parcel, individual).

(3) Identify appropriate levels and methods of stakeholder engagement.

Framing the stakeholder outreach efforts were a set of guiding principles, based upon discussions amongst the Core Project Team and literature.

+ **Accessible** – Stakeholders must be aware and be provided with a variety of engagement opportunities and formats to participate in the process.
+ **Participatory** – Creating an environment to facilitate the expression and the participation of different and diverse actors, such as oral communication, written communication, and schematic or visual representations. Promote a culture of participation with programs and activities that support ongoing engagement and ownership.
+ **Informative** – Help all involved to listen to each other, explore new ideas, learn, and apply information in ways that generate new solutions, methods, or opportunities.
+ **Collaborative** – Support and encourage participants, government and civil society groups, and other interested parties to work together to advance the common good.
+ **Representative** – Equitably incorporate diverse people, voices, ideas, and information to lay the groundwork for quality outcomes and democratic legitimacy.

To effectively engage various Stakeholder groups and the general public, various engagement tactics were identified to solicit the desired input or feedback specific to the targeted audience. See the following sections for an overview of engagement for different groups.

3.2.4 Broader Stakeholder Outreach

An online stakeholder survey was administered over a two-month period to gather information on major wildfire-related concerns, active and proposed activities/projects (including fuels reduction projects, emergency planning, and outreach), and any geospatial data and/or relevant plans/reports from a broad set of community stakeholders. This included stakeholders from infrastructure, governmental agencies, residential/commercial property-owners, and community groups. A total of 13 agencies and organizations provided responses to the stakeholder survey, either through an online survey or paper form.

A summary of broader stakeholder comments is provided in Appendix D.

3.2.5 Public Outreach

A priority for the City was to get broad community participation and engagement in the development of the CWRA. This was accomplished through public workshops and a public survey.

3.2.5.1 Public Survey

A community survey was administered from February 20, 2025 to May 12, 2025. The survey was intended to gather feedback from the general public regarding broad and more nuanced information to better tailor community-based activities, educational programs, services, policies, and other action items that not only help mitigate wildland fire risks, but also are locally relevant, inclusive, and sustainable. Refer to Section 6.2.3 for a high-level summary of the results and Appendix C for greater detail.

3.2.5.2 Public Workshops

Over the course of the CWRA development process, two public workshops were held at Agoura Hills Recreation and Event Center.

- **Workshop #1** – The first workshop was in-person and held on May 20, 2025 (See Figure 2). Members of the public were invited and attended the workshop via public announcements on the City's website, social media accounts, email blasts, and calendar, as well as direct communications with key stakeholders and community groups. Attendees included local residents, homeowner association representatives, City officials, Fire Safe Council representatives, and other interested parties. In addition to learning about and providing feedback on the CWRA process, participants also had the opportunity to examine the results of initial wildfire hazard assessments and identify areas of specific concern. Throughout the presentation, stakeholders were given the opportunity to provide targeted comments and questions on specific topics of interest or concern via notecards that were collected at the end of the workshop.

Figure 2. First public workshop held on May 20th, 2025 at the Agoura Hills Recreation and Event Center.

- **Workshop #2** – Upon completion of the CWRA development process, a final workshop was held on July 29th, 2025 to review the results of the overall risk assessment and recommendations.

A summary of all workshops, meeting notes and stakeholder comments are available in Appendix E.

4.0 Community Overview

4.1 OVERVIEW

The City of Agoura Hills, with an estimated population of 19,429 residents, is located west of Los Angeles and north of the Santa Monica Mountains (Figure 3). The City is bordered by Westlake Village to the west, Hidden Hills and Calabasas to the east, Oak Park to the north, and unincorporated Los Angeles County land to the south. It is approximately 8 square miles in area and is considered a Community-at-Risk (CAR) by CAL FIRE.

Historically, wildfires have been a major part of the area's natural ecosystem. The climate, surrounding topography, suburban-rural landscapes and fire-adapted vegetation creates an environment for periodic burns. Increasing effects of changing climate (e.g., increasing frequency and severity of droughts, extreme storms, flooding, increased number of fire danger days, etc.), as well as areas of over-grown vegetation have left Agoura Hills with increased risk to wildfire.

Several communities across the City, particularly the more established communities, have narrow roads with significantly overgrown, dense vegetation along the roadways. These conditions can expose both residents and first responders to unsafe and/or dangerous conditions such as increasing the likelihood of fire encroachment, high temperatures, poor visibility, untenable conditions, congestion, blocked roadways, etc. In addition, the City has of a variety of other characteristics including intermixed overgrown vegetation, pre-WUI code construction, variable compliance with defensible space, communication dead-zones, need for large animal evacuation, and other characteristics that can increase susceptibility to loss from potential wildfire threats.

Figure 3. Planning Area for the CWRA.

4.2 FIRE HAZARD SEVERITY ZONES

> FHSZs are based on wildfire hazards over a 30- to 50-year period and therefore do not consider how recent wildfire activity or fuel modifications may influence potential fire severity.

Fire Hazard Severity Zone (FHSZ) maps identify geographic areas of significant fire hazard in both State and Local Responsibility Areas as defined by CAL FIRE. The zones are based on factors that influence wildfire behavior such as vegetation, topography, weather, etc. There are designated categories: moderate, high, and very high. All State Responsibility Areas (SRA) and Local Responsibility Areas (LRA) are classified into one of these three categories. As FHSZs are based on wildfire hazards over a 30- to 50-year period, they do not consider how recent wildfire activity or fuel modifications may influence potential fire severity. CAL FIRE is required to produce FHSZ maps under the California Public Resources Code 4201-4204, California Code of Regulations Title 14 Section 1280, and California Government Code 51175-89.

While FHSZs do not predict when or where a wildfire may occur, they do identify areas where wildfire hazards are likely more severe and of greater concern. As such, FHSZs identify areas where increased wildfire safety provisions for various building and site components (e.g., maintained defensible space, fire, or ignition resistant materials, including vents, decks, and windows) are required for all new construction per California Building Code Chapter 7A. The FHSZ designation of a property is used by local governments to support wildfire risk analysis and hazard mitigation planning[1] .

Based on the most current FHSZ maps (LRA effective 3/24/25 and SRA effective 4/1/24), the majority of the City (77.7%) is in an LRA-designated Very High Fire Hazard Severity Zone (VH FHSZ). There are no SRA or Federal Responsibility Area (FRA) lands located within the City limits (Figure 4).

Table 2. Percentage Breakdown of Fire Hazard Severity Zones in the Planning Area

Responsibility Area	Fire Hazard Severity Zone (% of total Planning Area)				Direct Protection Area in acres (% of total area)
	Very High	High	Moderate	Non-Burnable	
FRA[2]	N/A	N/A	N/A	N/A	N/A
SRA	N/A	N/A	N/A	N/A	N/A
LRA	77.7%	8.3%	7.7%	53.7%	5,003 (100%)
Total	***77.7%***	***8.3%***	***7.7%***	***53.7%***	***5,003 (100%)***

[1] https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/

[2] The federal government has a different fire hazard scoring system to CAL FIRE's FHSZ classification system and is not applicable to the Percentage Breakdown of Fire Hazard Severity Zones in the Planning Area table.

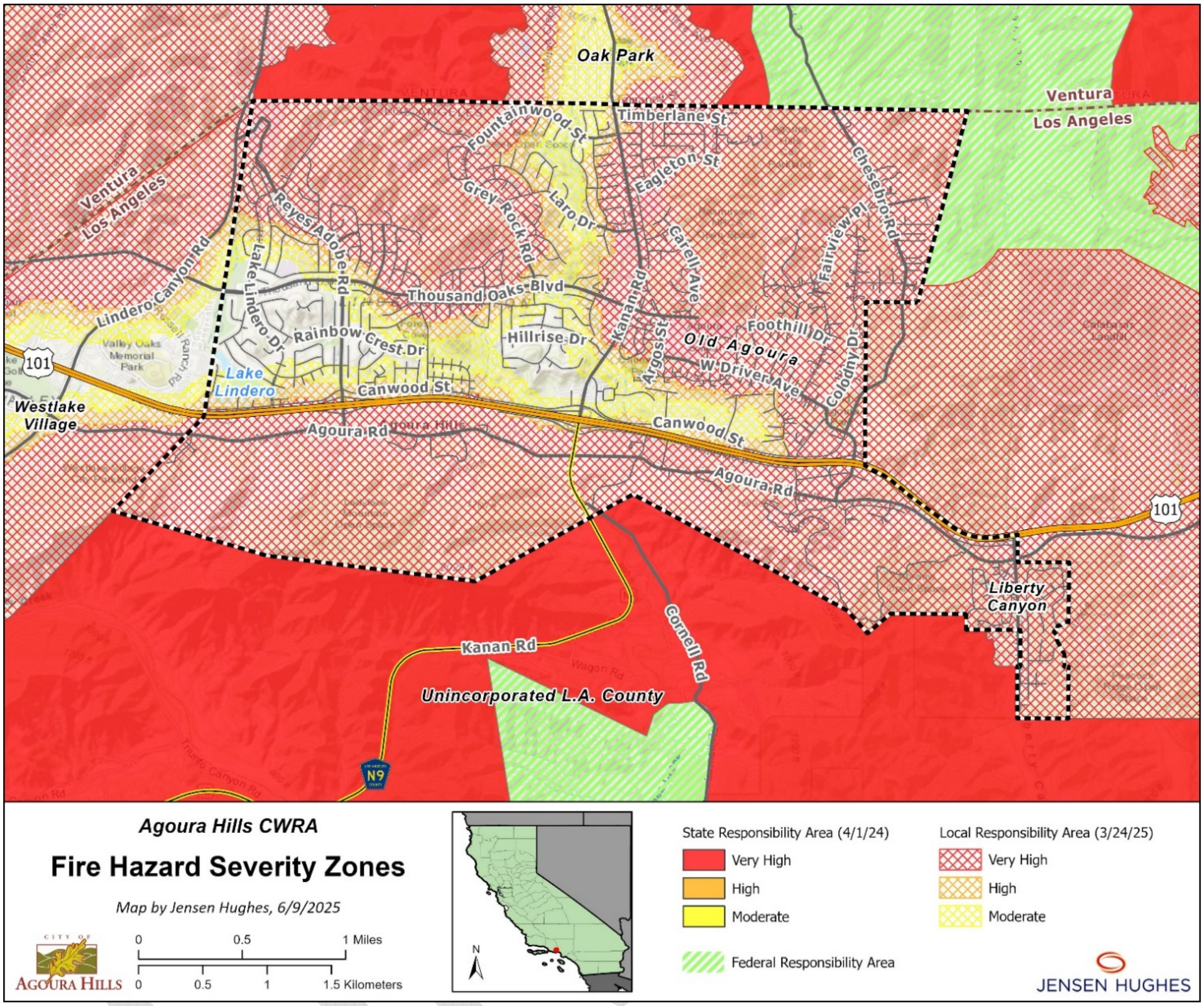


Figure 4: Fire Hazard Severity Zones

4.3 THE WILDLAND-URBAN-INTERFACE (WUI)

The wildland-urban interface, commonly called the WUI, is defined as the line, area, or zone where structures and other man-made development meet or intermingle with undeveloped wildland or vegetative fuels (NWCG, 2018). Oftentimes, the WUI is perceived as rural areas where uninhabited wildlands (primarily timbered forests) meet individual structures or homes. This perception has led many who live in more suburban and urban areas "near the WUI" to believe they are not at risk from wildfire, because they are not exactly at the interface of wildlands or they live adjacent to large open spaces of primarily grass and shrub-lands (instead of forestlands) [FEMA, 2022].

> The National Wildfire Coordinating Group (NWCG, 2009) defines the WUI as "the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels."

To help protect people and property from potential catastrophic wildfire, the 2000 National Fire Plan (NFP) required the identification of communities in the wildland-urban interface (WUI). WUI zones across Agoura Hills are shown in Figure 5.

All three WUI designations are considered at risk and susceptible to wildland fires. Below is a brief description of each of the WUI zones:

1. **Wildland-Urban Interface**: dense housing development adjacent to vegetation that can burn in a wildland fire.
2. **Wildland-Urban Intermix:** housing development interspersed within an area dominated by wildland vegetation subject to wildfire.
3. **Wildland-Urban Influence Zone:** wildfire susceptible vegetation up to 1.5 miles from Wildland-Urban Interface and/or Intermix areas.

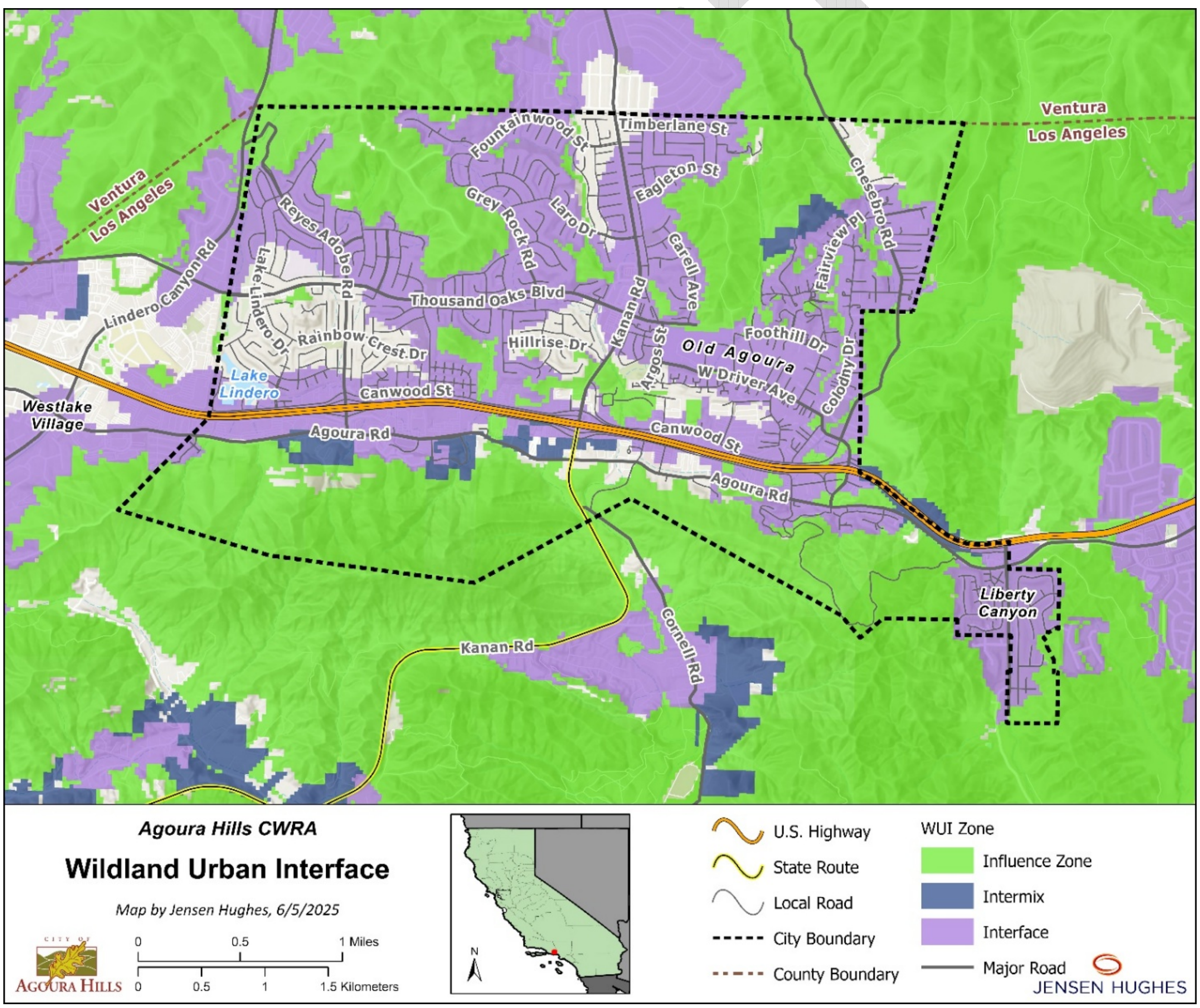


Figure 5. Wildland Urban Interface Zones for Agoura Hills.

4.4 VALUES AT RISK

The City of Agoura Hills is an important location for both locals and visitors with its trailheads, shopping and dining opportunities, agriculture and livestock operations, historic and cultural resources, government facilities and services, and educational facilities. Attempts to capture all the City's measurable and intrinsic values are difficult. As such, the CWRA only considers those values that can be most readily impacted by wildfire.

Community values at risk to wildfires are often considered to be life safety, private property and critical infrastructure. However, values can also include human health, natural resources, sensitive species and habitats, cultural and historical resources, viewscapes and other intangibles (e.g., social capital, community culture, livelihood). Although not all values can be protected directly through wildfire mitigation measures, actions can be taken to indirectly protect those values by developing strategies that reduce the wildfire threat overall. An ongoing challenge is to balance the level of hazard mitigation work required to protect one set of values without compromising others.

The following values or assets have been identified by the Agency Stakeholder Working Group, Agoura Hills residents and other community stakeholders for the purposes of this CWRA:

Figure 6 illustrates the spatial arrangement of community assets across the City. These assets were included as part of the quantified risk assessment, described in more detail in Section 5.0 and Section 6.0. Note: A more detailed description of community asset categories and types will be provided as part of the CWPP development process.

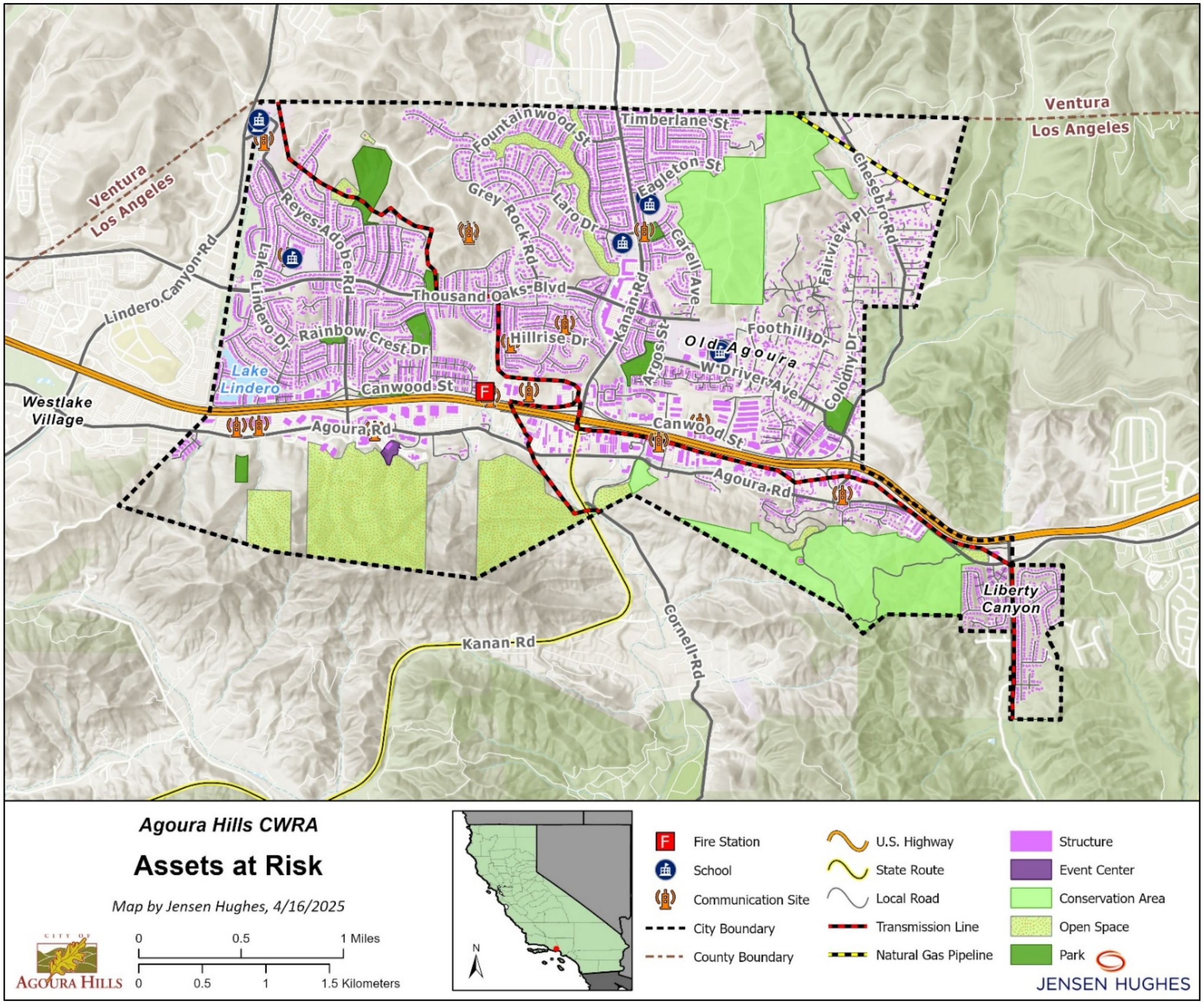


Figure 6. Assets-at-Risk for Agoura Hills.

4.5 LAND USE

The Community Conservation and Development chapter of the Agoura Hills General Plan 2035 is intended to guide development of Agoura Hills' built environment to the year 2035. Agoura Hills' land use policies have adapted over time, as the City is now almost fully developed. Therefore, policies focus on how population and employment growth can be managed to preserve the qualities of the City's neighborhoods, business districts, and open spaces.

The City of Agoura Hills is primarily residential land use (approx. 42%), as demonstrated in Figure ***7***. Parks and open space make up the second most common land use (approx. 28%), and planned development the third most common (approx. 16%). Business and manufacturing and commercial use make up the least amount of acreage, at roughly 6% and 5%, respectively.

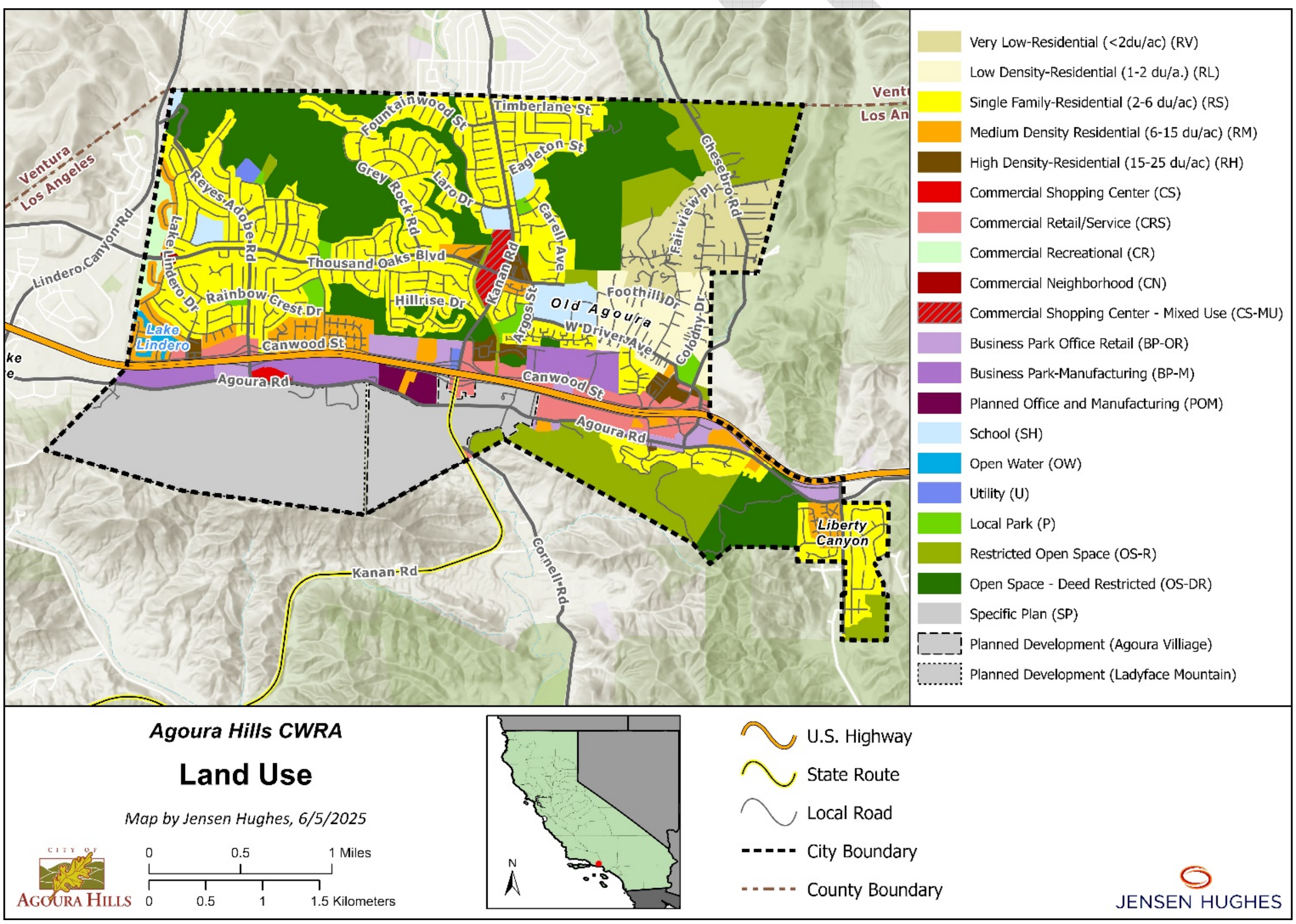


Figure 7. Agoura Hills Land Use Diagram.

4.6 CLIMATE AND CLIMATE CHANGE

The City of Agoura Hills has a Mediterranean climate, with 16.6" annual precipitation falling primarily in the winter months. Agoura Hills is impacted by the marine layer, a mass of cooler air and cloud cover that moves inland from the ocean, with the greatest impacts during the spring and early summer. When the marine layer forms, temperatures are moderated and relative humidity increases, diminishing fire danger. The marine layer contributes to average temperatures peaking in later summer in the 100s F, with a relatively moderate range between the summer mean high (92 F) and the winter mean low (47 F) (Figure 8). This supports a moderate maritime climate that occasionally sees extreme temperature and extreme rainfall events. While the hottest month on average is August, the record hottest day (108 F) is in early September.

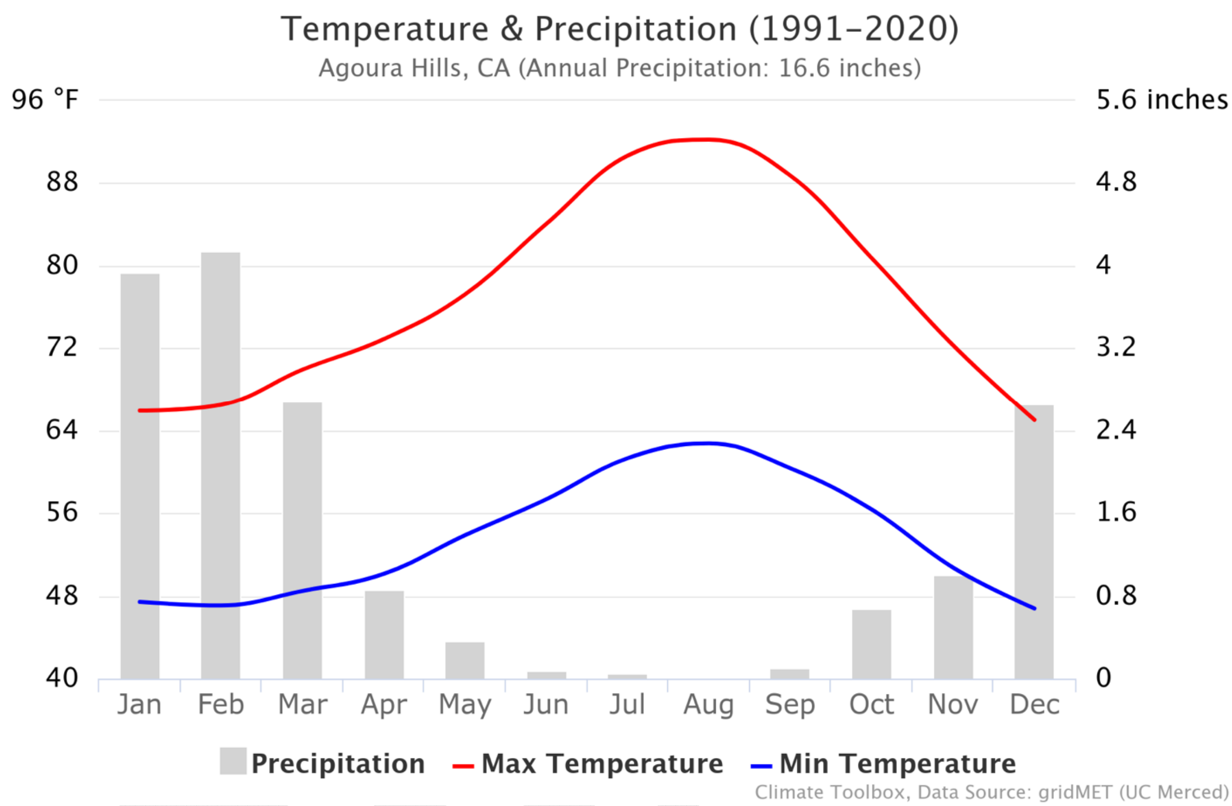


Figure 8 . Annual mean climatology over the 1991 – 2020 reporting period for the Planning Area.

While global climate change is often reported as an average rise in temperature (i.e., warming) for the entire planet, the observed changes are highly variable across the globe and even within states, such as California. Changes in temperature, precipitation, and other meteorological phenomena are also variable both across the seasons of the year, and in terms of the intensity of extreme events. As wildfire tends to occur under extreme conditions in the Planning Area, it is critical to understand how climate change specifically impacts both the frequency and intensity of these extreme weather events, as well as how it affects the vegetation fueling the fire. Both fuels and extreme heat events are affected by climate change. Abnormally wet winter-spring periods yield higher than normal fine fuel loads, which are the primary carriers of fire.

In the Planning Area, conditions conducive to producing the most extreme fire behavior, including rapid rates of spread and uncontrollable flames, occur in the autumn and winter months when easterly Santa Ana winds coincide with drought conditions (Figure 9). Winter droughts are expected to increase in frequency and intensity under climate change.

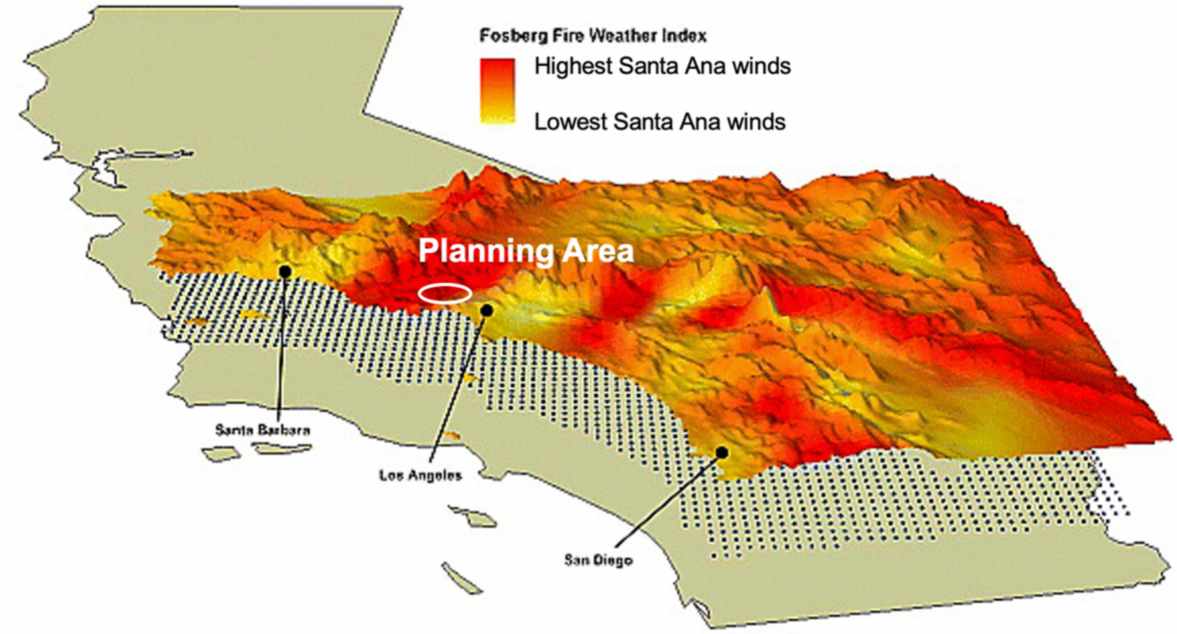


Figure 9. Map adapted from Moritz et al. (2010) showing where the highest Santa Ana winds concentrate and facilitate uncontrollable and extreme wildfires. The Planning Area (white oval) is in an area heavily impacted by strong Santa Ana winds.

Agoura Hills has warmed 2.1° F overall in the last 100 years (Figure 10). However, temperatures are highly variable from year-to-year, with 2014 registering the hottest year for the Planning Area since 1895. Warming has occurred across all four seasons and for both daytime highs and nighttime lows, but the greatest warming trends are the nighttime lows, particularly in autumn.

These trends are consistent with reduced nighttime relative humidity recovery, where it remains dry at night rather than becoming more humid, and support anecdotal observations from fire suppression personnel that fires are more active at night now than they have been in the past. Reduced nighttime humidity recovery across spring, summer, and fall seasons is a contributing factor to an observed trend towards increased fire danger, specifically because fuel aridity is higher and fuels are less resistant to fire spread (Abatzoglou and Williams 2016, Goss et al. 2020)[3][4]. When a Santa Ana or Sundowner wind event develops in conjunction with low fuel moisture (i.e., high fuel aridity) there is a greater probability of rapid fire spread and the development of large, longer duration wildfires (Rolinski et al. 2016)[5].

[3] Abatzoglou, J.T. and Williams, A.P., 2016. Impact of anthropogenic climate change on wildfire across western US forests. Proceedings of the National Academy of Sciences, 113(42), pp.11770-11775.

[4] Goss, M., Swain, D.L., Abatzoglou, J.T., Sarhadi, A., Kolden, C.A., Williams, A.P. and Diffenbaugh, N.S., 2020. Climate change is increasing the likelihood of extreme autumn wildfire conditions across California. *Environmental Research Letters*, *15*(9), p.094016.

[5] Rolinski, T., Capps, S.B., Fovell, R.G., Cao, Y., D'Agostino, B.J. and Vanderburg, S., 2016. The Santa Ana wildfire threat index: Methodology and operational implementation. *Weather and Forecasting*, *31*(6), pp.1881-1897.

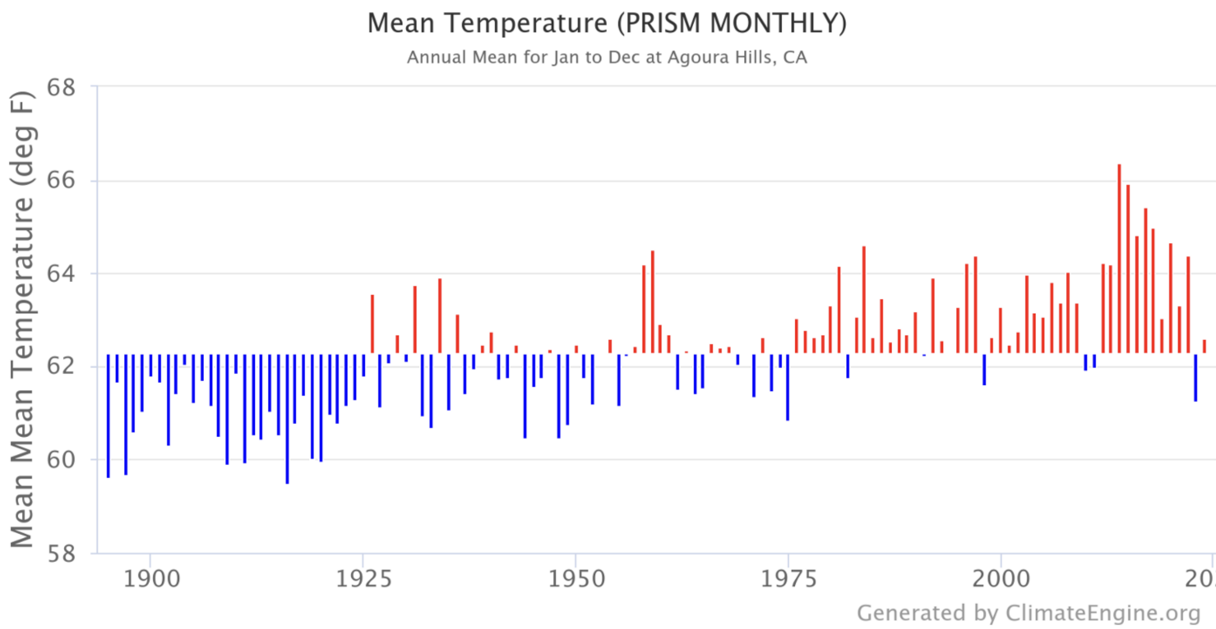


Figure *10. Mean annual mean daily temperature for Agoura Hills from 1895-2024, showing departure from the long-term average of 62.3 F.*

In contrast to a clear warming trend, annual precipitation in the planning area has not changed significantly over the past century (Figure 11). Notably, however, precipitation has declined substantially in the last four decades in Autumn, the season when Santa Ana winds pick up and the fastest spreading wildfires occur (Figure 12). Moisture availability has also declined due to changes in the coastal influence. The marine layer is a type of coastal fog that develops during the spring and summer, and due to the strong temperature gradient between the cool ocean waters and the superheated land mass. This layer is difficult to measure, but observations from Burbank and Santa Monica airports over the last 50 years show that it appears to be getting weaker and providing less shade (Figure 13), which increases vegetation aridity on the ground (Williams et al. 2018)[6]. Continued ocean warming in the future may further decrease the marine layer, potential making the western portion of the Planning Area more susceptible to fire.

[6] Williams, A.P., Gentine, P., Moritz, M.A., Roberts, D.A. and Abatzoglou, J.T., 2018. Effect of reduced summer cloud shading on evaporative demand and wildfire in coastal southern California. *Geophysical Research Letters*, *45*(11), pp.5653-5662.

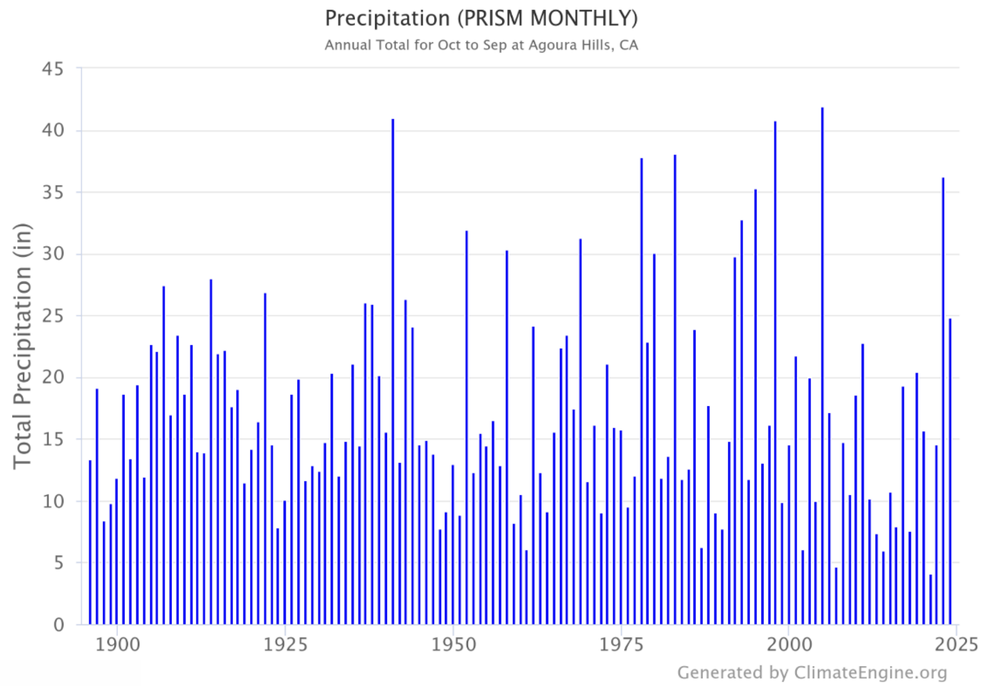


Figure 11. Mean annual water year (Oct. – Sept.) total precipitation for the Planning Area (1895-present).

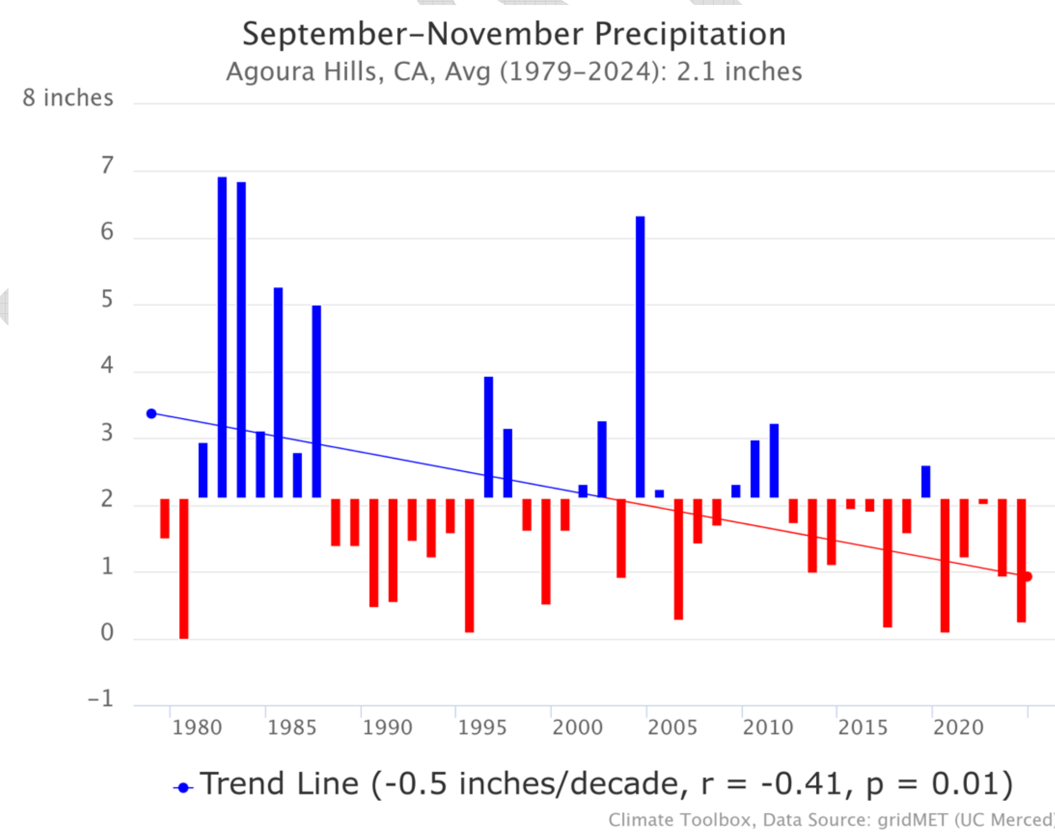


Figure 12. Decline in Autumn precipitation from 1979-2025.

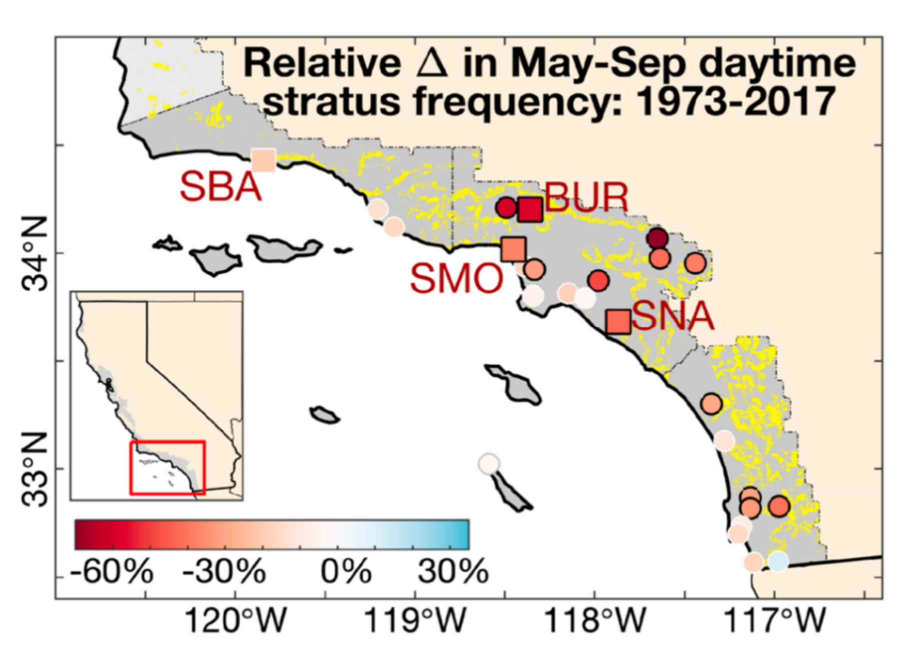


Figure 13. Summer decline in daytime cloud cover (frequency of stratus clouds observed at airfields including Burbank (BUR), Santa Monica (SMO), and Santa Barbara (SBA)) from 1973-2017 from Williams et al. (2018).

Overall, the rising temperatures and the declining autumn precipitation have increased fire potential in the City, as indicated in trends of Fire Danger indices, most notably the autumn Burning Index (BI; Figure 14).

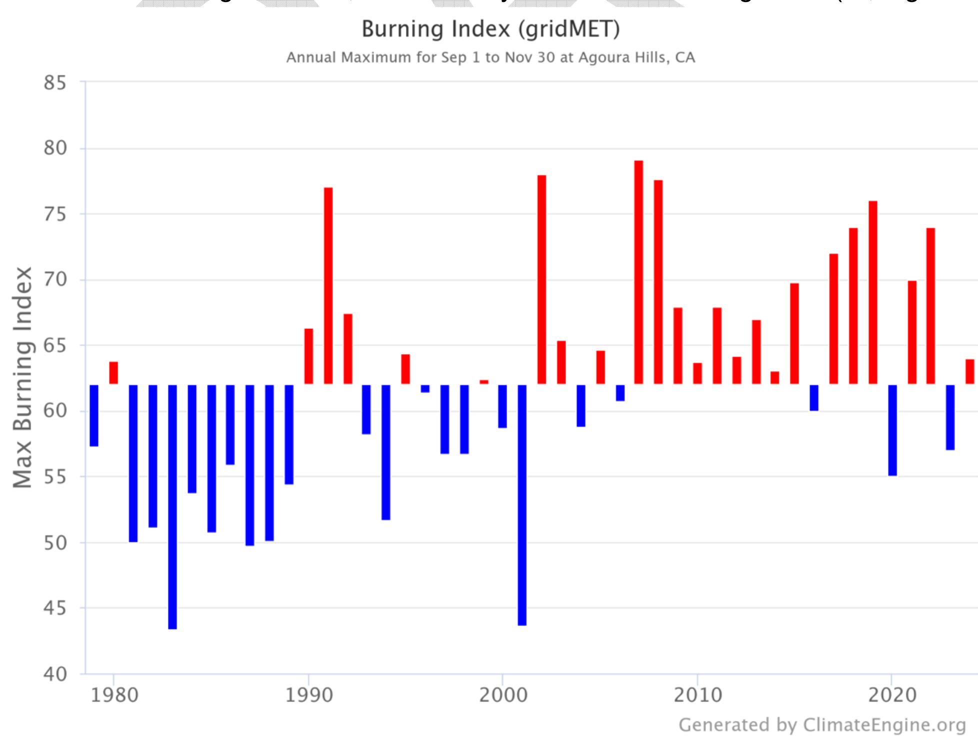


Figure 14. Autumn (October - December) maximum BI for the Planning Area shows the increase in dry, hot, windy events that are conducive to large fire growth.

Projections of future climate change are modeled based on anthropogenic (i.e., human) emissions of greenhouse gases, but also account for natural climate variability. Increases in fire activity across the western United States have been definitively partially attributed to anthropogenic climate change (Abatzoglou and Williams 2016)[7], so there is high confidence that projections of future climate will have implications for fire. These trends aren't just part of Earth's natural climate variability.

In the Planning Area, **there is a projected temperature increase of an additional 5 to 8° F by 2100**, with increases seen across all seasons, and for both maximum and minimum daily temperatures (Figure 15, Figure 16). In contrast to high relative certainty that temperatures will continue to increase, precipitation trends are relatively difficult to predict into the future. What is certain about future precipitation is that extreme precipitation events with high rates of rainfall will become more frequent, even if precipitation ultimately declines. The projected temperature increases, especially the increasing nighttime lows, reduced relative humidity, and the increasing frequency of extreme events, such as heatwaves and dry periods coinciding with autumn and winter Santa Ana winds, drive a substantial increase in the number of days per year where there is Extreme Fire Danger (Figure 17, Figure 18, Figure 19). Although global climate models vary widely, they generally agree on an increase in the number of days of Extreme Fire Danger compared to the historic period, with the most extreme models projecting a doubling of Extreme Fire Danger days. It is worth noting that historically most climate model projections have been fairly conservative and underestimated what has actually happened.

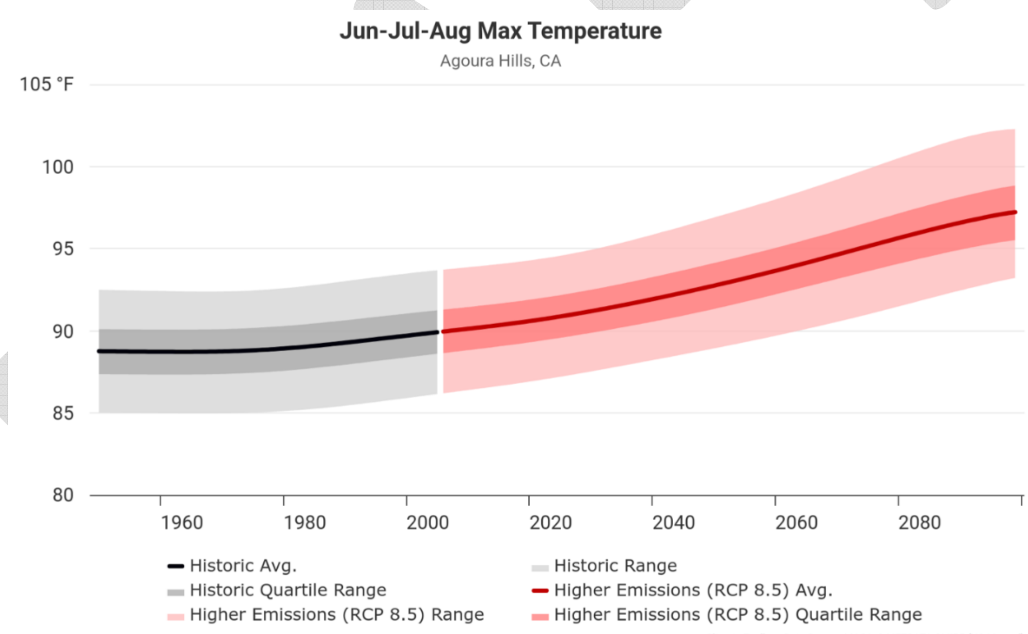


Figure 15. Increasing trends in average daily high summer (Jun-Jul-Aug) temperature for the Planning Area from 1979-present (in gray) and projected into the future to 2100 (pink). The projected increase in maximum temperature is approximately 8 degrees F hotter than today, but the highest temperatures, during heat waves will likely register temperatures substantially greater than 8 degrees difference from today's hottest temperatures because extremes always exceed averages.

[7] Abatzoglou, J.T. and Williams, A.P., 2016. Impact of anthropogenic climate change on wildfire across western US forests. Proceedings of the National Academy of Sciences, 113(42), pp.11770-11775.

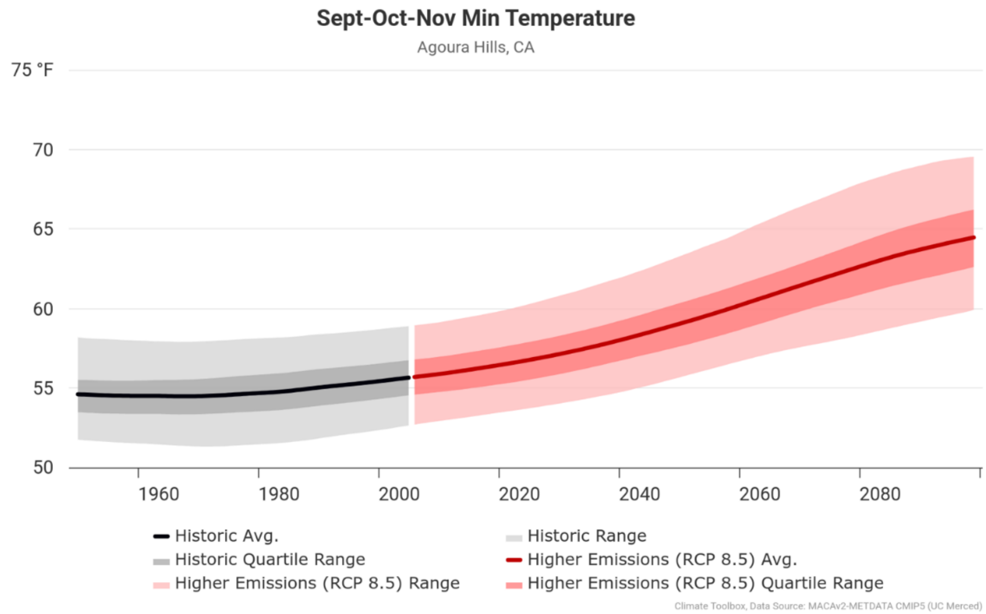


Figure 16. Increasing trends in average daily nighttime low temperature for autumn (Sept-Oct-Nov) for the Planning Area from 1979-present (in gray) and projected into the future to 2100 (pink). The projected increase in nighttime low temperature is 8.8 degrees F hotter than today. This is particularly critical for increasing fire danger during autumn Santa Ana wind events.

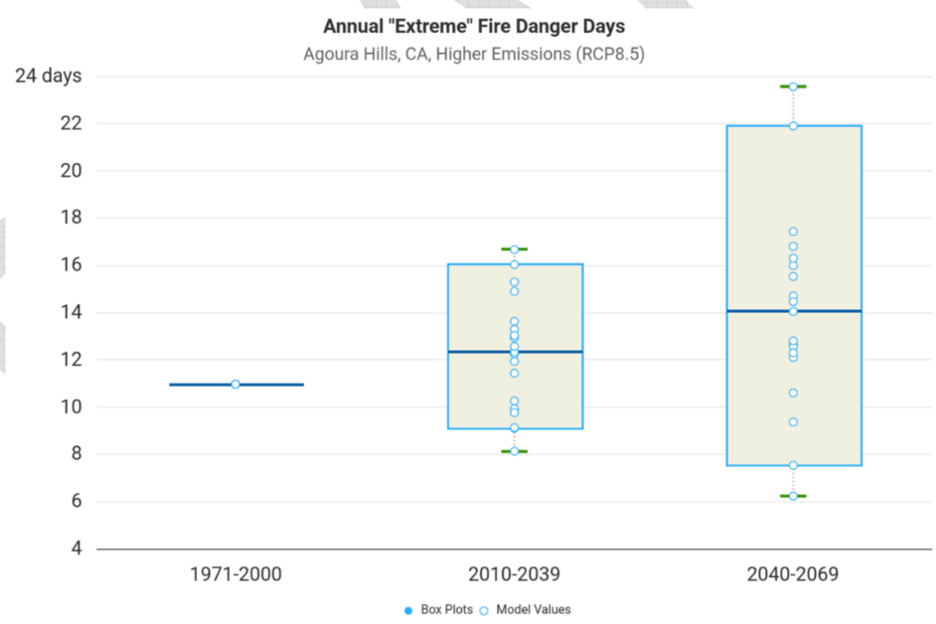


Figure 17. Projected change in number of days of extreme fire danger annually for Agoura Hills, based on global climate model outputs, for both the early 21st century (the current period) and the mid-21st century (future period 2040-2069) as compared to the historical period of 1971-2000. Each future boxplot represents a range of projections from different climate models, with the white dots representing the projection of a specific model, and the dark blue line in the middle representing the median projection. For the future period (2040-2069), the highest projections are for up to 22 days per year of Extreme (97th percentile) fire danger, nearly double the 11 days per year observed in the historic period.

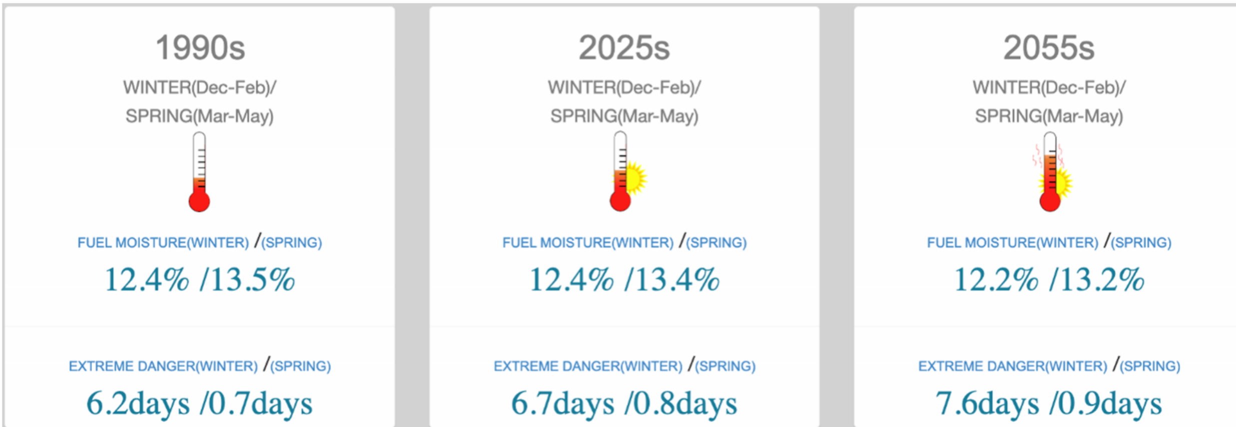


Figure 18. Projected change in average fuel moisture and the average number of days of extreme fire danger for the winter and spring months for Agoura Hills from global climate model outputs.

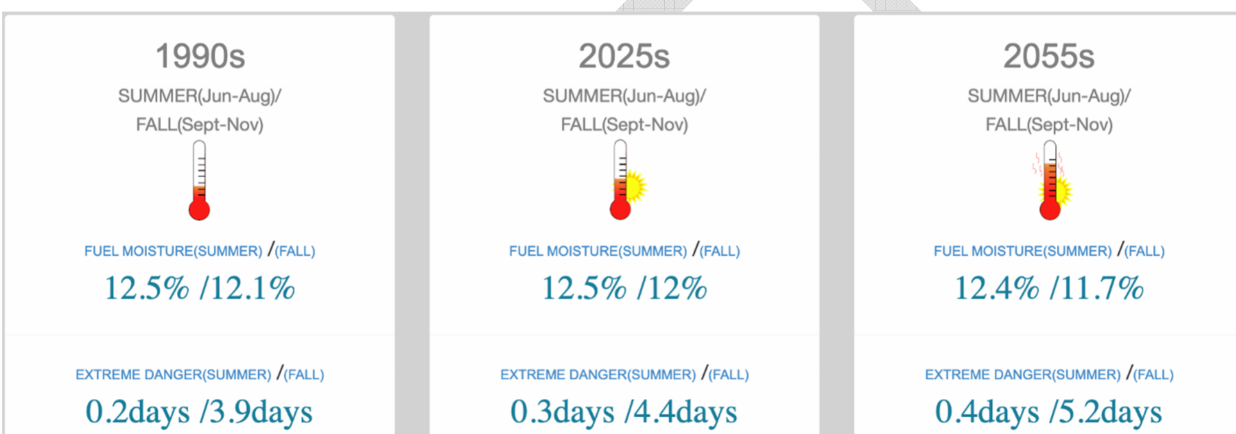
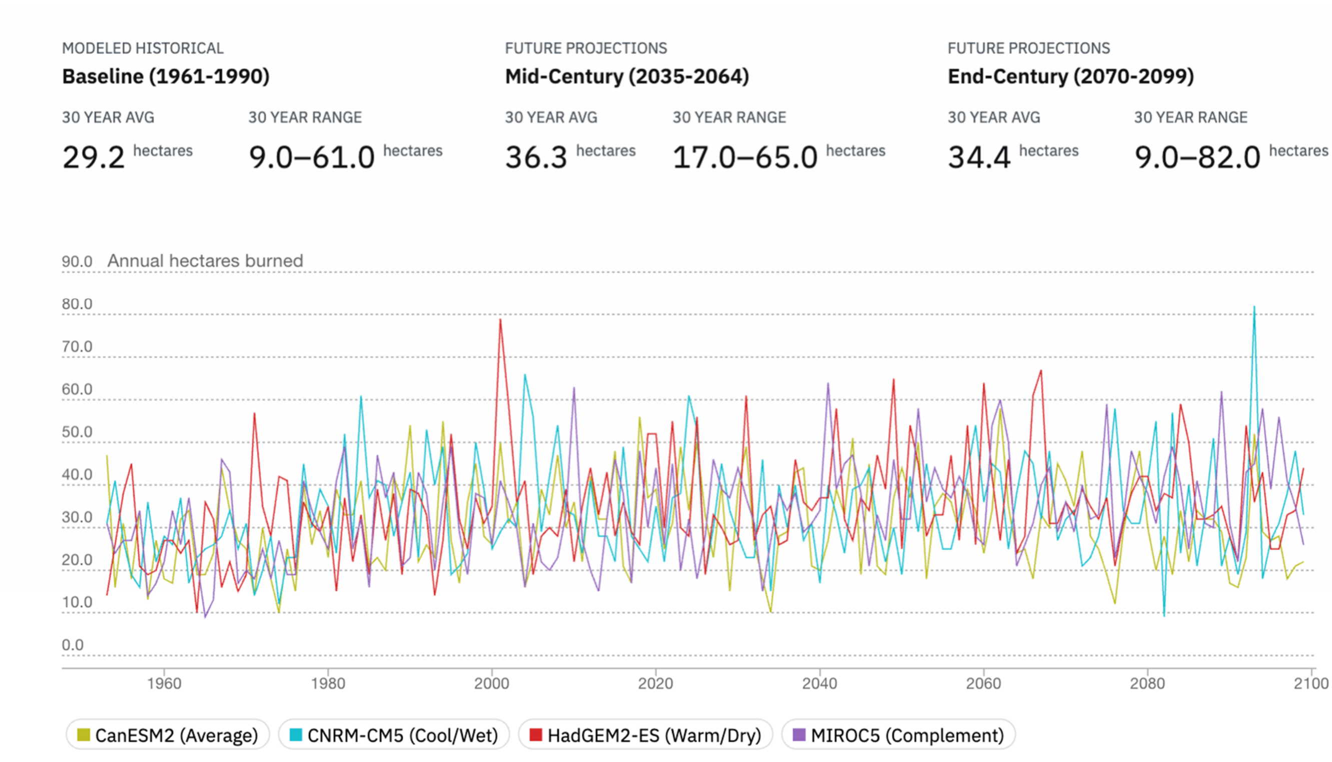


Figure 19. Projected change in average fuel moisture and the average number of days of extreme fire danger for the summer and autumn months for Agoura Hills from global climate model outputs.

These projections of future conditions indicate a substantial increase in the potential for more severe wildfire behavior on an increasing number of days. If no fuel management occurs, and no changes in how fires are managed as compared to the 20th century, fire models from the state CalAdapt project suggest a nearly 30% increase in annual area burned by the end of the 21st century for the Planning Area (Figure 20). Importantly, these models don't predict the actual area burned each year, rather, they project the change in a long-term average and show how variable the historic record is from year-to-year. From a planning and management perspective, this means that big fire years will be bigger with more area burned. As no fuel management is assumed in the models, however, these projections also demonstrate the critical need for fuels management to reduce fuel loads in order to mitigate undesirable negative outcomes.



Source: Cal-Adapt. Data: Wildfire Simulations for California's Fourth Climate Change Assessment (University of California Merced), Wildfire Simulations Derived Products (Geospatial Innovation Facility).

Figure 20. Projected change in area burned from four different global climate model scenarios (Average, Cool/Wet, Warm/Dry, and Complementary) based on 20th century fire history from CALFIRE and assumptions of no change in fire and fuels management shows a nearly 30% increase in average annual area burned from the baseline historic period (1970-2000) to the end of the 21st century (2070-2100). Active fuels management would substantially alter the projected outcomes.

5.0 Methodology

5.1 INTRODUCTION

Given the high fire prone nature of the City of Agoura Hills and surrounding areas, a community wildfire risk assessment (CWRA) composed of hazard, exposure and vulnerability analyses has been undertaken to help identify and prioritize the most at-risk communities, as well as inform strategic planning and preparedness efforts. See Figure 21. The assessment used a combination of methods – field visits, wildfire behavior modeling, geospatial analytics, current research and best practices – in collaboration with the City of Agoura Hills, the Agency Stakeholder Working Group, local fire safe council members, LA County Fire, subject matter experts and other interested parties in the community. The assessment provides a foundation for prioritizing a range of wildfire mitigation strategies across the City.

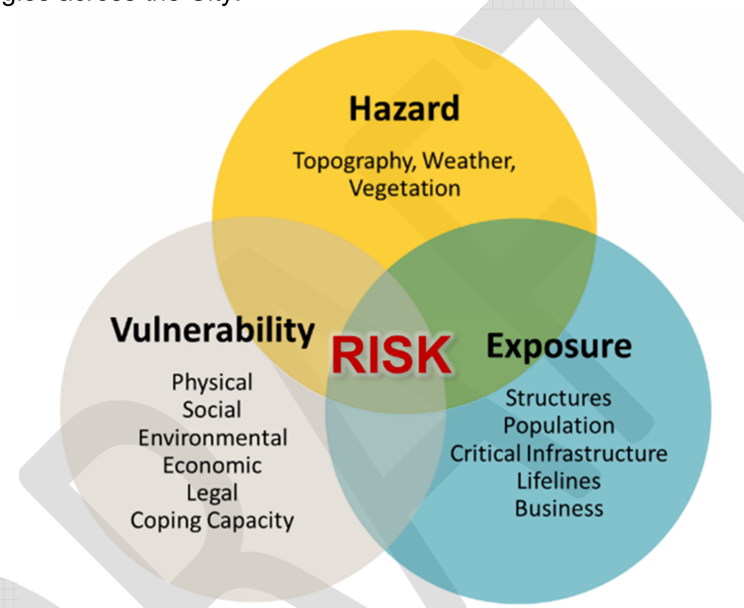


Figure 21. Key components of wildfire hazard and risk assessment for this CWRA.

The following sections provide the key approach and assumptions of each major component of the CWRA and are organized as follows:

- Risk-Informed Framework
- Wildfire Hazard Assessment Approach
- Wildfire Risk Assessment Approach

The results of these assessments are provided in Section 6.0.

5.2 RISK-INFORMED FRAMEWORK

To undertake a CWRA for the City of Agoura Hills, a generalized risk framework was adopted to help guide how the CWRA fits into an overall risk management decision-making process and ultimately the development of a CWPP. The wildfire risk framework, as shown in Figure 22, is based on well-established risk-informed approaches from other relevant fire-safety and disaster risk management sectors, guidance documents, industry best practices and latest research in wildfire risks. Note: This exemplar was used to help frame the CWRA work.

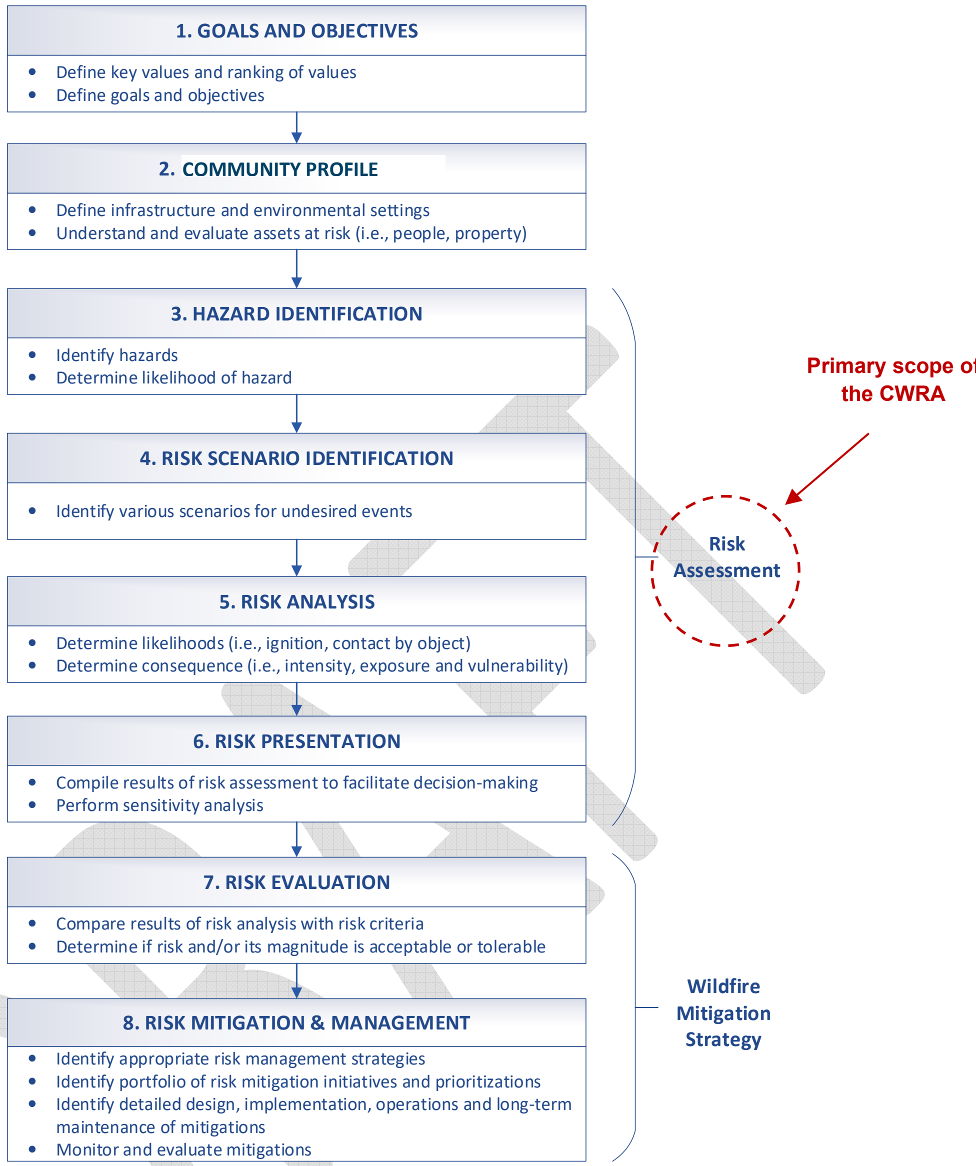


Figure 22. Generalized Risk-Informed Framework of which CWRA is a component.

As with any risk-informed approach, the process begins with identifying the key goals and objectives, selecting and ranking values and/or assets at risk, followed by a multi-step risk assessment – composed of a hazard analysis, risk scenario development, quantified risk analysis and presentation of the risk – and finally several steps for evaluating the risk assessment outcomes to inform decision-making and management strategy.

The following section describes the key methodology and assumptions of the wildfire hazard assessment.

5.3 WILDFIRE HAZARD ASSESSMENT ASSUMPTIONS

The objective of the wildfire hazard assessment is to identify areas within the Planning Area that are prone to severe fire conditions. Fire behavior characteristics such as rate of spread, flame length, fireline intensity, crowning and spotting are driven by the natural environment where topography, weather and fuels are primary forces. Fire behavior modeling is performed to estimate these characteristics and is based on key assumptions related to the primary driving forces – weather, fuels, and topography.

The key wildfire behavior modelling assumptions for the CWRA were reviewed and accepted by LACoFD in the “Fire Modelling Assumptions” technical memo issued on 2/28/2025. The following sections summarize those assumptions and any key updates since the issuance of the technical memo. The modeling assumptions and input data fall into six categories, as follows:

1. Analytical Boundary
2. Software
3. Key Input Data Sources
4. Weather
5. Fuels
6. Topography

5.3.1 Analytical Boundary

The analytical boundary adopted for the wildfire behavior modelling includes the administrative boundary of the City and an approximately 3-mile buffer extending out from the City’s boundary. See Figure 23.

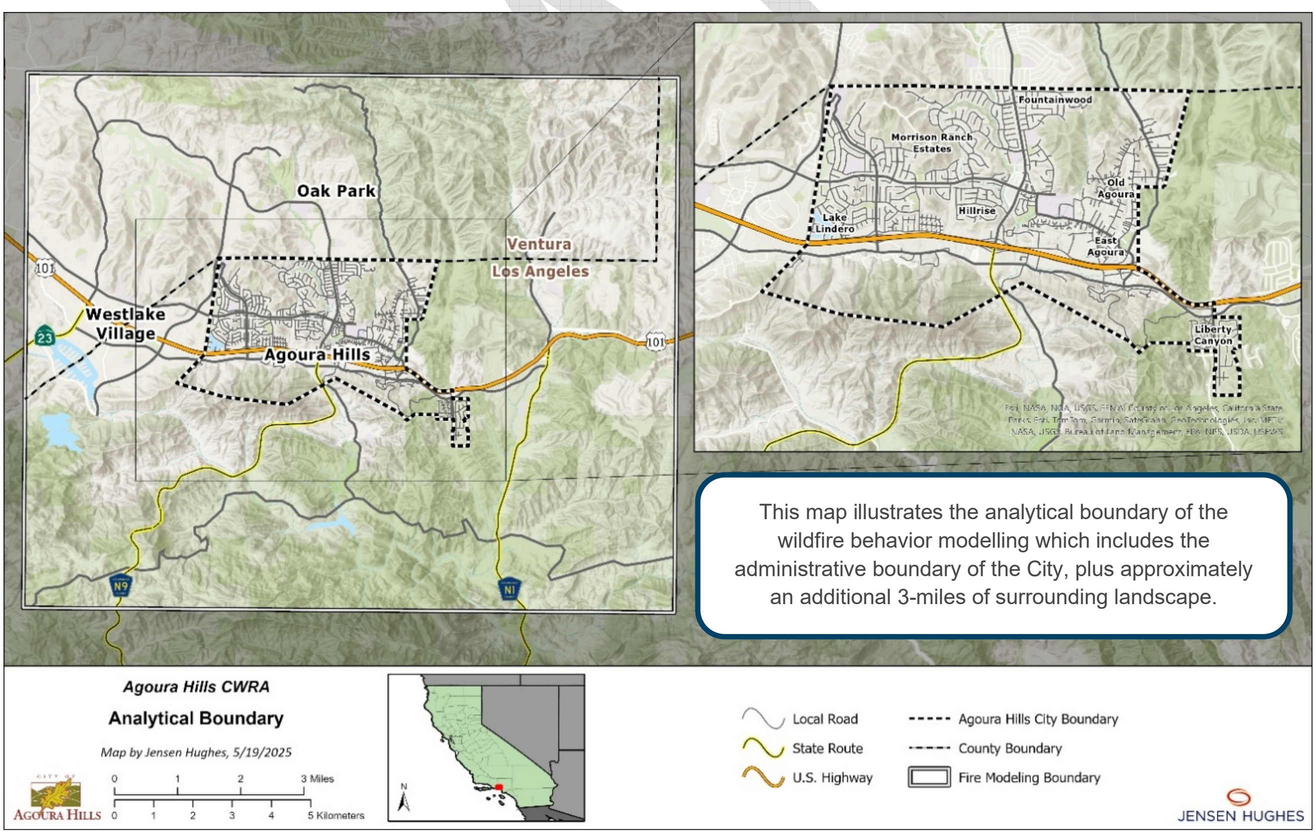


Figure 23. Analytical boundary of wildfire hazard assessment for Agoura.

While the CWRA is focused on the impacts of a potential wildfire to the City, by including additional landscape outside the city for the fire behavior modeling, the hazard analysis can identify influential topographic and fuel loads in the surrounding landscape that may impact the City. Since the primary threat of wildfire to Agoura Hills comes from ignitions located outside of the administrative boundary, it is important that this buffer be included in the overall analysis so that ignition sources, primary fire flow paths and distribution of the flow paths that threaten the community can be identified. Understanding threats outside the City can provide a better understanding of where future fire mitigation actions could prove to be most effective in protecting vulnerable locations within the City.

5.3.2 Software

Established wildland fire behavior modelling software provides the basis for evaluating the wildfire hazard, threat, and exposure analyses for the CWRA. The primary modelling software includes FLAMMAP (Version 6.0), FOFEM, and FireFamily Plus (Version 5.0). Wildfire Analyst Enterprise and NEXUS 2.0 were also used to capture some dynamic fire behavior features. The wildfire models used in the analysis are publicly available with the exception of Wildfire Analyst, which is a proprietary software application.

5.3.3 Key Input Data Sources

Spatial fire modeling utilizes eight spatial files as required inputs into the fire behavior model(s) and is commonly referred to as a landscape file or LCP file in the fire modeling community. The LCP is made up of layers representing Fuel Models, Canopy Cover, Canopy Height, Crown Bulk Density, Canopy Base Height, Elevation, Aspect, and finally slope. Figure 24 is a graphic of a representative LCP file data.

LCP files are commonly obtained from the LANDFIRE[8] program and are representative of conditions as of 2023. The LCP files contain all the spatial data used in the fire behavior models except for weather. The weather data used in the models is described in Section 4.6.

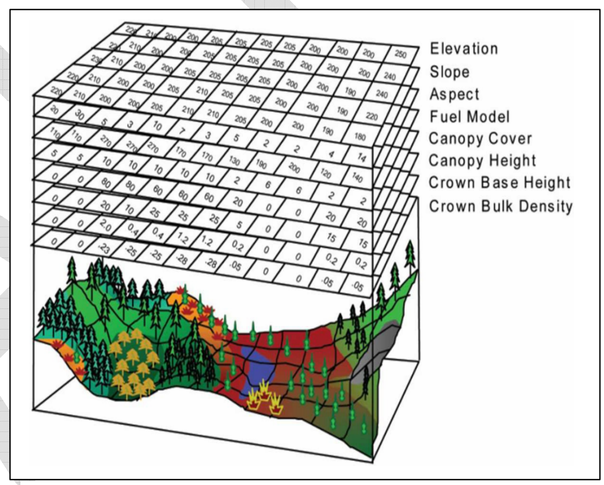


Figure 24. Landscape spatial files (LCP) used in wildfire hazard assessment. Data obtained primarily from LANDFIRE.

5.3.4 Weather Data and Analysis

Weather is one of the most important and variable elements of the wildland fire environment. Important components of fire weather that influence fire behavior are temperature, relative humidity, precipitation, wind, and atmospheric stability. These elements have the potential to enhance or retard wildfire spread and intensity.

As input into the fire spread model, fuel moisture and weather values are analyzed and evaluated based on weather percentiles. For the wildfire behavior modelling, weather values at the 97th and 90th percentiles (hottest, driest 3% and 10% of the days) were utilized as inputs into the fire spread model to generate the results that were then used in the risk assessment. For the base analysis, a 17-mph wind has been used to represent Santa Ana conditions. Based on feedback from LACoFD, a 31-mph wind based on conditions during the 2025 Palisades Fire was also performed. A northeast wind event at 23 mph similar to winds observed during the Woolsey fire was also explored as part of a sensitivity analysis. Refer to Appendix B for sample output from

[8] LANDFIRE (Landscape Fire and Resource Management Planning Tools) is a comprehensive program in the United States that provides data and tools for land management, particularly concerning wildfires, vegetation, and ecosystems. https://landfire.gov/

these sensitivity studies. *Note: As both the 2018 Woolsey Fire and 2025 Palisades Fire scenarios were extreme events, they did not provide significant variability in fire behavior conditions. That is, they would not be useful in identifying high priority areas in the landscape, as the entire landscape showed problematic fire conditions for both events.*

Historical weather data was obtained from **https://famauth.wildfire.gov/index.html/** or the Cheeseboro Remote Automated Weather Station (RAWS) from 2006 through 2024 (Figure 25). Fire Family Plus Version 5.0 (USDA Forest Service, 2020) was used to compare historical and current fire weather parameters associated with temperature, wind, and precipitation, and to generate a suite of inputs to the fire behavior models. The Cheeseboro RAWS is located northeast of the City of Agoura Hills at an elevation of 1,707 feet.

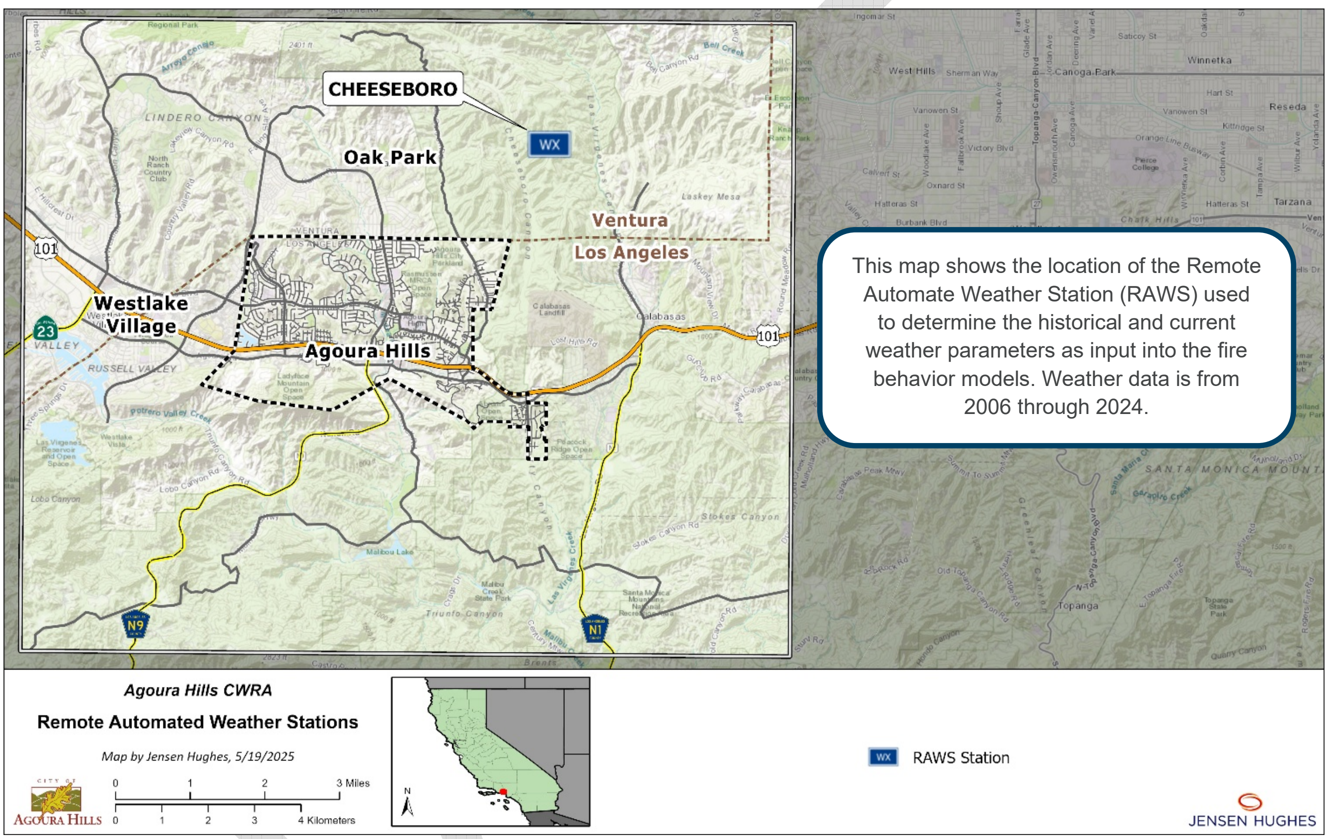


Figure 25. Weather station used for the wildfire behavior analysis.

Fire Danger – Energy Release Component (ERC) and Burning Index (BI)

One key fire danger rating index related to weather and regional climate that is used to understand the potential for severe fire is the Energy Release Component (ERC) index. ERC is a number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. This index provides an approximation for fuel moisture conditions associated with climatological changes throughout a fire season. Thus, the larger the ERC value, the potentially more severe the fire. Values typically range from 0 to 100, though they can be higher depending on weather extremes and fuel model. Specifically, ERC is used to describe fire danger trends because it is less sensitive to daily weather variations than other fire danger indices. The ERC calculation is also affected by fuel loadings in different size classes. NFDRS Fuel model Y, the default analysis fuel model assigned the Cheeseboro RAWS includes both live and dead fuels and has a significant portion of the fuel load driven by large dead fuels.

Large fuels are not a primary component in and adjacent to the City of Agoura Hills and therefore another NFDRS index, Burning Index (BI), is tracked by Los Angeles County Fire Department to monitor fire danger. The BI is an index that rates fire danger related to potential flame length over a fire danger rating area. The BI is expressed as a numeric value related to potential flame length in feet multiplied by 10. The scale is open-ended, which allows the range of numbers to adequately define fire problems, even during low to moderate fire danger. Information on current BI indices is located at https://fire.lacounty.gov/fire-weather-danger/.

Figure 26 provides the variation in historical maximum, minimum and average values of the ERC and BI fire danger indices for the Cheeseboro RAWS from 2012 – 2025. The 90th and 97th percentile conditions are shown with grey lines and are indicative of when extreme fire behavior may occur.

Based on the results of weather, ERC and BI analyses, high fire conditions can occur almost any time throughout the year. As ERC values are tracked by Predictive Services (**https://gacc.nifc.gov/oscc/fuelsFireDanger.php**) and BI values are monitored by LACoFD (**https://fire.lacounty.gov/fire-weather-danger/**), both indices can be monitored to provide an indication of potential fire danger on a daily basis based on the thresholds identified in Figure 26. Finally, the weather conditions at the 97th percentile annually were used as inputs into the fire behavior models used to inform the hazard component of the CWRA.

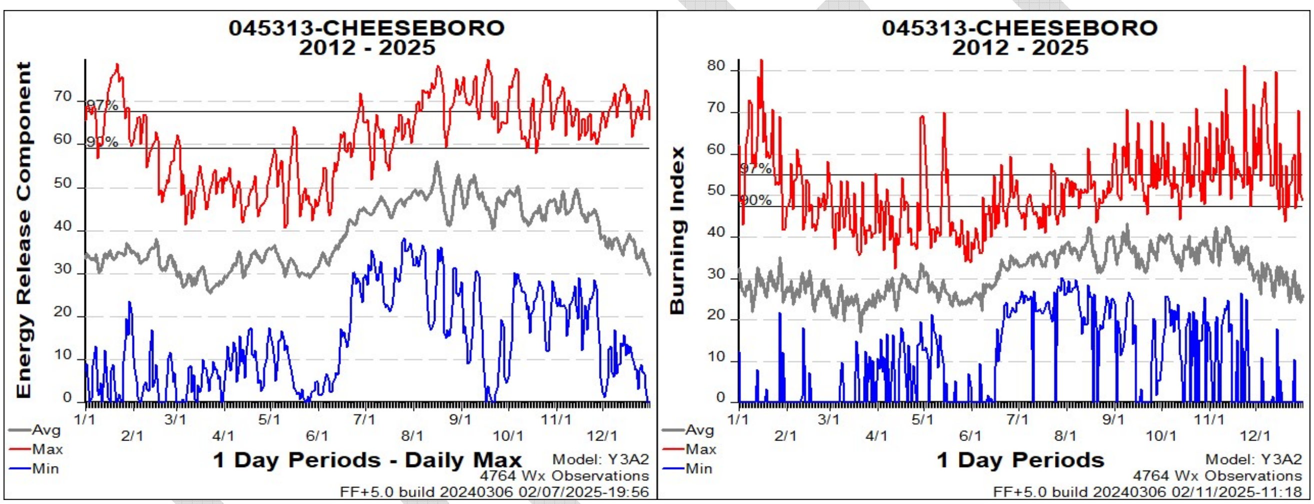


Figure 26. ERC (left) and BI (right) for Cheeseboro RAWS, National Weather Service station ID 045313.

Fuel Moisture

Fuel moisture is a dynamic variable controlled by seasonal and daily changes in the weather and is an important influence on wildland fire behavior. Simply stated, vegetation is most flammable when fuel moisture levels are low and less flammable when they are high. Fuel moisture levels will largely determine if a fire will ignite and spread. Fuel moisture is typically categorized as dead and live fuel moisture.

- **Dead fuels.** Dead fuels act like a sponge absorbing or giving up moisture to the air and ground which surrounds them. The moisture exchange rate between dead fuels and their surrounding environment varies by the size of the dead fuel particle, with fuels less than ¼ in diameter reaching equilibrium with their surroundings within one-hour. Because of this rapid exchange rate, these smaller size class fuels exert significant control over wildfire burning characteristics, especially in the grass and shrub dominated fuels associated with the Planning Area.

- **Live fuels.** Live fuel moisture is the moisture in living, growing vegetation and is controlled by the internal physiological mechanisms of the vegetation and external influences such as rainfall, drought, aspect, elevation, and seasonal drying patterns. Typically, live fuel moistures are highest in the spring through early summer and at their lowest in late summer through early winter when seasonal rains typically begin.

Live fuel moisture of 60% or below is a "critical" threshold where live fuels display similar burning characteristics as dead fuels.

Live fuel moisture status can be tracked at **https://fire.lacounty.gov/fire-weather-danger/**, with the Santa Monica Mountains data most applicable to the Agoura Hills Planning Area. Figure 27 shows both current and historical live fuel moisture data for the Santa Monica Mountains live fuel moisture sampling stations.

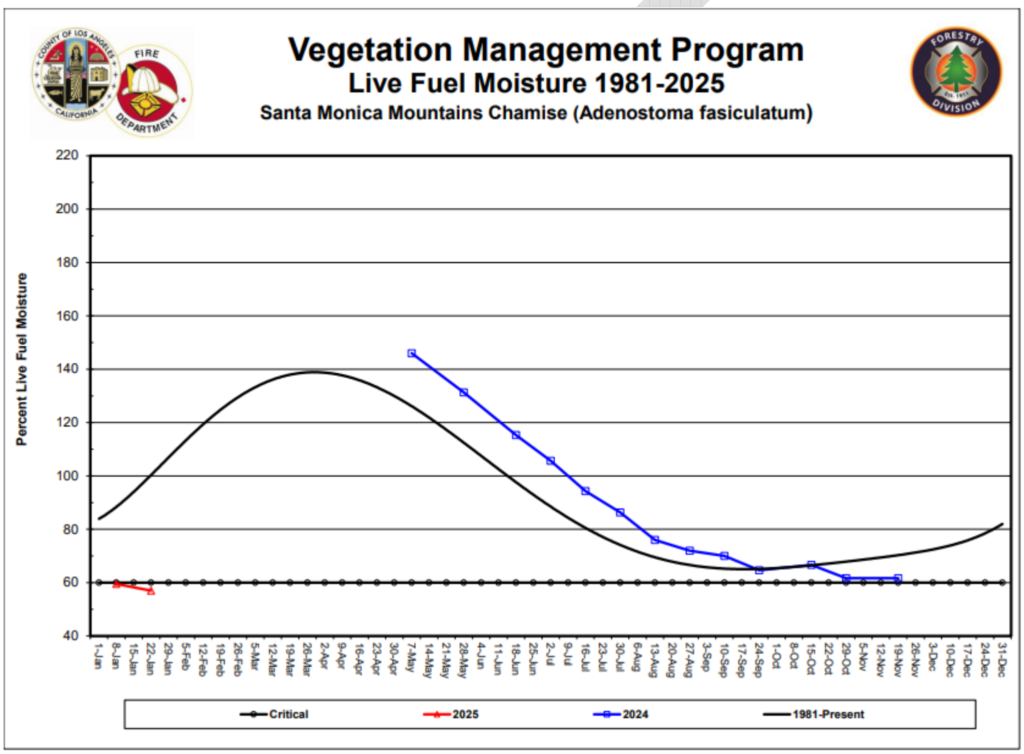


Figure 27. Current and historical live fuel moisture data for the Santa Monica Mountains station

Based on the 18-year historical weather data for the Remote Automated Weather Stations (RAWS), as described above, Fire Family Plus 5.0 was used to generate a suite of inputs to the fire behavior models for each ERC level (Table 3). Additionally, wind roses (Figure 28) were evaluated to determine the dominate wind direction. The bars of the wind rose represent the direction and speed from which the wind is blowing.

Table 3. Fuel Moisture and Weather Outputs – Base Fire Scenario

Weather Percentile	*90%*	*97%*
Energy Release Component	59%	68%
Burning Index	48%	55%
20-ft Windspeed Direction	WSW	WSW
20-ft Windspeed	15 mph	17 mph
Herbaceous Fuel Moisture	30%	30%
Woody Fuel Moisture	60%	60%
1 HR Fuel Moisture	3%	2%
10 HR Fuel Moisture	4%	3%
100 HR Fuel Moisture	8%	7%
1000 HR Fuel Moisture	30%	30%

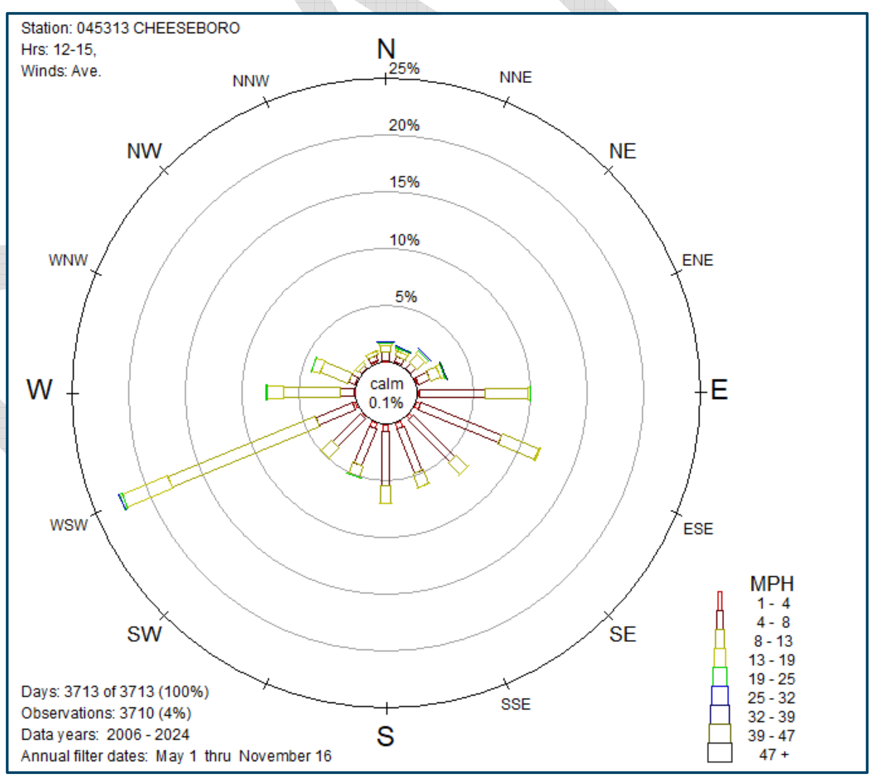


Figure 28. Wind Rose for the City of Agoura Hills

5.3.5 Fuel Types and Fuel Models

Fuels are categorized into specific fuel models (e.g., non-burnable, grass, grass-shrub, shrub, timber-understory, timber-litter, and slash- blowdown), which describe the physical properties of the vegetation that support fire. Fuel models are grouped by fire-carrying fuel type and the number of fuel models within each fuel type varies. Each fuel type has been assigned a mnemonic two-letter code.

> **IMPORTANT NOTE**: *Traditional wildfire behavior models do not capture fire spread into urban fuels and thus will show as "unburnable". However, we know that fire can readily burn into the built environment, particularly under conditions of high wind and low relative humidity.*

- **Non-burnable fuel models (NB).** Land areas that are considered non-burnable portions of the landscape are displayed on a fuel model map as NB. Urban development, barren land and water are all considered unburnable in fire behavior models.
- **Grass (GR).** The primary carrier of fire in the GR fuel models is grass. Grass fuels can vary from heavily grazed grass stubble or sparse natural grass to dense grass more than 6 feet tall. Fire behavior varies from moderate spread rate and low flame length in the sparse grass to extreme spread rate and flame length in the tall grass models.
- **Grass-Shrub (GS).** The primary carrier of fire in the GS fuel models is grass and shrubs combined; both components are important in determining fire behavior. The effect of live herbaceous moisture content on spread rate and intensity is strong and depends on the relative amount of grass and shrub load in the fuel model.
- **Shrub (SH).** The primary carrier of fire in the SH fuel models is live and dead shrub twigs and foliage in combination with dead and down shrub litter. A small amount of herbaceous fuel may be present, especially in SH1.
- **Timber-Understory (TU).** The primary carrier of fire in the TU fuel models is forest litter in combination with herbaceous or shrub fuels. The effect of live herbaceous moisture content on spread rate and intensity is strong and depends on the relative amount of grass and shrub load in the fuel model.
- **Timber-Litter (TL).** The primary carrier of fire in the TL fuel models is dead and down woody fuel. Live fuel, if present, has little effect on fire behavior.
- **Slash-Blowdown (SB).** The primary carrier of fire in the SB fuel models is activity fuel or blow down. Forested areas with heavy mortality may be modeled with SB fuel models.

Table 4 describes the fuel models found in the Planning Area and the amount of area designated as each fuel type. Note: For this analysis, the 2023 40 Scott and Burgan Fire Behavior Fuel Model from LANDFIRE has been used. See Figure 29 for a spatial distribution of the fuel models across the landscape.

Table 4. Breakdown of Generalized Fuel Types/Fuel Models within the Planning Area.

Fuel Model Type	*Vegetation Group*	*Fuel Type Acres*	*% Coverage*
Non-burnable – Fuel models (NB1-NB9)	*Non-burnable*	14,182	25.3%
Grass - Nearly pure grass and/or forb types are represented by grass fuel models (GR1- GR9)	*Grassland/Forb*	5,213	9.3%
Grass-Shrub – Up to about 50 percent shrub coverage are represented by grass shrub fuel models (GS1-GS4)	*Grassland/Forb* *Broadleaf Forest and Woodland*	19,884	35.5%
Shrubs – Cover at least 50 percent of the site; grass sparse to non-existent are represented by shrub fuel models (SH1-SH9)	*Chaparral*	14,110	25.2%
Timber-Understory – Grass or shrubs mixed with litter from forest canopy are represented by timber understory fuel models (TU1-TU5)	*Conifer Forest and Woodland*	762	1.4%
Timber-Litter – Dead and down woody fuel (litter) beneath a forest canopy is represented by timber litter fuel models (TL1-TL9)	*Broadleaf Forest and Woodland* *Conifer Forest and Woodland*	1,807	3.2%
Total		55,958	100.0%

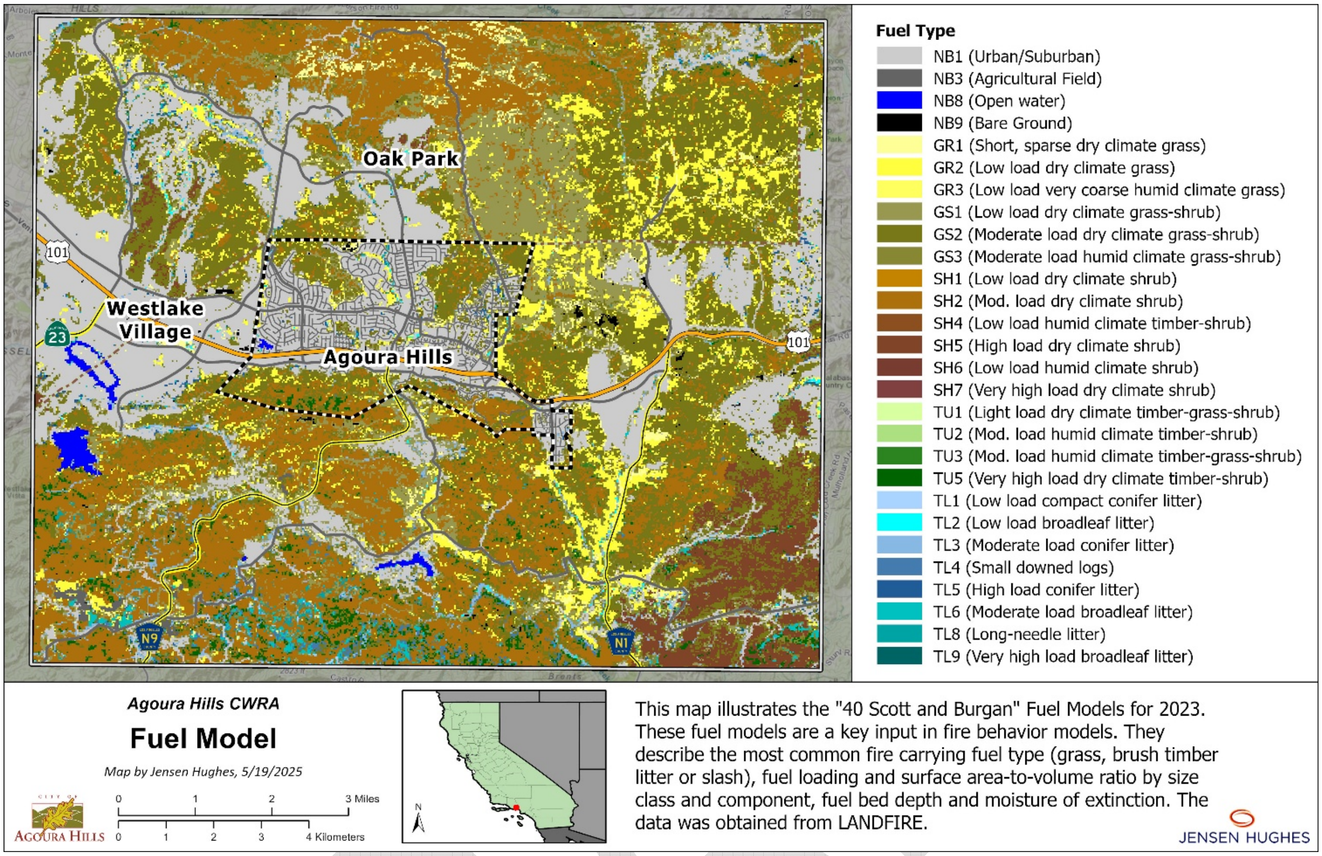


Figure 29. Fuel types/models within the Planning Area

5.3.6 Topography

Topography is the configuration of Earth's surface and is the most stable of the elements in the fire environment. Topography plays a significant role in wildland fire behavior by sheltering areas from the prevailing wind or by channeling wind through prominent canyons and drainages. Specific elements of topography that affect fire behavior include slope, aspect and elevation with the steepness of slope being the most influential. For the wildfire behavior modelling, topographic data was obtained from the LANDFIRE program

As seen in Figure 30, three principal drainages bisect the City. From east to west, these drainages are Chesebro/Palo Comado, Medea Creek Canyon and Lindero Canyon. These drainages flow from the Simi Hills north of the City and have a general north to south orientation. It is this north/south orientation that serves to channel and intensify winds during Santa Ana weather events.

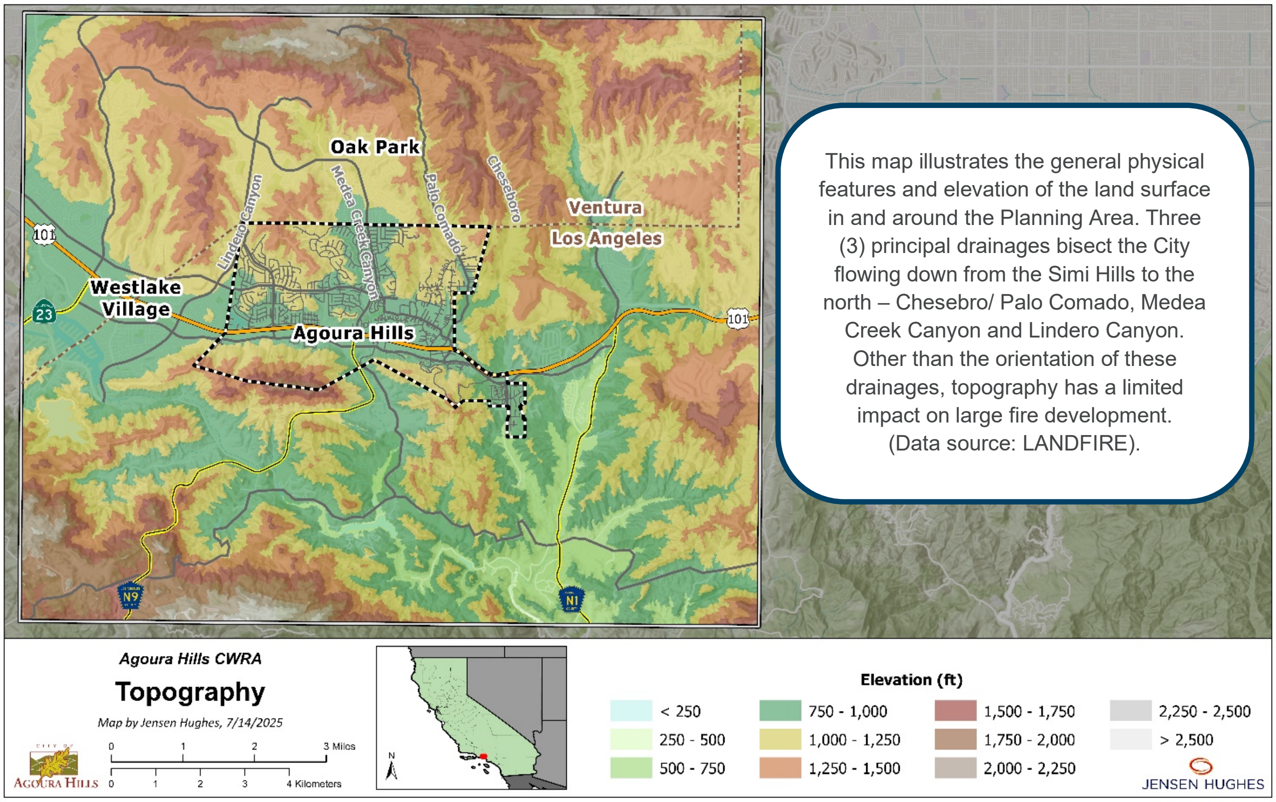


Figure 30. Elevations across the analytical boundary for City of Agoura.

Other than the orientation of these drainages, topography has a limited impact on large fire development in the Planning Area as drainage bottom-to-ridgetop distances are relatively short, preventing slope driven fires from developing sustained uphill fire runs. Generally, slopes are mild enough to allow for the use of mechanized equipment during fire suppression operations. Most slopes are less than 30%, with the exception of locations south of Highway 101 where slopes can exceed 80%.

Aspects within the Planning Area are divided along Highway 101, with areas to the north of the 101 having a south aspect, and slopes south of the 101, a north aspect. These aspects influence vegetation type, with south aspects supporting grass, grass-shrub dominate fuel types and north facing slopes displaying more chaparral and oak-woodland dominated fuel types.

5.4 WILDFIRE RISK ASSESSMENT ASSUMPTIONS

5.4.1 Overview

The key assumptions for the risk analysis of the WRA have been documented in the "Risk Assessment Methodology" technical memo issued on 11/15/2024. Refer to Appendix B for details.

The following sections provide an executive summary of those assumptions and any key updates since issuance of the technical memo. The risk analysis assumptions and input data fall into three (3) main categories:

1. Risk Scenario(s)

2. Risk Analytical Boundary
3. Risk Formulation

5.4.2 Risk Scenario

The primary risk scenario developed for this CWRA is due to wildfires originating in surrounding landscapes, posing a threat to the City and its values/assets. The risk scenario was developed for the purpose of informing medium-to-long term wildfire risk mitigation decision making, planning and preparedness programs, policies and procedures (e.g., large-scale, multi-phase vegetation management programs, capital improvements, education and outreach). Note: The potential impact of changing climate is also considered a risk but has been addressed using a separate analysis presented in Section 4.6.

Key Assumption: The risk scenario developed for this CWRA is intended to address medium-to-long term wildfire risk mitigation decision-making, planning and preparedness programs, policies and procedures (e.g., large-scale, multi-phase vegetation management programs, capital improvements, education and outreach).

5.4.3 Risk Analytical Boundary

Unlike the analytical boundary for the fire hazard analysis, which assumes a 3-mile buffer around the City for the purpose of understanding the broader wildfire settings within which the City is situated, the CWRA analytical boundary only includes natural-, built- and human-environment assets and values within City boundaries.

5.4.4 Risk Formulation

To quantify the potential wildfire risks to the City, the CWRA is based on a combination of the following risk components (as schematically shown in Figure 31):

+ **Hazard analysis** – The potential characteristics of wildfire hazards in and around the City including location, severity and frequency of wildfires. Fire hazard is a function of both “fire severity” and “fire frequency”.
    - The **“fire severity”** component of the hazard analysis represents a combination of various fire behavior characteristics including flame length, max spotting distance, fuel loading, and PM_{10} emissions. As fire characteristics are a function of the environmental settings (i.e., fuel, topography and weather), they are independent of the ignition source.
    - The **“fire frequency”** component of the hazard analysis represents a combination of simulated fire frequency and burn probability. Simulated fire frequency is the relative frequency that fire burns one areal unit of land compared to another areal unit based on historical fire starts from 1992 to 2022. Burn probability is the result of fire simulations of random ignitions across the landscape.
+ **Exposure analysis** – Identification, quantification and evaluation of a variety of values or assets that are at risk of being negatively impacted by potential wildfire hazards including people, property, critical infrastructure and facilities, natural resources, economic resources, health, etc. This is an overlay analysis, whereby the results of the hazard analysis are overlaid on top of the assets-at-risk.
+ **Vulnerability analysis** – Evaluation of the inherent susceptibility of people, properties and economic assets to suffer loss and/or damage. This may include socio-economic determinants, physical construction of buildings, spatial arrangements of neighborhoods, firefighting responses capacities and water supplies, etc.

For Scenario 1, these risk components are combined using the following general equation (See also Figure 31):

$$(0.6 \cdot Fire\ Severity + 0.4 \cdot Fire\ Frequency) \times (Asset\ Count + Vulnerability)$$

Where,

- **Fire Severity** – is a combination of various fire characteristics, as described above [Scale: 0-5]
- **Fire Frequency** – is the simulated fire frequency plus burn probability, as described above. [Scale: 0-5]
- **Asset Count** – is the density of values or assets at risk from fire exposure. [# of assets].
- **Vulnerability** – is an additional term(s) to account for the potential increase in damage or loss due to social or physical susceptibilities to wildfire impacts. [Scale: 1 – 2.5]

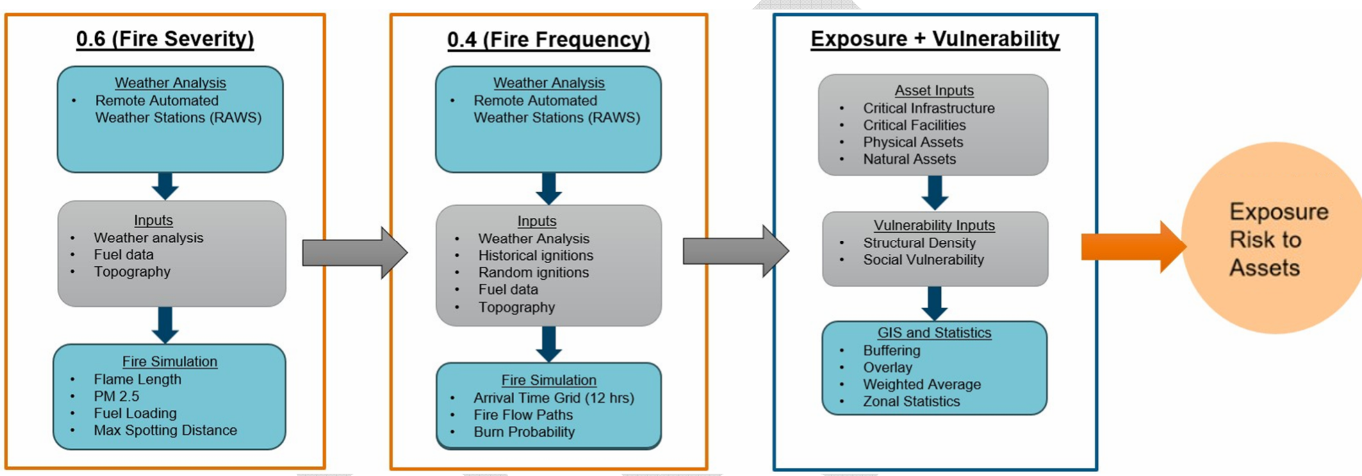


Figure 31. Quantified Risk Assessment Formulation.

Hazard Components ("Fire Severity" and "Fire Frequency")

As seen in the generalized risk equation, there are two components describing the fire hazard: (1) fire severity and (2) fire frequency. The reason for combing these two components is to acknowledge that wildfire risk is not only a function of how severe a fire is, but also how frequently it occurs. In other words, some of the most concerning fires can be those that occur less often but are more severe (low frequency-high intensity), particularly if they occur near high value assets or in vulnerable areas. High frequency-low intensity fires (such as those that occur in grasslands), may occur more often but may tend to be low intensity and therefore more manageable from a firefighting perspective. Thus, the use of a 0.6 factor for the fire severity is to provide greater importance to how severe a fire is compared to how often it occurs.

Exposure Analysis – Assets at Risk

Assets at risk from wildfires are often defined in terms of human life, buildings, and critical infrastructure. However, values can also include health, natural resources, sensitive habitats, cultural and historical resources, and other intangibles (e.g., social capital, community culture, livelihood).

For Scenario 1, the risk analysis considers multiple asset- or value-types such as critical infrastructure, critical facilities and buildings, and various assets/values within each category type (such as shown in Figure 32). Note: The inclusion of these asset-types and assets also serves as a proxy for spatial location of people and communities at risk. Thus, people and community boundaries are not explicitly included.

Figure 32. At Risk Asset Types and Assets/Values by Type for Scenario 1.

Exposure Analysis – Asset or Value Buffers

For Scenario 1, each asset is given a ¼ mile buffer to account for the physical dimension of the asset, and a "zone of influence" within which fire may have an impact on the asset. See Figure 33 for an example output.

Sensitivity analyses were also performed to evaluate smaller buffer sizes (i.e., 1/8 mi and 200 feet), as well as how assets were weighted (e.g., as a group of assets within an asset class or as individual assets).

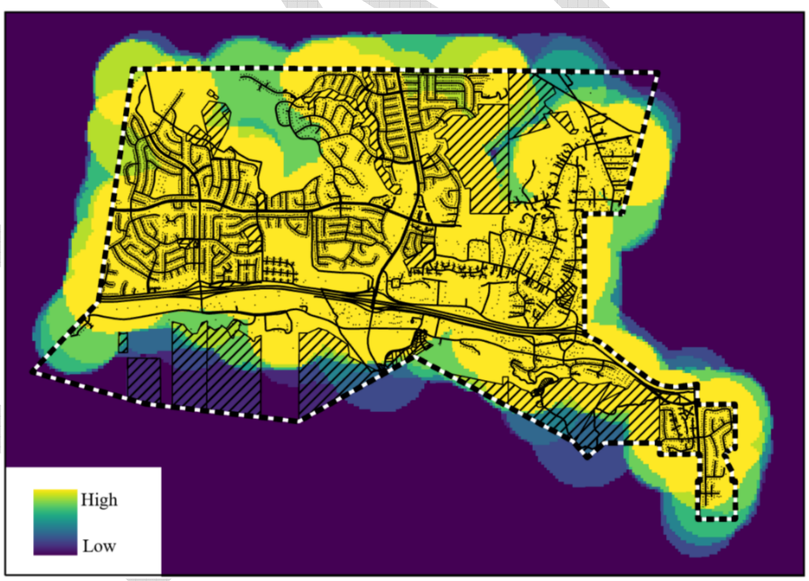


Figure 33. Results of asset density analysis given baseline assumptions (i.e., assets are buffered based on their respective asset type; and a buffer of ¼ mile). Asset density in the City has limited variability.

Exposure Analysis – Asset or Value Ranking ("Weights")

As Scenario 1 considers multiple asset- or value-types, a relative ranking of the importance of each value/asset type has been included based on input and agreement from the Stakeholder Working Group to acknowledge that some values/assets are considered to have more value than others. The weighting for each asset type is illustrated in Figure 34.

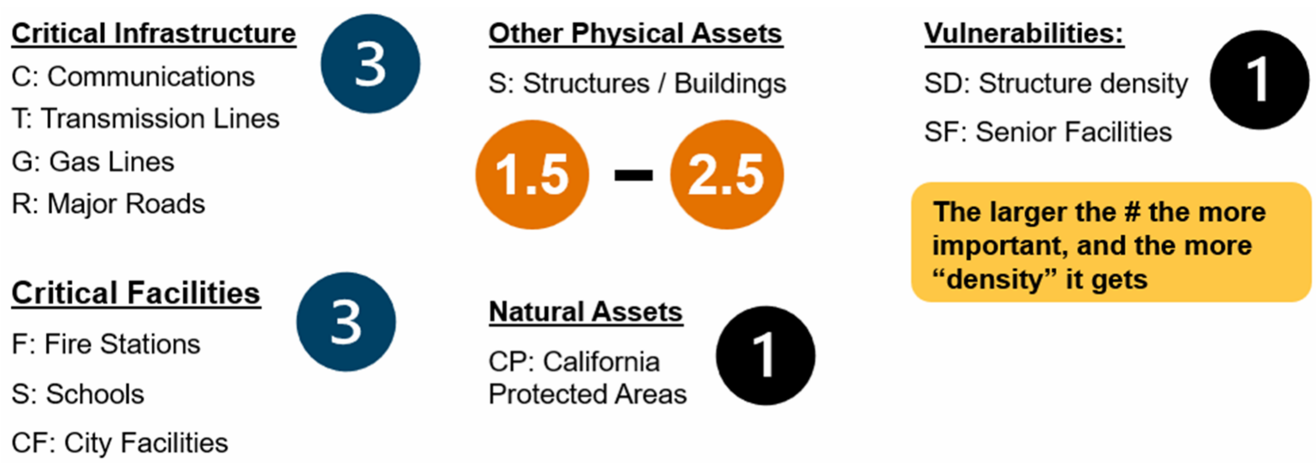


Figure 34. Asset significance weighting

Vulnerability Analysis

In addition to exposure, some assets may be more susceptible to damage or loss to wildfires due to a variety of inherent physical, social or technical characteristics. Some examples of physical vulnerabilities include construction material, age of asset, structure spacing, etc. Catastrophic fires and research in recent decades have illustrated that more closely spaced homes/buildings can potentially be more vulnerable to structure-to-structure fire spread.[9] Thus, the closer a structure is to other structures, the higher the weighing factor. The structure density weights ultimately range from 1.5 to 2.5 as shown above and in Figure 34.

Other forms of vulnerability that were evaluated included social determinants (e.g., age, income levels, access to transit) and coping capacities (e.g., response time coverage). These vulnerabilities, however, were considered qualitatively. See Section 6.2

9 FEMA (2023) Marshall Fire Mitigation Assessment Team: Decreasing Risk of Structure-to-Structure Fire Spread in a Wildfire

6.0 Wildfire Hazard and Risk Assessment Results

Based on the methodology and key assumptions described in Section 5.0, this section presents the results of wildfire hazard and risk assessment results.

6.1 WILDFIRE HAZARD ASSESSMENT RESULTS

The objective of the wildfire hazard assessment is to identify areas within the Planning Area that are prone to problematic fire conditions, and to use this as the basis for designing and prioritizing fuel treatments and other mitigation strategies as part of the CWPP process.

The Wildfire Hazard Assessment performed to support the CWRA and future development of the CWPP include:

(1) Fire History

(2) Ignition Density

(3) Fire Severity

(4) Simulated Fire Frequency

(5) Fire Flow Paths

(6) Flame Length

(7) Potential Crown Fire

For the purpose of this CWRA and future CWPP, three Fire Planning Units (FPUs) (A-C) were identified to allow interested parties at a more localized level to focus efforts on their specific subregion and community.

6.1.1 Fire History

Fire history provides a useful tool for fire prevention and preparedness as it can provide an understanding of fire frequency, fire season, fire behavior and characteristics, major sources of ignition and portions of the landscape that are the most vulnerable.

There is a significant recent history of large wildfires burning in and around the City. The most impactful of these was the 2018 Woolsey Fire, which damaged or destroyed approximately 2,007 structures, approximately 31 within the City limits (See Figure 36). While the Woolsey Fire directly impacted the city, multiple larger fires have burned in the general vicinity of the community including:

- **Kenneth Fire** – January 2025, burned 1,052 acres northeast of the City in Calabasas.
- **Palisades Fire** – January 2025, burned 23,707 acres west of the City in Pacific Palisades and Malibu.
- **Franklin Fire** – December 2024, burned 4,087 acres south of the City in Malibu.
- **Hill Fire** – November 2018, burned 4,310 acres east of Camarillo (burned concurrently with the 96,949-acre Woolsey Fire).
- **Springs Fire** – May 2013, burned 23,676 acres east of Point Magu in Ventura County.

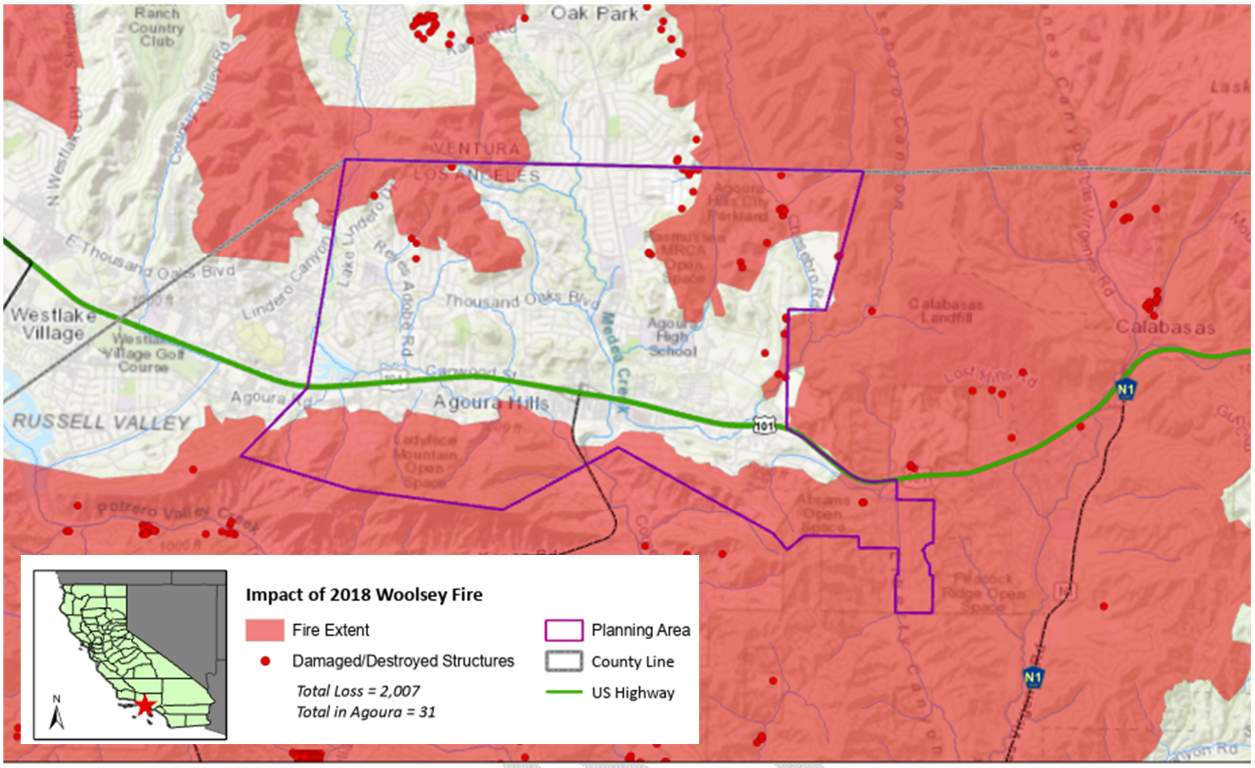


Figure 35. Damaged/Destroyed structures during the 2018 Woolsey Fire.

Additional major wildfires that have occurred in and around the City include the 2005 Topanga Fire and the 1982 Dayton Canyon Fire. The majority of the largest and most recent wildfires have occurred around the city, encroaching from the northeast and northwest (See Figure 36).

Wildland fire ignitions do not generally start within Agoura Hills itself but rather spread towards the City from surrounding areas during time of elevated fire danger. All of the large wildfires cited above have burned under Santa Ana/offshore wind conditions, including the Springs Fire, which burned in May, a month not typically associated with Santa Ana weather events.

The majority of ignitions occur to the southeast, near Malibu Creek State Park. This can be seen in the “hot spot” or fire cluster map in Figure 37.

These large fires in and adjacent to the city have modified the vegetative structure surrounding Agoura Hills by burning much of the older, denser chaparral. While these plant communities are in the process of recovery from these wildfires, they mainly support less dense grass and grass-shrub fuel types. These fuels will burn rapidly under summer and fall fire weather conditions, however not at high intensities. This allows for both aerial- and ground-based firefighting operations to be more effective than in areas with more dense fuels.

Throughout Agoura Hills, there are many instances where non-native ornamental vegetation is used as landscaping. Often it is this ornamental vegetation that allows fire to impact a structure, either by providing a receptive fuel for embers or by providing a flammable connection from wildland fuels to a structure.

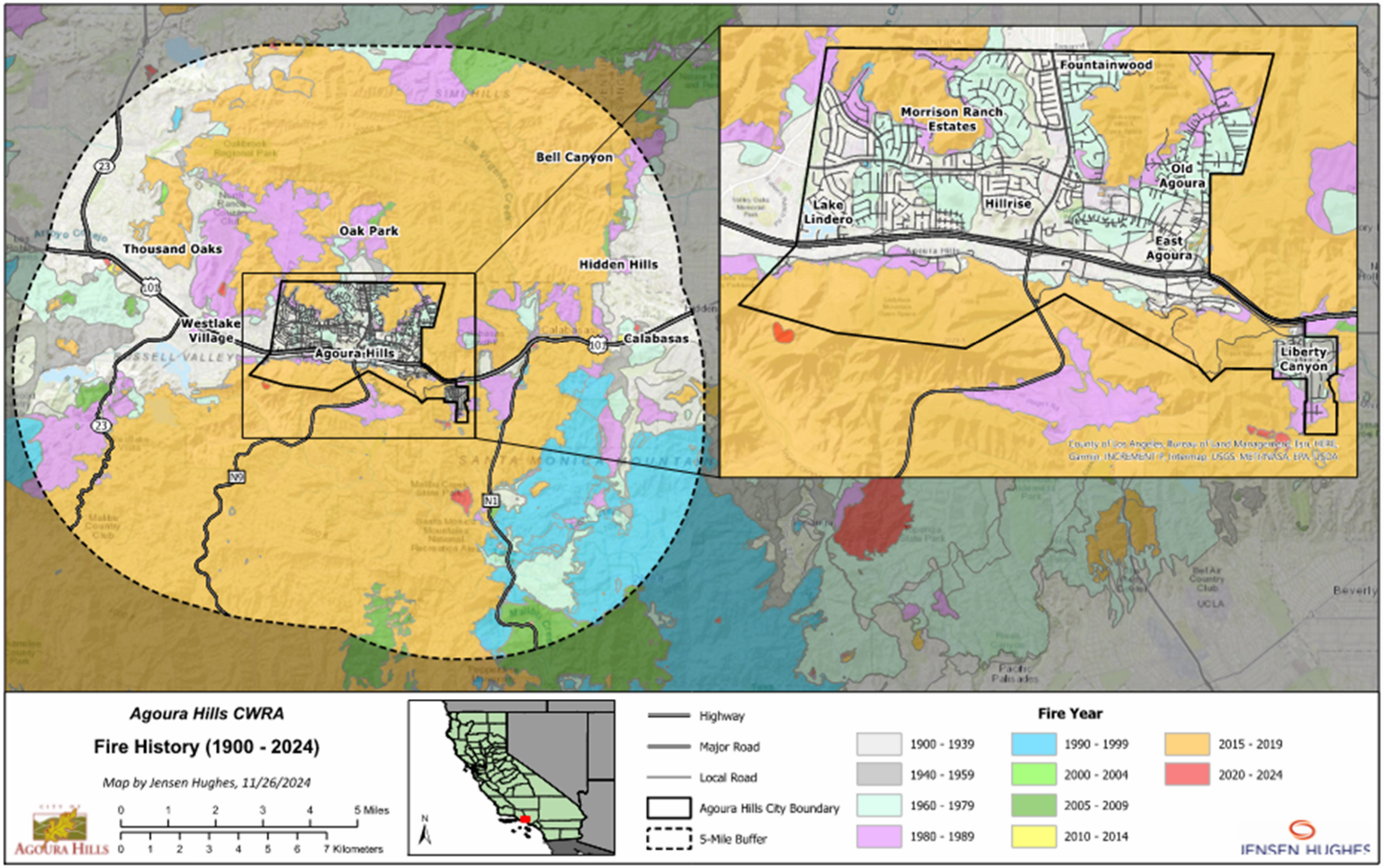


Figure 36. Historical Fire Perimeters in and around Agoura Hills.

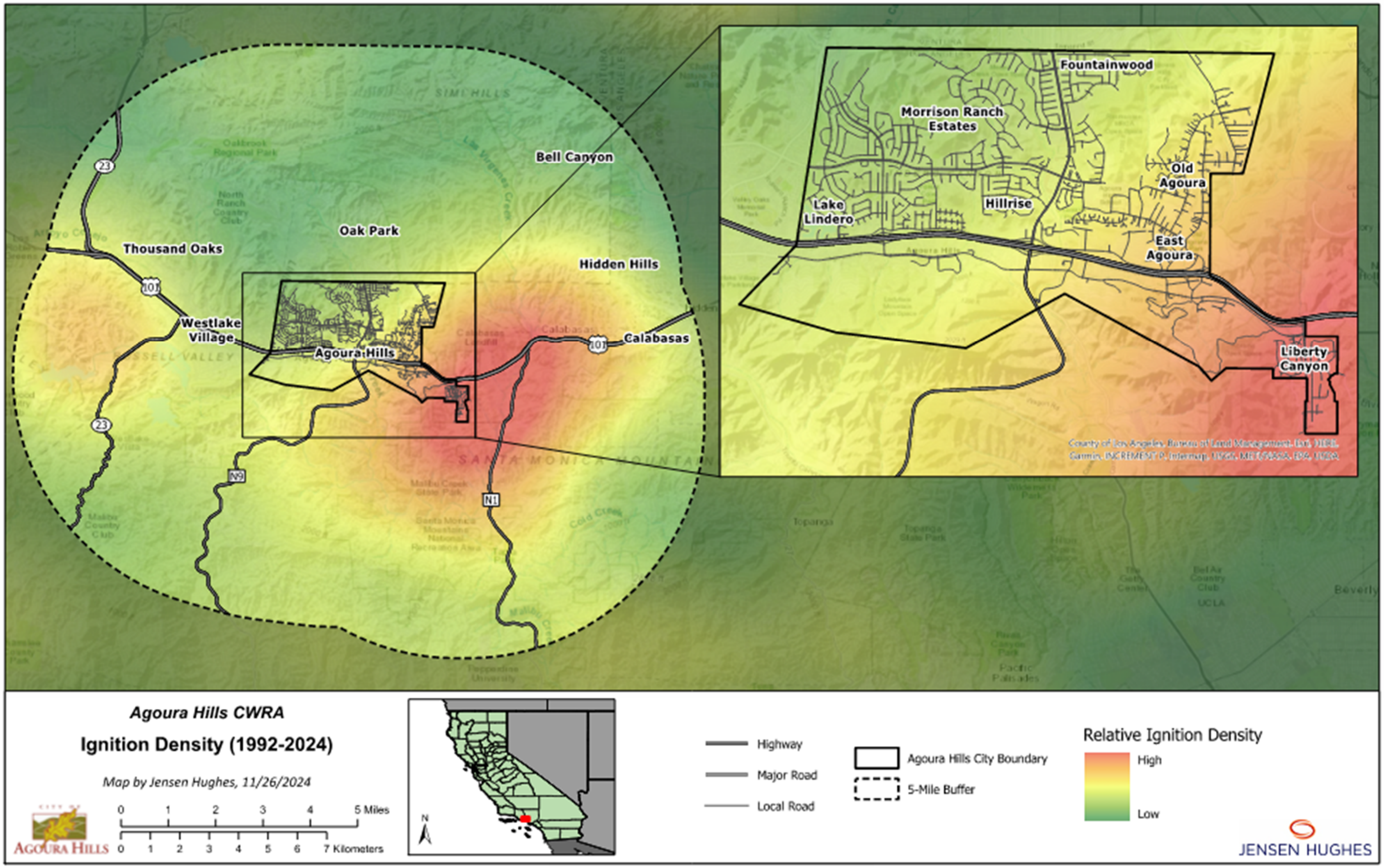


Figure 37. Historical Ignition Densities in and around Agoura Hills.

6.1.2 Ignition Density

Ignition density has been evaluated for two functions within the Wildfire Risk Assessment:

- **Firstly**, it is used as points from which fire spread simulations are run to determine fire severity and fire frequency for the Planning Area.
- **Secondly**, ignition density provides insight into specific locations where fire prevention actions are needed to reduce the wildland fire threat to the community.

Historic ignition density was based on ignitions that occurred between 1992-2020 and is from the United States Forest Service's Fire Program Analysis dataset[10]. See Figure 38.

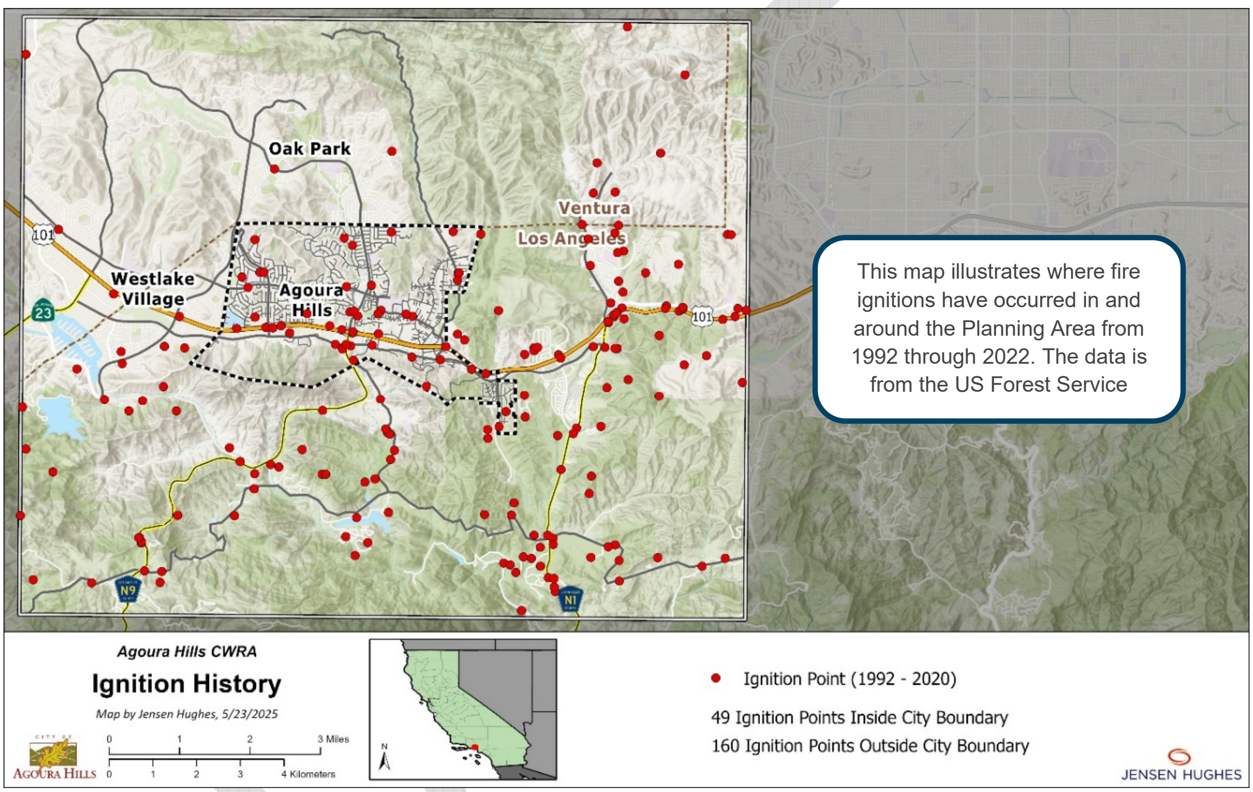


Figure 38. Ignition history in and around the Planning Area from 1992 - 2020. Source: USFS.

As seen in the figure, the distribution of ignitions across the Planning Area shows that ignitions tend to cluster along travel routes, with US-101, Kanan Road and Las Virgenes Road having the greatest density of ignitions. The most potentially impactful ignition clusters to the city are those located along Chesebro Road, below the Calabasas landfill and along Las Virgenes Road. In these locations, if an ignition were to occur during a Santa Ana weather event, fire would be rapidly pushed into residential areas to the west and south.

Of less concern to the city are the ignition clusters south of the administrative boundary. Under normal southwest winds, burning conditions are typically within the ability of the local fire agencies to successfully suppress. Fire history indicates that no large fire has spread into Agoura Hills from the south.

[10] Short, Karen C. 2022. Spatial wildfire occurrence data for the United States, 1992-2020 [FPA_FOD_20221014]. 6th Edition. Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2013-0009.6

6.1.3 Fire Severity ("Hazard")

Fire severity ("hazard") is used to classify how intense a fire will burn under a variety of environmental conditions. Fire behavior is the product of the natural environment or the unique combination of topography, weather and fuels. Topography and weather are factors on which humans have little effect but, fuels can be altered through human intervention or natural processes such as fire (rapid) or decomposition (very slow). Therefore, when assessing fire severity ("hazard"), the focus can be on fuels and the associated fire behavior and how severe those conditions may be. This can be determined by fire behavior characteristics such as rate of spread, flame length, fireline intensity, torching, crowning, spotting, fire persistence and resistance to control.

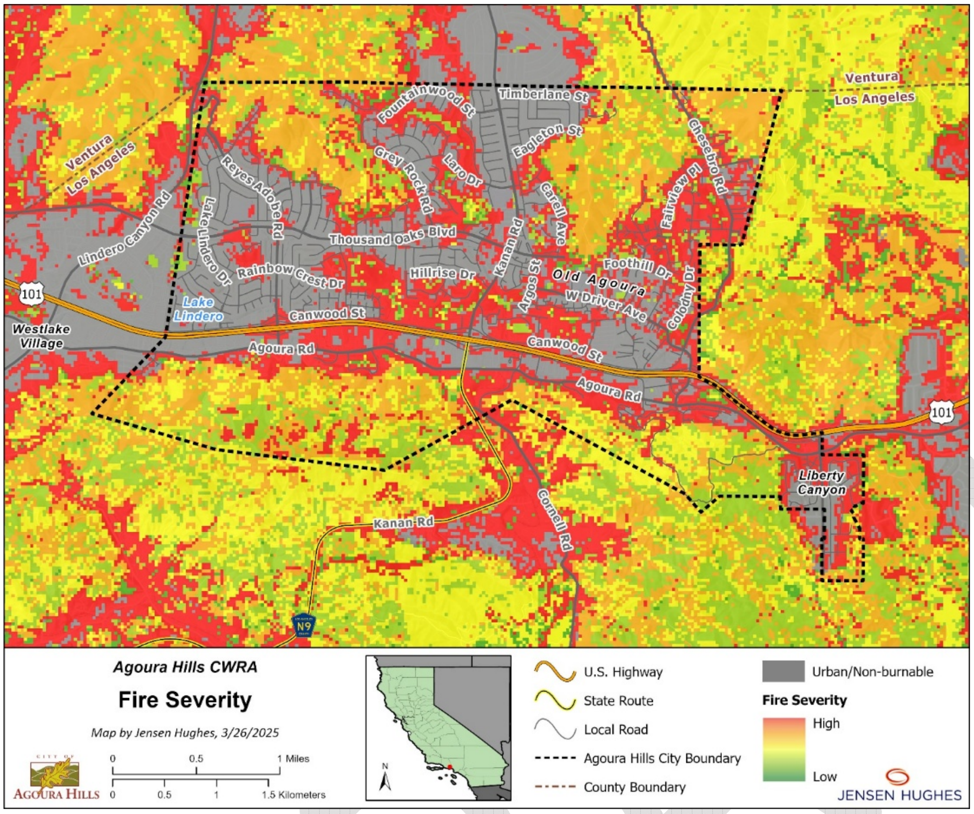
The fire hazard analysis conducted for the Planning Area represents a combination of four fire behavior and fire effects outputs merged into one representation to display the alignment of potential problematic areas on the landscape that would exhibit high severity fire. The four modeling outputs used to develop this analysis are:

- Flame length
- Spotting distance
- $PM_{2.5}$ emissions
- Fuel loading

Each of the above layers are stratified into five rating classes (Low to Very High) then merged into a single display to identify areas on the landscape where the highest potential for hazardous fire conditions exists. This analysis is designed to: (1) Allow land managers to identify locations in the landscape where the greatest fire hazard exists, and (2) Prioritize locations where management action may reduce these hazards.

The hazard analysis does not consider the nexus of hazard to values at risk but only evaluates the landscape features and fire behavior modeling outputs that influence fire hazard.

Figure 39 displays the outcome of the fire hazard analysis, while Table 5 summarizes the hazard ratings for the 97th percentile weather conditions for the City and for the surrounding landscapes. Locations shown in red have the highest potential for high severity/hazard and indicate areas where fuel treatments would provide beneficial effects to reduce the potential impacts to high value resources and assets, while improving firefighter and public safety and enhance fire suppression efficiencies.



This map illustrates the anticipated severity or intensity of a fire, in the event fire were to occur in and around the Planning Area. For the CWRA, fire severity consists of a combination of fire behavior characteristics – flame length, max spotting distance, fuel loading, and PM 2.5 emissions. This data layer has been based on fire behavior modelling given current fuel loads, topography and 97th percentile weather conditions, and is independent of any specific ignition source.

Figure 39. Fire hazard ("severity") across the Planning Area. Fire severity includes flame length, spotting distance, PM2.5 emissions, fuel loading

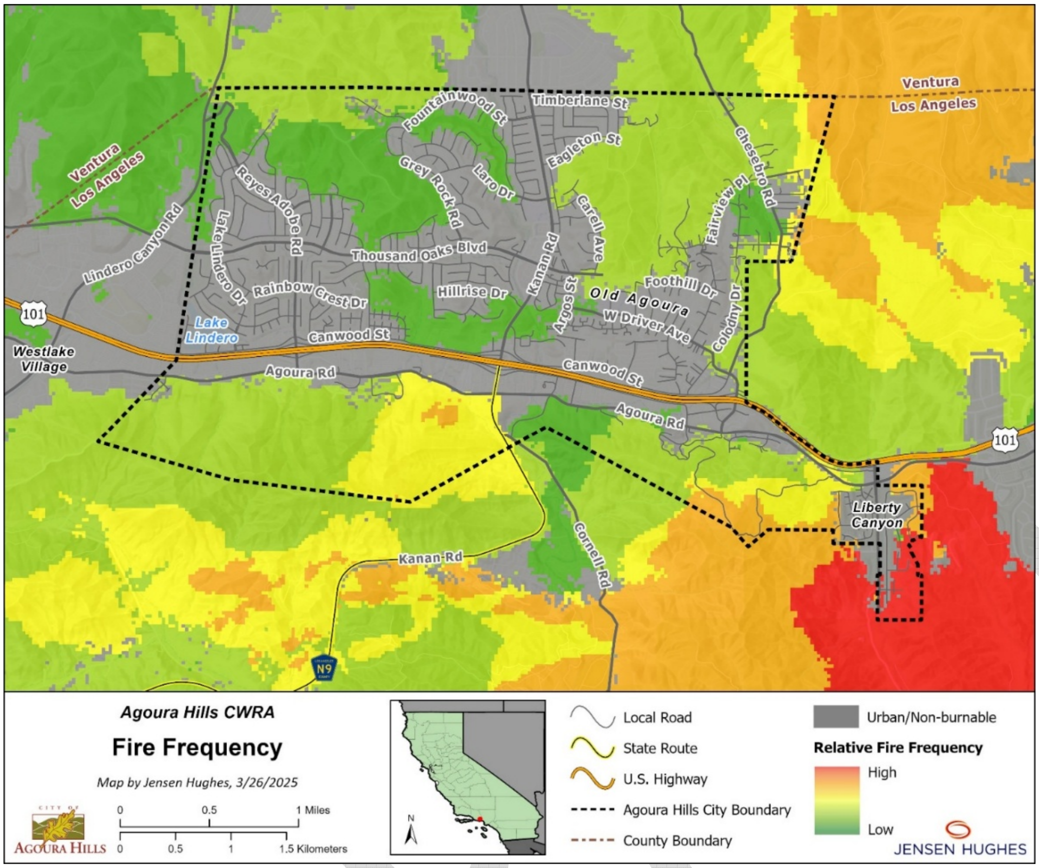
Table 5. Fire hazard severity by % acres in the City and surrounding area for 97th% weather conditions

Planning area	*Non-burnable*	*Very Low*	*Low*	*Moderate*	*High*	*Very High*
Entire Analytical Area	25%	2%	20%	20%	18%	14%
City of Agoura Hills	54%	1.6%	10%	9%	16%	10%

6.1.4 Simulated Fire Frequency

Simulated Fire Frequency (SFF) or "Fire Frequency" outputs were created using the Minimum Travel Time (MTT) module in FlamMap to understand where on the landscape wildfire has the greatest probability of spreading based on historic ignition locations within the Planning Area. SFF can also be used to identify where the pathways of fire spread are most rapid under a defined set of weather parameters, as well as help identify potential fuel reduction activities, that will assist in interrupting or altering the spread, direction, and/or intensity of fire entering the community.

To develop the SFF data layer, historic ignitions from 1992-2020 were used to simulate fire spread over a 12-hour active burn period assuming all ignitions in a single year are burning simultaneously. The resulting fire perimeters and flow paths are then over-laid to determine where fires occurred more frequently. Note: These simulations assume no suppression activities. See Figure 40.



This map illustrates the relative frequency wildfires have occurred in and around the Planning Area based on simulations of historical incidents over a 12-hour burn period. Fire history data was obtained from the USFS.

Figure 40. Simulated Fire Frequency (SFF) across the City and surrounding areas.

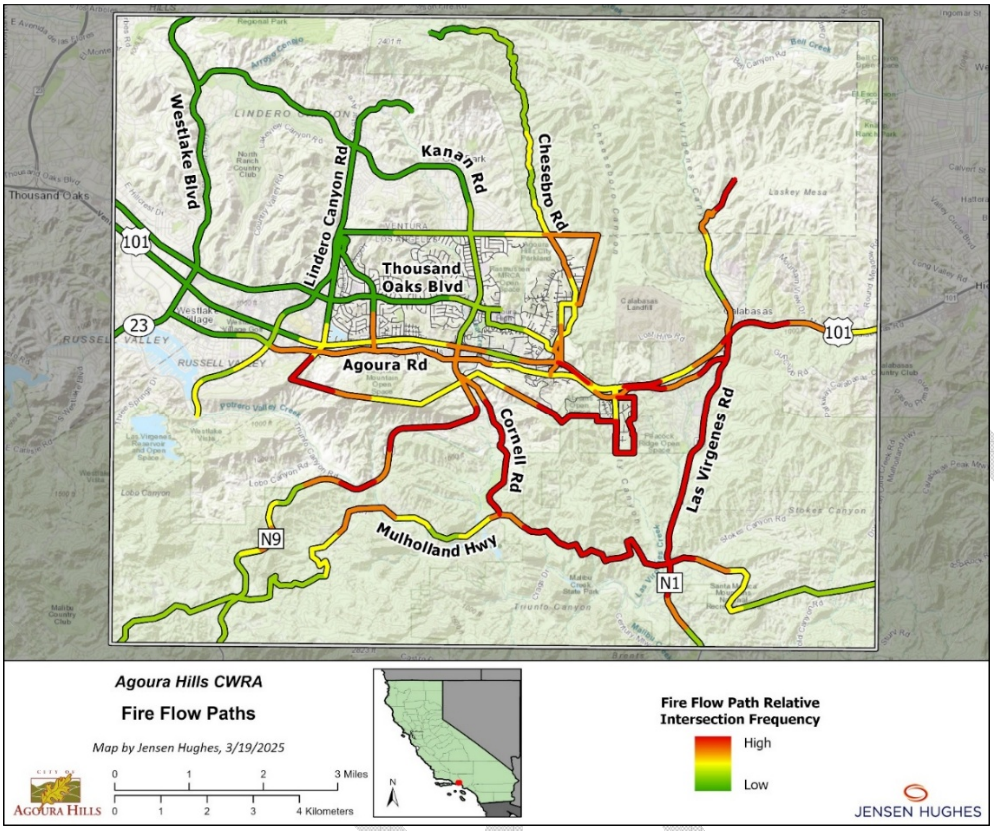
As seen in Figure 40, wildfire frequently flows through Las Virgenes/Chesebro/Palo Camado Canyons, Liberty Canyon, Kanan and Cornell Road south of Highway 101 and to a lesser degree Lindero Canyon. This corresponds with historic wildfire corridors observed by LA County Fire Department. These locations all feature north/south oriented canyons which funnel and accelerate winds during Santa Ana weather events.

6.1.5 Fire Flow Paths

Fire Flow Paths are an output derived from the Simulated Fire Frequency analysis. These fire behavior outputs examine the intersection and concentration of where fires originating from different parts of the landscape would converge or intersect on the landscape. As part of the overarching risk assessment, documented fire locations for the time 1992 through 2020 were simulated and allowed to burn unsuppressed for a 24-hour period under 97th percentile fuel moisture conditions and a 17mph wind from the northeast. Flow paths from these simulations were compiled in GIS to determine locations along the corporate boundary of Agoura Hills where fires are most likely to impact the community.

The analysis indicates that the east side of the community, particularly in Chesebro and Liberty Canyons are highly prone to wildfire, while the locations west of Kanan Road and the west side of the city show fewer intersects with the modeled fires. This same analysis was used to show the potential impacts on major travel routes in the city, with results indicating that locations along Chesebro Road, Agoura Road and Liberty Canyon

Road showing the greatest number of fire intersections. These major travel routes will be the principal evacuation routes for members of the community in the event of a significant wildfire. Figure 41 shows the flow path intersection with the road systems and the administrative boundary of the city.



This map illustrates major wildfire flow paths for simulated ignitions in Chesebro Canyon. A wildfire flow path is a major route in which a fire spreads due to wind, terrain, or other factors. Outputs were captured for each ignition location based on a Minimum Travel Time (MTT) analysis. This map demonstrates where wildfire flow paths are most likely to cross Highways or Major Roads.

Figure 41. Fire Flow Paths intersections of major roadways and Agoura Hills city boundary.

The fire flow path analysis focused on historic ignition locations and how fire spread impacts linear features like roads and boundary lines but additionally flow paths can also be used to see how a fire might spread into a community. To look at how a fire may impact certain locations within the City, three ignition points were selected north of Agoura Hills and allowed to burn unsuppressed for six hours under weather conditions like those that occurred in the 2025 Palisades Fire. The locations selected for these ignitions were, Chesebro Canyon, Palo Comado Canyon and Red Oak Elementary School near Lindero Canyon (Figure 42).

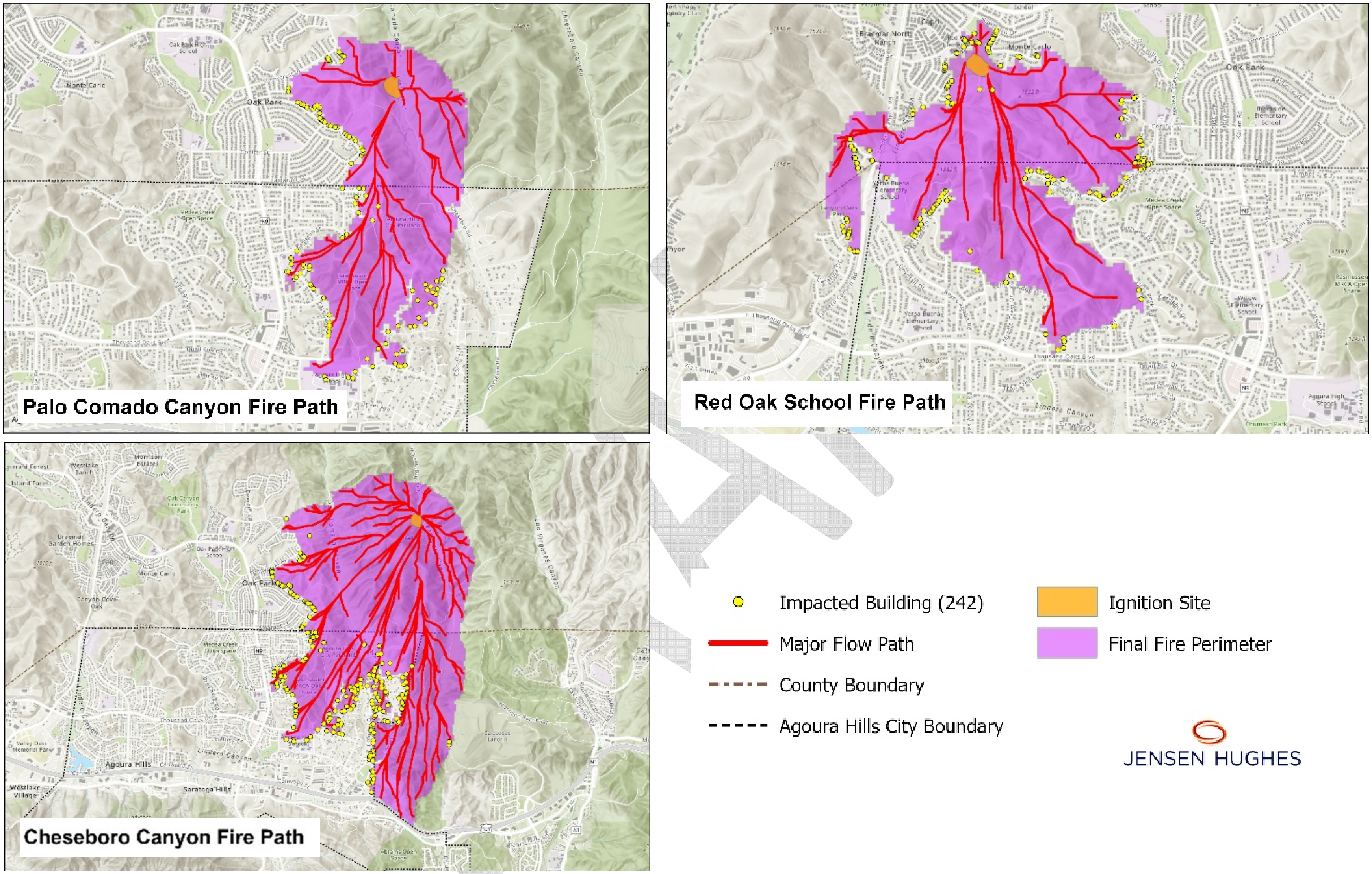


Figure 42. Simulated fire flow paths with ignition points in Palo Comado Canyon (top left), near Red Oak School (top right), and Chesebro Canyon (bottom).

Each simulation demonstrates how a fire burning during a Santa Ana weather event can spread into the core of the city and impact the built environment. Note: These simulations likely underestimate fire spread within the community as flammable landscape vegetation and structure-to-structure fire spread is beyond the capabilities of current fire models. The flow paths indicate where community impacts are most anticipated under these burning conditions given these defined ignition points and weather conditions.

6.1.6 Flame Length

Flame length is the observable feature of wildland fire that is directly related to a fire's intensity. Flame length can also be used as a proxy for fire hazard and is an easily relatable fire behavior characteristic to communicate fire hazard to the public. Flame length has also been correlated by fire scientists to the potential success of fire suppression operations. Generally, flame lengths less than 8 feet can be successfully attacked by ground-based firefighting resources (Table 6). The correlation between flame length and suppression success is also useful when designing fuel treatments to mitigate fire hazard, with fuel treatment prescriptions often targeting post-treatment conditions that produce flame lengths of 4-feet or less.

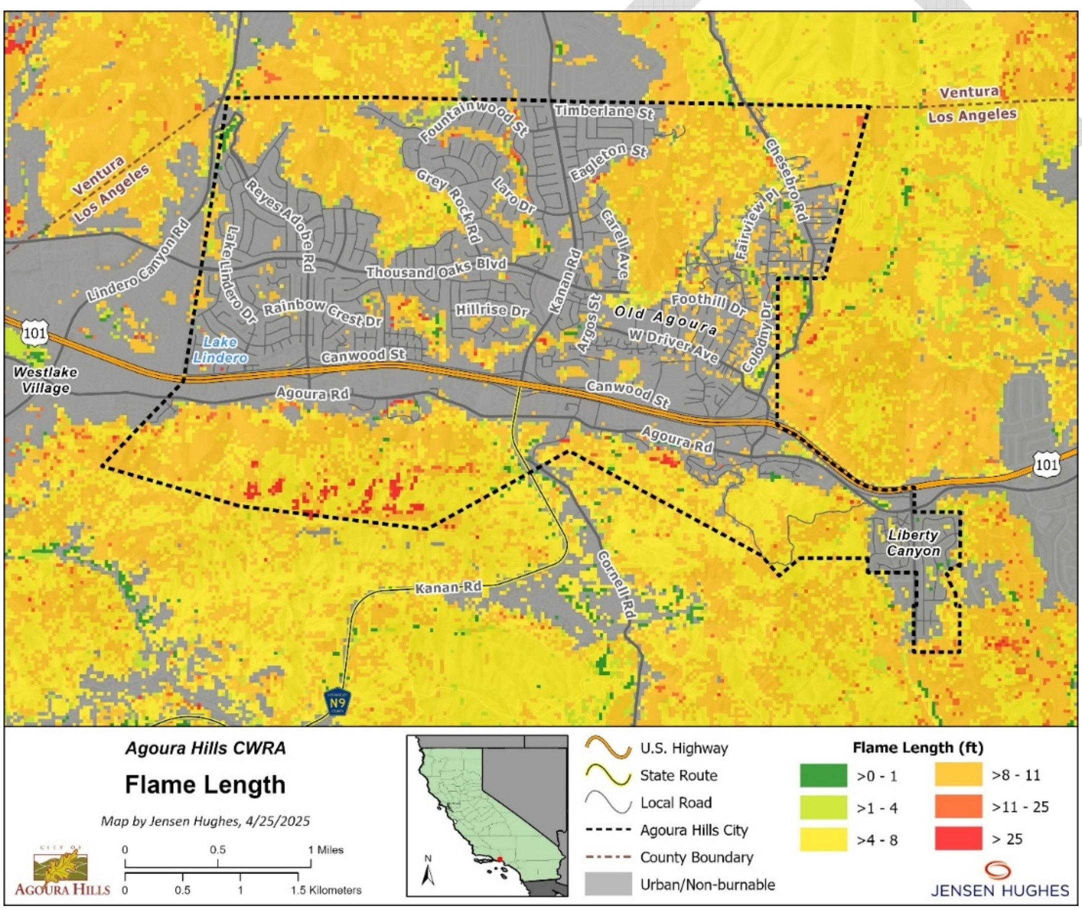
Table 6. Fire Behavior Characteristics and Suppression Capability

Flame Lengths (feet)	*Fireline Intensity (BTU/foot/Second)*	*Interpretation*
0-4	0-100	Fires can be generally attacked at the head or flanks by persons using hand tools. Handlines should hold the fire
4-8	100-500	Fires are too intense for direct attack at the head of the fire by persons with hand tools. Handlines cannot be relied upon to hold the fire. Equipment such as dozers, engines and retardant aircraft can be effective.
8-11	500-1,000	Fires may present serious control problems – torching out, crowning and spotting. Control efforts at the head of the fire will probably be ineffective.
11+	1,000+	Crowning, spotting and major fire runs are common. Control efforts at the head of the fire are ineffective.

Highly influenced by windspeed, flame length can vary greatly within the same fuel types under different wind conditions. For this risk assessment, winds associated with 97th percentile weather conditions (17 mph) were evaluated. A tabular summary of the distribution of flame lengths across the Planning Area is shown in Table 7, while Figure 43 displays the spatial distribution of the modeled flame lengths across the landscape.

Table 7. Modelled flame lengths in the City and surrounding landscape.

Flame Length	*97th percentile weather*	
	Agoura Hills	*Surrounding Landscape*
Non-burnable	54%	25%
0 – 4 feet	3%	5%
4 – 8 feet	16%	35%
8 – 11 feet	26%	29%
11+ feet	1.6%	5%



Flame Length is an estimate of the mean flame length (in feet) for all potential fires that may occur given vegetative conditions, fuel moistures, and peak winds. This metric is often used as a proxy for fire intensity. Model inputs are based on 97th and 90th percentile conditions obtained from 20 years of weather records from remote automated weather stations (RAWS) during the core fire season.

Figure 43. Modeled flame lengths across Agoura Hills.

6.1.7 Crown Fire

In addition to flame length, the type of predicted fire can provide a strong correlation to the potential for extreme fire behavior characteristics such as how fires spread (surface or crown). The type of predicted fire also governs the potential strategic and tactical operations alternatives by fire agencies during a wildfire. Examples could include the use of aircraft or the potential for indirect attack methods based on crown fire potential or fast-moving brush fires.

The following are fire types and how they can influence potential fire behavior:

+ **Surface Fire** – A surface fire burns in the surface fuel layer, which lies immediately above the ground fuels, but below the canopy. Surface fuels consist of needles, leaves, grass, dead and down branch wood, logs, shrubs, low brush, and short trees (<3 feet). Surface fire behavior varies widely depending on the nature of the surface fuel complex (vertical and horizontal arrangement). Surface fires are generally easier to contain than any type of crown fire.

+ **Crown Fire** – A crown fire burns in the elevated canopy fuels. Canopy fuels normally consumed in crown fires consist of the live and dead foliage, lichen, and very fine live and dead branch wood found in the forest canopy. Reducing the potential for crown fire is very important in reducing the risk of lofted fire brands that may threaten structures and the WUI. In addition, crown fires are defined as either "passive" or "active."
  - **A passive crown fire ("torching")** is defined as the ignition of a single or small group of trees, but does not spread continuously through the canopy of the trees.
  - **An active crown fire** is where the entire fuel complex is involved in flame, but the initiation and spread of the crown fire is dependent on the heat released from surface fuel.

For the City of Agoura Hills, crown fire initiation and propagation are not considered an issue of great concern. Crown fires under the limits of the current fire models are associated with timber understory and timber litter fuel types only, with these fuel types representing only 4.6 percent of the overall Planning Area. Where timber dominated fuel models exist on the landscape, the fuels are comprised of an oak dominated overstory, which is more resistant to crown fire initiation than conifer species.

The fuel structure in and around Agoura Hills will not allow for the development of an active crown fire.

Fire behavior modeling does indicate that passive crown fires have the potential to occur on 0.9% of the Planning Area and is mostly confined to extreme southeast portion of the analysis area within the Santa Monica Mountains.

While crown fire is not a landscape level issue for Agoura Hills, there are locations within the City where torching of individual trees used as landscaping near structures and along road systems can occur. This is particularly true where groups of pines, eucalyptus, cypress, or pepper trees occur.

A simple tool that property owners may use to evaluate if trees within their home ignitions zones have the potential to be ignited from a surface fire is the *"Crown Fire Initiation*" model, that uses the surface fire intensity, foliar moisture of the tree canopy, and the separation distance between the surface fuels and the lowest level of canopy of a tree to determine if torching is probable.

Fire behavior outputs from fire hazard assessment indicate that in urban environments adjacent to wildland fuels, flame lengths are generally 4-foot or less. By using a standard foliar moisture of 90-percent the simple crown fire initiation model indicates that there needs to be a canopy separation distance of 11 feet (red lines) to mitigate potential ignition of the tree canopy (Figure 44).

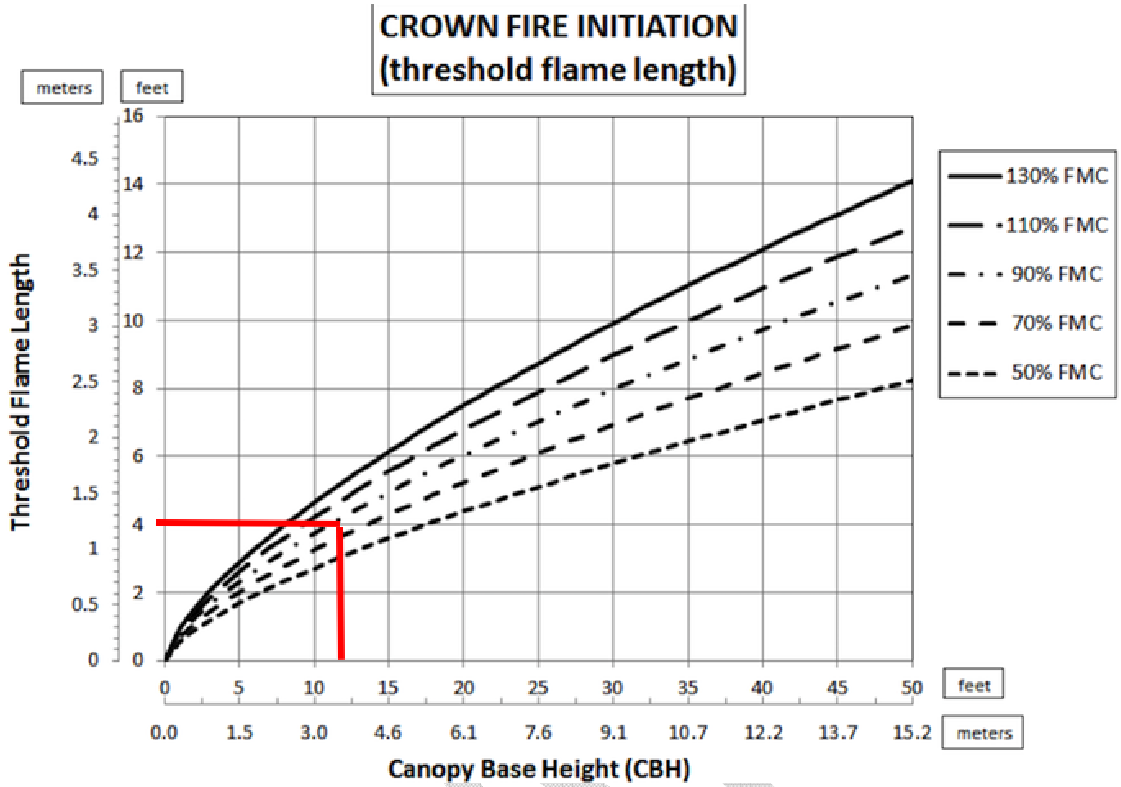


Figure 44. Crown Fire Initiation.

6.2 COMMUNITY WILDFIRE RISK ASSESSMENT

In its simplest form, community wildfire risk is the likelihood of a fire and its potential consequences on the community. It includes:

(1) The identification of potential fire hazards and associated characteristics such as location, intensity, frequency and probability of fire.

(2) The analysis of exposure and vulnerability of physical, social, health, environmental and economic assets or values in the community; and

(3) The evaluation of the effectiveness of coping capacities in response to and recovery from potential wildfire impacts.

This provides a basic framework to not only identify potential risks but, more importantly, determine various strategic actions for individuals, communities, agencies and other stakeholders to better prepare for, mitigate, respond to and recover from future wildfire threats.

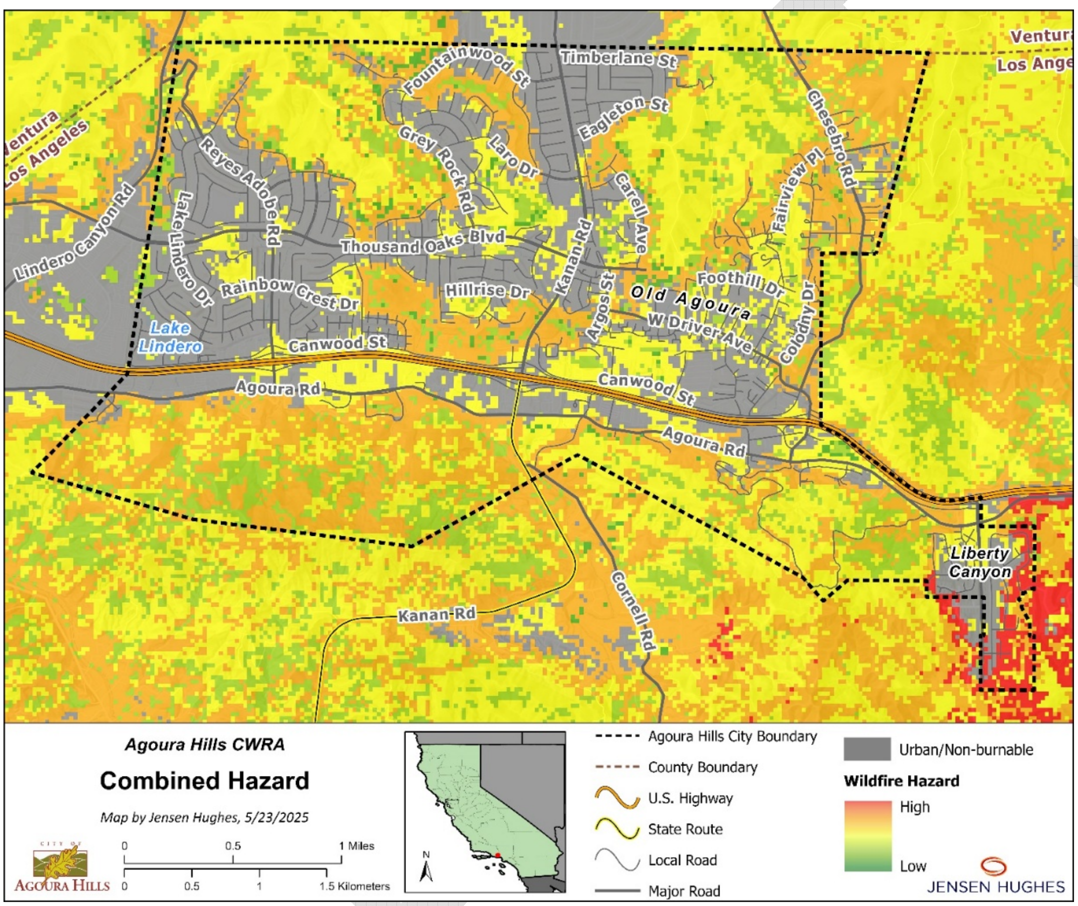
For the purposes of this CWRA, the community risk assessment is based on a combination of approaches – both quantitative and qualitative – to determine the nature and extent of wildfire risks across the Planning Area. In addition to the quantified risk assessment in Section 6.2.1, various physical and social vulnerability analyses –neighborhood- and parcel-level vulnerabilities, community-level vulnerabilities, vulnerable populations – were conducted to help further inform overall risk and targeted mitigation actions.

6.2.1 Quantitative Risk Assessment Results

To understand the potential wildfire risks across the Planning Area, a quantified risk assessment was performed as described in Section 5.4.4, where the governing risk equation is as follows:

$$(0.6\ Fire\ Severity) + (0.4\ Fire\ Frquency) \times (Exposure + Vulnerability)$$

As previously discussed, the hazard component of the risk equation is comprised of two parts: (1) Fire severity and (2) Fire Frequency. See Sections 6.1.3 and 6.1.4 for detailed discussions regarding these two individual components. Figure 45 shows the combined Fire Severity and Fire Frequency components of the risk equation and provides an indication of where higher intensity-higher frequency fires are more likely across the Planning Area. As seen in the figure, Liberty Canyon has the highest relative likelihood of problematic fires.



Combined fire hazard is the combination of fire frequency and fire severity, which provides a relative indication of where higher intensity fires are more likely to occur. The data in this layer is based on 97th percentile wind and weather conditions, and vegetative coverage.

Figure 45. Combined hazard (0.6 fire severity + 0.4 frequency) across the City.

As wildfire risk is not just a function of the fire itself, but also whether there are community values at risk, the general risk equation also includes a component for “assets” and “vulnerability.” For this CWRA, three (3) different measures of risk were evaluated to better understand different aspects of risk. These are as follows:

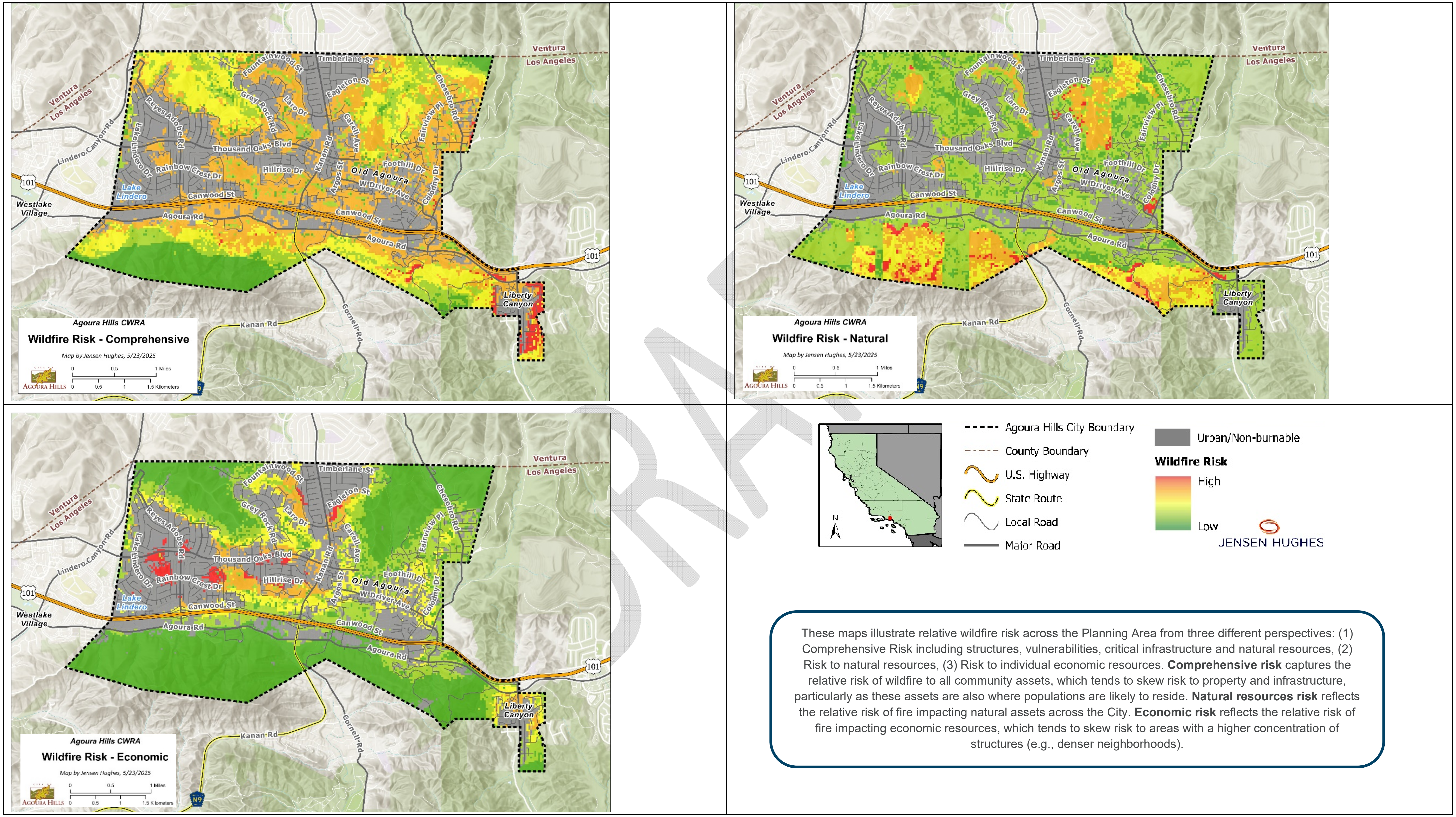
(1) Risk to All Assets (“Comprehensive Risk”)

(2) Risk to Natural Resources

(3) Risk to Economic Resources

As each of the three (3) measures evaluates risk from a different perspective, the types of assets or values, and the vulnerabilities included in each analysis are specific to that perspective. For example, risk to economic resources includes buildings and structures, as equally weighted assets, that provide the City with economic value. Comprehensive risk captures all assets, but is generally more weighted to reflect risk to people, property and infrastructure, particularly as these assets are also where populations are likely to reside.

Refer to Figure 46, for all three risk maps for the Planning Area. Risk is displayed from green to dark red, with dark red indicating areas of higher risk. “Non-burnable” regions (i.e., urban areas and water) are also indicated on the risk maps. Note: Current wildfire models do not have an urban fuel model. This does not mean urban areas cannot burn; it just means that fire science has yet to credibly define urban fuel burn characteristics.



These maps illustrate relative wildfire risk across the Planning Area from three different perspectives: (1) Comprehensive Risk including structures, vulnerabilities, critical infrastructure and natural resources, (2) Risk to natural resources, (3) Risk to individual economic resources. **Comprehensive risk** captures the relative risk of wildfire to all community assets, which tends to skew risk to property and infrastructure, particularly as these assets are also where populations are likely to reside. **Natural resources risk** reflects the relative risk of fire impacting natural assets across the City. **Economic risk** reflects the relative risk of fire impacting economic resources, which tends to skew risk to areas with a higher concentration of structures (e.g., denser neighborhoods).

Figure 46. Community Risk from three different perspectives across the City.

As seen in the comprehensive risk map in Figure 46, very high risk zones are concentrated in the region of Liberty Canyon. Additionally, much of the City is also considered to be at a moderate to high risk due to the density of assets and high potential fire severity across the city. Peacock Ridge ranges around moderate to high fire risk, as does Morrison Ranch and Fountainwood. Morrison Ranch, however, has more area under the high hazard classification and Fountainwood has more area under the urban or non-burnable classification. Chateau Creek, Hillrise, Annandale and Old Agoura all contain larger areas of both high fire hazard and urban or non-burnable zones. Lake Lindero is primarily of the non-burnable and urban classification.

IMPORTANT NOTE: *"Non-burnable" regions (i.e., urban areas, agriculture, water and barren lands) in the following risk maps are not truly "non-burnable" with exception of the water features. The "non-burnable" areas are only a limitation of the wildfire behavior models, which currently do not have fuel models for these land-type uses. This does not mean they cannot burn. It just means that fire science has yet to develop credible burn models to describe the fire characteristics (e.g., flame length, rate of spread) through these spaces. That said, these areas can be considered to have a lower likelihood of burning as a wildland fire. In some cases, for the urban areas, these are no longer wildland fuels, but urban fuels.*

6.2.2 Vulnerabilities

6.2.2.1 Observations of Neighborhood-Level Vulnerabilities

While earlier research focused on the home ignition zone as providing the primary sources of structure vulnerability (e.g., construction materials, home hardening and defensible space features immediately around the home), current research and technical guidance also highlights the significance of landscape level features and neighborhood designs on influencing structure vulnerability to wildfires. That is, a structure's vulnerability is determined by a complex interaction of vulnerabilities at different scales – building, parcel, neighborhood, and community.

During the site and based on some of the wildfire modelling, many neighborhoods across the City are vulnerable to one or combination of neighborhood- or community-level vulnerabilities, including:

(1) Limited access/egress routes

(2) Proximity to large, uninterrupted wildland vegetation or poorly maintained open spaces

(3) Proximity to north-south trending drainage pathways (e.g., Chesebro, Palo Comado, Lindero Canyons)

(4) Proximity to integrated greenbelts into the built environment (e.g., Medea Creek)

(5) Proximity to older, non-WUI code compliant neighborhoods

See Figure 47 for examples of neighborhood- and community-level vulnerabilities observed across the City.

In addition to some of these high hazard neighborhoods, even communities that are more remote from large areas of continuous vegetation are still vulnerable to wildfires due to embers that can be carried large distances from the fire front, landing and igniting receptive fuel beds on and immediately surrounding a structure, as seen during the 2018 Woosley. Fire receptive fuel beds can include ornamental landscaping, dead vegetation, litter, debris built up in rain gutters, and mulch beds. Enclaves, islands, and riparian corridors of wildland vegetation and ornamental vegetation are also found within neighborhoods and interspersed with structures throughout communities. These create significant opportunities for wildfires to ignite and destroy structures.

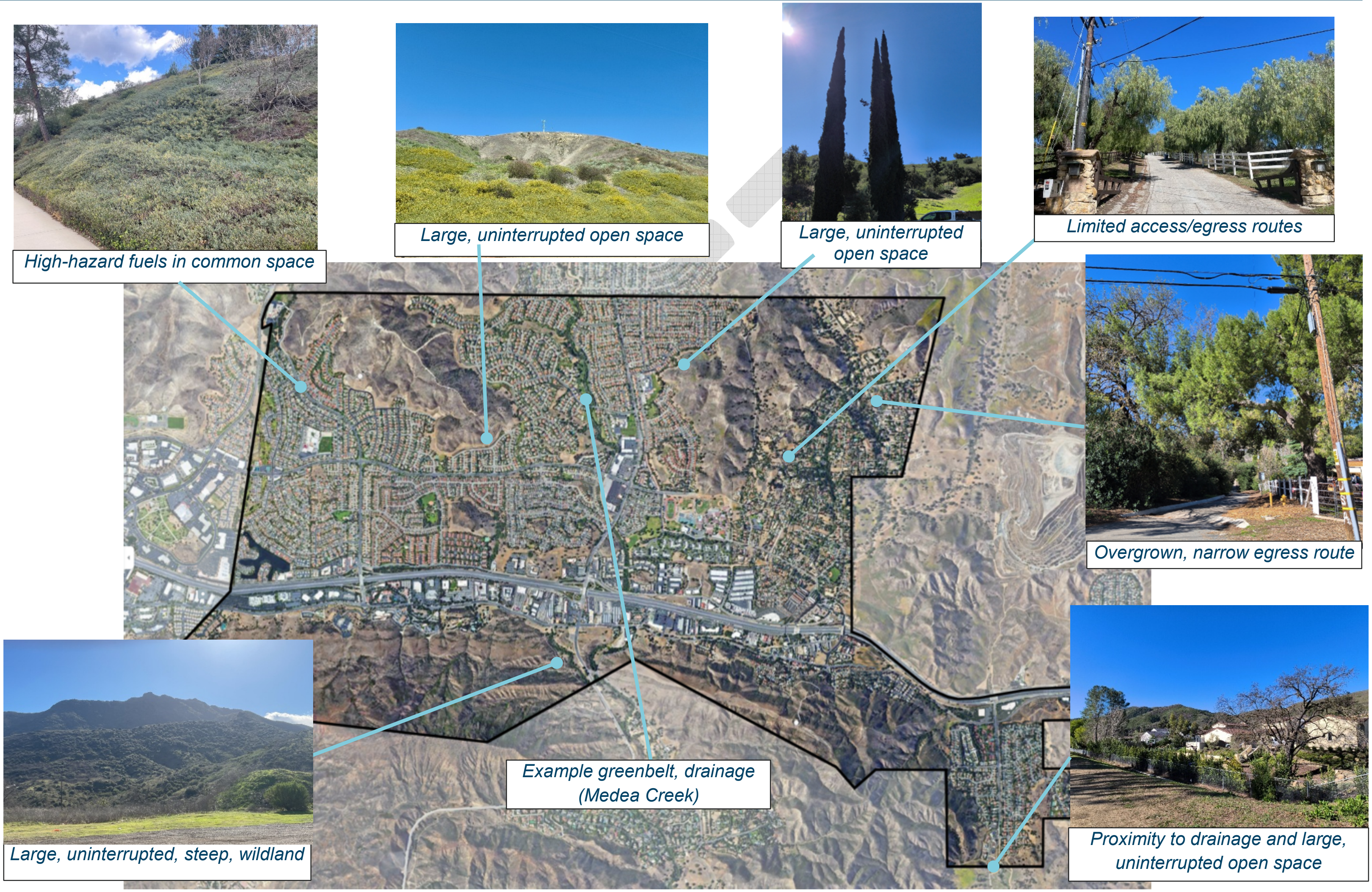


Figure 47. Observed neighborhood- and community-level vulnerabilities

6.2.2.2 Observations of Parcel-Level Vulnerabilities

In addition to community-scale vulnerabilities, several neighborhoods were observed to have parcel-level vulnerabilities throughout Agoura Hills. Homes and other structure types had varying degrees of vulnerability to wildfire, including:

- **Defensible space** is the space around a structure that, under normal conditions, creates a sufficient buffer to modify or arrest the spread of a wildfire to a structure. Flammable landscaping and other combustible items, such as firewood or debris piled near a structure, pose an ignition threat. Structures are more susceptible to ignition when exposed to significant radiant and convective heat from burning material. Several neighborhoods, particularly older communities (e.g. Old Agoura), across the City have significant overgrown vegetation (e.g. Figure 48), high hazard plants/trees or combustible man-made fuels (e.g., trash bins, storage sheds) proximate to the home. See

Figure 48: Overgrown vegetation in Zone 0 and 1 proximate to the exterior of the home. This introduces several paths for fire to spread and encroach the home.

- **Vents** – Vents in eaves, attics or crawl spaces are an easy entry point for embers to penetrate the interior of a structure, particularly vents located in the underside of soffits. Where embers enter attic spaces, fires in can go easily undetected from the outside, as attics typically do not have smoke detection or sprinkler protection. In past fires, structures have been lost when fire personnel have left the scene unaware that a fire has ignited in the attic. The majority of homes across the City have limited vent protection (e.g.,1/8" or 1/16" non-corrosive metal mesh or a listed ember resistant vent system) against embers during a wildfire.

Figure 49: Wooden fences and vegetation near and between homes can act as a "wick" that contributes to fire spread.

- **Wood Fences** – Wood fences act as a fuel source and also as a fire pathway carrying fire to a structure. Wooden fences connecting adjacent homes present a major threat. If ignited, these fences can act as "wicks" that contribute to fire spread from home to home (Figure 49). Wood and other combustible fences surrounding and connecting homes was observed in multiple neighborhoods across the City.
- **Siding** – Combustible siding can provide a pathway for flames to reach vulnerable portions of a structure, such as eaves or windows. Siding is especially vulnerable when combustible materials (e.g., vegetation, wooden decks and fences, stacked firewood) are near a structure's siding and can provide a heat source to

ignite siding. Most homes in Agoura Hills appeared to have stucco siding or other ignition-resistant material. However, in some older neighborhoods (e.g., Lake Lindero area) combustible siding is still present.

+ **Roofing** – Roof construction and maintenance is a key factor influencing structure loss in wildfire. Vulnerability is not just related to roofing material, but also design, construction details, condition, and whether the roof is clear of combustible material (e.g., pine needles and other debris). The majority of the homes in Agoura have Class A roof systems. However, some homes have complex roof designs (e.g. Figure 50) that create multiple ledges, valleys and other features where vegetative debris and embers have a higher likelihood of collecting, leading to ignition along gaps at the various roof joints.

Figure 50: Example of a complex roof, which introduces several locations where flammable debris and embers can gather.

+ **Garages** – Gaps at the top, bottom and edges of garage doors allow embers to enter a home. Garages often contain combustible materials or flammable liquids that a highly susceptible to ignition and challenging fires. Garages typically also have vents along the façade to provide venting for a variety of purposes (e.g., gas furnace or hot water heaters, natural ventilation, clothing dryer). These vents can provide easy entry points for embers, as most garage vents are unscreened or have large openings (e.g., greater than 1/8" openings). Similar to other vents, protection is garage vents is likely deficient across the City.

+ **Nooks and Crannies** – Grooves, inside corners, and roof valleys are areas where flammable debris (e.g., leaf litter, bird nests) collect over time. Embers can land on this debris, leading to ignition. These areas can also accumulate a large number of embers, which increases the likelihood of ignition of combustible concealed spaces just behind the exterior façade, roof covering or similar outer building material. Many homes in Agoura Hills have tiled roofs. Tiled roofs tend to have gaps at the roof edge underneath the tiles, which if left unprotected, can allow flammable debris to collect.

+ **Windows** – Single pane windows can be a major vulnerability during a major fire. Single pane windows can oftentimes break due to impact by airborne materials or crack and fallout due to thermal exposure to intense heat. This can create large entry points into the structure allowing flames, hot gases and embers to penetrate the home, igniting interior combustible materials. The majority of homes in Agoura have double-paned windows.

Wildfire will continue to threaten Agoura Hills. However, residents and homeowners can and should take proactive measures to mitigate this threat. Current land use planning, zoning regulations, and codes adopted by the State of California and local fire departments provide the regulatory basis for preparedness, but these alone will not protect life safety and other community values.

6.2.2.3 Community-Level Vulnerabilities

Community-level vulnerability refers to the resilience of various built environment characteristics to wildfire threats over both the short and long-term. While there are numerous values in the natural, built and human environments that may be exposed to the same wildfire, how much loss or damage is experienced by those values can vary dramatically depending on the inherent physical resiliency of those assets to wildfire – individually or as a collective. Some examples of physical vulnerability include age of construction, code compliant structural hardening and defensible space, limited access/egress routes, and structure separation distances. Community-level vulnerabilities may also include coping capacities of the community (e.g., the availability of resources to effectively respond to or recover from a wildfire threat). Some coping capacity proxies may include fire service response times, firefighting water supplies, emergency power supplies, communication dead zones, etc. Note: As vulnerability assessments are often limited by the availability, quality and scale of the datasets, the corresponding analyses has been governed by these limitations.

For the CWRA, fire service response time coverage has been evaluated as a proxy for wildfire coping capacities across the City. See Figure 51.

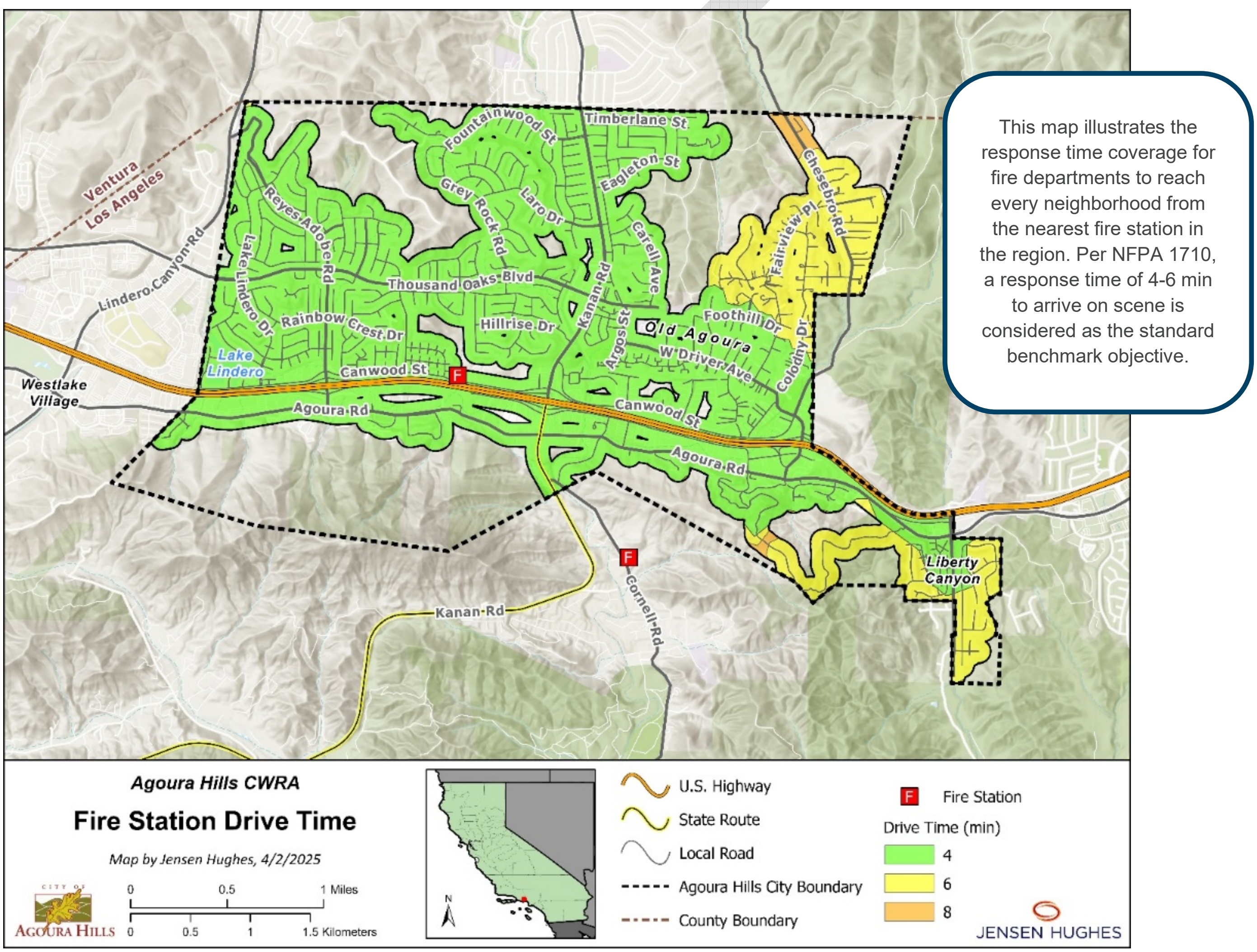


Figure 51: Fire Department response time coverage across the City.

As seen in Figure 51, the majority of the city has a very good fire department response time with expected arrival times of less than 4 min to the nearest fire station. The northern portion of Old Agoura and the southern portion of Liberty canyon have slightly higher response times, primarily between 4 and 6 min, reaching between 6 and 8 minutes in few places.

6.2.2.4 Social Vulnerabilities

While many people might be exposed to the same wildfire, differences in demographic and socioeconomic characteristics can result in very different short and long-term impacts. Vulnerable or functional needs populations may have limited capacities to prepare for, respond to, and recover from a wildfire incident. These individuals are also less likely to be involved in wildfire mitigation activities (Ojerio, 2008). As a proxy for individual-level vulnerability data, key demographic and population statistics for Agoura Hills from the 2020 U.S. Census and 2023 American Community Survey (U.S. Census Bureau, http://data.census.gov) were assessed to identify potential vulnerable populations:

- **Population**: 19,429
- **Housing Units:** 7,585
- **Average population density**: ~2,500 people/square mile
- **Racial makeup:** 68.7% White (non-Hispanic), 15.3% Hispanic or Latino, 0.8% Black or African American, 7.9% Asian, 0.1% American Indian or Alaska Native, 0.1% Native Hawaiian/Pacific Islander, 10.2% Other/Two or More Races
- **Language other than English spoken at home:** 20.1% of the population
- **Disabilities:** 4.9% of the population
- **Vulnerable age groups:** 3.4% of the population under 5 years, 16.0% 65 years and older
- **Poverty**: 5.7% of the population live below the federal poverty level

Vulnerable or functional needs populations include those who are physically and/or mentally disabled (e.g., blind, cognitive disorders, limited mobility), limited or non-English speaking, culturally isolated, medically or chemically dependent, homeless, Deaf or hard-of-hearing, of vulnerable ages (e.g., elderly or young), or lack digital services.

These characteristics may influence people's ability to plan and prepare in advance of a wildfire, respond quickly and independently during a wildfire, and recover following a wildfire. For example, older individuals are likely to have difficulty undertaking defensible space maintenance around their properties and may also need assistance evacuating. Those with limited English proficiency may need emergency communications, as well as information about wildfire preparedness, shared in a language other than English. Limited access to financial resources may hinder the ability of lower-income populations to invest in emergency preparedness and mitigation measures, as well as to recover from losses. Other characteristics, and combinations of different characteristics, impact social vulnerability in different ways. Planning for vulnerable or functional needs populations is critical to providing a holistic wildfire mitigation preparedness plan that works for the entire community.

Understanding where vulnerable populations are geographically is important for targeting outreach and interventions to reduce impacts. A small sample of the many attributes that contribute to social vulnerability was explored as part of the CWRA. The number of households with at least one member aged 65 or over was found to have the greatest spatial variation (Figure 52). These individuals are more likely to have greater challenges with all aspects of wildfire preparedness and areas with a greater proportion of these vulnerable populations may need additional resources. This is simply a starting point for understanding how social vulnerability varies across Agoura Hills and should be combined with other, more locally specific, information.

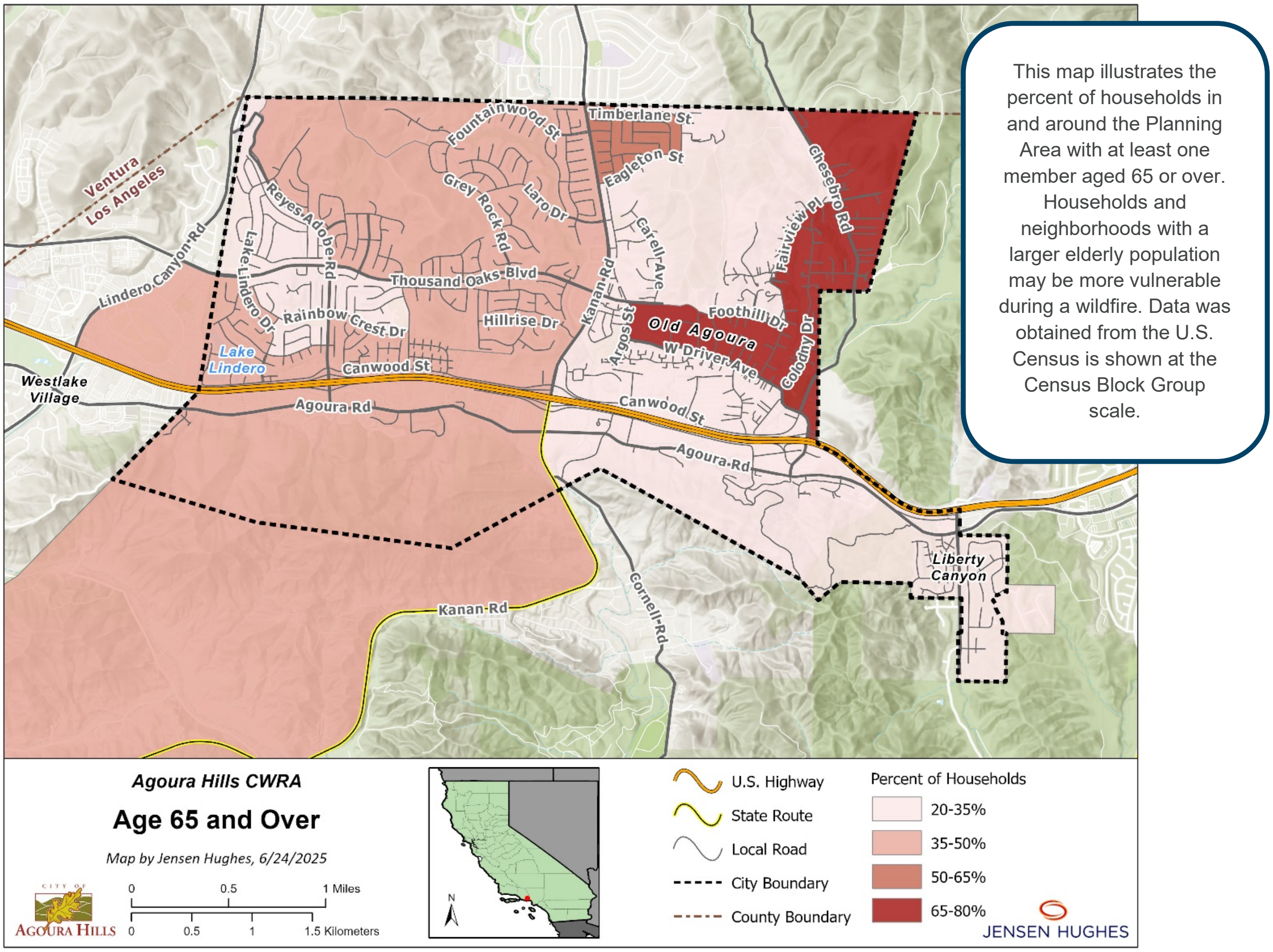


Figure 52: Percent of households in each census block group with at least one member aged 65 or over

As shown in Figure 52, Old Agoura and the northeastern parts of Agoura Hills have the highest proportion of older residents, with up to 80% of households having at least one member aged 65 or over. The parts of Fountainwood east of Kanan Rd also have, on average, over 50% of households with at least one older member.

6.2.3 Community Input on Hazards and Risks

As part of the CWRA process, three forms of community outreach were used to understand the experiences, perceptions and concerns of local residents, agencies, organizations, and other interested parties to past and future wildland fire threats in and around Agoura Hills. The forms of community outreach included:

+ Public survey
+ Public workshops
+ Digital polling

A summary of the feedback is provided in the following sections. See Appendix C and Appendix E for additional details.

6.2.3.1 Feedback from the General Public

As described in Section 3.2.5.1, a public survey was administered to gather feedback on wildfire-related concerns, past experiences and recommendations for mitigations to future wildfire threats. Approximately 371 households responded to the survey.

The following are common themes that arose from the survey:

- **Major wildfire concerns:**
  - Insurance availability and cost
  - Home hardening – cost and enforcement
  - Vegetation management, including HOAs – cost and enforcement
  - Evacuation, including power outages and signal traffic outages
- **Suggested opportunities and strategies to increase public education and awareness:**
  - Community workshops with greater advertising and webinar formats
  - Providing information on proper materials and contractors for home hardening
  - Door-to-door campaigns and tabling at public events

6.2.3.2 Public workshops

As described in Section 3.2.5.2, two (2) public workshops were held during the CWRA development process (May and July 2025). Attendees represented various agencies, organizations, interested parties and general public across the City.

NOTE: This section will be updated after the second workshop in July.

The following are common themes that arose from workshops:

- **Major wildfire concerns:**
  - Evacuation routes & emergency communication
  - Community education on mitigation efforts & egress routes
  - Costs of home hardening
- **Most important assets within the City:**
  - Human life & community cooperation
  - Property
  - City parks & natural environment and animals

6.2.3.3 Digital Polling – Broader Community Stakeholders

As described Section 3.2.4, a broader stakeholder digital poll was administered from March 3 – 31, 2025. Approximately 13 representatives of fire agencies, fire safe councils, land managers, utilities and other community groups responded to the digital poll.

The following are common themes that arose from the digital polling:

+ **Major wildfire concerns:**
  - Availability of funding to pursue WUI-related projects
  - Inter-agency coordination during a wildfire
  - Feasibility and enforcement of defensible space measures
  - Egress and evacuation challenges (e.g., notifications, evacuation planning, vulnerable populations)
+ **Suggested opportunities and strategies to increase wildfire resiliency:**
  - Provide more guidance information for evacuations
  - Increase community education initiatives

7.0 Recommendations

This chapter provides a set of preliminary recommendations for the City of Agoura Hills as a result of the CWRA. These recommendations are intended to provide the City and associated partners a variety of mitigation actions to help inform potential future policies, programs, analysis and/or projects. The mitigations are organized into 10 thematic categories (in no particular priority order):

A. Codes and Enforcement
B. Fuels Mitigation
C. Property Protection (Defensible Space)
D. Property Protection (Home Hardening)
E. Wildfire Resiliency of Critical Infrastructure
F. Public Notification and Communication
G. Evacuation Planning and Preparedness
H. Public Education and Awareness
I. Community and Regional Partnerships, Collaboration and Coordination
J. Emergency Response

This set of recommendations will be expanded as part of the CWPP development process.

Table 8. Recommended Actions.

Objective	***Number***	***Action***
A. Codes and Enforcement Keep local codes, standards, and guidance documents up to date with the latest developments in wildfire resiliency best practice and research	**CW-1**	**Develop a public education outreach plan to increase awareness on maintaining defensible space** in accordance with Los Angeles County Fire Code Section 325.2.1, California Public Resources Code 4291, and local ordinances. Education should include information on Zone 0 or "ember-resistant zone" (0-5 feet from a structure) in accordance with AB-3074 for both new and existing conditions. This includes providing updates on upcoming and/or new code changes.
B. Fuels Mitigation Manage landscape vegetation to promote the return of fire resilient species and lower vegetation densities.	**CW-2**	**Undertake a study to identify and provide recommendations for mitigating common ignition sources across the City.** This will include common sources of ignition in both the public and private sectors and developing strategies for reducing the number and frequency of ignitions.

Objective	Number	Action
		Recommendations and collaboration efforts should be tailored for the appropriate audience (e.g., electrical utilities, homeowners, private industry)
	CW-3	**Coordinate with MRCA and NPS on mechanical fuel treatments adjacent to the city**, particularly in Palo Comado, Chesebro Canyon, and the 101 Freeway Corridor.
	CW-4	**Seek funding to develop a community chipper program** that focuses on neighborhoods east of Kanan Road and south of Hwy-101.
	CW-5	**Work with LACo Fire, NPS and MRCA to identify opportunities to implement grazing of herbaceous fuels**, particularly in Palo Comodo/Chesebro and Liberty Canyons. Grazing was a historic land use practice in the Agoura Hills vicinity.
	CW-6	**Work with LACo Fire and NPS to identify and maintain strategic fuel breaks** that were developed during the Woolsey Fire. Consider using the fire suppression repair map to identify these locations.
	CW-7	**Work with LACo Fire, NPS, MCRA and State Parks to identify opportunities to use prescribed fire to treat non-native invasive species**. This provides a resource benefit while also breaking up fuel continuity adjacent to the city.
	CW-8	**Evaluate city-managed open spaces and parks to ensure that vegetation is maintained** in a state of low fire flammability. Focus on the elimination of down woody surface fuels. Priority location – Medea Creek Park.
C. Property Protection (Defensible Space)	**CW-9**	**Seek grant funding to support homeowners wishing to remove hazardous trees species** (cypress, pines, eucalyptus) within their defensible space zones.

Objective	*Number*	*Action*
Improve fuel treatment strategies for defensible space around structures	**CW-10**	Work with LACo Fire to **ensure that weed abatement and defensible space inspections are conducted and enforced**.
	CW-11	**Leverage the work of local FSCs to inspect and educate properties owners on defensible space requirements**. Focus on the development of the ember-resistant zone at structures.
	CW-12	**Develop and post signage along primary travel routes to higher risk neighborhoods identifying compliance dates for fire hazard reduction work**. Provide contact information for residents who wish to request support to better understand defensible space requirements and maintenance.
	CW-13	**Develop a list of city-vetted vendors who can provide services for properties owners requiring assistance** with developing and maintaining their defensible space.
	CW-14	Leverage existing databases (e.g., Agoura Hills Fire Safe Council database) to **create a new spatial database of HOAs/ Firewise USA neighborhoods** that have responsibility **for the maintenance of defensible space**. **Map treated areas**.
	CW-15	Provide community workshops, informational videos, demonstration landscapes and other educational methods to increase the general public's understanding of **best practices around fire-resistant and drought-resistant plant species, and best practices for landscaping and maintenance.**
	CW-16	**Investigate opportunities where HOAs can expand ongoing defensible space actions** beyond 200' onto lands managed by the City or Los Angeles County. Evaluate using LACo Fire hand crews for labor to control costs.

Objective	***Number***	***Action***
D. Property Protection (Home Hardening) Improve Hardening of Existing Building Stock	**CW-17**	**Provide ongoing education and outreach for residents**. Information should include defensible space and home hardening standards to assist homeowners with implementing firesafe practices as well as meeting or exceeding requirements of State, County and Local codes and ordinances. A mix of web-based and in-person formats should be utilized in order to reach all critical audiences.
	CW-18	**Explore funding opportunities to aid property owners in retrofitting existing structures** to current WUI building construction standards. Prioritize providing financial resources, physical assistance, and other support to vulnerable populations (e.g., elderly, fixed-income, low-income). Develop clear program guidelines, criteria, and management strategies. There should be a focus on clarifying to residents what level of work/upgrades triggers certain requirements.
	CW-19	Consider creating a **website that directs homeowners to various home hardening resources**: • Home hardening products (e.g., CALFIRE WUI products) • Suppliers and hardware stores • Design professionals and contractors • Shared resource programs, such as a tool lending library. • Existing incentives • Insurance carrier discounts
	CW-20	**Work with the insurance industry** and California Insurance Commissioner's office to recognize **risk reduction efforts at landscape, parcel and neighborhood-scales** in insurance coverage, premiums, and deductibles. Coordinate and collaborate with county, regional, and local stakeholders, subject matter experts, and academics to systematically

Objective	***Number***	***Action***
		identify and quantify the risk reduction measures at various scales to help support insurance needs.
	CW-21	Consider developing (and updating over time) a **parcel- and neighborhood-level WUI risk assessments.**
E. Wildfire Resiliency of Critical Infrastructure	**CW-22**	Work to develop agreements with agencies, HOAs, and private landowners to establish and maintain **fuel treatments** along **major routes** and **roadways**, with a primary focus on access/egress-constrained communities and communities with vulnerable populations.
	CW-23	**Conduct a study to evaluate the wildfire resiliency of critical infrastructure and facilities** across the City (e.g., water infrastructure, communications systems). Prioritize and implement resiliency improvements. Coordinate and collaborate with relevant fire, law enforcement, government, private sector, and other subject matter experts to ensure programs, policies and systems are evaluated, designed, and maintained for quality, fire resistance, durability, functionality, efficiency, and sustainability.
F. Public Notification and Communication	**CW-24**	**Work with providers to coordinate efforts on analyzing, monitoring, and maintaining enhancements and redundancies to current emergency communication systems** such as generator backups, increased cellular coverage via traditional cell towers, repeaters, and other technologies to improve communications.

Objective	***Number***	***Action***
	CW-25	Work with emergency responders and other government agencies in and around the City to **conduct a review and alignment of current public emergency communication systems and messaging policies**, protocols, and procedures. This would include evaluation of the range of target audiences (e.g., residents, visitors, limited English proficiency, elderly, secondary homeowners), with the intent of providing more reliable, timely, informative, and consistent information during/after a major wildfire incident. This may also include the need for training/drills and evaluation/adoption of newly available technologies.
G. Evacuation Planning and Preparedness	**CW-26**	**Post on the city website and advertise at local events the LACo Fire-identified evacuation zones** in order to increase public awareness. Consider posting evacuation zone identification signage along primary travel routes.
	CW-27	Develop a strategy for assessing **wildfire evacuation vulnerability** which may include quantifying evacuation capacities, surveying residents and stakeholders, and identifying and prioritizing improvements to ensure life safety of the public and emergency responders in the event of a major wildfire in or around the City.
	CW-28	**Identify specific areas and neighborhoods where secondary means of egress** are needed to increase evacuation capacity and access for first responders in a wildfire. Where possible, work towards developing and maintaining secondary egress routes for constrained neighborhoods. Identify other strategies as appropriate (e.g., policies to open locked gates).
H. Public Education and Awareness	**CW-29**	Establish **improved communications with Homeowners Associations** concerning wildfire mitigation actions – home

Objective	Number	Action
Educate the public on how to mitigate wildfire hazards and risks, as well as appropriately preparing and responding to wildfires. A challenge for all communities is how to generate interest and maximize awareness of the wildfire threat and encourage participation in preparing for a wildfire at an individual and community level. Public education is critical to community preparedness and citizens need to know where to obtain accurate information before, during and after an event occurs.		hardening, defensible space, and maintenance of any common areas within their jurisdiction.
	CW-30	**Ensure public education and communication materials on wildfire preparedness, planning and response are generally accessible.** This may include translation into different languages, common-language descriptions, ADA compliance, and conversion into different formats.
I. Community and Regional Partnerships, Collaboration and Coordination	**CW-31**	Encourage, promote, and assist **grassroots, community wildfire mitigation and preparedness organizations** such as Fire Safe Councils, Firewise Communities, radio groups, non-profits, etc. Support may include marketing, outreach, recruitment efforts, GIS support, and others. Help various organizations provide consistent communications, tools, and outreach.
J. Emergency Response	**CW-32**	**Consider the development and implementation of a parking restriction ordinance for Red-Flag warning days** to ensure that emergency equipment can access smaller road systems. Focus on neighborhoods south of I-101 as a priority location.
	CW-33	**Develop standardized signage that identifies residences with static water sources** that can be used during suppression operations should the pressurized system fail. Provide signage free to residents willing to install the identification.

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Appendices Table of Contents

Appendix A Glossary of Terms

The following provides terms or words found in or relating to this plan (additional terms are available at http://www.nwcg.gov/glossary):

+ ***1-Hour Timelag Fuels (a.k.a., one-hour fuels):*** Fuels consisting of dead herbaceous plants and roundwood less than about ¼ inch (6.4 mm) in diameter. Also included is the uppermost layer of needles or leaves on the forest floor.
+ ***10-Hour Timelag Fuels (a.k.a. ten-hour fuels):*** Dead fuels consisting of roundwood ¼ to l inch (0.6 to 2.5 cm) in diameter and, very roughly, the layer of litter extending from immediately below the surface to ¾ inch (1.9 cm) below the surface.
+ ***100-Hour Timelag Fuels (a.k.a., hundred-hour fuels):*** Dead fuels consisting of roundwood in the size range of 1 to 3 inches (2.5 to 7.6 cm) in diameter and very roughly the layer of litter extending from approximately ¾ of an inch (1.9 cm) to 4 inches (10 cm) below the surface.
+ ***1,000-Hour Timelag Fuels (a.k.a., thousand-hour fuels):*** Dead fuels consisting of roundwood 3 to 8 inches in diameter and the layer of the forest floor more than 4 inches below the surface.
+ ***Active Crown Fire:*** A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other.
+ ***Aspect:*** Direction a slope faces.
+ ***Canopy Spacing:*** The distance from the edge of one tree canopy to another. Crown spacing varies from open (with 10 feet or more of space between tree canopies) to closed (where trees may be growing in very close proximity with little space between them).
+ ***Crown Fire:*** A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.
+ ***Dead Fuels***: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.
+ ***Direct Attack:*** A method of fire suppression where actions are taken directly along the fire's edge. In a direct attack, burning fuel is treated directly, by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.
+ ***Fire Apparatus Access Roads -*** The means for emergency apparatus to access a facility or structure for emergency purposes. Roadways must extend to within 150 feet of all portions of the exterior of the first floor of any structure and must meet specified criteria for width, pavement characteristics, roadway gradient, turning radius, etc. Fire apparatus access roads are also referred to as fire lanes.
+ ***Fire Behavior:*** The manner in which a fire reacts to the influences of fuel, weather, and topography.
+ ***Fire Frequency:*** Temporal fire occurrence described as a number of fires occurring within a defined area within a given time period.
+ ***Fire Intensity:*** A general term relating to the heat energy released by a fire.

+ ***Fire Lane Identification -*** Signs or curb markings that allow fire apparatus access roads to be readily recognized so that they will remain unobstructed and available for emergency use at all times.
+ ***Fire Potential:*** The likelihood of a wildland fire event measured in terms of anticipated occurrence of fire(s) and management's capability to respond. Fire potential is influenced by a sum of factors that includes fuel conditions (fuel dryness and/or other inputs), ignition triggers, significant weather triggers, and resource capability.
+ ***Fire Regime:*** The characterization of fire's role in a particular ecosystem, usually characteristic of particular vegetation and climatic regime, and typically a combination of fire return interval and fire intensity (i.e., high frequency, low intensity/low frequency, high intensity).
+ ***Fire Return Interval:*** The length of time between fires on a particular area of land
+ ***Fire Weather:*** Weather conditions that influence fire ignition, behavior, and suppression.
+ ***Flame Length:*** The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.
+ ***Flaming Front:*** The zone of a moving fire where combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.
+ ***Fuel:*** Any combustible material, which includes but is not limited to living or dead vegetation, human-built structures, and chemicals that will ignite and burn.
+ ***Fuelbed:*** An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.
+ ***Fuel Loading:*** The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.
+ ***Fuel Model:*** Mathematical descriptions of fuel properties (e.g., fuel load and fuel depth) that are used as inputs to calculations of fire danger indices and fire behavior potential***.***
+ ***Fuel Moisture Content:*** The quantity of moisture in fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.
+ ***Fuel Type:*** An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.
+ ***Gates and Barriers*** - Devices that restrict pedestrian and vehicle ingress and egress to and from a facility.
+ ***Gate and Barrier Locks*** - Devices that are installed on gates and barriers to secure a property or facility.
+ ***Goals:*** A goal is a broad statement of what you wish to accomplish, an indication of program intentions.
+ ***Ground Fire:*** Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.
+ ***Hose Pull*** - The effective distance (150 feet is standard) that firefighters can drag a hose from fire apparatus to attack a fire. Hose pull is measured along a simulated path of travel accounting for obstructions and not "as the crow flies."
+ ***Intensity:*** The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.

+ ***Ladder Fuels:*** Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and ensure the continuation of crowning.
+ ***Local Responsibility Area (LRA)*** – Land where a city/county has primary financial responsibility for the prevention and suppression of wildland fires. LRA land is generally located within city boundaries.
+ ***Live Fuels:*** Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.
+ ***Mid-flame Windspeed:*** The speed of the wind measured at the midpoint of the flames, considered to be most representative of the speed of the wind that is affecting fire behavior.
+ ***Objectives:*** They contribute to the fulfillment of specified goals and are measurable, defined, and specific.
+ ***Passive Crown Fire:*** Also called torching or candling. A fire in the crowns of trees in which single trees or groups of trees torch, ignited by the passing front of the fire.
+ ***Safety Zone:*** A preplanned area of sufficient size and suitable location in the wildland expected to prevent injury to fire personnel without using fire shelters.
+ ***Red Flag Warning:*** Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.
+ ***Riparian:*** Situated or taking place along or near the bank of a watercourse.
+ ***Spotting:*** Refers to the behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire*.*
+ ***State Responsibility Area (SRA) –*** Land where the State of California (i.e. CAL FIRE) has primary financial responsibility for the prevention and suppression of wildland fires. All SRA land is located within County unincorporated areas; SRA does not include lands within city boundaries or in federal ownership
+ ***Strategy:*** The general plan or direction selected to accomplish incident objectives.
+ ***Surface Fire:*** Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.
+ ***Surface Fuels:*** Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.
+ ***Topography:*** Referred to as “terrain.” The term also refers to parameters of the “lay of the land” that influence fire behavior and spread. Key elements are slope (in percent), aspect (the direction a slope faces), elevation, and specific terrain features such as canyons, saddles, “chimneys,” and chutes.
+ ***Understory:*** Term for the area of a forest which grows at the lowest height level below the forest canopy. Plants in the understory consist of a mixture of seedlings and saplings of canopy trees together with understory shrubs and herbs.
+ ***Values at Risk:*** People, property, ecological elements, and other human and other intrinsic values within the City. Values at Risk are identified by stakeholders as important to the way of life in the City and are particularly susceptible to damage from undesirable fire outcomes.
+ ***Very High Fire Hazard Severity Zone (VHFHSZ)*** – A designated area in which the type and condition of vegetation, topography, fire history, and other relevant factors increase the possibility of uncontrollable

wildland fire. Structures within a VHFHSZ require special construction features to protect against wildfire hazards; please consult with the local building department and refer to CBC Chapter 7A for specific requirements

+ ***Wildland Fire Environment:*** The surrounding conditions, influences, and modifying forces of fuels, topography, and weather that determine wildfire behavior.
+ ***Wildfire Risk Area*** – Land that is covered with vegetation, which is so situated or is of such an inaccessible location that a fire originating upon it would present an abnormally difficult job of suppression or would result in great or unusual damage through fire, or such areas designated by the fire code official. For purposes of this document, Wildfire Risk Area includes Very High Fire Hazard Severity Zones (see above), Wildland-Urban Interfaces (WUI), and similarly hazardous areas

Appendix B Risk Assessment Methodology Technical Memo

For the full Risk Assessment Methodology Technical Memo, contact the City of Agoura Hills.

Appendix C Public Survey Results

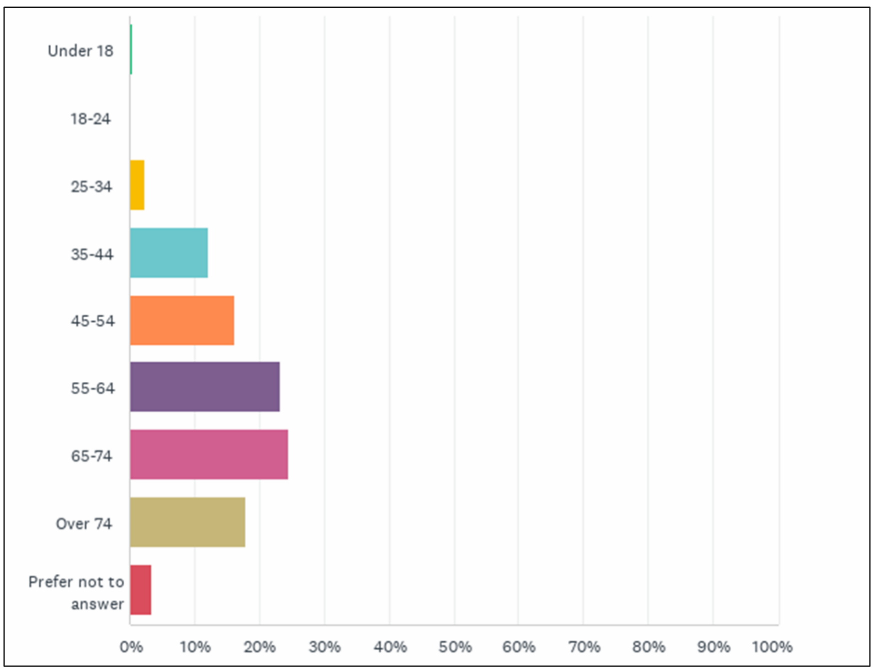
This appendix is intended to only be a summary of results. For full results, contact the City of Agoura Hills.

The public survey received 371 online responses and 10 in-person responses.

C.1 OVERVIEW OF QUANTITATIVE RESPONSES

Below are some key descriptive statistics from the survey responses:

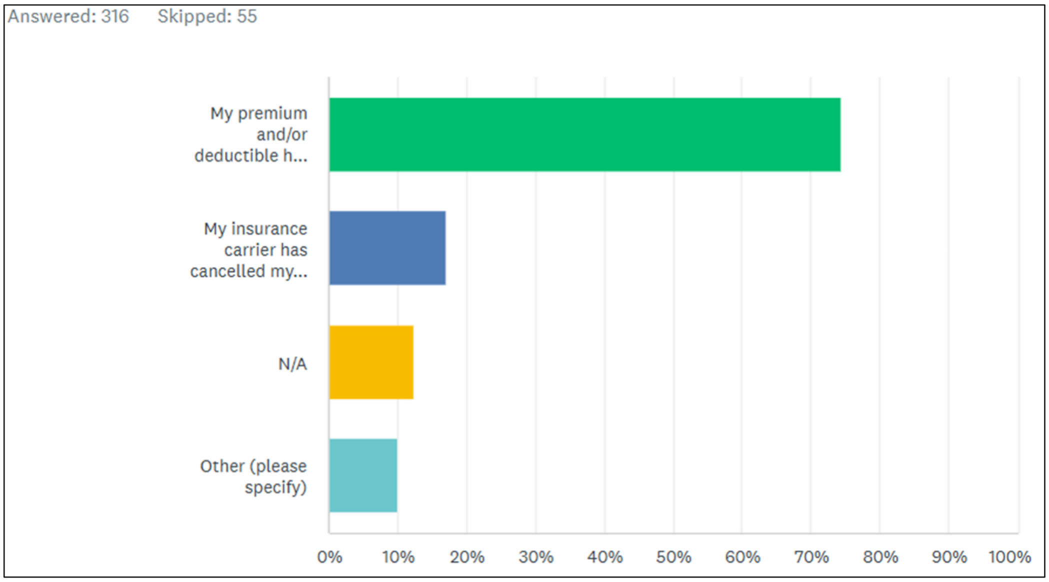
- Most residents have lived in Agoura Hills – 21+ years
- A broad range of neighborhoods represented.
- Most represented ages – 55 to over 74 years old:



Responses from written surveys:
(2) – 65-74
(6) – Over 74
Skipped: 2

Figure 53. Age of survey respondents by percentage.

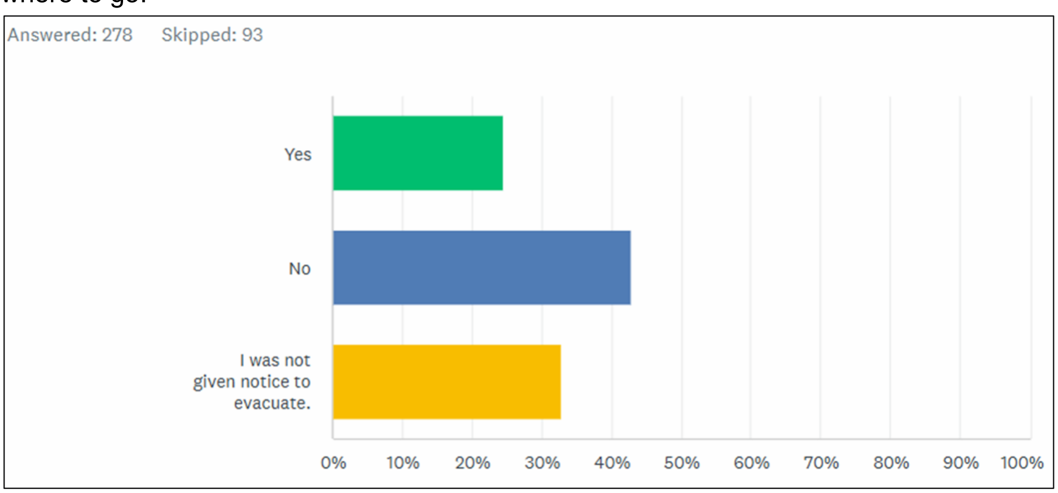
- Respondents largely reside in detached single-family homes
- Most homes built between 1970 to 1989
- Most homes are owned by the residents.
- Most residence are privately insured for wildfires.
- Over 70% of respondents indicated insurance premium and/or deductible has gone up:



Responses from written surveys:
(6) – My premium and/or deductible has gone up
(3) – My insurance carrier has cancelled my coverage
Skipped: 1

Figure 54. Impacts on insurance (by percentage of responses)

- Many respondents indicated they have done some level of home hardening (primarily vegetation management and window improvements)
- About half of the respondents indicated that they have created defensible space
- Nearly 90 percent of respondents indicated that they have been impacted by a wildfire in Agoura Hills
- For respondents that have been evacuated in the past, over 50 percent indicated they were given sufficient notice
- Over 40 percent of respondents also indicated they were not given sufficient information on how, when, and where to go:



Responses from written surveys:
(1) – Yes
(5) – No
(3) – I was not given notice to evacuate
Skipped: 1

Figure 55. Percentage of respondents that were given sufficient information on evacuation

C.2 OVERVIEW OF OPEN RESPONSES

This section provides a high-level summary of the common themes received in the open response portion of the public survey.

C.2.1 Feedback on Critical Facilities and Services

Regarding reliability of critical facilities and services, residents identified three main categories of concern – communication, electricity and access/egress – where wildfires negatively impacted reliability or availability.

+ Public Communication and Information:
    - Lack of consolidated information (including that the city website was insufficient) and having to visit multiple sources to access critical information.
+ Electricity or Power:
    - Poor communication around power outages from utilities
    - A cascade of issues associated with power outages (e.g., communication and evacuation during the extended power outages).
+ Evacuation:
    - Unable to recognize street names used to reference evacuation zones.
    - Unable to determine whether they were under an evacuation order or the direction of evacuation.
    - Unable to find evacuation shelters.
    - Many residents reported extreme congestion, with multiple references to Kanan and 'TO' streets as "gridlocked", with down traffic signals and no one directing traffic.

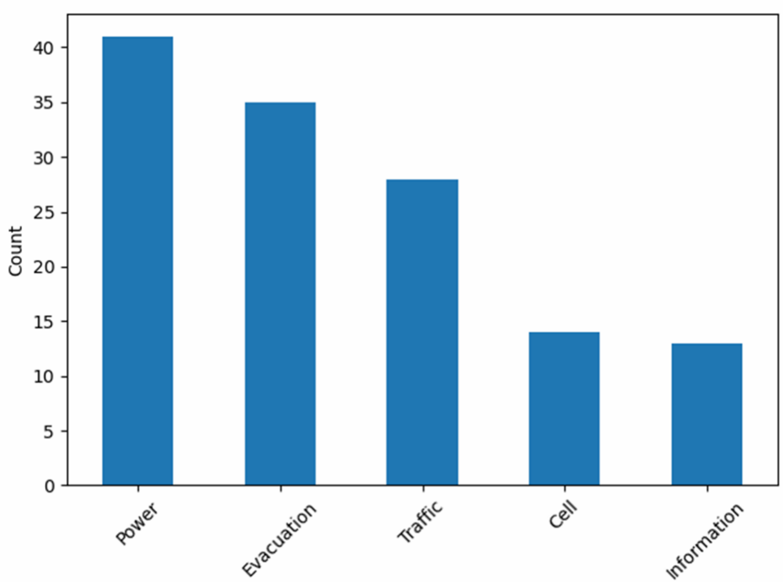


Figure 56. Critical Facilities and Services Identified by Residents as Negatively Impacted by Wildfires in the City. Y-axis identifies the number of times a particular service was identified by respondents.

C.2.2 Feedback on Primary Fire Risk Concerns

Residents' primary concerns for fire risk to their home and community included **insurance, damage/loss to their home, evacuation, home hardening and vegetation management.** The top three concerns related to the following:

+ Insurance:
    - Cost of and availability of insurance, with multiple residents reporting that they were leaving the area because they could no longer afford insurance or could not afford the risk of having insufficient coverage.
+ Home hardening and vegetation management:
    - The hazard posed by neighboring properties.
    - Lack of enforcement or enaction of vegetation management by HOA's.
    - Difficulty affording the cost of home hardening and vegetation management.
    - Lack of resources on best practices.
    - Some residents report concern about the management of public parks and undeveloped lots which contain dry, dead, and nonnative plants.
+ Evacuation:
    - Multiple communities report concerns about having only one access/egress route.

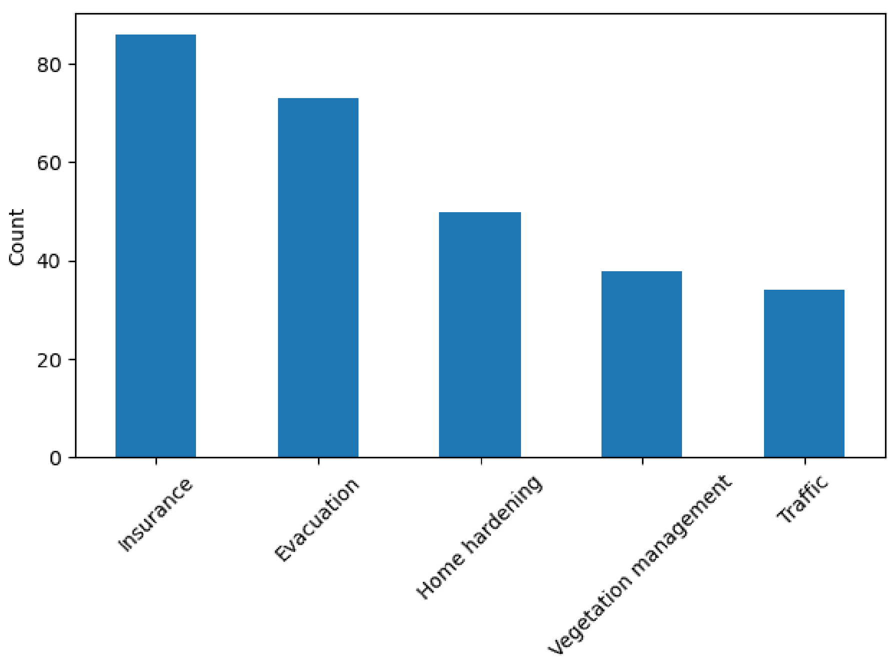


Figure 57. Primary wildfire risk concerns for residents. Y-axis identifies the number of times a resident identified a particular risk concern category.

C.2.3 Mitigation Activities Performed by Residents

Residents described mitigations activities they currently perform to reduce wildfire risk. Common activities included **home hardening** and **vegetation removal**, **evacuation planning**, assembling **go bags and kits**, **self-education** and grass roots **organizing**. See below.

- Implementing various home hardening activities. Note: Several residents commented on the value of the voluntary hardening evaluation program available in the City.
- Conducting vegetation and whole-tree removal.
- Making evacuation plans.
- Assembling kits for power outages, assembling go bags, and organizing possessions for evacuation.
- Organizing to become a Firewise community and other grassroots community coordination activities.
- Taking CERT classes and attending public workshops or emergency fairs.
- Documenting home contents for insurance and reevaluating insurance coverage to check if there's enough coverage for their home value.

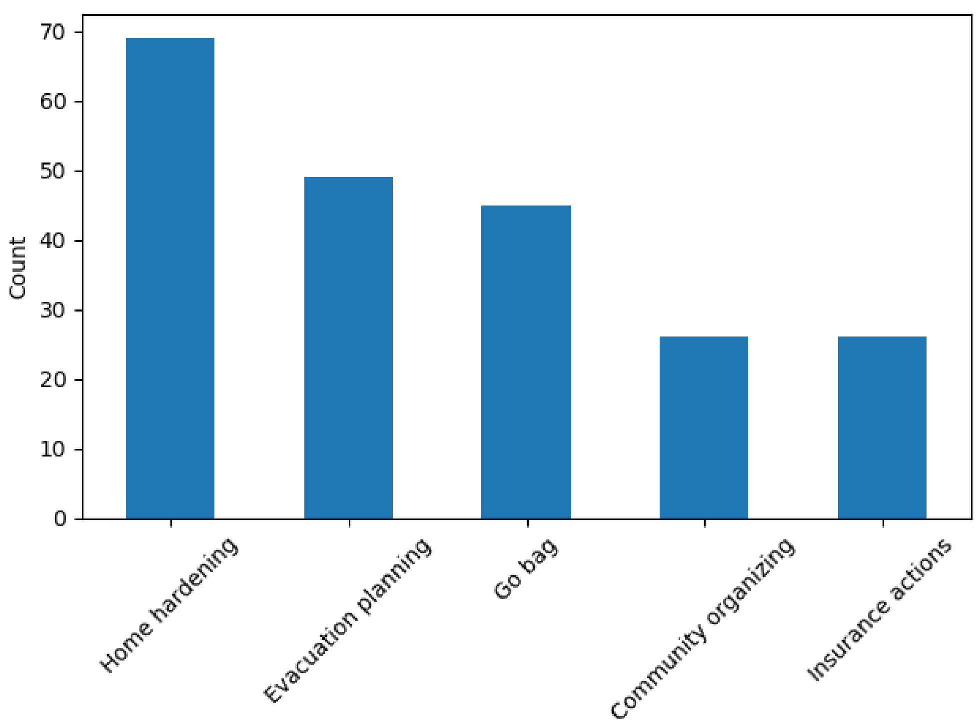


Figure 58. Common wildfire mitigation and preparedness activities undertaken by residents. Y-axis identifies the number of times a resident identified a particular mitigation activity category.

C.2.4 Feedback on Areas of Improvement for Community Wildfire Resiliency and Awareness

Residents provided recommendations for improving community wildfire resiliency. Common suggestions included:

- Many residents requested both in-person and online **workshops and webinars**. Some requested door-to-door campaigns or tabling at public events.
- The timing of current webinars was not doable for many residents, and they requested **additional weekend or evening webinar**s.
- How or where to find **proper materials and contractors** for home hardening.
- Development of "**The Great Shakeout**" drill but for wildfire.

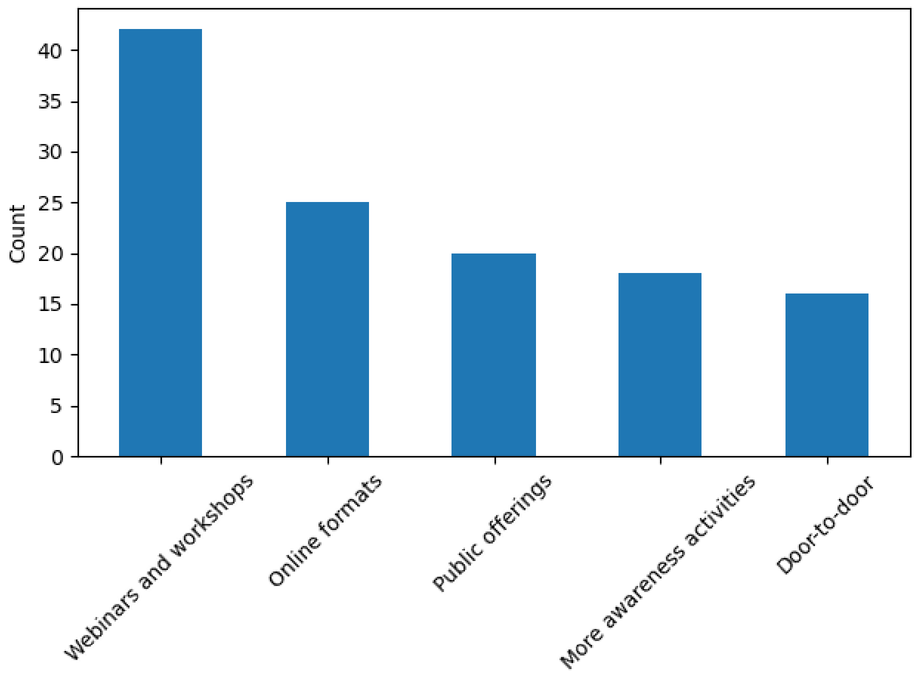


Figure 59. Recommendations for increasing wildfire resiliency and awareness. Y-axis identifies the number of times a resident identified a particular area of improvement category.

C.2.5 Additional General Feedback

Residents also provided additional general comments. These are summarized as follows:

- Residents found **communication** around evacuation and outages to be deficient.
- Residents had additional concerns about **evacuation**, repeating how roads clogged during evacuations, and some noted the prevalence of single lane roads.
- Residents also had additional concerns regarding **utilities**, including power outages, loss of communication due to power outages, and the threat of ignition from overhead lines.

- Residents were concerned about **fuels management** in public spaces including along roads and power lines and called for cohesive and extensive improvements to make Agoura hills more fire safe. Similarly, residents had concerns about non-native plants/tress (e.g., tropical vegetation and palms) on public and private property. and called for clear and consistent communication on vegetation management best practices.

Appendix D Broader Stakeholder Survey Results

For full broader Stakeholder Survey results, contact the City of Agoura Hills.

Appendix E Public Workshops

The following is a sample agenda provided as part of the public workshops held at the Agoura Hills Event Center.

JENSEN HUGHES
Advancing the Science of Safety

Workshop Agenda

Meeting Title:	Agoura Hills Community Wildfire Risk Assessment (CWRA) 1st Public Workshop
Date | Time:	Tuesday, May 20th, 2025 | 6:00 p.m. – 8:00 p.m. (PDT)
Location:	Agoura Hills Recreation and Event Center 29900 Ladyface Court Agoura Hills, CA 91301

Time	*Description*
6:00 p.m. – 6:05 p.m.	**Welcome & Introduction**
6:05 p.m. – 6:10 p.m.	**Fire Agency Introduction**
6:10 p.m. – 6:25 p.m.	**CWRA Process Overview** • What is a CWRA? • Who have we worked with? • CWRA Sections
6:25 p.m. – 6:35 p.m.	**Breakout Session #1** • What are your biggest wildfire-related concerns?
6:35 p.m. – 6:50 p.m.	**Hazard vs. Risk**
6:50 p.m. – 7:00 p.m.	**Breakout Session #2** • What assets or values are important to you and the community to protect?
7:00 p.m. – 7:05 p.m.	**Observed Risks in Agoura Hills** • Fire-prone environment • Land & people management • Defensible space & housing density
7:05 p.m. – 7:10 p.m.	**Break**
7:10 p.m. – 7:20 p.m.	**Reporting Out**
7:20 p.m. – 7:55 p.m.	**Q&A Session**
7:55 p.m. – 8:00 p.m.	**Next Steps & Closing Remarks**

CITY OF AGOURA HILLS

A copy of the full presentation is available through the City of Agoura Hills.