SANTA BARBARA

Community Wildfire Protection Plan

April 2025

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Table of Contents

SECTION	PAGE NO.

Acronyms and Abbreviations v

Acknowledgements vii

Executive Summary ix

1 Introduction 1
- 1.1 Purpose and Need 2
- 1.2 Plan Goals and Objectives 2
- 1.3 Community Wildfire Protection Plan Planning Process 3
  - 1.3.1 County of Santa Barbara CWPP Process 4
- 1.4 Community Engagement 4
  - 1.4.1 Development Team 5
  - 1.4.2 Working Group 6
  - 1.4.3 Public and Community Engagement 6
- 1.5 Funding/Grant Management 18
- 1.6 Signatories 18

2 Plan Area Description 19
- 2.1 Location 19
- 2.2 Land Ownership 19
- 2.3 Plan Area Communities 23
- 2.4 Fire Hazard Areas 25
  - 2.4.1 State Fire Hazard Severity Zones 25
  - 2.4.2 County High Fire Hazard Area 29
- 2.5 Climate 33
  - 2.5.1 Prevailing Winds and Sundowner Winds 34
  - 2.5.2 Climate Change 36
- 2.6 Terrain 37
- 2.7 Vegetation and Fuels 38
  - 2.7.1 Vegetative Fire Hazard 38
- 2.8 Threats that Exacerbate Wildfire Hazard 45
- 2.9 Wildfire Types and Potential Fire Behavior 45
- 2.10 Fire History and Ignitions 47
  - 2.10.1 2009 Jesusita Fire 54
- 2.11 Fire Protection 55
  - 2.11.1 Santa Barbara County Fire Department 55
  - 2.11.2 U.S. Forest Service 59

2.11.3 Fire Protection Partnerships 59
2.12 Existing Fire Risk Reduction Programs 60
2.12.1 Mission Canyon Community Wildfire Protection Plan 60
2.12.2 Santa Barbara County Fire Safe Council 61
2.12.3 Regional Wildfire Mitigation Program – Santa Barbara South Coast Region 61
2.12.4 Santa Barbara County Fire Programs 62
2.12.5 U.S. Forest Service 64
2.12.6 City of Santa Barbara 64
2.12.7 Montecito Fire Protection District 65
2.12.8 Alert Wildfire Cameras 65
2.13 Evacuation 65
2.14 Values at Risk 66
2.14.1 At-Risk Communities 66
2.14.2 Wildland-Urban Interface 67
2.14.3 Structures and Population 71
2.14.4 Recreational Areas and Places of Local Significance 71
2.14.5 Critical Facilities and Infrastructure 71
2.14.6 Cultural Resources 75
2.14.7 Natural Resources 76

3 Wildfire Hazard and Risk Assessment 81
3.1 Wildfire Hazard 81
3.1.1 Landscape Fire Behavior Analysis 81
3.1.2 Landscape Burn Probability Analysis 89
3.1.3 Vegetative Wildfire Threat to Structures 97
3.1.4 Fire Progression Modeling 101
3.1.5 Wildfire Hazard Summary 105
3.2 Community Relative Wildfire Risk Ranking 105

4 Transportation Study 113
4.1 Goals and Approach 113
4.2 Methodology 113
4.3 Findings 114
4.4 Recommendations 115

5 Action Plan 117
5.1 Plan Monitoring and Management 118
5.2 Action Plan 118
5.2.1 Vegetation Management 119
5.2.2 Structural Ignitability 125
5.2.3 Community Outreach and Education 128
5.2.4 Access and Evacuation 131

5.2.5 Funding ... 136
5.2.6 Post-Fire Recovery ... 138

6 CWPP Authorization ... 141

7 References ... 143

TABLES

1 Development Team Members ... 5
2 Fuel Risk Reduction and Vegetation Management Technique Approval Ratings ... 7
3 Land Ownership within the Plan Area ... 23
4 Plan Area Communities ... 23
5 Effects of Topographic Features on Fire Behavior ... 38
6 Vegetation Types in the Plan Area ... 43
7 Fire Behavior Interpretation ... 46
8 Fire History ... 53
9 Ignition History within 2 Miles of Plan Area ... 53
10 Fire Stations within 5 Miles of the Plan Area ... 56
11 Fire Suppression Interpretation ... 81
12 Community Relative Risk Ranking Input Variables ... 105
13 Estimated Time to Clear Screenline During an Evacuation Event ... 114
14 Plan Area Issues Addressed in the Action Plan ... 117
15 Vegetation Management Actions ... 119
16 Principles of Fire Resistance to Tree-Dominated Vegetation Types ... 124
17 Structural Ignitability Actions ... 127
18 Community Outreach and Education Actions ... 129
19 Access and Evacuation Actions ... 133
20 Funding Actions ... 138
21 Post-Fire Recovery Actions ... 139

EXHIBITS

1 Plan Area wildland-urban interface. ... 1
2 Community Wildfire Protection Plan timeline. ... 3
3 Members of the Development Team and consultant team conducting a field visit in the Plan Area on December 6, 2023. ... 5
4 Community workshops held on May 14 and May 22, 2024. ... 8
5 Biggest wildfire concerns. ... 9
6 Risk reduction activities. ... 13

7 Vegetation management techniques. 14
8 Community members, SBC Fire, and interested parties participating in group discussions at community workshops held on May 14 and May 22, 2024. 15
9 Group discussion results – challenges. 17
10 Group discussion results – opportunities. 17
11 Sundowner winds over the Plan Area. 35
12 Jesusita Fire burn scar, May 13, 2009 54
13 Integrated hazard calculations. 89

FIGURES

1 CWPP Plan Area xi
2 Community Concerns 11
3 Land Ownership 21
4 Fire Hazard Severity Zones 27
5 County High Fire Hazard Area 31
6 Vegetation Communities 41
7 Fire History 49
8 Ignition History 51
9 Wildland-Urban Interface 69
10 Highly Valued Resources and Assets 73
11 Flame Length 83
12 Rate of Spread 87
13 Integrated Hazard 91
14 Relative Firebrand Hazard 95
15 Vegetative Threat to Structures 99
16 Wildfire Progression 103
17 Community Relative Wildfire Rish Index 109
18 Concentration of Very High Risk Areas 111

APPENDICES

A Community Engagement Results
B Wildfire Hazard and Risk Assessment Memorandum
C Transportation Study*
D Planning and Regulatory Environment
E Prioritized Vegetation Management Projects
F Vegetation Management Techniques and Best Management Practices

**While the Santa Barbara Foothill Community Wildfire Protection Plan is recommended for adoption by the Santa Barbara County Board of Supervisors, this Transportation Study is recommended as a receive and file document inserted as an Appendix to the plan.*

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
CAL FIRE	California Department of Forestry and Fire Protection
CERT	Community Emergency Response Team
County	County of Santa Barbara
CWPP	Community Wildfire Protection Plan
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
GIS	geographic information system
LPNF	Los Padres National Forest
MIT-PPS	Mitigation Planning and Public Services
PRC	California Public Resources Code
RAWS	Remote Automated Weather Station
SBC Fire	Santa Barbara County Fire Department
SBC Sheriff	Santa Barbara County Sheriff's Department
SBCFSC	Santa Barbara County Fire Safe Council
SR	State Route
SRA	State Responsibility Area
USFS	U.S. Forest Service
WUI	wildland-urban interface

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Acknowledgements

The California Department of Housing and Community Development awarded a grant to the County of Santa Barbara to develop a Community Wildfire Protection Plan (CWPP) for the Plan Area, consisting of Foothill Communities within unincorporated Santa Barbara County. The U.S. Department of Housing and Urban Development allocated Community Development Block Grant – Mitigation Planning and Public Services (MIT-PPS) funds to the State of California. MIT-PPS funds help assist local jurisdictions with mitigation-related planning and public services needs to support risk reduction from wildfire, flooding, and earthquake hazards. Eligible jurisdictions and nonprofit entities may use MIT-PPS funds to create projects that address risks to, or across, community lifelines that support human health and safety and provide mitigation for individual and community-based systems.

This CWPP has been developed collaboratively by the Santa Barbara County Fire Department, with support from the consultant team, Dudek and Fehr and Peers, and in coordination with the CWPP Development Team, the County CWPP Working Group, and the Foothill Communities.

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Executive Summary

The Santa Barbara County Fire Department (SBC Fire) has developed this Community Wildfire Protection Plan (CWPP) and Transportation Study (Appendix C) for the Santa Barbara County Foothill Communities, in coordination with the Foothill Communities, interested parties, a development team, the County of Santa Barbara, and a consultant team. The area covered by this CWPP encompasses 10,696 acres within the Santa Barbara foothills, located north of the City of Santa Barbara and Highway 101, east of State Route 154, west of the community of Montecito, and generally south of Camino Peak within the Santa Ynez Mountains (Plan Area) (see Figure 1, Plan Area). The Plan Area includes a variety of land uses, including mountainous area and residential, recreation, agriculture, and open lands.

CWPP STORYMAP

This CWPP has been prepared in conjunction with a StoryMap. The StoryMap is intended to serve as a public-facing version of this CWPP, and provides supplementary information, maps, and graphics. References to the StoryMap throughout this CWPP are referring to the StoryMap that can be found at the following web address: https://storymaps.arcgis.com/stories/70505d4aa8134ca9ab84767efa3d06a7

The Plan Area exhibits a complex wildfire environment that presents a significant wildfire risk due to the presence of steep and varied terrain, wildland vegetation, structures within the wildland-urban interface or wildland-urban intermix, and large areas of land within the Los Padres National Forest and Santa Ynez Mountain Range within and adjacent to the Plan Area. The Plan Area has a significant history of large and damaging wildland fires. The following recent and significant wildfires burned within or partially within the Plan Area: the 2019 Cave Fire (2,600 acres), 2017 Thomas Fire (281,790 acres), 2009 Jesusita Fire (8,734), and the 2008 Tea Fire (1,946 acres). Post-fire effects are also a significant and recurring risk to life, property, and Plan Area resources. SBC Fire recognizes the potentially catastrophic impact of wildfire in the Santa Barbara foothills and is committed to reducing hazards and risk through development and implementation of this CWPP. This CWPP and Transportation Study (Appendix C) present the results of an assessment of wildfire hazard and risk, an evaluation of evacuation conditions, and extensive community engagement in the Plan Area, as well as collaborative identification of risk reduction actions and prioritization through an Action Plan (Chapter 5 of this CWPP).

The wildfire hazard and risk assessment was conducted for the Plan Area using fire behavior modeling software and subsequent geographic information system (GIS) analysis. The analysis was conducted in two basic stages: the first stage modeled wildfire hazard and the second stage modeled wildfire risk. For details regarding the hazard and risk assessment methodology, see Appendix B. The wildfire hazard and risk assessment involved modeling burn probability, fire intensity, and spotting (ember) potential under extreme wind and weather conditions, consistent with those experienced during Sundowner wind events unique to the Santa Barbara region. Other wildfire hazard and risk variables were also evaluated for the Plan Area, including terrain, vegetation (fuels), vegetation age, community access, ignition history, and development patterns. The wildfire hazard and risk assessment resulted in identification of high-risk community areas and corresponding priority project areas to reduce wildfire risk to communities.

A Transportation Study (Appendix C) was prepared for the Plan Area using Vistro analysis software to identify road segments and intersections that may have delays during a wildfire evacuation event and identify potential solutions for reducing evacuation-related delays. The surrounding topography restricts the number of evacuation routes connecting the Plan Area to major transportation corridors (e.g., State Route 154, State Route 192, and Highway 101). The

Transportation Study identified issue areas and provided recommendations to improve emergency access and evacuation.

CWPP development also included extensive community outreach and engagement. The community engagement strategy included regular meetings with a Development Team, a public survey, three community workshops, and a dedicated webpage created on Esri's ArcGIS StoryMap platform to facilitate delivery and sharing of the CWPP and community engagement opportunities. Prior to developing the CWPP, two in-person community meetings were held in May 2024 to discuss community priorities and concerns to be addressed in the CWPP. An online survey was distributed from April through June 2024 to solicit community feedback. A third community meeting was held on February 27th, 2025, after release of the draft CWPP for public review to solicit community feedback on the draft document and Action Plan. Project information was distributed to the community through SBC Fire and Santa Barbara County Fire Safe Council websites, email, mail, social media, e-newsletters, and flyers/posters in the community, and the draft CWPP was made available on the project StoryMap. When appropriate, updates were made to the draft CWPP to reflect the community input received.

This CWPP includes an Action Plan (Chapter 5) that presents a series of recommendations intended to guide implementation of the CWPP. The recommendations are divided into the following categories: vegetation management, structural ignitability, community outreach and education, access and evacuation, funding, partnerships, infrastructure and communications, and post-fire recovery. Vegetation management recommendations include identification of management types, standards, and techniques, as well as best management practices to avoid or minimize resource impacts. The recommendations included in this CWPP are intended to achieve the stated goals of this CWPP, including protecting lives, property, natural resources, and other values threatened by wildfire while considering the unique circumstances of the Foothill Communities.

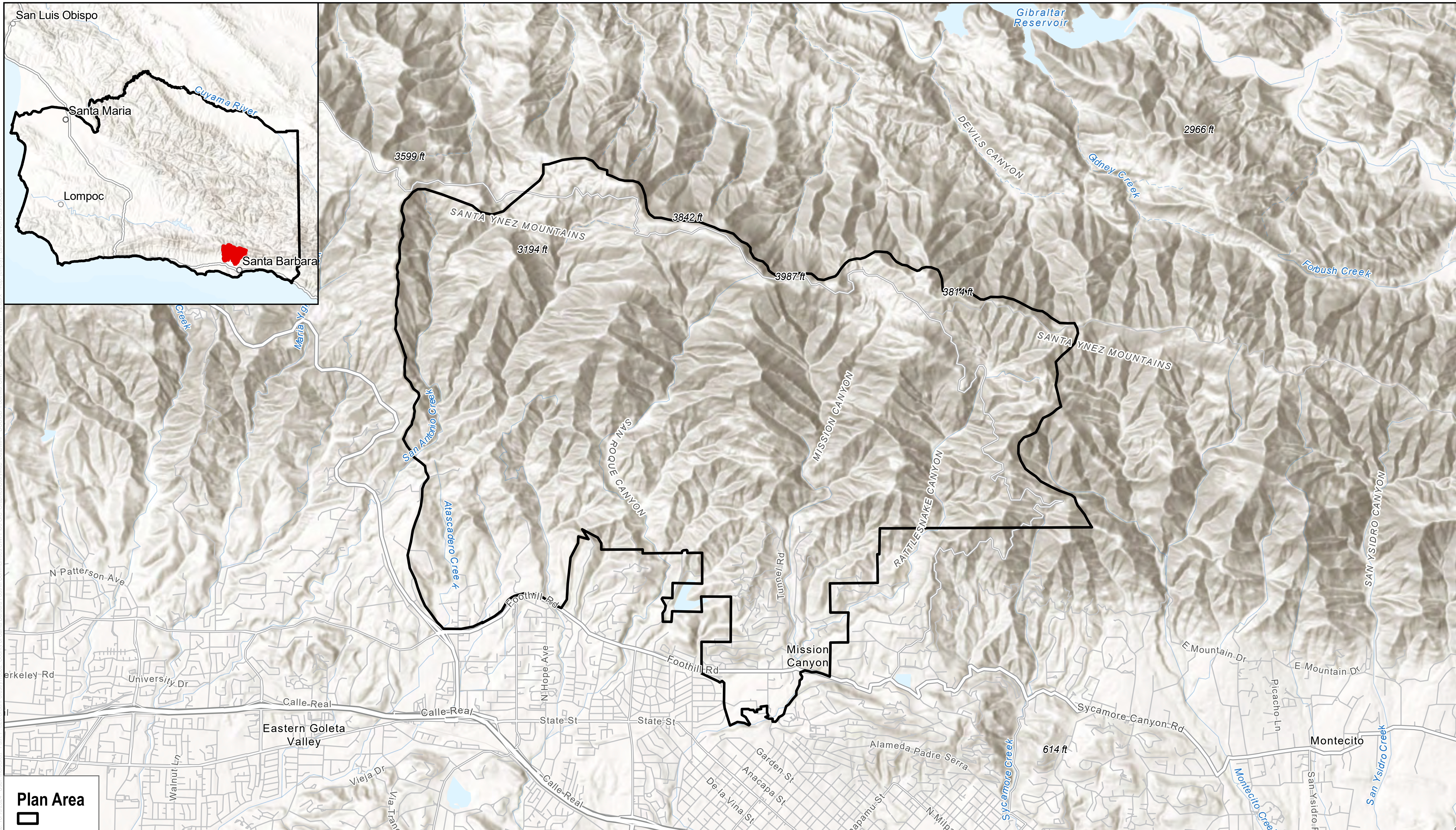

FIGURE 1

CWPP Plan Area

Santa Barbara County Foothill Communities CWPP

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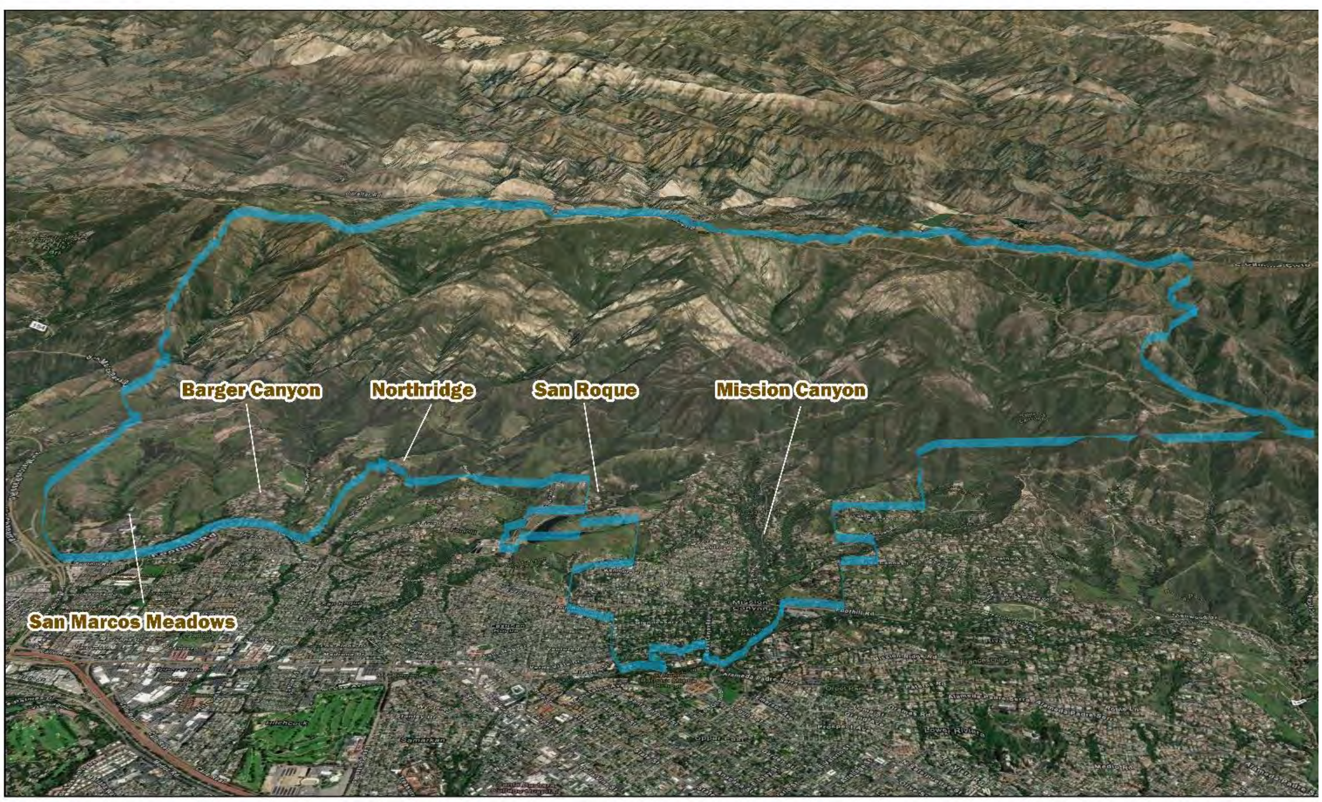
1 Introduction

This Community Wildfire Protection Plan (CWPP) and Transportation Study (presented in Appendix C) has been developed for the Santa Barbara County Foothill Communities. The Santa Barbara County Foothill Communities are in an unincorporated area within the County of Santa Barbara (County), north of the City of Santa Barbara boundary and east of State Route (SR) 154 (see Figure 1, Plan Area). The area covered by this CWPP encompasses 10,696 acres within the Santa Barbara foothills, located north of the City of Santa Barbara and Highway 101, east of SR-154, west of the community of Montecito, and generally south of Camino Peak within the Santa Ynez Mountains (Plan Area). Established communities within the Plan Area are located along the southern border, while the remainder of the Plan Area to the north is located within the Santa Ynez Mountains and Los Padres National Forest (LPNF). The Plan Area is an example of a wildland-urban interface (WUI) area, where development and wildlands abut and intermingle. The differences in built and natural landscapes create a complex community wildfire risk profile with distinct challenges. Exhibit 1 depicts a satellite image of the Plan Area, which demonstrates the relationship between the built and natural environment in the Plan Area.

Exhibit 1. Plan Area wildland-urban interface.



The wildfire environment in the Plan Area is influenced by local wind patterns and weather conditions (including Sundowner wind events), adjacent open space and naturalized vegetation, steep and varied terrain, and drought conditions that have historically exacerbated wildfire risk and contributed to destructive wildfires that have occurred in the Plan Area. Notable fires that have burned within the Plan Area include the following: the 2019 Cave Fire (2,600 acres), 2017 Thomas Fire (281,790 acres), 2009 Jesusita Fire (8,734), and the 2008 Tea Fire (1,946 acres). Post-fire debris flows in the Plan Area are a real and recurring risk to life, property, and resources.

As a key component of the Healthy Forest Restoration Act of 2003, a CWPP serves as a mechanism for community input and identification of areas presenting high wildfire risk, as well as identification of potential projects intended to mitigate such risk. Further, the CWPP process is intended to provide the community a forum for identifying values at risk from wildfire, which may include people, property, natural resources, agricultural lands, cultural resources, economic interests, and infrastructure. The identification of these values at risk strongly influences the potential wildfire hazard mitigation projects identified in this CWPP.

This CWPP was developed by the Santa Barbara County Fire Department (SBC Fire) for the Foothill Communities with input and direction from stakeholders, agency representatives, and community members. The purpose of this collaboratively prepared CWPP is to serve as a fire protection planning document that presents the communities' physical characteristics, wildfire hazard, assets at risk from wildfire, wildfire risk reduction approaches, vegetation/fuel management projects, and goals and action items intended to reduce wildfire risk in the Plan Area. The goal of this CWPP is to protect lives, property, assets, and Plan Area resources threatened by wildland fire.

1.1 Purpose and Need

The Plan Area faces the potential for significant loss of life, property, and resources from wildfire. After evaluating and assessing key attributes of the Plan Area, such as fire history, community characteristics, vegetation conditions, and emergency access and evacuation, the Plan Area communities, SBC Fire, and other interested parties further understand the complexities of the wildfire environment and the significant risks present in the Plan Area. SBC Fire proactively addresses wildfire risk reduction in the County through implementation of various pre-fire programs and leads plans and programs throughout the County intended to mitigate wildfire risk to communities. Through coordination and collaboration in recent years, SBC Fire has identified the need for a CWPP for the Foothill Communities and intends for this CWPP to reflect the priorities of the communities. In 2011, the Mission Canyon Association and SBC Fire created a CWPP for the Mission Canyon Community, highlighting the need for interagency collaboration and management; identifying and prioritizing areas for hazardous fuel reduction treatments; addressing structure ignitability throughout the Mission Canyon area; and increasing the community's understanding of living in a fire-adapted ecosystem and their ability to prepare for, respond to, and recover from wildfire. The Mission Canyon CWPP discusses the need to update the CWPP when new project locations are identified or when the needs of the community adjust as conditions change. The Foothill Communities CWPP builds upon the Mission Canyon CWPP and expands these efforts into the communities adjacent to Mission Canyon and the surrounding area. Intended users of this CWPP include the Foothill Communities, the Santa Barbara County Fire Safe Council (SBCFSC), SBC Fire, the County, the U.S. Forest Service (USFS), and other agencies that own or manage land in the Plan Area.

1.2 Plan Goals and Objectives

The following goals were identified during development of this CWPP:

Community: Provide the community with consolidated and consistent wildfire mitigation and evacuation information.

Partnerships: Increase collaboration with community partners, mutual aid partners, and other stakeholders to build consensus and expand wildfire mitigation strategies within and outside the Plan Area.

Evacuation: Improve evacuation for all residents, workers, and visitors while maintaining emergency access for first responders.

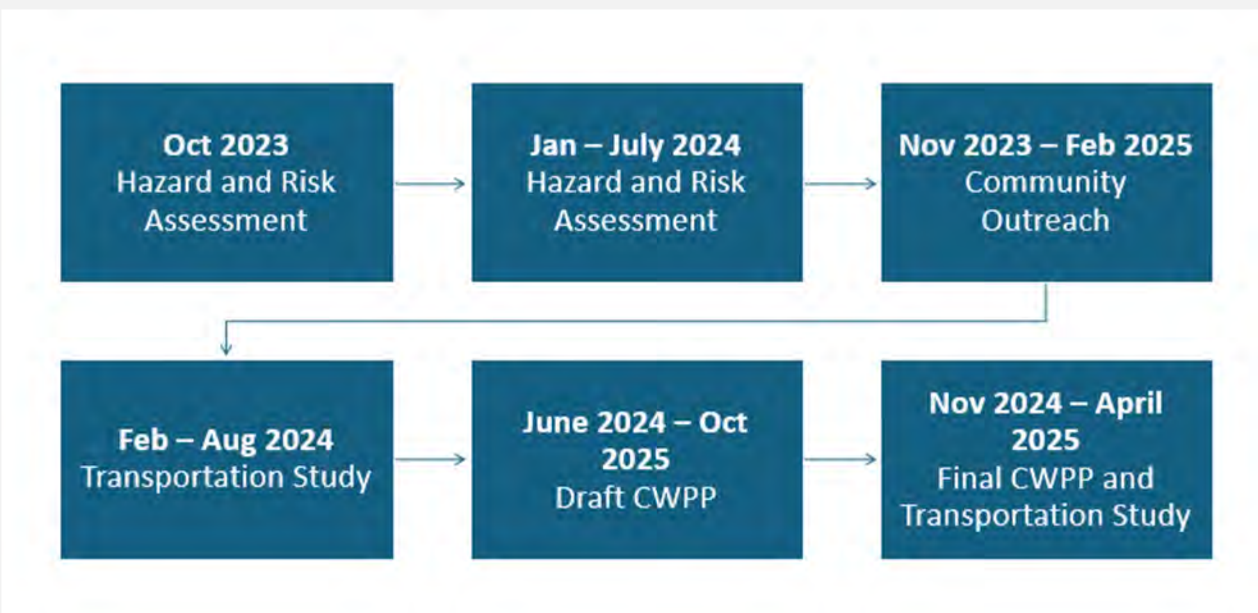
Protect: Increase wildfire resilience and protect community resources and values throughout the Plan Area.

Funding: Seek funding for wildfire mitigation projects by pursuing grants and other opportunities.

1.3 Community Wildfire Protection Plan Planning Process

The CWPP planning process, which took place from October 2023 to April 2025, collaboratively engaged interested parties and community members to identify the CWPP goals, define community values and assets at risk from wildfire, and identify wildfire risk mitigation projects to achieve the CWPP goals. The process utilized wildfire hazard and risk modeling to better understand wildfire threat in the Plan Area and transportation modeling to determine the issue areas in the transportation network. Community feedback received during the public survey, community workshops, and Development Team meetings was incorporated into the CWPP Action Plan (Chapter 5) to address wildfire and evacuation risks in the Plan Area. The Action Plan identifies how and where landowners, land managers, residents, community groups, and government agencies can implement wildfire and evacuation mitigation actions within the Plan Area. The CWPP timeline is shown in Exhibit 2 below.

Exhibit 2. Community Wildfire Protection Plan timeline.



This CWPP complies with the requirements for CWPPs, as defined by the 2003 Healthy Forests Restoration Act:

- **Collaboration**: CWPPs must be collaboratively developed. Local and state officials must meaningfully involve federal agencies that manage the land in vicinity of the community, other interested parties, and non-governmental stakeholders.
- **Prioritized Fuel Reduction:** The CWPP must identify and prioritize areas for fuel reduction treatments on federal and non-federal lands. The CWPP must recommend types and methods of treatments that, if completed, would reduce the wildfire risk to the community.
- **Treatment of Structural Ignitability:** The CWPP must recommend measures that homeowners and communities can undertake to reduce the ignitability of structures throughout the Plan Area.

1.3.1 County of Santa Barbara CWPP Process

The County Board of Supervisors approved a CWPP development process for the County that identifies the need to engage with interested parties and to collaborate with applicable federal and state agencies. The development process includes eight steps that describe the standardized approach for developing CWPPs in the County. The following summarizes the eight steps identified in the County's CWPP development process.

1. **Convene the CWPP Development Team** – The Development Team is discussed in Section 1.4.1.
2. **CWPP Development Team Involves Applicable Federal and State Agencies** – CWPP agency representatives are discussed in Section 1.4.1.
3. **CWPP Development Team Engages Interested Parties** – CWPP public and community engagement is discussed in Section 1.4.3.
4. **Establish a Community Base Map and Boundary Area** – The extent of the Plan Area and associated maps are presented in Chapter 2, Plan Area Description.
5. **Develop a Community Risk Assessment** – The risk assessment completed for this CWPP is presented in Chapter 3, Wildfire and Hazard Risk Assessment.
6. **Recommend Community Hazard Reduction Priorities and Measures to Reduce Structural Ignitability** –Hazard reduction and structural ignitability recommendations are presented in Chapter 5, Action Plan.
7. **Develop Draft CWPP** – A draft CWPP was prepared from June through October 2024 and provided to SBC Fire, the Development Team, and the County CWPP Working Group for review and posted to the CWPP's web page for community and public review and comment.
8. **Finalize and Submit the CWPP** – Following the community and public review and comment period, the CWPP was finalized and signed, as noted in Section 1.6, Signatories.

1.4 Community Engagement

A successful CWPP requires risk reduction strategies that reflect community concerns and priorities. Community members and interested parties have a wealth of local knowledge regarding their open spaces, wildfire hazards, defensible space, fire prevention activities, resources, and evacuation routes. Therefore, community and public outreach and engagement are foundational to successful community wildfire planning processes.

SBC Fire aimed to maintain a transparent and inclusive process for community engagement during development of this CWPP, including consideration of the interests of diverse social, cultural, and economic elements of the population within the Plan Area. This process assisted SBC Fire in creating a more effective CWPP by increasing public buy-in, promoting cooperation, and enhancing the quality of information on which the CWPP is based. Community engagement also helped guide decision-makers in communicating goals and outcomes and ensuring efficient implementation of policies, programs, and projects.

1.4.1 Development Team

Exhibit 3. Members of the Development Team and consultant team conducting a field visit in the Plan Area on December 6, 2023.

The Development Team members were invited to participate in the CWPP process as representatives of the communities, agencies, and organizations within and adjacent to the Plan Area (see Exhibit 3). The Development Team consisted of individuals from SBC Fire, SBCFSC, City of Santa Barbara Fire Department, Montecito Fire Protection District, LPNF, Santa Barbara Botanic Garden, Mission Canyon Association, and community representatives. Many Development Team members actively participated in community engagement during the CWPP development process by sharing project information, the public survey, and public workshop details with their community. The Development Team was responsible for engaging with and representing their communities; attending monthly Development Team meetings; providing feedback on CWPP and Transportation Study analyses and results; providing review and feedback on the draft CWPP and Transportation Study; providing recommendations for projects; and, in some cases, facilitating or hosting field assessments.

Table 1 identifies the members of the CWPP Development Team.

Table 1. Development Team Members

Members	Role/Representation
Fred Tan	Fire Marshal, Santa Barbara County Fire Department
Dustin McKibben	Pre-Fire Engineer, Santa Barbara County Fire Department
Kate Furlong	Community Resilience Domain Lead, Santa Barbara County Fire Safe Council
Gustavo Agredano	Community Wildfire Resilience Associate, Santa Barbara County Fire Safe Council
Mark VonTillow	Inspector II/Wildland Specialist, City of Santa Barbara Fire Department
Nic Elmquist	Wildland Fire Specialist, Montecito Fire Protection District
Rudy Uribe	Forest Fuels Planner, Los Padres National Forest
Steve Windhager	Executive Director, Santa Barbara Botanic Garden
Selden Edner	Community Member, Mission Canyon Association
Raymond Smith	Community Member, Mission Canyon Association
John Wells	Community Member, Northridge Community
Stu Sherman	Community Member, Northridge Community
Richard Dallet	Community Member, Northridge Community

Table 1. Development Team Members

Members	Role/Representation
Scott Eckardt Dana Link-Herrera Matthew Crockett Alison Sells Ashleyann Bacay	Consultant, Dudek
Nata Kovalova Chelsea Richer	Consultant, Fehr and Peers

1.4.2 Working Group

The Working Group is a County-established group that provided review of the draft CWPP and Transportation Study. The Working Group included representatives from SBC Fire, County Planning and Development, County Office of Emergency Management, the County Executive Office, and the California Department of Forestry and Fire Protection (CAL FIRE). These representatives include the chief executive officer or designee (overall lead), SBC Fire chief/fire vegetation management captain, state forester, and planning and development staff.

1.4.3 Public and Community Engagement

Several approaches were undertaken to communicate with the Foothill Communities and solicit input regarding the CWPP and Transportation Study, including creating and hosting an interactive ArcGIS StoryMap web page, distributing an online survey, and hosting community meetings. A discussion of communication efforts conducted in support of CWPP development is presented in the following sections.

1.4.3.1 StoryMap

A CWPP web page was created with ArcGIS StoryMaps, an Esri web-based platform chosen for its interactive storytelling elements. The StoryMap was maintained and updated throughout the CWPP development process. The StoryMap hosts CWPP information including interactive maps, engagement opportunities, wildfire hazards and risk assessment results, Transportation Study results, and community resources. The web page allows for community members, interested parties, and the public to access CWPP-related information, sign up for upcoming engagement opportunities, and express written feedback, comments, and concerns regarding the CWPP process and the Plan Area. The StoryMap is intended to serve as a living document that is an adaptable version of the CWPP and will be maintained and updated as the CWPP is implemented. The StoryMap is located at https://ims.dudek.com/sbfoothillscwpp.

1.4.3.2 Survey

An online survey was distributed to solicit input from residents, landowners, and interested parties about wildfire and evacuation concerns in the Plan Area. The survey was intended to provide another avenue for interested parties to provide feedback during the CWPP development process. The survey included questions regarding demographics, risk awareness, wildfire preparedness, wildfire concerns, and reducing wildfire risk. A total of 102 survey responses were received. Survey respondents were mostly Mission Canyon residents (67%), and most lived in the area full time (95%). The following summarizes the survey findings:

- Primary wildfire risk concerns identified included fuels on a neighboring property (92%), fuels on the respondent's property (56%), home/neighborhood is difficult for fire responders to access (43%), and building materials used on the respondent's home (39%).
- Most respondents had installed a Class A roof (76%[1]) completed defensible space vegetation management activities on their property (74%), and installed dual paned windows (67%).
- Primary wildfire concerns identified included structure losses (75%), evacuation (53%), and personal injury or death (49%).
- Primary barriers to evacuation identified included the neighborhood not having adequate evacuation routes (68%), alternative housing being too difficult to find (54%), or respondents wanting to stay and defend their homes (36%).
- Respondents felt that the most important activities to address wildfire risk were creating/maintaining defensible space (59%), fuel management on private lands (53%), and fuel management on public lands (52%).

Table 2 shows the survey respondents' approval ratings of various fuel risk reduction and vegetation management techniques.

Table 2. Fuel Risk Reduction and Vegetation Management Technique Approval Ratings

Fuel Risk Reduction Technique	Approval Rating	Vegetation Management Technique	Approval rating
Defensible space	96%	Grazing	97%
Vegetation clearance on public property (parks, greenbelts, etc.)	94%	Hand treatment	87%
Roadside vegetation clearance	91%	Prescribed fire	63%
Invasive plant removal	87%	Mechanical/ equipment treatments	50%
Fuel breaks	85%	Herbicides	21%

The fuel risk reduction and vegetation management techniques most supported by respondents included grazing (97% approval), creating/maintaining defensible space (96% approval), clearing vegetation on public property (94% approval), conducting roadside vegetation treatments (91% approval), conducting hand treatments (87% approval), removing invasive plants (87% approval), creating fuel breaks (85% approval), and using prescribed fire (63% approval).

[1]This percentage reflects the percentage of survey respondents that self-reported having a Class A roof. The actual percentage of Class A roofs in the Plan Area may be higher/lower.

The vegetation management techniques least supported by respondents included applying herbicides (21% approval) and using mechanical treatment (50% approval).

Complete results from the survey and the public workshops are presented in Appendix A.

1.4.3.3 Community Workshops

Two in-person community workshops were held in May 2024. The first workshop (May 14, 2024) was held at the Santa Barbara Botanic Garden and the second workshop (May 22, 2024) was held at the SBC Fire headquarters. Approximately 53 people attended the community workshops, representing a variety of participants including private property owners, homeowners, local agency representatives, environmental groups, homeowner's associations, and community groups. These workshops included a brief overview of the project followed by passive and active engagement activities aimed at garnering discussion and gaining input from community members. A summary of the activities and community input received is provided in the following sections. Exhibit 4 presents images from the community workshops held on May 14 and May 22, 2024.

Exhibit 4. Community workshops held on May 14 and May 22, 2024.

Self-Guided Activities

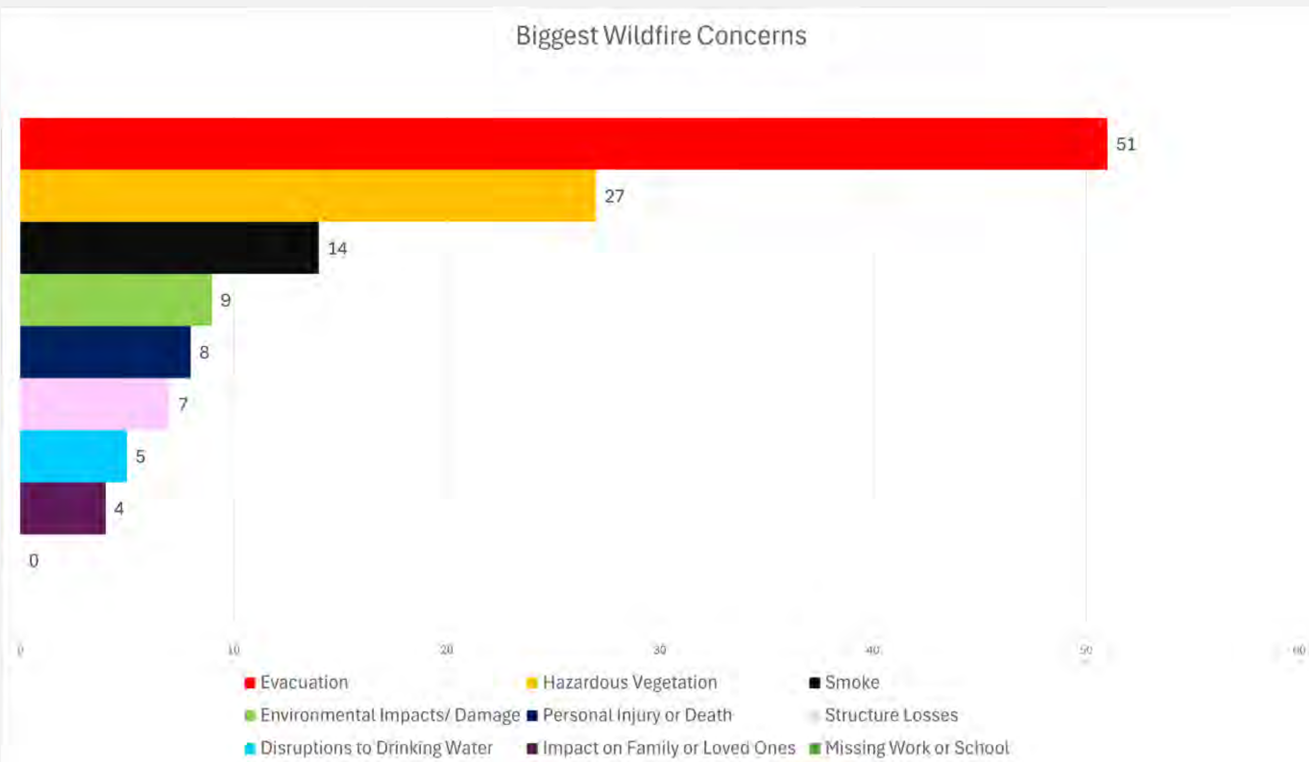
The self-guided activities included a map activity and three bead activities. The map activity allowed community members to identify areas of concern, including limited evacuation routes, hazardous vegetation, and structures/communities in need of structural hardening. Areas pinned by community members are shown in Figure 2, Community Concerns. Many of the pins were in areas that participants lived in or were familiar with, which gave great insight into those areas; however, there were gaps in areas without attendee representation at the workshops.

The bead activities allowed residents to identify their answers to three different questions:

1. What is your biggest concern about wildfire?
2. What risk reduction methods do you think should be a priority in your community?
3. What vegetation management techniques do you want to see utilized in your community?

This involved community members identifying their top answers to the above questions by placing a bead in a corresponding jar to record their answers. Exhibit 5 shows the results from the answers to the question "What is your biggest concern about wildfire?" Full results from the other bead activities can be found in Appendix A.

Exhibit 5. Biggest wildfire concerns.



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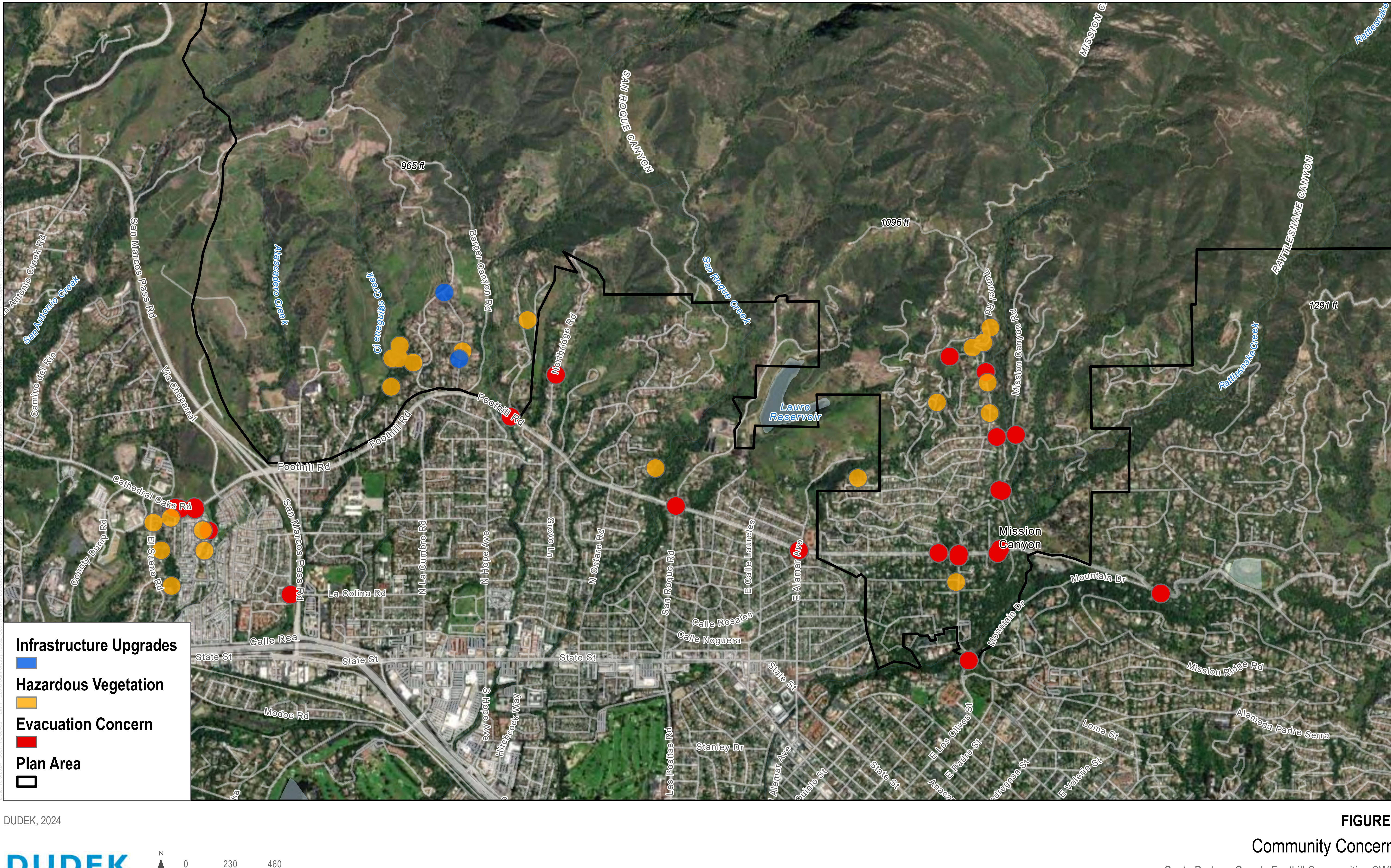

DUDEK, 2024

FIGURE 2

Community Concerns

Santa Barbara County Foothill Communities CWPP

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As shown in Exhibit 5, participants were most concerned about **evacuation**, with 51 beads being placed in that jar, followed by **hazardous vegetation** as the next biggest concern (27 beads). The issues that participants were least concerned about included **missing work or school** (0 beads).

As shown in Exhibit 6, when asked what risk reduction activities they most wanted to see in their communities, **public lands fuels reduction** was the top answer with 50 beads, followed by **roadside vegetation clearance** (29 beads) and **evacuation route improvement** (25 beads). Risk reduction activities that were not as highly desired by participants included **green waste disposal** (5 beads). It is possible that this received the fewest beads because green waste disposal programs are already taking place in the Plan Area. Residential properties in the Plan Area receive curbside pickup of their green waste bins alongside their trash and recycling by Marborg. Materials picked up curbside are taken to the County's ReSource Center, which includes a landfill and an anerobic digestor to deal with organic materials including green and food waste (Santa Barbara County Resource Recovery & Waste Management Division 2023). Additionally, the SBCFSC has a chipping program that in past years has included multiple communities within the Plan Area. The SBCFSC was awarded a 3-year grant to provide free curbside chipping services for residents throughout the south coast of the County to reduce fire risks around their homes by encouraging the development of defensible space in designated neighborhoods (SBCFSC 2024).

Lastly, as shown in Exhibit 7, when asked what vegetation management techniques participants wanted to see most in their communities, **prescribed fire** and **grazing** were the top answers, with 57 and 52 beads, respectively. **Herbicides** was the technique that was least desired by participants with only 2 beads.

Exhibit 6. Risk reduction activities.

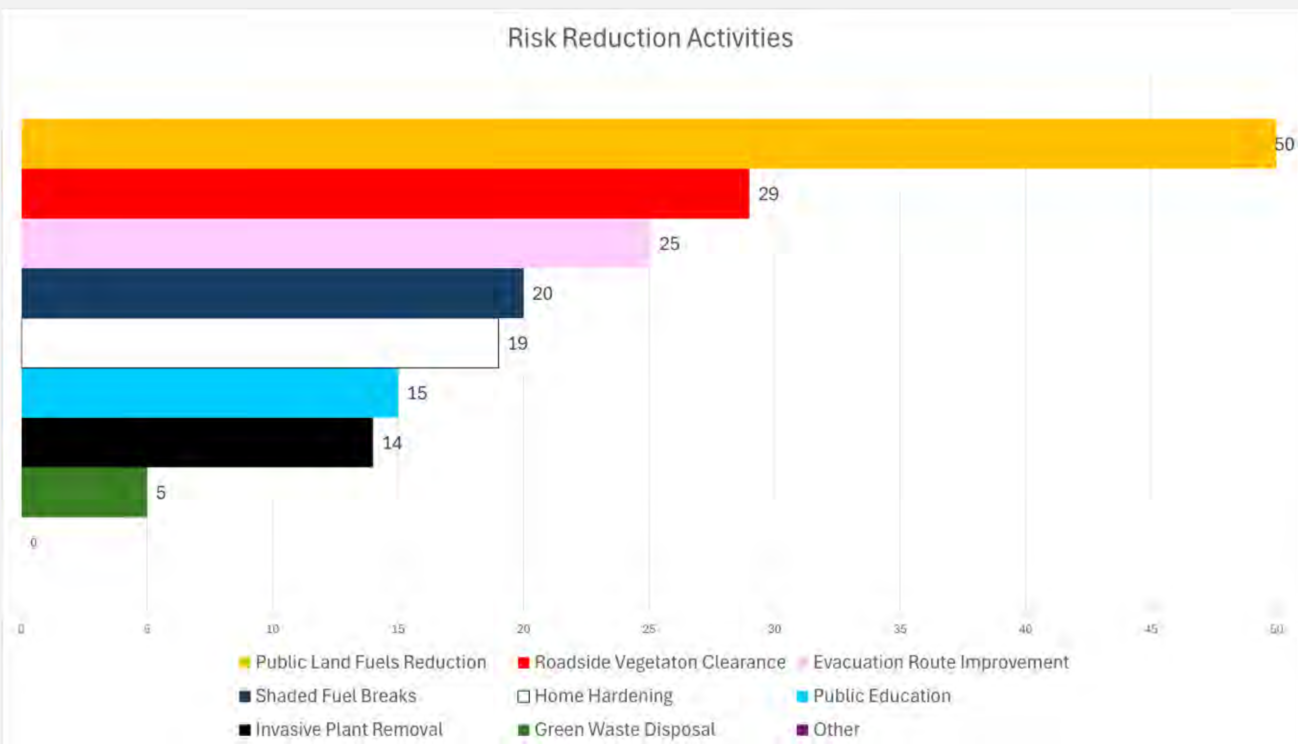
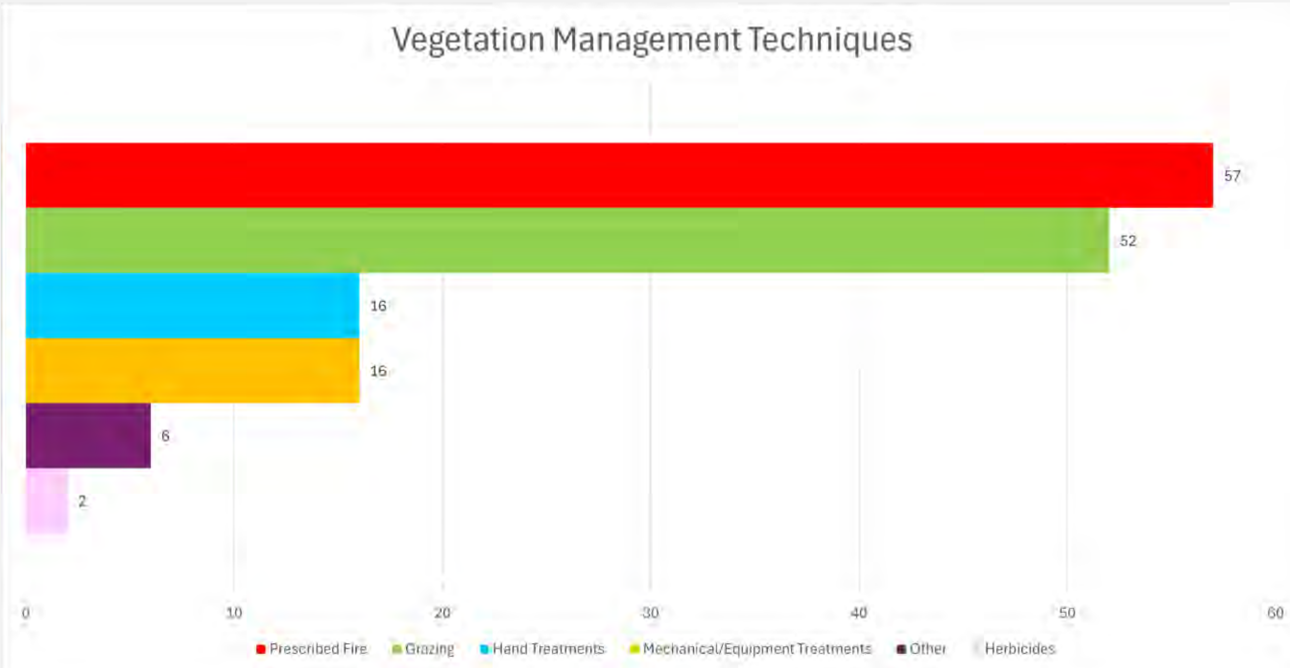


Exhibit 7. Vegetation management techniques.



Group Discussions

The community workshops included small group discussions, conducted in a roundtable format with small groups rotating to different discussion topics, each led by a facilitator. The group discussions were a key feature of the community workshops to learn more about the community members' experience with wildfire and build upon the insights received from the public survey. Exhibit 8 depicts community members, SBC Fire, and other interested parties participating in the group discussions. The discussion groups were assigned four topics:

1. Home hardening
2. Wildfire planning
3. Defensible space/vegetation management
4. Evacuation/community response

Exhibit 8. Community members, SBC Fire, and interested parties participating in group discussions at community workshops held on May 14 and May 22, 2024.

Each group discussed every topic, with the responses from previous groups being hidden at the start of each discussion section to allow for each group to think independently. Participants were asked to think about each topic in terms of challenges and opportunities that could either help or harm a community in preparing for wildfire. This framing helped garner input that can directly feed into actions items from the CWPP. Once the challenges and opportunities were compiled for each discussion section, the data were compiled and assigned a category. The categories are as follows:

Challenges

- Individual behavior
- Resource limitations
- Homeowner maintenance
- Public infrastructure
- Targeted education
- Outreach
- Community action

Opportunities

- Funding
- Outreach materials
- Multijurisdictional cooperation
- Communication
- Infrastructure upgrades
- Community action
- Resources
- Targeted education

The tree maps shown in Exhibit 9 and Exhibit 10 highlight the distribution of topics identified as challenges and opportunities related to wildfire resilience during the discussion groups from both workshops. The sizes of the individual rectangles within the tree maps are indicative of the number of times that topic was mentioned. The bigger the rectangle, the bigger the challenge/opportunity. When looking at the challenges (Exhibit 9), **resource limitations** and **individual behavior** were the categories that stood out as the biggest challenges to wildfire resilience. When looking at the tree map displaying opportunities (Exhibit 10), **community action** and **targeted education** represented the biggest opportunities identified. Breakdowns within each discussion topic and the full analysis can be found in Appendix A.

A third public workshop took place on February 27, 2025, via Zoom to present the Draft CWPP and allow community members to discuss comments and questions about the Draft CWPP. The final workshop included 18 attendees. The main feedback from the public workshop was positive, with comments indicating that the document was thorough and organized. The questions from the meeting involved the different treatment types recommended in the action plan, including the role of restoration in wildfire mitigation projects. Additionally, there were clarifications on the transportation study results.

Exhibit 9. Group discussion results – challenges.

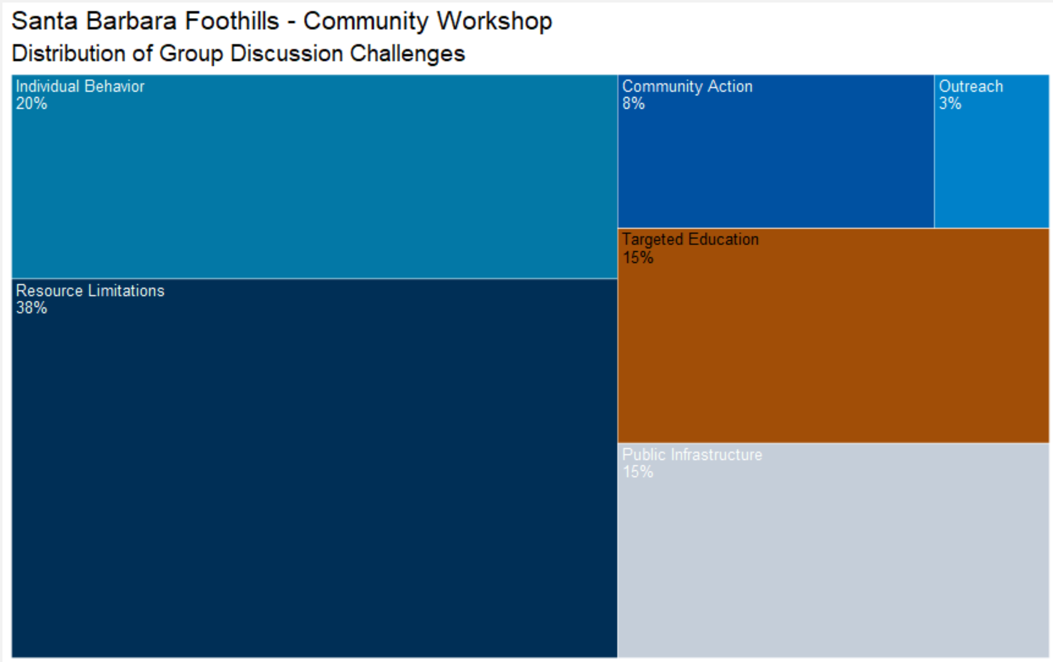
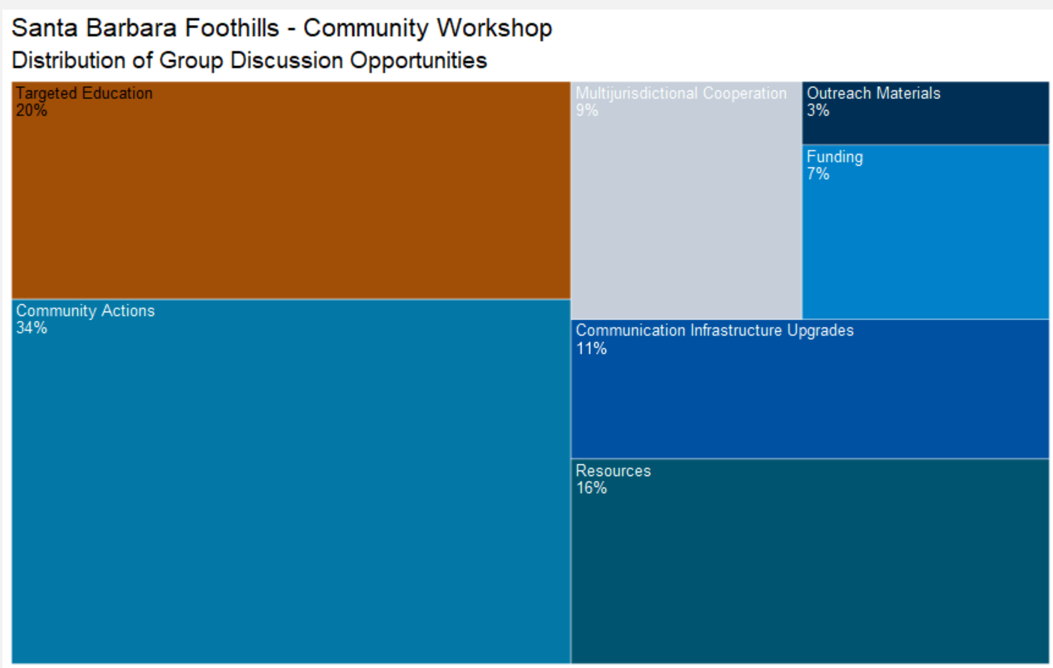


Exhibit 10. Group discussion results – opportunities.



1.5 Funding/Grant Management

Funding for the preparation of this CWPP was made available from a California Department of Housing and Community Development grant through the U.S. Department of Housing and Urban Development. The U.S. Department of Housing and Urban Development allocated Community Development Block Grant – Mitigation Planning and Public Services (MIT-PPS) funds to the State of California. MIT-PPS funds help assist local jurisdictions with mitigation-related planning and public services needs to support risk reduction from wildfire, flooding, and earthquake hazards. Eligible jurisdictions and nonprofit entities may use MIT-PPS funds to create projects that address risks to, or across, community lifelines that support human health and safety and provide mitigation for individual and community-based systems.

The grant period started on December 14, 2021, and extends through June 25, 2025. Grant management and reporting are being conducted by SBC Fire.

1.6 Signatories

The signatories for the Santa Barbara County Foothill Communities CWPP are as follows:

5. **Local government:** Roy Lee, 1st District Supervisor, Santa Barbara County Board of Supervisors
6. **SBC Fire:** Mark Hartwig, Fire Chief
7. **CAL FIRE:** John Owens, San Luis Obispo Unit Chief

2 Plan Area Description

2.1 Location

The Plan Area is in the southern portion of the County, immediately north of the City of Santa Barbara boundary. The Plan Area encompasses 10,696 acres bounded generally by SR-154/San Marcos Pass to the west, Santa Ynez Mountain Range and Montecito to the east, Santa Ynez Mountain Range and LPNF to the north, and City of Santa Barbara to the south. East Camino Cielo runs through most of the northern border of the Plan Area, while Gibraltar Road runs through the easternmost section of the Plan Area. The Plan Area location is presented in Figure 1.

2.2 Land Ownership

The dominant land use within the Plan Area is public land managed by the LPNF, which encompasses 8,554 acres in the northern majority of the Plan Area. The majority of these lands are undeveloped and feature large, densely vegetated, and steep open space areas. The LPNF includes many recreational use areas including the popular Tunnel, Jesusita, and Cathedral Peak trails. These trails provide access to popular recreational sites including Inspiration Point, Seven Falls, and Cathedral Peak. The La Cumbre Peak day use area is also managed by the LPNF and is accessible via East Camino Cielo.

Within the LPNF, the City of Santa Barbara owns and operates roughly 1,376 acres including Rattlesnake Canyon and Gould Park recreation areas. Also within the LPNF, the Land Trust for Santa Barbara owns, through easement, roughly 1,016 acres of natural areas. The University of California, through the UC Reserve System, owns roughly 134 acres within the southern extend of the LPNF. The UC Reserve System is a network of protected areas managed by the University of California to support research, education, and conservation.

The County owns roughly 106 acres of public land in the Plan Area including the Santa Barbara Botanic Garden and Rocky Nook Park. The Santa Barbara Botanic Garden is a roughly 78-acre botanical preserve located in the heart of Mission Canyon. Established in 1926, it focuses on the conservation and display of California's native plants. The Santa Barbara Botanic Garden includes native flora, scenic trails, and historic buildings. Over 100,000 people visit the Santa Barbara Botanic Garden annually.

Private land encompasses roughly 2,142 acres of the Plan Area and is mainly located in the southern region of the Plan Area. Private lands are mainly composed of moderate to high density single-family residential developments. Moving north, residential development generally becomes lower density with homes located on larger lots compared to developed areas to the south. Private cropland is also prevalent throughout the Plan Area often in the form of citrus or avocado orchards.

Table 3 describes the land ownership with the Plan Area. Land ownership distribution is presented in Figure 3.

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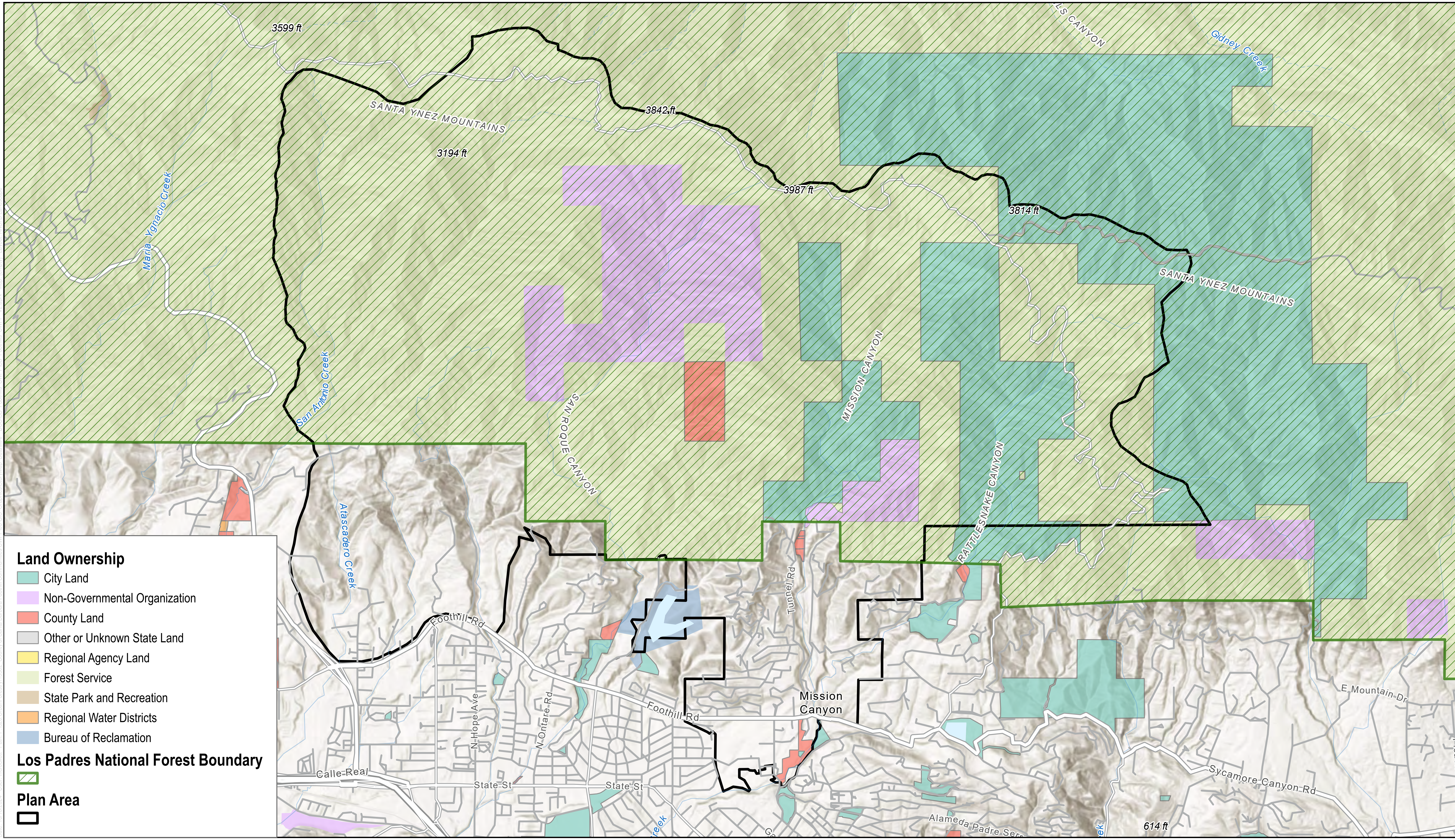

Source: USGS, 2020

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FIGURE 3

Land Ownership

Santa Barbara County Foothill Communities CWPP

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Table 3. Land Ownership within the Plan Area

Land Ownership	Acres	Percentage of Total
U.S. Forest Service, Region 5	5,811	54%
Private Ownership	2,142	20%
City of Santa Barbara	1,376	13%
Land Trust for Santa Barbara County	1,016	9%
University of California	134	1%
U.S. Bureau of Reclamation	110	1%
County of Santa Barbara	106	1%
Santa Barbara Flood Control and Water Conservation District	<1	<1%
Total:	**10,696**	**100%**

Source: USGS 2024a.

2.3 Plan Area Communities

This CWPP collectively covers a population of approximately 3,400 people who reside within the Santa Barbara County Foothill Communities of Mission Canyon, Barger Canyon, and portions of Northridge and San Roque, as well as several residences northeast of Foothill Road and SR-154 and rural residences north of these distinct established communities. The majority of development in the Plan Area consists of residential land uses. The largest and most densely populated community within the Plan Area is Mission Canyon. Table 4 provides a description of the residential communities within the Plan Area.

Table 4. Plan Area Communities

Plan Area Community	Community Description
Barger Canyon	The Barger Canyon community area encompasses a variety of land uses. The urbanized/built community located in the lower half of the community area is immediately adjacent to coastal oak woodland, cropland, montane hardwood, mixed chaparral, and annual grassland. Residential areas consist of approximately 123 structures concentrated primarily along Antone Road, Debra Drive, and La Vista Road. Croplands and deciduous orchards both have a large presence within the Barger Canyon community. Barger Canyon Preserve is located within this area. Cieneguitas Creek almost runs parallel with the western community boundary, while Arroyo Burro Creek runs through middle of the Barger Canyon community and moves southeast. This community boundary does not overlap with the Los Padres National Forest boundary.
Northridge	Not all of the Northridge community is included within the Plan Area. The piece of the Northridge community in the Plan Area is just north of where the majority of the residential structures are located along Northridge Road. Approximately four structures in the Northridge community exist within the Plan Area along the northernmost portion of Northridge Road. The area south of the Plan Area boundary along Northridge Road is within City of Santa Barbara jurisdiction. While the majority of the Northridge community area is dominated by mixed chaparral, additional vegetation in this area includes valley foothill riparian communities along the west and eastern community boundaries, coastal oak woodland alongside the valley

Table 4. Plan Area Communities

Plan Area Community	Community Description
	foothill riparian community in the northeastern portion of the area, and a small parcel of cropland. A portion of northern part of the community boundary overlaps with that of the Los Padres National Forest boundary. San Roque Creek flows in the northeast corner of the community boundary and into the San Roque community.
San Roque	The Plan Area encapsulates two different parts of the San Roque community: the southeast portion of the community, which contains the Lauro Canyon Reservoir, Cater Water Treatment Plant, Jesusita Trailhead, and a portion of the Jesusita Trail, and the northern portion of the community, which contains San Roque Canyon and a portion of the Jesusita Trail. The San Roque community within the Plan Area contains the most variety of land uses aside from the associated urban land use outside of the Plan Area. Vegetative communities found within this area are mixed chaparral, valley foothill riparian, coastal oak woodland, annual grasslands, croplands, and deciduous orchards. San Roque Creek is present from the northern to the southern border of the community and crosses into Steven's Park. Approximately 10 structures in the San Roque Community exist in the Plan Area, with the northernmost structures located off of an unnamed road adjacent to Jesusita Trail, southernmost closest to the Northridge Road and North Ontare Road junction, and easternmost off of Jesusita Lane and San Roque Lane. The area south of the Plan Area boundary is located within City of Santa Barbara jurisdiction, while the areas east of North Ontare Road (where it crosses into the northern San Roque boundary) and approximately 800 feet north of Santa Teresita Drive are within Los Padres National Forest boundary.
Mission Canyon	Out of the four communities located within the Plan Area, the Mission Canyon community is the most populous and largest with regard to area, structures, and population. Approximately 1,153 structures are heavily concentrated in the neighborhoods off State Route 192 and along the roads into the foothills. The northwest to northeast areas along the northern community boundary overlap with the Los Padres National Forest boundary. The Mission Canyon community area is almost entirely accounted for within the Plan Area and includes areas such as Rocky Nook Park, Rattlesnake Canyon, and the Santa Barbara Botanic Garden. Mission Creek moves through Mission Canyon—both of which are within the Santa Barbara Botanic Garden area. Rattlesnake Creek, which enters the community through the east, converges with Mission Creek approximately 500 feet north of Rocky Nook Park.
Northeast of Foothill Road and SR-154	The community west of Barger Canyon contains approximately 180 structures concentrated along Cieneguitas Road and Cocopah Drive. This community is located south of the San Marcos Foothills Preserve. A large portion of the area west of Barger Canyon is encapsulated by the San Marcos Foothills Preserve. A large area of cropland mixed with deciduous orchards is located just north of the preserve.
Rural residences	A few sparse residences exist outside of the aforementioned communities. Four structures are located along Rancho Vista del Mundo Via Gaitero, located north of the San Marcos Foothills Preserve and north of La Vista Road. A couple clusters of structures, as well as singles and duos, exist along different parts of Gibraltar Drive. In the southeastern corner of the Plan Area, there are 10 structures located relatively near each other. In the northeastern corner off of Gibraltar Road, there are another 10 structures located near one another. Two structures are located off a private road near the Tunnel Trailhead where East Camino Cielo and Gibraltar Road fork, near the northern boundary of the Plan Area. Two structures are located along the middle portion of the northern border of the Plan Area, approximately 0.5 miles from each other. Additional backcountry structures may be found throughout the Los Padres National Forest area.

2.4 Fire Hazard Areas

2.4.1 State Fire Hazard Severity Zones

Fire Hazard Severity Zones (FHSZs) are geographical areas designated pursuant to California Public Resources Code (PRC) Sections 4201–4204 and California Government Code Sections 51175–51189; they are currently classified as Very High, High, or Moderate in State Responsibility Areas (SRAs), and as Very High in Local Responsibility Areas. PRC Sections 4201–4204 and Government Code Sections 51175–51189 direct CAL FIRE to map areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors. The resulting FHSZs define the application of various mitigation strategies to reduce the risk associated with wildland fires (OSFM 2024). The model used to determine the extent of FHSZs is based on an analysis of many factors such as fire history, existing and potential fuel (natural vegetation), predicted flame length, terrain, typical fire weather, and blowing embers in non-wildland areas (OSFM 2024). Structures built in FHSZs are subject to more stringent fire-hardening requirements to increase survivability to wildland fires.

The Plan Area is in Very High (7,195 acres) and High (23 acres) FHSZs in an SRA. The Plan Area is also in Very High (26 acres), High (40 acres) and Moderate (43 acres) FHSZs in a Local Responsibility Area in the very southern region. Senate Bill 63 mandated CAL FIRE to revise the LRA FHSZ maps. The updated maps released in March 2025, broadened the FHSZs in the LRA to also cover areas with Moderate fire hazards, in addition to those classified as High and Very High. The Plan Area also includes lands classified as a Federal Responsibility Area (LPNF), where the federal government is responsible for fire protection. As a CAL FIRE Contract County, SBC Fire is the responsible agency for fire protection within the State and Local Responsibility Areas, while USFS in the responsible agency in the Federal Responsibility Area (LPNF). The State and Local FHSZ designations are presented in Figure 4, Fire Hazard Severity Zones.

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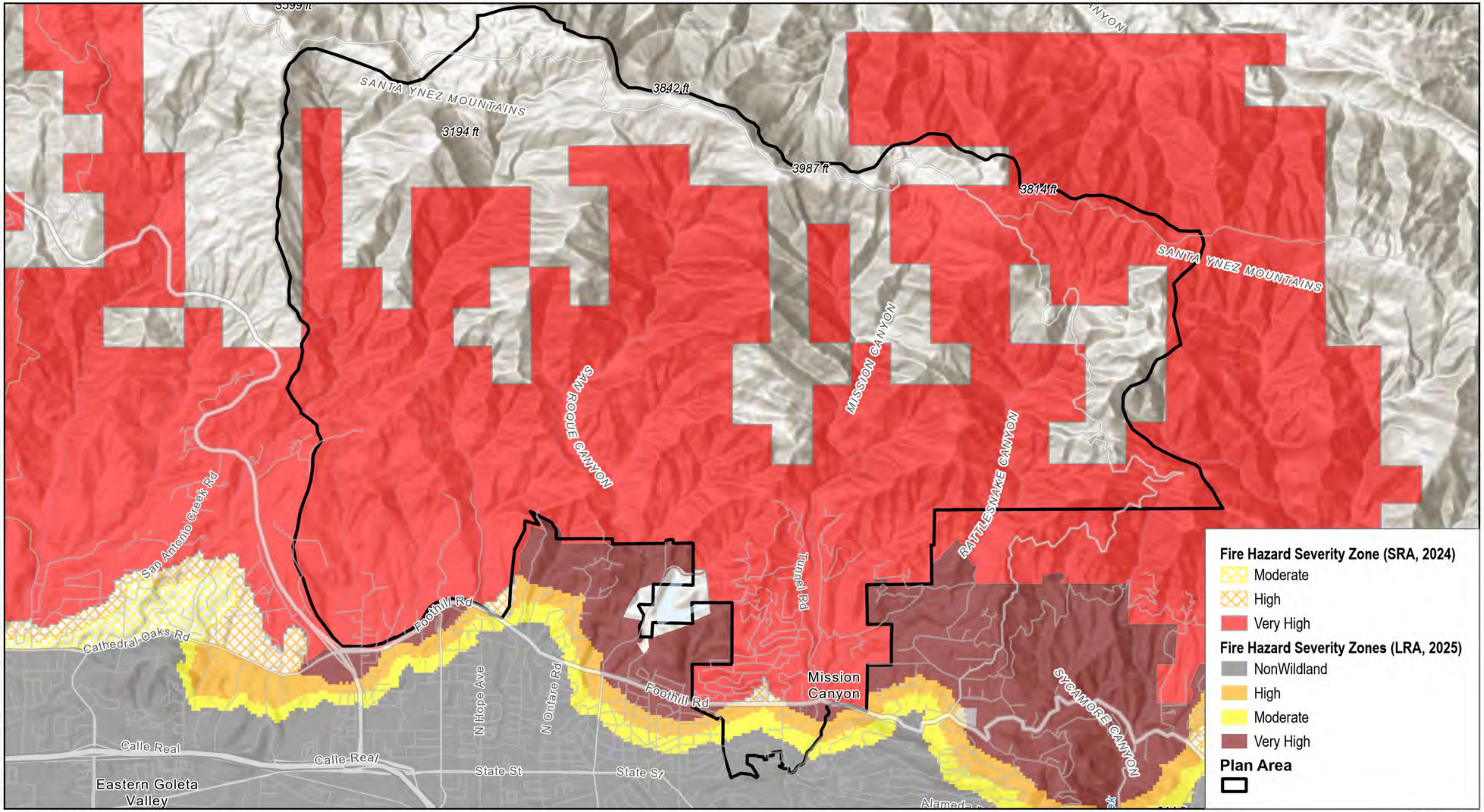

SOURCE: CAL FIRE, 2024 & 2025

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0 0.5 1 Miles

FIGURE 4

Fire Hazard Severity Zones

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2.4.2 County High Fire Hazard Area

During its adoption of the 2019 California Fire Code, SBC Fire added the "High Fire Hazard Area" map, which was adopted under Chapter 10 of the Santa Barbara County Code. Specifically, Section 702A of the California Building Code was amended for the County by adding the following definition:

> High Fire Hazard Area is an area of the County of Santa Barbara designated by the Building Official as having a high propensity for wildfire due to the existence of excessive wild brush fuel, lack of adequate water for fire suppression, or lack of adequate access to firefighting equipment and is shown on a map entitled "High Fire Hazard Area Map" on file in the County of Santa Barbara Building and Safety Division of the Planning and Development Department. This area is to be considered a Wildland-Urban Interface Area.

All of the Plan Area is within the County's High Fire Hazard Area. The County High Fire Hazard Area designation is presented in Figure 5, County High Fire Hazard Area.

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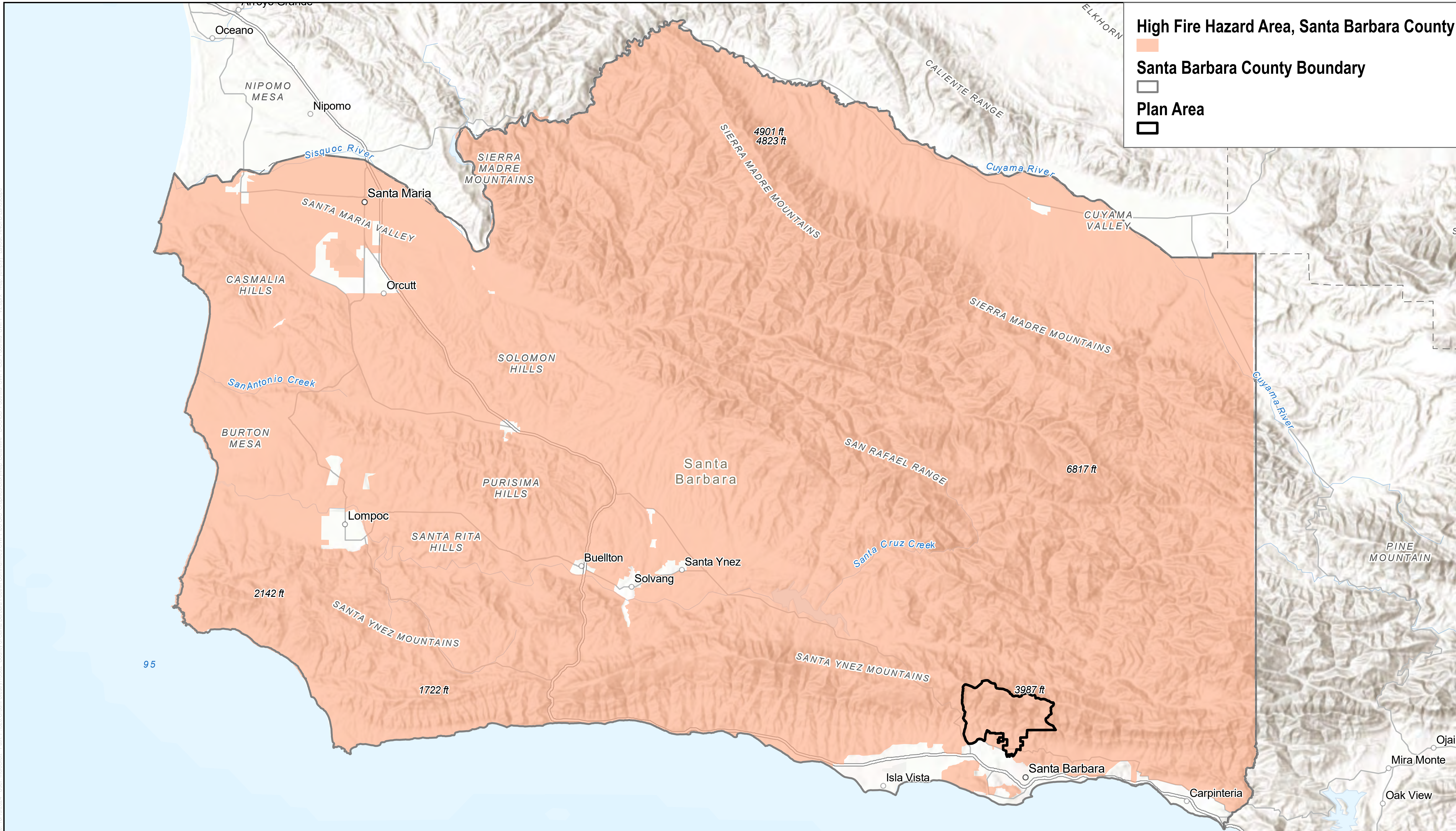

SBCFD, 2020

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N 0 230 460 Feet

FIGURE 5

County High Fire Hazard Area

Santa Barbara County Foothill Communities CWPP

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2.5 Climate

The Plan Area is generally characterized by a Mediterranean climate with dry summers followed by cool, wet winters. Average annual rainfall is roughly 20 inches, with the majority of rainfall occurring between November and April (U.S. Climate Data 2024). The average annual temperature in 2022 was 63.51°F and in 2023 was 61.87°F, with higher temperatures occurring in the summer and early fall (June through September). The average annual precipitation for the area is 17.73 inches, with the most rainfall concentrated in December (2.62 inches), January (8.00 inches), February (4.23 inches), March (5.18 inches), and April (1.34 inches). Rainfall is much less during June (0.09 inches), July (0.02 inches), and August (0.02 inches) (WRCC 2024).

The majority of precipitation in the Plan Area occurs during the winter months due to the migration of mid-latitude cyclonic storms (fronts) arriving along the California coast. Rainfall amounts generally increase with elevation along the Santa Ynez Mountains due to orographic lifting and cooling processes. Inversions, or the trapping of a stable layer of cool air below warmer air, is caused in part by the Santa Ynez Mountains north of the Plan Area. Surface and upper-level wind flow varies seasonally and geographically, and lack of wind and the right meteorological conditions can lead to an inversion. Surface temperature inversions occur between 0 and 500 feet above the ground surface and are most common during the winter. During an inversion, warmer air is held above cooler air; the normal temperature profile with altitude is inverted (MRCC n.d.). Fog is often present during the summer months as a result of warm air from inland areas meeting cold marine air.

The Plan Area falls into the Battalion 1 South geographical area categorized by the County. Battalion 1 is characterized by cities located along the coast and communities sprawling into the southern slopes of the Santa Ynez Mountain Range. It observes weather typical to other coastal communities of Central and Southern California. The many deep canyons running out of the coastal mountains towards the coast tend to catch and concentrate winds, enhancing the fire threat in warm, dry weather (County of Santa Barbara Fire Department 2023).

Live fuel moisture content, a measure of the relative mass of water and an indicator of ignitability, for most vegetation in the Santa Ynez Mountains reaches the driest point in the late summer or early fall. Seasonal drying of vegetation produces conditions that can result in fuel-driven wildfires and fire-associated climatic changes. This condition is referred to as a plume-dominated wildfire. Plume-dominated wildfires are fires where the energy produced by the fire, in conjunction with atmospheric instability, creates significant convective forces and increased wind speeds. Such fires are incredibly unpredictable, spread in various directions simultaneously, and exhibit extreme fire behavior. However, wildfires can occur during all times of the year due to local weather variations including drought conditions, high winds, or unusually high temperatures, all of which occur throughout California.

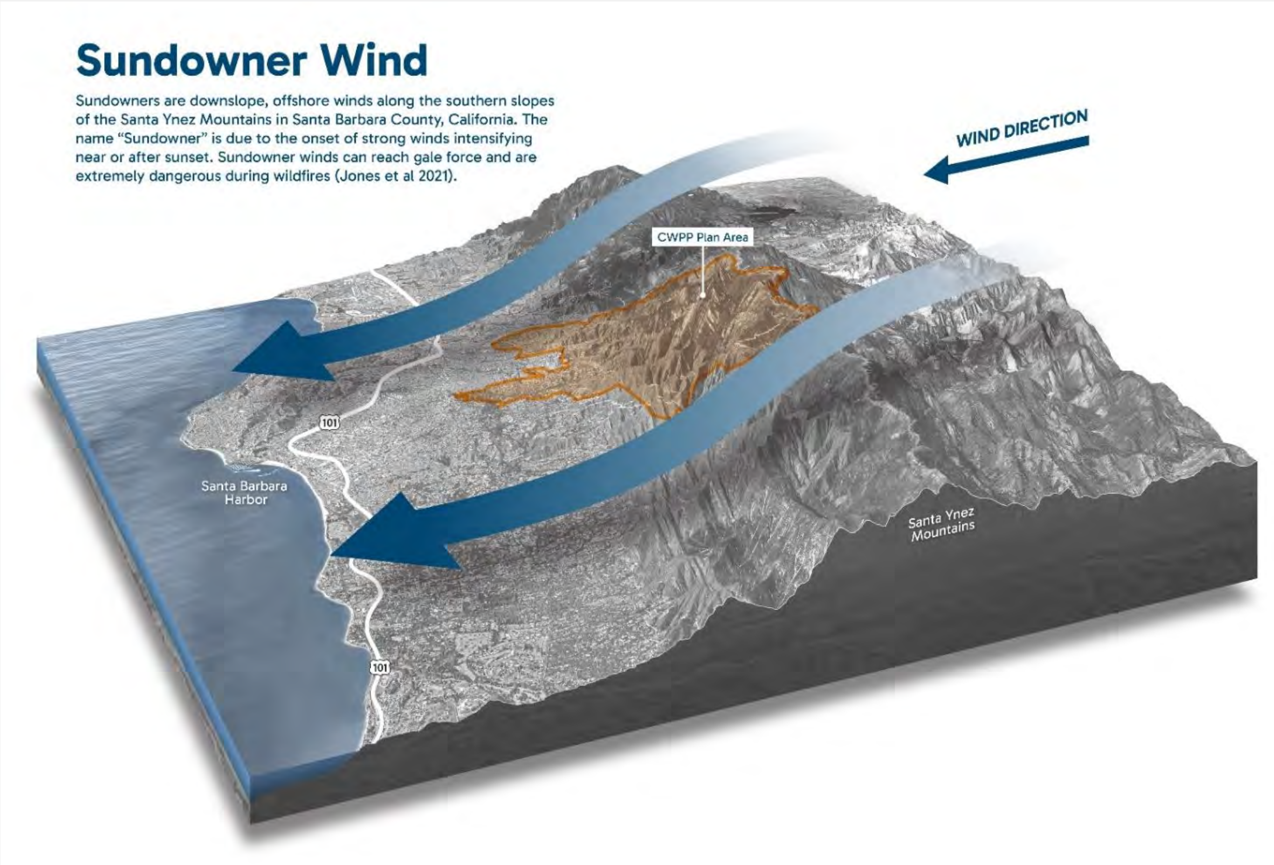
Micro-climates are also present in the Plan Area due to significant variations in topography. Micro-climates vary from low-elevation, wind-sheltered, and damp locations with northerly or easterly aspects, to high-elevation, wind-exposed, and dry locations with southerly or westerly aspects. Microclimate conditions can greatly affect fire hazard and should be considered when determining vegetation treatment priorities and implementation timing. Such conditions are often not captured in weather station datasets or recorded in easily referenced weather almanacs, but are usually well known to landowners, land managers, and local fire agency personnel.

Certain weather conditions can increase wildfire risk, resulting in the declaration of a Red Flag Warning by the National Weather Service. A Red Flag Warning means warm temperatures, very low humidity, and strong winds are expected to combine to produce an increased risk of fire danger. The Plan Area is located in three Fire Weather Zones: CA350, CA352, and some minor portions of CA351 (National Weather Service 2024). The County Red Flag Warning Program enables firefighting agencies within the County to manage critical resources and prepare suppression responses to protect life and property. Red Flag Warnings are typically issued 24 hours in advance of the fire weather. The Santa Barbara Office of Emergency Management, in conjunction with local fire officials, manages the text messaging system for alerting residents of Red Flag Warning Days.

2.5.1 Prevailing Winds and Sundowner Winds

Unlike most of the state's coastline, which experiences prevailing winds from the northwest, the Santa Ynez Mountains cause prevailing winds in the Santa Barbara region to flow from the south or west (Ryan 1994). Conversely, offshore winds that blow from the north/northeast are typically associated with low humidity and increased temperatures, which can lead to drier vegetation. This combination of dry fuel and strong winds can create ideal conditions for fire spread. Strong offshore winds can also make fire suppression difficult due to an increase in spot fires occurring ahead of the main fire front. The Plan Area also periodically experiences significant downslope wind and warming events. These strong, downslope winds are referred to as “Sundowner” winds because they often begin in the late afternoon or early evening. Sundowner winds are typically associated with a rapid rise in temperature and a decrease in relative humidity, similar to Santa Ana winds. Unlike Santa Ana winds which do not occur in Santa Barbara County, Sundowners may occur year-round in Santa Barbara County, and they occur within the Santa Barbara region an average of two or three times each year, with the highest frequency observed in spring (Hatchett et al., 2018). These winds have exacerbated all major wildfires in Santa Barbara County, including the Thomas Fire in December 2017, which became the most destructive wildfire in recent Southern California history (Kolden and Abatzoglou, 2018). Sundowner winds, which are usually warm and dry, can locally reach speeds in excess of 40 mph and cause a variety of public safety hazards. In the most extreme Sundowner wind events, wind speeds can be gale-force or higher, and temperatures over the coastal plain can rise to above 100°F. Wildfires driven by Sundowner winds have historically resulted in significant property damage (UCLA 1998). Exhibit 11 provides a graphic representation of Sundowner winds.

Exhibit 11. Sundowner winds over the Plan Area.



Dry Sundowner winds promote the ignition and rapid spread of wildfires by drying fuels and fanning the flames of fires once they are started. The wind's greatest effect on fire tends to be in autumn when vegetation has been desiccated after a long dry summer and before the onset of the winter rainy season. However, large fires have occurred during Sundowner conditions as late as February. Surface winds can also be influenced locally by topography and slope variations (Westerling et al. 2004). Daily timing of Sundowner winds (late afternoon/early evening) can create challenges for firefighting efforts, especially if ignitions occur late in the day or at night, as suppression actions using aircraft to limit initial spread are limited or impossible.

The greatest fire danger for the Plan Area coincides with the period when the Sundowner winds are at their strongest. Wildfires occurring in the WUI, fanned by the high winds, pose the most significant hazard associated with strong to severe Sundowner windstorms. All major wildfires affecting the Santa Barbara coast have exhibited significant fire spread rates toward the Santa Barbara WUI due to Sundowner winds. Some dramatic examples of these rapidly spreading wildfires fueled by strong Sundowner winds are the Eagle Canyon (September 1979), Painted Cave (June 1990), Gap (July 2008), Tea-House (November 2008), Jesusita (May 2009), Sherpa (June 2016), Whittier (July 2017), and Thomas Fires (December 2017). The 2017 Thomas Fire is considered the largest wildfire in Southern California's history to date. Despite the importance of Sundowners, little is known about the spatiotemporal variability and mechanisms driving these events. Contrary to Santa Ana winds that prevail during fall and winter seasons (Hughes and Hall 2010;

Jones et al. 2010), Sundowners occur year-round, though they appear to be more frequent during spring (Hatchett et al. 2018; Carvalho et al. 2020).

2.5.2 Climate Change

The fire season in the Plan Area has historically occurred in June through October as the fog recedes earlier in the day and vegetation begins to dry out from regular, dry, offshore winds. The fire season has historically ended in November with the onset of winter rainfall, cooler temperatures, and higher relative humidity, with fires less common from December through April. However, climate change effects are altering the fire season throughout the state, and the fire season in the Plan Area may ultimately be year-round, as observed with the 2017 Thomas Fire (December), the 2009 Jesusita Fire (May), and the 2008 Tea Fire (November)—all fires that occurred in the Santa Ynez Mountains.

California faces a dramatic increase in the number and severity of wildfires, with 15 of the 20 most destructive fires occurring since 2015 (CAL FIRE 2025). The state's major study on climate impacts, the Fourth Climate Assessment (OPR et al. 2019), projects that California's wildfire burn area is likely to increase by 77% by the end of the century. As identified in Governor Newsom's Strike Force report (State of California 2025), the growing risk of catastrophic wildfires has created an imperative for the state to act urgently and swiftly to expand fire prevention efforts. Current research has also identified that the frequency of autumn days with extreme fire weather has more than doubled in California since the early 1980s, a result of human-caused climate change. Such fire weather exhibits strong offshore winds (e.g., Sundowner winds) and coincides with unusually dry vegetation resulting from warm conditions over the summer months prior to the onset of autumn precipitation (Goss et al. 2020).

Climate change is expected to make landscapes more susceptible to extreme wildfires by altering temperatures (Hayhoe et al. 2004) and the availability and aridity of fuels (Abatzoglou and Williams 2016). Anthropogenic climate change has emerged as a driver of increased fire activity, a trend that is expected to continue (Abatzoglou and Williams 2016). All analyses completed for fire occurrence and severity into the future predict more frequent fires, a greater number of fires, and higher fire severity under climate change scenarios (Fried et al. 2004; Lenihan et al. 2008; Westerling 2018; Westerling et al. 2011).

A changing climate, combined with anthropogenic factors, has already contributed to more frequent and severe wildfires in the western United States (Abatzoglou and Williams 2016; Mann et al. 2016; Westerling 2016), with the number of human-caused fires being much higher in more populated regions of the state. Recently, the area burned by wildfires has increased consistent with increasing air temperatures (OEHHA 2018). Increased wildfire risk and severity are vulnerabilities that are anticipated throughout California (Krawchuk et al. 2009; Westerling 2018). Increased fire occurrence and severity under climate change would secondarily affect other areas of vulnerability, as noted below:

- **Increased Fire Risk:** Warmer air temperatures are expected to lengthen the fire season, drying out vegetation more quickly and increasing fire risk. Based on high- and low-emissions climate change scenarios, increases in the number of high-severity wildfires are anticipated (Westerling 2018). Multi-year severe drought is supported as a factor in increasing fire size and severity, as drought caused plant mortality (Crockett and Westerling 2018). On interannual and shorter time scales, climate variability affects the flammability of live and dead vegetation (Westerling 2016). Fire size in the central coast area also increases with air temperature in the month of ignition and with low precipitation in the preceding 12-month period (Westerling 2018). Additionally, the frequency of extreme fire weather in the fall months has increased over the past 40 years, a trend that is expected to continue under climate change models (Goss et al. 2020).

- **Greater Fuel Loads:** Years with widespread fires are historically preceded by wet years, which influence greater vegetation growth, especially in the understory. Highly flammable species, which often populate disturbed areas quickly, may have a competitive advantage over other species, typically resulting in a higher, more flammable fuel load. Drought may result in increased plant mortality and reduced fuel moisture, which contributes to increased ignition potential alongside higher fuel loads and increased wildfire size and severity (Crockett and Westerling 2018). Increasing fire size and severity and tree mortality are linked to increasing temperatures and aridity (Crockett and Westerling 2018). Increased prevalence of dead or desiccated fuels resulting from drought effects is conducive to crown fires, which require ladder fuels to move from volatile grasses to the less volatile mid-level forest to the dry and volatile canopy cover (Crockett and Westerling 2018). Increased fuel aridity contributes to larger forest areas experiencing increased periods of high fire potential (Goodwin et al, 2021) (Abatzoglou and Williams 2016).
- **Ecological Impacts:** Increased fire severity is expected to amplify and accelerate the ecological impacts of climatic change. Drought years may increase the vulnerability of vegetation to insects and disease. Climate-induced changes in fire behavior and frequency influence species distribution, migration, and extinction (Flannigan et al. 2000). Greater occurrence of fires increases the amount of carbon and particulates released into the atmosphere (Westerling and Bryant 2008).
- **Social Impacts:** Increased expenditures for fire suppression are anticipated, and the amount of burned property (in total area and monetary value) in coastal Southern California communities increases substantially under global climate models' high-emissions scenarios due to greater fire risk (Levy 2018; Westerling and Bryant 2008). In areas with the highest fire risk, wildfire insurance is estimated to see costs rise by 18% by 2055, and the number of properties insured lowered (Westerling 2018). Wildland fire smoke exposure is a growing risk to public health (Domitrovich et al. 2017). Secondary effects of increased fire, such as loss of recreational amenities, area closures, and excessive smoke, can have serious financial effects on regional business interests and local economies.

2.6 Terrain

The terrain of the Santa Barbara foothills is characterized by rugged, hilly landscapes and steep canyons. The foothills rise sharply from the coastal plain, with elevations ranging from a few hundred feet to several thousand feet (3,987 feet), creating steep slopes and canyons. The numerous canyons and steep drainages can funnel winds and contribute to rapid fire spread, especially during Santa Ana wind events.

The Plan Area includes diverse topography, including ridgelines, which are expected to increase wind speeds during Sundowner wind events. Many of these ridgelines exist in close proximity to communities, which may cause elevated fire behavior and unpredictable wind patterns near development. Notable terrain features in the Plan Area include Mission Canyon, San Roque Canyon, Barger Canyon, Rattlesnake Canyon, La Cumbre Peak, Cathedral Peak, Angostura Pass, Spyglass Ridge, and Owl Ridge.

Terrain affects wildfire movement and spread and can influence fire behavior, as summarized in Table 5 (See Project Storymap for photo examples). Steep terrain typically results in faster upslope fire spread due to the pre-heating of uphill vegetation. Flat areas typically result in slower fire spread when absent of windy conditions. Topographic features such as saddles, canyons, and chimneys (land formations that collect and funnel heated air upward along a slope) may form unique circulation conditions that concentrate winds and funnel or accelerate fire spread. Fire generally moves slower downslope than upslope. Terrain may also buffer, shelter, or redirect winds away from some areas based on canyons or formations on the landscape. Saddles occurring at the top of drainages or ridgelines may facilitate the migration of wildfire from one canyon to the next.

Table 5. Effects of Topographic Features on Fire Behavior

Topographic Feature	Effect
Narrow Canyon	Surface winds follow canyon direction, which may differ from the prevailing wind; wind eddies/strong upslope air movement expected, which may cause erratic fire behavior; radiant heat transfer between slopes facilitates spotting/ignition on opposite canyon side.
Wide Canyon	Prevailing wind direction not significantly altered; aspect significant contributor to fire behavior. Wide canyons are not as susceptible to cross-canyon spotting except in high winds.
Box Canyon/Chute	Air is drawn in from canyon bottom; strong upslope drafts. No gaps or prominent saddles to let heated air escape. Fires starting at the canyon bottom can move upslope very rapidly due to a chimney-like preheating of the higher-level fuels and upslope winds.
Ridge	Fires may change direction when reaching ridge/canyon edge; strong air flows likely at ridge point; possibility for different wind directions on different sides of the ridge. Ridges experience more wind. Fires gain speed and intensity moving toward a ridge. Fires burning at a ridge can exhibit erratic fire behavior. Strong air flows can cause a whirling motion by the fire. As the wind crosses a ridge it usually has a leeward eddy where the wind rolls around and comes up the leeward side.
Saddle	Potential for rapid rates of fire spread; fires push through saddles faster during upslope runs. Winds can increase when blowing through saddles due to the funneling effect of the constricted pass. On the other side, winds will slow, but erratic winds potentially occur at the saddle due to eddies.

Sources: NFPA 2011; Teie 1994.

2.7 Vegetation and Fuels

2.7.1 Vegetative Fire Hazard

Hazardous fuels include live and dead vegetation that exists in a condition that readily ignites, transmits fire to adjacent structures or ground surface or overstory vegetation, and/or is capable of supporting extreme fire behavior. All vegetation burns, but some plants are more flammable than others. Flammability can be defined as a combination of ignitability, combustibility, and sustainability. Ignitability is the ease or delay of ignition, combustibility is the rapidity with which a fire burns, and sustainability is a measure of how well a fire continues to burn with or without an external heat source (White and Zipperer 2010). Flammability is influenced by several factors that can be classified into two groups: physical structure (e.g., branch size, leaf size, leaf shape, surface-to-volume ratio, retention of dead material) and physiological elements (e.g., volatile oils, resins, and moisture content) (Moritz and Svihra 1998; UCCE 2016; UCFPL 1997; White and Zipperer 2010). Plants that are less flammable have low surface-to-volume ratios, high moisture contents, and minimal dead material or debris. Examples of such plants include agave, oleander, and olive trees. More flammable species have high surface-to-volume ratios, exhibit low moisture contents, contain volatile oils, and have high levels of dead material or debris (Moritz and Svihra 1998; UCFPL 1997; UCCE 2016; White and Zipperer 2010). Examples of such plants include pampas grass, juniper, and pine. Plant condition and maintenance is also an important factor in flammability potential. Some plants that have more flammable characteristics can become less flammable if well maintained and irrigated. Conversely, plants can be explosively flammable when poorly maintained or situated on south-facing slopes, in windy areas, or in poor soils (Moritz and Svihra 1998).

Age of fuels can also affect their vegetative fire hazard. In general, fuel accumulation is directly related to vegetation age, with older vegetation likely to exhibit greater fuel loads and increased wildfire intensity (Regelbrugge & Conard, 1998; Green, 1981). Fires in these older fuels tend to burn hotter and spread faster compared to fires burning in younger fuels.

Insects, fungi, other microbes, and vertebrates are a natural component of California native plant communities. Populations of pests are dynamic and fluctuate in response to climatic and environmental changes such as drought, stand density, fire, and other site disturbances. Healthy, vigorous plants are typically able to withstand pest attacks when pest populations are at low to moderate levels. When stressors exist (e.g., overstocking, shading, drought), plant vigor is reduced, and susceptibility to pest attacks and infestations increases. Infestations of pitch canker (*Fusarium circinatum*) and sudden oak death (*Phytophthora ramorum*) have been reported within the County (Pitch Canker Task Force 2012; University of California 2004). Eucalyptus longhorned borer (*Phoracantha semipunctata* and *Phoracantha recurva*) has also been documented within the County (California Agriculture 1996). These diseases/pests can contribute to wildfire hazards by increasing dead surface fuel loads and hindering firefighting efforts.

2.7.1.1 Vegetation Types

The existing vegetation types present in the Plan Area and their associated contributions to fire hazards are further discussed below. Table 6 summarizes the different vegetation types identified and mapped in the Plan Area, and Figure 6 presents the distribution of vegetation types in the Plan Area. Portions of the Plan Area have been mapped as urban land cover. Urban land cover typically represents noncombustible material (e.g., pavement) or developed and maintained landscapes (e.g., buildings, turf), although some areas may be disturbed lands characterized by annual or perennial grass cover. Ornamental landscape vegetation also characterizes portions of areas mapped as urban land cover. Such vegetation is a combination of native and introduced ground cover with grass, shrub, and tree species. Some ornamental vegetation may increase fire hazards due to plant composition and structure (as described above) and the lack of irrigation and maintenance.

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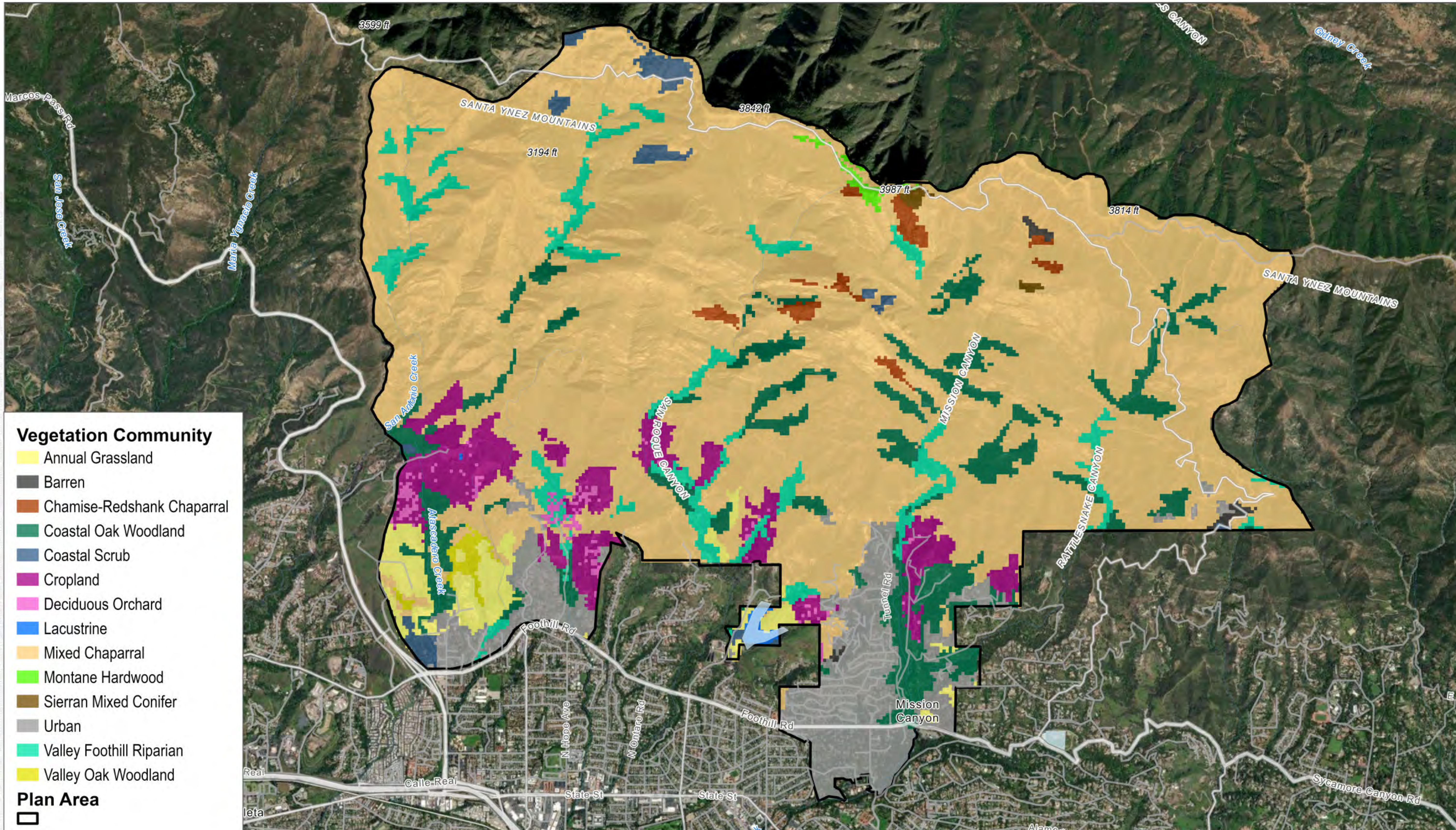

SOURCE: FVEG, 2021

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FIGURE 6
Vegetation Communities

Santa Barbara County Foothill Communities CWPP

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Table 6. Vegetation Types in the Plan Area

Vegetation Type	Acres	Percent Cover
Herbaceous Dominated		
Annual Grassland (AGS)	239	2%
Shrub Dominated		
Chamise-Redshank Chaparral (CRC)	86	1%
Coastal Scrub (CSC)	110	1%
Mixed Chaparral (MCH)	7,595	71%
Tree Dominated		
Coastal Oak Woodland (COW)	817	8%
Montane Hardwood (MHW)	26	<1%
Sierran Mixed Conifer (SMC)	16	<1%
Valley Foothill Riparian (VRI)	421	4%
Valley Oak Woodland (VOW)	38	<1%
Other		
Lacustrine (LAC)	23	<1%
Cropland (CRP)	497	5%
Deciduous Orchard (DOR)	58	1%
Urban (URB)	748	7%
Barren (BAR)	23	<1%

Source: FVEG 2015.

Herbaceous Dominated

Herbaceous-dominated fuels in the Plan Area are represented primarily by annual grassland (2% of Plan Area). Grassland is found in small communities throughout the southern portion of the Plan Area and is concentrated in the southwestern area outside of the Barger Canyon. Northridge is the only community that does not contain grassland.

Grassland types may include scattered and widely spaced trees and/or shrubs, although grasses are the dominant cover type. Grasses are fine fuels that are loosely compacted with a low fuel load.[3] Grasses have a high surface-area-to-volume ratio, requiring less heat to remove fuel moisture and raise the fuel to ignition temperature. They are also subject to early seasonal drying in late spring and early summer. Live fuel moisture content in grasses typically reaches its low point in early summer, and grasses begin to cure soon after. Due to these characteristics, grasses have the potential for a high rate of spread, rapid ignition, and facilitation of extreme fire behavior. Grasses are the vegetation type in the Plan Area with the highest risk for wildfire ignition. Their low overall fuel loads typically result in faster moving fires with lower flame lengths and heat output. Untreated grasses can help spread a fire into other adjacent surface fuel types (e.g., shrubs) or facilitate surface to crown fire[4] transition where they exist beneath tree canopies. Grasslands have a mean fire return interval of 2 years (USFS 2012).

3 The amount of available and potentially combustible material, usually expressed as tons per acre (NWCG 2022).
4 A crown fire is a forest fire that advances, often at great speed, from tree top to tree top.

Shrub Dominated

Shrub-dominated fuels in the Plan Area are represented by the chaparral and coastal scrub vegetation types. Mixed chaparral dominates the Plan Area with 71% coverage. Coastal scrub covers 1% of the Plan Area. Both chaparral and coastal scrub vegetation types may include scattered and widely spaced trees, small patches of grass/herbaceous vegetation, or grass herbaceous vegetation occurring beneath shrub canopies, although shrubs are the dominant cover. Fire return intervals for shrub dominated areas is around 30 to 50 years (USFS 2012).

Chaparral

Chaparral is found throughout the Plan Area, in the Santa Ynez Mountains and into the communities located within the Plan Area. Chaparral is considered a moderately fine fuel that is loosely compacted and has a moderate to high fuel load, depending on age. Chaparral has a high surface-area-to-volume ratio, requiring less heat to remove fuel moisture and raise the fuel to ignition temperature. Chaparral is subject to early seasonal drying in the late spring and early summer but does not fully cure in the way that grasses do. The live fuel moisture content reaches its low point in the late summer and early fall months. Dead fuels consist mainly of 1-hour and 10-hour fuel sizes, or twigs and small stems ranging from 0.25 inches to 1 inch in diameter. Chaparral has the potential for a high rate of spread, rapid ignition, and extreme fire behavior given its high content of volatile organic compounds.

The fire regime of chaparral communities is mostly stand-replacing crown fires.[5] Fire frequency interval is moderate and ranges depending on the dominant species. Fire return intervals in chaparral dominated landscapes can range from 33 to 125 years (USDA 2018). Mature chaparral stands are more flammable compared to younger chaparral stands (Green 1981).

Coastal Scrub

Larger areas of coastal scrub are found toward the northern border of the Plan Area, where East Camino Cielo and Forest Route 5N20 intersect, surrounded by mixed chaparral. Other clusters of coastal scrub are found in southwestern portion of the Plan Area alongside coastal oak woodland, adjacent to urban areas in the Mission Canyon community area, and in the southeastern portion of the Plan Area boundary. Coastal scrub is considered a moderately fine fuel that is loosely compacted with a moderate fuel load. Coastal scrub has a high surface-area-to-volume ratio, requiring less heat to remove fuel moisture and raise the fuel to ignition temperature. It is subject to early seasonal drying in the late spring and early summer but does not fully cure in the way that grasses do. Compared to chaparral, coastal scrub tends to have a lower content of volatile organic compounds. The live fuel moisture content reaches its low point in the late summer and early fall. Dead fuels consist mainly of 1-hour and 10-hour fuel sizes, or twigs and small stems ranging from 0.25 inches to 1 inch in diameter. Coastal scrub has the potential for a high rate of spread, rapid ignition, and extreme fire behavior. Average fire return range for coastal scrub ranges from 20 to 50 years (USFS 2012).

Tree Dominated

Tree-dominated fuels in the Plan Area are represented primarily by coastal oak woodland (8%) and valley foothill riparian (4%). Tree-dominated types may also include understory shrubs or shrub groupings and small patches of grass/herbaceous vegetation, although trees are the dominant cover.

5 A stand-replacing fire is usually of high fireline intensity and may be a crown fire but is characterized more by its effect on vegetation than the physical character of the fire. Stand-replacing fires leave few or no surviving plants/trees (Agee 1993).

Oak woodlands are the dominant forest type in the Plan Area, covering 8% of the landscape. Coastal oak woodlands are found in Plan Area drainages and canyons, along north-facing slopes, and are composed primarily of coast live oak (*Quercus agrifolia*). Coastal oak woodland populations are also found with and alongside valley foothill riparian vegetation communities within the Plan Area. These trees are notably flame-resistant due to their non-flammable leaves, which allows fires to smolder in the underbrush without reaching the canopy. Unlike many conifers, oaks do not easily propagate fire from tree to tree. However, other species in these woodlands, like coastal scrub, have highly flammable foliage that can create ladder fuels, potentially igniting the oak canopy.

Closed canopy oak woodlands often limit surface fuel production due to shading. The litter in these areas has a low surface-area-to-volume ratio, making it less conducive to fire spread. Although seasonal drying occurs in late summer, factors like fog drip and the canopy's windbreak can maintain higher fuel moisture levels. Oaks' low volatile organic compound content further reduces fire risks associated with these woodlands.

In open oak stands with shrub understories, the risk of severe fire behavior increases due to significant fuel loads, which can facilitate a transition from surface to crown fires. Grass understories in oak woodlands also influence fire dynamics, with larger oaks potentially acting as wind barriers and enhancing fuel moisture through shading.

Fire behavior in oak woodlands is influenced by dead fuel sizes, ranging from small litter to larger branches. While these woodlands generally lack features that promote fire spread, extreme weather and steep terrain can lead to moderate fire rates and severe fire behavior in certain conditions. The transition from ground fires to crown fires can elevate intensity, with oak trees igniting more readily under sufficient heat, particularly from low-hanging limbs or brush. Managing these risks can involve clearing underbrush and limbing trees to reduce fire hazards. The estimated fire return interval for oak woodlands is estimated to be about 12 years (UCANR 2017).

2.8 Threats that Exacerbate Wildfire Hazard

Insects/Pests

Insects, fungi, other microbes, and vertebrates are a natural component of California forests. Populations of pests are dynamic and fluctuate in response to climatic and environmental changes such as drought, stand density, fire, and other site disturbances. Healthy, vigorous trees are typically able to withstand pest attacks when pest populations are at low to moderate levels. When stressors exist in forests (e.g., overstocking, shading, drought), tree vigor is reduced, and tree susceptibility to pest attacks and infestations increases. Infestations of pitch canker (*Fusarium circinatum*) and sudden oak death (*Phytophthora ramorum*) have been reported within Santa Barbara County (Pitch Canker Task Force 2012; University of California 2004). Eucalyptus longhorned borer (*Phoracantha semipunctata* and *Phoracantha recurva*) has also been documented within the City (California Agriculture 1996). These diseases/pests can contribute to wildfire hazards by increasing dead surface fuel loads and hindering firefighting efforts.

2.9 Wildfire Types and Potential Fire Behavior

Several wildfire types exist, as summarized below.

- **Ground Fire:** A fire burning on the ground or through understory vegetation and not reaching into the canopy (NWCG 2022).
- **Surface Fire:** A surface burning fire with low flame lengths (usually less than 1 meter) that does not result in significant movement into understory or overstory vegetation (NWCG 2022).

- **Crown Fire:** A fire that has burned upward from the ground and into the tree or shrub canopy. There are three types of crown fires:
  - ***Passive Crown Fire*****:** A crown fire in which individual or small groups of trees or shrubs torch out, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fires encompass a wide range of crown fire behavior, from the occasional torching of isolated vegetation to a nearly active crown fire. Also called torching (Scott and Reinhardt 2001).
  - ***Active Crown Fire*****:** A crown fire in which the entire fuel complex becomes involved, but the crowning phase remains dependent on heat released from the surface fuels for continued spread. Also called running and continuous crown fire (Scott and Reinhardt 2001).
  - ***Independent Crown Fire:*** A crown fire that spreads without the aid of a supporting surface fire (Scott and Reinhardt 2001).

Another component of fire behavior is spotting—the transfer of firebrands (embers) ahead of a fire front—which can ignite smaller vegetation fires (NWCG 2022). These smaller fires can burn independently or merge with the primary fire. Spotting can also result in structural ignitions when transported embers reach a receptive fuel bed (e.g., combustible roofing), especially in wind-driven fires, such as those occurring during Sundowner wind events in the Santa Ynez foothills. Structure fires, as well as vegetation-fueled fires, can generate firebrands. Additionally, landscape features like ridges can dramatically affect fire behavior by changing prevailing wind patterns, funneling air, and increasing wind speeds, thereby intensifying fire behavior.

Each of the fire types mentioned above may occur within the Plan Area, depending on site-specific conditions. Fire behavior is how a wildland fire reacts to weather, fuels, and topography. The difficulty of controlling and suppressing a wildfire is typically determined by fire behavior characteristics, such as rate of spread, fireline intensity, torching, crowning, spotting, fire persistence, and resistance to control (NWCG 2022). Extreme fire behavior is that which precludes methods of direct control (e.g., flame lengths 8 feet and greater), behaves unpredictably and erratically, and typically involves high spread rates, crowning and spotting, the presence of fire whirls, and a strong convective column.

Fire behavior characteristics are an essential component in understanding fire risk. Flame length—the length of the flame of a spreading surface fire within the flaming front—is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews et al. 2008). Although it is a somewhat subjective and nonscientific measure of fire behavior, it is imperative to fireline personnel when evaluating fireline intensity and is worth considering as a vital wildfire variable (Rothermel 1993). Fireline intensity is a measure of heat output from the flaming front and affects the potential for a surface fire to transition to a crown fire. Table 7 presents an interpretation of flame length and its relationship to fire suppression efforts. As described further in Appendix B, Wildfire Hazard and Risk Assessment Memorandum, roughly 79% percent of areas within 500 feet of structures are modeled to exhibit flame lengths greater than 8 feet during extreme weather conditions.

Table 7. Fire Behavior Interpretation

Flame Length	Fireline Intensity	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 feet to 8 feet	100–500 BTU/ft/s	Fires are too intense for a direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.

Table 7. Fire Behavior Interpretation

Flame Length	Fireline Intensity	Interpretations
8 feet to 11 feet	500–1,000 BTU/ft/s	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1,000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at the head of fire are ineffective.

Source: Roussopoulos and Johnson 1975.
Note: BTU/ft/s = British thermal units per foot per second.

2.10 Fire History and Ignitions

Fire history is an important component of fire planning and can provide an understanding of fire frequency, fire type and behavior, most vulnerable community areas, and significant ignition sources, among others.

Wildfire suppression, human development patterns, and the absence of indigenous burning practices have led to significant fire history within and around the Plan Area and the County. According to CAL FIRE's Fire History Database, which includes timber fires 10 acres or greater and brush fires 30 acres or greater dating back to 1914, 13 wildfires have occurred within the Plan Area, 21 wildfires have occurred inside or within 1 mile of the Plan Area, and 491 wildfires have occurred within the County since the beginning of the fire history record. The topography, vegetation, and climatic conditions in the Plan Area combine to create a unique situation capable of supporting large-scale, high-intensity, and sometimes damaging wildfires, such as the 2009 Jesusita Fire. The history of wildfires in the Plan Area is summarized in Table 8 and graphically presented in Figure 7, Fire History, and Figure 8, Ignition History.

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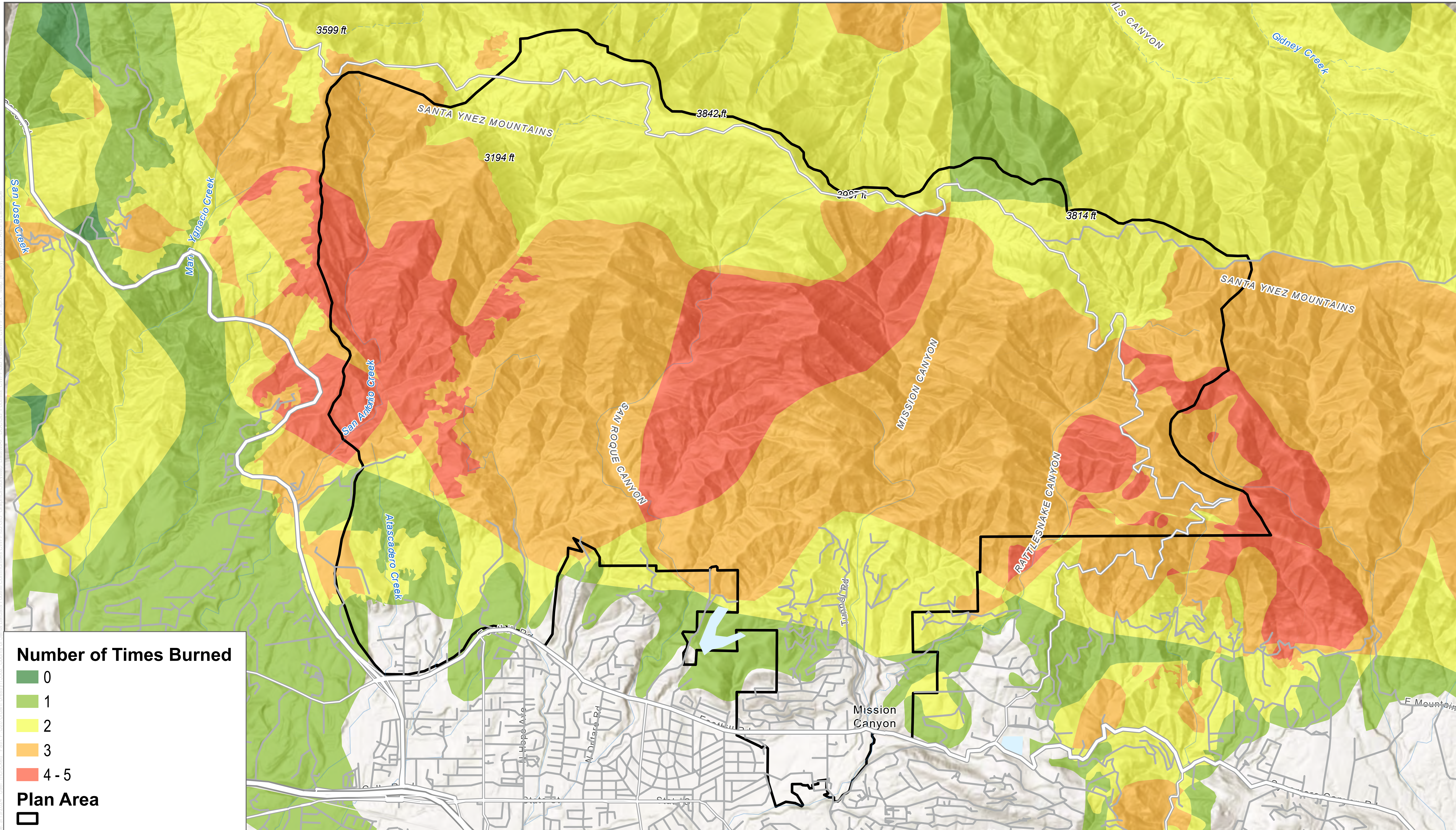

SOURCE: FRAP, 2024

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0 230 460 Feet

FIGURE 7
Fire History
Santa Barbara County Foothill Communities CWPP

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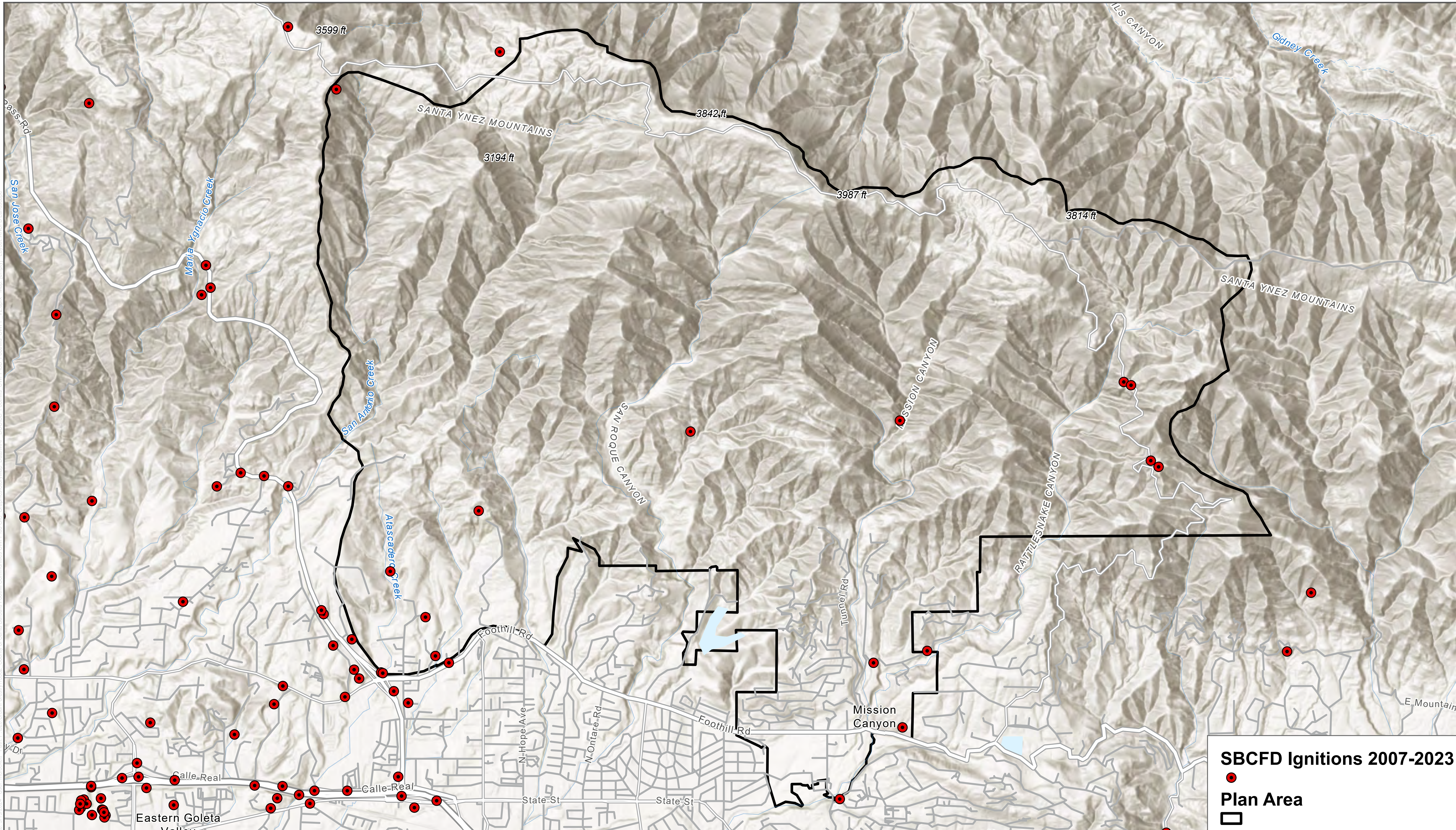

SOURCE: SBCFD, 2024

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0 230 460 Feet

FIGURE 8

Ignition History

Santa Barbara County Foothill Communities CWPP

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Table 8. Fire History

Fire Name	Year	Month	Acres	Cause
Unnamed	1914	Unknown	121	Unknown/Unidentified
Unnamed	1914	Unknown	99	Unknown/Unidentified
Unnamed	1917	Unknown	4,078	Unknown/Unidentified
Unnamed	1923	Unknown	61,896	Miscellaneous
Unnamed	1924	Unknown	2,253	Miscellaneous
Unnamed	1925	Unknown	12,119	Miscellaneous
Coyote	1964	September	65,339	Unknown/Unidentified
Rey	1981	September	2,244	Unknown/Unidentified
Paint	1990	June	4,425	Arson
Tea	2008	November	1,946	Campfire
Jesusita	2009	May	8,734	Equipment Use
Thomas	2017	December	281,791	Miscellaneous
Cave	2019	November	2,597	Arson

Source: CAL FIRE 2021a.

As presented in Table 8, significant wildfires have occurred from May through December. This timeframe somewhat coincides with the dry summer and fall seasons, when vegetation has lower fuel moistures and Sundowner winds are prominent. However, wildfires have burned outside of typical fire season, such as the Jesusita Fire in May 2009 and the Paint Fire in June 1990. Although not all the fires shown in Table 8 were associated with Sundowner winds, the largest and most damaging fires have occurred during such winds.

The cause of the majority of fires that burned within the Plan Area is either miscellaneous or unknown/unidentified. However, fires within the Plan Area have also been directly related to human activity. Mechanized and power equipment use (e.g., mowers) is a potential ignition source with the area, such as that associated with the cause of the 2009 Jesusita Fire. Arson and campfires have also been sources of significant wildland fires in the Plan Area, including the 2008 Tea Fire and the 2019 Cave Fire. However, the largest recorded fire within Santa Barbara County, the 2017 Thomas Fire, ignited as a result of line slap (power lines coming into contact with each other, creating an electrical arc, which deposits hot, burning, or molten material onto the ground into a receptive fuel bed). The Thomas Fire burned a portion of the easternmost part of the Plan Area, and most of its burn acreage lies outside of the Plan Area.

An analysis of wildfire ignition data can also help to understand where ignitions are occurring and inform wildfire mitigation project development. The CAL FIRE data utilized for Table 8 also identify causes of ignitions for fires occurring within and outside of the Plan Area boundary. The data were analyzed to identify ignitions occurring in and within 2 miles of the Plan Area boundary. A total of 91 wildfire ignitions occurred within 2 miles of the Plan Area from 1913 through 2021. The results of this analysis are presented in Table 9.

Table 9. Ignition History within 2 Miles of Plan Area

Cause Type	Ignition Quantity (Number)	Percentage of Total Causes
Undetermined	33	36%
Incendiary	11	12%
Vehicle	9	10%
Equipment	8	9%

Table 9. Ignition History within 2 Miles of Plan Area

Cause Type	Ignition Quantity (Number)	Percentage of Total Causes
Electrical Power	8	9%
Campfire	6	7%
Railroad	5	5%
Other	3	3%
Smoking	3	3%
Structure (exposure)	3	3%
Debris, Vegetation Burn	1	1%
Cutting, Welding, & Grinding	1	1%
Total:	**91**	**100%**

Source: Marsh, pers. Comm., 2024.

2.10.1 2009 Jesusita Fire

Exhibit 12. Jesusita Fire burn scar, May 13, 2009

The 2009 Jesusita Fire is the most damaging wildfire to occur within the Plan Area. The Jesusita Fire burned a considerable amount of the Plan Area and encroached into communities within and outside of the Plan Area. The Jesusita Fire started on May 05, 2009, and was caused by two contractors clearing brush along the Jesusita Trail with power tools (Ford 2013). The fire sustained itself over a span of approximately 2 weeks and destroyed 80 homes and damaged 15 other structures before it was contained on May 18, 2009. In total, the Jesusita Fire burned 8,733 acres north of the City of Santa Barbara in the WUI area adjacent to the LPNF and in the area of Mission Canyon (see Exhibit 12) (CAL FIRE 2009). At its peak, about 30,000 residents evacuated. Mandatory evacuations were expanded to include most of San Roque and Mission Canyon, as well as much of the Upper Riviera to State Street (Powell 2019). Access challenges existed for fire suppression personnel due to the narrow roads, ornamental and native vegetation, and the arrangement of the homes among the canyons and ridges (CAL FIRE 2009). Nearly 30 firefighters sustained injuries from the Jesusita Fire. Following the containment of the Jesusita Fire, the two contractors were charged with operating a weed whacker without a hot work permit in December 2009. In 2011, 60 homeowners affected by the fire sued Stihl Incorporated, the manufacturer of the equipment, for not warning that the cutter's metal blades could spark fires, and reached a settlement for an undisclosed amount (EDHAT 2024).

Fire behavior related to the northwest and downslope Sundowner winds encouraged fire spread through spotting in favorable topography and caused the fire to extend in multiple directions (CAL FIRE 2009). A Santa Barbara Independent article written by Ray Ford details firsthand experience of this shift in winds and its effects on firefighting efforts (Ford 2009). A change in wind patterns in the area working with local topography contributed to a sudden increase in fire behavior and consequential firefighter and civilian injuries, as noted in the CAL FIRE Jesusita Fire Burnover Report. Canyons and drainages present in the Plan Area aligned with the Sundowner wind direction in a way that exacerbated fire behavior and fire spread. The report notes that, throughout the course of a day, the Jesusita wildfire reacted to upslope winds; the offshore wind stream began to interact with established up-canyon winds. resulting in an erratic, gusty wind flow; and the Sundowner winds in the area eventually took over. Subsiding air funneled downslope through canyons and passed with great velocity. The wind pattern propelled fire spread through spotting and contributed to the extension of the fire in multiple directions. The several engine companies assigned to structure protection during this day experienced sudden extreme fire behavior related to the Sundowner winds typical of the area, which resulted in the burn over of a Ventura County engine company, causing burns and smoke inhalation to the engine crew members, and major damage to the fire engine. During this same fire behavior event, several other engine companies and overhead personnel were required to take refuge in structures and apparatus (CAL FIRE 2009).

2.11 Fire Protection

2.11.1 Santa Barbara County Fire Department

SBC Fire was established in 1926 and is a multidisciplinary agency that responds to a variety of incidents, including vehicle, aircraft, and train accidents; hazardous materials incidents; urban search and rescue; structure fires; water rescue; medical emergencies; rope rescue; air support; confined space rescue; fire line construction; and vegetation fires. SBC Fire has 16 fire stations with 16 engines and two truck companies. There are three battalions in the south, central, and northern parts of the County. SBC Fire employs approximately 277 full-time employees and responds to more than 15,000 incidents annually. Additionally, SBC Fire is one of six contract counties with CAL FIRE, meaning in the SRA, fire protection is provided by the County under contract with CAL FIRE. SBC Fire protects 797,252 acres of SRA within the County (CAL FIRE 2023). SBC Fire Station 15 is within the Plan Area, located in the developed area of the Mission Canyon community on Foothill Road.

SBC Fire also serves as the County Operational Area Coordinator for all fire agencies within the County. Due to the combination of limited resources and frequent large incidents, there are regional response teams made up of personnel from local fire agencies that respond to large-scale incidents. XSB Incident Management Team No. 3 responds to all large-scale incidents the County. XSB Incident Management Team No. 3 has been deployed to oversee and manage incidents such as the Whitter Fire, Cave Fire, Gibraltar Fire, and January 9th Montecito Debris Flow.

SBC Fire provides a complete range of fire protection, prevention, and educational services in the Plan Area. SBC Fire is staffed and equipped for structural fire protection and wildland fire prevention and protection, including full-time staffing of wildland fire experts, developing codes and standards for vegetation management and structural protection, implementing vegetation management projects and a defensible space inspection program, and working with the community to increase resilience in the event of a wildland fire.

In addition to fire protection from SBC Fire, the Plan Area is served by USFS and mutual aid agreements with adjacent jurisdictions (e.g., Montecito Fire Department, City of Santa Barbara Fire Department).

2.11.1.1 Fire Stations and Fire Equipment

There are four SBC Fire stations, eight City (of Santa Barbara) fire stations, three USFS fire stations, two Montecito fire stations, one Carpinteria-Summerland fire station, and SBC headquarters within 5 miles of the Plan Area. Station 15 is in the Plan Area on Foothill Road. Each fire station in SBC Fire is staffed 24 hours a day/7 days a week with a minimum of three firefighters. The stations within 5 miles of the Plan Area and fire equipment available are listed in Table 10.

Table 10. Fire Stations within 5 Miles of the Plan Area

Station ID	Address	Equipment	Staffing
County Station 12	5330 Calle Real Goleta, California 93117	Engine 12 Engine 312	(1) Captain (1) Engineer (1) Firefighter Paramedic
County Station 13	4570 Hollister Santa Barbara, California 93110	Engine 13 Engine 313 UTV13 Reserve Engine 319	(1) Captain (1) Engineer (1) Firefighter Paramedic
County Station 15 **[located within Plan Area]**	2491 Foothill Road Santa Barbara, California 93105	Medic Engine 15 Engine 315	(1) Captain (1) Engineer (1) Firefighter Paramedic
City Station 1	121 West Carrillo St, Santa Barbara, California 93101	Engine 71 Truck 71	3-person engine: (1) Captain (1) Engineer (1) Firefighter 4-person truck/squad crew: (1) Captain (1) Engineer (2) Firefighter
City Station 2	819 Cacique St., Santa Barbara, California 93101	Type 1 Engine Type 1 Haz Mat Engine	(1) Captain (1) Engineer (1) Firefighter Hazardous Materials Response Team
City Station 3	415 East Sola St., Santa Barbara, California 93101	Engine 73 Engine 673	(1) Captain (1) Engineer (1) Firefighter
City Station 4	19 N Ontare Rd., Santa Barbara, California 93101	Engine 74 Engine 374	(1) Captain (1) Engineer (1) Firefighter

Table 10. Fire Stations within 5 Miles of the Plan Area

Station ID	Address	Equipment	Staffing
City Station 5	2505 Modoc Rd., Santa Barbara, California 93101	Type 1 Engine	(1) Captain (1) Engineer (1) Firefighter
City Station 6	1802 Cliff Dr., Santa Barbara, California 93101	Type 1 engine	(1) Captain (1) Engineer (1) Firefighter
City Station 7	2411 Stanwood Dr., Santa Barbara, California 93101	Engine 77 Engine 377	(1) Captain (1) Engineer (1) Firefighter
City Station 8 (at Santa Barbara airport)	40 Hartley Pl., Santa Barbara, California 93101	2 ARFF Engines (for aircraft incidents)	(1) Captain (2) Engineers All are federally ARFF certified
Montecito Fire Department Station 91 (HQ)	596 San Ysidro Rd., Montecito, California 93108	Type 1 Engines Paramedic Squad Battalion Chief vehicle Type 6 Engine Wildland Fire Engine Urban Search and Rescue – Medium Unit Type 2 Transport Ambulance	1 Battalion Chief 1 Captain 1 Engineer 2 Firefighter Paramedic 2 Firefighter Paramedic or Firefighter
Montecito Fire Department Station 92	2300 Sycamore Canyon Rd., Montecito, California 93108	Type 1 engine Type 6 engine Wildland fire engine	1 Captain 1 Engineer 1 Firefighter Paramedic 1 Firefighter Paramedic or Firefighter
Carpinteria-Summerland Fire Department 62	2375 Lillie Ave., Carpinteria, California 93013	2013 Type 1 engine (Structure) 2001 Type 1 engine (OES mutual aid engine)	1 Captain 1 Engineer 1 Firefighter Paramedic 1 Firefighter (this position is sometimes dropped due to staffing patterns)
US Forest Service Gibraltar Station	2499-2419, CA-192, Santa Barbara, California 93103	Type 3 Engine (Engine 346)	7- or 5 day staffing
US Forest Service Los Prietos Station	3505 Paradise Rd, Santa Barbara, California 93105	Two Type 3 Engine (Engine 342 and 343), Los Padres IHC, Dozer 4	7- or 5 day staffing

Table 10. Fire Stations within 5 Miles of the Plan Area

Station ID	Address	Equipment	Staffing
US Forest Service San Marcos Station	5398 E Camino Cielo, Santa Barbara, California 93105	Type 3 Engine (Engine 341)	7- or 5 day staffing
US Forest Service Rincon Station	6115 Casitas Pass Rd, Carpinteria, California 93013	Type 3 Engine (Engine 345)	7- or 5 day staffing

Sources: Atchison and Elmquist, pers. comm. 2024; vonTillow, pers. comm. 2024; Carpinteria-Summerland FPD 2014; SBC Fire 2022b.
Notes: ARFF = Aircraft Rescue and Fire Fighting

SBC Fire also has several special operation units, such as the Air and Wildland Fire Unit, Construction Section, Hazardous Materials Response Team, Urban Search and Rescue, Search Dog Team, Water Rescue Team, and Wildland Fire Crew (SBC Fire 2022c). The Air and Wildland Fire Unit was formed in response to the fire hazard in the County and repeated extreme wildfire events such as the Gap Fire, Tea Fire, Jesusita Fire, Sherpa Fire, Whittier Fire, and Thomas Fire. Within the Air and Wildland Fire Unit is the Construction Section and the Wildland Fire Crew. Resources include two firefighting helicopters, four fire bulldozers, two Type 1 20-person fire crews, and one Type 2 16-person fire crew. The Construction Section has multiple roles, which include fire suppression, fire rehabilitation, overhaul support on structure incidents, and fire roads/break maintenance. Some of the important functions of the Construction Section are to maintain fire access roads, prepare prescribed burns, reduce hazards, maintain and repair chainsaws, maintain and repair vehicles, and other projects. The Wildland Fire Crew is located at Camp One in Lake Cachuma. Each crew has 16 fire control workers and two full-time senior fire control workers who are directly supervised by an engineer/crew boss. There is also one captain to oversee the program. During fire season, the crew is staffed 7 days a week. The Wildland Fire Crew is also responsible for completing annual projects that meet that SBC Fire Unit Plan, as well as grant-funded, state-funded, and federal-funded projects throughout the County (SBC Fire 2022d, 2022e).

Fire Hydrants

An analysis done by researchers at University of California Santa Barbara showcases the access and spacing of fire hydrants within Santa Barbara, including the Plan Area. There are 164 fire hydrants in the Plan Area covering 110 road segments, with an average spacing between them of 511 feet and the maximum distance between them being 1,471 feet. This work identifies code violations throughout the Santa Barbara region that suggest pockets of vulnerability and risk (Figueroa et al. 2024).

In a similar analysis, researchers analyzed the distance between fire hydrants, access roads, and structures in the Plan Area, since accessibility between fire hydrants and buildings is paramount in emergency response. The researchers offer an approach to help with the challenges of analyzing the spatial relationship between structures, hydrants, and access roads. The methods can precisely and accurately identify the furthest point around a building structure from a hydrant, facilitating risk assessment. Within the Plan Area, the average path length from a hydrant to the furthest project point on a structure is just over 137 feet, with 1,317 conforming structures within 150 feet (Baik and Murray 2024).

2.11.2 U.S. Forest Service

The USFS Santa Barbara Ranger District has jurisdiction in the LPNF and can provide fire protection to the Plan Area. The USFS provides wildland fire suppression across the County via engine crews, hand crews, helitack crews, hotshots, and smoke jumpers. In addition to fire suppression, the USFS also facilitates fuels management projects such as prescribed burns and mechanical treatments and aids in fire prevention via Community Mitigation Assistance Teams and Fire Adapted Communities. The USFS Pacific Southwest Region Fire and Aviation Management is primarily responsible for fire suppression and management within the LPNF lands and lands managed by USFS partners. The Pacific Southwest Region Fire and Aviation Management is primarily responsible for wildland fire protection within the Federal Direct Protection Area (Fed DPA) (USDA 2024). Within the Plan Area, private lands do extend into the LPNF, which are designated as SRA. CAL FIRE has a legal responsibility to provide fire protection on all SRA and State DPA lands. SBC Fire is a contract county of CAL FIRE for the SRA and provides fire protection within the SRA designated zones. As mentioned below, SBC Fire and LPNF have a fire protection partnership that would allow them to collaborate for fire suppression and management.

2.11.3 Fire Protection Partnerships

As previously described, SBC Fire acts as the Operational Area Coordinator for all fire agencies within the County. This also includes coordinating mutual and automatic aid plans within and outside of the County. Automatic aid is a contractual agreement between agencies and/or fire districts, and aid is dispatched to all first alarms. Mutual aid agreements differ from automatic aid in that outside assistance typically is provided when the agreement is activated and aid is requested by the primary responding agency. Within the Operational Area, the following nine fire agencies provide mutual and automatic aid:

- Carpinteria-Summerland Fire Protection District
- Guadalupe City Fire Department
- Lompoc City Fire Department
- Montecito Fire Protection District
- Santa Barbara City Fire Department
- SBC Fire
- Santa Maria City Fire Department
- LPNF
- Vandenberg Air Force Base Fire Department

Additional aid from outside the County may come from San Luis Obispo County Fire, CAL FIRE, and Ventura County Fire. In the event of a large-scale wildfire, the state would also coordinate additional aid from across the state and country.

2.12 Existing Fire Risk Reduction Programs

2.12.1 Mission Canyon Community Wildfire Protection Plan

The County contains many areas that have a CWPP guiding wildfire protection planning for their applicable communities, but the Mission Canyon CWPP is the only CWPP within the Plan Area. The CWPP for the Mission Canyon community was published in 2011. The purpose of the Mission Canyon CWPP is as follows:

- Identify potential areas for hazardous fuel reduction treatments, increase the community's understanding of living in a fire-adapted ecosystem, and improve its ability to prepare for, respond to and recover from wildland fires.
- Recommend best practices fuel reduction treatments to protect lives and reduce structural ignitability of property, and recommend best practices to improve the fire resilience of the landscape while protecting other ecological, social, and economic values.

In addition to recommending priorities and strategies in the wildland urban interface and vicinity, the Mission Canyon CWPP assists SBC Fire and Mission Canyon area residents in the identification of surrounding lands, including federal and state lands, at risk from catastrophic wildland fire (MCA 2011).

The Mission Canyon CWPP was incorporated into this CWPP because the community is located within this CWPP's Plan Area. While the Mission Canyon CWPP details community-specific characteristics, issues, and concerns, this CWPP builds upon the existing Mission Canyon CWPP by utilizing fire behavior modeling and geographic information system (GIS) to analyze wildfire hazard and wildfire risk; analyzing evacuation scenarios with factors such as travel demand, roadway capacity, and ingress/egress in mind; and creating a community relative risk ranking to identify high risk communities where wildfire risk mitigation should be prioritized. Community outreach efforts were also conducted for direct insight into community concerns, barriers to wildfire resilience, and desired actions to mitigate wildfire risk.

Additionally, the Mission Canyon CWPP discusses project requirements, designs, and considerations for future projects in the community but does not list projects that were ongoing or planned for the area at the time the Mission Canyon CWPP was published. The Santa Barbara County Foothill Communities CWPP identifies priority projects in the Plan Area, which include the following in the Mission Canyon community area (see Appendix E for further details):

- Rocky Nook roadside (Fuels)
- Mission Oaks Lane road improvements
- Mission Canyon/Tunnel Road roadside (Fuels)
- Mission Canyon West (Fuels)
- Tunnel Road roadside (Fuels)
- Restore agricultural condition (Fuels)
- Three project areas alongside and east of Mission Canyon Road
- Owl/Holly/San Roque roadside (Fuels)
- Spyglass/Tunnel roadside (Fuels)

2.12.2 Santa Barbara County Fire Safe Council

The SBCFSC was formed in 1997 with a goal of promoting wildfire safety throughout the County through education and action. Its stated mission is to unify public and private organizations in the County to educate, motivate, and coordinate to minimize losses associated with wildfires (SBCFSC 2022). The SBCFSC provides education, supports community emergency planning, and helps create fire adaptive communities. Some of the education programs the SBCFSC offers are Ready! Set! Go!, Firewise USA, and One Less Spark–One Less Wildfire. The SBCFSC also partners with SBC Fire, City of Santa Barbara Fire Department, Carpinteria-Summerland Fire Protection District, and Montecito Fire Protection District.

The SBCFSC also supports community emergency planning efforts in the County. The SBCFSC has had a successful record of securing funding through state and local grants. Grant funding has been used to support fire risk reduction efforts, including preparing CWPPs; engaging in community outreach and education; promoting defensible space and community-level fuel break projects; supporting community chipping programs; guiding the Firewise USA process for local communities; and identifying, working with, and helping vulnerable communities in wildfire preparedness. The SBCFSC also conducts free home evaluations, hosts community education events about wildfire preparedness, creates educational videos, and is creating a home hardening and defensible space website portal.

Some of the projects that SBCFSC is working on in partnership with SBC Fire are listed in Section 2.12.4.4.

2.12.3 Regional Wildfire Mitigation Program – Santa Barbara South Coast Region

The Regional Wildfire Mitigation Program (RWMP) is a multi-year initiative designed to assess hazard, exposure, and vulnerability and equitably reduce wildfire hazard across the Santa Barbara front country. The RWMP provides a philosophical framework for a focal organization to facilitate a collaborative and holistic approach to wildfire resilience through built environment, landscape, and community programming. The program goals are to decrease the risk of wildfire impacts to structures and infrastructure; promote wildfire-resilient green space, working lands, and habitats; and develop community capacity to adapt and recover from natural disasters. The program is divided into three primary Resilience Domains:

- **Landscape Resilience Domain:** The Landscape Resilience Domain proposes a fire-resistant buffer or "greenbelt" area in strategic locations to create wildfire resilient green space, working lands, and habitats. Outcomes include co-benefits that support watershed and coastal ecological health using live oak shaded fuel breaks, habitat restoration, prescribed herbivory, hydrated and agricultural buffers, and land conservation.
- **Built Environment Resilience Domain:** The Built Environment Resilience Domain seeks to build local capacity to retrofit and increase wildfire resilience for homes, businesses, and critical infrastructure. This domain prioritizes retrofit and mitigation programs in areas that will provide the highest community benefit.
- **Community Resilience Domain:** Through collaboration with the SBCFSC, the Community Resilience Domain engages, educates, and trains local residents and communities to increase their resilience to wildfire by conducting home evaluations, encouraging communities to join the Firewise USA Program, hosting wildfire education and preparedness events, and working directly with communities to reduce their wildfire risk.

The Regional Wildfire Mitigation Program is a collaboration between many local, regional, and national partners, including SBCFSC and SBC Fire.

2.12.4 Santa Barbara County Fire Programs

2.12.4.1 Defensible Space and Vegetation Management

As outlined in Chapter 15 of the Santa Barbara County Code of Ordinances (adopted by Ordinance No. 5901), all parcels in areas designated as High Fire Hazard by the Santa Barbra County Building Official are required to meet the County's defensible space requirements year-round. Vegetation within defensible space zones, native or otherwise, must be maintained to create an effective fuel break by thinning dense vegetation and removing dry brush, flammable vegetation, and combustible growth from areas within 100 feet of all buildings or structures. With site-specific inspection and authorization from SBC Fire, up to 300 feet of defensible space vegetation treatments may be undertaken. Crossing property lines to achieve defensible space vegetation treatment is not required, although it is desirable when authorized by agreements with neighboring landowners.

Defensible space clearance also includes clearance of brush, vegetative growth, and combustible materials from all parcels deemed a fire hazard. SBC Fire also facilities a Hazard Reduction Program, which sends notices to abate fire hazards to property owners. The notices indicate defensible space requirements, and property owners have approximately 3 weeks to meet the requirements for defensible space.

2.12.4.2 Road Clearance

The County conducts roadside vegetation management to reduce the amount of vegetation along roadways, enhance evacuation during a wildfire, and allow greater access for fire engines and equipment to respond during a wildfire. Chapter 15 of the County Code of Ordinances requires property owners to maintain an area cleared of flammable vegetation and combustible growth on their properties on fire access roads and on driveways of 10 horizontal feet on each side; additionally, overhanging vegetation must be removed for a vertical clearance, not less than 13 feet 6 inches.

2.12.4.3 SBC Fire Vegetation Management Section

The County's uses a three-pronged approach to vegetation management that focuses on reducing old-age class fuel loads, using broadcast burning in strategic locations, and maintaining and enhancing defensible space around communities. The goal is to create protection for communities at risk and to conduct larger-scale mechanical treatments of identified hazardous fuel beds to help stop the spread of wildfire. Officially, the Vegetation Management Program exists in the Fire Marshal's office in the Fire Prevention Division. Fire Prevention staff, including the Fire Marshal, Deputy Fire Marshal, two Fire Captains, and support staff identify and plan fuel treatments. The Fire Prevention Division also has one Fuels Crew based out of the Burton Mesa Training Center, which is grant funded and focuses on grant-funded fuel-reduction projects.

The Fire Prevention Division collaborates with the Operations Division to implement projects identified in the annual Unit Fire Plan. Other treatments can arise throughout the year, and after CEQA compliance is obtained, the Santa Barbara Fire Crew and/or Construction Sections coordinate implementation with Vegetation Management staff.

The Santa Barbara County Fire Crew Section consists of two Crew Superintendents and four fully staffed Fire Crews at 15 members each. The Fire Crew program is currently housed at the Los Prietos Camp. Our Fire Construction Section consists of one Heavy Equipment Supervisor, three Heavy Equipment Operators, and support personnel (Swampers) based out of Los Alamos. The Crew and Construction Sections are supervised directly by the Air and Wildland Battalion Chief.

Mechanical treatments consist of reducing continuity and the percentage of receptive fuel beds (SBC Fire 2022f).

The Vegetation Management Section of SBC Fire is responsible for producing the County's Unit Fire Plan and for planning and oversight of range improvement burns and vegetation management projects. The Unit Fire Plan ensures compliance with state-mandated hazardous fuel reduction (SBC Fire 2022f).

2.12.4.4 Fuel Breaks and Fuel Management Projects

The list below includes current projects on the SBC Fire website as of September 26, 2024, which are being implemented by SBC Fire and their partners, such as SBCFSC (SBC Fire 2022f) (See Appendix E):

- La Cumbre Repeater Site
- Santa Barbara Foothill Community Defensible Space Fuel Reduction Project
- Community Chipping (SBCFSC project)
- SB South Coast Herbivory Project (SBCFSC project)
- Montecito Neighborhood Fire Prevention Project

Current and past vegetation management projects throughout the state can be found on CAL FIRE's Cal Mapper, which can be accessed at https://gis.data.cnra.ca.gov/apps/CALFIRE-Forestry::cal-fire-fuels-reduction-projects-main-application/explore.

2.12.4.5 Defensible Space Inspections

SBC Fire conducts defensible space inspections throughout the County each year. The inspections ensure that property owners have completed their annual defensible space maintenance and serve to educate citizens on ways to improve structure survivability to wildfire. The inspections evaluate natural and ornamental vegetation; document construction materials; and check for SBC Fire access, the visibility of the address, water supply, and any fire hazards. The inspections are done in conjunction with CAL FIRE. Per Assembly Bill 38, property sold on or after July 1, 2021, needs documentation of a defensible space inspection.

2.12.4.6 Planning and Engineering

SBC Fire reviews documents for buildings, developments, and proposed projects to ensure all projects meet state and local fire safety requirements. SBC Fire reviews things such as fire protection water systems, fire sprinkler systems, fire alarm systems, cell sites, solar arrays, addressing, defensible space, tract and parcel maps, permits, land use, site development, and other fire-related items. The Planning and Engineering Section represents SBC Fire at County Special Development Review Committees, the County Special Problems Review Committee, and the County Planning Commission, and performs field inspections as needed to ensure compliance with project conditions.

2.12.4.7 Wildfire Predictive Services

SBC Fire also maintains nine Remote Automated Weather Stations (RAWSs) throughout the County. These stations are used to monitor and record fire weather conditions. The stations are at San Marcos Pass, Mission Canyon, Carpinteria Foothills, Refugio, Gaviota, Santa Ynez Mountains, Burton Mesa, Tepusquet, and Cuyama Valley. The RAWS at Mission Canyon is within the Plan Area. SBC Fire also monitors live fuel moisture to aid in predicting wildfires. Live fuel moisture is gathered from field samples in five locations, but the Mission Canyon RAWS is not one of these locations (SBC Fire 2022g).

2.12.4.8 Public Education

SBC Fire also provides public education and information on a variety of topics, including wildfire. Some of these programs include station tours, training Community Emergency Response Teams, and the Fire Safety House. SBC Fire also runs the Wildfire Education Campaign. The campaign was launched in 2009 and is part of the statewide Ready! Set! Go! approach to wildfire preparedness and evacuation. Additionally, SBC Fire offers free home fire safety inspections to residents. SBC Fire checks residents' homes and offers fire safety and prevention tips.

2.12.5 U.S. Forest Service

The LPNF is divided into five administrative units called "ranger districts." Much of the Plan Area contains overlap with the Santa Barbara Ranger District (USFS n.d.1). The Santa Barbara Ranger District of the LPNF has a dedicated fire management team, whose mission is to provide safe, efficient, and economical fire management while sustaining, protecting, and restoring ecosystems (USFS n.d.2).

The USFS helped to develop and implement the National Cohesive Wildland Fire Management Strategy (National Strategy), which outlines new approaches to coordinate and integrate efforts to restore and maintain healthy landscapes, prepare communities for fire season, and better address the nation's wildland fire threats (USDOI and USADA 2014a, 2014b). The National Action Plan, which is a companion to the National Strategy, supports the implementation of the National Strategy by providing a framework for implementation actions and tasks necessary at various scales (USDOI and USADA 2014c). An addendum update to the National Strategy was presented in January 2023, which presented new management options, enhanced strategic direction, and critical areas for immediate focus in implementing the cohesive strategy through the next quarter century. The ultimate success of the cohesive strategy effort depends on how the call to action, strategic direction, and national priorities can be translated into the on-the-ground, local actions of agencies, tribes, organizations, communities, and individuals with meaningful, cumulative effects (USDOI and USDA 2023).

The USFS recognizes the value of cross-boundary collaboration and has the ability to enter into agreements with state, county, and tribal agencies to perform forest, rangeland, and watershed improvement projects (including hazardous fuels reduction projects) on and adjacent to USFS lands under the Good Neighbor Authority. The Good Neighbor Authority allows the USFS to enter into up to 10-year agreements with partner agencies that have the mandate to conduct forest, rangeland, and watershed projects. Adjacency of land is not required, and there are no restrictions on mutual interests or mutual benefits. Under the Good Neighbor Authority, there is no match requirement for partner contribution, although a match is recommended (USFS 2022d).

The USFS works on and maintains vegetation management and defensible space projects within the County. This includes the Camino Cielo Defensible Fuels Profile Zone Project, a ridgeline fuel break that travels across the Plan Area in the far northern extent (See Appendix E).

2.12.6 City of Santa Barbara

Santa Barbara's Community Defense Fuel Treatments (CDFTs) are a set of wildfire prevention and mitigation strategies aimed at reducing the risk of wildfires and enhancing the resilience of communities, ecosystems, and infrastructure. These treatments focus on creating defensible space, reducing fuel loads, and enhancing firebreaks in and around urban areas.

As provided in Appendix E, the City has planned and existing fuels reduction projects located adjacent to the Plan Area. This includes recently conducted projects along Las Canoas Road and W Mountain Drive, as well as planned projects directly bordering the southern boundary of the Plan Area. These projects are expected to be completed in the near future and will provide dual benefits to the City and Plan Area.

2.12.7 Montecito Fire Protection District

The fuels treatment strategy for the Montecito Fire Protection District (MFPD) aims to improve wildfire protection for life safety, structures, and other values identified by local stakeholders, while also preserving the community's visual appeal, watershed, and its biological and cultural resources. Following the 2017 Thomas Fire, MFPD has identified priority fuels treatments for implementation including fuel breaks, roadside vegetation clearance, and shaded fuel breaks. In an after-action report which assessed the impacts and lessons learned of the Thomas Fire, it was found MFPD's fuel treatments created a significant fuel modification mosaic that greatly diminished the intensity of the fire as it moved downhill into Montecito during the Thomas Fire (MFPD 2018).

The Montecito Neighborhood Fire Prevention Project involved roadside vegetation clearance along Gibraltar Road just outside of the southeastern corner of the Plan Area (See Appendix E).

2.12.8 Alert Wildfire Cameras

ALERTCalifornia utilizes cutting-edge technology to support data-driven decision-making in the preparation, response, and recovery from natural disasters. Based at the University of California, San Diego, ALERTCalifornia is a public safety program focused on understanding wildfires, natural hazards, and their short- and long-term impacts on communities and the environment.

The program operates a statewide network of over 1,000 monitoring cameras and sensor arrays that collect real-time data. This data provides actionable insights that help inform public safety decisions, improve disaster management, and enhance our ability to respond to natural disasters effectively. Cameras near the Plan Area include Gibraltar 1 and Gibraltar 2. These and all other active ALERTCalifornia wildfire cameras can be found on their website, which can be accessed at https://ops.alertcalifornia.org/.

2.13 Evacuation

A Transportation Study for the Plan Area was conducted by Fehr and Peers as part of this CWPP. The Transportation Study evaluates the expected travel demand and roadway capacity under evacuation conditions in the Plan Area. This analysis focuses on evacuation by personal vehicles. Based on the results of the evacuation analysis, areas were identified that may have limited access and egress during an evacuation event and recommendations were developed to improve emergency access and resident/worker/visitor evacuations. The Transportation Study is presented in Appendix C of this CWPP.

The following roads are identified as regional evacuation routes in the County and within the Plan Area:

Foothill Road, also known as SR-192, runs east–west along the southern portion of the Plan Area and through Mission Canyon. Foothill Road provides access to SR-154 and Highway 101 to the west and to SR-150 and Highway 101 to the east, near the Ventura County line.

Mission Canyon Road is a north–south road that connects residences in northeastern and southeastern portions of Mission Canyon to Foothill Road. Mission Canyon Road extends into the northern limits of the developed areas of Mission Canyon, provides access to the Santa Barbara Botanic Garden, and connects to the City of Santa Barbara to the south.

Tunnel Road is a north–south road that connects residences in northwestern portions of Mission Canyon to Mission Canyon Road. Tunnel Road extends into the northern limits of the developed areas in Mission Canyon, terminating at the Tunnel Road Trailhead. Tunnel Road merges into Mission Canyon Road 0.25 miles north of Foothill Road.

Cheltenham Road is a narrow, winding road that connects the more densely developed western half of Mission Canyon north of Foothill Road to Foothill Road—both directly and via Tye Road. Cheltenham Road also connects to Tunnel Road to the north.

Las Canoas Road is a narrow east–west road that connects the eastern portion of Mission Canyon east of Mission Canyon Road to Mission Canyon Road.

Camino Cielo Road is a narrow east–west road that runs along the northern edge of the Plan Area. The road connects to SR-154 to the west and to Gibraltar Road to the east. Camino Cielo Road provides access to Tunnel Road Trailhead and the Arroyo Burro Trail.

Gibraltar Road is a narrow, winding north–south road that connects Camino Cielo Road in the northwest portion of the Plan Area to SR-192 just east of Mission Canyon. Gibraltar Road provides access to the Gibraltar Rock climbing area, Rattlesnake Canyon Trail, and the West Fork Trailhead.

To determine travel demand under evacuation conditions, the project team looked at six different scenarios and calculated the number of evacuating vehicles per building/recreational facility for each. Travel demand measures how many vehicles may use a roadway at a specific time. These scenarios are further detailed in Appendix C, which contains the Transportation Study, and are briefly described in Chapter 4 of this CWPP, along with findings of the evacuation analysis and methodology.

2.14 Values at Risk

2.14.1 At-Risk Communities

The Healthy Forest Restoration Act of 2003 identifies an at-risk community as an area:

A. that is comprised of—
    a. an interface community as defined in the notice entitled “Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire” issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat. 1009) (66 Fed. Reg. 753, January 4, 2001); or
    b. a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land;
B. in which conditions are conducive to a large-scale wildland fire disturbance event; and
C. for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.

In addition to this definition, the Office of the State Fire Marshal maintains a list of communities at risk. The National Fire Plan directs funding to be provided for projects designed to reduce the fire risks to these communities. These -high-risk communities identified within the WUI were published in the Federal Register in 2001 and include those communities neighboring federal lands.

- In addition to the 25 communities in Santa Barbara County recognized by State and Federal authorities, there are other communities within the County that are also at risk of wildfire and need to be acknowledged (SBC Fire, 2023). These communities, which are not included in any state or federally recognized lists but have been identified by County Fire and other local jurisdictions as being at risk, include:
- Cebada Canyon
- El Capitan
- Jonata Ranch / Bobcat Springs
- Miguelito Canyon
- Mission Canyon
- Painted Cave
- Refugio Canyon
- Tepusquet Canyon
- Toro Canyon
- Woodstock
- Hope Ranch
- Trout Club
- Rosario Park
- Jalama
- Paradise
- Gobernador

2.14.2 Wildland-Urban Interface

The WUI is a potential treatment zone in which fuel-reduction projects may be conducted to reduce wildland fire threats to communities at risk. The Healthy Forest Restoration Act defines the WUI as follows:

A. an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan; or

B. in the case of any area for which a community wildfire protection plan is not in effect-

   a. an area extending ½ mile from the boundary of an at-risk community;

   b. an area within 1½ miles of the boundary of an at-risk community, including any land that-

   c. has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community;

   d. has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or

   e. is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; and

C. an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at-risk community.

The importance of the Healthy Forest Restoration Act definition of the WUI is emphasized in the expedited environmental review process for federal fuel treatment projects conducted within 1.5 miles of a community at risk of wildfire. Specifically, if an authorized hazardous fuel reduction project proposed to be conducted in the WUI is no farther than 1.5 miles from the boundary of an at-risk community, “the Secretary is not required to study, develop, or describe any alternative to the proposed agency action in the environmental assessment or environmental impact statement prepared pursuant to Section 102(2) of the National Environmental Policy Act of 1969.” The WUI in the Plan Area is depicted in Figure 9, Wildland Urban Interface.

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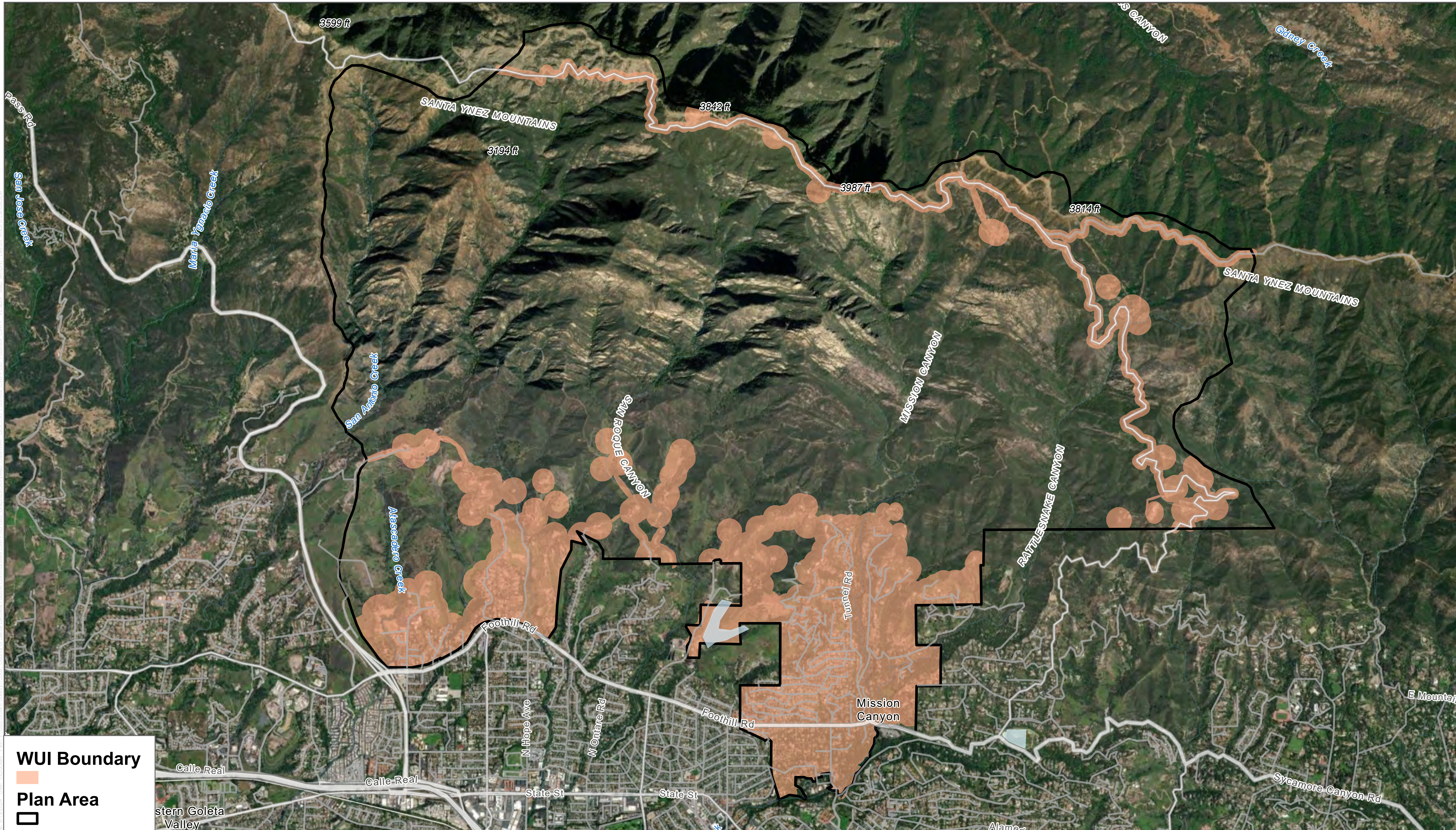

SOURCE: Dudek, 2024

DUDEK

N 0 230 460 Feet

FIGURE 9

Wildland-Urban Interface

Santa Barbara County Foothill Communities CWPP

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2.14.3 Structures and Population

The majority of the structures and population in the Plan Area exist within and adjacent to the established community areas. The majority of structures and population residing in the Plan Area are located in a Very High FHSZ, with small portions of the Plan Area designated as High FHSZ.

The population of the Plan Area is estimated to be 3,500 people. As further described in the project's Transportation Study (Appendix C), a quarter of the residents are aged 65 or over, with 19% of the population being aged 18 or younger. Within the Plan Area, Mission Canyon is the largest and most densely populated with an estimated 2,500 people (U.S. Census Bureau 2023).

2.14.4 Recreational Areas and Places of Local Significance

The Plan Area contains many recreational areas including parks, trail systems, and others. These recreational resources provide benefit to the community by providing access to park and open space areas. The Plan Area also provides access to the LPNF and associated trails. These trails are heavily visited by both Plan Area residents and visitors from throughout the region. Recreational resources within the Plan Area at risk from wildfire include the following:

- LPNF and associated trail network
- Rocky Nook Park
- Santa Barbara Botanic Garden
- Barger Canyon Preserve
- Rattlesnake Canyon Park
- San Marcos Foothills Preserve

2.14.5 Critical Facilities and Infrastructure

Critical infrastructure encompasses physical assets that are vital to maintaining essential services, such as water services, roads, and fire and police services. Critical infrastructure such as electric power supply lines, substations, communication towers, and natural gas lines are essential to supply residents and businesses with services that are in some cases critical to health and life safety. Critical facilities are facilities that are vital for the functioning of society, especially during emergencies or disasters. Examples of these facilities include emergency services such as police and fire stations, hospitals, senior care centers, and government buildings. Wildfires may damage or destroy critical infrastructure leading to significant societal and public safety impacts. Critical facilities and infrastructure at risk of wildfire in the Plan Area are provided in Figure 10 and listed below.

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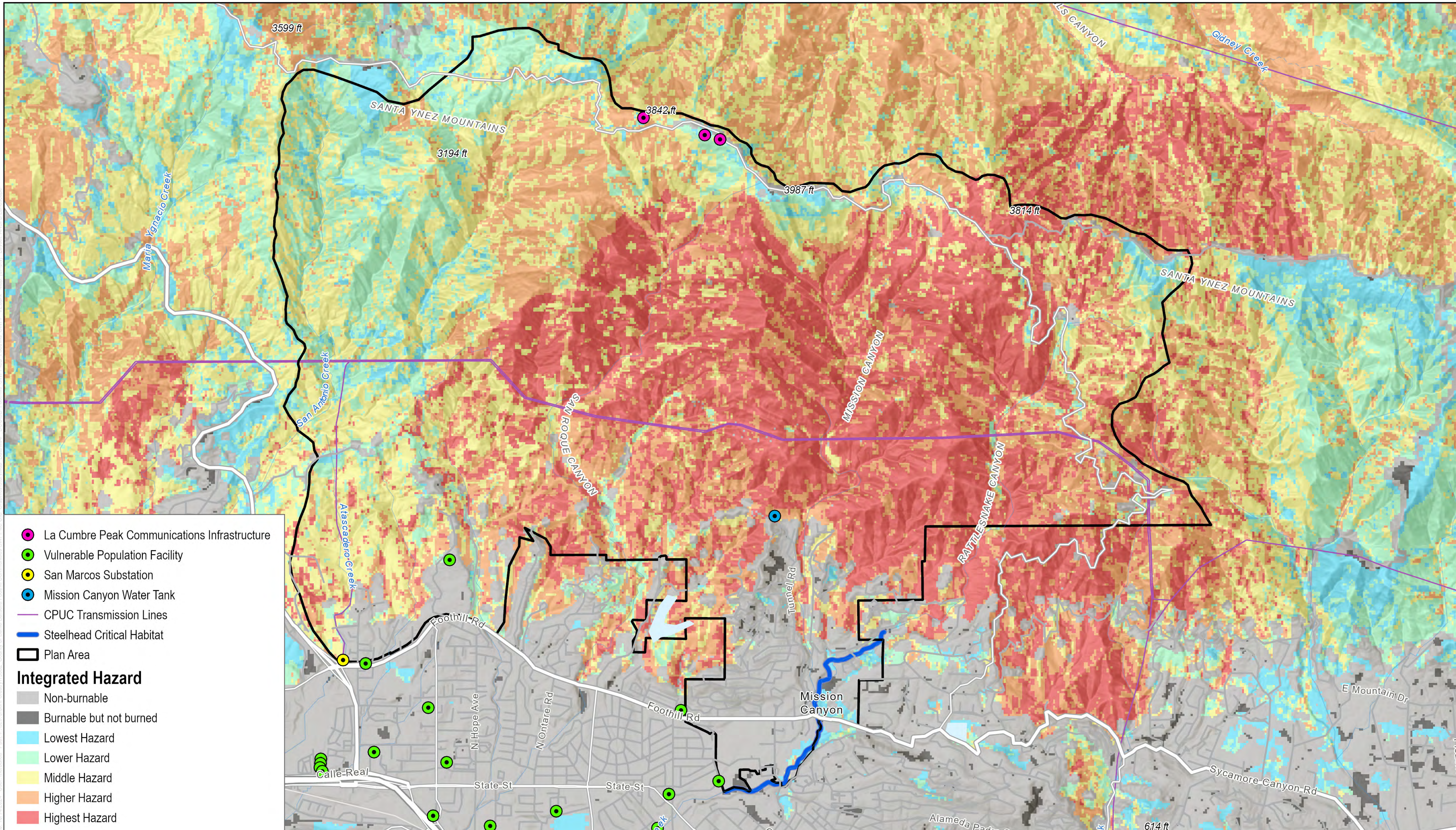

FIGURE 10

Highly Valued Resources and Assets

Santa Barbara County Foothill Communities CWPP

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Critical Infrastructure

- California Public Utilities Commission transmission lines and community distribution lines
- San Marcos Substation
- Mission Canyon water tank

Critical Facilities

- Wood Glen Senior Living Facility
- La Ventana Treatment Programs center
- SBC Fire Station 15

2.14.6 Cultural Resources

The history of the Plan Area implies the presence of several important cultural resources, archaeological and historic sites, traditional cultural properties, and tribal cultural resources. The Chumash peoples, whose territory once spanned from Malibu to Paso Robles, inhabited the Plan Area before the Spanish land expedition. The modern-day towns of Santa Barbara, Montecito, Summerland, and Carpinteria were carved out of the old Chumash territory (Santa Ynez Band of Chumash Indians n.d.).

The Mission Canyon Community Plan notes that Mission Canyon is archaeologically sensitive due to the presence of a wide range of mapped prehistoric and historic sites. Surveys performed in the Mission Canyon Community Plan area in 1983 and 1984 documented known historic and prehistoric cultural resources within the South of Foothill and Mission Canyon Heights neighborhoods. Two major villages known to the Chumash as Syutxtun and Xana'yan were located near Mission Creek, which the Chumash depended on for fresh water. The Syuxtun settlement was a large town located where Mission Creek emptied into the ocean, while Xana'yan was a small yet important village in Mission Canyon (Santa Barbara Historical Society 1983). Due to the area's archaeological richness, there is a possibility for unmapped archaeological resources to be present throughout the Plan Area (County of Santa Barbara 2014).

The Open Space Element of the County of Santa Barbara Comprehensive Plan (2009) identifies two historic sites within the Plan Area: Santa Barbara Mission, Water Works, and Grist Mill (in the City of Santa Barbara's "El Pueblo Viejo" District) and Rattlesnake Canyon Dam (in the South Coast area). In the Phase II inventory of the California History Plan, approximately 500 prehistoric and Indian sites were estimated to be included in the County inventory (County of Santa Barbara 2010). Cultural sites are not mapped publicly due to the sensitivity of historical and pre-historical resources.

Cultural resources are extremely vulnerable to direct and indirect impacts from wildfire, such as damage or destruction from extreme heat, and post-fire effects such as erosion (USGS 2024b). Protecting cultural resources requires careful planning and collaboration between fire managers and cultural resource specialists. This includes identifying and evaluating at-risk sites, implementing mitigation measures, and monitoring post-fire impacts. Further, wildfire mitigation projects must implement best management practices to protect cultural resources during vegetation and fuels management activities.

2.14.7 Natural Resources

The Plan Area contains chaparral-covered mountains, rolling hills, valleys, canyons, and streams. These natural resources are specifically called out in the Open Space Element and Conservation Element of the Santa Barbara Comprehensive Plan (County of Santa Barbara 2009), as well as the Mission Canyon Community Plan. The natural resources present in the Plan Area can be generally categorized into the following: biological resources, streams and water resources, slope stability and soils, visual resources, and air quality. The following sections address these assets in more detail.

2.14.7.1 Biological Resources

The County, including the Plan Area, contains a broad diversity of natural habitats for a variety of plant and animal species, a number of which are classified as rare or endangered. The diversity of habitats is due primarily to the climatic and topographic variations with the County (County of Santa Barbara 2009). A list of rare, threatened, and endangered wildlife species, plant species, and ecological communities that have the potential of being found within the County can be found in the Conservation Element of the County of Santa Barbara Comprehensive Plan.

The Mission Canyon Community Plan outlines an overarching goal of protecting, preserving, and enhancing the native and created biological diversity of Mission Canyon, along with policies, development standards, and actions to achieve this goal. Several special-status species have been observed at the Santa Barbara Botanic Garden and would be expected to occur in the Plan Area. These include monarch butterfly (*Danaus plexippus*), Cooper's hawk (*Astur cooperii*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), American kestrel (*Buteo lineatus*), Nuttall's woodpecker (*Dryobates nuttallii*), oak titmouse (*Baeolophus inornatus*), and California thrasher (*Toxostoma redivivum*). Several sensitive plant species, including Santa Barbara honeysuckle (*Lonicera subspicata var. denudate*), Nuttall's scrub oak (*Quercus dumosa*), California walnut (J*uglans californica*), Fish's milkwort (*Polygala cornuta* var. *fishiae*), and Hoffmann's sanicle (*Sanicula hoffmannii*) occur either naturally or in the created landscapes of the Santa Barbara Botanic Garden and could potentially occur in other areas of Mission Canyon. Additionally, sensitive aquatic species that could occur in the Plan Area include the federally threatened California red-legged frog (*Rana draytonii*), which lives in aquatic habitats along streams and rivers. The Southwestern pond turtle (*Actinemys pallida*) is a California Species of Special Concern that occurs throughout the County along rivers and streams with permanent ponds. Suitable habitat is present in and along well-wooded sections of Mission and Rattlesnake Creeks. The Mission Canyon community area, as part of the south coast area of the County, is designated critical habitat for the Southern California steelhead trout (*Oncorhynchus mykiss*), which has the potential to occur in any of the streams and creeks. Steelhead have been observed in Rattlesnake Creek, a designated critical habitat for steelhead, as well as in the main stem of Mission Creek, downstream of Rattlesnake Creek. In the event that a public or private road or trail were proposed in or over a stream corridor in Mission Canyon, the National Marine Fisheries Service Guidelines for Salmonid Passage at Stream Crossings and the California Department of Fish and Wildlife California Salmonid Stream Habitat Restoration Manual should be consulted for project design and implementation methods to protect the passage of migrating salmonids (County of Santa Barbara 2014).

Appendix C and Appendix D of the Mission Canyon Community Plan list special-status animals and special-status plants and their potential occurrence in the Plan Area and specifies the status of these species.

While the Plan Area contains fire-adapted ecosystems, high severity wildfires have the potential to result in lasting impacts to biological resources, including, but not limited to, loss of habitat, wildlife injury and mortality, water resource impacts, and ecological changes. Additionally, vegetation and fuel management techniques in natural areas should be implemented such that potential impacts to wildlife and botanical resources are avoided or mitigated. Appendix D of this CWPP describes the planning and regulatory framework related to wildfire mitigation projects in the County, including requirements for conducting environmental review for projects under the California Environmental Quality Act/National Environmental Policy Act.

2.14.7.2 Streams and Water Resources

Wildfires can negatively impact water resources including natural streams and human-made water supply infrastructure, including reservoirs. Lauro Canyon Reservoir is located in the Plan Area, on Diablo Creek, within the Mission Canyon community (USDOI 2021). The Plan Area has two watersheds: the Atascadero Creek Watershed and the Mission Creek Watershed (SBC Atlas 2018). The Mission Canyon Community Plan notes three watersheds: the Arroyo Burro Watershed, the Mission Creek Watershed, and the Rattlesnake Canyon Subwatershed. Rivers within the Plan Area include Atascadero Creek, Cieneguitas Creek, Arroyo Burro Creek, San Roque Creek, Rattlesnake Creek, Mission Creek, and Rattlesnake Creek (SBC Atlas 2018; County of Santa Barbara 2014). Both watershed sources show that the watershed areas mostly encompass large wildland areas, though the Mission Canyon Watershed, which encompasses most of the Mission Canyon community and northeastern part of the Plan Area, contains the most urbanized areas of the watersheds listed.

Canopy cover is extensive along Mission Creek, with 85% native vegetation. Relatively undisturbed stretches of contiguous oak woodland, scrub, and grassland habitats support a high diversity of plants and wildlife, including special-status species. Additionally, Mission Creek is the only watershed draining through the City of Santa Barbara that has extensive historical records of steelhead trout presence (the Southern California steelhead trout population is federally designated as an endangered species). High quality habitat conditions exist, but steelhead have not been observed in recent history upstream of a 6-foot-tall boulder cascade located just above the confluence of Mission and Rattlesnake Creeks. Rattlesnake Creek contains high-quality habitat conditions for steelhead upstream from the confluence with Mission Creek, but steelhead are unable to migrate upstream due to natural and human-made barriers. The Arroyo Burro Watershed also contains habitat conditions in the upper San Roque Creek that could support a self-sustainable population if migratory access were provided at downstream barriers, but the watershed currently does not support a steelhead population (County of Santa Barbara 2014).

Hillslope erosion and sediment delivery to watercourses greatly accelerates following severe wildfire as described in detail in the following section. Post-fire sediment inputs can degrade water quality through deposition of toxic organic compounds and increased stream turbidity. Aquatic species are often sensitive to these changes in water quality and can be threatened in a post-fire environment. In addition to habitat degradation, post-fire sediment deposition can impact water supply infrastructure. Reservoirs downstream of burned watersheds often experience reductions in water storage capacity due to sediment inundation. Increased sediment deposits in reservoirs also limit the capacity for hydroelectric energy production.

2.14.7.3 Slope Stability and Soils

Steep slopes are present in the Plan Area due to its location within the foothills of the Santa Ynez Mountains. Much of Mission Canyon north of Foothill Road contains slopes greater than 20%–40% and has a high landslide potential rating. Most of the soils in Mission Canyon are rated by the Natural Resources Conservation Service as severe (County of Santa Barbara 2014). Dangers from landslides, erosion, and fire are among the major factors to be considered (County of Santa Barbara 2009). The Seismic Safety and Safety Element presents a County-wide map and four study area maps depicting slope stability and landslides (County of Santa Barbara 2023). The Plan Area is in the south coast area of the study maps and is partially analyzed (the LPNF area is excluded from the analysis). The Slope Stability, Landslides map shows some parts of the Plan Area communities having a "Moderate" problem rating. This area of overlap also appears to match that of the Moderate and Moderate-Severe problem severity for the Geologic Problems Index map. Problems that were rated and delineated on topographic base maps were tsunamis - seiches, earthquake intensity, liquefaction, slope stability, compressible soils, and high groundwater.

The impacts of wildfire to soil are far-reaching, and in some locations, wildfires are considered the single most important cause of geomorphological change (Shakesby and Doerr 2006). Wildfires are known to accelerate rates of soil erosion and reduce slope stability. Increased rates of soil erosion and downstream sedimentation occur due to a loss of soil cover, the creation of hydrophobic soil conditions, and a lack of precipitation interception from the forest canopy (DeBano 2000). Post-fire erosion is also highly influenced by slope steepness, with higher rates of erosion occurring on steeper slopes. During severe wildfires, complete combustion of soil cover can occur. The exposed soil surface becomes susceptible to rain splash detachment and is eroded by overland flow in response to reductions in soil water absorption capacity (Cerdà and Doerr 2008). Detachment can be further exacerbated by reductions in soil structure due to the degradation of organic cements that break down when burned and increase soil erodibility (Mataix-Solera et al. 2011). In some cases, during severe, slow-moving fires, the combustion of vegetation during wildfires creates a gas that can penetrate the soil. As the soil cools, this gas condenses and forms a waxy coating that causes the soil to repel water. This phenomenon, called hydrophobicity, increases the rate of surface water runoff and erosion as water percolation into the soil is reduced (Moench and Fusaro 2012).

Rainfall intensity often drives concerns regarding landslide and debris flow risk. High intensity rainfall can overwhelm burned watersheds and result in soil mass movements. Landslides can occur after wildfires when significant precipitation in tandem with a loss soil of soil structure from the combustion of stabilizing plant roots compromise hillslopes. Debris flows involve fast moving slurries of rock, soil, and woody debris that pose serious threats to human life and property. Post-fire debris flow risk is heightened following severe wildfires in steep watersheds.

2.14.7.4 Visual Resources

The County is renowned for the scenic beauty of its seascapes and mountains. The seascapes and the mountains are admired by both residents and visitors in the Plan Area. Officially designated or eligible scenic highways are not present in the Plan Area; however, SR-154, which is immediately west of the Plan Area, is an officially designated Scenic Highway, and Highway 101, which is south of the Plan Area, is eligible for Scenic Highway designation (Caltrans 2019). The Open Space Element of the Santa Barbara County Comprehensive Plan discusses the importance of preserving the County’s scenic areas (County of Santa Barbara 2009). The Land Use Element of the Comprehensive Plan includes policies to protect and enhance visual resources (County of Santa Barbara 2024). Similarly, the Mission Canyon Community Plan lists goals, policies, development standards, and actions designed to protect public views and minimize the visual impacts of grading and outdoor lighting (County of Santa Barbara 2014).

Wildfires threaten visual resources in the Plan Area with direct and indirect impacts. Wildfire can degrade scenic areas and create prolonged periods of impaired aesthetics. Further, reduced air quality can impair views along scenic highways and corridors and limit public enjoyment of visual resources. Wildfires damage visual resources and have damaged the Plan Area in the past, most recently during the 2019 Cave Fire. The County’s scenic beauty is one of the principal factors that has attracted its residents and visitors. Without doubt, high quality scenic areas should be preserved, both to retain the present quality of life and to ensure the future of the tourist sector of the economy (County of Santa Barbara 2009).

2.14.7.5 Air Quality

The California Air Resources Board regulates the air quality within California. Air pollution control districts are mandated to develop plans to meet federal and state air quality standards, monitor air quality, and regulate activities that may result in air pollution. Air pollution control districts within the County include the Santa Barbara County Air Pollution Control District.

Wildland fire affects air quality by producing smoke emissions that may exceed California Air Resources Board's standards for carbon monoxide, carbon dioxide, methane and non-methane hydrocarbons, and particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively). The amount of chemicals and particulate matter produced in a wildland fire is directly related to the amount of fuel consumed.

Carbon dioxide, water vapor, carbon monoxide, particulate matter, hydrocarbons, and other constituent materials are all present in wildfire smoke. The specific composition of smoke depends largely on the fuel type (vegetation types contain different amounts of cellulose, oils, waxes, and starches that, when ignited, produce different compounds). In addition, hazardous air pollutants and toxic air contaminants, such as benzene and formaldehyde, are present in smoke. However, the principal pollutant of concern from wildfire smoke is particulate matter. In general, particulate matter from smoke is very small in size and can be inhaled into the deepest recesses of the lungs, presenting a serious health concern (Stone et al. 2019). Air quality during large fires can become severely hazardous and can remain impaired for several days after the fire is ignited (Stone et al. 2019). Wildfire smoke can also impact areas far from the fire and result in smoke inundation.

Wildland fire mitigation involves many fuels management practices, such as prescribed burning, cutting, chipping, and mechanical methods. Prescribed burning, like wildfire, produces chemical and particulate matter that has the potential to exceed California Air Resources Board standards. Unlike wildfire, prescribed burning can be mitigated through smoke management practices outlined by the California Air Resources Board and regional air pollution control districts to avoid exceeding air quality standards. Other fuel management practices where vegetation is not burned, but cut, chipped, or mechanically removed, do not exceed air quality standards, and are considered a nonsignificant, short-term activity.

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3 Wildfire Hazard and Risk Assessment

A Wildfire Hazard and Risk Assessment was conducted for the Plan Area using fire behavior modeling software and subsequent GIS analysis. Wildfire hazard represents the existing wildfire environment and potential wildfire behavior. Wildfire risk is the intersection of wildfire hazard, identified assets and high-valued resources, and the resulting potential impact on those assets and resources. The analysis was conducted in two basic stages: the first stage modeled wildfire hazard, and the second stage modeled wildfire risk. The model results can be used to identify and prioritize projects intended to reduce wildfire risk. For a detailed write up of the hazard and risk assessment methodology, refer to Appendix B.

3.1 Wildfire Hazard

3.1.1 Landscape Fire Behavior Analysis

Wildfire hazard in the Plan Area was modeled under extreme (97th percentile) weather conditions to resemble a Sundowner wind event. These conditions represent extremely low fuel moisture and very high wind speeds. Peak weather conditions are intended to represent the predicted worst case wildfire behavior in the Plan Area. A landscape fire behavior assessment was conducted in the Interagency Fuels Treatment Decision Support System (IFTDSS) to map basic fire behavior outputs, including flame length and rate of spread, and integrated hazard, all of which are described below. Customized weather and fuel moisture inputs were utilized to predict fire behavior representative of a Sundowner wind event. Specific weather and fuel moisture values are provided in Table 2 of Appendix B. To initiate the modeling effort, a landscape base file was created and analyzed. The landscape base file consisted of eight distinct data layers representing terrain (elevation, slope, and aspect) and vegetation/fuels (fuel model designation, canopy cover, stand height, canopy base height, and canopy bulk density). Given that there is no standardized method for modeling fire behavior in urban fuels such as structures, community areas lacking wildland vegetation are classified as non-burnable. However, this does not imply that these areas may not burn during wildfire. While non-burnable fuel models generally have a lower risk of wildfire under standard conditions, extreme weather, certain environmental factors can still make these areas vulnerable to fire, either directly or through spot fires. To understand wildfire risk in community areas lacking wildland vegetation, see Section 3.2, *Community Relative Wildfire Risk Ranking.*

Flame Length

Flame lengths correspond to wildfire intensity and identify the capacity for fire suppression efforts. As flame lengths increase, the capacity to suppress wildfire is limited and threats to firefighters increase. Table 11 below describes how flame length relates to anticipated fire intensity and wildfire suppression efforts.

Table 11. Fire Suppression Interpretation

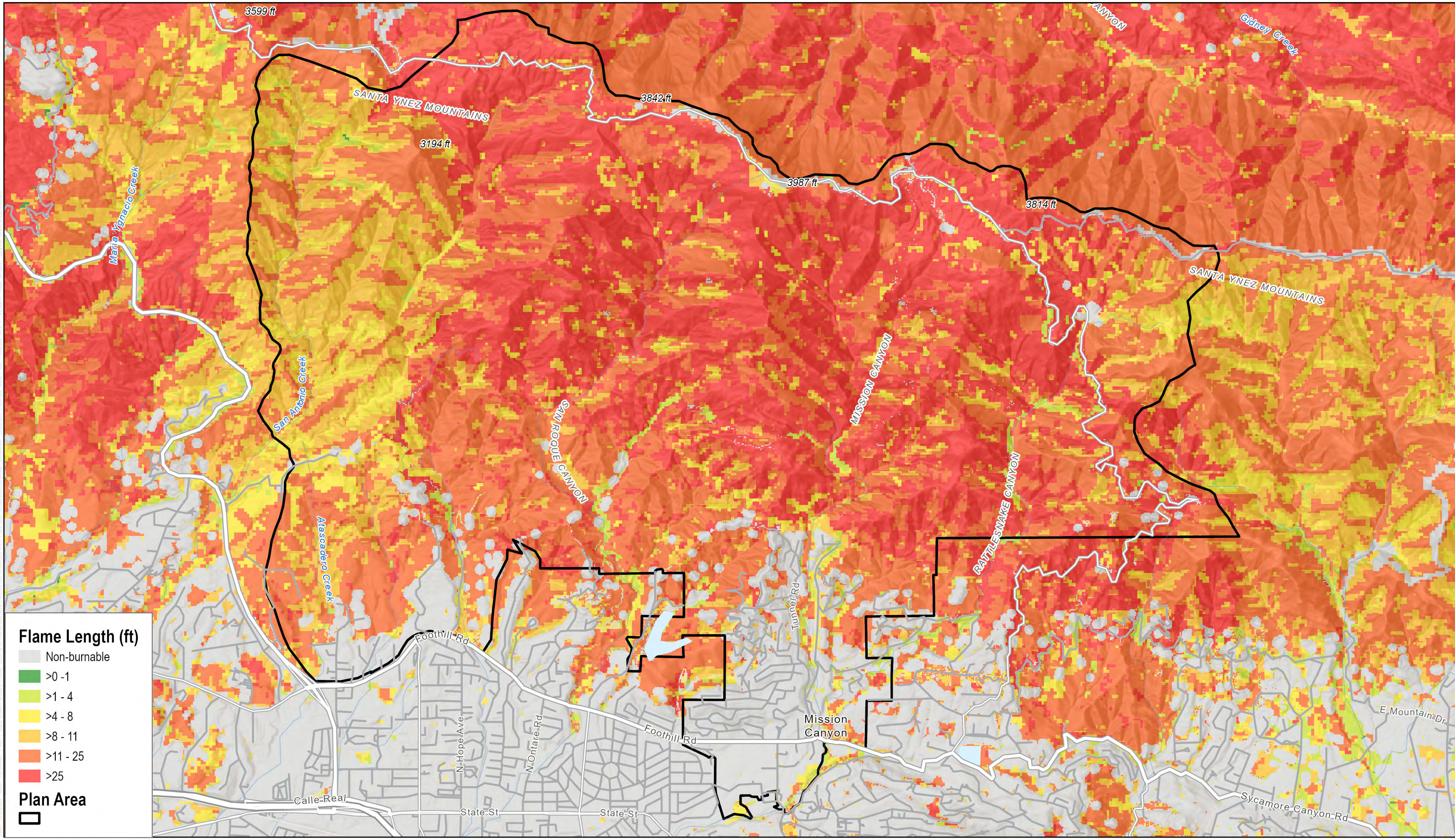
Flame Length	Fireline Intensity	Interpretation
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 feet to 8 feet	100–500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.

Table 11. Fire Suppression Interpretation

Flame Length	Fireline Intensity	Interpretation
8 feet to 11 feet	500–1,000 BTU/ft/s	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1,000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Source: Roussopoulos and Johnson 1975.
BTU/ft/s = British thermal units per foot per second.

As presented in in Figure 11, Flame Length, flame lengths are modeled to exceed 11 feet in most vegetated areas of the Plan Area. Flame lengths are most severe in high load chaparral and coastal fuels. While many developed areas are classified as non-burnable, meaning they lack significant surface vegetative fuels, 79% of areas within 500 feet of structures are modeled to exhibit flame lengths greater than 8 feet during extreme weather conditions. As a result, there is a considerable risk of direct flame exposure to structures in the Plan Area.



SOURCE: Dudek, 2024

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FIGURE 11

Flame Length (Sundowner Wind Event)

Santa Barbara County Foothill Communities CWPP

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Rate of Spread

Wildfire rate of spread describes the speed of the flaming front, or how quickly the fire advances across a given area. Terrain, fuels, and weather combine to influence wildfire spread rates. The rate of spread is measured in miles per hour and is defined as the speed with which the fire is moving away from its origin. Several factors influence the rate of spread:

1. **Fuel Type:** Different vegetation types burn at different rates. For example, grass or shrub fires generally spread faster than those in heavier fuels like timber.
2. **Moisture Content:** Drier fuels ignite and burn more readily than those with higher moisture content, affecting the speed at which a fire spreads.
3. **Weather Conditions:** Wind speed and direction are critical; strong winds can dramatically increase the rate of spread. Temperature and humidity also play significant roles.
4. **Topography:** Fires spread faster uphill due to the preheating of fuels above the flame. Slope steepness can significantly impact rate of spread.
5. **Fire Behavior:** The fire's intensity and the presence of embers can influence how rapidly it spreads. Crowning (when fire moves through the tops of trees) can also accelerate the rate.

Vegetation in the Plan Area is subject to rapid rates of spread due to heavy chaparral and coastal scrub fuels, steep terrain, and steep topography that often aligns with Sundowner winds. Anticipated wildfire spread rates throughout the Plan Area are presented graphically in Figure 12, Rate of Spread. As pictured, spread rates commonly exceed 4 mph and are often most rapid near ridgelines. Therefore, wildfires that ignite a considerable distance away from Plan Area residents may travel quickly and pose significant risks.

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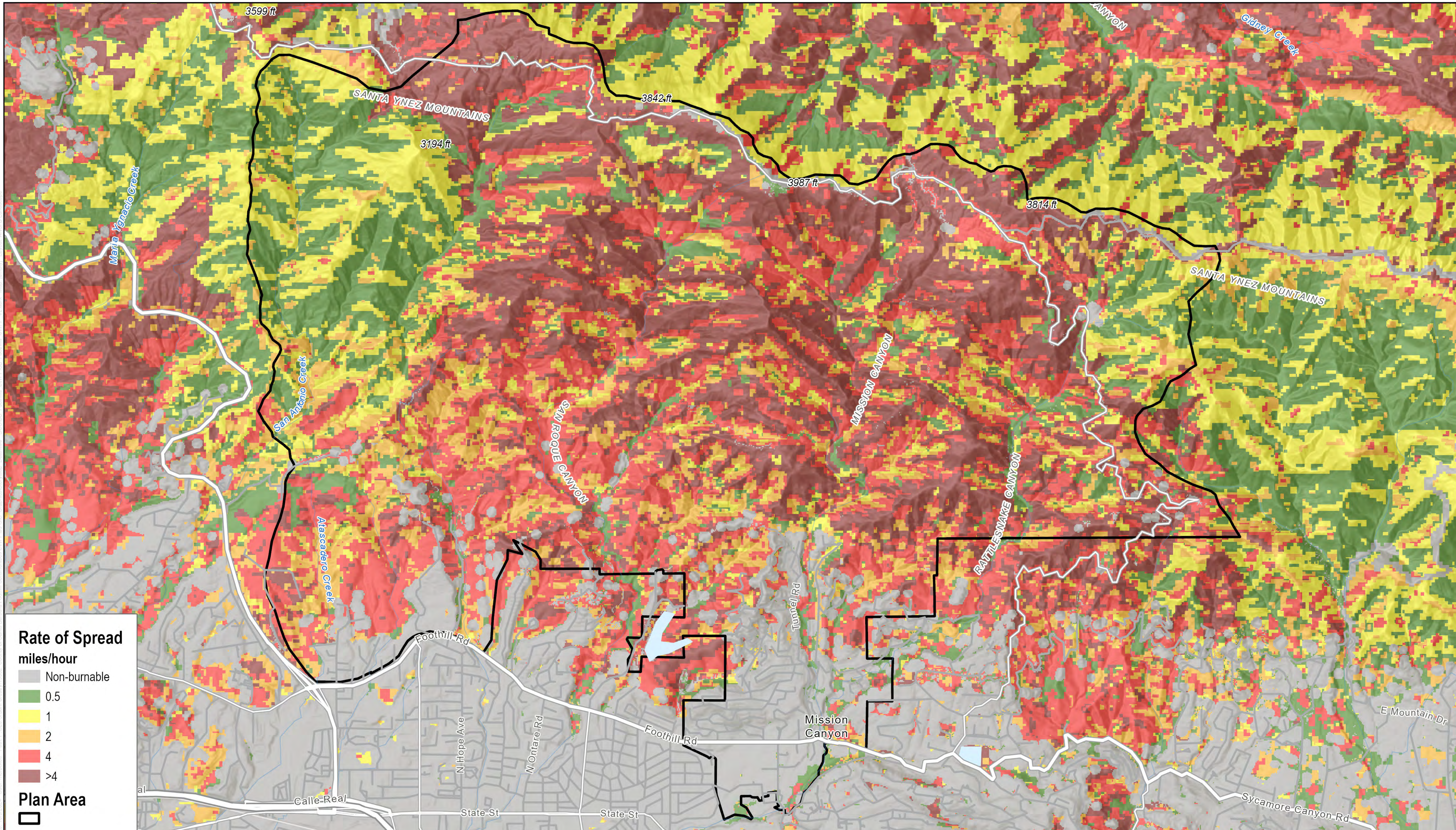

SOURCE: Dudek, 2024

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FIGURE 12

Rate of Spread (Sundowner Wind Event)

Santa Barbara County Foothill Communities CWPP

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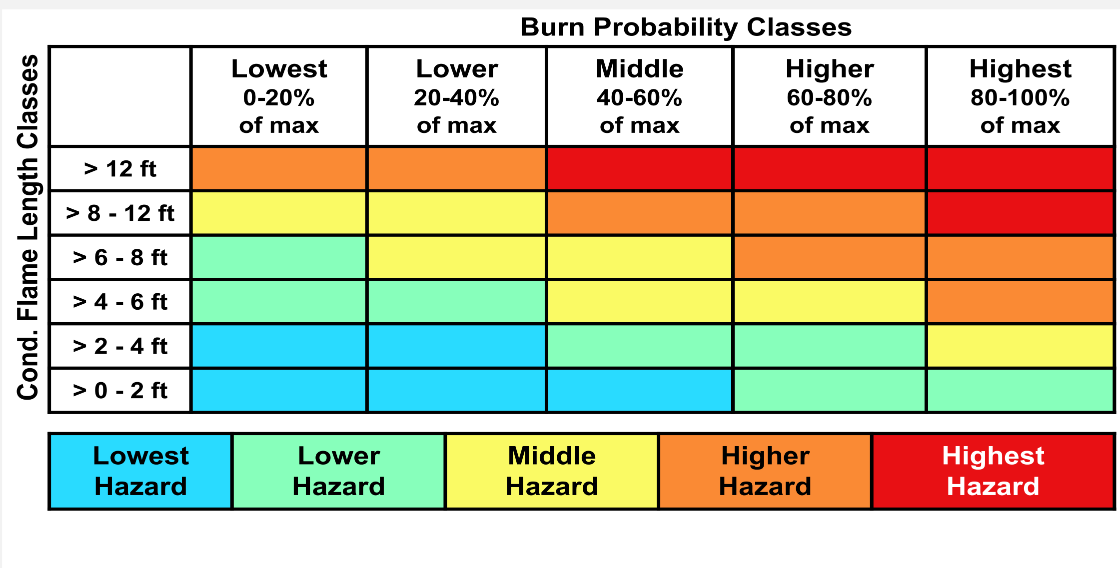
3.1.2 Landscape Burn Probability Analysis

Integrated Hazard

A landscape burn probability analysis was performed in the IFTDSS software to evaluate integrated hazard. Integrated hazard is an analysis process that combines two important measures—burn probability and conditional flame length—into a single GIS output layer.

Burn probability represents the likelihood that a given location in the analysis area would burn, considering the model inputs used. Burn probability is related to the size of fires that occur on a given landscape, where larger fires produce higher burn probabilities than smaller fires. Conditional flame length is an estimate of the mean flame length for all the fires that burn at a given point on the landscape during a model run. This value is typically lower than flame length values generated from a landscape fire behavior analysis in IFTDSS as it accounts for heading, flanking, and backing fires. Burn probability and conditional flame length outputs are combined to calculate integrated hazard according to the classes provide below in Exhibit 13.

Exhibit 13. Integrated hazard calculations.



As presented in Figure 13, Integrated Hazard, areas classified as higher and highest hazard are prevalent throughout the Plan Area, and in many cases, in close proximity to developed areas. This highlights the high potential for fire spread and associated high intensity throughout the Plan Area.

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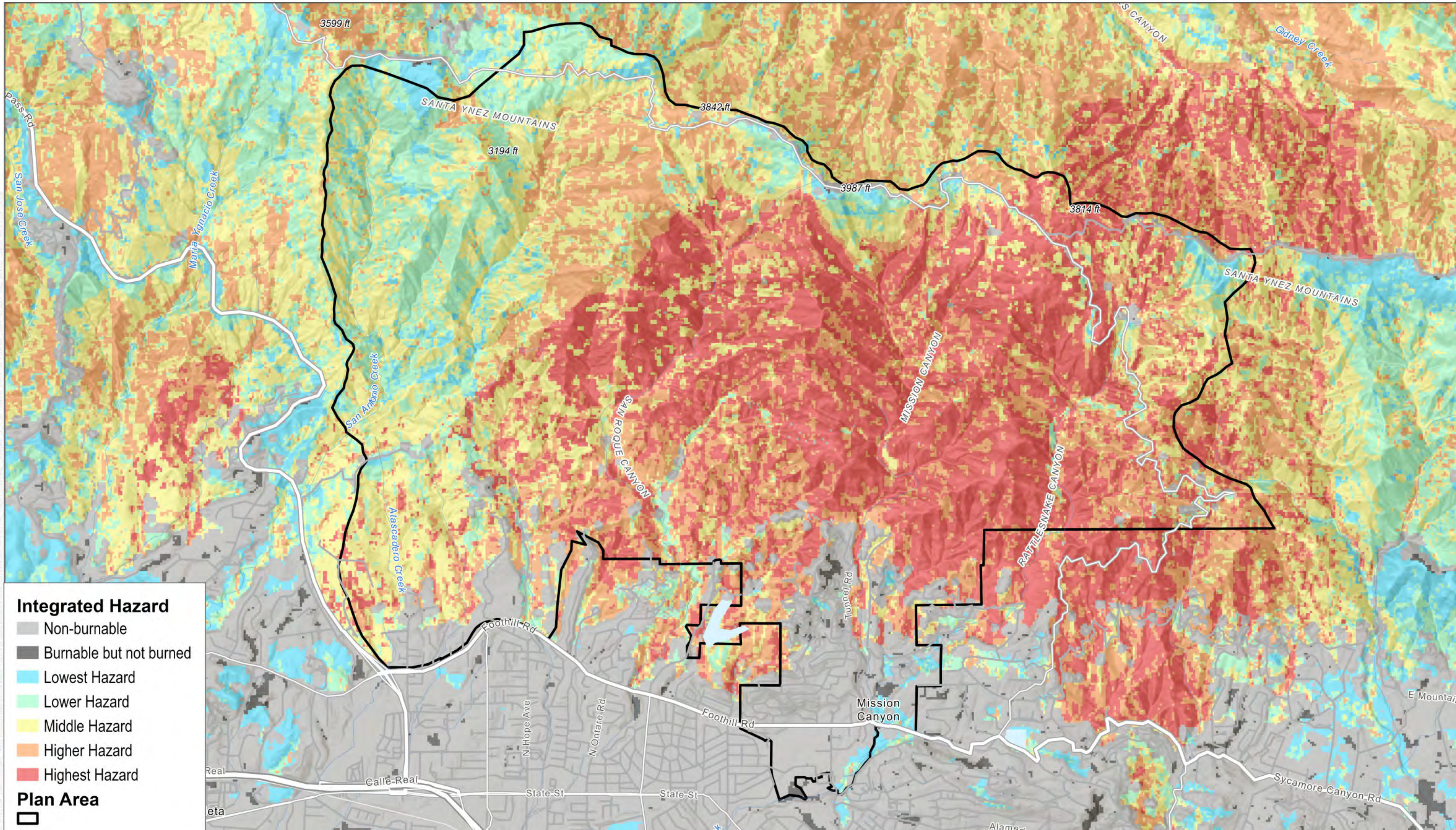

SOURCE: Dudek, 2024

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FIGURE 13

Integrated Hazard

Santa Barbara County Foothill Communities CWPP

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Ember Exposure

It is estimated that up to 90% of structure losses from wildfire are caused by embers rather than the main fire front (IBHS 2020). Ember load quantifies the relative number of airborne embers that may fall onto an area from a nearby wildfire. Ember load relates to spotting distance, which quantifies the distance airborne embers may travel from their source. Ember load data were obtained from the Conditional Ember Load Index dataset created by Pyrologix (Figure 13) (Pyrologix 2021). This dataset incorporates surface and canopy fuel characteristics, climate, and topography to determine the relative amount of embers landing per pixel in a 30-meter raster environment. This dataset does not account for burn probability. The Conditional Ember Load Index dataset was clipped to the Plan Area footprint and scaled into five classes based on the relative severity of ember load, with 1 representing lowest values and 5 representing highest values.

As presented in Figure 14, Relative Firebrand Hazard, the Plan Area is subject to high risks from airborne embers/firebrands. While risks from firebrands are relatively greater for structures located in closer proximity to large, heavily vegetated open spaces, the entire Plan Area has the potential to be impacted by firebrands due to firebrand spotting distances, which can exceed 5 miles in extreme cases (OCFA, 2024).

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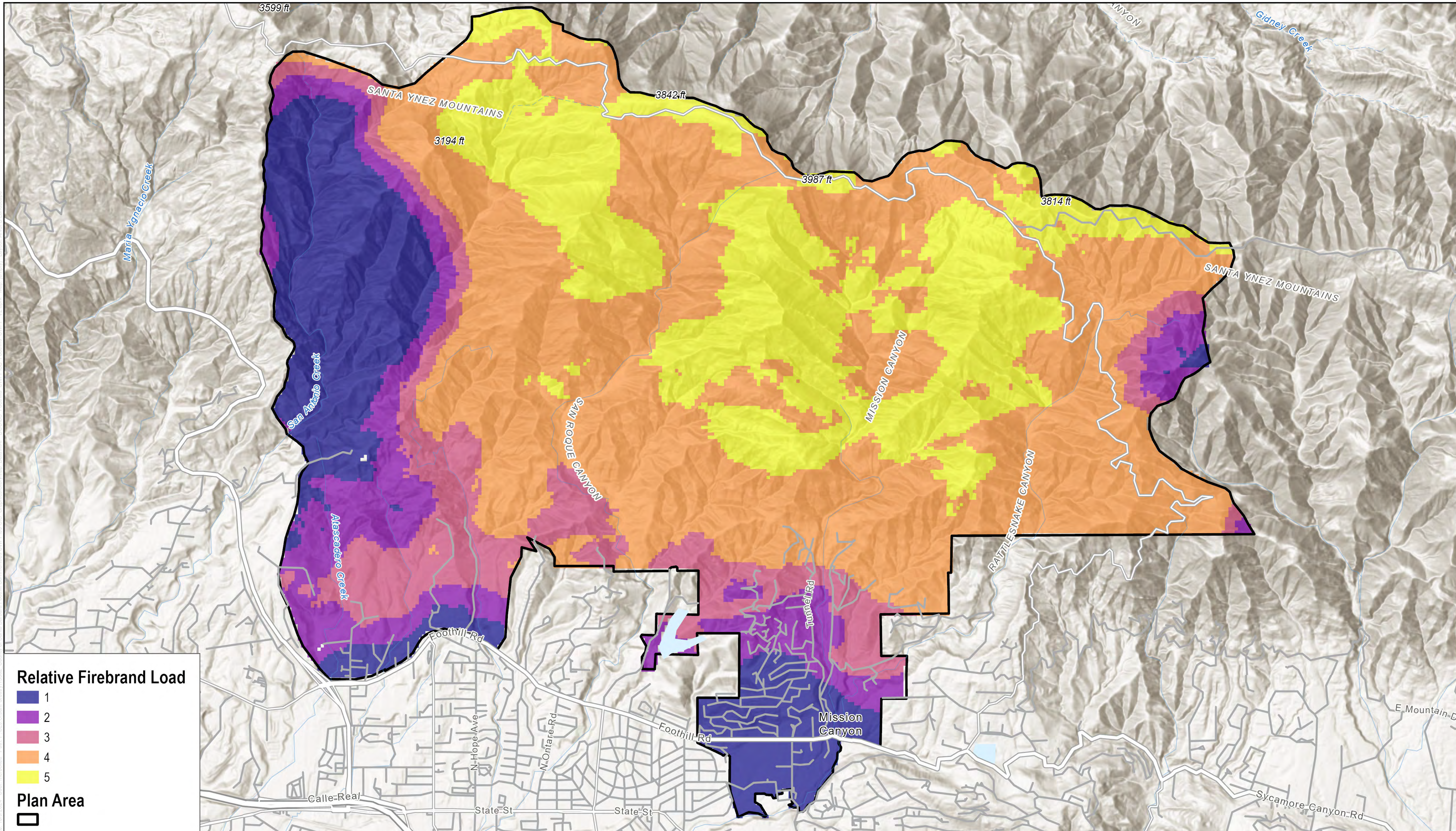

SOURCE: Dudek, 2024

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FIGURE 14

Relative Firebrand Hazard

Santa Barbara County Foothill Communities CWPP

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3.1.3 Vegetative Wildfire Threat to Structures

This analysis calculated the likelihood of a fire occurring and its intensity, considering how these two factors impact structures. Vegetated areas likely to experience high intensity wildfires in close proximity to communities are assigned a higher vegetative threat score to reflect the potential harm to communities from direct wildfire exposure.

This assessment was based on the flame length outputs described above, along with high-resolution building footprint information obtained from the Federal Emergency Management Agency (FEMA). A buffer around the building footprints of 200 feet was created, and then the flame length raster was clipped to this buffer. As shown in Table 11, flame lengths over 8 feet are often considered the threshold for extreme fire behavior, making fire control very challenging and increasing the risk of damage to structures. Areas with flame lengths exceeding 8 feet within the building buffer were isolated to assess where extreme fire behavior is widespread near buildings. The extent of these areas with extreme fire behavior formed the basis for ranking the wildfire threat to structures into three categories: moderate, high, and very high. Vegetative wildfire threat to structures in the Plan Area is presented graphically in Figure 15.

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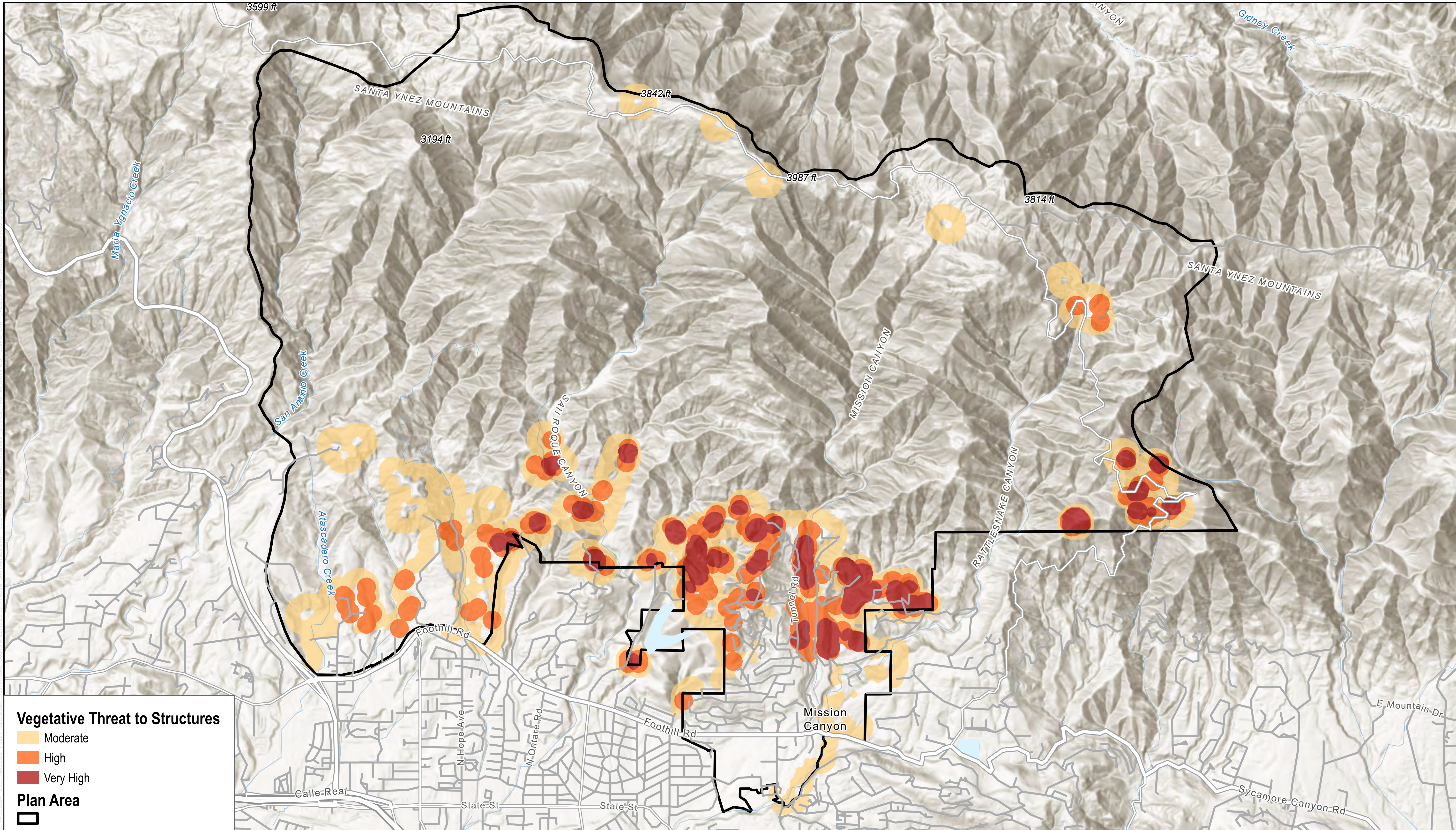

Source: DUDEK, 2024

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FIGURE 15

Vegetative Threat to Structures

Santa Barbara County Foothill Communities CWPP

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As presented, vegetative threat to structures from wildland fuels is considerable in many areas of the Plan Area. Specific areas of concern include the northern region of the Mission Canyon community, developed areas off of Gibraltar road, and developed areas off of North Ontare Road.

3.1.4 Fire Progression Modeling

Fire progression modeling predicts how a fire will spread over time by simulating its behavior based on current conditions such as fuel types, weather, and topography. These simulations forecast the fire’s intensity, spread, and perimeter under specific conditions. Fire progression modeling was conducted within the Plan Area to simulate fire spread during a Sundowner wind event. Using a hypothetical ignition location to the north of community areas, the simulation depicts fire arrival times based on predicted wildfire spread.

As provided in Figure 16, Wildfire Progression Modeling, wildfire is modeled to spread rapidly south and downhill during Sundowner wind conditions. In most cases, contingent on the chosen ignition location, wildfire is expected to reach developed areas in less than 1 hour.

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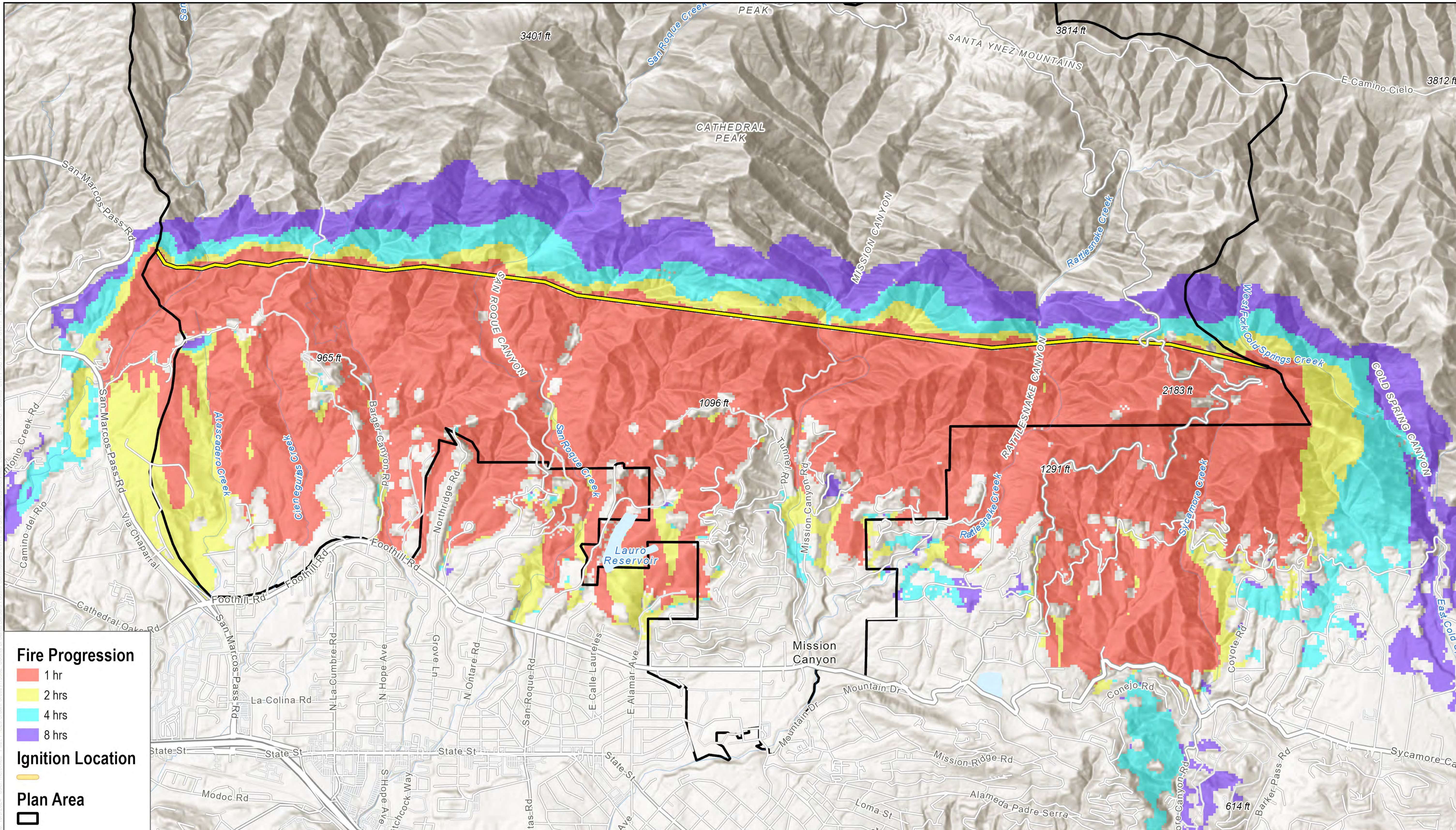

SOURCE: Dudek, 2024

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FIGURE 16

Wildfire Progression (Sundowner Wind Event)

Santa Barbara County Foothill Communities CWPP

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3.1.5 Wildfire Hazard Summary

The wildfire hazard in the Plan Area is considerable, as illustrated by the maps. Factors such as chaparral vegetation, steep terrain, and the potential for extreme fire weather contribute to a high probability of severe fire behavior, including large flame lengths, rapid spread, and airborne embers. For context, the Plan Area faces a higher risk of wildfire than over 98% of communities across the country (USFS 2024).

The Plan Area experiences a Mediterranean climate, characterized by warm, dry summers and mild, wet winters. This climate is conducive to wildfire occurrence as vegetation is often driest during the warmer summer and fall months. The potential for extreme fire weather is also possible, notably during Sundowner wind events, which bring warm dry air and extreme wind speeds to the Santa Barbara region. Vegetation within the Plan Area includes shrublands, woodlands, grasslands, and non-native urban vegetation associated with residential development. All of these vegetation types can facilitate wildfire spread. The Plan Area and adjacent lands feature hilly terrain, in some cases very steep slopes and canyons, which contributes to fire hazard. The presence of canyons or valleys can channel and intensify winds, further exacerbating wildfire risk. Steep slopes can also make firefighting efforts more challenging.

The Plan Area also includes an extensive WUI. The development pattern in the Plan Area results in homes, roads, and other assets interspersed with vegetation with varying degrees of fuel loading. This means most of the communities are exposed to areas where wildfires may occur. Large adjacent open space areas (primarily in the northern region of the Plan Area) expose the communities to wildfires originating outside the Plan Area and burning towards it.

3.2 Community Relative Wildfire Risk Ranking

A community relative risk ranking was conducted for the Plan Area to identify high risk communities where wildfire risk mitigation should be prioritized. This assessment also aims to enhance resident awareness of the relative risks associated with their community. The evaluation of community wildfire risk involved quantifying key variables within the designated community areas. Each variable was assigned a relative ranking to account for its influence on community wildfire risk. For a more detailed description of the community relative risk ranking approach, refer to Appendix B. Risk variables utilized in this assessment are provided below in Table 12.

Table 12. Community Relative Risk Ranking Input Variables

Model Input	Ranking Range
Proximity to Extreme Fire Behavior	For the purposes of this assessment, extreme fire behavior is considered that which precludes methods of direct control (e.g., flame lengths 8 feet and greater), behaves unpredictably and erratically, and typically involves high spread rates, crowning and/or spotting, the presence of fire whirls, and a strong convective column (NWCG 2022). Areas with flame lengths greater than or equal to 8 feet were aggregated with areas predicted to experience crown fire to create extreme fire behavior layer. This layer was then buffered by 200–1,000 feet to quantify community proximity to extreme fire behavior. A weighting factor of 4 was applied to this input.
Ember Exposure	The Conditional Ember Load Index dataset, as described in Section 3.1.2, was clipped to the Plan Area footprint and scaled into four classes (1–4) using natural breaks. A weighting factor of 3 was applied to this input.
Community Access	Community access was defined by the available road network that can be utilized for emergency entry and exit during a wildfire event. Communities with single access, often

Table 12. Community Relative Risk Ranking Input Variables

Model Input	Ranking Range
	referred to as one way in and one way out, are generally considered of higher risk given the more limited evacuation options and potential congestion with entering emergency vehicles. Using data provided by the County, single access roads were buffered by 500 feet to identify structures limited to a single entry and exit route during wildfire. Areas limited to single access were assigned a value of 4, with areas with two or more means of access assigned a value of 0. A weighting value of 3 was assigned to this input variable.
Proximity to High Load Chaparral Fuels	Chaparral vegetation has the potential for a high rate of spread, rapid ignition, and extreme fire behavior given its high content of volatile organic compounds. As the age of chaparral increases, the amount of vegetative material and woody fuels builds up and contributes to increased fire severity. Communities in proximity to high load chaparral fuels are at greater risk of direct exposure to high intensity wildfire. To identify areas of high load chaparral fuels, the California Forest Observatory dataset was utilized, selecting vegetated areas classified as “Dense, finely branched shrubs with significant fine dead fuel, about 4 to 6 feet tall” (California Forest Observatory, 2021) This layer was then buffered by 200–1,000 feet to quantify community proximity to chaparral fuels. A weighting factor of 2 was applied to this input.
Wildfire Suppression Difficulty	Wildfire suppression difficulty quantifies relative fire suppression effort based on a variety of factors including topography, fuel type, fire behavior under extreme fire weather, fireline production rates in different fuel types using hand tools, and access (distance from roads, trails). Communities with a higher wildfire suppression difficulty are at increased risk of experiencing uncontrollable wildfires. The dataset for wildfire suppression difficulty was obtained from Pyrologix and the USFS’s Contemporary Wildfire Hazard Across California (USFS 2019). This dataset classifies wildfire suppression difficulty into six classes. Values were reclassified into four classes with equal intervals. A weighting factor of 2 was assigned for this input.
Wind Speed	Areas with higher wind speeds are likely to experience more intense fire behavior. Topography greatly influences wind characteristics including speed and direction. For example, the highest wind speeds are often observed at ridge tops or at the mouths of narrow canyons in alignment with the prevailing wind direction. Variability in wind speed throughout the Plan Area was determined using the Wind Ninja software embedded within FLAMMAP. Wind Ninja accounts for changes in wind speed based on topographical features including slope, elevation, and aspect. Topography inputs were derived from the 10-meter resolution U.S. Geological Survey (USGS) digital elevation model (DEM). A baseline wind speed of 37 mph at a direction of 17 degrees was incorporated into the model. Areas where wind speeds were elevated (>37–55 mph) were assigned a value of 3, and areas where wind speeds were severity elevated (>55 mph) were assigned a value of 4. Areas with wind speeds of 37 mph or less were assigned a value of 0. A weighting factor of 2 was chosen for this input.
Slope Steepness	Communities with steep slopes are believed to be at greater risk for structure–structure fire spread during a wildfire event. Average slope was determined within urbanized areas using a 10-meter DEM from the USGS. Urbanized areas were identified using the edited fuel model dataset (See Section 1.1.1 of Appendix B), selecting for areas mapped as non-burnable. Urban areas with

Table 12. Community Relative Risk Ranking Input Variables

Model Input	Ranking Range
	slopes greater than 20 degrees were assigned a value of 4, with flatter areas assigned a value of 1.5.
Urban Vegetation	Urban vegetation can contribute to the transmission of wildfires from natural vegetation to developed regions. During intense wildfires, embers that land in urban vegetation can result in additional fire outbreaks within communities, even if they are located a significant distance away from the primary fire front. Urban vegetation cover was obatined from the National Land Cover Database Tree Canopy Cover database, which displays the proportion of the land surface covered by trees for the years 2011–2021 (USFS 2023). Vegetation cover was clipped to the Plan Area footprint and classifed into four equal classes from 0%–100%. A weighting factor of 1.5 was assigned for this input variable.
Historic Ignition Occurrence	Community areas near common wildfire ignition locations can be considered more susceptible to wildfire exposure. Historic ignition locations were gathered from the SBC Fire ignition dataset spanning 2007–2023. Community areas in close proximity to locations with more frequent ignition occurrences were assigned a value of 4, while all other areas were assigned a value of 0. A weighting factor of 1 was assigned to this input variable.

The total range of observed hazard values were sorted into five classes using manual intervals including very low, low, moderate, high, and very high to best distribute relative community risk throughout the Plan Area. However, these classifications are relative, as all of the Plan Area experiences a high degree of wildfire risk. Therefore, this assessment provides further insight into where wildfire risk is most severe in order to best prioritize wildfire risk reduction efforts.

As presented in Figure 17, Community Relative Wildfire Risk, areas classified as high and very high risk most often occur along the edges of developed areas where structures directly abut wildland vegetation. However, areas of very high and high risk also exist within the interior of developed areas, particularly where dense urban vegetation and steep slopes are prevalent. Figure 18, Concentration of Very High-Risk Areas, provides a clear picture of where very high-risk areas are most widespread. Areas with a high concentration of very high risk include the entire northern extent of the Mission Canyon community, Mission Canyon south of Los Canoas Road and east of Mission creek, the southwest region of Mission Canyon near Kenmore Place, and developed areas near the northern extent of Barger Canyon road.

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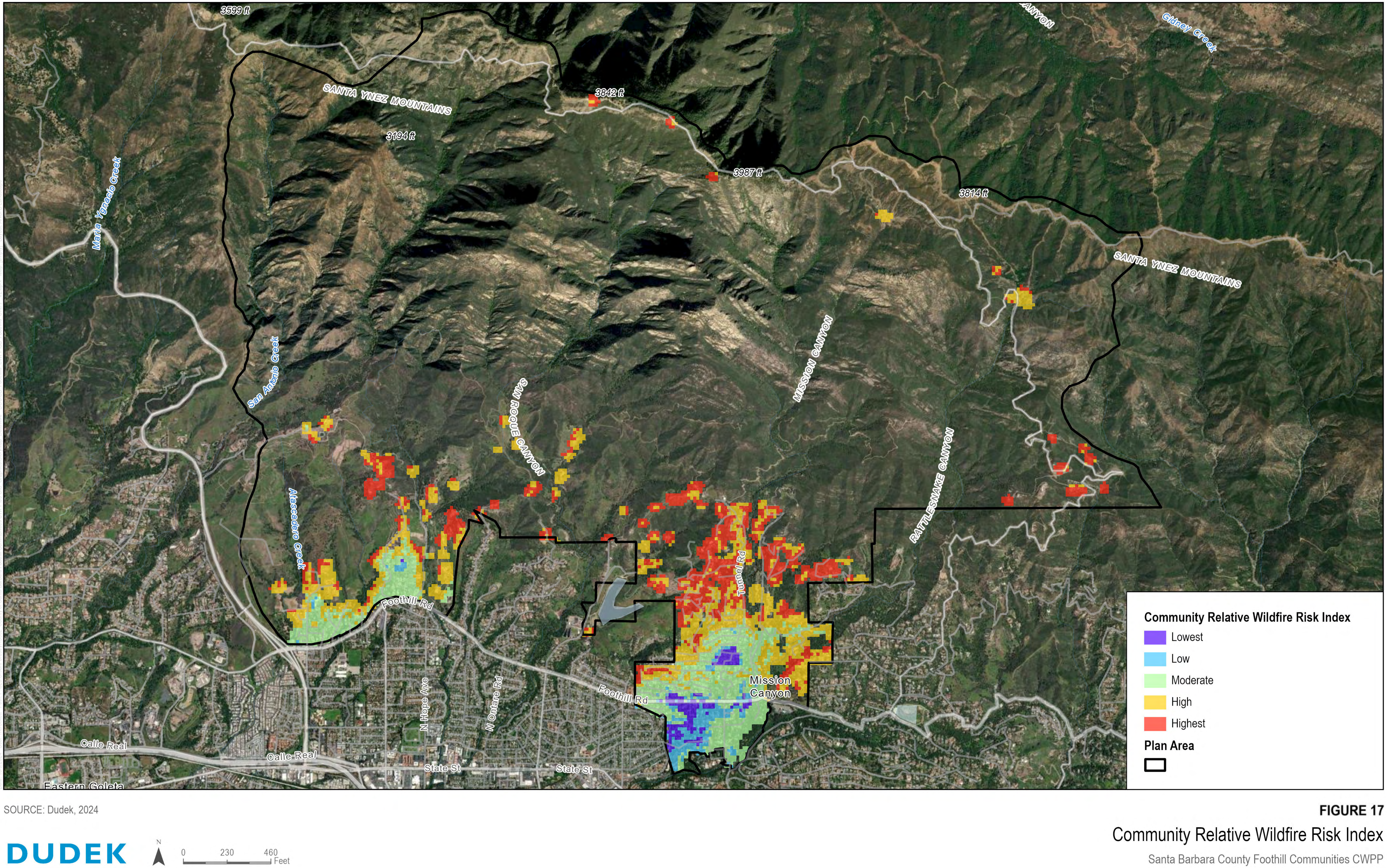

SOURCE: Dudek, 2024

DUDEK

FIGURE 17

Community Relative Wildfire Risk Index

Santa Barbara County Foothill Communities CWPP

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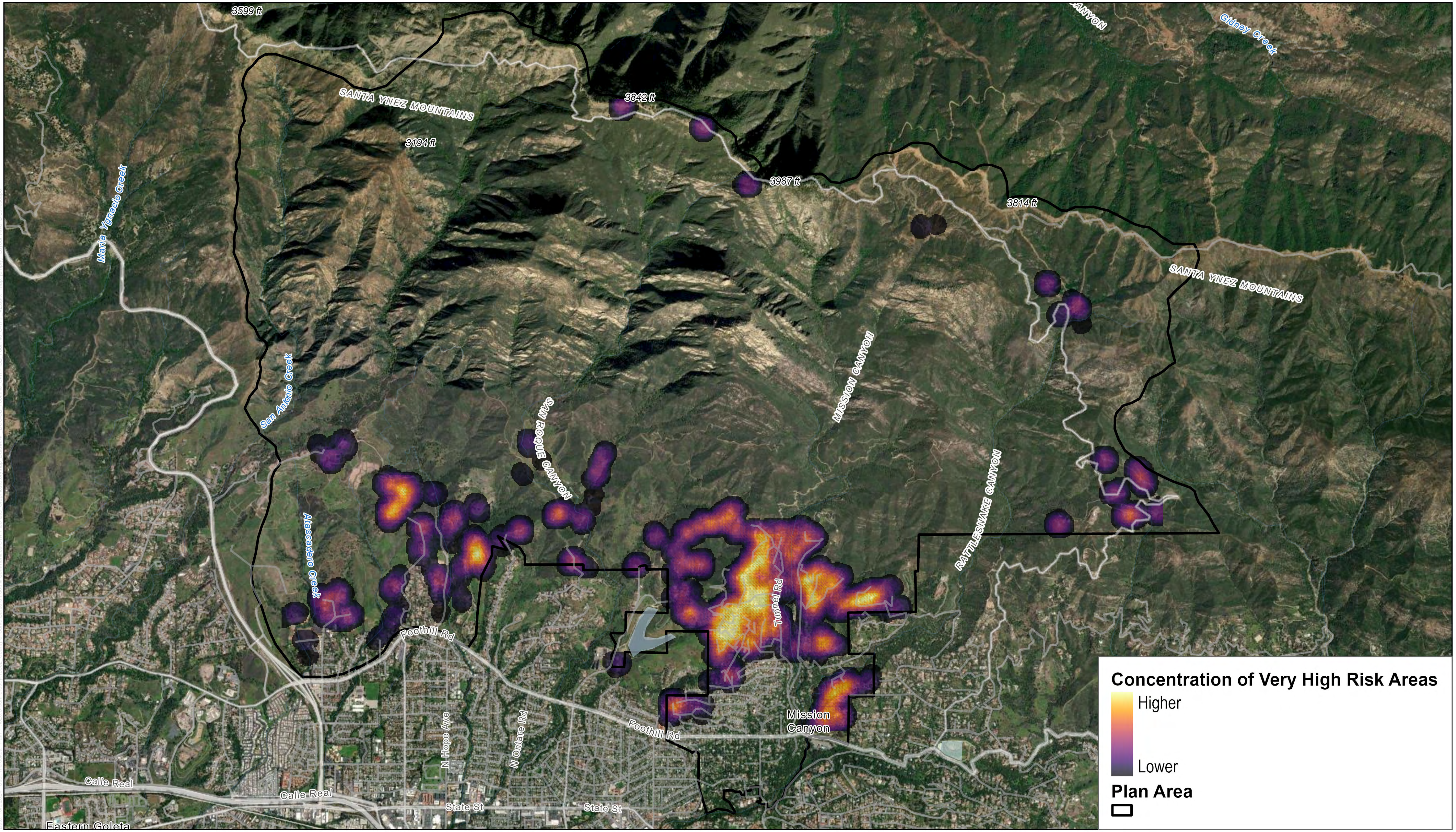

SOURCE: Dudek, 2024

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FIGURE 18

Concentration of Very High Risk Areas

Santa Barbara County Foothill Communities CWPP

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4 Transportation Study

4.1 Goals and Approach

In support of the CWPP, a Transportation Study was conducted to identify areas within the Santa Barbara Foothill Communities that may take the longest to evacuate due to the limited number of available evacuation routes and/or high levels of evacuation-related traffic. The surrounding topography restricts the number of evacuation routes connecting the Santa Barbara Foothill Communities to SR-154, SR-192, and Highway 101. A primary goal of the Transportation Study was to provide recommendations to improve emergency access and resident/worker/ visitor evacuations.

The amount of time it may take to evacuate the Plan Area was estimated by comparing the roadway capacities in the Plan Area under evacuation conditions to the expected evacuation travel demand. Travel demand estimates how many vehicles may need to use a roadway during an evacuation conducted at a specific time. The following six scenarios were developed with input from the technical team to reflect potential evacuation extents and times that would generate differing levels of travel demand:

- **Scenario One:** Entire Plan Area ordered to evacuate on a weekday afternoon
- **Scenario Two:** Entire Plan Area ordered to evacuate midday on a weekend
- **Scenario Three:** Subset of the Plan Area, affected by a western ignition point, ordered to evacuate on a weekday afternoon
- **Scenario Four:** Subset of the Plan Area, affected by a western ignition point, ordered to evacuate midday on a weekend
- **Scenario Five:** Subset of the Plan Area, affected by an eastern ignition point, ordered to evacuate on a weekday afternoon
- **Scenario Six:** Subset of the Plan Area, affected by an eastern ignition point, ordered to evacuate midday on a weekend

4.2 Methodology

Population characteristics such as age, employment, residency, and disabilities were factored into the evacuation analysis/travel demand for estimating the population in the Plan Area at different times of the day and week. Fehr and Peers used metrics provided in the Santa Barbara County Comprehensive Plan Circulation Element to estimate the roadway capacity in terms of vehicles per lane per hour for all evacuation routes in the analysis area. To determine evacuation travel demand, the project team looked at six different scenarios, which consisted of three ignition point locations and two times of the week, and calculated the number of evacuating vehicles per building/recreational facility for each. Travel demand measures how many vehicles may use a roadway at a specific time. To aid this determination, Fehr and Peers developed a methodology to estimate the number of evacuating vehicles and assign vehicles to evacuation routes listed in Section 2.1.1 of the Transportation Study (Appendix C) and in Section 2.13 of this CWPP. Appendix C contains the full text of the Transportation Study and presents further information about factors and calculations used to determine evacuation route capacity and Fehr and Peers' evacuation travel demand methodology.

4.3 Findings

The results of the evacuation analysis suggest evacuation traffic will be greatest in the southern portion of the Mission Canyon community. The results of the Transportation Study also informed the key takeaways listed below.

Single access residential areas are likely to require the most time to evacuate. The evacuation results suggest that everyone evacuating from the single access residential areas along Tunnel Road north of Cheltenham Road and along Mission Canyon Road north of Las Canoas Road would be able to reach Foothill Road within 2 hours under Scenarios One, Two, Five, and Six and within 1 hour under Scenarios Three and Four.

Weekend evacuation travel demand may be greater than weekday demand. Regardless of ignition point, greater evacuation travel demand is expected under a weekend scenario compared to a weekday scenario. This greater demand is also reflected in longer estimated evacuation times on weekends.

The location of the ignition point may impact evacuation times in the Mission Canyon community. Although overall estimated evacuation travel demand is highest under the central ignition point scenarios, the eastern ignition scenarios produce the greatest individual level of localized traffic in the Mission Canyon portion of the Plan Area.

Across all scenarios, four common points along the evacuation route network were identified to have the greatest expected evacuation traffic. The estimated time for residents, workers, and visitors located upstream to pass through these points—also referred to as “screenlines”—is summarized in Table 13 below.

Table 13. Estimated Time to Clear Screenline During an Evacuation Event

Screenlines with Greatest Expected Traffic	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Mission Canyon Road (southbound) Between Foothill Road and Alameda Padre Serra	2–3 hours	3–4 hours	<1 hour	1–2 hours	3–4 hours	4–5 hours
Foothill Road (westbound) Between southern and northern legs of Mission Canyon Road	1–2 hours	2–3 hours	<1 hour	<1 hour	2–3 hours	3–4 hours
Mission Canyon Road (southbound) Between Tunnel Road and Foothill Road	1–2 hours	1–2 hours	<1 hour	<1 hour	1–2 hours	1–2 hours
Foothill Road (westbound) Between Mission Canyon Road and Mountain Drive	<1 hour	<1 hour	<1 hour	<1 hour	1–2 hours	1–2 hours

For example, it would take a resident, worker, or visitor located upstream Foothill Road(between Mission Canyon Road and Mountain Drive) less than one hour under scenario 1 or up to 2 hours in scenario 6 to pass Foothill Road. These results also simulate that it would take someone 2-3 hours to pass though Mission Canyon Road (between Foothill Road and Alameda Padre Serra) under scenario 1 and up to 5 hours under scenario 6.

Recommendations to improve evacuations within the Plan Area by managing vehicle demand, efficiently using roadway capacity, and providing the public with information are described in the Action Plan (Chapter 5).

4.4 Recommendations

The goal of the Transportation Study's recommendations is to improve evacuations within the Plan Area by managing vehicle demand, efficiently using roadway capacity, and providing the public with information—both ahead of time and in real-time during an evacuation event. Due to topographic constraints, these communities lack the ability to expand roadway capacity; therefore, many of the study recommendations focus on planning and programmatic efforts. There are some opportunities for infrastructure-related projects as well. Discussion of recommendations is organized by whether the suggested action addresses evacuation time by better managing demand (demand-side), creating more roadway capacity (supply-side), or providing people with relevant and timely information (information side).

On the demand side, opportunities identified to reduce overall evacuation travel demand include efforts that would consolidate evacuating residents into fewer vehicles or distribute traffic across more routes. To encourage greater distribution of traffic across available evacuation routes, the Santa Barbara County Transportation Division could explore options for installing a system of sensors that would assess traffic conditions and detect incidents on evacuation routes.

On the supply side, high priority actions to consider include developing an evacuation intersection traffic management plan, conducting roadside fuel reduction, and removing hazardous trees. Other supply-side recommendations include coordinating with owners of private roads to establish alternate evacuation routes (which could be particularly beneficial to Mission Canyon residents) and studying the feasibility of installing roundabouts at Foothill Road/Mission Canyon Road (the intersection with Mission Canyon Road south of Foothill Road) and Foothill Road/Alamar Avenue. Well-designed roundabouts can improve traffic flow (relative to a signalized or side street stop-controlled intersection), are resilient to power outages, and have safety benefits for all road users (including pedestrians and bicyclists) that could result in benefits during everyday conditions.

Providing residents, workers, and visitors with information that is relevant, timely, easy to access, and easy to understand is a critical component of improving evacuations and was one of the most noted suggestions during stakeholder outreach for this project. During community meetings, many residents expressed interest in having a single web-based point of information that could provide real-time updates on the status of wildfires and evacuation route conditions. The County is currently in the process of developing an emergency communication platform using Genasys, which could address the requests for a web-based supplement to existing emergency alerts.

Collaboration between SBC Fire, the SBCFSC, the Santa Barbara County Transportation Division, the Santa Barbara County Office of Emergency Management, and community members will be a key component of implementing the Transportation Study (Appendix C) recommendations.

A future phase of work could use dynamic modeling techniques to understand the relative effectiveness of the recommendations on the total estimated time to evacuate the Plan Area.

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5 Action Plan

This chapter identifies recommended actions and projects to be implemented in the Plan Area that would help to increase wildfire resilience in the community. Projects and actions identified in this section would need to be funded and approved by the appropriate regulatory authority prior to implementation. In some cases, completion of environmental review would be necessary prior to project implementation.

SBC Fire, along with interested parties and community members, intends to assess project progress annually and invite agencies, landowners, and involved community members to recommend projects that would minimize wildfire risk and promote community wildfire resilience. Project identification and implementation is an ongoing process, and additional projects will be evaluated by SBC Fire. Where applicable, the projects or recommended actions presented in this section will be updated to reflect additions or changes.

This CWPP is a living document and has been created to allow for ongoing management, updates, and community input intended to reduce the impact of wildfires in the Plan Area.

This Action Plan is organized into sections with recommendations that address the following topics:

- Vegetation Management
- Structural Ignitability
- Community Outreach and Education
- Access and Evacuation
- Funding
- Post-Fire Recovery

Each recommended action item addresses one or more issues identified in the Plan Area. Issues addressed by the action are identified by the corresponding icon, as shown in Table 14.

Table 14. Plan Area Issues Addressed in the Action Plan

			
Wildfire Hazard The vegetation and fuels conditions that can be hazardous.	**Evacuation and Access** The natural and built conditions that could hinder or prevent evacuation or emergency access.	**Community Participation and Education** The need for community collaboration and/or education.	**Wildfire Ignition** The potential for a wildfire to start due to the interaction of natural and human environments.

Table 14. Plan Area Issues Addressed in the Action Plan

			
Jurisdiction and Land Ownership The interactions between various landowners, agencies, community organizations, and other entities.	**Structure Exposure** The potential for buildings to ignite or spread a fire due to the materials used to build the structure.	**Financial Barriers** The costs preventing certain actions or activities from taking place.	**Environment** The impact of wildfire and wildfire hazard reduction projects on the environment.

5.1 Plan Monitoring and Management

Long-term monitoring of projects and project areas (e.g., vegetation management areas) is important for identifying areas that need follow-up maintenance or identifying new or additional projects necessary for reducing overall community wildfire risk. The following actions by SBC Fire are intended to reduce community wildfire risk:

- **Conduct annual monitoring of vegetation management project areas.** Management of vegetation is recommended in this CWPP, and maintenance of treated areas can typically be completed at a lower cost than that of the initial effort. Monitoring efforts can identify areas in need of additional vegetation management treatments. Monitoring efforts will be managed by SBC Fire, and performance standards will be identified on a project-level basis.
- **Maintain this CWPP.** Long-term maintenance of this CWPP is essential. Maintaining the CWPP document is critical to track completed projects and ongoing vegetation management efforts and, most importantly, to address and define new priority projects. SBC Fire should directly manage the CWPP and should conduct a review of the CWPP at least annually with an edit cycle every 3 to 5 years. SBC Fire should set up a standing committee to address the long-term management and maintenance of this CWPP.
- **Review vegetation management projects.** The prioritized list of vegetation management projects included in Appendix E of this CWPP should be reviewed at least annually by SBC Fire and updated accordingly. Requests from project proponents to update this table should be considered in a timely manner.

5.2 Action Plan

This CWPP identifies action items that can be implemented to serve and protect lives, property, critical infrastructure, and Plan Area resources threatened by wildfire. SBC Fire recognizes the catastrophic impacts of wildfire on the Santa Barbara Foothill Communities, and this CWPP is intended to reduce wildfire hazards and risk through implementation of the action items outlined in this section. Actions identified in this section would need to be funded and approved by the appropriate regulatory authority prior to implementation, where necessary. In some cases, completion of environmental review would be necessary prior to project implementation.

5.2.1 Vegetation Management

Vegetation management is a critical component to wildfire risk reduction in the Plan Area. All vegetation will burn, given the right conditions (Reinhardt et al. 2008). Therefore, the goal of vegetation management is not to remove all vegetation, but to moderate potential fire behavior by reducing fuel loads and altering the structure, composition, and spacing (horizontal and vertical) of retained vegetation. Vegetation management treatment types (e.g., fuel breaks) and techniques (e.g., grazing) are used to meet overall vegetation management goals, which are dependent on vegetation type, structure, and condition. It is anticipated that vegetation management projects identified in this CWPP would be further clarified at advanced stages of project planning, with detailed management prescriptions and management area boundaries defined. The following sections identify vegetation management types, recommended treatment standards, and treatment techniques that can be used for the vegetation management projects identified in this CWPP.

Potential vegetation management projects were identified during development of the wildfire hazard and risk assessment, as well as by community members and interested parties during Development Team meetings, agency meetings, public workshops, and field meetings. Vegetation management projects were prioritized by evaluating their locations relative to the fire hazard map developed and evaluated for this CWPP and through direct feedback on community priorities. It is anticipated that vegetation management projects identified in this CCWPP would be further clarified at advanced stages of project planning, with detailed management prescriptions and management area boundaries defined. Environmental review would also be conducted for these projects prior to implementation, where necessary. This would include resource surveys to ensure that vegetation management activities would not impact any listed species. A prioritized list and map of recommended vegetation management projects is provided in Appendix E. It is intended that this prioritized list will be reviewed and updated routinely by SBC Fire. A geodatabase including GIS mapping data for prioritized projects is kept on file with SBC Fire, GIS Section.

In addition to the recommended priority projects (Appendix E), the actions listed in Table 15 are recommended to address vegetation management in the Plan Area.

Table 15. Vegetation Management Actions

Action	Responsible Party*/Partnerships/ Collaborators	Priority (Low-Med-High)	Issue
Evaluate opportunities to implement vegetation management/fuel reduction projects identified in this CWPP (see Appendix E).	SBC Fire	High	
Collaborate with relevant jurisdictions (e.g., USFS, County of Santa Barbara, and City of Santa Barbara, Montecito Fire Protection District, and NGOs etc) to implement new and maintain existing vegetation management/fuel reduction treatments in county, city, and federally owned lands. Support collaborative	SBC Fire, adjacent jurisdictions, SB County Chiefs Association	High	

Table 15. Vegetation Management Actions

Action	Responsible Party*/Partnerships/ Collaborators	Priority (Low-Med-High)	Issue
vegetation management projects across ownership boundaries.			
Conduct and maintain vegetation management/fuel reduction around critical infrastructure and facilities, major roadways, high risk communities, and evacuation routes.	SBC Fire, Public Works, Municipal Water	High	
Increase utilization of CEQA/NEPA environmental review streamlining options when planning vegetation management/fuel reduction/ecological restoration projects.	SBC Fire, SBCFSC, USFS	Med	
Routinely review and update, as necessary, the City's High Fire Hazard Area Desirable Plant List document.	SBC Fire, SBBG, SBCFSC	Med	
Explore opportunities for private and public collaboration to ensure County code requirements for roadside fuels reduction (Chapter 15 of the County Code) are implemented and enforced on public and private roads and driveways in the Plan Area, notably 10 feet of horizontal clearance and 13.5 feet of vertical clearance to ensure ease of emergency access and evacuation.	SBC Fire, Public Works, private property owners	High	

Note: USFS = U.S. Forest Service

5.2.1.1 Vegetation Treatment Types

Wildland-Urban Interface Fuels Reduction

The WUI is the geographic area where wildlands and development intersect or intermix, presenting significant fire hazard risks and a complex fire environment. When wildfires occur in WUI areas, firefighting and emergency response efforts are primarily focused on protecting human life and property. WUI fuel reduction generally consists of strategic reduction and removal of vegetation to reduce fuel loads and prevent or slow the spread of wildfire between structures and wildlands. WUI fuel reduction treatments also provide emergency access points and staging areas for firefighters and equipment and reduce flammable vegetation near emergency evacuation routes. Additionally, WUI fuel reduction treatments may serve to enhance habitat quality in areas where existing habitat is degraded, such as by removing invasive plant species (additional treatments that improve habitat quality are discussed below in the Ecological Restoration subsection).

WUI fuel reduction is also part of the requirements of WUI building codes (e.g., California Building Code Chapter 7A), defensible space (e.g., PRC Section 4291, County Code Chapter 15), and other structure hardening and fire safe development requirements. Defensible space is an effective means of reducing the risk of loss of life and property due to wildfire. Defensible space works to achieve four objectives: reduce the risk of direct flame contact with a structure, reduce the overall fire intensity and rate of spread near a structure, remove ember sources and provide a space for embers to fall to the ground before reaching the structure, and provide an area for firefighters to safely engage with a fire and access structures. A defensible space zone around an entire structure has been proven to be effective for achieving these objectives (Syphard et al. 2014). Conversely the lack of defensible space within 30 feet of a structure has been shown to be a key factor in structure ignition during wildfires (Troy 2020).

WUI fuel reduction treatments for the Plan Area are anticipated to occur within the space between structures and wildlands or other areas of non-maintained vegetation. The size of the treatment area (distance from structure) would be dictated by the most currently applicable codes and standards in place for the adjacent structures (PRC 4291, County Code Chapter 15, or other more restrictive standard). WUI fuel reduction treatments may occur on private property or public property if there is insufficient room for required treatments on private property and the treatment area extends into other undeveloped land (e.g., neighboring undeveloped parcel). Vegetation management occurring outside of WUI areas, as defined, would be categorized as fuel breaks or ecological restoration (discussed below).

Fuel Breaks

Fuel breaks are typically wide strips of land where vegetation management has taken place so that wildfires burning into them can be more easily controlled. Fuel breaks are not intended to stop fire spread, especially where embers can be transported via strong winds over the fuel break, but rather to modify fire behavior and enhance firefighting capabilities. Fuel breaks are intended to reduce fire intensity, slow fire progression rates, reduce flame lengths, minimize the likelihood of crown fire transition, increase fireline construction rates, and provide for points of access for fire crews (CAL FIRE 2019b). Fuel breaks increase the horizontal spacing between retained vegetation, increase the vertical separation between surface fuels and overstory tree canopies, and modify surface fuels (grasses, shrubs, debris) to reduce fire intensity and flame lengths. Fuel breaks can vary in total width depending on terrain, vegetation, and proximity to developed uses and may reach up to 300 feet wide (CAL FIRE 2019b). Fuel breaks in shrub-dominated vegetation types typically consist of thinning brush stands to remove dead vegetation, decrease surface fuels loading, and provide horizontal spacing between retained shrubs or shrub groupings. Fuel breaks in tree-dominated vegetation types (shaded fuel breaks) typically consist of ladder fuel removal (removal or treatment of live and dead understory trees and shrubs) to provide vertical spacing between trees and tree groupings and understory vegetation and, in some cases, selective removal of overstory trees to provide horizontal separation between retained tree canopies.

Fuel breaks can be combined with other treatment types to increase effectiveness and should be designed considering terrain, fuel characteristics, anticipated fire behavior, and local weather conditions. The useful life of a shaded fuel break is the estimated amount of time (in years) that the mitigation action will be effective and is based on several factors, including vegetation type, treatment location, and weather conditions. In general, fuel breaks in grasslands have a lower useful life (1 year), those in brush-dominated areas have a moderate useful life (2 to 4 years), and those in forested areas have a longer useful life (3 to 20 years). Maintenance of fuel breaks over time is necessary to maintain their utility in reducing fire hazard.

Ecological Restoration

Ecological restoration treatments focus on restoring ecosystem processes, conditions, habitat value, and wildfire resiliency by modifying uncharacteristic fuel conditions (Fuller et al. 2020). Such fuel conditions could exist for various reasons, including a history of fire exclusion; occurrence of severe wildfire events; conversion of vegetation community types; displacement of native plant communities by invasive species; increased plant mortality due to pest or disease infestations; or other influences that contribute to deviation from historical landscape conditions, such as climate change, land use conversions, and other indirect effects (Lenihan et al. 2008). Ecological restoration treatments would involve management actions intended to return the treatment area to more natural conditions. Wildfire is a natural occurrence in many California ecosystems and has played an important role in shaping the landscape and maintaining ecosystem processes (Pausas et al. 2004). Ecological restoration treatments can contribute to improving overall ecosystem health by increasing plant vigor, reducing susceptibility to pests and disease, increasing tolerance to drought and climate change effects, and reducing the threat of high-severity wildfire. Healthy ecosystems have a mosaic of successional stages, providing a diversity of wildlife habitats, and are composed of vegetation that is more resistant to pest and disease outbreaks.

Potential ecological restoration treatments in the Plan Area may include invasive species control or removal, treatments focused on managing type conversion of vegetation communities, treatments to mimic natural disturbances to control species encroachment and alter vegetation community successional stages, prescribed burning to mimic natural fire recurrence, prescribed burning to treat thatch buildup in grasslands, post-fire hazard tree removal, treatment of pest-or disease-infected vegetation, and treating ladder fuels or thinning forest stands to reduce fuel loads and return woodlands/forests to historical compositions.

5.2.1.2 Vegetation Management Techniques

Vegetation management for fire hazard mitigation is the practice of thinning, pruning, removing, or otherwise altering vegetation to reduce the potential for ignitions and modify fire behavior. Different vegetation management techniques can be used, depending on vegetation type, location, condition, and configuration. Given the dynamic nature of vegetation, a single treatment technique or management prescription may not be appropriate for one site over time. Therefore, an adaptive approach that allows for the selection of appropriate management techniques is needed to achieve management goals. Selection of a vegetation management technique or a combination thereof will be determined by site-specific conditions during the project planning process. In general, vegetation management techniques can be classified into five categories:

- Biological (grazing)
- Manual
- Mechanical
- Prescribed fire
- Chemical (herbicides)

Appendix F describes these vegetation management techniques in more detail and identifies best management practices to minimize or avoid resource impacts. It is anticipated that environmental review will be necessary prior to implementation of vegetation management projects. Additionally, selection of qualified and trained contractors, training of personnel, scheduling, and supervision to carry out vegetation management treatments and any associated best management practices are also key components of an effective vegetation management project.

5.2.1.3 Vegetation Treatment Standards

The vegetation management and maintenance standards presented in this CWPP are intended to reduce fire hazards by rearranging and maintaining the spatial distribution of fuels. Vegetation management for fire hazard reduction is an ongoing, cyclical process. Given the dynamic nature of vegetation, a single management prescription cannot be assigned to any location and be effective in perpetuity. Additionally, management prescriptions intended for initial treatments may differ from those intended for maintenance of the same area. Therefore, the management and maintenance standards presented herein are derived from the principles of vegetation management for fire hazard reduction and have been broken down by dominant vegetation community/land cover type (grassland/herbaceous, brush/scrub, and tree/woodland/forest).

This "dynamic approach" allows the vegetation management techniques outlined herein to be selected based on the needs of each management area as conditions change over time. The management and maintenance standards outlined here are intended to modify fuel arrangements to moderate potential fire behavior. These standards have been developed to reduce fuel loads, eliminate fuel ladders, disrupt the horizontal continuity of vegetation, minimize ignition potential, and prioritize the retention of fire-resistant plants.

Grassland/Herbaceous

In grass-dominated vegetation types, management is intended to reduce vegetation height (e.g., mowing, grazing), resulting in a shorter and more compact surface fuel layer that is less ignitable and less likely to sustain fire spread. Implemented beneath shrub or tree canopies, such treatments also minimize the potential for a surface to crown fire transition. Management is also intended to maintain low fuel volumes in the areas between shrub- and tree-dominated vegetation types.

This section outlines management and maintenance standards for grasses; other light, flashy fuels; and surface fuels capable of igniting and carrying fire. Grassland/herbaceous fuels in the Plan Area are composed primarily of annual grasslands, but may also include other disturbed areas (e.g., along roadsides) where grasses have been established. The following management standards have been identified for grass/herbaceous fuels in treatment areas:

- Grasses and other light, flashy fuels should be treated such that heights do not exceed 3 inches. Avoid removal of the mineral soil to minimize erosion.
- Cut grass may be left on the ground surface to protect the soil as long as it does not exceed 6 inches in height.
- All dead or dying ground cover, vines, and other surface vegetation should be removed or chipped and spread on site.
- All dead twigs, branches, and limbs from overstory shrubs and/or trees should be removed or treated (e.g., chipped, piled, and burned) and spread as a ground cover (mulch) on site.
- All mulch or chipped material should be spread to a depth not to exceed 4 inches.
- All material removed from the treatment area should be properly disposed of per County standards.

Brush/Scrub

In shrub-dominated vegetation types, management is intended to reduce surface fuel loading and flame lengths and slow fire spread by increasing the horizontal spacing between retained shrubs. In areas beneath trees, management is also intended to increase the vertical spacing between shrub and tree canopies to reduce the potential for a surface to crown fire transition. Removal or treatment (e.g., chipping) of dead material from shrub-dominated types also reduces dead fuels loads, can assist in reaching spacing standards, and helps minimize the growth of highly ignitable grass/herbaceous vegetation.

This section outlines management and maintenance standards for brush/scrub vegetation. Brush/scrub fuels in the Plan Area are composed primarily of chaparral and coastal scrub types. Brush/scrub vegetation is typically characterized by relatively open to dense woody shrub cover and may include some scattered trees or clusters of trees. Brush/scrub fuels may be found within other dominant vegetation types (e.g., woodlands) and should be treated to the standards outlined in this section. The following management standards have been identified for brush/scrub fuels in treatment areas:

- All dead brush/scrub should be removed.
- Removal of dead and dying growth from retained shrubs should be prioritized.
- Individual shrub crowns should be horizontally separated from adjacent shrubs, shrub groupings, or trees by at least two times the height of the shrub crown. Groupings of shrubs may be retained such that the grouping does not exceed 8 feet in diameter. Shrub groupings should be horizontally separated from adjacent shrubs, shrub groupings, and trees by at least two times the height of the shrub crown.
- Where brush/scrub is located within the dripline of an individual tree, isolated tree, or small tree grouping, the vertical separation between the top of the shrub and the lowest tree branch should be at least three times the height of the shrub crown or 8 feet, whichever is greater.
- Individual, isolated, undesirable trees located within brush/scrub stands should be prioritized for removal (SBC Fire 2022h).
- Where treatment occurs in chaparral, chamise (*Adenostoma fasciculatum*) and big pod ceanothus (*Ceanothus megacarpus*) should be prioritized for treatment.
- Manzanita shrubs (*Manzanita* spp.) occurring in treatment areas should be retained, where feasible.
- To minimize soil erosion potential, removed shrubs should be cut at or near the ground surface and root systems left intact.
- All vegetative material from brush/scrub removal or trimming should be removed or treated (e.g., masticated, chipped) and spread on site (or piled and burned).
- All chipped material should be spread to a depth no greater than 4 inches.
- All material removed from the treatment area should be properly disposed of per County standards.
- When brush/scrub removal is necessary to achieve the spacing standards outlined above, removal of undesirable plants should be prioritized over desirable plants.

Tree/Woodland/Forest

In tree-dominated vegetation types, specifically oak woodlands, management is intended to remove fuel ladders by increasing the vertical spacing between surface fuels (shrubs, grasses) and tree canopies to reduce the potential for surface to crown fire transition. Creating more fire-resilient woodlands involves reducing surface fuels and ladder fuels (i.e., fuel that can facilitate fire spread from ground fuels into tree crowns). As noted by Nunamaker et al. (2007), surface and ladder fuels should have the highest priority for management to reduce fire intensity, rate of spread, and crown fire potential. Active crown fires are initiated with torching but are ultimately sustained by the density of the overstory crowns. Reduction in potential surface fire behavior plus an increase in canopy base height minimizes torching potential (Agee and Skinner 2005). Table 16 summarizes the effects and advantages associated with fuel management in tree-dominated vegetation types.

Table 16. Principles of Fire Resistance to Tree-Dominated Vegetation Types

Principle	Effect	Advantage	Concerns
Reduce surface fuels	Reduces potential flame length	Control easier; less torching	Surface disturbance less with fire than other techniques
Increase height to live crown	Requires longer flame length to begin torching	Less torching	Opens understory; may allow surface wind to increase
Decrease crown density	Makes tree-to-tree crown fire less probable	Reduces crown fire potential	Surface wind may increase and surface fuels may be drier

Table 16. Principles of Fire Resistance to Tree-Dominated Vegetation Types

Principle	Effect	Advantage	Concerns
Keep big trees of resistant species	Results in less mortality for same fire intensity	Generally restores historical structure	Less economical; may keep trees at risk of insect attack

Source: Agee and Skinner 2005.

This section outlines management and maintenance standards for tree-dominated vegetation types. Tree/woodland/forest fuels in the Plan Area are primarily composed of oak woodlands, although smaller occurrences of other hardwood and conifer types are present. Tree-dominated vegetation in the Plan Area varies from relatively open tree stands to dense stands with relatively closed canopy cover. Tree/woodland types may also include scattered shrubs or shrub groupings, small patches of grass/herbaceous vegetation, or shrub and grass herbaceous vegetation occurring beneath tree canopies, although trees are the dominant cover type. The general management standards outlined below apply to oak woodlands and other hardwood stands where canopy retention is an overall goal. The shade of the retained canopy helps reduce the potential for rapid re-growth of surface vegetation and can reduce erosion. The following management standards have been identified for tree/woodland/forest fuels in treatment areas:

- Dead, dying, and undesirable trees should be removed or treated to remove dead/dying material.
- Coast live oak trees measuring 8 inches and greater in trunk diameter (as measured at 4 feet, 6 inches above grade) should not be removed.
- Portions of tree crowns above roads should be pruned to maintain 13.5 feet of vertical clearance above the road surface.
- Retention of other healthy native understory components (e.g., toyon) should be prioritized, as long as they do not create fire ladders.
- Trees should be pruned to remove limbs located closer than 6 feet above the ground surface.
- Where brush/scrub is located within the dripline of a tree, the vertical separation between the top of the retained shrubs and the lowest tree branch should be at least three times the height of the retained shrub crown or 8 feet, whichever is greater.
- Pruned oak limbs should be clean cut using the best industry standard practices.
- All chipped material should be spread to a depth no greater than 4 inches. Chip piles should be kept at least 5 feet from oak tree trunks.
- Cut (lop and scatter) vegetation should be treated such that it does not exceed 12 inches in depth.
- To minimize soil erosion potential, stumps from removed trees should be left intact, with stump heights not exceeding 6 inches (as measured from the uphill side).
- Native vegetative material from tree removal or trimming should be removed or treated (e.g., chipped) and spread on site. Where necessary for erosion control, logs no smaller than 8 inches in diameter (small end) may be retained on the soil surface.
- All material removed from the site should be properly disposed of per County standards.

5.2.2 Structural Ignitability

There are two main components to reducing structural ignitability: vegetation management and structural hardening. Structures ignite via direct fire exposure (flame impingement, convection, radiation) or via ember exposure. To reduce structural ignitability, efforts need to address direct fire and ember exposure (Maranghides et al. 2022). Addressing structural ignition potential is an effective mitigation strategy for preventing wildfires and increasing WUI ignition resistance (Zhou 2013). Research has found that structural characteristics, especially roofing, play a significant role in reducing structural vulnerability to fire and the likelihood of burning (Gorte and Bracmort 2012; Kolden and Henson 2019; Manzello et al. 2011; Syphard et al. 2017; Zhou 2013). Further, reducing a structure's likelihood of ignitions reduces the risk for individual homeowners and the risk associated with fire spreading to other homes and wildland areas (Mockrin et al. 2020). Reducing fire exposure is achieved via vegetation management in defensible space areas. The following five zones are identified for defensible space areas. Recommendations for management actions that can be taken by homeowners in each of these zones can be found on SBC Fire's website at https://sbfiresafecouncil.org/get-ready/. In addition, SBCFSC conducts free home evaluations to help the community understand the contribution of embers and direct flame impingement to structure ignition risk.

- **Zone 0 (0–5 feet):** Zone 0, sometimes referred to as the "immediate zone," is the area nearest the house and includes the surfaces of the structure itself, plants, decks, and outdoor furniture. Ideally, there should be zero combustibles in this zone. This area is the most vulnerable and should be more aggressively maintained to be fire resistant.
- **Zone 1 (5–30 feet):** Zone 1, sometimes referred to as the "intermediate zone," extends from the house's exterior walls to a distance of 30 feet. Management actions include a combination of landscaping and hardscaping, with the goal of moderating fire behavior.
- **Zone 2 (30–100 feet):** Zone 2, sometimes referred to as the "extended zone," extends from 30 feet to at least 100 feet. More defensible space may be required depending on site-specific characteristics, such as topography, building construction, and vegetation types, or within certain areas of the County.
- **Zone 3 (0–10 feet along access routes):** Zone 3, the "access zone," extends from 0 feet to at least 10 feet horizontally from the edges of roads and driveways and includes 13 feet, 6 inches of overhead clearance. Property owners are responsible for vegetation adjacent to roads and driveways. Properly maintained access routes are critical for emergency evacuations and first responder access.
- **Zone 4 (100+ feet):** If defensible space treatments are necessary beyond 100 feet (following site-specific inspection and authorization from SBC Fire), coordination with neighboring landowners may be necessary. Management actions in Zone 4 would be similar to Zone 2.

Structural hardening also plays an important role in minimizing the potential for structure ignitions. Structural hardening refers to steps a property owner may take to enhance the survivability of an existing structure that may not be up to the current building or residential code standards for wildland areas. Homes survive wildfires through a combination of vegetation management and maintenance, management of combustible materials on the property, and installation and maintenance of fire- and ember-resistant construction materials. Hardening of the homes and other structures to enhance survivability during a wildfire would include retrofitting the most vulnerable home features, including the following:

- Roofs
- Vents
- Eaves and soffits
- Windows
- Walls
- Decks
- Rain gutters
- Patio covers
- Chimneys
- Garages
- Fences
- Driveway and access roads
- Address signage
- Water supply

Although fire-resistant construction standards are mandatory for new buildings in the Plan Area, hardening of existing structures is voluntary. Adopting mandatory home hardening provisions in building and fire codes is problematic because existing and nonconforming structures were typically approved and built to the codes in effect at the time of construction. The problem persists, however, that a burning structure in a wildfire contributes to the fire and presents a danger to nearby structures through radiant heat exposure and other structures downwind by way of embers. Retrofits to existing structures can reduce fire risk, and some cost-sharing and grant programs are available to offset costs. Resources for hardening structures can be found on the following websites:

- Wildfire Home Retrofit Guide: https://readyforwildfire.org/wp-content/uploads/2024/03/wildfire-home-retrfito-guide-1.26.21.pdf
- Protect Your Property from Wildfire: https://www.fema.gov/sites/default/files/2020-11/fema_protect-your-property_wildfire.pdf
- How to Prepare for a Wildfire: https://www.ready.gov/sites/default/files/2020-07/how-to-prepare-for-a-wildfire.pdf
- Low Cost Retrofit List: https://www.osfm.fire.ca.gov/media/p0elt0sp/low-cost-retrofit-list-update-2_17_22.pdf
- Hardening Your Home: https://readyforwildfire.org/prepare-for-wildfire/hardening-your-home/

Wildfire Home Hardening Guide: https://sbfiresafecouncil.org/wildfire-home-hardening-guide/

In addition to the resources above, the actions in Table 17 are recommended to address structural ignitability in the Plan Area.

Table 17. Structural Ignitability Actions

Action	Responsible Party*/Partnerships/ Collaborators	Priority (Low-Med-High)	Issue
Monitor and evaluate opportunities for structural retrofit programs in the Plan Area. Encourage structural retrofits based on findings. Focus these efforts in high and very high risk areas.	SBC Fire, SBCFSC	Med	
Conduct home assessments and educate Plan Area residents about potential upgrades and available programs. Prioritize the most cost-effective structural hardening actions in community education.	SBC Fire, SBCFSC	High	
Evaluate community-scale retrofitting projects to reduce costs. Target contiguous community areas to provide maximum benefit towards reducing structure-to-structure ignitions. Pursue grant opportunities to fund these efforts.	SBC Fire, SBCFSC	Med	

5.2.3 Community Outreach and Education

Community outreach and education is an important component in community wildfire hazard reduction efforts. Such efforts increase the community's knowledge and awareness of wildland fire, can assist in prevention and preparedness efforts, and are an important component in planning and implementing vegetation management projects. SBC Fire, SBCFSC, and other partners collaborate to host ongoing fire prevention and public education and outreach programs countywide. The SBCFSC is currently engaged in active public outreach through a variety of programs and provides valuable resources through its website at https://sbfiresafecouncil.org/. SBC Fire also provides valuable resources regarding safety preparedness for wildfire and other disasters that can be found through its website at https://sbcfire.com/safety-preparedness/.

The following programs are currently active in the County to address wildfire risk and community engagement:

- **Firewise USA** Program - SBCFSC helps communities within the Plan Area and throughout Santa Barbara County become recognized as a Firewise community. The Firewise program provides a collaborative framework to help neighbors in a geographic area get organized, find direction, and take action to increase the ignition resistance of their homes and community to reduce wildfire risks at the local level. Resources on the Firewsie USA program can be found at https://sbfiresafecouncil.org/firewise-usa/
- **"Ready! Set! Go!"** – SBC Fire has adopted the "Ready! Set! Go!" Wildfire Action Plan through the Santa Barbara County Ready Program (https://readysbc.org/). Ready! Set! Go! was designed to provide the community with information about creating defensible space around homes, retrofitting homes with fire-resistive materials, and preparing the community to safely evacuate well ahead of a wildfire. The Ready! Set! Go! Action Plan provides a three-step process that teaches homeowners to create their own action plan of preparedness, have situational awareness, and leave early in the event of a fire. A copy of the Ready! Set! Go! Action Plan can be found at https://www.sbcfire.com/ready-set-go/.
- **Defensible Space Program** – SBC Fire administers the County's Defensible Space Program, as outlined in PRC Section 4291. The Defensible Space Program addresses defensible space zones, general guidelines for creating and maintaining defensible space, the County's Hazard Reduction Program, structural hardening, defensible space inspections, and fire-resistive landscaping. The Defensible Space Program also allows residents to request a defensible space inspection. More information about SBC Fire's Defensible Space Program can be found at https://www.sbcfire.com/defensible-space-program.
- **SBCFSC Wildfire Preparedness Evaluations** – Wildfire preparedness evaluations are a free and voluntary review of the vulnerability of a house and landscape to wildfire and ember ignition conducted by SBCFSC staff. The assessment includes a review of defensible space and home hardening principles and makes specific recommendations based on the property evaluated. The evaluation also addresses evacuation preparedness. This is not a regulatory program, but rather a community outreach and education program offered by the SBCFSC. More information can be found at https://sbfiresafecouncil.org/evaluation/.
- **Community Emergency Response Team** – The Community Emergency Response Team (CERT) educates people about disaster preparedness for hazards that may impact their area and trains people in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members also are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community. More information on the CERT program managed by SBC Fire can be found at https://www.sbcfire.com/CERT.

- **Red Flag Warnings** – A Red Flag Warning means that critical fire weather conditions are either occurring now or will shortly. A combination of strong winds, low relative humidity, and warm temperatures can create extreme fire behavior. The National Weather Service provides daily fire weather forecasts in close coordination with local fire agencies. The Red Flag Warning Program enables firefighting agencies to manage critical resources and prepare appropriate suppression responses for protecting life and property. Red Flag Warnings are typically issued within 24 hours of an impending critical fire weather event. More information about Red Flag Warnings and fire weather in the County can be found at https://www.sbcfire.com/red-flag-warnings.
- **ReadySBC Notification System** – The ReadySBC Notification System is an emergency notification system that allows the County to alert individuals of existing or potential emergencies. Through ReadySBC, the County can alert individuals by landline, cell phone, text, TTY (teletype), and email. Individuals can register for emergency alerts at https://readysbc.org/.
- **Santa Barbara Equine Assistance and Evacuation Team –** This team serves members of the community who own or stable large animals and are adversely affected or displaced by fire and other emergency disaster incidents. Upon notification of disaster and need for large animal evacuation, the team establishes a mobile command center at a designated site and prepares for the intake and sheltering of large animals. More information about this team can be found at https://www.sbequineevac.org/.
- **Santa Barbara County Animal Services** – This department, in cooperation with the Santa Barbara Humane Society and other local non-profits, functions as part of SBC Fire's emergency response system in case of wildfires. More information about the department and its services can be found at https://www.countyofsb.org/415/Animal-Services. Information related to disaster planning for pets can be found at https://www.countyofsb.org/3292/Disaster-Preparedness.
- **Surviving Disaster Podcast (previously known as the Community Alert Radio Program)** – The Community Alert Radio Program is now a podcast called Surviving Disaster, which promotes initiatives that educate communities on wildfire safety. The podcast is hosted by Ted Adams and Mike Williams of the Wildland Residents Association. Both are longtime Santa Barbara locals with extensive experience in disaster preparedness, and Ted is a founding board member of the SBCFSC. They interview experts on topics like fire ecology, prescribed fire, and community resilience, sharing valuable lessons on wildfire prevention. Podcast episodes and descriptions can be found on Apple, Spotify, and the SBCFSC website at https://sbfiresafecouncil.org/informative-podcasts/.

In addition to the above listed programs, the specific actions in Table 18 are recommended to address community outreach and education in the Plan Area.

Table 18. Community Outreach and Education Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
Conduct annual educational seminars to educate occupants on wildfire preparedness. Educational topics will include: • Defensible space • Structural hardening and retrofits • Evacuation	SBC Fire, SBCFSC, SBC Sheriff, SBC OEM	High	

Table 18. Community Outreach and Education Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
• Vegetation management techniques, including mechanical, manual, herbicides, prescribed fire, and herbivory. • Fire insurance			
Promote Firewise Community recognition and engagement within the Plan Area, and continue to engage/assist existing Firewise communities with risk reduction items outlined in their Action Plans to reduce wildfire risks at a local level.	SBCFSC, community members	High	
Continue defensible space inspections in the Plan Area under SBC Fire's Defensible Space Program.	SBC Fire, SBCFSC	High	
Develop and implement an education and certification program for contractors that conduct home hardening/defensible space work (e.g., home hardening or defensible space training for contractors)	SBC Fire, SBCFSC	Med	
Update and promote a quick reference guide with home hardening/defensible space options that are potentially effective and cost efficient.	SBCFSC	High	
Promote the County's single web-based point of information (including using Genasys during evacuations) regarding wildfire status and evacuation orders/warnings. Coordinate with partner agencies (SBC Fire, USFS, County of Santa Barbara, The Nature Conservancy, Santa Barbara Land Trust, and others) to ensure information is shared and consistent.	SBC OEM, SBC Fire, SBCFSC, adjacent fire agencies and partner agencies	High	
Update and consolidate wildfire awareness materials (e.g., handouts, signage, QR codes) for display and/or distribution at recreation areas (e.g., State Parks, County Parks, trailheads, USFS recreation areas) to increase non-resident awareness of wildfire hazard in the Plan Area.	SBC Fire, SBCFSC, USFS, County Parks, State Parks, local jurisdictions	Med	
Continue to conduct public outreach/education in communities where vegetation management projects are proposed prior to initiation of work. Collaborate with partner agencies that are implementing vegetation management projects. Ensure information is shared through the County's web-based single point of information.	SBC Fire, SBCFSC, USFS, adjacent fire agencies, local jurisdictions	High	

Table 18. Community Outreach and Education Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
Emphasize and educate Plan Area residents about the importance of an ember resistant zone (zone 0) around all structures.	SBC Fire, SBCFSC, FIREWISE	High	
Create wildfire evacuation education materials that incorporate the Transportation Study and other evacuation studies/research.	SBC Fire, SBCFSC, Mission Canyon Association, property management companies, community groups	High	
Incorporate Transportation Study findings into wildfire education campaigns (e.g. Ready! Set! Go!) ▪ Promote information about available evacuation routes, County-identified temporary areas of refuge and temporary evacuation points, and traffic restrictions to expect during an evacuation. ▪ Promote information about how to sign up for local emergency alerts and warnings. ▪ Highlight how evacuation preparedness makes evacuation easier on everyone by spreading out evacuation traffic.	SBC OEM*, SBC Fire, SBCFSC	Med	
Promote the availability of SBC Fire's and USFS's ongoing fuel moisture sampling information to public to ensure the community is made aware when critical moisture levels and increased fire risk are present in the County and Plan Area.	SBC Fire, USFS	Med	

Note: SBC Fire = Santa Barbara County Fire Department; SBCFSC = Santa Barbara County Fire Safe Council; USFS = U.S. Forest Service.

5.2.4 Access and Evacuation

The Plan Area presents unique challenges for evacuation due to terrain, limited radio and cellular communication capabilities, narrow/winding road networks, locked gates, non-maintained roads, the distribution of residences, and the non-resident population (e.g., recreational visitors). Private roads and infrastructure can be an asset during fire suppression efforts because landowners and managers are familiar with resource availability and access constraints. Fire agency access is also a critical component of fire risk reduction. Providing and maintaining road access across ownerships can help facilitate fire suppression efforts during wildfire events and support pre-fire mitigation activities. Finally, controlling public access in strategic areas and at strategic times (e.g., during Red Flag Warnings) can minimize wildfire ignition potential ingress and egress challenges.

The following summarizes different components of wildfire evacuation in the Plan Area:

- The Santa Barbara County Sheriff's Department (SBC Sheriff) is responsible for alerting and warning the public, coordinating evacuations, enforcing laws and emergency orders, establishing safe traffic routes, ensuring that security is provided at incident facilities, ensuring access control to damaged areas, ordering and coordinating appropriate mutual aid resources, and assuming responsibility for the coroner function. SBC Sheriff has the sole jurisdictional authority to order and lift evacuation notices within the Plan Area.
- The County's Reverse 911 system is also managed by SBC Sheriff. In the event of an emergency, an operator can identify the affected community or region of the County and record a message that describes the emergency situation. The Reverse 911 system automatically calls listed and unlisted telephone numbers within the affected area and delivers the recorded message. Additionally, through ReadySCB, the County can alert individuals by landline, cell phone, and email. Individuals can register for emergency alerts at https://readysbc.org/.
- SBC Sheriff communicates the need for evacuation to the public using various communication methods, including Reverse 911, ReadySBC alerts, the Emergency Alert System supported by the National Weather Service broadcast, radio and television announcements, public address systems and announcements from emergency responders, door-to-door notifications, and social media.
- SBC Sheriff and SBC Fire have an Incident Evacuation Plan and Incident Re-Entry Plan that assist law enforcement and fire department personnel in the implementation of evacuation plans. These plans guide agencies in the decision-making process for evacuation and re-entry of residents and small and large animals. Evacuation levels defined in the existing plan are as follows:
  - ***Evacuation Order –*** Movement of community members out of a defined area due to an immediate threat to life and property from an emergency incident. An Evacuation Order should be used when there is a potential or actual threat to civilian life within 1 to 2 hours.
  - ***Evacuation Warning –*** Alerting residents in a defined area of a potential threat to life and property from an emergency incident. An Evacuation Warning may be issued when the potential or actual threat to civilian life is more than 2 hours away.
  - ***Shelter in Place –*** Directs residents to stay secured inside their current location. This direction is only used if the safety of the citizens can be assured if they remain or if an evacuation will cause a higher potential for loss of life.
  - ***Safe Refuge Area –*** A temporary safe location to hold evacuees until evacuation routes are open.
- Levels of closure of areas when evacuation occurs are as follows:
  - ***Level 1 Closure –*** Closed to all traffic except local residents; this level may require escorts.
  - ***Level 2 Closure –*** Closed to all traffic except fire suppression resources, law enforcement, and critical incident resources (e.g., utility companies; California Department of Transportation; Santa Barbara County Public Works, Transportation Division).
  - ***Level 3 Closure –*** Closed to all traffic except fire suppression resources and law enforcement.
  - ***Level 4 Closure –*** Closed to all traffic, including fire suppression resources and law enforcement.
- The County's Ag Pass program provides a uniform way to identify vetted commercial farm and ranch owner operators and their employees to firefighting personnel, California Highway Patrol officers, Sheriff's deputies and other law enforcement officers, and other emergency personnel. An Ag Pass allows for limited emergency access during a wildfire event to protect or care for agricultural assets and/or provide support information to emergency personnel. Ag Pass cards are applied for by and distributed to eligible agriculturalists before a disaster. More information on the program can be found at https://sbfiresafecouncil.org/ag-pass-program/ and https://www.countyofsb.org/293/Ag-Pass.

- Evacuation preparedness and planning should follow the process of developing an Action Plan under the County's Ready! Set! Go! Program. A copy of the Ready! Set! Go! Action Plan can be found at https://www.sbcfire.com/ready-set-go/. Information regarding large animal evacuation can be found at https://www.sbequineevac.org/.
- Re-entering an evacuated area requires as much forethought and planning as an evacuation order. The safety of residents and emergency responders is of the utmost concern and must drive the decision of when to repopulate. SBC Fire and SBC Sheriff determine when it is safe for residents, pets, and large animals to move back into an area.

The actions in Table 19 are recommended to address access and evacuation in the Plan Area.

Table 19. Access and Evacuation Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
Demand-side			
Develop an evacuation vehicle demand reduction strategy to encourage households to evacuate in a single vehicle when possible.	Public Works (County Roads), County Planning, SBC OEM, SBC Fire, SBCFSC, community members	Med	
Develop an evacuation plan for the Wood Glen Senior Living facility.	SBC Transportation Division, Wood Glen Senior Living*, SBC Fire, SBCFSC	High	
Work with recreational facilities and other guest-oriented businesses to develop evacuation plans and preparedness for wildfire.	SBC Fire, SBCFSC, SBC OEM	Med	
Explore options for installing a system of sensors to enable real-time traffic and incident monitoring and provide dynamic travel information.	SBC Transportation Division, California Highway Patrol, SBCOEM, SBC Sheriff's Office	Low	
Supply-side			
Develop an evacuation intersection traffic management plan ▪ Restrict left turns from Foothill Road at unsignalized intersections between Mission Canyon Road and Cieneguitas Road ▪ Signal modifications activated during evacuation events (i.e. extending green time for protected left turns, "green wave" outbound) onto La Cumbre Rd, Ontare Rd, San Roque Rd, and Alamar Ave	SBC Transportation Division, SBC Fire, County Planning, SBC OEM, , SBC Sheriff's Office	High	

Table 19. Access and Evacuation Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
▪ Restrict Foothill Road to evacuation traffic only between State Route 154 and Sycamore Canyon Road ▪ Deploy manual traffic control officers at N Mission Canyon & Foothill Rd and S Mission Canyon & Foothill Rd during an evacuation			
Identify trigger points for closing surrounding highways to through traffic. Criteria to consider include: ▪ Number of homes confirmed to have ignited ▪ Number of evacuation zones issued formal evacuation order	SBCFD, California Highway Patrol (CHP), SBCOEM	High	
Conduct roadside fuels reduction along major roadways.	SBC Fire, SBC Transportation Division, Caltrans	High	
Identify and remove or prune hazardous trees along major evacuation corridors to maintain vertical clearance.	SBC Fire, SBC Transportation Division, private property owners	Med	
Identify private/unmapped roads and coordinate with appropriate stakeholders to maintain them as viable egress routes and allow for their use during an evacuation.	SBC Transportation Division, SBC Fire, private property owners	High	
Study feasibility of converting intersections to roundabouts (candidates include Foothill/S Mission Canyon, Foothill/Alamar).	SBC Transportation Division, Public Works (County Roads)	High	
Facilitate neighbor-to-neighbor agreements and collaboration amongst Firewise and other communities to identify and explore options for alternate escape routes during evacuation.	SBCFSC, private property owners	High	
Coordinate to maintain access roads into wildland areas to ensure accessibility by firefighting crews during initial attack on wildfire ignitions.	SBC Fire, SoCal Edison, USFS	High	
Explore options for improving Mission Oaks Lane as a potential alternative emergency access route.	SBC Fire, Public Works	Med	

Table 19. Access and Evacuation Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
Information-side			
Identify areas to install evacuation wayfinding signage.	SBC Transportation Division	High	
Incorporate an early notification system for parcel clusters with a single egress route into evacuation notification systems (e.g., Genasys).	SBC OEM	High	
Support, coordinate, and participate in evacuation practices/drills with the community.	SBCFSC, OEM, SBC Fire	High	
Explore the feasibility of a curbside management system along roads north of Foothill used for recreational and visitor parking to help enforce parking restrictions on Red Flag Warning days. Elements of the system could include: • A registration requirement for people to park at trailheads, enabled through a mobile app • Prohibit registering (and parking) on Red Flag Warning days, serving as an extra layer of communication about fire risk to visitors.	SBC Transportation Division, SBC Fire	Med	
Incorporate information into existing evacuation preparedness campaigns about considering fire hazard conditions when scheduling gardening and home maintenance services to reduce the number of vehicles in the plan area on Red Flag Warning days.	SBC OEM, SBC Sheriffs, SBCFSC	Med	
When CAL FIRE releases updated Fire Hazard Severity Zone maps in the SRA and LRA, local Planning, Building and Safety, and Fire agencies should review and consider modifications to the maps in areas which are known to have evacuation challenges and experience strong Sundowner wind events.	County Planning, SBC Fire, SBC Sheriff	High	

5.2.5 Funding

Funding is critical to implementing projects identified in this CWPP. SBC Fire and partner agencies and organizations (SBCFSC) have been successful in securing grant funds in the past. Identifying additional funding sources and developing incentive programs for landowners, land managers, and residents of the Plan Area can encourage reduction of wildfire hazards and risks. The following provides information on potential project funding opportunities:

State

- **CAL FIRE:** CAL FIRE provides grant funding for various project types, including forest health, wildfire prevention, and wildfire resilience projects. Eligible project types under these grant programs include fuels management, fire reintroduction, treatment of degraded areas, conservation of forests, hazardous fuels reduction, wildfire prevention planning, and wildfire prevention education. More information regarding CAL FIRE grants can be found at https://www.fire.ca.gov/grants/.
- **California Healthy Soils Program:** The Healthy Soils Program stems from the California Healthy Soils Initiative, a collaboration of state agencies and departments to promote the development of healthy soils on California's farmlands and ranchlands. Covered management practices include but are not limited to cover cropping, no-till, reduced-till, mulching, compost application, and conservation plantings. More information can be found at https://www.cdfa.ca.gov/oefi/healthysoils/.
- **State Fire Assistance Grants (USFS grants administered by California Fire Safe Council):** Program to support fire risk reduction activities by landowners and residents in at-risk communities to restore and maintain resilient landscapes and create fire-adapted communities. Projects may include fuel hazard mitigation (chipping, thinning, burning, or grazing), community hazard mitigation planning (CWPPs, Firewise assessments, hazard assessments, and similar types of planning activities), prevention, mitigation, and education (outreach, mailings, workshops, events, project-specific analysis, and other educational programs). More information regarding State Fire Assistance Grants can be found at https://cafiresafecouncil.org/grants-and-funding/apply-for-a-grant/.
- **California Wildfire Mitigation Program:** This program, developed by the California Governor's Office of Emergency Services and CAL FIRE, institutes a home hardening initiative to retrofit, harden, and create defensible space for homes at high risk to wildfires, focusing on high socially vulnerability communities and providing financial assistance for low- and moderate-income households. This project is in its pilot phase and currently operating only in San Diego, Shasta, and Lake Counties. More information can be found at https://www.caloes.ca.gov/cal-oes-divisions/recovery/disaster-mitigation-technical-support/california-wildfire-mitigation-program.
- **Coastal Conservancy Wildfire Resilience Program:** This program funds on-the-ground activities to restore the health and increase resilience of California forests, grasslands, and natural lands to wildfire, and for planning and capacity building to increase wildfire resilience. More information regarding Coastal Conservancy grants can be found at https://scc.ca.gov/wildfire-resilience-program/.
- **County Coordinators Grant:** The objective of the County Coordinators Grant is to educate, encourage, and develop countywide collaboration and coordination among various wildfire mitigation groups operating within counties containing SRA lands. Grants to be used to cover administrative costs relevant to countywide coordination efforts (salary, support, and administrative costs) for a designated County Coordinator. More information regarding County Coordinator Grants can be found at https://cafiresafecouncil.org/find-your-county-coordinator/

- **County Evacuation Route Grant:** For completing wildfire evacuation route projects, including evacuation route planning, implementation, public education, construction, signage, maintenance, and related activities. More information regarding County Evacuation Route Grants can be found at https://cafiresafecouncil.org/grants-and-funding/cfsc-grant-programs/.

Federal

- **Environmental Quality Incentives Program:** A cost-share program for working landscapes that can address wildfire preparation or damage, including fuel reduction, reforestation, soil erosion control, and water quality protection, often on parcels 1 acre or more or smaller parcels with natural resource concerns. Neighbors can collaborate to meet acreage requirements. Information regarding the Environmental Quality Incentives Program can be found at https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality incentives.
- **U.S. Department of Agriculture Community Wildfire Defense Grants:** Community Wildfire Defense Grants are intended to help at-risk local communities and tribes plan and reduce the risk against wildfire. The program prioritizes at-risk communities in an area identified as having high or very high wildfire hazard potential that are low-income and/or have been impacted by a severe disaster. Grants assist WUI communities restore and maintain landscapes, create fire adapted communities, and improve wildfire response. More information regarding Community Wildfire Defense Grants can be found at https://www.fs.usda.gov/managing-land/fire/grants.
- **FEMA Hazard Mitigation Assistance Grants:** FEMA's hazard mitigation assistance provides funding for eligible mitigation measures that reduce disaster losses. The following programs are applicable to wildfire:
  - **Hazard Mitigation Grant Program:** Provides funding to state, local, tribal, and territorial governments to implement hazard mitigation projects. Eligible projects include creation of defensible space, application of ignition-resistant and/or non-combustible materials on new and existing homes, and treatment of hazardous fuels proximate to at-risk structures. More information regarding FEMA's Hazard Mitigation Grant Program can be found at https://www.fema.gov/grants/mitigation/hazard-mitigation.
  - **Hazard Mitigation Grant Program Post-Fire Grant:** Post-fire assistance to help communities implement hazard mitigation measures after wildfire disasters. Eligible projects include wildfire mitigation (e.g., removal of burned trees), infrastructure retrofits (e.g., water system repairs), soil/slope stabilization, and post-fire flood prevention/sediment reduction. More information regarding FEMA's Hazard Mitigation Grant Program Post-Fire Grants can be found at https://www.fema.gov/grants/mitigation/post-fire.
  - **Building Resilient Infrastructure and Communities Grants:** Support states, local communities, tribes, and territories in hazard mitigation projects to reduce the risks faced from disasters and natural hazards. A wide variety of projects are eligible for Building Resilient Infrastructure and Communities Grant funding. More information regarding these grants can be found at https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities.

The actions in Table 20 are recommended to address funding wildfire mitigation projects in the Plan Area.

Table 20. Funding Actions

Action	Responsible Party*/Partnerships/ Collaborators	Priority (Low-Med-High)	Issue
Continue to collaborate with community partners to seek grant funding for community wildfire mitigation projects.	SBC Fire, SBCFSC,	Med	
Identify and pursue grant funding for community scale defensible space and structural retrofit programs.	SBC Fire, SBCFSC	Med	
Maintain status on California's Fire Risk Reduction Communities List to be prioritized for CAL FIRE Fire Prevention Grant Funding.	SBC Fire, County Planning	High	
Partner with universities and research institutions to support or conduct wildfire mitigation projects or research that would benefit the Plan Area.	SBC Fire, SBCFSC	Low	
Evaluate opportunities for subsidies or incentive programs for property owners to complete and maintain defensible space, home hardening, and vegetation management work.	SBC Fire, SBCFSC, SB County	Med	
Seek opportunities to bolster prevention staff to improve capacity for fuel reduction, inspection, education, and enforcement efforts.	SBC Fire	High	

5.2.6 Post-Fire Recovery

The Plan Area has been subject to numerous large wildfires that have necessitated evacuations, impacted Plan Area road systems, reduced soil stability, and damaged infrastructure and natural resources. Post-fire debris flows have also occurred, causing further damage and impacts downstream of the burn area. Issues associated with post-fire recovery include repair and re-opening of access roads, repairs to utilities and other infrastructure, instability of slopes, proliferation of invasive species, and the need to rebuild damaged or destroyed structures. Post-fire recovery actions are difficult to complete in advance because the location and extent of a burn area is unknown, and the level of burn severity drives much of the required actions. However, some preliminary actions can be taken to minimize community impacts.

The Cachuma Resource Conservation District has compiled a valuable list of resources related to post-fire recovery, including erosion control, restoration, and post-fire flood and mudslide prevention and response. They are partnered with the Natural Resources Conservation Service who also provide post-fire disaster assistance. The actions in Table 21 are recommended to address post-fire recovery in the Plan Area.

Table 21. Post-Fire Recovery Actions

Action	Responsible Party*/Partnerships /Collaborators	Priority (Low-Med-High)	Issue
Develop post-fire rehabilitation guidelines for property owners and landowners. Topics should include, but are not limited to: ▪ post-fire effects of flooding and soil erosion ▪ reducing the importation or spread of invasive species	SBC Fire, SBC OEM, County Planning	Med	
Coordinate with appropriate federal, state, and local agencies to ensure post-fire recovery efforts follow best practices, including but not limited to: ▪ dozer lines constructed during wildfire events are properly repaired to minimize the potential for erosion ▪ restoration of native habitats	SBC Fire, SBC OEM, County Planning, Santa Barbara County Flood Control, Incident Command, USFS	High	
Evaluate and identify alternative access routes for communities, or portions thereof, that may become isolated following wildfires and post-fire debris flows.	SBC Fire, Public Works, SBC Sheriff	Med	

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6 CWPP Authorization

The Santa Barbara County Foothill Communities CWPP was collaboratively developed. Interested parties and local, state, and federal agencies managing land within or adjacent to the Plan Area were consulted. This document identifies and prioritizes areas for hazardous fuel reduction treatments, provides recommendations for the types and methods of treatment that will protect the at-risk communities in the Plan Area, and recommends measures to reduce the ignitability of structures within the Plan Area. This CWPP is intended to better protect the community from the threat of wildfires by promoting community-level fuel reduction projects.

The following entities mutually agree with the contents of the Santa Barbara County Foothill Communities Community Wildfire Protection Plan:

Laura Capps, Chair
Santa Barbara County Board of Supervisors

Mark Hartwig, Fire Chief
Santa Barbara County Fire Department

John Owens, San Luis Obispo Unit Chief
California Department of Forestry and Fire Protection

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Appendix A
Community Engagement Results

Community Outreach

To complement the hazard risk analysis completed for the Plan Area, the project involved a three-prong community engagement approach. Public input is a crucial component in community wildfire protection plans (CWPPs) to ensure that the findings and recommendations presented are specialized to fit the worries, needs, and desires of each Plan Area community to help make them safer and more resilient from wildfire. To ensure that the project reached the most amount of community members, the public outreach for this project involved a Stakeholder Working Group, a public survey, and one in-person community workshop for each city.

1 Development Team

The CWPP Development Team was formed to bring together a diverse representation of Santa Barbara County Fire staff and City staff to help advise the CWPP's developmental process (Table B-1). 9 Working Group meetings were held between November 2023 and February 2025, with each meeting facilitated by the consultant team. During the series of Working Group meetings, members were introduced to the project, presented with preliminary hazard and risk assessment findings, discussed desired project outcomes, worked collaboratively to develop the CWPP guiding principles and goals, and reviewed the administrative draft of the CWPP and Action Plan. Each Working Group member brought a unique perspective to the group, providing the context for local policy and regulatory perspectives, community challenges, and safety considerations.

Table 1 identifies the members of the CWPP Development Team.

Table A-1. Development Team Members

Members	Role/Representation
Dustin McKibben	Pre-Fire Engineer, Santa Barbara County Fire Department
Fred Tan	Fire Marshal, Santa Barbara County Fire Department
Kate Furlong	Community Resilience Domain Lead, Santa Barbara County Fire Safe Council
Gustavo Agredano	Community Wildfire Resilience Associate, Santa Barbara County Fire Safe Council
Mark VonTillow	Inspector II / Wildland Specialist, City of Santa Barbara Fire Department
Nic Elmquist	Wildland Fire Specialist, Montecito Fire Protection District
Rudy Uribe	Forest Fuels Planner, Los Padres National Forest
John Wells Stu Sherman	Representative, Northridge Road Defensible Space Committee
Selden Edner	Representative, Mission Canyon Association
Steve Windhager	Executive Director, Santa Barbara Botanic Garden
Raymond Smith	Mission Canyon community member
Matt Hurst	Representative, La Colina Fire Wise Community, Cocopah Community
Scott Eckardt Dana Link-Herrera Matthew Crockett Alison Sells	Consultant, Dudek

Table A-1. Development Team Members

Members	Role/Representation
Ashleyann Bacay	
Nata Kovalova Chelsea Richer	Consultant, Fehr and Peers

2 Public Survey

For a broad understanding of how community members feel and are impacted by wildfire, we sent out an online survey using the ArcGIS Survey123 platform. The survey had 26 questions that focused on four main categories of topics.

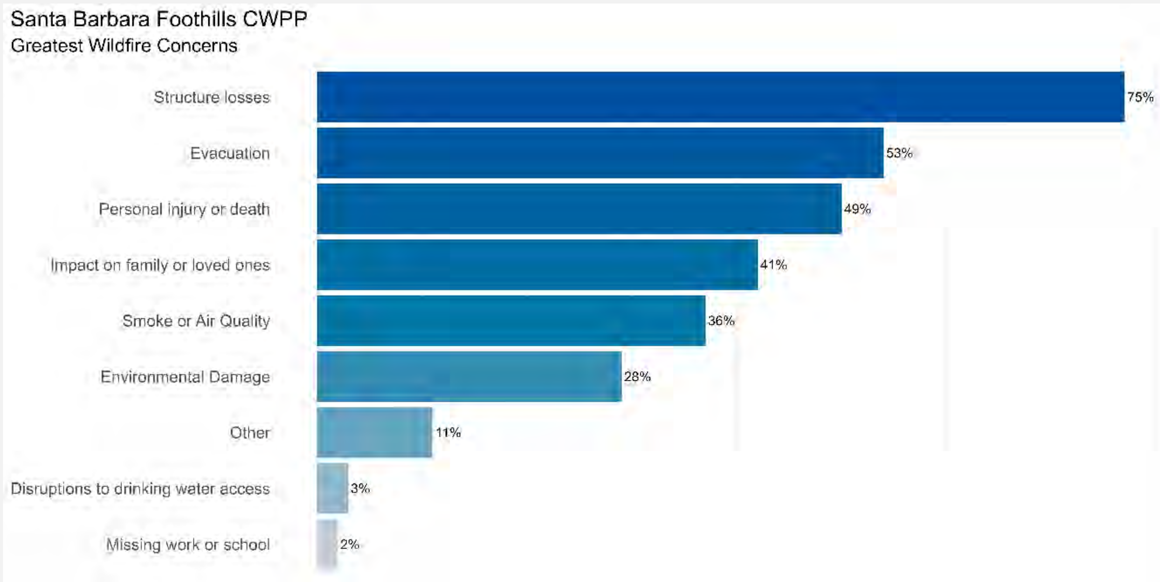
1. Community members' perception of wildfire
2. How community members would or have prepared for wildfire in the past
3. Barriers that have or would prevent them from preparing for a wildfire effectively
4. Community members' opinions on specific wildfire mitigation activities and methods

The survey garnered 102 responses, with the vast majority living there full time (99) and (69) from Mission Canyon.

2.1 Key Results

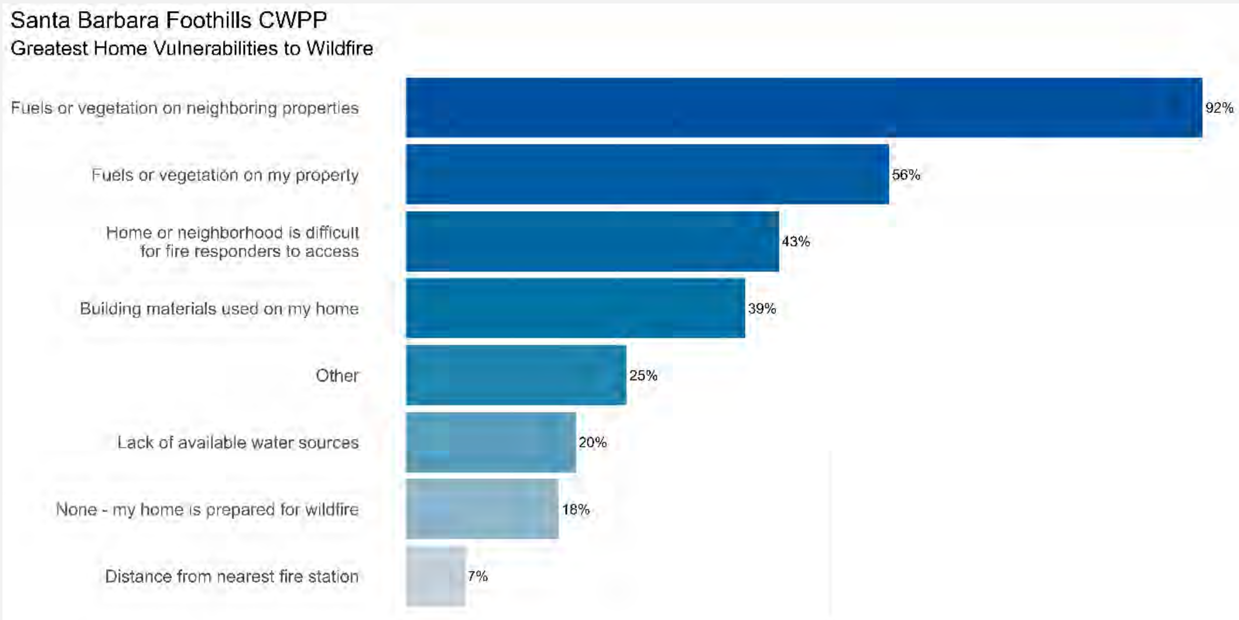
Although our survey covered a wide range of topics regarding wildfire, the key findings will focus on community members' wildfire concerns, specific concerns related to evacuation, desired actions, and methods to complete the desired action. When asked about their greatest wildfire concerns, primary fire concerns included : structure losses (75%), evacuation (53%), and personal injury or death (49%).

Exhibit A-1. Greatest Wildfire Concerns



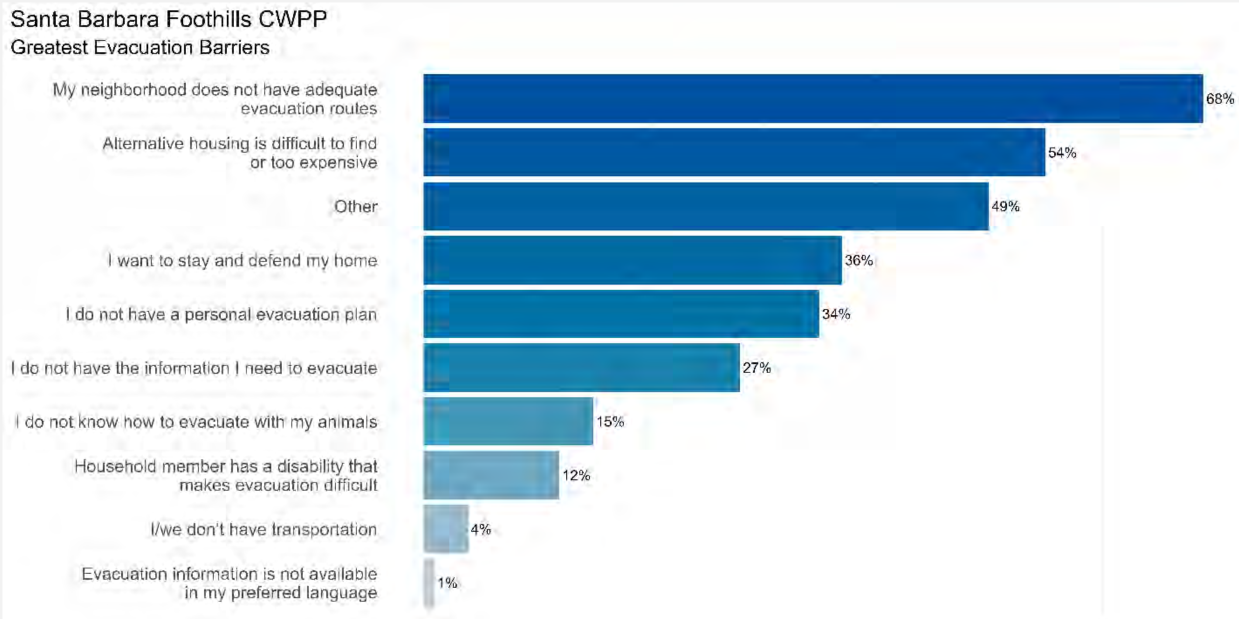
When asked specifically what their greatest home vulnerabilities were to wildfire, the top answers were fuels on a neighboring property (92%), fuels on the respondent's property (56%), home/neighborhood is difficult for fire responders to access (43%), and building materials used on the respondent's home (39%). There were also a portion of "other" answers that included lack of infrastructure including fire hydrants, and concerns around availability and affordability of Home insurance.

Exhibit A-2. Greatest Home Vulnerabilities to wildfire



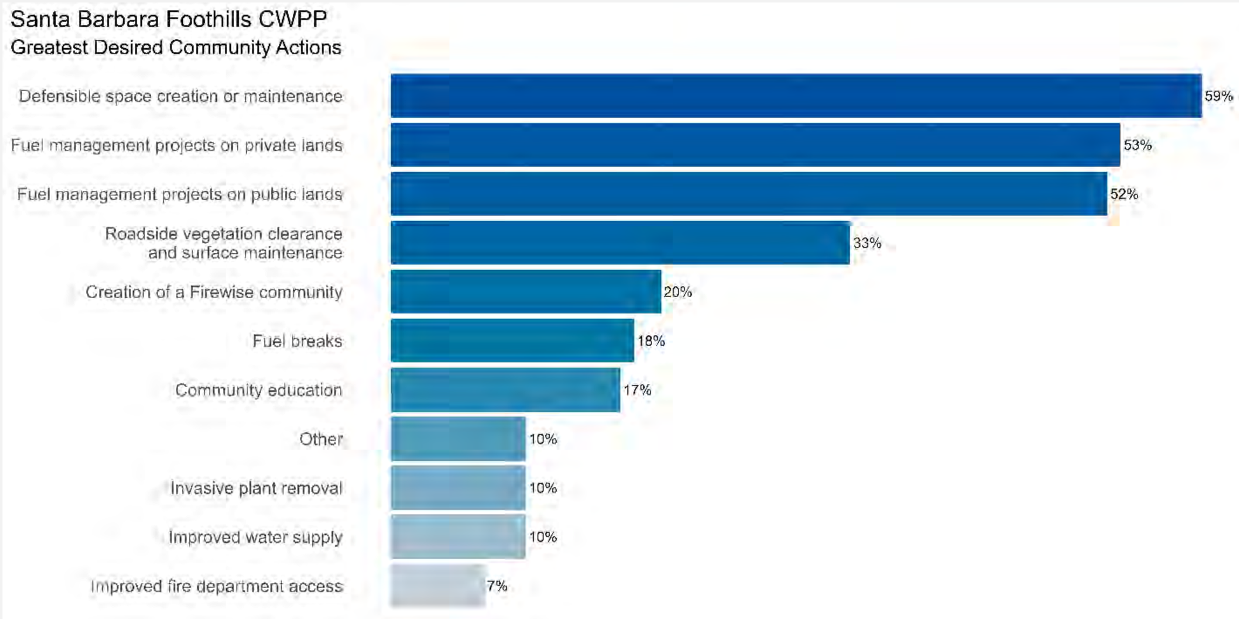
Since evacuation is a major concern for the Foothill Communities, respondents were then asked what barriers they have/ perceive to have in the case of an evacuation. Primary barriers to evacuation were their neighborhood not having adequate evacuation routes (68%), alternative housing being too difficult to find (54%) , or respondents wanting to stay and defend their home (36%). There were also a fair amount of respondents in the "other" category that discussed not knowing what to do in an evacuation order, in addition to some respondents saying they do not have any barriers to evacuation. Additionally, when asked what their response would be to an evacuation warning, 85% of respondents said they would immediately prepare for an evacuation, with 10% respondents saying they would wait for either more information or until an evacuation order was issued.

Exhibit A-3. Greatest Evacuation Barriers



When asked what desired actions community members would want to see to make the Plan Area safer from wildfire, the top responses were creating/maintaining defensible space (59%), fuel management on private lands (53%), and fuel management on public lands (52%).

Exhibit A-4. Greatest Desired Community Actions



Additionally, when asked what techniques were most favorable, as shown in table 2, the fuel risk reduction techniques that had an approval rating of 90% or higher were roadside vegetation clearance, defensible space, and vegetation clearance on public property. When looking at vegetation management techniques, the majority of them also had a high approval rating, including grazing, hand treatment, and mechanical or equipment treatments all having an approval rating of 50% or higher.

Table 2. Approval Rating of Management Techniques

Fuel risk reduction techniques	Approval rating	Vegetation Management Techniques	Approval rating
Defensible Space	96%	Grazing	97 %
Vegetation clearance on public property (parks, greenbelts, etc)	94%	Hand treatment	87%
Roadside vegetation clearance	91%	Prescribed Fire	63 %
Invasive Plant Removal	87%	Mechanical/ Equipment treatments	50%
Fuel Breaks	85%	Herbicides	20%

However, using herbicide as a vegetation management technique had majority disapproval, with only 20% of respondents in support of this activity. These results help identify the most approved methods for action in each community to help the Santa Barbara County Fire Department match up a technique with a given community.

3 Community Workshops

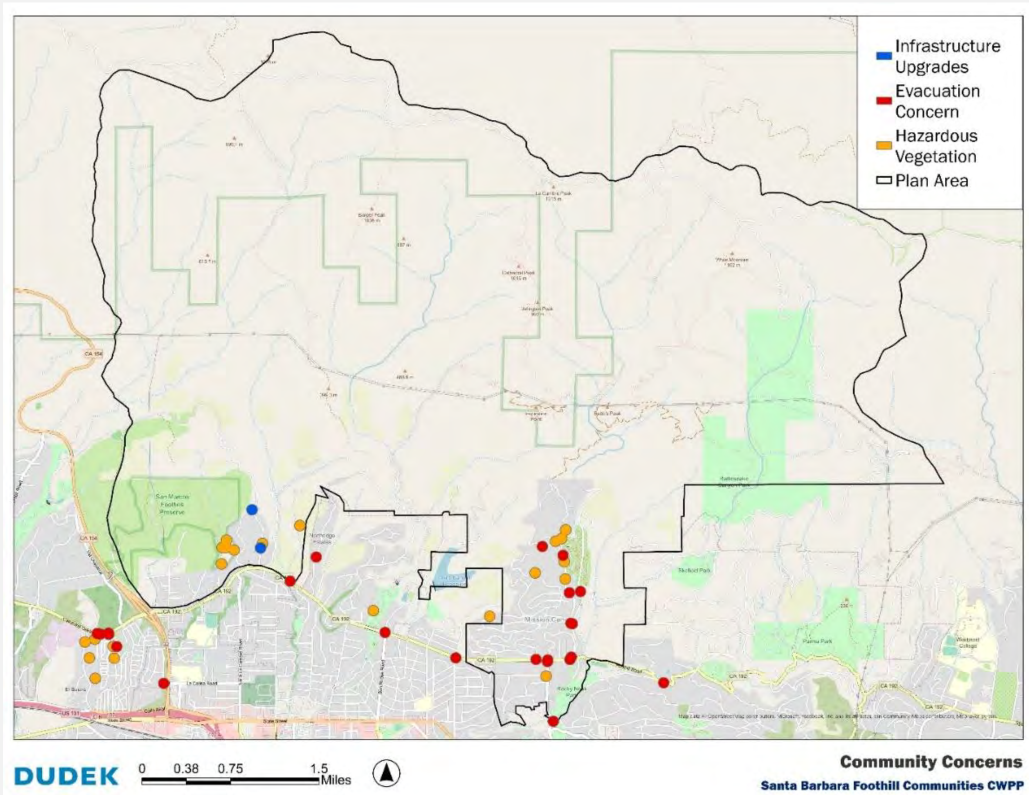
Two in-person community workshops were held in May 2024. The first workshop (May 14, 2024) was held at the Santa Barbara Botanic Garden and the second workshop (May 22, 2024) was held at the Santa Barbara County Fire Headquarters. Approximately 53 people attended the community workshops, representing variety of participants including private property owners, homeowners, local agency representatives, environmental groups, homeowner's associations, and community groups. These workshops included a brief overview of the project followed by passive and active engagement activities aimed at garnering discussion and gaining input from community members. A summary of the activities and community input received is provided in the following sections.

3.1 Self Guided Activities

3.1.1 Map Activity

The passive activities included a map activity where community members could identify areas of concern, including limited evacuation routes, hazardous vegetation, and structures where structural hardening is needed. Areas pinned by community members are shown in Figure A-1. Many of the pins were in areas that participants lived in or were familiar with, which gave great insight into those areas; however, it left a gap for areas for which we did not have representation at the workshops.

Figure A-1. Map Activity Points



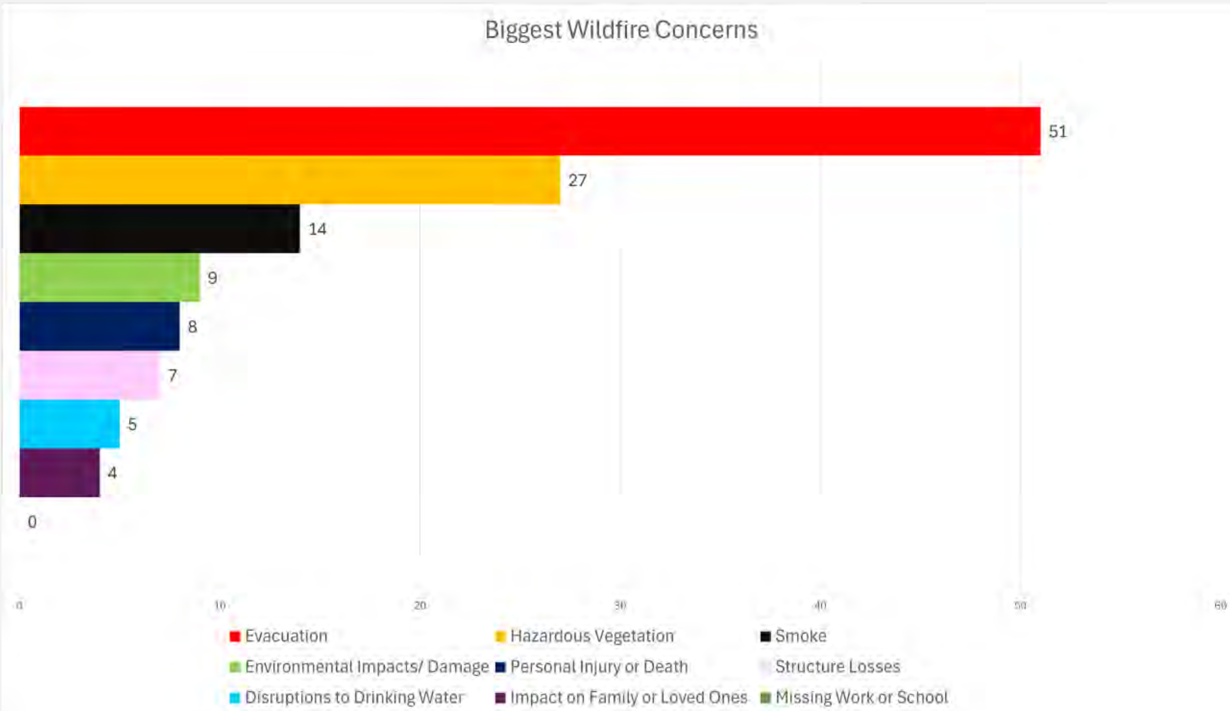
3.1.2 Bead Activity

The bead activities allowed residents to identify their answers to three different questions:

1. What is your biggest concern about wildfire?
2. What risk reduction methods do you think should be a priority in your community?
3. What vegetation management techniques do you want to see utilized in your community?

This involved community members identifying their top answers to the above questions by placing a bead in a corresponding jar to record their answers.

Exhibit A-5. Biggest Wildfire Concerns Bead Results



As show in Exhibit A-5, participants were most concerned about evacuation, with 51 beads being placed in that jar with hazardous vegetation following with 27 beads. The issues that participants were least concerned about included missing work or school that had 0 beads.

As show in Exhibit A-6, When asked what risk reduction activities they most wanted to see in their communities, public lands fuels reduction was the top answer with 50 beads, with roadside vegetation clearance (29 beads) and evacuation route improvement (25 beads) following. Risk reduction activities that are not desired as much by these participants include green waste disposal (5 beads).

Exhibit A-6. Risk Reduction Activities Bead Results

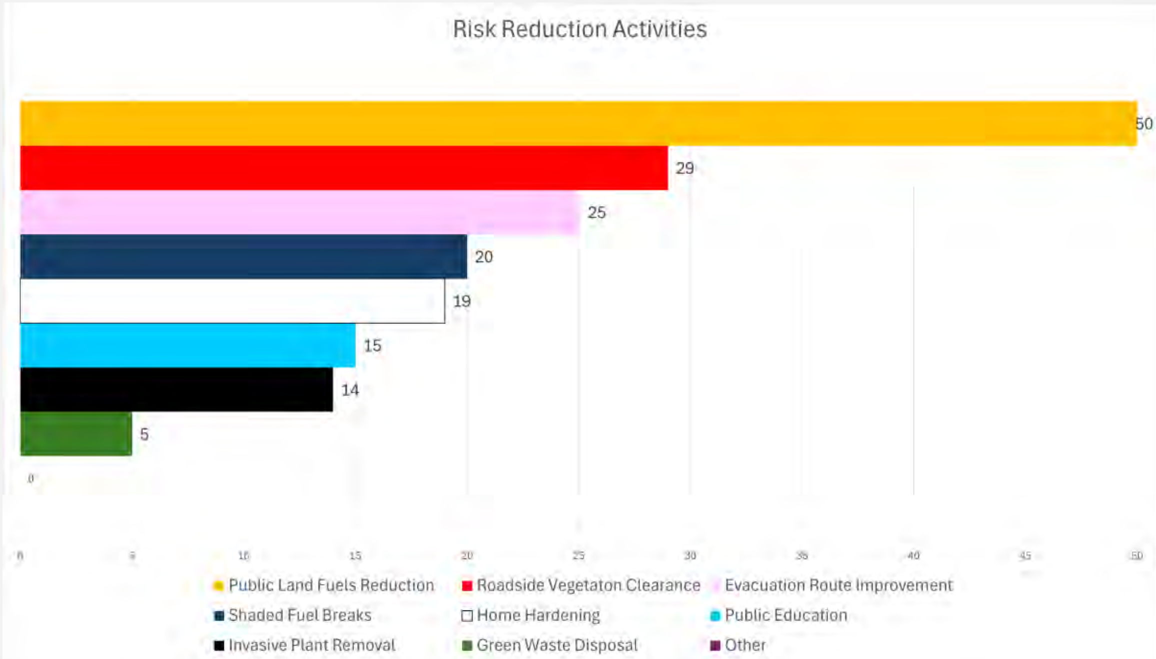
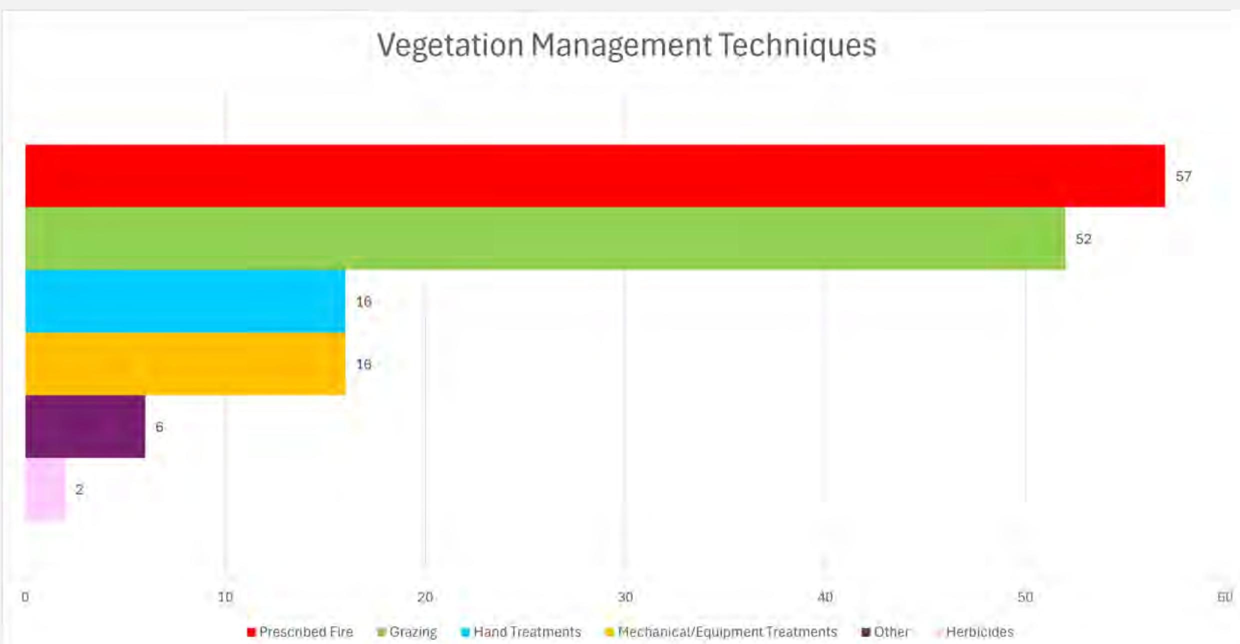


Exhibit A-7. Vegetation Management Techniques Bead Results



Lastly, as shown in Exhibit A-7, when asked what vegetation management techniques participants wanted to see most in their communities, prescribed fire and grazing were the top answers with 57 and 52 beads respectively. Herbicides was the technique that was least desired by participants with only 2 beads.

4 Community Group Discussions

The community workshops included small group discussions, conducted in a roundtable format with small groups rotating to different discussion topics, each led by a facilitator. The group discussions were a key feature of the community workshops to learn more about the community members' experience with wildfire and build upon the insights received from the public survey. The discussion groups were divided amongst four topics:

1. Home Hardening
2. Wildfire Planning
3. Defensible Space/ Vegetation Management
4. Evacuation/ Community Response

Each group discussed every topic with the responses from previous groups being hidden at the start of each discussion section to allow for each group to think independently. These discussions were framed to have participants think about each topic in terms of challenges and opportunities that could either help or harm a community in preparing for wildfire. This framing helped garner input that can directly feed into actions items from the CWPP. Once the challenges and opportunities were compiled for each discussion section, the data was compiled and assigned a category. The categories are as follows:

Challenges

- Individual Behavior
- Resource Limitations
- Homeowner Maintenance
- Public Infrastructure
- Targeted Education
- Outreach
- Community Action

Opportunities

- Funding
- Outreach Materials
- Multijurisdictional Cooperation
- Communication Infrastructure Upgrades
- Community action
- Resources
- Targeted Education

Summary Tree Maps

The tree maps below Exhibit A- 8 and highlight the distribution of categories identified throughout the discussion groups form both workshops. The size of the individual rectangles within the bigger tree map are indicative of the amount of times that category was mentioned. Meaning the bigger the rectangle, the more times that category was discussed, and vice versa. For example, when looking at all of the challenges, **Resource Limitations** and **Individual Behavior** were the categories with the majority of the concerns. When looking at the tree map discussing overall opportunities (Exhibit A-9), **Community Action** and **Targeted Education** represented a majority of the opportunities identified.

Exhibit A-8. Overall Group Discussion Challenges Results

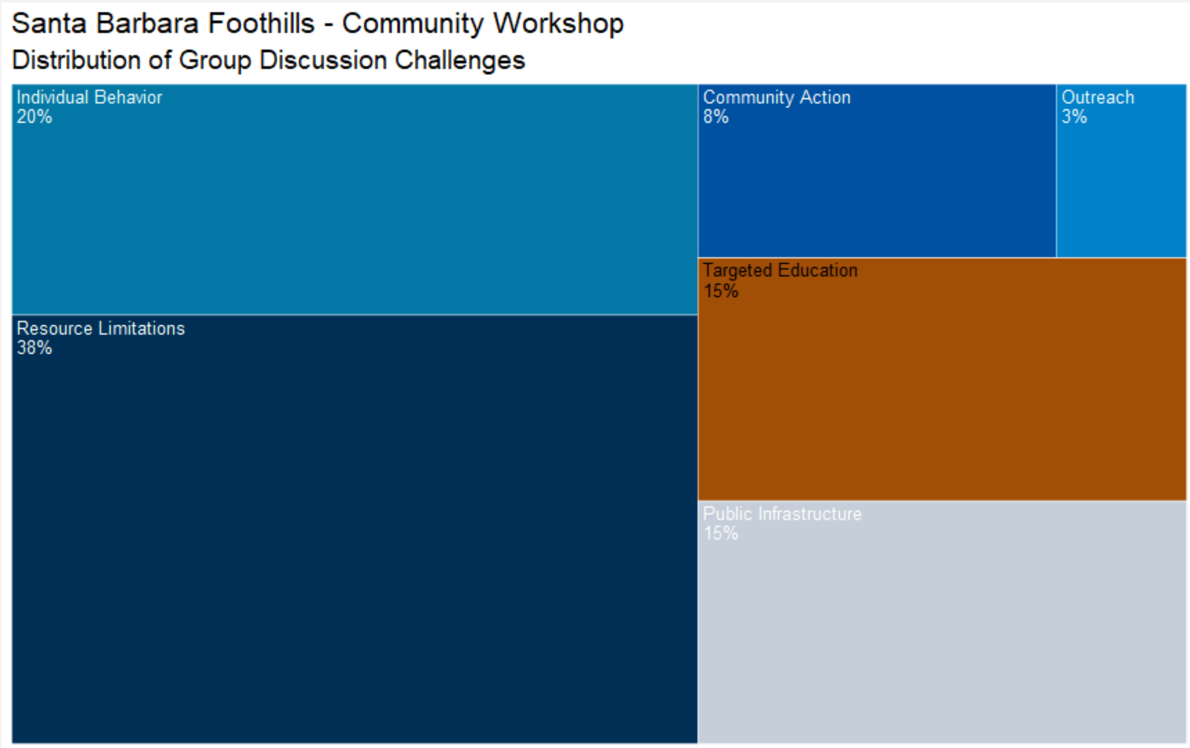


Exhibit A-9. Overall Group Discussion Opportunities Results

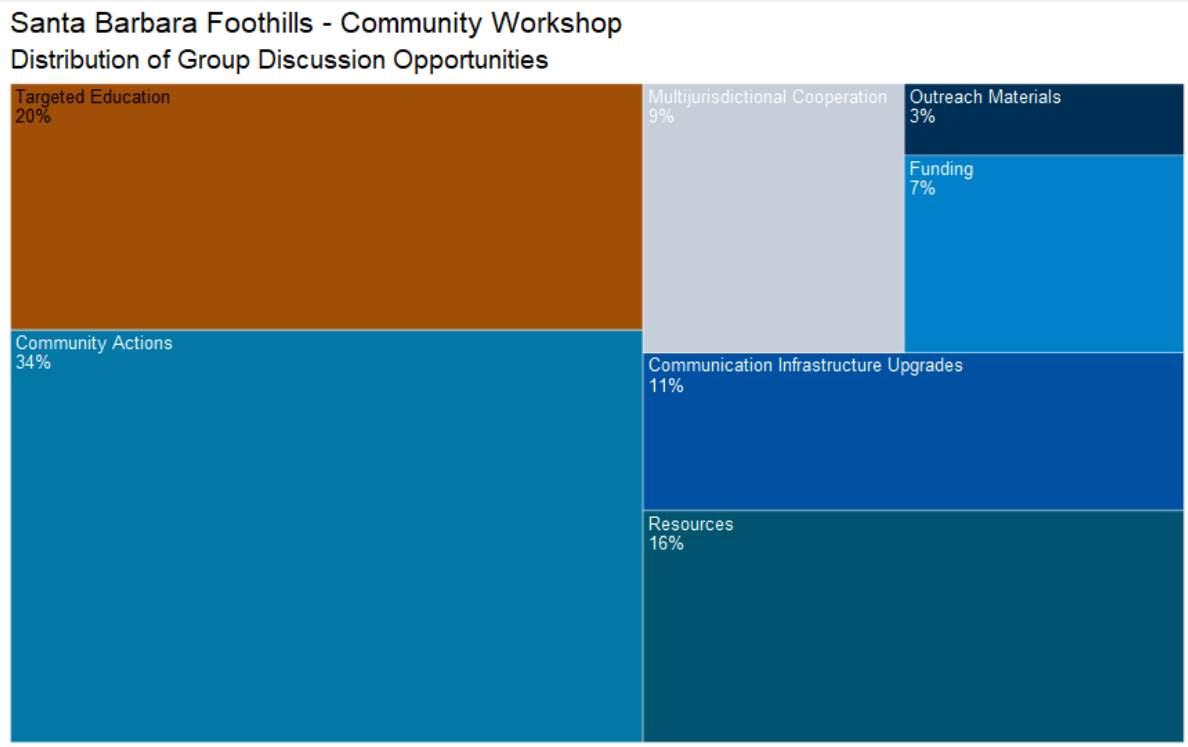
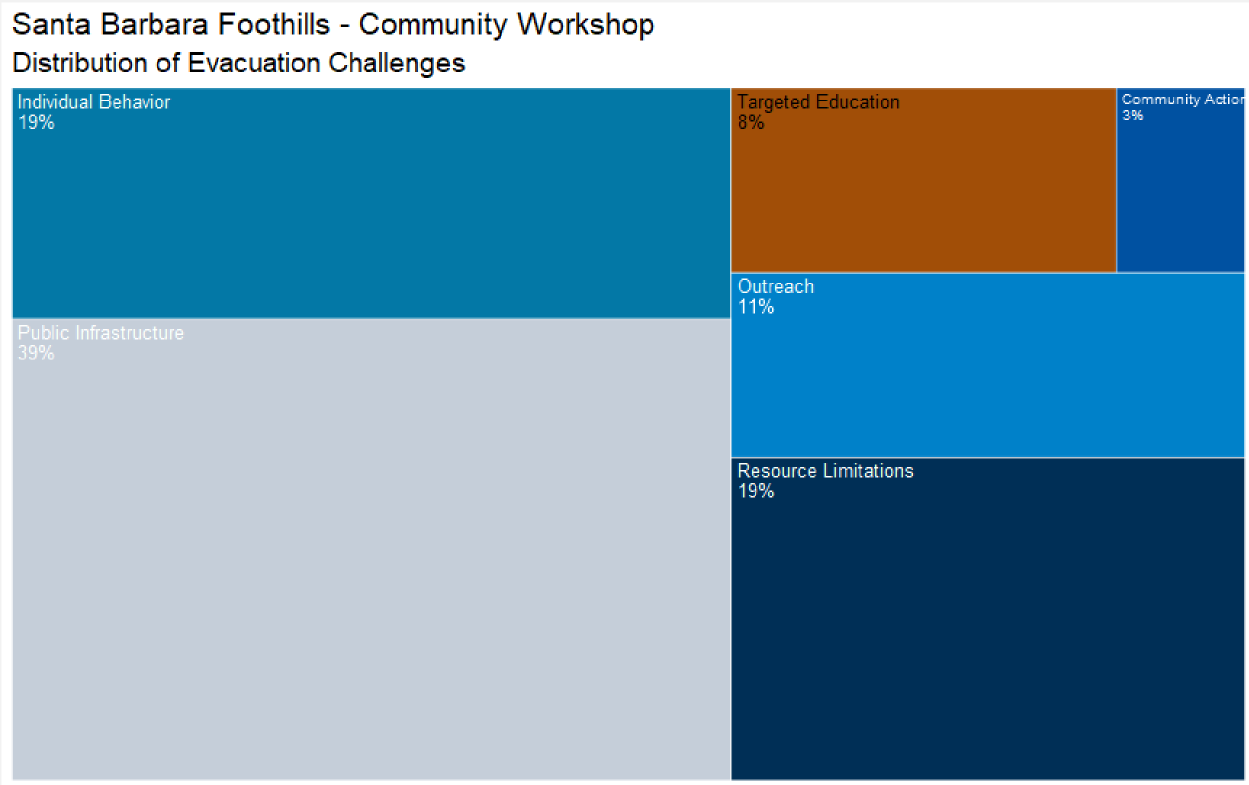


Exhibit A-10. Group Discussion Results: Evacuation Challenges



Individual Topic tree Maps

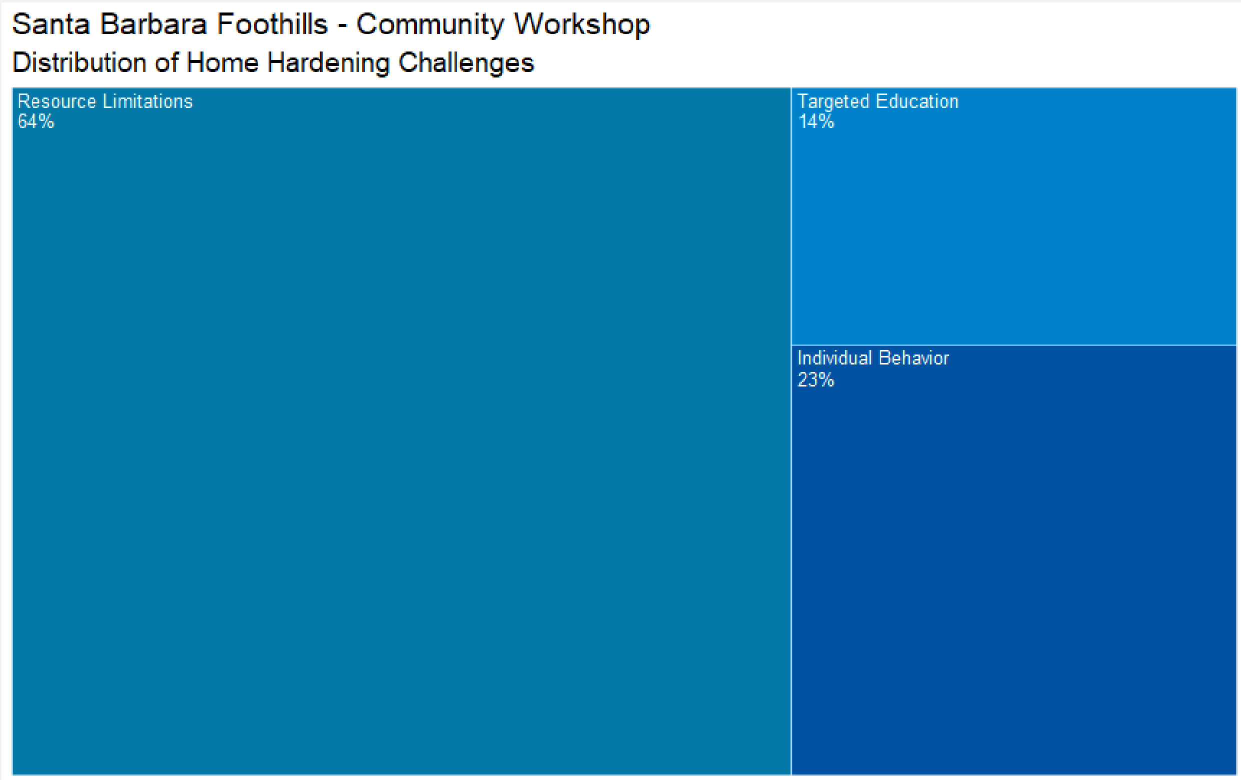
In addition to the tree maps that summarized all of the concerns and opportunities, the data as also analyzed by discussion topic. The following displays the concerns and opportunity for each of the four discussion topics.

Evacuation

Exhibit A-11. Group Discussion Results: Evacuation Opportunities

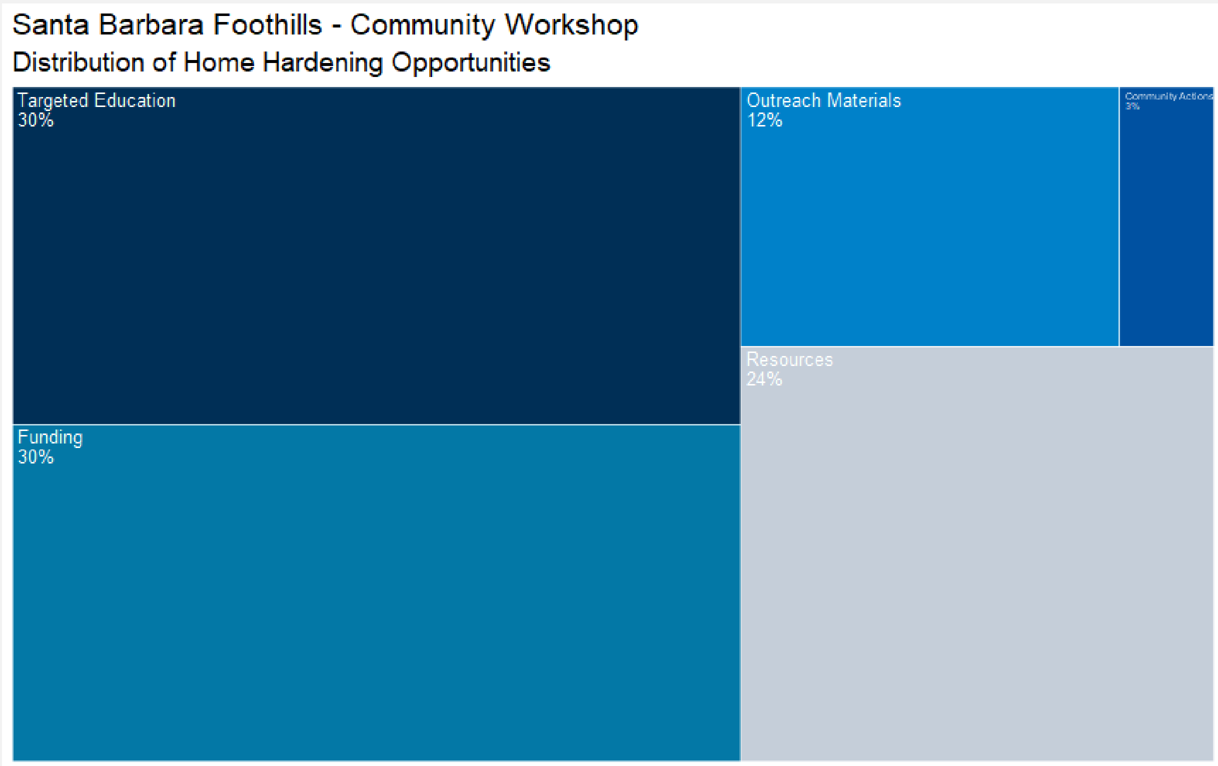
Regarding evacuation, as shown in exhibit A-10, Public Infrastructure was a large category of concern, receiving 39% of the comments. Workshop participants specifically were concerned about lack of communication when cell phones are down, lack of traffic management, and narrow roads. Individual Behavior and Resource Limitations were also key categories of concern with each representing 19% of comments. This included people parking on both sides of narrow roads or ,not wanting to evacuate whereas some of the resource limitations regarding evacuation include lack of real time information or not begin able to evacuate with animals. Switching to opportunities, as shown in exhibit A-11, **Community Actions** (34%) and **Communication Infrastructure Upgrades** (28%) represented a majority of the comments. Community actions regarding evacuation included evacuation drills or coordination within community members to help get larger animals evacuated and coordination with private landowners to use their roads as potential future evacuation routes. Communication Infrastructure upgrades included implementation of alternative communication methods like an app that serves an information hub or walkie talkies.

Exhibit A-12. Group Discussion Results: Home Hardening Challenges



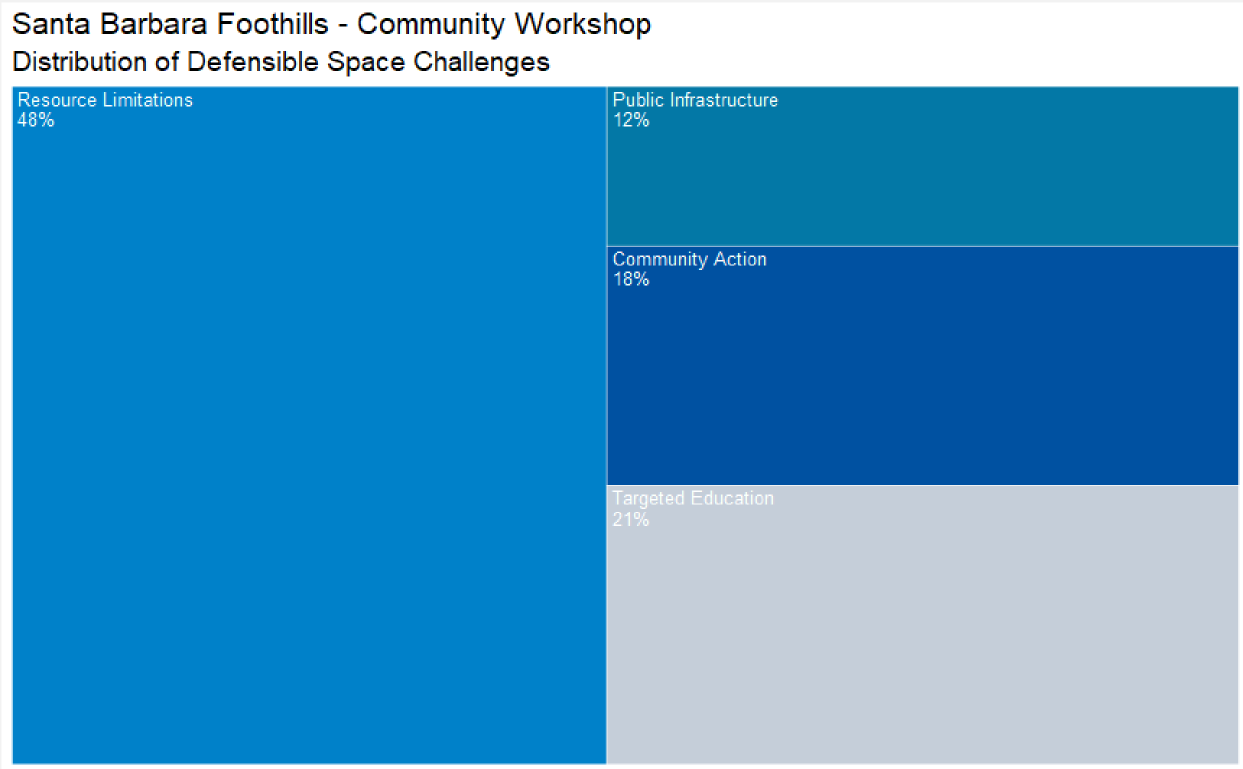
Home Hardening

Exhibit A-13. Group Discussion Results: Home Hardening Opportunities



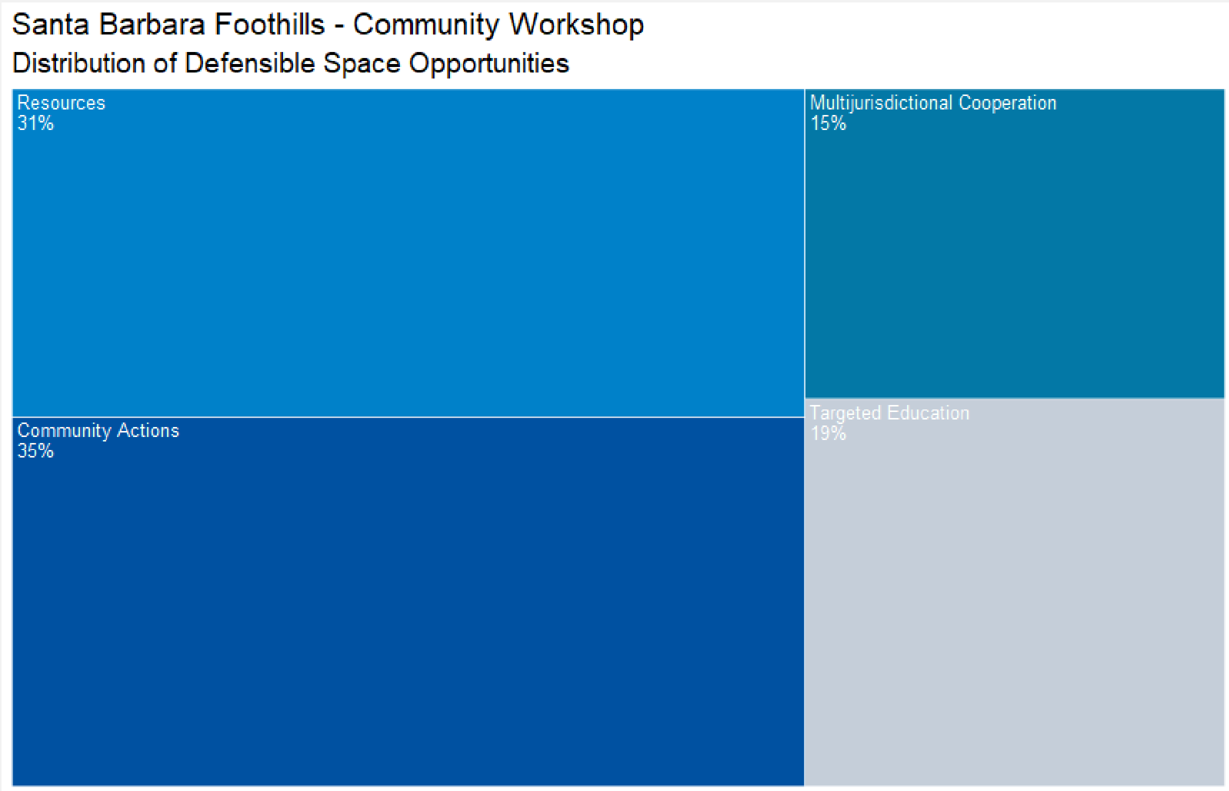
Regarding Home Hardening, as shown in exhibit A-12, **Resource Limitations** represented the vast majority (64%) of comments. These resources include the cost, time, ability, and or expertise to do this work. The remaining comments representing Individual Behavior and targeted education referred to individuals not hardening their home and or needing more education to know what home hardening fully entailed. When looking at opportunities, as shown in exhibit A-13, **Targeted Education** and **Funding** were the key focus for the opportunity comments each representing 30%. Targeted education include smaller groups like Firewise to help tailer this education to individual communities' needs and a one page resource that helps identify the actions that will get community members the most bang for their buck. Funding including grants or tax rebates to help incentivize community members to harden their homes.

Exhibit A-14. Group Discussion Results: Defensible Space Challenges



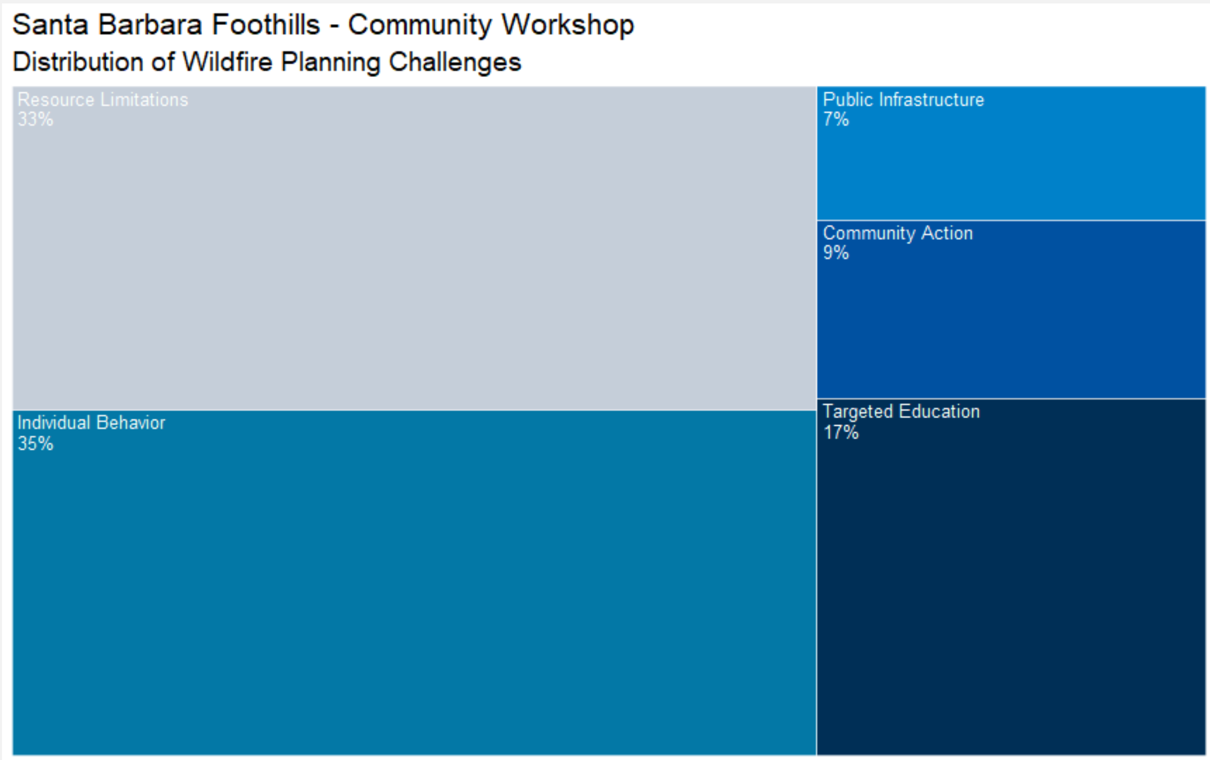
Defensible Space

Exhibit A-15. Group Discussion Results: Defensible Space Opportunities



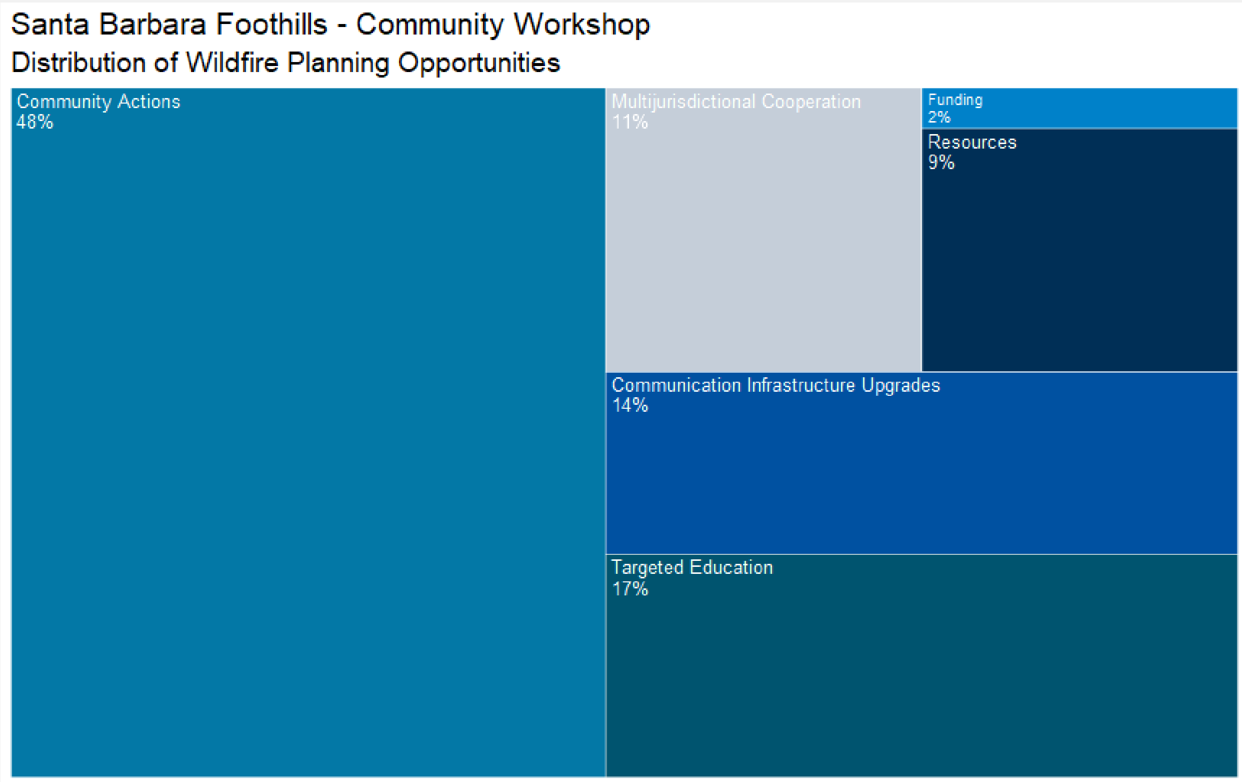
Similarly to Home Hardening, as shown in exhibit A-14, **Resource Limitations** was a large category of concern regarding Defensible Space , receiving 48% of the comments. Workshop participants specifically were concerned about costs, the lack of contractors, and the density of homes affecting their ability to implement defensible space properly. They were also concerns about how to balance vegetation management with environmental concerns and aesthetic preferences. When looking at opportunities, as shown in exhibit A-15, workshop participants were most interested in exploring opportunities regarding **Community Actions**(35%) and **Resources**(31%). This specially included more defensible space inspections, bucket brigades, and more focus on Firewise communities. Resources included more grants opportunities and information regarding “Ready Set Go” and how insurance can be impacted by implementing Defensible Space.

Exhibit A-16. Group Discussion Results: Wildfire Planning Challenges



Wildfire Planning

Exhibit A-17. Group Discussion Results: Wildfire Planning Opportunities



Lastly, when looking at Wildfire Planning, as shown in exhibit A-16, Participants were concerned most about **Individual Behavior**(35%) and **Resource Limitations** (33%). Individual Behavior concerns included non-compliance from neighbors, short term visitors ,or part time residents, and difference in opinions regarding proper behavior from different community members. Resource Limitations included lack of space on barrow streets, having too many cars either parked on narrow streets or when trying to evacuate, ;ack of emergency alerts, and lack of shoulders on narrow roads. Regarding opportunities, as shown in exhibit A-17, workshop participants were very interested in exploring opportunities regarding **Community Actions** (48%) and **Targeted Education**(17%). This included more information sharing of previous experience when evacuating or implementing Home Hardening/ Defenisble Space principles, small community groups, recognition programs for exemplary compliance, community specific evacuation planning or drills, and communication across communities. Targeted Education included education about local ordinances, more education on fire behavior in the Plan Area, and more education regarding the importance of Home Hardening and Defensible Space.

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Appendix B

Wildfire Hazard and Risk Modeling

Wildfire Hazard and Risk Assessment Memorandum

Santa Barbara Foothill Communities CWPP

Prepared for:

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1 Wildfire Hazard and Risk Assessment

A Wildfire Hazard and Risk Assessment (WRA) was conducted for the Plan Area using the Interagency Fuel Treatment Decision Support System (IFTDSS) program (USDOI and USDA 2022) and supporting GIS analysis. The assessment was conducted in two basic stages: the initial stage modeled wildfire hazards, and the second stage modeled wildfire risk. Wildfire hazard represents the existing wildfire environment and potential wildfire behavior occurring in that environment. Wildfire risk is the intersection of wildfire hazard and identified highly valued resources and assets and represents the potential impact of wildfire on these assets and resources. This memorandum summarizes the Wildfire Hazard and Risk Assessment and includes a discussion of datasets, assumptions, model inputs, and model results. The model results can be utilized to identify and prioritize vegetation management project locations intended to reduce wildfire risk.

1.1 Wildfire Hazard Assessment

The wildfire hazard assessment for the Plan Area was conducted through the following stages:

1.1.1 Landscape Fire Behavior Analysis

A Landscape fire behavior assessment was conducted in IFTDSS to map basic fire behavior outputs, including flame length and rate of spread. To initiate the modeling effort, a Landscape Base file was created and analyzed. The Landscape Base file consisted of eight distinct data layers representing terrain (elevation, slope, and aspect) and vegetation/fuels (fuel model designation, canopy cover, stand height, canopy base height, and canopy bulk density). The Landscape Base file created at a scale of 10-meters using the following data sources.

Table 1. Landscape Base File Inputs

Model Input	Data Source
Elevation	USGS, 10-meter Digital Elevation Model (DEM)
Slope	Created in ArcGIS Pro using USGS DEM
Aspect	Created in ArcGIS Pro using USGS DEM
Fuel Model	LANDFIRE 2022 – Scott and Burgan Fuel Models*
Canopy Cover	LANDFIRE 2022*
Stand Height	LANDFIRE 2022*
Canopy Base Height	LANDFIRE 2022*
Canopy Bulk Density	LANDFIRE 2022*

Note *: Data was resampled to 10-meters

Vegetation and fuels data was sourced from the 2022 LANDFIRE dataset embedded in the IFTDSS application. LANDFIRE base data is provided in raster format, with a ground resolution of 30 meters. The 2022 LANDFIRE data was rescaled to a spatial resolution of 10-meters. In addition, the LANDFIRE data was edited and evaluated to confirm fuel model accuracy, particularly in more urbanized areas. When analyzing the default landscape data, it was clear that many areas of natural vegetation were not recognized due to their proximity to urbanized areas. The converse was also evident, as many urban areas were assigned vegetative fuel models even though the ground surface is non-burnable. This is due to the considerable amount of street tress in the Plan Area, which misguide the designated surface fuel model selection. The edited data allows for better accuracy when modeling wildfire hazard and risk in the assessment area, especially within the wildland-urban interface.

The assessment was performed under 97th percentile weather conditions (Sundowner wind event) using the inputs provided below in Table 2.

Table 2. Wildfire Behavior Modeling Inputs

Model Input	97th Percentile
Wind Speed*	37 mph
Wind Direction	17 degrees
Wind Type	Gridded
1-Hour Fuel Moisture	3%
10-Hour Fuel Moisture	4%
100-Hour Fuel Moisture	5%
Herbaceous Fuel Moisture	30%
Live Woody Fuel Moisture	60%
Crown Fire Calculation Method	Scott/Reinhardt

Note*: Represents sustained wind speed. Gusts over 60 mph have been observed within the Plan Area.

Wind speed, wind direction, and fuel moisture values were determined through local Remote Automated Weather Stations and confirmed through historic wildfire and Sundowner wind reports. The 97th percentile values, reflecting extremely low fuel moisture and very high wind speeds, were used for peak weather (Sundowner Wind) scenarios. Wind data for 97th percentile weather was obtained from Mission Canyon, Santa Barbara, and Montecito Remote Automated Weather Station using the FireFamily Plus software.

For 97th percentile weather conditions, gridded winds were used to model fire behavior, which utilize the WindNinja program embedded in IFTDSS. Gridded winds alter wind flows across the landscape based on topographic effect (e.g., drag effect vegetation has on wind flow). Gridded winds more accurately model the effects of complex terrain (e.g., funneling through narrow canyons) during directional wind events.

OUTPUTS

FLAME LENGTH

Flame length—the length of the flame of a spreading surface fire within the flaming front—is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews et. al. 2008). Although it is a somewhat subjective and nonscientific measure of fire behavior, it is imperative to fireline personnel when evaluating Fireline intensity and is worth considering as a vital wildfire variable (Rothermel 1993).

Table 3. Fire Behavior Interpretation

Flame Length	Fireline Intensity	Interpretation
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 feet to 8 feet	100–500 BTU/ft/s	Fires are too intense for a direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 feet to 11 feet	500–1,000 BTU/ft/s	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1,000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at the head of fire are ineffective.

Source: Roussopoulos and Johnson 1975.
Note: BTU/ft/s = British thermal units per foot per second.

RATE OF SPREAD

Wildfire rate of spread describes the speed of the flaming front refers to how quickly the fire advances across a given area. Terrain, fuels, and weather combine to influence wildfire spread rates. The rate of spread is measured in miles per hour (m/min) and is defined as the speed with which the fire is moving away from its origin.
refers to how quickly the fire advances across a given area. Several factors influence the rate of spread:

1. **Fuel Type**: Different vegetation types burn at different rates. For example, Grass or shrub fires generally spread faster than those in heavier fuels like timber.

2. **Moisture Content**: Drier fuels ignite and burn more readily than those with higher moisture content, affecting the speed at which a fire spreads.

3. **Weather Conditions**: Wind speed and direction are critical; strong winds can dramatically increase the rate of spread. Temperature and humidity also play significant roles.

4. **Topography**: Fires spread faster uphill due to the preheating of fuels above the flame. Slope steepness can significantly impact rate of spread.

5. **Fire Behavior**: The fire's intensity and the presence of embers can influence how rapidly it spreads. Crowning (when fire moves through the tops of trees) can also accelerate the rate.

1.1.2 Wildfire Progression Modeling

Wildfire progression modeling was conducted to determine how wildfire is likely to spread during a Sundowner wind event in the Plan Area. This assessment utilized the Minimum Travel Time (MTT) tool embedded within IFTDSS. The MTT tool is a two-dimensional fire growth model which calculates fire growth based on calculated fire spread rates from an ignition source (point, line, or polygon). The MTT tool uses fire spread rates to find minimum travel paths between data cells in the GIS landscape, with an output data file representing the number of minutes for a wildfire to reach a particular location from the ignition source. As this is a static representation of fire behavior, modeling using the MTT tool holds wind and weather inputs constant over the modeling period.

The assessment utilized the weather and fuel moisture values provided in Table 2. The simulation period was set to 8 hours. A hypothetical ignition file in the form of a continuous line was implemented to determine wildfire spread from a variety of potential ignition locations to the north of the Plan Area.

1.1.3 Landscape Burn Probability Analysis

A Landscape Burn Probability (LBP) analysis was performed in the IFTDSS software to evaluate Integrated Hazard. Integrated Hazard is an analysis process that combines two important measures—burn probability and conditional flame length—into a single geographic information system (GIS) output layer. The LBP model is identical to the Minimum Travel Time Burn Probability model in FlamMap. The LBP analysis has fixed input variables (Table 2), and simulates head, backing, and flanking fire front (see Section 1.1.3. 2, Conditional Flame Length). Conditional flame length is the mean flame length value (in feet) for all the randomly simulated fires that burn a given point of the analysis area during a model run. The Integrated Hazard modeling analysis generates seven relative hazard classes based on the intersection between burn probability and conditional flame length (see Section 1.1.3.4, Integrated Hazard).

To run LBP in IFTDSS, model inputs are required for wind, weather, ignition, and model duration. Inputs used during this assessment are provided below in Table 1. For 97th percentile weather conditions, gridded winds were used to model fire behavior, which utilize the WindNinja program embedded in IFTDSS. Gridded winds alter wind flows across the landscape based on topographic effect (e.g., drag effect vegetation has on wind flow). Gridded winds more accurately model the effects of complex terrain (e.g., funneling through narrow canyons) during directional wind events.

Fuel moisture values were set to “do not condition” for all three scenarios. This approach is typically used when fuel moistures are known, as was the case with this analysis (fuel moisture values were instead input directly). The Scott/Reinhardt (2001) crown fire model method was selected for all three scenarios as it better predicts the likelihood of crown fire transition with subsequent crown fire behavior. The spotting probability feature in IFDTSS controls how many pixels launch embers where a crown fire is initiated. Spotting probability was set to 40%. In a wind-driven fire, spotting is a major factor and significantly contributes to fire growth and can cause spot fires miles away from the flaming front (see Section 1.1.3, Spotting Potential).

Ignitions were set to random. IFTDSS models a minimum of 1,000 fires for an LBP run and keeps adding ignitions until at least 98% of the burnable portions of the analysis area burn. Burn period length describes the duration of worst-case fire growth. The burn period was set to 8 hours.

1.1.3.1 Burn Probability

Burn probability represents the likelihood that a given location in the analysis area would burn, considering the model inputs used. Burn probability is related to the size of fires that occur on a given landscape, where larger fires produce higher burn probabilities than smaller fires. As fire size is a function of wildfire spread rate and wildfire duration, weather conditions that reduce spread rates will lower burn probability. Burn probability is calculated as follows:

- Burn Probability = number of times burned / total number of ignitions

As noted, random ignitions were utilized for all model runs. A total of 6,264 modeled fires were run for the LBP analysis. In this example, if a pixel burned 850 times over the model run period (with 6,264 fire simulations), it would have a burn probability of 0.14, (850 / 6,264 = 0.14). If a pixel burned 6,264 times in 6,264 fire simulations, it would have a burn probability of 1.0, (6,264/6,264= 1.0). If a pixel never burned during the 6,264 fire simulations, it would have a burn probability of 0 (0/6,264 = 0).

The modeling results for burn probability are displayed with seven distinct classes. The first two classes represent pixels that did not burn:

- Non-burnable – pixels have a non-burnable fuel model and cannot burn.
- Burnable but did not burn – pixels have burnable fuels but did not burn (e.g., a fire never reached the pixel, or a fire started within the pixel, but it was unable to burn out of the pixel because the fire spread rate was too slow).

The other five classes are based on the maximum value of burn probability for the model run.

- Lowest (0%–20% of maximum)
- Lower (20%–40% of maximum)
- Middle (40%–60% of maximum)
- Higher (60%–80% of maximum)
- Highest (80%–100% of maximum)

1.1.3.2 Conditional Flame Length

Conditional flame length is an estimate of the mean flame length for all the fires that burn at a given point on the landscape during a model run. This value is typically lower than flame length values generated from a Landscape Fire Behavior analysis in IFTDSS as it accounts for heading, flanking, and backing fires. Heading fires typically have higher flame lengths than flanking or backing fires; thus, the conditional flame length value is lower as it represents the mean of these three fire types. Conditional flame length is also the mean of all fires encountered by a pixel over the model period as compared with a single fire. Conditional flame length values have a maximum of 25 feet.

Conditional flame length is calculated as follows (where FLP_i is the probability of fire at a given intensity and FL_i is the mid-point of the given intensity level):

- Conditional Flame Length = $\sum_{i=1}^{n} FLP_i * FL_i$

The model results for conditional flame length are displayed with eight distinct classes. The first two classes represent pixels that did not burn:

- Non-burnable – pixels have a non-burnable fuel model and cannot burn.
- Burnable but did not burn – pixels have burnable fuels but did not burn (e.g., a fire never reached the pixel, or a fire started within the pixel, but it was unable to burn out of the pixel because the fire spread rate was too slow).

The remaining six classes match those of the fire intensity levels:

- Greater than 0–2 feet
- Greater than 2–4 feet
- Greater than 4–6 feet
- Greater than 6–8 feet
- Greater than 8–12 feet
- Greater than 12 feet

1.1.3.3 Spotting Potential

Spotting is the launching of embers that result in spot fires increasing the spread of a fire and is included in LBP models (it does not produce a separate model output). Spotting occurs in trees and taller vegetation where an active or passive crown fire is initiated. Spotting occurs in short range (proximate to the flaming front) and long range (a long distance from the flaming front). Past fire behavior has documented long-range spotting at distances over 1 mile from the fire's flaming front. Spotting probability in IFTDSS ranges from 0% to 100% and controls how many pixels where a crown fire is initiated will result in embers being launched. A spotting value of 0% effectively turns off the spotting function, and a spotting value of 100% means that all points where a crown fire is initiated will launch embers.

Spotting probability also determines if a landed ember will result in a spot fire. For embers do that land, a random number, between 0 and 100, is generated. If the random number is lower than the spotting probability, then the landed ember will result in a spot fire. If the random number is higher than the spotting probability, the ember is discarded by the model, and no spotting occurs from that cell. For example, if the spotting probability is 25% and the random number generator chooses 16 then the ember lands and creates a spot fire.

The direction of ember travel is the same as the maximum spotting direction. The distance the ember travels before landing is determined using the random number generated for the cell and the maximum spotting distance. Spotting distance is calculated as follows:

- Spotting Distance = -log (random number) × Maximum Spot Distance / 5

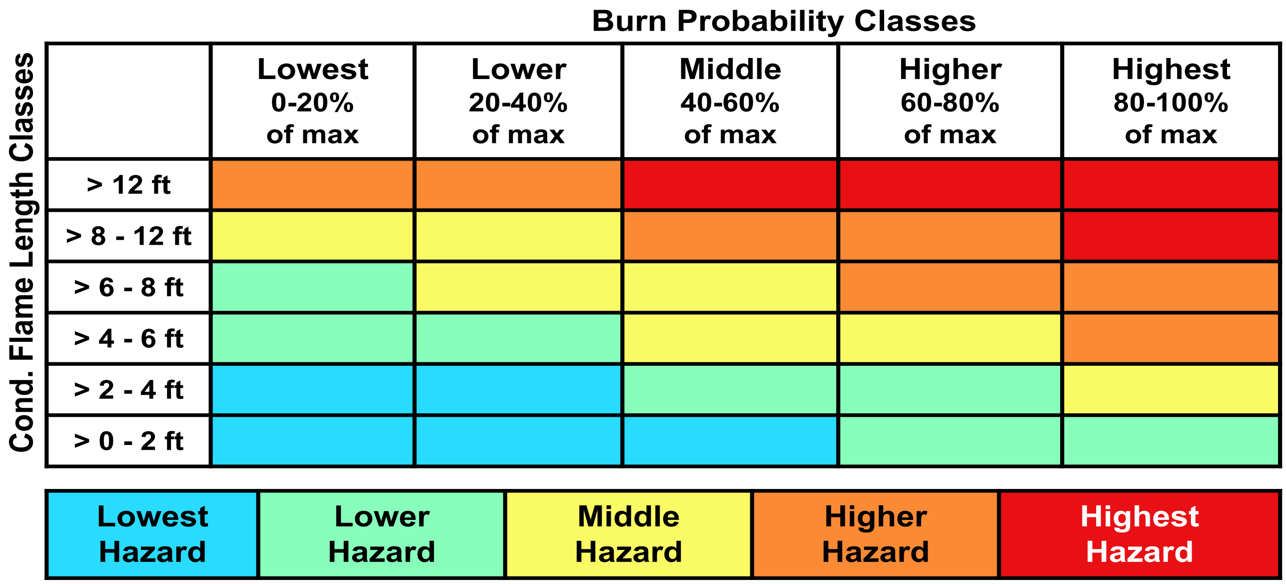
If an ember lands within the fire perimeter (already burned) or non-burnable fuels, the ember is discarded, and spotting does not occur.

1.1.3.4 Integrated Hazard

Integrated hazard is quantified and categorized in IFTDSS using the LBP model. This model evaluates burn probability (probability of a fire occurring at a specific point under a specified set of conditions) and conditional flame length (intensity at a specific point given a fire occurs) results. A diagram of the integrated hazard analysis process is included below (Exhibit 1). Integrated hazard is categorized into seven distinct classes: the first two are for pixels that did not burn, and the remaining five classes are based on the integrated hazard matrix presented below. The seven classes include the following:

- Non-burnable
- Burnable but not burned
- Lowest hazard
- Lower hazard
- Middle hazard
- Higher hazard
- Highest hazard

Exhibit 1. Burn probability classes.



1.1.4 Vegetative Wildfire Threat to Structures

Vegetation wildfire threat to structures for the purposes of this assessment if defined as the potential for wildland vegetation to cause damages to existing structures caused by close proximity to wildland fuels, and a high potential for extreme wildfire severity.

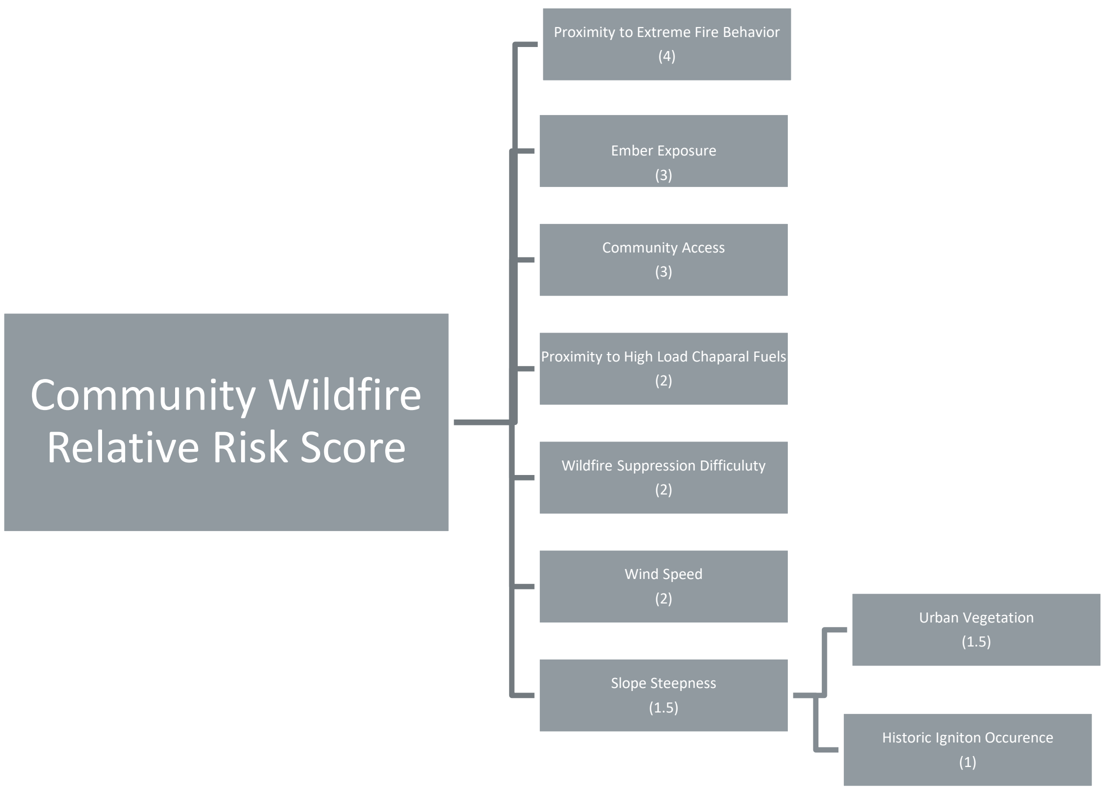
This assessment was based on the flame length outputs described above, along with high-resolution building footprint information obtained from FEMA (FEMA, 2023). A buffer around the building footprints of ___ feet was created, and then the flame length raster was clipped to this buffer. As shown in Table 3, flame lengths over 8 feet are often considered the threshold for extreme fire behavior, making fire control very challenging and increasing the risk of damage to structures. Areas with flame lengths exceeding 8 feet within the building buffer were isolated to assess where extreme fire behavior is widespread near buildings. The extent of these areas with extreme fire behavior formed the basis for ranking the wildfire threat to structures into three categories: Moderate, High, and Very High.

1.1.5 Ember Hazard Assessment

It is estimated that up to 90% of structure losses from wildfire are caused by embers rather than the main fire front (IBHS 2020). Ember load quantifies the relative number of airborne embers that may fall onto an area from a nearby wildfire. Ember load relates to spotting distance, which quantifies the distance airborne embers may travel from their source. Ember load data was obtained from the Conditional Ember Load Index dataset created by Pyrologix (Figure 14) (Pyrologix, 2021). This dataset incorporates surface and canopy fuels characteristics, climate, and topography to determine the relative amount of embers landing per pixel in a 30-meter raster environment. This dataset does not account for burn probably. The Conditional Ember Load index dataset was clipped to the Plan Area footprint and scaled into 5 classes.

1.2 Community Relative Risk Ranking Assessment

A community relative risk ranking was conducted for the Plan Area to identify high risk communities where wildfire risk mitigation should be prioritized. This assessment also aims to enhance resident awareness of the relative risks associated with their community. The evaluation of community wildfire risk involved quantifying key variables within the designated community areas. Each input value was then assigned a weighting value to account for the input's relative influence on wildfire hazard, with some inputs (i.e., proximity to hazardous vegetation) influencing wildfire hazard more than others (i.e., slope). Overall community wildfire risk was calculated at a 10-meter raster environment Exhibit 2 below depicts the conceptual framework for calculating wildfire hazard.



Input variables were weighted dependent on their significance and combined to determine the overall risk ranking for communities (Table 3).

Table 3. Community Relative Risk Ranking Input Variables

Model Input	Ranking Range
Proximity to Extreme Fire Behavior	For the purposes of this assessment, extreme fire behavior is considered that which precludes methods of direct control (e.g., flame lengths 8 feet and greater), behaves unpredictably and erratically, and typically involves high spread rates, crowning and/or spotting, the presence of fire whirls, and a strong convective column (NWCG 2023). Areas with flame lengths greater than or equal to 8 feet were aggregated with areas predicted to experience crown fire to create the extreme fire behavior layer. This layer was then buffered by 200-1,000 feet to quantify community proximity to extreme fire behavior. A weighting factor of 4 was applied to this input.
Ember Exposure	The Conditional Ember Load index dataset as descried in Section 1.1.5 was clipped to the development area footprint and scaled into 4 classes (1-4) using natural breaks. A weighting factor of 3 was applied to this input.
Community Access	Community access defined by the available road network which can be utilized for emergency ingress and egress during a wildfire event. Communities with single access, often referred to as one way in and one way out, are generally considered of higher risk given more limited evacuation options and potential congestion with entering emergency vehicles. Using data provided by the County, single access roads were buffered by 500 to identify structures limited to a single ingress and egress route during wildfire. Areas limited to single access were assigned a value of 4, with areas with two or more means of access assigned a value of 0. A weighting value of 3 was assigned to this input variable.
Proximity to High Load Chaparral Fuels	Chaparral vegetation has the potential for a high rate of spread, rapid ignition, and extreme fire behavior given its high content of volatile organic compounds. As the age of chaparral increases, the amount of vegetative material and woody fuels build up and contribute to increased fire severity. Communities is proximity to high load chapparal fuels are at greater risk of direct exposure to high intensity wildfire. To identify areas of high load chaparral fuels, the California Forest Observatory dataset was utilized, selecting vegetated areas classified as “Dense, finely branched shrubs with significant fine dead fuel, about 4 to 6 feet tall” (SOURCE). This layer was then buffered by 200-1,000 feet to quantify community proximity to chaparral fuels. A weighting factor of 2 was applied to this input.

Table 3. Community Relative Risk Ranking Input Variables

Model Input	Ranking Range
Wildfire Suppression Difficulty	Wildfire suppression difficulty quantifies relative fire suppression effort based on a variety of factors including topography, fuel type, fire behavior under extreme fire weather, Fireline production rates in different fuel types using hand tools, and access (distance from roads, trails). Communities with a higher wildfire suppression difficulty are at increased risk of experiencing uncontrollable wildfires. The dataset for wildfire suppression difficulty was obtained from Pyrologix and the USDA Forest Service's Contemporary Wildfire Hazard Across California (USFS 2019). This dataset classifies wildfire suppression difficulty in six classes. Values were reclassified into four classes with equal intervals. A weighting factor of 2 was assigned for this input.
Wind Speed	Areas with higher wind speeds are likely to experience more intense fire behavior. Topography greatly influences wind characteristics including speed and direction. For example, the highest wind speeds are often observed at ridge tops or at the mouth of narrow canyons in alignment with the prevailing wind direction. Variability in wind speed throughout the Planning Area was determined using the Wind Ninja software embedded within FLAMMAP. Wind Ninja accounts for changes in wind speed based on topographical features including slope, elevation, and aspect. Topography inputs were derived from the 10-meter resolution USGS DEM. A baseline wind speed of 37 mph at a direction of 17 degrees was incorporated into the model. Areas where wind speeds were elevated (>37-55 mph) mph were assigned a value of 3, and areas where wind speeds were severity elevated (>55mph) were assigned a value of 4. Areas with wind speeds of 37 moh or less were assigned a value of 0. A weighting factor of 2 was chosen for this input.
Slope Steepness	Communities with steep slopes are believed to be at greater risk for structure-structure fire spread during a wildfire event. Average slope was determined within urbanized areas using a 10-meter digital elevation model (DEM) from the USGS. Urbanized areas were identified using the edited Fuel Model dataset (see Section 1.1.1), selecting for areas mapped as non-burnable. Urban areas with slopes greater than 20 degrees were assigned a value of 4, with flatter areas assigned a value of 1.5.

Table 3. Community Relative Risk Ranking Input Variables

Model Input	Ranking Range
Urban Vegetation	Urban vegetation can contribute to the transmission of wildfires from natural vegetation to developed regions. During intense wildfires, embers that land in urban vegetation can result in additional fire outbreaks within communities, even if they are located a significant distance away from the primary fire front. Urban vegetation cover was obatined from the USA NLCD Tree Canopy Cover database which displays the proportion of the land surface covered by trees fror the years 2011-2021 (USFS, 2023) Vegetation cover was clipped to the devleopment footrpint and classifed into 4 equal classes from 0-100%. A weighting factor of 1.5 was assigned for this input variable.
Historic Ignition Occurrence	Community areas near common wildfire ignition locations can be considered more susceptible to wildfire exposure. Historic ignition locations were gathered from the SBCFD ignition dataset spanning 2007-2023. Community areas is close proximity to locations with more frequent ignition occurrences were assigned a value of 4, while all other areas were assigned a value of 0. A weighting factor of 1 was assigned to this input variable.

The total range of observed hazard values were binned into 5 classes using manual intervals including Very Low, Low, Moderate, High, and Very High to best distribute relative community risk throughout the Plan Area.

3 References

CAL FIRE (California Department of Forestry and Fire Protection). 2022. “State Responsibility Area Fire Hazard Severity Zone” [datasets]. https://osfmfhsz.blob.core.windows.net/public/index.html.

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Appendix C
Transportation Study

Transportation Study*

Santa Barbara Foothill Communities Community Wildfire Protection Plan

Prepared for:
Santa Barbara County Fire Department

April 10, 2025

LA23-3499

FEHR PEERS

While the Santa Barbara Foothill Community Wildfire Protection Plan is recommended for adoption by the Santa Barbara County Board of Supervisors, this Transportation Study is recommended as a receive and file document inserted as an Appendix to the plan.

Table of Contents

1. Introduction 2

1.1 Background 2

1.2 Study Area Overview 2

1.3 Organization of Report 5

2. Evacuation Assessment 6

2.1 Roadway Capacity 6

2.1.1 Evacuation Routes 6

2.1.2 Evacuation Route Capacity 7

2.2 Evacuation Travel Demand 10

2.2.1 Evacuation Scenarios 10

2.2.2 Demand Estimation Methodology 11

2.2.3 Evacuation Travel Demand Estimates 12

2.3 Evacuation Analysis Results 16

2.3.1 Scenarios One & Two – Central Ignition Point 17

2.3.2 Scenarios Three & Four – Western Ignition Point 18

2.2.3 Scenarios Five and Six – Eastern Ignition Point 18

3. Study Recommendations 25

3.1 Demand-Side Recommendations 25

3.2 Supply-Side Recommendations 27

3.3 Information-Side Recommendations 29

4. Conclusion 31

List of Figures

Figure 1: Analysis Area 3
Figure 2: County Evacuation Routes and Single Access Points 9
Figure 3: Trip Assignment Zones and Screenlines for Evacuation Travel Demand Estimation 14
Figure 4: Scenario One Evacuation Analysis Results (Central ignition point, weekday) 19
Figure 5: Scenario Two Evacuation Analysis Results (Central ignition point, weekend) 20
Figure 6: Scenario Three Evacuation Analysis Results (Western ignition point, weekday) 21
Figure 7: Scenario Four Evacuation Analysis Results (Western ignition point, weekend) 22
Figure 8: Scenario Five Evacuation Analysis Results (Eastern ignition point, weekday) 23
Figure 9: Scenario Six Evacuation Analysis Results (Eastern ignition point, weekend) 24

List of Tables

Table 1: Plan Area Residential Population Characteristics 4
Table 2: Assumed Share of Population Evacuating Analysis Area by Scenario 10
Table 3: Estimated Number of Evacuating Vehicles Per Building 12
Table 4: Estimated Evacuation Vehicle Demand by Screenline and Evacuation Scenario 15
Table 5: Estimated Time to Clear Screenline During an Evacuation Event 17
Table 6: Demand-side Recommendations 26
Table 7: Supply-side Recommendations 28
Table 8: Information-side Recommendations 30

A Note on Emergency Evacuation Assessments

This document is intended to provide an assessment of roadway capacity and time needed to evacuate under the described evacuation scenarios. Please note that emergency evacuation can occur due to any number of events. Additionally, any emergency movement is unpredictable because it has an element of individual behavior related to personal risk assessment for each hazard event as the associated evacuation instructions are provided. As such, this assessment is intended to provide the Santa Barbara County Fire Department (SBC Fire) and the plan area with a broad understanding of the capacity of the transportation system during an evacuation scenario; it does not provide a guarantee that evacuations will follow modeling that is used for analysis purposes, nor does it guarantee that the findings are applicable to any or all situations. Moreover, as emergency evacuation assessment is still an emerging field, there is not yet an established standard methodology. Fehr & Peers has adopted existing methodologies in transportation planning that, based on our knowledge and experience, we believe are the most appropriate within the limits presented by the tools and data available, the budgetary and time constraints in the scope of work, and by current knowledge and state of the practice. While this assessment should help SBC Fire better prepare for hazard related events and associated evacuations, SBC Fire should take care in planning and implementing any potential evacuation scenario. Fehr & Peers cannot and does not guarantee the efficacy of any of the information from this assessment as such would be beyond our professional duty and capability.

1. Introduction

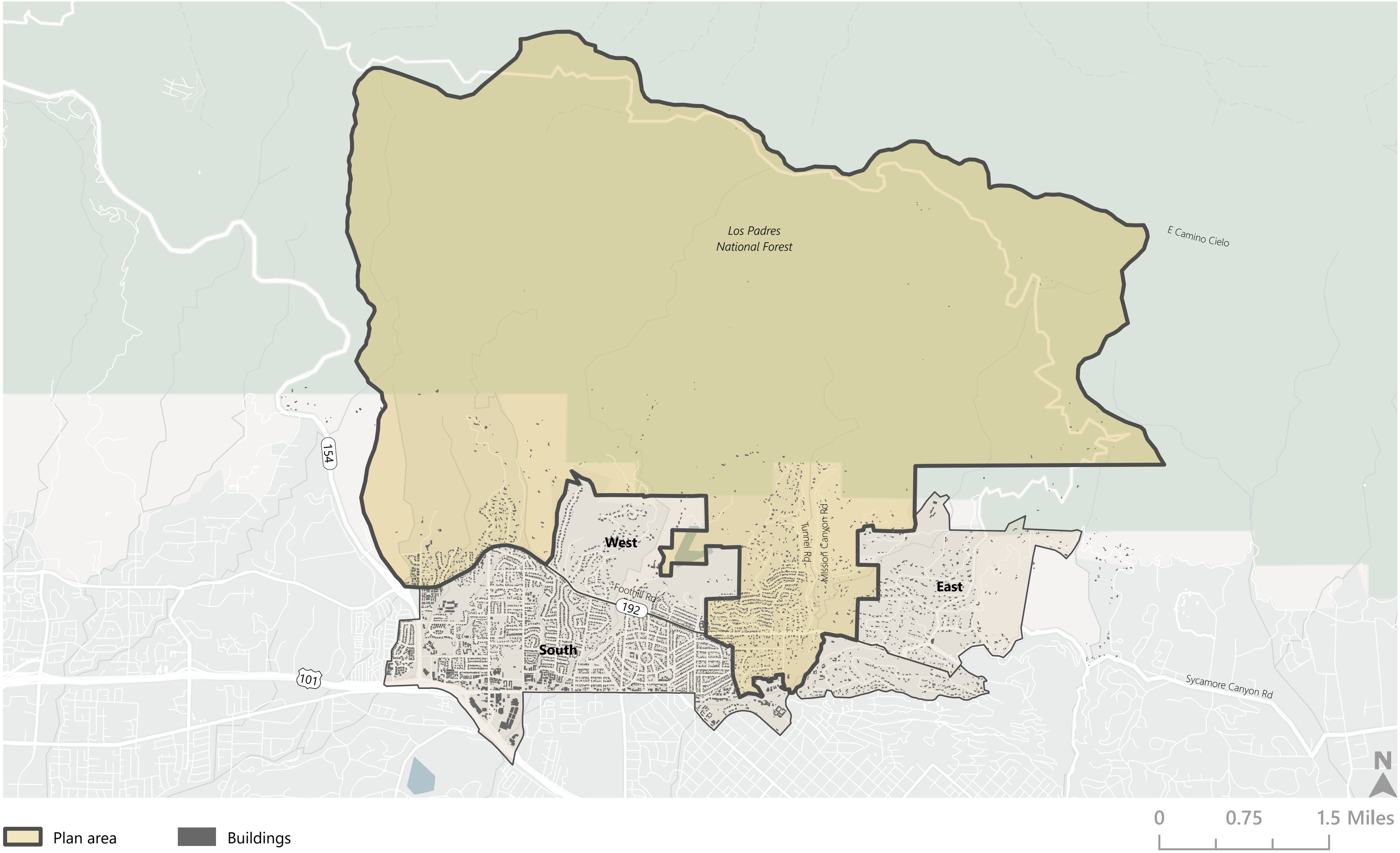
1.1 Background

This report ("Transportation Study") evaluates the expected travel demand and roadway capacity under evacuation conditions in the Santa Barbara Foothill Communities ("plan area") in support of the Community Wildfire Protection Plan (CWPP). Based on the results of the evacuation analysis, areas were identified that may have limited access and egress during an evacuation event and recommendations were developed to improve emergency access and resident/worker/visitor evacuations.

The Transportation Study and CWPP were developed in close partnership with the Santa Barbara County Fire Department (SBC Fire), and with input from local organizations (via monthly stakeholder meetings) and from community members (via two in-person workshops and a public survey). The evacuation analysis relied on demographic information from the U.S. Census and roadway information from the County of Santa Barbara (County). The CWPP—developed by Dudek in parallel with the Transportation Study—evaluates wildfire hazard and risk in the plan area to identify areas for hazardous fuel reduction treatments, and measures to reduce wildfire risk and increase wildfire preparedness. The County of Santa Barbara is conducting a broader countywide evacuation study concurrently.

1.2 Study Area Overview

The plan area is located north of the City of Santa Barbara in Unincorporated Santa Barbara County. The developed areas are comprised of the Mission Canyon community and the area immediately north of Foothill Road between San Marcos Pass Road and Northridge Road. These areas are primarily zoned for single family residential development and recreation. The remainder of the plan area is largely undeveloped and zoned for agricultural use and resource protection. Most of the undeveloped areas fall on Los Padres National Forest land. When estimating travel demand, the evacuation analysis included developed areas immediately adjacent to the plan area, referred to in this report as "shadow regions". These shadow regions were included to account for nearby populations that may evacuate voluntarily along the same transportation corridors as the plan area, without receiving a direct evacuation order, thereby adding to the number of vehicles considered in each evacuation scenario. **Figure 1** illustrates the plan area, along with the shadow regions, which together make up the analysis area.



Plan area

Buildings

Shadow regions

Figure 1

Analysis Area

The plan area has a residential population of approximately 3,500 people across approximately 1,400 households, according to 2022 American Community Survey (ACS) five-year estimates. The residential population is concentrated in the developed areas described above, though there are a limited number of households in the northwest portion of the plan area along Gibraltar Road. **Table 1** breaks down the residential population by demographic and employment characteristics. Approximately 40% of the residential population is employed and another 11% is school age. Nearly a quarter of the population is aged 65 and over. These characteristics are relevant when estimating the population in the plan area at different times of the day and week and were therefore factored into the evacuation analysis discussed in **Chapter 2**. Due to the higher density of development south of Foothill Road, the residential population of the analysis area is substantially larger, with approximately 24,000 people across 10,000 households.

Table 1: Plan Area Residential Population Characteristics

	Plan Area Estimates	Share of Plan Area Population
Total population[1]	3,500	100%
Population under 5 years of age	276	8%
Population ages 5-18	373	11%
Population ages 65 and over	831	24%
Persons with disabilities	202	6%
Total employed population[2]	1,350	39%
Employed population that works from home[3]	300	9%

Note:
[1]Includes permanent residential population and the estimated average daily population of residents whose second home is in the study area.
[2]Refers to people who live in the study area and are employed. Their employer may or may not be located within the study area.
[3]Calculated using telework estimates by industry from the BLS "Telework, Hiring, and Vacancies – 2022" report and employment data from LEHD Origin-Destination Employment Statistics 2021 Residential Area Characteristics.
Source: 2022 ACS 5-Year estimates; 2021 LEHD Origin-Destination Employment Statistics Residential Area Characteristic.

The non-residential population that may need to evacuate in the event of a wildfire includes people employed within the plan area, and daytime visitors. Approximately 325 jobs are located within the plan area, with most employees commuting in from other parts of the County.[1] Top industries include healthcare and social assistance, entertainment and recreation, and construction. The southeast portion of Mission Canyon has the highest job density in the plan area. The number of jobs in the plan area was estimated using data from the 2021 Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics Workplace Area Characteristics and FEMA USA Structures. In addition, Fehr & Peers developed a methodology to estimate the number of private household-employed workers (e.g. yard/landscape workers, housekeepers, etc.), which are historically underrepresented in Census employment data.[2, 3] The analysis area has nearly 10,000 jobs, half of which are concentrated along State Street between La Cumbre Road and Hope Avenue. Daytime visitor volumes were estimated based on approximate daily attendance of the study area's major attractions: the Santa Barbara Botanic Garden in Mission Canyon and the trailheads scattered throughout the undeveloped portions of the plan area.[4] Note, the Santa Barbara Botanic Garden is required to be closed on "red flag" days where the risk of wildfire is high; therefore, the inclusion of visitors to this site in this analysis reflects a "worst case" scenario for an unanticipated wildfire that emerges and spreads suddenly. As with the residential population, day of week and time of day would impact the size of the non-residential population that may need to evacuate, which was considered in the evacuation analysis.

1.3 Organization of Report

This report is divided into four chapters, including this introduction. **Chapter 2** describes the evacuation analysis, with sections on roadway capacities, the methodology for estimating evacuation travel demand, and the evacuation model results. **Chapter 3** describes recommendations for improving emergency access and resident/worker/visitor evacuations. **Chapter 4** summarizes the report's findings and discusses opportunities to build upon this work.

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[1] Approximately two percent of workers in the plan area live in the plan area as well according to Census OnTheMap 2021 data.

[2] UCLA Labor Center, "Profile of Domestic Workers in California," 2020.

[3] A brief literature review was conducted to understand how many household workers may be employed in households of different income levels and were unable to find anything conclusive. Therefore, a simplified approach was taken to estimate this figure. Private household-employed workers were estimated by assuming households located in top 25th percentile median household income block groups employ one private household worker per week on average.

[4] The Botanic Garden parking lot was assumed to be at capacity on weekends and at 72% capacity on weekdays, based on a comparison of weekday vs. weekend daily attendance data for June – September 2023. Parked vehicles were counted via a weekday afternoon site visit and supplemented with Google Street View for Inspiration Point Trailhead, Rattlesnake Canyon Trailhead, Jesusita Trailhead, and the parking area for San Marcos Foothill Preserve. Weekend trail parking occupancy was estimated to be double that of weekday trail parking occupancy counts.

2. Evacuation Assessment

A goal of the Transportation Study was to estimate the amount of time it may take to evacuate the plan area and use this data to identify potential bottlenecks in the transportation network. To this end, Fehr & Peers examined the roadway capacities of the evacuation routes in the plan area and compared them to the expected evacuation travel demand under different evacuation scenarios.

2.1 Roadway Capacity

The capacity of the evacuation roadway network was evaluated to understand how many vehicles per lane per hour could potentially evacuate along different routes during an evacuation event.

2.1.1 Evacuation Routes

The surrounding topography restricts the number of evacuation routes connecting the Santa Barbara Foothill Communities to State Route 154, State Route 192, and Highway 101. Santa Barbara County has identified regional evacuation routes, and those within the plan area are described and examined below. Unpaved, private roads are not included in this evacuation analysis but are revisited in **Chapter 3** in the context of study recommendations. This analysis focuses on evacuation by personal vehicles; there are currently no designated bike facilities within the study area, and many of the roads lack sidewalks.

- **Foothill Road**, also known as State Route 192, runs east-west along the southern portion of the plan area and through Mission Canyon. Foothill Road provides access to State Route 154 and Highway 101 to the west, and to State Route 150 and Highway 101 to the east, near the Ventura County line.
- **Mission Canyon Road** is a north-south road that connects residences in northeastern and southeastern portions of Mission Canyon to Foothill Road. Mission Canyon Road extends into the northern limits of the developed areas of Mission Canyon, provides access to the Santa Barbara Botanic Garden, and connects to the City of Santa Barbara to the south.
- **Tunnel Road** is a north-south road that connects residences in northwestern portions of Mission Canyon to Mission Canyon Road. Tunnel Road extends into the northern limits of the developed areas in Mission Canyon, terminating at the Tunnel Road trailhead. Tunnel Road merges into Mission Canyon Road a quarter mile north of Foothill Road.
- **Cheltenham Road** is a narrow, winding road that connects the more densely developed western half of Mission Canyon north of Foothill Road to Foothill Road—both directly and via Tye Road. Cheltenham Road also connects to Tunnel Road to the north.
- **Las Canoas Road** is a narrow east-west road that connects the eastern portion of Mission Canyon east of Mission Canyon Road to Mission Canyon Road.
- **Camino Cielo Road** is a narrow east-west road that runs along the northern edge of the study area. The road connects to State Route 154 to the west and to Gibraltar Road to the east. Camino Cielo Road provides access to Tunnel Trailhead and the Arroyo Burro Trail.

- **Gibraltar Road** is a narrow, winding north-south road that connects Camino Cielo Road in the northwest portion of the study area to State Route 192 just east of Mission Canyon. Gibraltar Road provides access to the Gibraltar Rock climbing area, Rattlesnake Canyon Trail, and the West Fork Trailhead.

Nearly half of the neighborhoods in the plan area have single points of access and egress; these areas are primarily residential. Constrained neighborhoods include the residential areas west of La Cumbre Road, homes along San Roque Road north of Foothill Road, and much of the Mission Canyon community north of Foothill Road. **Figure 2** illustrates the broader network of evacuation routes in the analysis area and highlights neighborhoods with single access points.

2.1.2 Evacuation Route Capacity

Using metrics provided in the Santa Barbara County Comprehensive Plan Circulation Element (Circulation Element), roadway capacity was estimated in terms of vehicles per lane per hour for all evacuation routes in the analysis area. All evacuation routes in the analysis area met the Circulation Element roadway classification definition for either a two-lane major road or a collector road. The Circulation Element indicates the policy capacity of a two-lane major road is 10,000 Average Daily Traffic (ADT) and the policy capacity of a collector road is 5,000 ADT. Policy capacity refers to the average amount of traffic that policy makers deem “acceptable” on a particular category of roadway. Design capacity, on the other hand, is the amount of traffic a particular roadway can support based on its physical design.[5] It is useful to understand a roadway’s full design capacity in an evacuation scenario, so the ADT for each roadway type (as defined in the Circulation Element) was divided by 0.8 to estimate each roadway’s design capacity.[6] This approach resulted in an estimated design capacity of 12,500 ADT for two-lane major roads and 6,250 ADT for collector roads. To calculate the hourly capacity per lane, a metric called the K-Factor was applied to the ADT for each roadway type; this analysis used a K-factor of 0.12.[7] This approach resulted in a vehicle per lane per hour capacity of 375 for collector roads and 750 for two-lane major roads. However, given the actual context of the roadways in question, a vehicle per lane per hour capacity of 375, which implies six vehicles per minute in a single direction, is unrealistically low as a design capacity.

The evacuation scenarios being studied do not reflect normal operations, which makes the policy capacity less relevant to the questions at hand. In the absence of detailed figures for maximum design capacity, and given the specific roadway characteristics, the analysis relied on the assumption that all evacuation routes in the analysis area would operate with the capacity of a two-lane major road as defined by the Circulation

[5] Design capacity refers to the maximum amount of Average Daily Traffic (ADT) that a given roadway can accommodate, based upon roadway design—in this case determined by the Santa Barbara County Public Works Department. Design Capacity usually equates to Level of Service (LOS) E/F.

[6] Per the County’s public guidelines, the policy capacity was interpreted as corresponding to 80% of design capacity.

[7] The K-Factor is a metric that helps convert ADT to hourly volumes. It refers to the proportion of ADT on a roadway segment or link during the Design Hour, which is the hour in which the 30th highest hourly traffic flow of the year takes place and can be used to convert ADT to hourly volumes. The K-Factor typically ranges from 7% to 12% depending on whether a facility is in an urban, suburban, or rural area. In this case, a higher K-Factor was used due to relatively low level of density in the plan area.

Element. To be conservative, a 20% capacity reduction was applied to account for capacity constraints related to smoky conditions and navigability issues that could arise during a wildfire event. These calculations resulted in an evacuation roadway capacity of 600 vehicles per lane per hour for all evacuation routes in the analysis area.

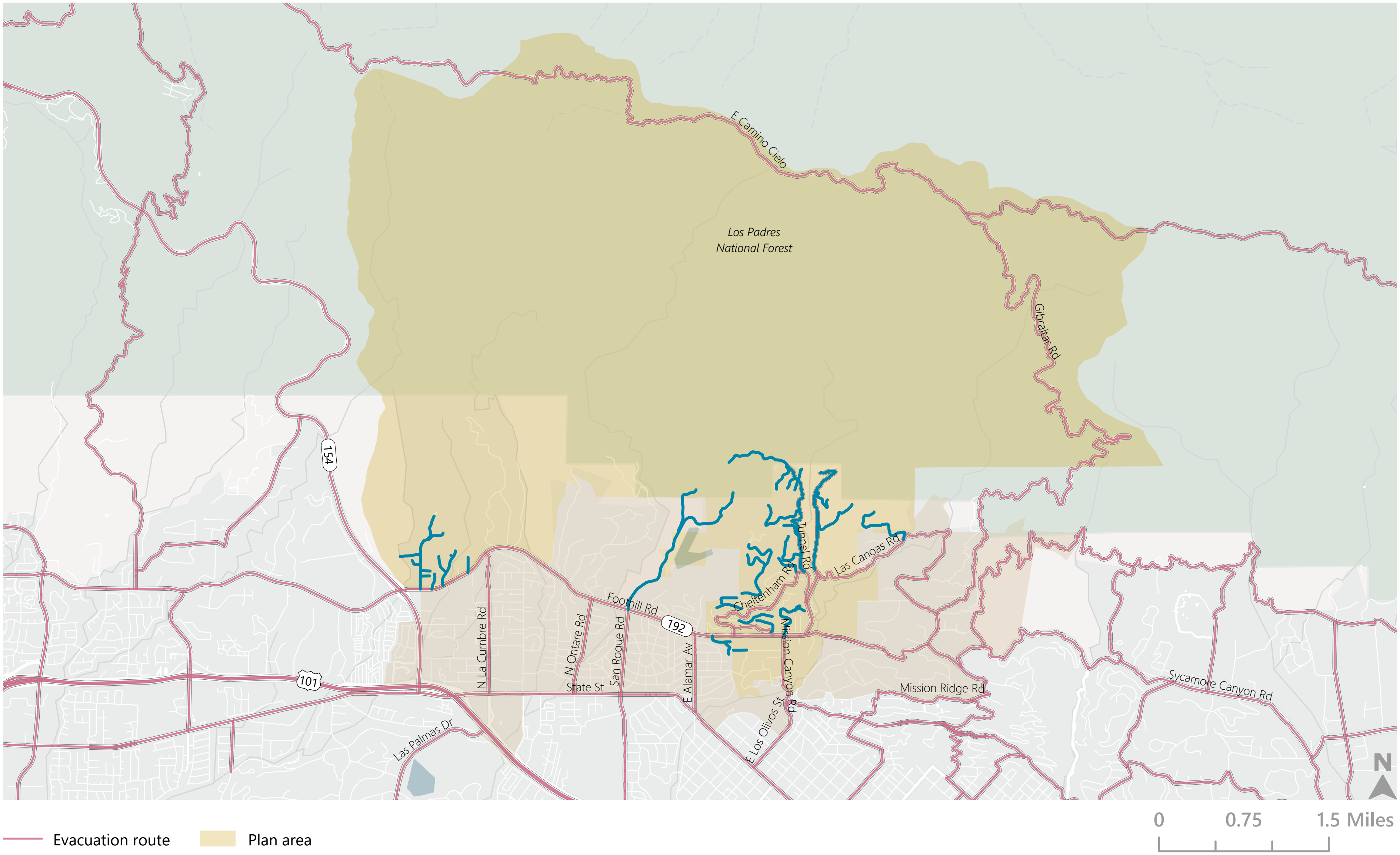


Figure 2

County Evacuation Routes and Single Access Points

2.2 Evacuation Travel Demand

To determine travel demand under evacuation conditions, the project team looked at six different scenarios and calculated the number of evacuating vehicles per building/recreational facility for each. Travel demand measures how many vehicles may use a roadway at a specific time.

2.2.1 Evacuation Scenarios

The evacuation analysis considered three ignition point locations and two times of the week to evaluate a total of six evacuation scenarios. In the most extensive evacuation scenario, which assumes an ignition point located centrally in the plan area, a wildfire event would require the entire plan area and much of the analysis area to evacuate. Ignition points in the western and eastern portions of the plan area that would result in a smaller share of the total plan area evacuating were also considered. **Table 2** summarizes the evacuation scenario parameters.

Table 2: Assumed Share of Population Evacuating Analysis Area by Scenario

Scenario	Ignition Point	Day of Week	Share of Population Evacuating							
			Plan Area Evacuation Zone 1	Plan Area Evacuation Zone 2	Plan Area Evacuation Zone 3	Plan Area Evacuation Zone 4	Plan Area Evacuation Zone 5	Shadow Region West	Shadow Region South	Shadow Region East
1	Central	Weekday	100%	100%	100%	100%	100%	100%	50%	100%
2	Central	Weekend	100%	100%	100%	100%	100%	100%	50%	100%
3	Western	Weekday	100%	100%	30%	30%	30%	100%	50%	30%
4	Western	Weekend	100%	100%	30%	30%	30%	100%	50%	30%
5	Eastern	Weekday	30%	30%	100%	100%	100%	100%	50%	100%
6	Eastern	Weekend	30%	30%	100%	100%	100%	100%	50%	100%

For each of the six scenarios, the evacuation travel demand estimates considered day and time of week by estimating demand on a **weekday afternoon** versus a **weekend midday**. These times were selected because they reflect contexts in which different shares of residential and non-residential populations would be in the plan area and reacting to an evacuation order. On a **weekday afternoon**, employed residents and school-age residents were expected to be outside of the plan area (at work and school, respectively); people who work in the plan area were expected to be in the plan area; visitors were expected to be present but at lower levels relative to a weekend. On a **weekend midday**, most of the residential population was expected to be home; workers in a subset of industries—such as *entertainment and recreation* and *accommodation and food services* (per NAICS)—were expected to be in the plan area; visitor volumes were expected to be at their peak levels. A weeknight scenario was also considered. However, this scenario had a similar profile to a weekend midday scenario but with fewer workers and visitors present. To be more conservative, this analysis chose to estimate travel demand for the midday weekend scenario.

2.2.2 Demand Estimation Methodology

To calculate evacuation travel demand, Fehr & Peers developed a methodology to estimate the number of evacuating vehicles and assign vehicles to evacuation routes. The analysis relied on the official County of Santa Barbara evacuation routes discussed in **Section 2.1.1**. The first step used FEMA USA Structures data to estimate the number of evacuating vehicles per building. The per-building figures for different kinds of buildings (single family residential, multifamily residential, non-residential) were used to estimate the total number of vehicles that would potentially evacuate the analysis area under each scenario.[8] Next, the analysis area was divided into smaller zones. Each of these zones was assigned to evacuation routes along the evacuation route network. Then, using Vistro analysis software, the cumulative number of evacuating vehicles at different geographic points of analysis (screenlines) along the evacuation network within the analysis area was estimated.

For **residential buildings**, in both weekday and weekend scenarios, the number of evacuating vehicles was estimated on a per dwelling unit basis. Dwelling units in multi-family buildings were estimated by dividing the square footage of the building by an average unit size of 800 square feet.[9] For the **weekday** scenarios, the average number of residents that would be home on a weekday was used as a proxy for the number of evacuating vehicles for each dwelling unit. To estimate the average number of residents that would be home on a weekday in a given unit, the share of residents who are employed and do not work from home, as well as the share of school-age residents, was subtracted from the average household size. For residential buildings in top 25th percentile median income Census block groups, the estimated number of private household-employed workers was added to the evacuating vehicle estimate. For the **weekend** scenarios, the average number of household vehicles was used to estimate the number of evacuating vehicles per dwelling unit.

For **non-residential buildings**, each job corresponded to one evacuating vehicle. While ACS data indicates that some people carpool or use alternative modes of transportation, this represents a small share of commuters. So, to be conservative, it was assumed that all workers drove alone to work. For the **weekday** scenarios, the number of jobs per non-residential building was estimated by dividing the number of jobs in a Census block ("block") by the number of non-residential buildings in the corresponding block, so all non-residential buildings within a block had the same number of estimated average jobs. Although work patterns shift throughout the week, this approach reflects an average weekday. For the **weekend** scenarios, the number of jobs was adjusted to only include industries that are most likely to work on the weekends. For these scenarios, the number of jobs in each block was multiplied by the share of jobs in that block that are classified as *entertainment and recreation* or *accommodation and food services* (per NAICS) for the weekend scenario. **Table 3** summarizes these assumptions by population and time of week.

[8] Assumptions and methods were developed using data from the plan area only, and applied to shadow zones on a per-dwelling unit and per-non-residential building basis

[9] The average unit size was determined by calculating the average square footage of multifamily units available for rent within the plan area on real estate websites such as Zillow and Apartments.com. Assuming a larger average unit size would result in lower estimated evacuation travel demand.

Table 3: Estimated Number of Evacuating Vehicles Per Building

	Weekday Afternoon	Weekend Midday
Residential building		
Residential vehicles per dwelling unit	1.5	2.1
Private household employed worker vehicles	0.2[1]	0
Non-residential building		
Worker vehicles	28 (per building average)	2.5 (per building average)

Note: [1]Applied to households in top 25th percentile median income block groups only and assumes these households employ one private household-employed worker per week on average.

Next, the analysis area was divided into smaller zones to calculate the portion of the above evacuating vehicle demand that fell within each zone. The zones were determined by clustering buildings such that it would be reasonable to assume all the evacuating vehicles within a zone would turn out onto the same evacuation route segment during an evacuation event. For each zone, evacuation vehicle trips were assigned to the evacuation route network based on the ignition point and the closest intersection to each zone. It was assumed that drivers would prioritize getting south of Foothill Road as quickly as possible, and would make right turns over left turns where possible (avoiding more challenging turns with conflicting vehicle movements).

The final step was to examine how the calculated demand for different zones might interact with existing evacuation routes. Screenlines were mapped at the approach in each direction for each intersection of evacuation route segments throughout the analysis area. The cumulative number of evacuating vehicles that would potentially pass through each screenline when evacuating the analysis area was analyzed using Vistro analysis software. This analysis was performed for the six evacuation scenarios described in **Section 2.2.1**.[10] **Figure 3** illustrates the boundaries of the trip assignment zones and the placement of the screenlines.

2.2.3 Evacuation Travel Demand Estimates

The evacuation travel demand results provide an estimated number of evacuating vehicles at each screenline in each scenario. **Table 4** summarizes the results in terms of number of evacuating vehicles. Overall, greater evacuation travel demand is expected under a weekend scenario compared to a weekday scenario. The total estimated number of evacuating vehicles is similar under a central and eastern ignition point (Scenarios One, Two, Five and Six) and lower under a western ignition point (Scenarios Three and Four).

[10] For each zone, the number of estimated vehicles per building was summed under a weekday and weekend scenario, and vehicles associated with the Santa Barbara Botanic Gardens and four trailheads were added where applicable. Evacuation assumptions associated with how each of the three ignition points might affect evacuation behaviors were then applied, and used to generate six evacuation travel demand estimates.

When considering the entire analysis area, evacuation travel demand is expected to be highest south of Foothill Road going southbound along La Cumbre Road, Ontare Road, Alamar Avenue, and Los Olivos Street due to the cumulative traffic from the plan area and the southern shadow region. Within the plan area, evacuation travel demand is expected to be highest heading southbound on Mission Canyon Road south of Foothill Road.

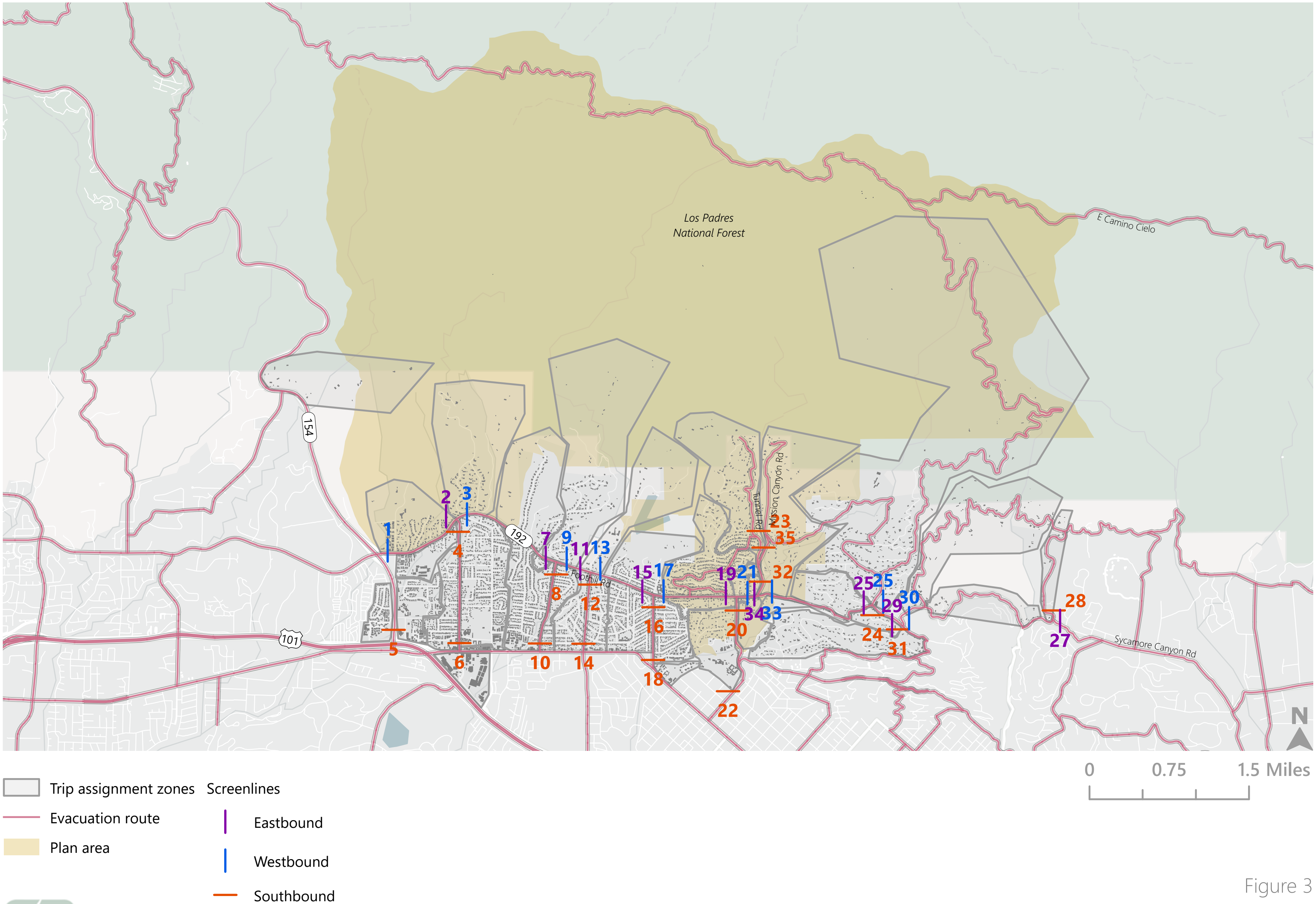


Figure 3

Trip Assignment Zones and Screenlines for Evacuation Travel Demand Estimation

Table 4: Estimated Evacuation Vehicle Demand by Screenline and Evacuation Scenario

Screenline (Direction)	Road Name	Number of Vehicles - Weekday			Number of Vehicles - Weekend		
		Scenario 1	Scenario 3	Scenario 5	Scenario 2	Scenario 4	Scenario 6
1 (WB)	Foothill Rd	413	413	212	474	474	247
2 (EB)	Foothill Rd	318	318	184	366	366	215
3 (WB)	Foothill Rd	291	291	155	359	359	193
4 (SB)	N La Cumbre Rd	609	609	339	725	725	408
5 (SB)	Hwy 154	479	479	232	538	538	266
6 (SB)	N La Cumbre Rd	2,805	2,805	2,535	2,292	2,292	1,975
7 (EB)	Foothill Rd	112	112	112	144	144	144
8 (SB)	N Ontare Rd	420	420	420	459	459	459
9 (WB)	Foothill Rd	0	0	0	0	0	0
10 (SB)	N Ontare Rd	1,100	1,100	1,100	1,236	1,236	1,236
11 (EB)	Foothill Rd	0	0	0	0	0	0
12 (SB)	San Roque Rd	278	83	278	309	93	309
13 (WB)	Foothill Rd	197	59	197	203	61	203
14 (SB)	San Roque Rd	707	512	707	778	562	778
15 (EB)	Foothill Rd	0	0	0	0	0	0
15 (WB)	Foothill Rd	197	59	197	203	61	203
16 (SB)	E Alamar Av	599	180	599	719	216	719
17 (WB)	Foothill Rd	468	141	468	583	175	583
18 (SB)	E Alamar Av	1,451	1,032	1,451	1,669	1,166	1,669
19 (EB)	Foothill Rd	407	122	407	507	152	507
20 (SB)	Mission Canyon Rd	1,595	496	2,068	1,969	609	2,562
21 (WB)	Foothill Rd	1,128	356	1,601	1,387	434	1,980
22 (SB)	E Los Olivos St	1,965	607	2,438	2,351	723	2,944
23 (SB)	Tunnel Rd	372	112	372	478	143	478
24 (SB)	W Mountain Dr	459	138	459	581	174	581
25 (WB)	Mission Ridge Rd	64	19	164	78	23	201
25 (EB)	Mission Ridge Rd	286	86	0	362	108	0
26 (EB)	W Mountain Dr	87	30	0	108	37	0

Screenline (Direction)	Road Name	Number of Vehicles - Weekday			Number of Vehicles - Weekend		
		Scenario 1	Scenario 3	Scenario 5	Scenario 2	Scenario 4	Scenario 6
26 (WB)	W Mountain Dr	229	69	515	290	87	652
27 (EB)	Sycamore Canyon Rd	611	252	94	747	298	99
28 (SB)	Coyote Rd	35	10	35	44	13	44
29 (EB)	Mission Ridge Rd	0	0	44	0	0	55
29 (WB)	Mission Ridge Rd	94	94	94	99	99	99
30 (EB)	Mission Ridge Rd	373	116	0	470	145	0
30 (WB)	Mission Ridge Rd	64	19	164	78	23	201
31 (SB)	Stanwood Dr	64	19	208	78	23	256
31 (NB)	Stanwood Dr	467	210	94	569	244	99
32 (SB)	Mission Canyon Rd	667	201	667	811	243	811
33 (WB)	Foothill Rd	396	135	869	495	166	1,088
34 (WB)	Foothill Rd	396	135	869	495	166	1,088
34 (EB)	Foothill Rd	0	0	0	0	0	0
35 (SB)	Mission Canyon Rd	295	89	295	333	100	333

Note: Screenlines with zero estimated vehicles are the result of trip distribution assumptions for individual zones. For example, all traffic east of Screenline 9 was assigned to evacuate via San Roque Road or north-south evacuation routes east of San Roque Road, so no westbound traffic is expected to pass through Screenline 9.

2.3 Evacuation Analysis Results

The relationship between demand and capacity at various points throughout the analysis area helps determine how much time would be required for all evacuating vehicles to clear each point. As such, the next phase of the evacuation analysis compared the estimated evacuation travel demand to the roadway capacity at each screenline under evacuation conditions. The figures in this section illustrate the results of the analysis, which are presented in terms of the total number of hours it could take for all evacuating vehicles to clear each screenline from the time the first vehicle begins to evacuate following the evacuation order until the last vehicle crosses the screenline. These estimates therefore represent the cumulative amount of time for every evacuating vehicle to cross a given screenline, not the time an individual vehicle may require to evacuate. The analysis assumes a conservative, worst-case scenario where all residents, workers, and visitors would need to evacuate immediately. The time estimates do not include any preparatory time that a person may require before getting into their vehicle.

This analysis assumed no background traffic on evacuation routes as the portion of Foothill Road within the analysis area would be closed to through-traffic under an emergency evacuation order, and segments north of Foothill Road do not serve through-traffic as they only have one point of access/egress. Intersection and segment level of service—a measure of the quality of traffic flow—under evacuation conditions was not evaluated. Across scenarios, the analysis identified four points along the evacuation route network within the plan area with the greatest evacuation traffic. The estimated time for residents, workers, and visitors located upstream to pass through these points during an evacuation event is summarized in **Table 5**. Scenario-specific findings are discussed in more detail below.

Table 5: Estimated Time to Clear Screenline During an Evacuation Event

Screenlines with Greatest Expected Traffic	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Mission Canyon Road (southbound) *Between Foothill Road and Alameda Padre Serra*	2-3 hours	3-4 hours	<1 hour	1-2 hours	3-4 hours	4-5 hours
Foothill Road (westbound) *Between southern and northern legs of Mission Canyon Road*	1-2 hours	2-3 hours	<1 hour	<1 hour	2-3 hours	3-4 hours
Mission Canyon Road (southbound) *Between Tunnel Road and Foothill Road*	1-2 hours	1-2 hours	<1 hour	<1 hour	1-2 hours	1-2 hours
Foothill Road (westbound) *Between Mission Canyon Road and Mountain Drive*	<1 hour	<1 hour	<1 hour	<1 hour	1-2 hours	1-2 hours

2.3.1 Scenarios One & Two – Central Ignition Point

Scenarios One and Two assume the entire plan area would be ordered to evacuate. In these scenarios, the analysis predicts traffic may be greatest on:

- **Mission Canyon Road** – heading southbound after Tunnel Road and Mission Canyon merge
- **Foothill Road** – heading westbound to turn south onto Mission Canyon Road
- **Mission Canyon Road** – south of Foothill Road heading southbound

The results suggest that everyone evacuating from the single access residential areas along Tunnel Road north of Cheltenham Road and along Mission Canyon Road north of Las Canoas Road would be able to reach Foothill Road within two hours. However, the analysis suggests it could take vehicles between three and four hours to pass through the intersection at Foothill Road and Mission Canyon Road to continue south on Mission Canyon Road. **Figure 4** and **Figure 5** compare the estimated time to evacuate on a weekday as opposed to a weekend. As discussed in **Section 2.2**, greater evacuation travel demand is expected under a weekend scenario compared to a weekday scenario. This greater demand is also reflected in longer evacuation times on weekends.

2.3.2 Scenarios Three & Four – Western Ignition Point

Scenarios Three and Four describe scenarios with a western ignition point. The analysis estimates evacuation travel demand for a western ignition point to be lower than the predictions for either of the other two ignition points. In Scenarios Three and Four, all portions of the plan area are expected to be able to evacuate within an hour. Traffic is expected to be greatest on **Mission Canyon Road**, south of Foothill Road heading southbound. **Figure 6** and **Figure 7** compare the estimated time to evacuate under a weekday versus a weekend scenario.

2.2.3 Scenarios Five and Six – Eastern Ignition Point

Although overall estimated evacuation travel demand is highest under the central ignition point scenarios, the eastern ignition scenarios produce the greatest level of localized traffic in the Mission Canyon portion of the plan area. Scenarios Five and Six assume traffic from the eastern shadow region would take Foothill Road westbound to Mission Canyon Road, as opposed to heading eastbound on Foothill Road, which would impact traffic flow. Traffic is expected to be greatest on:

- **Mission Canyon Road** – heading southbound after Tunnel Road and Mission Canyon merge
- **Foothill Road** – heading westbound to turn south onto Mission Canyon Road
- **Mission Canyon Road** – south of Foothill Road heading southbound

Even with the predicted impacts of an eastern ignition, the results still suggest that people evacuating the single access residential areas along Tunnel Road north of Cheltenham Road and along Mission Canyon Road north of Las Canoas Road would be able to reach Foothill Road within two hours, though the analysis suggests it could take vehicles between four and five hours to pass through the intersection at Foothill Road and Mission Canyon Road to continue south on Mission Canyon Road. **Figure 8** and **Figure 9** compare the estimated time to evacuate under a weekday and weekend scenario. The area with the greatest risk of a bottleneck is at the **intersection of Foothill Road and Mission Canyon Road**, for traffic heading southbound on Mission Canyon Road south of Foothill Road.

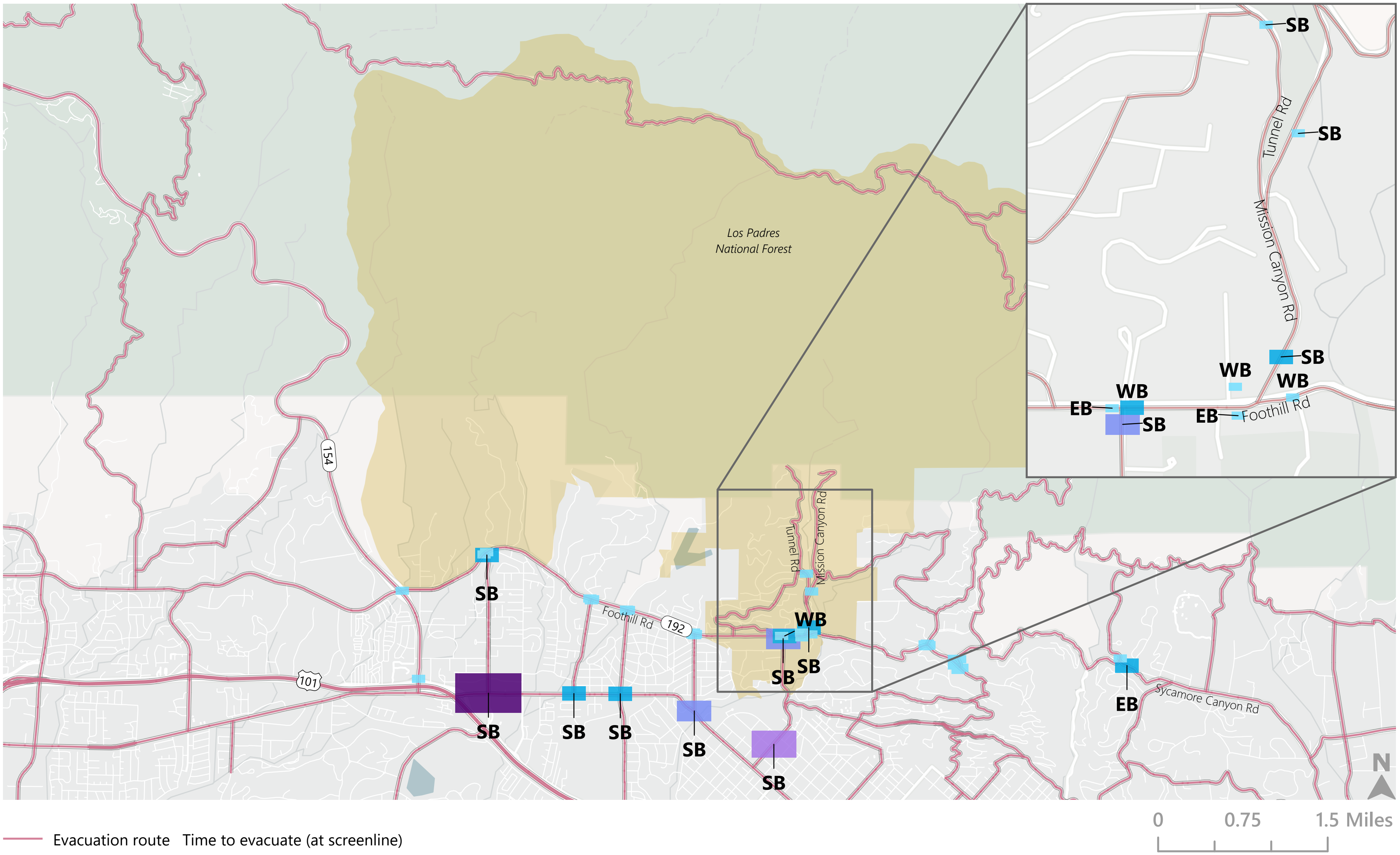
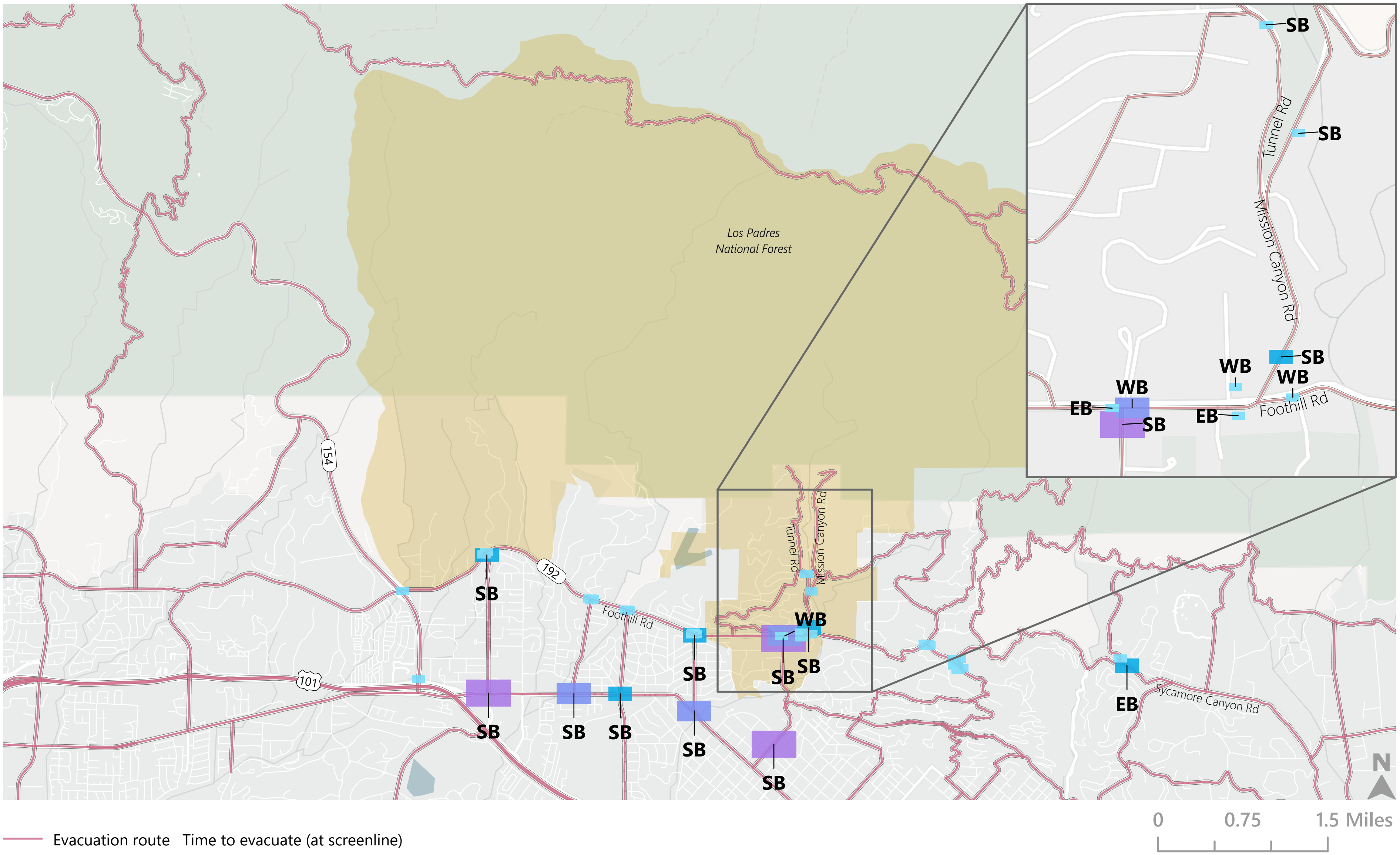


Figure 4

Scenario One Evacuation Analysis Results (Central ignition point, weekday)



Evacuation route

Plan area

Time to evacuate (at screenline)

1 hour or less

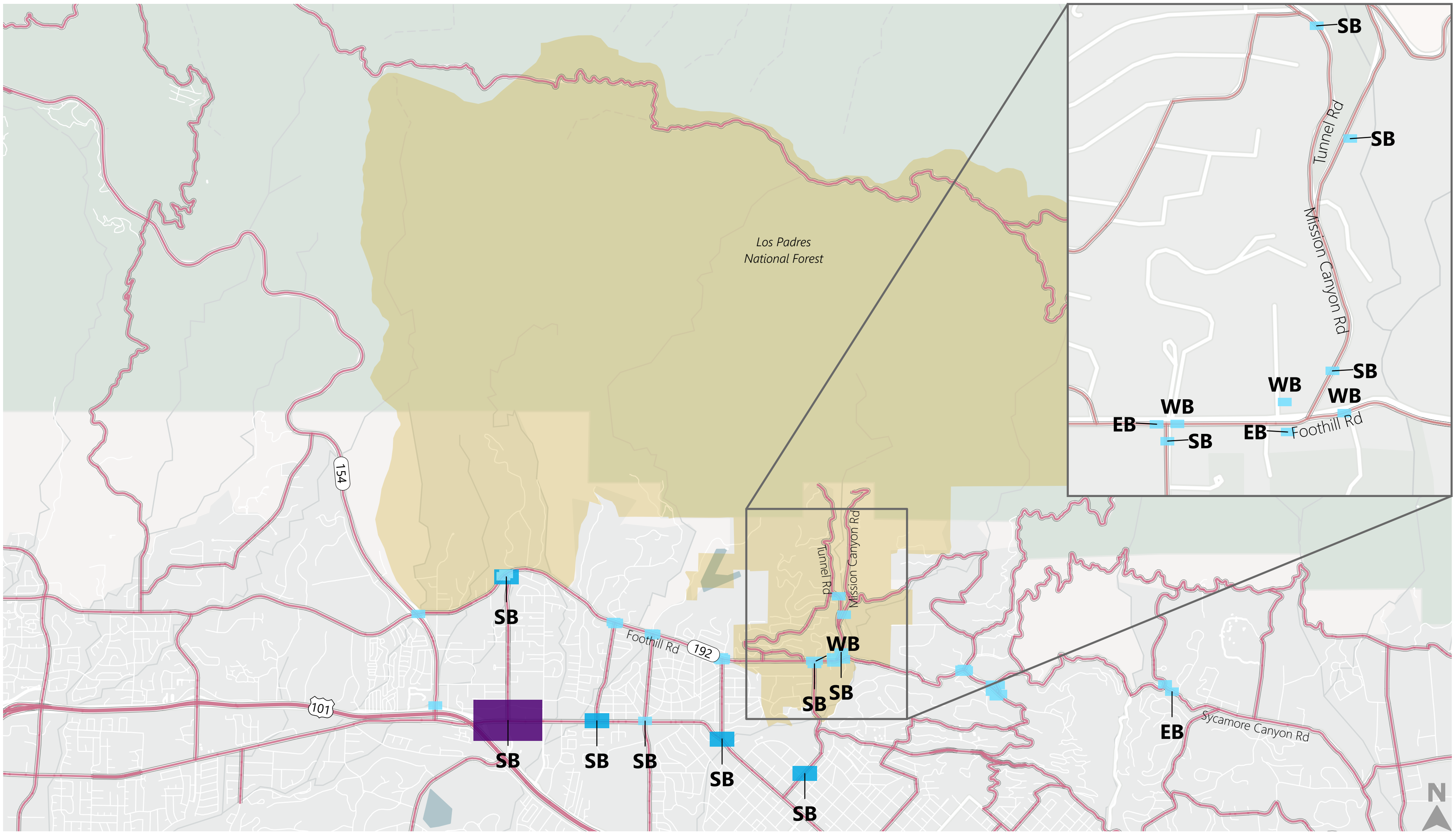
1-2 hours

2-3 hours

3-4 hours

Figure 5

Scenario Two Evacuation Analysis Results (Central ignition point, weekend)



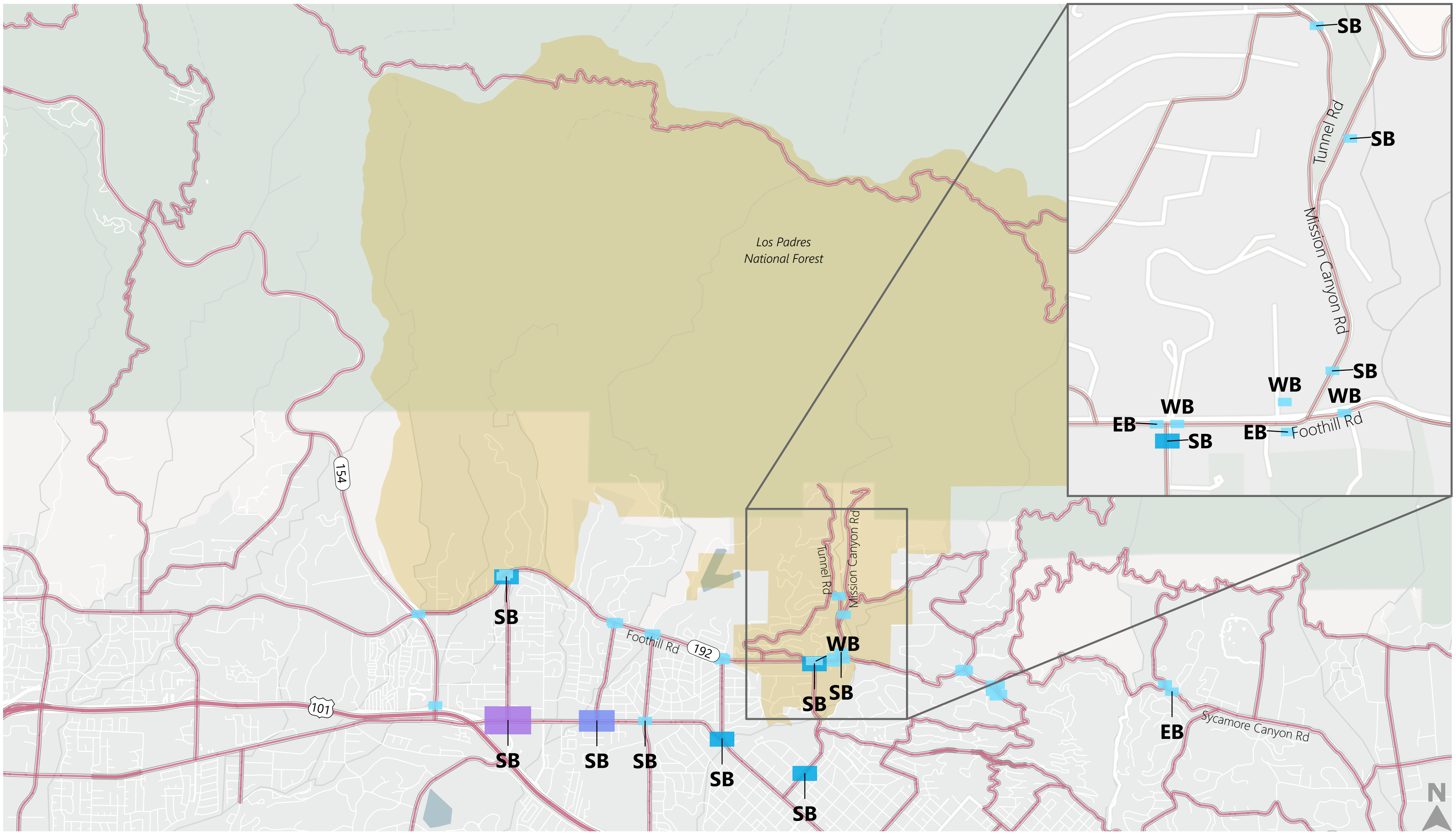
Evacuation route
Plan area

Time to evacuate (at screenline)
- 1 hour or less
- 1-2 hours
- 2-3 hours
- 3-4 hours
- 4-5 hours

0 0.75 1.5 Miles

Figure 6

Scenario Three Evacuation Analysis Results (Western ignition point, weekday)



Evacuation route

Plan area

Time to evacuate (at screenline)

1 hour or less

1-2 hours

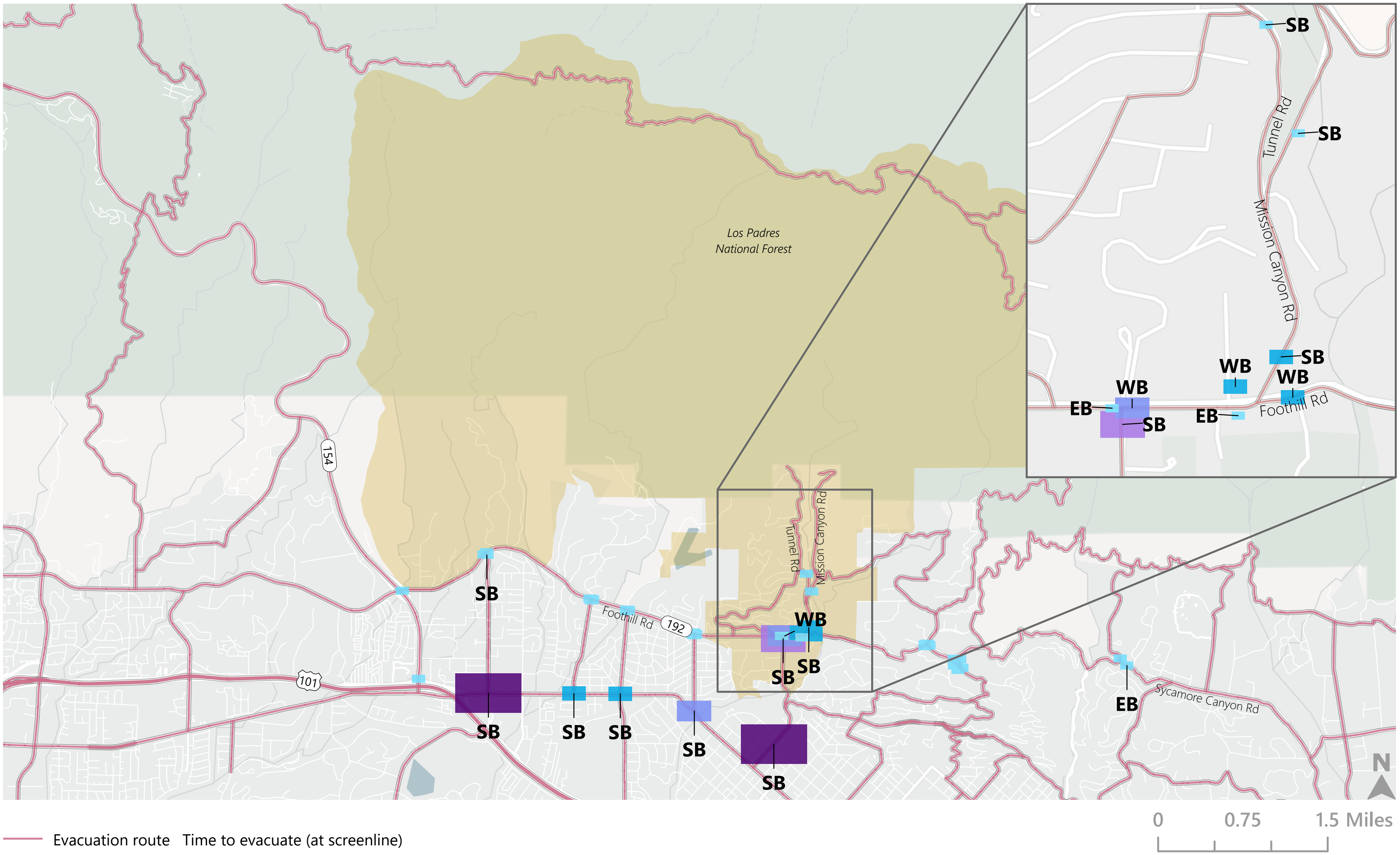
2-3 hours

3-4 hours

0 0.75 1.5 Miles

Figure 7

Scenario Four Evacuation Analysis Results (Western ignition point, weekend)



Evacuation route

Plan area

Time to evacuate (at screenline)

1 hour or less

1-2 hours

2-3 hours

3-4 hours

4-5 hours

Figure 8

Scenario Five Evacuation Analysis Results (Eastern ignition point, weekday)

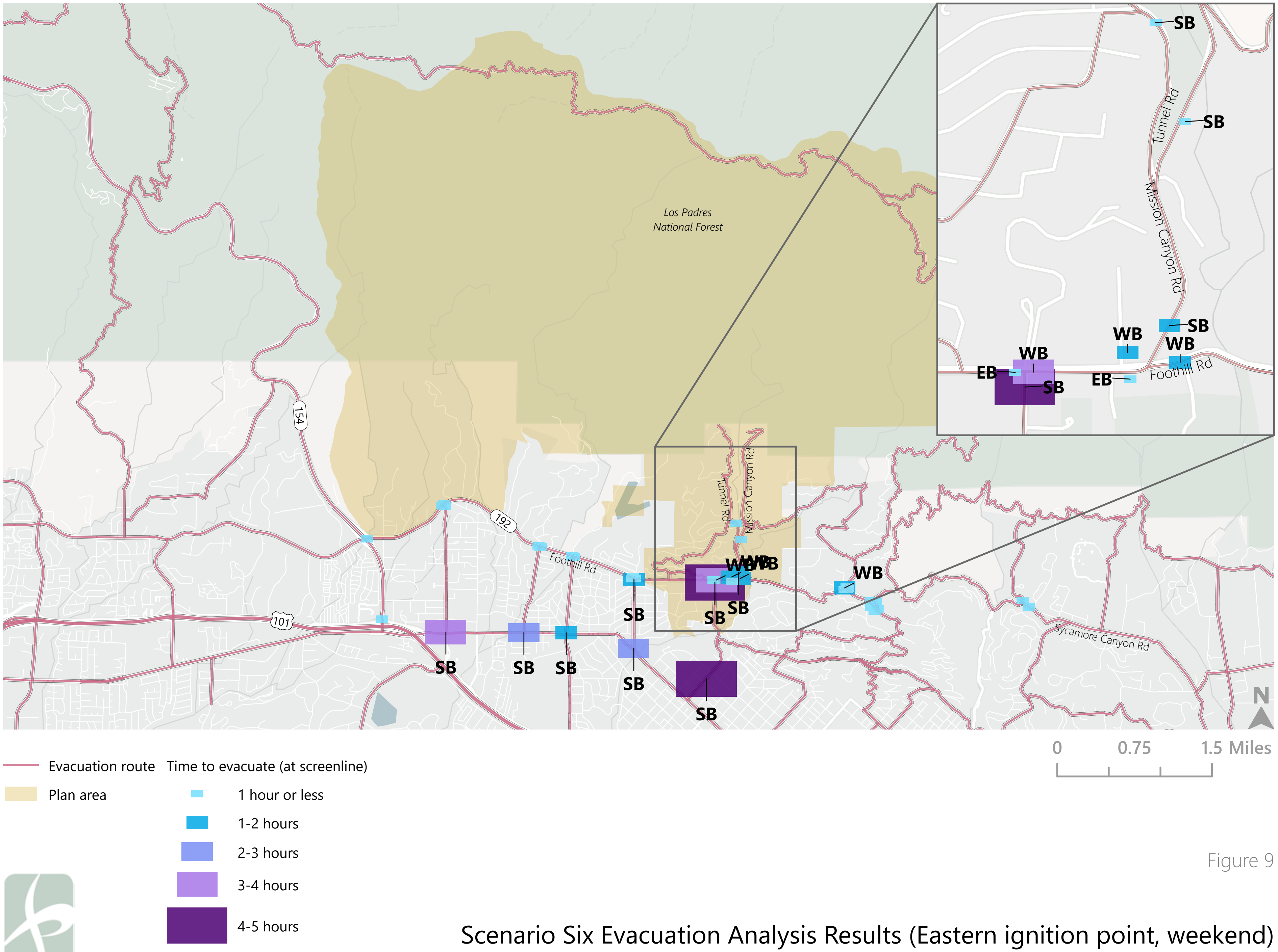


Figure 9

Scenario Six Evacuation Analysis Results (Eastern ignition point, weekend)

3. Study Recommendations

The goal of this study's recommendations is to improve evacuations within the plan area by managing vehicle demand, efficiently using roadway capacity, and providing the public with information—both ahead of time and in real-time during an evacuation event. Due to topographic constraints, this community lacks the ability to expand roadway capacity, and therefore many of the study recommendations focus on planning and programmatic efforts. There are some opportunities for infrastructure-related projects as well. Discussion of recommendations is organized by whether the suggested action addresses evacuation time by better **managing demand** (demand-side), creating more **roadway capacity** (supply-side), or providing people with relevant and timely **information** (information-side). A future phase of work could use dynamic modeling techniques to understand the relative effectiveness of the recommendations on the total estimated time to evacuate the plan area.

3.1 Demand-Side Recommendations

On the **demand** side, opportunities identified to reduce overall evacuation travel demand include efforts that would consolidate evacuating residents into fewer vehicles or distribute traffic across more routes. In community meetings, residents shared that they try to evacuate as many of their vehicles as possible, so the analysis assumed a 1:1 relationship between the average number of household vehicles and the number of evacuating vehicles. The Santa Barbara County Fire Safe Council (SBCFSC) could partner with community members to recommend households evacuate in a single vehicle if possible and incorporate this information into evacuation preparedness education and evacuation alerts. This program could include identification of a staging area in the community (but outside zones likely to require evacuation) in which residents could "pre-evacuate" and park any additional vehicles during high-wildfire-risk days. This would allow community members to feel confident that they have the vehicles they need during an evacuation, while reducing demand on the network during the actual evacuation itself. There may also be an opportunity for the Santa Barbara County Transportation Division (SBC Transportation Division) to coordinate with the Wood Glen Senior Living facility to develop an evacuation plan that could utilize larger buses to efficiently evacuate residents in fewer vehicles. Other efforts to reduce overall evacuation travel demand include incorporating information into existing evacuation preparedness campaigns about considering fire hazard conditions when scheduling gardening and home maintenance services to reduce the number of vehicles in the plan area on Red Flag Warning days and prompting local planning, building and safety, and fire agencies to consider modifications to maps in areas known to have evacuation challenges based on the latest CAL Fire Fire Hazard Severity Zone maps in the SRA and LRA.

To encourage greater distribution of traffic across available evacuation routes, the SBC Transportation Division could explore options for installing a system of sensors that would assess traffic conditions and detect incidents on evacuation routes. This technology could be used to provide real-time travel information to people evacuating the plan area, enabling them to make more informed routing decisions and potentially avoid bottlenecks. As a Transportation Systems Management and Operations (TSMO) strategy, real-time traffic and incident monitoring could offer benefits beyond an evacuation context, reducing congestion and improving traffic flow on a day-to-day basis.

Table 6 summarizes the demand-side recommendations, responsible parties and partners, and the relative priority of the recommendation.

Table 6: Demand-side Recommendations

Recommendation	Strategy Type	Responsible Party/Partnerships	Priority
Develop an evacuation vehicle demand reduction strategy to encourage households to evacuate in a single vehicle when possible.	Plan	Public Works (County Roads), County Planning, SBC OEM, SBC Fire, SBCFSC, community members	Medium
Develop an evacuation plan for the Wood Glen Senior Living facility.	Plan	SBC Transportation Division, Wood Glen Senior Living*, SBC Fire, SBCFSC	High
Work with recreational facilities and other guest-oriented businesses to develop evacuation plans and preparedness for wildfire.	Plan	SBC Fire, SBCFSC, SBC OEM	Medium
Explore options for installing a system of sensors to enable real-time traffic and incident monitoring and provide dynamic travel information.	Project	SBC Transportation Division, California Highway Patrol, SBC OEM, SBC Sheriff's Office	Low
Incorporate information into existing evacuation preparedness campaigns about considering fire hazard conditions when scheduling gardening and home maintenance services to reduce the number of vehicles in the plan area on Red Flag Warning days.	Program	SBC OEM, SBC Sheriffs, SBCFSC	Medium
When CAL FIRE releases updated Fire Hazard Severity Zone maps in the SRA and LRA, local planning, building and safety, and fire agencies should review and consider modifications to the maps in areas known to have evacuation challenges and experience strong, sundowner wind events.	Plan	County Planning, SBC Fire, SBC Sheriff	High

Note: SBC Fire = Santa Barbara County Fire Department; SBCFSC = Santa Barbara County Fire Safe Council; USFS = U.S. Forest Service; * = lead party.

3.2 Supply-Side Recommendations

On the **supply** side, high priority actions to consider include developing an evacuation intersection traffic management plan, conducting roadside fuel reduction, and removing or pruning hazardous trees. The evacuation intersection traffic management plan has multiple components, the simplest of which would be to restrict left turns from Foothill Road at unsignalized intersections (between Cieneguitas Road in the west and Mission Canyon Road in the east). Left turns typically slow down traffic as drivers must wait for a gap in perpendicular traffic, so concentrating left turns at signalized intersections could help to improve traffic operations under evacuation conditions. Encouraging right turns onto Foothill Road could also help better distribute traffic across the north-south evacuation routes south of Foothill Road. La Cumbre Road, Alamar Avenue, and Mission Canyon Road/Los Olivos Street currently have greater estimated evacuation travel demand than State Route 154, Ontare Road, and San Roque Road. Roadside fuel reduction, which refers to reducing the amount and continuity of burnable vegetation, and hazardous tree removal, could be prioritized in the areas where the greatest evacuation travel demand was identified.

Other supply-side recommendations include exploring the feasibility of a curbside management system to help enforce parking restrictions on Red Flag Warning days, coordinating with owners of private/unmapped roads to maintain them as viable egress routes and allow for their use during an evacuation (which could be particularly beneficial to Mission Canyon residents), and studying the feasibility of installing roundabouts at Foothill Road/Mission Canyon Road (the intersection with Mission Canyon Road south of Foothill Road) and Foothill Road/Alamar Avenue). Well-designed roundabouts can improve traffic flow (relative to a signalized or side street stop-controlled intersection), are resilient to power outages, and have safety benefits for all road users (including pedestrians and bicyclists) that could result in benefits during everyday conditions.[11]

Table 7 summarizes the supply-side recommendations, responsible parties and partners, and the relative priority of the recommendation.

[11] FHWA, "Roundabouts." https://highways.dot.gov/safety/intersection-safety/intersection-types/roundabouts.

Table 7: Supply-side Recommendations

<table>
<tr><th>Recommendation</th><th>Strategy Type</th><th>Responsible Party/Partnerships</th><th>Priority</th></tr>
<tr><td>Develop an evacuation intersection traffic management plan
1. Restrict left turns from Foothill Road at unsignalized intersections between Mission Canyon Road and Cieneguitas Road
2. Signal modifications activated during evacuation events (i.e. extending green time for protected left turns, “green wave” outbound) onto La Cumbre Rd, Ontare Rd, San Roque Rd, and Alamar Ave
3. Restrict Foothill Road to evacuation traffic only between State Route 154 and Sycamore Canyon Road
4. Deploy manual traffic control officers at N Mission Canyon & Foothill Rd and S Mission Canyon & Foothill Rd during an evacuation</td><td>Plan</td><td>SBC Transportation Division, SBC Fire, County Planning, SBC OEM, SBC Sheriff’s Office</td><td>High</td></tr>
<tr><td>Identify trigger points for closing surrounding highways to through traffic. Criteria to consider include:
• Number of homes confirmed to have ignited
• Number of evacuation zones issued formal evacuation order</td><td>Plan</td><td>SBC Fire, California Highway Patrol (CHP), SBC OEM</td><td>High</td></tr>
<tr><td>Conduct roadside fuels reduction along major roadways.</td><td>Program</td><td>SBC Fire, SBC Transportation Division, Caltrans</td><td>High</td></tr>
<tr><td>Identify and remove or prune hazardous trees along major evacuation corridors to maintain vertical clearance.</td><td>Program</td><td>SBC Fire, SBC Transportation Division, private property owners</td><td>Medium</td></tr>
<tr><td>Identify private/unmapped roads and coordinate with appropriate stakeholders to maintain them as viable egress routes and allow for their use during an evacuation.</td><td>Project</td><td>SBC Transportation Division, SBC Fire, private property owners</td><td>Low</td></tr>
<tr><td>Study feasibility of converting intersections to roundabouts (candidates include Foothill/S Mission Canyon, Foothill/Alamar)</td><td>Project</td><td>SBC Transportation Division, Public Works (County Roads)</td><td>High</td></tr>
<tr><td>Explore the feasibility of a curbside management system along roads north of Foothill used for recreational and visitor parking to help enforce parking restrictions on Red Flag Warning days. Elements of the system would include:
• A registration requirement for people to park at trailheads, enabled through a mobile app.
• Prohibit registering (and parking) on Red Flag Warning days, serving as an extra layer of communication about fire risk to visitors.</td><td>Project</td><td>SBC Transportation Division, SBC Fire</td><td>Medium</td></tr>
</table>

Note: SBC Fire = Santa Barbara County Fire Department; SBCFSC = Santa Barbara County Fire Safe Council; USFS = U.S. Forest Service.

3.3 Information-Side Recommendations

Providing residents, workers, and visitors with **information** that is relevant, timely, easy to access, and easy to understand is a critical component of improving evacuations, and one of the most noted suggestions during stakeholder outreach for this project. High priority information-side recommendations to consider include promoting information about evacuation routes, traffic restrictions to expect during an evacuation, and how to sign up for local emergency alerts and warnings. Ongoing educational campaigns conducted via online and mail channels could be coupled with annual in-person evacuation preparedness workshops to create more comprehensive learning opportunities. Efforts to target new residents upon move-in can also be beneficial since they may have less experience with evacuation events compared to longtime residents. The Santa Barbara County Fire Department (SBC Fire) is likely best positioned to lead such campaigns in partnership with the SBCFSC and SBC OEM.

During community meetings, many residents expressed interest in having a single web-based point of information that could provide real-time updates on the status of wildfires and evacuation route conditions. The County is currently in the process of developing an emergency communication platform using Genasys, which could address the requests for a web-based supplement to existing emergency alerts.

Table 8 summarizes the information-side recommendations, responsible parties and partners, and the relative priority of the recommendation.

Table 8: Information-side Recommendations

Recommendation	Strategy Type	Responsible Party/Partnerships	Priority
Create wildfire evacuation education materials that incorporate Transportation Study findings.	Project	SBC Fire, SBCFSC Mission Canyon Association, property management companies, community groups	High
Incorporate Transportation Study findings into wildfire education campaigns (e.g. Ready! Set! Go!) • *Promote information about available evacuation routes, County-identified temporary areas of refuge and temporary evacuation points, and traffic restrictions to expect during an evacuation.* • *Promote information about how to sign up for local emergency alerts and warnings.* • *Highlight how evacuation preparedness makes evacuation easier on everyone by spreading out evacuation traffic.*	Project	SBC OEM*, SBC Fire, SBCFSC	Medium
Conduct annual educational seminars to educate residents on wildfire preparedness. Educational topics will include: • *Defensible space* • *Structural hardening and retrofits* • *Evacuation* *Vegetation management techniques, including mechanical, manual, herbicides, prescribed fire, and herbivory*	Program	SBC Fire, SBCFSC, Firewise, SBC Sheriff, SBC OEM	High
Promote the County's single web-based point of information (including using Genasys during evacuations) regarding wildfire status and evacuation orders/warnings. Coordinate with partner services (SBC Fire, USFS, County of Santa Barbara, The Nature Conservancy, Santa Barbara Land Trust, and others) to ensure information is shared and consistent.	Project	SBC OEM, SBC Fire, SBCFSC, adjacent fire agencies and partner agencies	High
Identify areas to install evacuation wayfinding signage.	Project	SBC Transportation Division	High
Incorporate an early notification system for parcel clusters with a single egress route into evacuation notification systems (e.g. Genasys).	Program	SBC OEM	High

Note: SBC Fire = Santa Barbara County Fire Department; SBCFSC = Santa Barbara County Fire Safe Council; USFS = U.S. Forest Service; * = lead party.

4. Conclusion

The purpose of this Transportation Study is to identify areas within the Santa Barbara Foothill Communities that may have limited access and egress during an evacuation event and provide recommendations to improve emergency access and resident/worker/visitor evacuations. To achieve these goals, Fehr & Peers estimated the amount of time it may take for all vehicles to evacuate the plan area and used this data to identify potential bottlenecks in the transportation network. The roadway capacities of the evacuation routes in the plan area were examined and compared to the expected evacuation travel demand under six evacuation scenarios.

- **Scenario One:** Central ignition point on a weekday afternoon
- **Scenario Two:** Central ignition point on a weekend, midday
- **Scenario Three:** Western ignition point on a weekday afternoon
- **Scenario Four:** Western ignition point on a weekend, midday
- **Scenario Five:** Eastern ignition point on a weekday afternoon
- **Scenario Six:** Eastern ignition point on a weekend, midday

The results of the evacuation analysis informed the following key takeaways.

1. **Evacuation traffic will be greatest in the southern portion of the Mission Canyon community:** Across all three scenarios, the results of the analysis suggest traffic will be greatest on Mission Canyon Road south of Foothill Road heading southbound. Additional bottlenecks under a subset of scenarios may occur at Mission Canyon Road heading southbound after Tunnel Road and Mission Canyon merge, and at Foothill Road heading westbound to turn south onto Mission Canyon Road.
2. **Single access residential areas are likely to require the most time to evacuate:** The evacuation results suggest that everyone evacuating from the single access residential areas along Tunnel Road north of Cheltenham Road and along Mission Canyon Road north of Las Canoas Road would be able to reach Foothill Road within two hours under Scenarios One, Two, Five, and Six and within an hour under Scenarios Three and Four.
3. **Weekend evacuation travel demand may be greater than weekday demand:** Regardless of ignition point, greater evacuation travel demand is expected under a weekend scenario compared to a weekday scenario. This greater demand is also reflected in longer estimated evacuation times on weekends.
4. **The location of the ignition point may impact evacuation times in the Mission Canyon community:** Although overall estimated evacuation travel demand is highest under the central ignition point scenarios, the eastern ignition scenarios produce the greatest individual level of localized traffic in the Mission Canyon portion of the plan area.

Based on the evacuation analysis findings, recommendations were developed to improve evacuations within the plan area by managing vehicle demand, efficiently using roadway capacity, and providing the public with information—both ahead of time and in real-time evacuations. There are some opportunities for infrastructure-related projects, however many of the study recommendations focus on planning and programmatic efforts due to the plan area's limited options for expanding roadway capacity. High priority actions to consider include developing an evacuation vehicle demand reduction strategy, developing an evacuation intersection traffic management plan, and promoting the single web-based point of information regarding wildfire status and evacuation orders/warnings that the County is developing using Genasys. Collaboration between the Santa Barbara County Fire Department, the Santa Barbara County Fire Safe Council, the Santa Barbara County Transportation Division, the Santa Barbara County Office of Emergency Management, and community members will be a key component of implementing this study's recommendations. A future phase of work could use dynamic modeling techniques to understand the relative effectiveness of the recommendations on the total estimated time to evacuate the plan area.

Appendix D
Planning and Regulatory Environment

PLANNING AND REGULATORY ENVIRONMENT

The existing plans, codes, and standards relevant to wildfire protection and fuels management in the Plan Area are described herein.

Federal

Healthy Forests Restoration Act

The 2003 Healthy Forests Restoration Act (HFRA) is the legislative component of the Healthy Forest Initiative. The HFRA provides provisions for expediting the preparation and implementation of hazardous fuels reduction projects on federal land and assisting states, rural communities, and landowners with restoring healthy forest and watershed conditions. As a key component of the HFRA, a CWPP serves as a mechanism for community input and identification of areas presenting high wildfire risk, as well as identification of potential projects intended to mitigate such risk. The HFRA places a priority on fuel treatments identified by communities in their CWPPs.

National Fire Plan

The National Fire Plan was a presidential directive in 2000 in response to severe wildland fires that had burned throughout the United States. The National Fire Plan focuses on reducing fire impacts on rural communities and providing assurance for sufficient firefighting capacity in the future. The National Fire Plan addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. The plan continues to provide technical, financial, and resource guidance and support for wildland fire management across the United States. The USFS and the Department of the Interior are working to implement the key points outlined in the National Fire Plan (U.S. Government 2000).

National Incident Management System

The National Incident Management System (NIMS) is a system that guides all levels of government, nongovernmental organizations, and the private sector to work together to prevent, protect against, mitigate, respond to, and recover from incidents. The National Incident Management System provides guidance regardless of the cause, size, location, or complexity of the incident, and provides shared vocabulary, systems, and processes as well as defines operational systems used during incidents.

Disaster Mitigation Act

The Disaster Mitigation Act of 2000 created incentives for state and local entities to coordinate hazard mitigation planning and implementation. The act is an important source of funding for fuels reduction and fire hazard reduction efforts through federal hazard mitigation grants.

National Forest Management Act

The National Forest Management Act governs the administration of national forests and was an amendment to the Forest and Rangeland Renewable Resources Planning Act of 1974. The act called for the management of renewable resources on national forest lands.

National Historic Preservation Act

The National Historic Preservation Act protects and preserves historic and cultural sites. The act also created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices.

Endangered Species Act

The Endangered Species Act of 1973 protects species that are listed as endangered or threatened throughout all or a significant portion of their range. The act also provides protection for critical habitats on which the listed species depend.

Los Padres National Forest Land Management Plan

In accordance with the National Forest Management Act, each national forest has a land and resource management plan. The Land Management Plan for the Los Padres National Forest describes the strategic direction for managing the forest's land and resources over the next 10 to 15 years (USFS 2005).

Quadrennial Fire Review

The Quadrennial Fire Review is a strategic risk assessment that is conducted every 4 years, with the most recent assessment carried out in 2014. The purpose of the review is to forecast the conditions that may present the greatest challenge for wildland fire management over the next 10 to 20 years.

National Cohesive Wildland Fire Management Strategy

The National Cohesive Wildland Fire Management Strategy is a push to work collaboratively among stakeholders across landscapes to create resilient landscapes, fire-adapted communities, and safe and effective wildfire response. Its vision is "To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire." The Cohesive Strategy addresses the nation's wildfire problems by focusing on three key areas:

- Restore and Maintain Landscapes
- Fire Adapted Communities
- Response to Fire

Federal Wildland Fire Management Policy

The Federal Wildland Fire Management Policy was developed in 1995, updated in 2001, and again in 2009 by the National Wildfire Coordinating Group, a federal multi-agency group that establishes consistent and coordinated fire management policy across multiple federal jurisdictions. An important component of the Federal Wildland Fire Management Policy is the acknowledgement of the essential role of fire in maintaining natural ecosystems. The Federal Wildland Fire Management Policy and its implementation are founded on the following guiding principles, found in the Guidance for Implementation of Federal Wildland Fire Management Policy (NWCG 2009):

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.

- Fire management plans, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- Fire management plans and activities are based upon the best available science.
- Fire management plans and activities incorporate public health and environmental quality considerations.
- Federal, state, tribal, local, interagency, and international coordination and cooperation are essential.
- Standardization of policies and procedures among federal agencies is an ongoing objective.

International Fire Code

Created by the International Code Council, the International Fire Code addresses a wide array of conditions hazardous to life and property, including fire, explosions, and hazardous materials handling or usage (although not a federal regulation, but rather the product of the International Code Council). The International Fire Code places an emphasis on prescriptive and performance-based approaches to fire prevention and fire protection systems. Updated every 3 years, the International Fire Code uses a hazards classification system to determine the appropriate measures to be incorporated to protect life and property (often these measures include construction standards and specialized equipment). The International Fire Code uses a permit system (based on hazard classification) to ensure that required measures are instituted.

International Wildland-Urban Interface Code

The International Wildland-Urban Interface Code is published by the International Code Council and addresses wildfire issues in the WUI. It is a model code that is intended to be adopted and used supplemental to the adopted building and fire codes of a jurisdiction. The International Wildland-Urban Interface Code establishes minimum special regulations for development in the WUI to safeguard life and property from wildfire hazards.

National Fire Protection Association Codes, Standards, Practices, and Guides

National Fire Protection Association (NFPA) codes, standards, recommended practices, and guides are developed through a consensus development process approved by the American National Standards Institute. This process brings together professionals representing varied viewpoints and interests to achieve consensus on fire and other safety issues. NFPA standards are recommended guidelines and nationally accepted good practices in fire protection but are not laws or codes unless adopted or referenced as such by a state, county, city, or other fire code or local fire agency.

- **NFPA 1140, Standard for Wildland Fire Protection (2022):** This standard provides the minimum requirements for wildland fire management and the associated professional qualifications for wildland fire positions. It is intended to specify the minimum requirements for fire protection and emergency services infrastructure in wildland, rural, and suburban areas; wildland fire management practices and policies; methods of assessing wildland fire ignition hazards; and job performance requirements for wildland fire positions.
- **NFPA 1141, Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas (2017):** This standard addresses the requirements for fire protection infrastructure in

wildland, rural, and suburban areas where there is an intended change of land use or intended land development. It is intended to develop fire protection and emergency services infrastructure to reduce the impact of land use changes in wildland, rural, and suburban areas.

- **NFPA 1142, Standard on Water Supplies for Suburban and Rural Firefighting (2022):** This standard addresses a method for determining the minimum requirements for alternative water supplies for structural firefighting purposes in areas where the authority having jurisdiction (AHJ) determines that adequate and reliable water supply systems for firefighting purposes do not otherwise exits. It is intended to assist the AHJ in establishing the minimum water supply necessary for structural firefighting purposes in areas where it has been determined that there is no water or inadequate water for firefighting.
- **NFPA 1143, Standard for Wildland Fire Management (2018):** This standard provides minimum requirements to fire protection organizations on the management of wildland fire, including prevention, mitigation, preparation, and suppression. It is intended to specify management practices and policies necessary for a fire protection organization to develop a wildland fire management program.
- **NFPA 1144, Standard for Reducing Structure Ignition Hazards from Wildland Fire (2018):** This standard provides a methodology for assessing wildland fire ignition hazards around existing structures, residential developments, and subdivisions, and improved property or planned property improvement that will be located in a WUI area, and provides minimum requirements for new construction to reduce the potential of structure ignition from wildfires. It is intended to assess fuel sources in the structure ignition zone for their potential to ignite structures, and to identify possible mitigation measures to reduce the possibility of structure ignition.

State

California Strategic Fire Plan

The 2018 Strategic Fire Plan for California reflects CAL FIRE's focus on (1) fire prevention and suppression activities to protect lives, property, and ecosystem services, and (2) natural resource management to maintain the state's forests as a resilient carbon sink to meet California's climate change goals and to serve as important habitat for adaptation and mitigation. Strategic Fire Plan goals include the following (State Board of Forestry and Fire Protection and CAL FIRE 2018):

1. Identify and evaluate wildland fire hazards and recognize life, property, and natural resource assets at risk, including watershed, habitat, social and other values of functioning ecosystems. Facilitate the collaborative development and sharing of all analyses and data collection across all ownerships for consistency in type and kind.
2. Promote and support local land use planning processes as they relate to: (a) protection of life, property, and natural resources from risks associated with wildland fire, and (b) individual landowner objectives and responsibilities.
3. Support and participate in the collaborative development and implementation of local, county, and regional plans that address fire protection and landowner objectives.
4. Increase fire prevention awareness, knowledge, and actions implemented by individuals and communities to reduce human loss, property damage, and impacts to natural resources from wildland fires.
5. Integrate fire and fuels management practices with landowner/land manager priorities across jurisdictions.

6. Determine the level of resources necessary to effectively identify, plan and implement fire prevention using adaptive management strategies.
7. Determine the level of fire suppression resources necessary to protect the values and assets at risk identified during planning processes.
8. Implement post-fire assessments and programs for the protection of life, property, and natural resource recovery.

California Fire Service and Rescue Emergency Mutual Aid Plan

The California Fire Service and Rescue Emergency Mutual Aid Plan is an extension of the California Emergency Plan. The plan supports the Incident Command System, the Integrated Emergency Management System, and multi-hazard response planning. The plan provides more detailed operational plans that support fire and rescue resources at the state, regional, and local levels.

California State Multi-Hazard Mitigation Plan

Approved by the Federal Emergency Management Agency (FEMA) in August 2023 as an Enhanced State Mitigation Plan, the 2023 State Multi-Hazard Mitigation Plan update continues to build upon California's commitment to reduce or eliminate the impacts of disasters caused by natural, technological, accidental, and adversarial/human-caused hazards, and further identifies and documents progress made in hazard mitigation efforts, new or revised state and federal statutes and regulations, and emerging hazard conditions and risks that affect the State of California.

California Government Code

California Government Code Sections 51175 through 51189 provide guidance for classifying lands in California as fire hazard areas and provide requirements for management of property within those lands. CAL FIRE is responsible for classifying FHSZs based on statewide criteria and makes the information available for public review. Further, local agencies must designate, by ordinance, Very High FHSZs within their jurisdiction based on the recommendations of CAL FIRE.

Section 51182 sets forth requirements for maintaining property within fire hazard areas, such as defensible space, vegetative fuels management, and building materials and standards. Defensible space around structures in fire hazard areas must consist of 100 feet of fuel modification on each side of a structure, but not beyond the property line unless findings conclude that the clearing is necessary to significantly reduce the risk of structure ignition in the event of a wildfire. Clearance on adjacent property is only conducted following written consent by the adjacent owner. Further, trees must be trimmed from within 10 feet of the outlet of a chimney or stovepipe, vegetation near buildings must be maintained, and roofs of structures must be cleared of vegetative materials. Exemptions may apply for buildings with an exterior constructed entirely of nonflammable materials.

California Public Resources Code

PRC Section 4290 requires minimum fire safety standards related to defensible space that are applicable to residential, commercial, and industrial building construction in SRA lands and lands classified and designated as Very High FHSZs. These regulations include road standards for fire apparatus access, standards for signs identifying roads and buildings, fuel breaks and green belts, and minimum water supply requirements. These regulations do not supersede local regulations that equal or exceed minimum regulations required by the state.

PRC Section 4291 requires a reduction of fire hazards around buildings adjacent to a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered in flammable material. It is required to maintain 100 feet of defensible space around all sides of a structure, but not beyond the property line unless required by state law, local ordinance, rule, or regulations. Further, PRC Section 4291 requires the removal of dead or dying vegetative materials from the roof of a structure, and trees and shrubs must be trimmed from within 10 feet of the outlet of a chimney or stovepipe. Exemptions may apply for buildings with an exterior constructed entirely of nonflammable materials.

PRC Section 4741 states that CAL FIRE shall assist local governments in preventing future wildland fire and with vegetation management problems by making its wildland fire prevention and vegetation management expertise available to local governments.

PRC Sections 4292-4296 and 14 CCR 1256 address vegetation clearance standards for electrical utilities. They include standards for clearing around energy lines and conductors.

California Code of Regulations

Title 14, Natural Resources

California Code of Regulations (CCR) Title 14, Division 1.5, Chapter 7, Subchapter 3, Fire Hazard, sets forth requirements for defensible space and provides alternate options if the required distances cannot be achieved. For example, options that have similar practical effects include noncombustible block walls or fences; 5 feet of noncombustible material horizontally around a structure; installing hardscape landscaping or reducing exposed windows on the side of structures with less than 30-foot setbacks; or additional structure hardening, such as those required in the California Building Code, CCR Title 24, Part 2, Chapter 7A.

CCR Title 14, Division 1.5, Chapter 7, Subchapter 2, Article 1, Section 1270.04 outlines SRA/VHFHSZ fire safe regulations, and establishes minimum wildfire protection standards for building, construction, and development in the SRA and VHFHSZs. These regulations aim to ensure basic emergency access, perimeter wildfire protection measures, and other safety standards to mitigate wildfire risks. Provisions for Application of these Regulations applies as follows: (a) the Local Jurisdictions shall provide the Director of CAL FIRE or their designee with notice of applications for Building permits, tentative parcel maps, tentative maps, and installation or use permits for construction or Development within the SRA, or if after July, 1 2021, the VHFHSZ, (b) the Director or their designee may review and make fire protection recommendations on applicable construction or development permits or maps provided by the Local Jurisdiction, and (c) the Local Jurisdiction shall ensure that the applicable sections of this Subchapter become a condition of approval of any applicable construction or Development permit or map.

Title 19, Public Safety

CCR Title 19 addresses public safety and includes State Fire Marshal requirements (CCR, Title 19, Division 1), which incorporate general fire and safety standards regarding fire department access and egress, fire alarms, emergency planning, and evacuation procedures.

Title 19, Division 2, Chapter 1, Standardized Emergency Management System Regulations

The Standardized Emergency Management System (Emergency System) regulations are described in CCR Title 19, Division 2, Chapter 1. The Emergency System is required by the California Emergency Services Act to manage multi-agency and multi-jurisdictional responses to emergencies in California, and to coordinate among all levels of government and affected agencies. The Emergency System unifies all elements of California's emergency management community into a single, integrated system, and standardizes key elements.

Title 24, California Building Standards Code

The California Building Standards Code (CCR Title 24) contains provisions for building and safety standards, including fire safety standards for new buildings that are provided in the California Building Code (CCR Title 24, Part 2) and the California Fire Code (CFC) (CCR Title 24, Part 9). These standards apply to all occupancies in California, except where state agencies and local governing bodies adopt more stringent standards.

Title 24, Part 2, California Building Code

The California Building Code includes several chapters relevant to fire safety and protection that address types of construction, fire and smoke protection features, construction materials and methods, and rooftop construction. Typical CFC safety requirements include fire sprinklers in all high-rise buildings; fire-resistance standards for fire doors, building materials, and particular types of construction; debris and vegetation clearance within a prescribed distance from occupied structures within wildfire hazard areas; and fire-flow requirements, fire hydrant spacing, and access road specifications.

Chapter 7A of the California Building Code regulates building materials, systems, and/or assemblies used in the exterior design and construction of new buildings within a fire hazard area. Fire hazard areas as defined by the California Building Code include areas identified as an FHSZ within an SRA or a WUI fire area. The purpose of Chapter 7A is to establish minimum standards for the protection of life and property by increasing the ability of structures in a fire hazard area to resist the intrusion of flames or embers projected by a wildfire, and to contribute to a systematic reduction in structural losses from a wildfire. New buildings in such areas must comply with the ignition-resistant construction standards outlined in Chapter 7A.

Title 24, Part 9, California Fire Code

Part 9 of Title 24 contains the California Fire Code (CFC), which incorporates by adoption the International Fire Code with necessary California amendments. The purpose of the CFC is to establish the minimum requirements to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, and dangerous conditions in new and existing buildings, structures, and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations. CFC Chapter 49 contains minimum standards for development in the WUI and fire hazard areas.

The CFC and Office of the State Fire Marshal provide regulations and guidance for local agencies in the development and enforcement of fire safety standards. The CFC is updated and published every 3 years by the California Building Standards Commission.

2022 California Fire Code

The 2019 CFC (CCR Title 24, Part 9) establishes regulations to safeguard against the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The CFC also establishes requirements intended to provide safety for and assistance to firefighters and emergency responders during emergency operations. The provisions of the CFC apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building and structure throughout California. The CFC includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and WUI areas.

Assembly Bill 3074

Assembly Bill 3074 was passed into law in 2020 and requires a third zone of defensible space. The law requires the Board of Forestry and Fire Protection to develop regulations for the ember-resistant zone (Zone 0) within 0 to 5 feet of a structure by January 1, 2023. Within this zone, fuels reduction would be more intense and be designed to keep fire and embers from ignition material that could spread fire to a structure.

Assembly Bill 38

Assembly Bill 38 established that, as of July 1, 2021, sellers of property located in a High or Very High FHSZ are required to provide the buyer with documentation that the property is in compliance with defensible space requirements.

1968 California FAIR Plan Act

The California FAIR Plan Act is composed of all insurer's licenses to write property insurance in California. The insurance pool was established to ensure the availability of property insurance to people who, beyond their control, have been unable to obtain insurance in the voluntary insurance market.

County

Santa Barbara Comprehensive Plan

The Santa Barbara Comprehensive Plan is a long-term planning document for the development of the County. The plan includes various elements, such as land use, circulation, open space, conservation, housing, safety, and noise. The goal of the plan is to analyze regional resources and environmental constraints to identify opportunities for urban development, agriculture expansion, and recreational activities. The plan also evaluates environmental hazards, ecological communities, and scenic values. Additional elements in the plan are groundwater resources, oak tree protection, air quality, and coastal land use (County of Santa Barbara 2022).

The Seismic Safety and Safety Element is intended to guide land use planning by providing pertinent data regarding geologic, soil, seismic, fire and flood hazards. The Fire Hazard and Fire Services section of this Element details fire issues of the County in the following categories: Causes and History of Wildfire, Responsible Fire Protection Agencies, Establishing Fire Hazard Severity Areas, Fire Hazard Reduction Measures, Land Use Planning and It's Relation to Fire Hazards, and Fire Goals, Policies, and Implementation Measures. Of importance for the CWPP is that within the Seismic and Safety Element are the goals and policies for protecting the community from fire-related hazards, shown in Table 1.

Table 1: Fire Goals, Policies, and Implementation Measures from Seismic Safety & Safety Element

Policy Group	Policy or Action Number	Policy and Action Title and Text
Avoidance & Minimization of Wildfire Hazards	Policy FIRE 1.0	**Fire Prevention Programs** Continue to pursue and promote County fire prevention programs and control measures.
Avoidance & Minimization of Wildfire Hazards	Policy FIRE 1.0.1	**Maintain and Enforce Fire Prevention Programs and Plans** Continue to pursue and promote the following fire prevention programs: • Regular inspection and code enforcement by County Fire Department. • Fire Code Operational Permit Program • Santa Barbara County Ready-Set-Go Program • Living with Fire Homeowners Guide • County Fire Development Standards • County Code and ordinance development • County Fire Hazardous materials process and inspection • County Fire investigation and data analysis • Public education and information • Santa Barbara County Unit Strategic Fire Plan • Vegetation Management Program • Defensible Space Inspection Program • County Fire Department Red Flag Warning Plan
Avoidance & Minimization	Policy FIRE 1.1	**Subdivisions in the VHFHSZ:** Subdivisions in the Very High Fire Hazard Severity Zone shall provide secondary access where feasible or substantial

of Wildfire Hazards		mitigations and/or management plans are required that offset the known risks, a Wildfire Protection Plan is prepared and approved, and a setback from wildland vegetation determined by the Fire Department, is established as part of the subdivision and is implemented prior to development.
Avoidance & Minimization of Wildfire Hazards	Policy FIRE 1.2	**Minimize Risks in Hazard Zones:** The County will consider risks from hazards when reviewing plans for development and occupancies in High or Very High Fire Hazard Severity Zones and take action to minimize risks to occupants to the greatest extent feasible
Avoidance & Minimization of Wildfire Hazards	Policy FIRE 1.3	**Open Space Facilities:** The County shall manage County-owned urban open space facilities to reduce wildfire hazards and associated risks consistent with State and County wildfire regulations and standards.
Avoidance & Minimization of Wildfire Hazards	Policy FIRE 1.4	**Existing Development Risk Mitigation** The County should work with property owners of existing developments that do not conform to contemporary fire safe standards to improve or mitigate access, water supply and fire flow, signing, and vegetation clearance to meet current State and/or locally adopted fire safety standards.
Avoidance & Minimization of Wildfire Hazards	Policy FIRE 1.5	**Subdivision Access** Subdivision projects shall site access roads between new homes and wildland areas, to the greatest extent feasible, while also minimizing disturbance to sensitive environmental resources, in order to maximize defensible space, access for fire suppression, egress for affected residents, and to reduce wildfire risk to new homes and structures.
State Mapping and Areas subject to Wildfire Standards	Policy FIRE 2.0	**Fire Hazard Severity Zones & Areas subject to Building Standards for New Development:** The County shall use California Department of Forestry and Fire Protection-Fire Hazard Severity Zones to determine areas that will require appropriate construction materials for new buildings in State Responsibility Areas and Local Responsibility Areas, local agency Very-High Fire Hazard Severity Zones, and designated Wildland-Urban Interface areas pursuant to the

		California Code of Regulations Title 24, Part 2, California Building Code.
State Mapping and Areas subject to Wildfire Standards	Policy FIRE 2.1	**State Map Collaboration and Adoption:** The County should continue to collaborate with the California Department of Forestry and Fire Protection in the revision of Fire Hazard Severity Zone Maps and shall adopt the official areas of Very High Fire Hazard Severity Zones in the Local and State Responsibility Areas
Vegetation Management and Defensible Space	Policy FIRE 3.0	**Defensible Space:** The County shall continue to require consistency with Fire Department Development Standards that ensure adequate defensible space clearance around all structures in compliance with the California Fire Code, Public Resource Code §4291, and Government Code §51175-51188.
Vegetation Management and Defensible Space	Policy FIRE 3.1	**Fuel Modification and Defensible Space** New development shall meet or exceed the State Fire Safe Regulations through application of the Fire Code and wildfire development standards pertaining to fuel modification and defensible space.
Vegetation Management and Defensible Space	Policy FIRE 3.2	**Wildfire Protection Plans:** A Wildfire Protection Plan is required for all new large developments in the Very High Fire Hazard Severity Zone (VHFHSZ), including: subdivisions, mixed-use development, commercial cannabis activities, multi-family housing, businesses open to the public, and large assembly uses and/or events. Such uses may require a Wildfire Protection Plan in the High FHSZ, at the discretion of the Fire Marshal.
Vegetation Management and Defensible Space	Policy FIRE 3.3	**Maintenance of Wildfire Protection Plans:** When a Wildfire Protection Plan is required, it shall include measures for modifying fuel loading, a maintenance plan to ensure measures are maintained, and a site plan with locations of any roads or existing structures that may act as a fuel barrier in a configuration that will maximize their benefit as a fuel barrier/fire break to the proposed development.
Vegetation Management	Policy FIRE 3.4	**Long Term Maintenance of Hazard Reduction Projects:**

and Defensible Space		Santa Barbara County Fire Department shall continue to implement the Vegetation Management Program through implementation of its Unit Strategic Fire Plan and maintained in CalMapper, providing long-term maintenance of fire hazard reduction projects to mitigate risks to existing development and communities.
Vegetation Management and Defensible Space	Policy FIRE 3.5	**Community Wildfire Protection Plans:** Communities within Santa Barbara County are encouraged to prepare Community Wildfire Protection Plans to identify and prioritize areas for hazardous fuel reduction treatments, describe methods to reduce structure ignitability, and methods of fuel treatment that protect essential infrastructure.
Vegetation Management and Defensible Space	Policy FIRE 3.6	**Fire Development Standards:** To reduce the potential for fire damage, the County shall continue to require consistency with Fire Department Development Standards pursuant to the California Fire Code, Public Resource Code §4291, and Government Code §51175-51188, as may be amended.
Vegetation Management and Defensible Space	Action FIRE 3.6.1	**Fire Development Standards** Continue to maintain and enforce County, Carpinteria Summerland Fire Protection District, and Montecito Fire Protection District Development Standards required to protect the community from unreasonable risk associated with urban and wildland fires pursuant to Title 24 of the California Code of Regulations, Part 9 California Fire Code, as may be amended.
Interagency Partnerships, Planning, and Coordination	Policy FIRE 4.0	**Interagency Partnerships:** The County shall strive to maintain partnerships with tribal governments, state, local, and federal agencies to identify, prioritize, and implement fire prevention and protection measures in the County.
Interagency Partnerships, Planning, and Coordination	Policy FIRE 4.1	**Interagency Emergency Planning & Coordination:** The County Office of Emergency Management (OEM) shall continue coordinating emergency planning for the Santa Barbara Operational Area pursuant to the California Emergency Services Act of 1970.

Interagency Partnerships, Planning, and Coordination	Action FIRE 4.1.1	**County Defense and Disaster Code** Continue enforcement of County Code Chapter 12-Civil Defense and Disaster, as may be amended, which provides direction to the County Office of Emergency Management including preparation and implementation of plans for the protection of persons and property in the event of an emergency and coordination of the County's emergency functions with all other public agencies, corporations, organizations and affected private persons.
Interagency Partnerships, Planning, and Coordination	Policy FIRE 4.2	**Multi-Jurisdictional Hazard Mitigation Plan Consistency:** The County's Safety Element should continue to incorporate the Santa Barbara County Multi-Jurisdiction Hazard Mitigation Plan in order to consider measures to reduce potential harm from fire-related activity to property and lives.
Interagency Partnerships, Planning, and Coordination	Policy FIRE 4.3	**Mutual Aid Plan:** The County's fire districts shall update and implement the Santa Barbara County Mutual Aid Plan each year to establish a plan for interagency preparedness, coordination, automatic aid, and mutual aid.
State Fire Code and Fire Safe Regulation Compliance	Policy FIRE 5.0	**New Development Compliance with Fire Safe Regulations:** New development in the State Responsibility Areas and Very High Fire Hazard Severity Zone shall meet or exceed State Fire Safe Regulations, as may be amended, relating to roads, water, signing and fuel modification; and Fire Hazard Reduction Around Buildings and Structures Regulations relating to fuel modification (Title 14, California Code of Regulations 1299.01-1299.05), as may be amended.
State Fire Code and Fire Safe Regulation Compliance	Policy FIRE 5.1	**Fire and Building Code Compliance:** New development within the State Responsibility Area, Very High Fire Hazard Severity Zones, and County High Fire Hazard Area will meet or exceed State standards set forth in the County Fire Code and County Building Code, Chapter 7A Materials and Construction Methods for Exterior Wildfire Exposure, as may be amended.
State Fire Code and Fire Safe	Action FIRE 5.1.1	**Enforce County Fire Code**

Regulation Compliance		Continue to maintain and enforce County Code Chapter 15 "Fire Prevention", which includes adoption of the California Fire Code, fire Development Standards, standards for weed abatement, fire protection mitigation fees, Carpinteria-Summerland Fire Protection District fire protection mitigation fee ordinance, Orcutt Fire Protection District fire protection mitigation fees, Goleta Fire Protection District fire protection mitigation fees, automatic fire sprinkler systems, fees, violations, Fire Department administration of hazardous materials/wastes laws, and fireworks.
State Fire Code and Fire Safe Regulation Compliance	Policy FIRE 5.2	**Non-Conforming Roads and Development:** The County will continue to evaluate non-conforming development and apply contemporary road standards consistent with the State Fire Safe Regulations through the development review process.
State Fire Code and Fire Safe Regulation Compliance	Policy FIRE 5.3	**Hydrant Spacing, Water Flow, and Stored Water:** All new development shall meet requirements identified in the State Fire Safe Regulations, National Fire Protection Association Standard 1142 on water supplies for suburban and rural firefighting, State Fire Code, and local Fire District Development Standards for hydrant spacing, water flow rates for fire suppression, and stored water for water and fire protection systems
State Fire Code and Fire Safe Regulation Compliance	Policy FIRE 5.4	**Addressing, Signage, Access, and Roadside Vegetation Clearance:** New development in the State Responsibility Area and Very High Fire Hazard Severity Zone shall meet or exceed the requirements in the State Fire Code and Fire Safe Regulations, which include visible home and street addressing and signage, evacuation and emergency vehicle access, and vegetation clearance maintenance on public and private roads that ensure adequate evacuation and emergency vehicle access
Facilities and Emergency Service Coverage	Policy FIRE 6.0	**New Essential Public Facilities:** Prohibit the siting of new essential public facilities (including, but not limited to, hospitals and health care facilities, emergency shelters, emergency command centers, and emergency communications facilities) in the Very High Fire Hazard Severity Zone in the Local and State Responsibility Areas, unless all

		feasible risk reduction measures have been incorporated into project designs or conditions of approval.
Facilities and Emergency Service Coverage	Policy FIRE 6.1	**Standard of Coverage Study Updates:** The County's fire districts shall continue to review and update Standard of Coverage studies provided for existing and planned new development to ensure there are adequate fire protection services, such as fire stations, equipment, and coverage during emergencies.
Facilities and Emergency Service Coverage	Policy FIRE 6.2	**Future Emergency Service Needs** The County's fire districts shall periodically prepare or update a Standard of Coverage Study to assess future emergency service needs and identify additional resources and services necessary to provide satisfactory emergency response services to meet future needs.
Facilities and Emergency Service Coverage	Action FIRE 6.2.1	**Mapping of Emergency Service Facilities** The Safety Element will be updated with the latest map and information on the location, adequacy, and coverage provided by emergency service facilities and areas lacking these services in the State Responsibility Area and the Very High Fire Hazard Severity Zone.
Facilities and Emergency Service Coverage	Policy FIRE 6.3	**Emergency Service Staff Training** The County's fire districts shall continue to train and certify their staff using the California Incident Command Certification System or by the requirements and guidelines set by the State Fire Marshal for training emergency service staff.
Public Outreach & Disaster Preparedness, Response, and Recovery	Policy FIRE 7.0	**Emergency Resources and Vulnerable Communities** The County shall ensure completeness and availability of identified emergency supplies and resources to all segments of the population, focusing especially on vulnerable and disadvantaged communities, including but not limited to temporary shelter or housing, and items such as medical supplies and services, water main repair parts, generators, pumps, sandbags, road clearing, and communication facilities.
Public Outreach & Disaster	Policy FIRE 7.1	**Disaster Response and Recovery Preparedness**

Preparedness, Response, and Recovery		The County shall maintain and improve disaster response and recovery capabilities and shall meet the emergency needs of all members of the community, especially the most vulnerable and disadvantaged.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.1.1	**Fire-Related Health and Prevention Needs** The County shall partner with existing public health community outreach and engagement efforts to address fire-related health and prevention needs.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.1.2	**Disaster Recovery Plans** The County shall develop, or continue to update and refine, disaster recovery plans to define roles and responsibilities and procedures for recovery after wildfire and related disasters.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.1.3	**Post-Fire Short-Term Housing** County Planning & Development, Housing and Community Development, and Public Health Departments shall coordinate with other local, regional or state agencies and community-based organizations, as needed, to develop contingency plans for meeting short-term, temporary housing needs of those displaced during a catastrophic wildfire event.
Public Outreach & Disaster Preparedness, Response, and Recovery	Policy FIRE 7.2	**Post-Fire Reconstruction** Post-wildfire reconstruction shall conform to the latest applicable Fire and Building Code standards.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.2.1	**Develop Wildfire Like-for-Like Ordinance** The County shall develop an ordinance to allow a post-wildfire rebuild with the same use and floor area that may be re-built in a location within the lot with less wildfire risk without the need for a discretionary entitlement as long as the structure(s) otherwise comply with other zoning and environmental regulations and does not significantly affect environmental resources.
Public Outreach &	Policy FIRE 7.3	**Outreach to At-Risk Populations**

Disaster Preparedness, Response, and Recovery		The County shall continue to promote outreach programs that educate at-risk populations and the wider community on defensible space, evacuation routes, and other information aimed at mitigating wildfire hazards.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.3.1	**Defensible Space Outreach** The County's fire districts will continue to promote their Defensible Space Programs and work with organizations, such as the Santa Barbara County Fire Safe Council, to plan and implement community wildfire education and hazard abatement programs.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.3.2	**Evacuation** The County emergency response agencies will promote preparedness by making evacuation information available to the community through web-based education materials, participation in public outreach opportunities, and other programs that will increase individual preparedness and encourage public registration in local alert and warning programs.
Public Outreach & Disaster Preparedness, Response, and Recovery	Action FIRE 7.3.3	**Populations with Disabilities Access and Functional Needs** The County will continue to promote its programs and resources aimed at ensuring Disabled and Access and Functional Needs populations can plan for emergencies with respect to evacuation and powering medical devices.
Access and Evacuation	Policy FIRE 8.0	**Residential Subdivision Access Standards in the VHFHSZ** The County shall require new residential subdivisions in the Very High Fire Hazard Severity Zone to provide not less than two means of access for emergency vehicles and resident evacuation. A deviation from this policy is only allowed if substantial mitigations and management plans are put in place to offset the known risks, and when the Fire Chief approves the proposed deviation mitigation and management plans.
Access and Evacuation	Policy FIRE 8.1	**Access Requirements in the VHFHSZ** All new development in the Very High Fire Hazard Severity Zone VHFHSZ will comply with ingress/egress requirements found in applicable wildfire Development Standards, Fire Code, and the State Fire Safe Regulations.

Access and Evacuation	Action FIRE 8.1.1	**Evacuation Route Assessment** The County shall develop evacuation routes and assess their capacity, safety, and viability in Hazard Areas. The County will survey areas at increased risk and develop recommendations to reduce risks and improve evacuation safety.
Enduring Adequate Infrastructure	Policy FIRE 9.0	**Adequate Water Infrastructure for Fire Suppression** All new development shall maintain adequate water infrastructure that ensures water supply and flow rates are adequate for fire suppression.
Enduring Adequate Infrastructure	Policy FIRE 9.1	**Infrastructure for Long-Term Water Supply** New development, including that which is not supplied by a water purveyor, shall have adequate infrastructure flow rate, and storage onsite that supports long-term water supply.
Enduring Adequate Infrastructure	Policy FIRE 9.2	**Coordination with Water Purveyors** The County will coordinate with water purveyors to encourage water supply infrastructure upgrades to maintain an adequate, long-term water supply for fire suppression needs for the community.

The Land Use Planning Element puts forth the recommended policies as those that are necessary to achieve goals set for the County regarding Environment, Urbanization, Agriculture, and Open Lands. The following are related to fire and vegetation:

- Hillside and Water Protection Policies section:
  - On any lands not Comprehensive Planned and zoned for agriculture, grading and “brushing” shall require a permit. Exceptions shall be grading of 50 cubic yards or less and “brushing” within a radius of 100 yards of a residential structure for fire purposes.
  - All developments shall be designed to fit the site topography, soils, geology, hydrology, and any other existing conditions and be oriented so that grading and other site preparation is kept to an absolute minimum. Natural features, landforms, and native vegetation, such as trees, shall be preserved to the maximum extent feasible. Areas of the site which are not suited to development because of known soil, geologic, flood, erosion or other hazards shall remain in open space
  - Temporary vegetation, seeding, mulching, or other suitable stabilization method shall be used to protect soils subject to erosion that have been disturbed during grading or development. All cut and fill

slopes shall be stabilized as rapidly as possible with planting of native grasses and shrubs, appropriate non-native plants, or with accepted landscaping practices.

- Where agricultural development and/or agricultural improvements will involve the construction of service roads and the clearance of natural vegetation for orchard and vineyard development and/or improvements on slopes of 30 percent or greater, cover cropping or any other comparable means of soil protection, which may include alternative irrigation techniques, shall be utilized to minimize erosion until orchards and vineyards are mature enough to form a vegetative canopy over the exposed earth, or as recommended by the County Public Works Department.

In addition to those policies, the General Plan Advisory Committee for the Santa Barbara area, which worked with County staff to formulate statements of goals and policies, and land use and circulation recommendations for each planning area, is a citizen committee that functioned as the official channel for county citizen participation in the planning and zoning process. The General Plan Advisory Committee for the Santa Barbara recommend the following to be considered in regard to fire:

- Land Use: Development should be restricted within such hazardous areas as flood plains, ocean bluffs, or within the 75-year retreat estimate, on filled land (unless supplemental building code requirements are met), on active or potentially active landslide areas, on unstable slopes, in fire hazard areas, or adjacent to potentially active earthquake faults.

- Environment: A program to achieve maximum fire protection consistent with the natural beauty of the mountain slopes should be developed.

In addition to the above policies, the Land Use Planning element designates mountainous areas (MA-320 on the Santa Barbara County Land Use Element Map) within the Plan Area that have an average slope in excess of 40 percent as well as isolated table land and valleys surrounded by slopes exceeding 40 percent. Generally, fire hazard is extreme, and public road access and availability of Land Use Element Republished December 2016 138 public services to these lands is minimal. Such lands usually are at higher elevations than lands designated MA-40, and often border lands having medium- to low-intensity residential and agricultural uses. Such lands include the steep mountain lands within the Los Padres National Forest boundaries. These areas shall be kept free of development to reserve them for such uses as watershed, scenic enjoyment, wildlife habitat, grazing, orchards, and vineyards. In addition, certain low-density residential uses at a density of not greater than one dwelling unit per 100 acres are permitted provided they are consistent with applicable policies of the Comprehensive Plan

The Open Space Element divides the open space areas in the Couty of Santa Barbara into 24 areas for identification and analysis of principal open space issues in each part of the County, which correspond generally to the hydrographic unit boundaries previously utilized in the Conservation Element. According to the Open Space Analysis Areas map within the Open Space element, the Plan Area appears to fall into the Santa Barbara subdivision of the South Coast area and the Santa Barbara Front area. While these open space area categorizations do not propose any policies, the categorizations provide important fire risk and behavior information about these landscapes that may be utilized for and inform future Projects in these areas.

The Open Space Element mentions the following about the Santa Barbara subdivision of the South Coast area regarding fire and vegetation:

- North of Foothill Road, fire hazards are high in the Mission Canyon - Lauro Canyon area. In the rest of the Santa Barbara area, fire hazard is moderate. However, the proximity of these lands to the Santa Barbara Front and the tendency of fires originating in the Santa Barbara foothills to climb rapidly up the Front during the critical fire weather calls for special open space buffer zones between urban development and the steep chaparral-covered slopes.

The Open Space Element mentions the following about the Santa Barbara Front regarding fire and vegetation:

- Watershed protection is the major open space function of the Santa Barbara Front, the mountainous northern portion of the South Coast study area lying within the National Forest boundaries. The potential flood hazards can be exacerbated by large wildland fires, thereby increasing the risk of extensive damage in the urbanized areas of the coastal plain. Almost all of the mountainous area is classified in the extreme fire hazard category, with only isolated patches in the high fire hazard category found on the flatter grasslands. Floods could pour down 22 stream channels draining the canyon on the Santa Barbara Front.

The Santa Barbara Front presents a scenic backdrop for the South Coast which would be especially vulnerable to intrusion by clearing, grading, or construction. Even fuelbreak systems would have to be designed carefully to harmonize with the topography and vegetation. Maintenance of the Santa Barbara Front in its natural state would satisfy wilderness-type recreational needs, as well as meeting watershed protection requirements. Only during critical fire weather periods would it be necessary to restrict access for recreation.

Mission Canyon Community Plan

This Mission Canyon Community Plan, which is a subset of the Land Use Planning Element, also lists fire protection goals, policies, development standards, and actions, shown in Table 2, to help reduce parcel-specific and cumulative fire hazards, implement critical action items that resolve parking and circulation constraints affecting emergency access, and for the pursuit of a long-term, sustainable fuel management program.

Table 2: Mission Canyon Community Plan Fire Protection Goals, Policies, Development Standards, and Actions

GOAL FIRE-MC-1:	**Maximize effective and appropriate prevention measures to reduce wildfire damage to human and animal life, property, and the Mission Canyon ecosystem.**
Policy FIRE-MC-1:	The County shall develop and implement fire emergency early warning systems to alert residents within Mission Canyon.
Policy FIRE-MC-2:	Support collaborative fuel management projects between Planning and Development, County Fire, and Public Works, the City of Santa Barbara, and Mission Canyon residents to encourage fire hazard reduction and protection of natural resources
Action FIRE-MC-2.1:	The County shall consider a plan and adoption of a Resolution of Intention to fund additional fire prevention services and roadway improvement program to reduce the damage and severity of wildfires and improve emergency ingress and egress. The plan shall specify the funding mechanism for the program by means of a Benefit Assessment District or Special Tax. If required, an Engineer’s Report shall be prepared that contains a description of the improvements to be financed, the proposed district boundaries, and a description of the special benefit that each parcel would receive as a result of

	the assessment. The program shall include an option for property owners to construct specified roadway improvements in lieu of payment to the assessment, subject to Public Works or County Fire Department permitting approval and standards. Fire prevention and roadway improvement services may include: • Implementation of the goals outlined in the Mission Canyon Community Wildfire Protection Plan (i.e., reducing hazardous fuels on public and private lands, increase education and awareness, and improve and protect critical evacuation routes); • Water infrastructure upgrades for firefighting purposes; and • Improvements to public and private roads for emergency ingress and egress.
Action FIRE-MC-2.2:	Planning and Development shall coordinate with the County Fire Department to develop educational materials and enhanced programs for properties along creeks and with environmentally sensitive habitat to ensure that fuel modification activities and practices achieve a balance between habitat values and fire hazard risk (see LUDC Environmentally Sensitive Habitat Overlay Zone section 35.28.100).
Action FIRE-MC-2.3:	Planning and Development shall refer project applicants to the State Board of Forestry and Fire Protection "General Guidelines for Creating Defensible Space," or its successor (available on the California Board of Forestry and Fire Protection's website at http://bofdata.fire.ca.gov/), and the Mission Canyon Community Wildfire Protection Plan (available on Planning and Development's website at http://longrange.sbcountyplanning.org/planareas/mission_canyon), or its successor, for additional information on fuel modification for defensible space.
Policy FIRE-MC-3:	Fire hazards in the Mission Canyon Plan Area shall be minimized to reduce the cost and need for increased fire protection services and to protect natural resources.
DevStd FIRE-MC-3.1:	Along access roads and driveways, limbing of native tree branches shall be allowed in order to meet the minimum vertical clearance requirements of the California Fire Code and County Fire Department development standards. To the maximum extent feasible, fuel modification practices shall not result in the removal, or substantial risk of loss, of mature, healthy, native trees (see DevStd BIO-MC-4.2 and Action BIO-MC-4.3).
DevStd FIRE-MC-3.2:	Development proposals shall include an evaluation of the need and location for a fire hydrant, subject to review and approval by the County Fire Department. Fire hydrants may be required on either side of a roadway depending on such factors as: (1) the roadway represents a main route out of the Mission Canyon area; or (2) the Fire Chief, or designated representative, determines the use of fire hydrants on the opposite side of the roadway may prove operationally difficult, or may create unsafe working conditions
DevStd FIRE-MC-3.3:	Development shall comply with the County Fire Department's development standards for fire hydrant spacing and flow rates.
DevStd FIRE-MC-3.4:	Development on private roads that does not currently comply with the minimum County Fire Department's development standards for private roads and driveways shall

	construct reasonable road frontage improvements or other applicable measures to expand the road and driveway space available for emergency turnout zones, pedestrian access, and appropriate landscaping and hardscaping, to the extent allowable by publicly or privately owned easements.
DevStd FIRE-MC-3.5:	Development shall comply with current state and County Fire Department's development standards for defensible space (i.e., presently a minimum of 100 feet of fuel modification from buildings and structures, according to California Public Resources Code 4291).
Action FIRE-MC-3.6:	The County shall encourage homeowners to investigate converting overhead power lines to underground facilities throughout Mission Canyon for the purpose of fire hazard reduction.
Action FIRE-MC-3.7:	The County shall encourage homeowners to retrofit existing homes to use fire resistant materials, such as fire resistive roofing or other buildings materials required in the current California Building Code.
Policy FIRE-MC-4:	Ensure that adequate fire facilities and staffing are available to meet the needs of both existing and new development in Mission Canyon
Policy FIRE-MC-5:	Conditional uses, including new construction and increases in intensity of use, shall not significantly contribute, individually or cumulatively, to the existing deficiency in roadway evacuation capacity from the Mission Canyon Plan Area. For new, amended, or revised Conditional Use Permits that include temporary events, the County shall consider the following measures as part of the required Fire Protection Plan in the conditions of approval: • Annual special event calendar coordination between institutional uses within and adjacent to the Plan Area (County and City); • A traffic management program for all events that have the potential to exceed the existing supply of visitor parking spaces. Offsite parking for temporary events shall not occur on adjacent residential streets and parking for shuttle buses shall occur outside the Plan Area; and • A maximum attendance number for any single event during the County Fire Department declared High Fire Season.
DevStd FIRE-MC-5.1:	Development shall comply with the County Fire Department's development standard for two separate access roads unless the County Fire Department waives/modifies the requirement and documents finding(s) for the waiver/modification based upon substantial evidence that public safety will not be compromised.

The following Biological Resources Goals, Policies, Development Standards, and Actions, shown in Table 3, may also be of importance with regard to fuel modification and fire.

Table 3: Mission Canyon Community Plan: Fire-Related Goals, Policies, Development Standards, and Actions for Biological Resources

Policy BIO-MC-4	Fuel modification for defensible space shall adhere to standards specified in the California Fire Code, County of Santa Barbara Fire Prevention Code, and Mission Canyon Community Wildfire Protection Plan, or their successors, to the extent feasible and consistent with other provisions of this Community Plan.
DevStd BIO-MC-4.1:	Fuel modification for defensible space within Environmentally Sensitive Habitat (ESH) and ESH buffers shall maintain the habitat's structural integrity and ecological functions that physically support species (e.g., stream bank stabilization, erosion control, water quality, shading effects of tree canopies).
Action BIO-MC-4.2:	The Santa Barbara County Land Use & Development Code (LUDC) shall be amended upon Community Plan adoption to: (1) regulate and provide criteria for the removal of vegetation and mature native trees in designated ESH; (2) identify activities that are exempt from permits, in addition to other existing permit review provisions and policy; and (3) provide new definitions as needed to clarify criteria. The intent of the permit exemption is to allow for compliance with state and local defensible space regulations while protecting ESH. Activities requiring permits and exempt activities shall be detailed in the LUDC. Exempt activities shall not involve any grading or use of heavy equipment within riparian areas.
DevStd BIO-MC-4.3:	To the extent feasible, fuel modification practices involving mature oaks and other native trees shall be limited to removing dead trees and materials, proper pruning, mowing the understory, and limbing up the branches. Unless permitted or required by the County Fire Department (see DevStd FIRE-MC-2.1), fuel modification practices shall not normally result in the removal or substantial risk of loss of protected, mature, healthy oaks or other native trees.
Policy BIO-MC-5:	Landscaping for development shall use appropriate plant species to ensure compatibility with and preservation of sensitive resources. Property owners are encouraged to remove existing non-native flammable or invasive exotic species and replace them with non-invasive, native, fire resistant varieties.
DevStd BIO-MC-5.1:	Development requiring a landscape plan should use only non-invasive, fire resistant species (see firewise garden examples listed in Appendix E of the Land Use Planning Element). Plants listed on the most recent California Invasive Plant Council (Cal IPC) Invasive Plant Inventory and Undesirable Plant Species listed in Appendix E shall not be included in any landscape plan for new development.

Eastern Goleta Valley Community Plan

The Eastern Goleta Valley Community Plan, which is also a subset of the Land Use Planning Element, expands its 1993 plan boundary into a "Proposed Rural Area" that extends into the western portion of the Santa Barbara Foothills CWPP Proposed Plan Area, in the area west of the Mission Canyon area. The following policies in the Eastern Goleta Valley Community Plan, shown in Table 4, have been developed to support exemplary fire protection, law enforcement, and emergency response services for the community.

Table 4: Eastern Goleta Community Plan: Fire-related and Fuel Modification-related Land Use and Development Policies and Implementation Strategies

OBJECTIVE FIRE-EGV-1: Minimize the potential hazard to human and animal life, property, and the ecosystem of Eastern Goleta Valley due to fire	
Policy FIRE-EGV-1.1	The County shall support and pursue collaborative fuel management and wildfire protection programs for the City of Santa Barbara, the City of Goleta, and Eastern Goleta Valley to encourage fire hazard reduction and protection of natural resources.
Policy FIRE-EGV-1.2	Fire hazards shall be minimized in order to reduce the cost of and need for increased fire protection services, while protecting environmental resources.
DevStd FIRE-EGV-1A	In high-fire hazard areas, compliance with State and local defensible space and vegetation management requirements for structures and properties shall be demonstrated prior to development.
DevStd FIRE-EGV-1B	In high-fire hazard areas, the use of native, drought-tolerant, and fire-resistant plants shall be strongly encouraged in landscaping and restoration projects.
DevStd FIRE-EGV-1C (INLAND)	Within high fire hazard areas, vegetation management practices within Environmentally Sensitive Habitat (ESH)/Riparian Corridor (RC) overlay and setback areas should be limited to the following activities to balance environmental resources preservation against wildfire protection: • Removal of non-native trees or immature native trees • Removal of surface debris • Removal of invasive non-native plants as defined and listed in the California Invasive Plant Council's "California Invasive Plant Inventory" • Removal of vegetation in non-riparian oak woodland or forest within the minimum defensible space area from structures as required by the County Fire Department • Selective limb removal of mature trees away from structures within minimum defensible space area as required by the County Fire Department

	• Thinning, pruning or mowing of vegetation (except trees) to no less than that required to meet fuel modification criteria (in no case less than 4 inch stubble) and leaving the roots intact
DevStd FIRE-EGV-1C (COASTAL)	Within high fire hazard areas, vegetation management practices within Environmentally Sensitive Habitat (ESH) overlay and setback areas for new development shall be limited to the following activities to balance environmental resources preservation against wildfire protection and shall be consistent with the requirements of DevStd ECO-EGV-2B: • Removal of non-native trees • Removal of surface debris • Removal of invasive non-native plants as defined and listed in the California Invasive Plant Council's "California Invasive Plant Inventory" • Removal of vegetation in non-riparian oak woodland or forest within the minimum defensible space area from structures as required by the County Fire Department • Selective limb removal of mature trees away from structures within minimum defensible space area as required by the County Fire Department • Thinning, pruning or mowing of vegetation (except trees) to no less than that required to meet fuel modification criteria (in no case less than 4 inch stubble) and leaving the roots intact.
Policy FIRE-EGV-1.3	The Planning and Development Department shall work with the County Fire Department and other interested agencies as needed to address community wildfire protection planning, including, but not limited to, defensible space requirements, landscaping standards and/or guidelines, and other standards for high fire hazard areas.
Action FIRE-EGV-1A	Develop educational materials and enhanced programs for properties within the ESH/RC overlay in high fire hazard areas through coordination between Planning and Development and the County Fire Department to ensure that fuel modification activities and practices achieve a balance between habitat values and fire hazard risk
Action FIRE-EGV-1B	The County shall encourage and support the development of a Community Wildfire Protection Plan for at risk communities of the Eastern Goleta Valley in compliance with the Community Wildfire Protection Plan Development Process for Santa Barbara County, adopted on August 2, 2011.
OBJECTIVE FIRE-EGV-2: Provide fire protection services that meet or exceed the goals and standards established for adequate fire protection.	

Policy FIRE-EGV-2.1	The County should maintain a five (5) minute response time within the Urban Area and a staffing level of firefighters ideally at a ratio of one (1) firefighter per 2,000 people, but at a maximum ratio of one (1) firefighter per 4,000 people.
Policy FIRE-EGV-2.2	All roads which provide access to structures and properties served by the County Fire Department shall be designed and constructed to Fire Department and County engineering standards or approved equivalent.
Policy FIRE-EGV-2.3	Secondary access shall be a consideration in the location and design of development. Two routes of ingress and egress shall be required for discretionary development unless the County Fire Department waives or modifies this requirement. Routes of ingress and egress required by the Fire Department shall be open and unobstructed.
Policy FIRE-EGV-2.4	Additional rural fire access routes which increase accessibility to rural areas in the event of wildfire should be considered. Additional fire access routes should connect the Urban Area to the rural area, maintain vegetation clearing/fire breaks, and provide public trail access to the maximum extent feasible
Policy FIRE-EGV-2.5	The Planning and Development Department shall work with the County Fire Department to design, locate, and develop land use strategies for acquiring and constructing emergency access roads in the rural and urban areas to improve accessibility and evacuation in the event of wildfire.
Policy FIRE-EGV-2.6	All non-agricultural development in the foothills area shall include provisions for water storage tanks, or connection to the Goleta Water District or other public water purveyor if development is located within the extent of a water district.
Policy FIRE-EGV-2.7	Where feasible, water storage facilities shall be part of a large system or public supply which is reliably maintained, rather than individual ad hoc systems.
Policy FIRE-EGV-2.8	When located within the boundaries of a water district, fire hydrants shall connect to the water district system.
Action FIRE-EGV-2A	Remove impassible roadblocks and dead-end roadways where possible in compliance with the Fire Department's Development Standard #1 for Access Roads in order to improve the accessibility and circulation for emergency responders and evacuation routes. All required public access roads shall be able to be used routinely for access into and out of an area.
Action FIRE-EGV-2B	Reopen Fire Station 19 to improve fire protection service provision.
Action FIRE-EGV-2C	Study and establish as feasible rural fire access roads to provide both improved fire response services and public trail corridors.
OBJECTIVE ECO-EGV-1: Preserve and enhance the watershed ecosystems of Eastern Goleta Valley.	

Policy ECO-EGV-1.2:	The County shall adhere to and incorporate the following priorities for the protection of ecological and biological resources: • Preservation and/or enhancement of existing natural resources. • Maintenance of habitat continuity and wildlife corridors. • Establishment, enlargement, and restoration of ecological preserves and wildlife corridors. • Long-term protection of regional ecosystems. • Protection and/or enhancement of critical habitats for endangered, threatened, and sensitive biota. • Enhancement or restoration of degraded habitats, including active removal and management of invasive non-native species. • Active management of preserves, open space and/or conservation easements. • Active management of natural areas to diminish fire hazard while sustaining natural resources and values, such as habitat areas and hydrologic function, through management of fuel loads or other appropriate measures (see also, Section III.C: Public Safety). • Land use and development patterns that minimize or alleviate the impact to the natural environment and improve Eastern Goleta Valley's urban ecology.
OBJECTIVE ECO-EGV-2: Preserve and enhance the vitality of biological resources of Eastern Goleta Valley.	
Policy ECO-EGV-2.2	The use of native, drought-tolerant, and/or fire-resistant plants shall be strongly encouraged in landscaping and restoration projects, especially in parks, buffers adjacent to native habitats and in designated open space.
Policy ECO-EGV-2.4 (INLAND)	Where sites proposed for development contain sensitive or important habitats and areas to be preserved over the long-term, degradation of these habitats shall be avoided to the maximum extent feasible, and demonstrated unavoidable impacts minimized as a component of a project, including, but not limited to, one or more of the following conditions: • Dedication of onsite open space easements covering habitat areas. • Onsite habitat restoration programs utilizing appropriate native, drought-tolerant, and/or fire-resistant species. • Monetary contributions toward habitat acquisition and management.

	• Offsite easement and/or restoration of comparable habitat/area when onsite preservation is infeasible.
Policy ECO-EGV-2.4 (COASTAL)	Where sites proposed for development contain sensitive habitats and impacts to these habitats are unavoidable consistent with Policy ECO-EGV-5.8, degradation of these habitats shall be avoided to the maximum extent feasible, and demonstrated unavoidable impacts minimized as a component of a project, including but not limited to, one or more of the following conditions: • Dedication of onsite open space easements covering habitat areas. • Onsite habitat restoration programs utilizing appropriate native, drought-tolerant, and, where appropriate, fire-resistant species propagated from plants in close proximity to the site. • Offsite restoration and open space conservation (through an easement or other means) of comparable habitat/area when onsite restoration is infeasible
DevStd ECO-EGV-4C	To the extent feasible, fuel modification practices involving mature oaks and other native trees shall be limited to removing dead trees and materials, proper pruning, mowing the understory, and limbing up the branches. Fuel modification practices shall not result in the removal or substantial risk of loss of protected trees.
Policy ECO-EGV-5.8	(COASTAL) Resource dependent uses may be allowed in ESH where sited and designed to avoid significant disruption of habitat values. A resource dependent use is a use that is dependent on the ESH resource to function (e.g., nature study, habitat restoration, and public trails). Non-resource dependent development, including fuel modification, shall be sited and designed to avoid ESH and ESH buffer areas. If avoidance is infeasible and would preclude reasonable use of a parcel, then the alternative that would result in the fewest or least significant impacts shall be selected
DevStd ECO-EGV-6G	New development, including fuel modification, shall be sited and designed to protect riparian vegetation. Adverse impacts to riparian vegetation shall be avoided to the maximum extent feasible. Where avoidance is infeasible and would preclude reasonable use of a parcel, then the alternative that would result in the fewest or least significant impacts shall be selected. Riparian protection and riparian restoration measures shall be required in the review of a project requiring a coastal development permit or other discretionary approval and shall be based on a project's proximity to riparian habitat and the project's unavoidable adverse impacts to riparian habitat through activities such as grading, bush clearing, construction, vehicle parking, supply/equipment storage, or the proposed use of the property. Adverse impacts could include, but are not limited to, vegetation removal/disturbance, reduced buffer, erosion/sedimentation, trenching, and activities which hinder or prevent wildlife access and use of habitat. Resource dependent uses may be allowed in riparian habitats where sited and designed to avoid significant disruption of habitat values. A resource

	dependent use is a use that is dependent on the ESH resource to function (e.g., nature study, habitat restoration, and public trails)

3-Year Action Plans

Communities within the Plan area that have developed 3-year action plans are Firewise USA certified communities: Arriba Way, Upper Tunnel Road, Upper Mission Canyon, and Northridge Road. Montrose Place community has also created a 3-year action plan, which is currently pending approval from CalFire and NFPA. All of these communities except for Northridge Road are Firewise pods within the larger Mission Canyon Association. Arriba Way is within Santa Barbara City Fire jurisdiction, while the rest of the MCA is within Santa Barbara County Fire jurisdiction. The Upper Tunnel Road pod is in unincorporated Santa Barbara County, situated at the top of the community closest to the wildland fuels, and has one of the highest fire risks of the MCA community in terms of evacuation difficulty and wildfire hazard. The Upper Mission Canyon Pod is located within a canyon at the wildland urban interface in the foothills of the San Ynez Mountain range. Montrose Place is located in the unincorporated area of Santa Barbara County, just north of the city of Santa Barbara above Highway 192/Foothill Road and is located within Mission Canyon. The Northridge Road community is located within the Wildland Urban Interface in the City of Santa Barbara along the front range of the Los Padres National Forest.

The categories of goals for these communities' action plans are the same—Education & Outreach, Home Hardening, Defensible Space / Fuel Reduction, and Evac Planning and Wildfire Preparedness—but the goals in each of these categories are respective to each community's objectives. The overarching goal of these communities' action plans overlap—at least, for Montrose, Upper Tunnel Road, Upper Mission Canyon, and Northridge—in that the goal of the respective action plans is to develop a strategy to increase outreach, educate, and implement efforts to make their neighborhoods more fire resilient. The action plan for Arriba Way focuses on reducing woody material touching the homes to make the community more fire safe to continue to prevent home loss for when, not if, the next wildfire occurs.

Santa Barbara County Code of Ordinances

Chapter 35 – Zoning

The Santa Barbara County Land Use and Development Code is Chapter 35, Zoning, of the Santa Barbara County Code. The Development Code carries out the policies of the Santa Barbara Comprehensive Plan by classifying and regulating land use and structures within the County. The Development Code is adopted to protect and promote the public health, safety, comfort, convenience, prosperity, and regional welfare of residents and businesses in Santa Barbara County.

Chapter 15 – Fire Prevention

The Santa Barbara County Board of Supervisors adopted the 2022 edition of the California Fire Code and the following provisions of the 2021 edition of the International Fire Code, including Chapters 1—80 and Appendix Chapters 4, A, B, BB, C, CC, D, E, F, G, H, I, J, K, L, M, N, and O as published by the International Code Council, that are added and/or amended by Section 15-3.

Section 4911, Santa Barbara County Fire Hazard Abatement, is applicable to all areas within the Santa Barbara County Fire Protection District and all other unincorporated areas of the County. Section 4911 includes the requirements for the clearance of brush, vegetative growth, and combustible materials from parcels and roadways, and clearance for fire protection equipment.

Chapter 49 of Chapter 15 outlines requirements for WUI areas. Per Section 4907, Defensible Space:

> Defensible space will be maintained around all buildings and structures in State Responsibility Area (SRA) as required in Public Resource Code 4290 and "SRA Fire Safe Regulations" California Code of Regulations, Title 14, Division 1.5, Chapter 7, Subchapter 2, Section 1270. Buildings and structures within the Very-high Fire Hazard Severity Zones of a Local Responsibility Areas (LRA) shall maintain defensible space as outlined in Government Code 51175–51189 and any local ordinance of the authority having jurisdiction. Buildings and structures in the High Fire Hazard Area shall maintain defensible space as outlined in Government Code 51175–51189 and the Santa Barbara County Defensible Space Standard.

Chapter 10 – Building Regulations

County building regulations are defined in Chapter 10 of the Santa Barbara County Code of Ordinances. The County Code adopts Chapter 1, Divisions 1 and 2 of the California Building Code (2022 Edition) in its entirety, except as amended in Chapter 10. Chapter 10 amends standards related to structural hardening and the definition of "Local Agency Very High Fire Hazard Severity Zone," and it defines the County's High Fire Hazard Area. Structural fire protection standards are addressed in the building codes and address structural hardening requirements for buildings within a High Fire Hazard Area and are consistent with Chapter 7A of the California Building Code. Structural hardening requirements address roofing, exterior coverings, decking materials, windows and doors, eaves, and vents, among others. The intent of these requirements is to minimize the potential for structural ignition through radiant or convective heat exposure or ember intrusion.

Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan

The Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan serves as a complete hazard mitigation planning tool for the County. The emphasis of this plan is on assessing and avoiding identified risks, implementing loss reduction measures for existing exposures, and ensuring critical services and facilities survive a disaster. Further, the plan contains updated capability assessment information, vulnerability assessment, and mitigation strategies for each of the identified hazards, including wildfire (County of Santa Barbara 2023). By having a completed and approved plan, the County is eligible for mitigation grant funding made available by FEMA, which may involve funds for identified fire hazard reduction projects.

Under the Multi-Jurisdictional Hazard Mitigation Plan, wildfires are classified as either wildland fires or WUI fires. WUI fires are further subdivided into three categories: (1) classic WUI exists where well-defined urban and suburban development presses up against open expanses of wildland areas; (2) the mixed WUI is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings; and (3) the occluded WUI exists where islands of wildland vegetation occur inside a largely urbanized area. The plan identified the community of Gaviota as at-risk (County of Santa Barbara 2017).

The Multi-Jurisdictional Hazard Mitigation Plan is currently in the process of being updated. The Santa Barbara County Office of Emergency Management submitted the completed draft of the Multi-Jurisdictional Hazard

Mitigation Plan in June 2022 to the California Governor's Office of Emergency Services and the Federal Emergency Management Agency for each agency's review and approval. Review is underway as of the date of this Plan.

Santa Barbara County Unit Strategic Fire Plan

The 2023 Santa Barbara County Unit Strategic Fire Plan is intended to serve as a local planning document. The Plan is tiered under the 2018 California Strategic Fire Plan and the 2022 CAL FIRE Strategic Plan. The plan identifies goals and objectives to minimize wildland fire risk to County watersheds, communities, firefighters, the public, and various local assets (SBC Fire 2023). The Unit Strategic Plan incorporates the State CalMAPPER database and spatial mapping tool developed to map and record all data derived from local and state government funded fuel reduction projects. SBC Fire, as part of its contract with CAL FIRE, is required to develop, maintain, and annually update the Unit Strategic Fire Plan.

Santa Barbara Operational Area Emergency Management Plan

The Santa Barbara Operational Area Emergency Management Plan addresses planned response within the Santa Barbara Operational Area to natural disasters, technological incidents, and national security emergencies. The plan does not address normal day-to-day operations. The focus of the plan is on large-scale disasters. Within the plan, wildland fire is identified as a trigger point in which the plan would be activated (County of Santa Barbara 2013).

Environmental Review

National Environmental Policy Act

Any proposed fuel treatment project on federal land, funded by a federal agency, or requiring a discretionary action by a federal agency requires compliance with the National Environmental Policy Act (NEPA). NEPA requires federal agencies to evaluate the potential environmental effects of proposed actions prior to making decisions on permit applications, adopting federal land management actions, and constructing highways and other publicly owned facilities. Projects implementing a CWPP recommendation on federal land within the WUI defined in a CWPP are afforded expedited NEPA review. NEPA review is typically conducted by, and the appropriate level of NEPA analysis to be conducted is decided by, the federal agency carrying out the proposed action or related to land ownership (e.g., USFS). Lead agencies typically prepare a Record of Decision, Finding of No Significant Impact, Categorical Exclusion, Environmental Assessment, and/or Environmental Impact Statement to assess the likelihood of impacts from a proposed action and alternative courses of action.

California Environmental Quality Act

Proposed fuel treatment projects on non-federal lands may require compliance with the California Environmental Quality Act (CEQA). Private landowners conducting defensible space projects under PRC 4291 guidelines are not subject to CEQA review requirements. Non-defensible space fuel treatment projects on non-federal lands that are discretionary and are to be carried out or approved by public agencies are subject to CEQA review and documentation (CEQA Guidelines 21080[a]). CEQA review for non-defensible space fuel reduction projects should be instituted during the project planning process. Typically, the lead agency under CEQA is the public agency with discretionary authority over a project; that is, the public agency that has principal responsibility for carrying out or approving the project. The appropriate level of CEQA analysis is decided by the lead agency, which could be a Categorical Exemption, Initial Study/Mitigated Negative Declaration, Environmental Impact Report (EIR), or a document tiered from an EIR.

California Vegetation Treatment Program

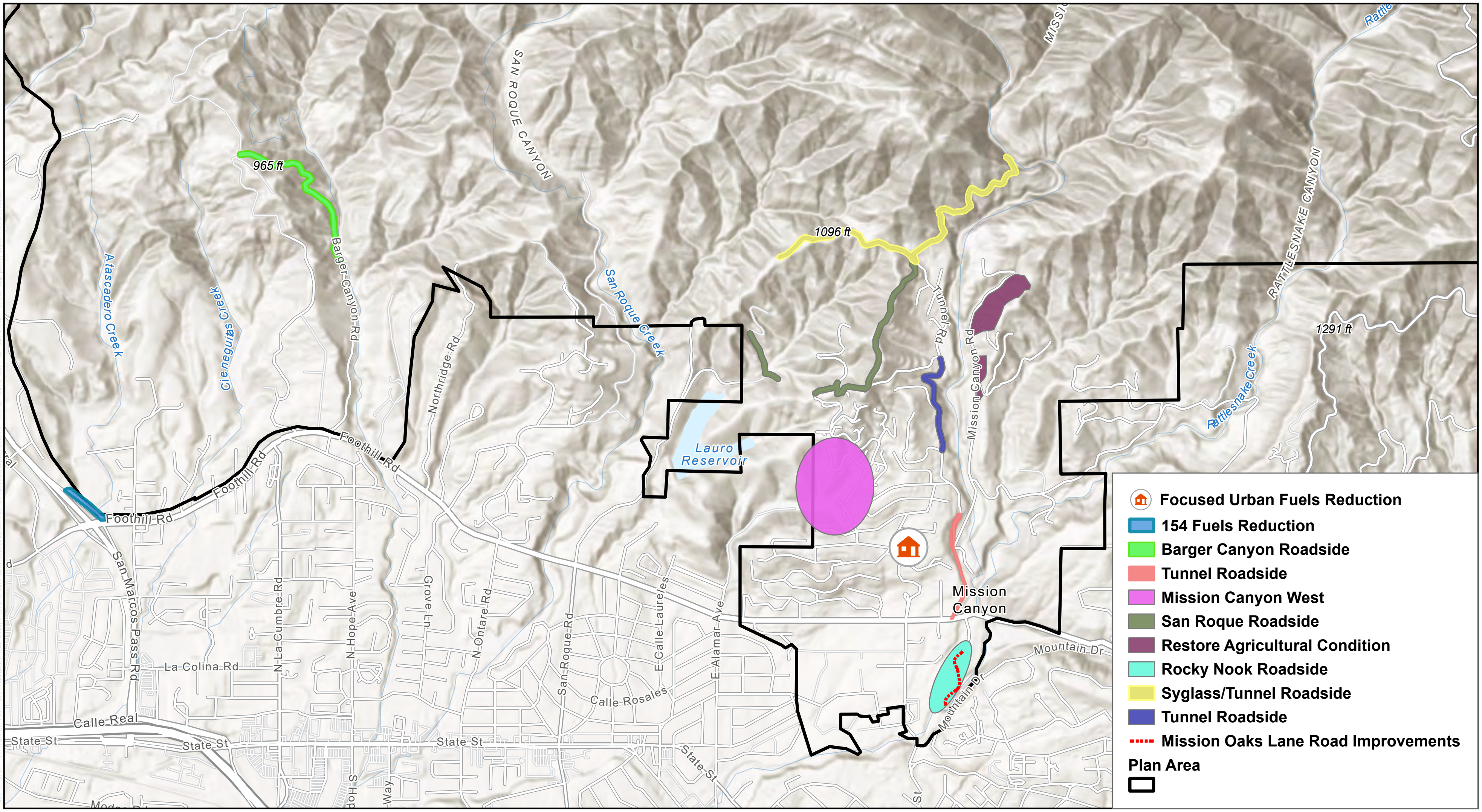
The California Vegetation Treatment Program (CalVTP) was developed by the California Board of Forestry and Fire Protection in an effort to address California's ongoing wildfire issues. The CalVTP includes the use of prescribed burning, mechanical treatments, manual treatments, herbicides, and prescribed herbivory activities to reduce hazardous vegetation, construct fuel breaks, and restore healthy ecological fire regimes (California Board of Forestry and Fire Protection 2022). The CalVTP Program EIR was prepared in accordance with CEQA and was approved by the Board of Forestry and Fire Protection in December 2019. The Program EIR provides a programmatic analysis of potential impacts related to vegetation treatment activities within the "Treatable Landscape," which is defined by the CalVTP. Project proponents may tier from the CalVTP Program EIR to analyze project-related impacts for future projects within the Treatable Landscape. Fuel management projects occurring in the Treatable Landscape can complete a streamlined CEQA review via the project-specific analysis process outlined in the CalVTP Program EIR (California Board of Forestry and Fire Protection 2019). Initial planning efforts for fuel management projects conducted under this CWPP should examine the project's location relative to the CalVTP Treatable Landscape to determine suitability for analysis under the CalVTP Program EIR.

Agency Consultation/Permitting

Regulatory permits may also be required for fuel treatment actions that would adversely impact riparian areas under the jurisdiction of the U.S. Army Corps of Engineers, Regional Water Quality Control Board, and California Department of Fish and Wildlife (CDFW). It is anticipated that the U.S. Army Corps of Engineers may require a fill permit under Section 404 of the Clean Water Act. CDFW may require a Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code. The Regional Water Quality Control Board may require a Water Quality Certification under Section 401 of the Clean Water Act. Additionally, it is anticipated that the U.S. Army Corps of Engineers would consult with the U.S. Fish and Wildlife Service pursuant to Section 7 of the federal Endangered Species Act during the 404 permitting process for potential impacts to special-status plants/wildlife and their habitats. Applications for each of these regulatory permits can be processed concurrently; however, some may take longer than others to process and obtain. Consultation with a qualified biologist, initiating any necessary seasonal surveys, and early coordination with the regulatory agencies are recommended.

Appendix E

Prioritized Vegetation Management Projects

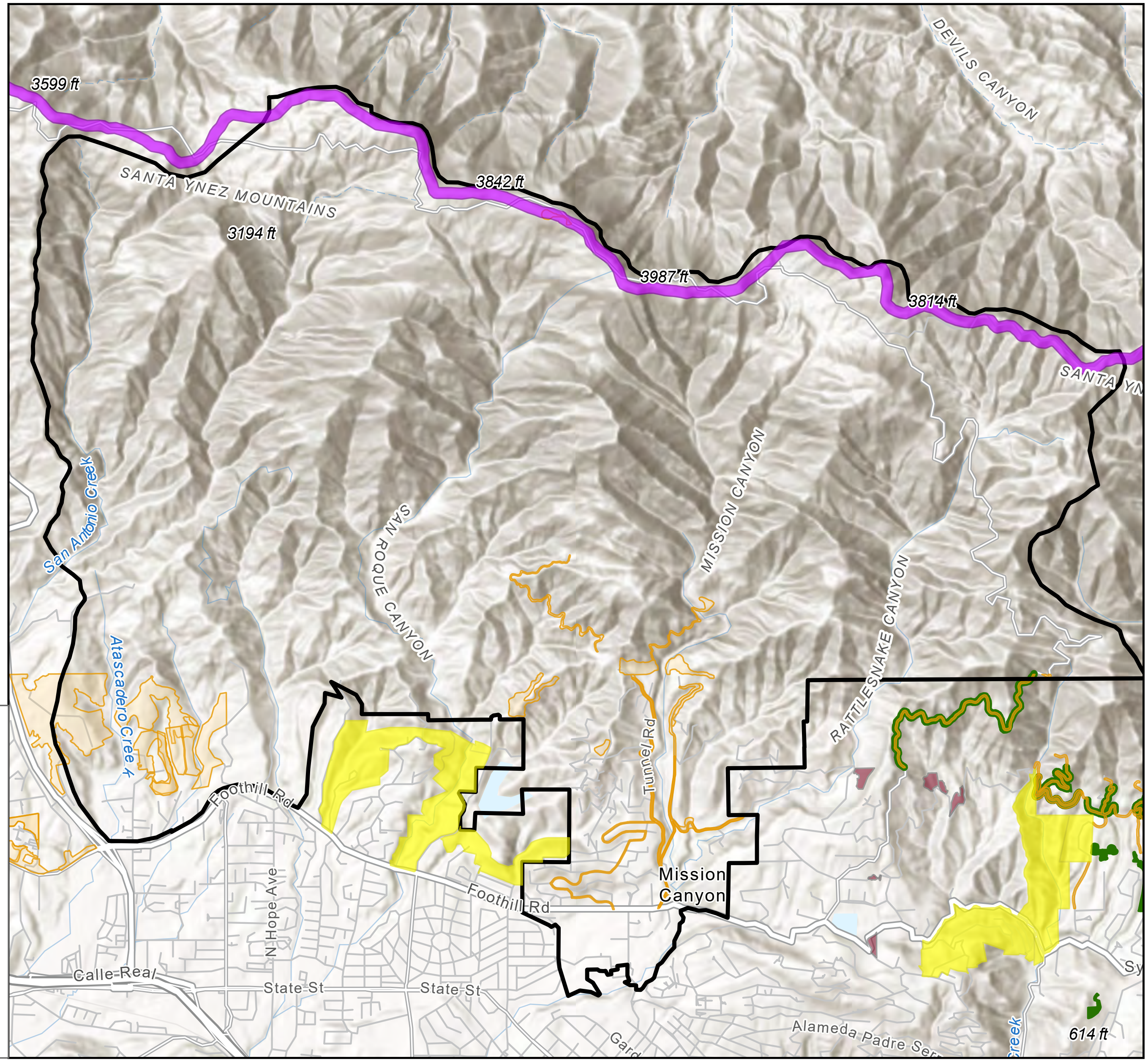


DUDEK

0 0.33 0.65 Miles

APPENDIX E

Priority Project Recommendations



CAL FIRE Existing Fuels Treatment Polygons

Montecito Fire Protection District Exisitng Fuel Treatments

USFS Fuels Exisitng Fuels Treatments

City of Santa Barbara Fuels Treatments

Recently Completed (2022-present)

Future Project

Plan Area

Source: CAL FIRE, 2024; SB CITY, 2024; MONTECITO FPD, 2024

DUDEK

0 0.5 1 Miles

APPENDIX B

Existing Fuels Treatments

Santa Barbara County Foothill Communities CWPP

Appendix F

Vegetation Management Techniques and Best Management Practices

1 Vegetation Management Techniques

As identified in this CWPP, vegetation management techniques can be classified into five categories:

- Biological
- Hand Labor
- Mechanical
- Prescribed Fire
- Chemical

The following sections present a discussion of each of the vegetation management techniques that may be implemented, including information regarding equipment, application, timing, limiting factors, special considerations, and BMPs.

1.1 Biological Techniques

1.1.1 Grazing

Grazing is a method of using livestock to reduce the fine fuel loading of live herbaceous growth, shrubs, and new growth of trees. Livestock, such as cattle, goats, or sheep, browse on grasses, forbs, shrubs, and fresh growth of young trees, thereby removing vegetation from the overall fine fuel load of the site. Grazing is effective in managing fine fuels and preventing the expansion of brush into grasslands. Livestock each have different grazing habits and not all livestock are ideally suited for grazing treatments in all areas. Most livestock, with the exception of goats, do not consume live or dead, tough, woody plant material in any significant quantity as this material is generally unpalatable. Additionally, livestock does not effectively create fuel breaks but is well-suited to maintain new annual growth within them.

To achieve management goals, grazing typically begins in the late spring, when the growth of annual grasses has slowed and continues through the summer in order to reduce fine fuels prior to the onset of peak fire season. Development of site-specific grazing management plans should be completed for proposed grazing treatments and should include goals and implementation actions to ensure that the timing of grazing treatment meets identified goals but minimizes potential negative effects. Grazing management plans should also identify the optimal stocking rate and grazing duration, typically measured in pounds per acre of residual dry matter. Optimal residual dry matter levels should be determined by overall management objectives, such as suppression of weeds, fuel load reduction, or minimizing erosion potential. As a fuel reduction technique, grazing does not need to be conducted each year if the intent is to control shrubs or maintain understory fuels; however, if the intent is to reduce grass or other flashy fuels, grazing should be conducted at least annually.

Grazing can be a relatively inexpensive and effective treatment method and can even generate revenue when cattle grazing is contracted for large areas. Control of livestock movements and prevention of overgrazing is critical for successful implementation. Using professional herders or portable fences may be an alternative to fixed fencing where the treatment is ephemeral. Additional controls may also be needed for the protection of retained plants, riparian zones, and sensitive resources areas, and to minimize erosion potential.

1.1.1.1 Grazing Management

Although the concept of grazing is the same regardless of which type of animal is used, how each animal type conducts its grazing varies significantly. As a result, not all animals will be ideally suited for grazing treatments in all areas. Animal selection should be determined by the fuel management goal. As noted, the development of site-specific grazing management plans should be completed considering site-specific conditions and identified management goals. The plan should specify management objectives and standards, animal stocking rates and use levels, grazing season (turn-out and turn-in dates), and monitoring requirements and performance criteria. Stocking rates are determined by a range analysis, which calculates the number of animals required for a given period to attain the desired use level, which generally ranges from 600 to 1,000 pounds per acre of residual dry matter, depending on site-specific conditions.

Timely movement of livestock to the next treatment area or other available pastures once identified goals have been met is important to minimize potential adverse effects, including soil compaction, overgrazing, and resource damage. Fencing is an important component of grazing management efforts to prohibit livestock from leaving the identified treatment area or gaining access to riparian zones, wetlands, or other sensitive resource areas. Finally, water sources are necessary for livestock and need to be provided if insufficient water is available at the treatment site. The following summarizes specific considerations for different grazing animals:

- **Goats:** Goats also have the ability to access steeper slopes in an efficient manner. Unlike other livestock, goats prefer to browse on woody vegetation (e.g., tree leaves, twigs, vines, and shrubs) and will consume materials up to 6 feet above the ground. This grazing pattern makes goats a desirable choice for fuel reduction treatments as they can effectively create and maintain vertical separation between surface vegetation and the lower limbs of overstory trees (NRCS 2005). Additionally, substantial amounts of invasive plant seed can effectively be removed from the landscape by the use of time-controlled, short-duration, high-intensity grazing in early spring (Menke 1992). However, since goats will indiscriminately damage most plants, their use in areas with desired shrub and tree retention should be minimized as goats can girdle shrubs and trees by browsing on bark. Alternatively, portable electric fences can be effectively used to control goat herds and more effectively guide the outcome of grazing efforts.
- **Sheep:** With proper management, sheep dramatically reduce the density of grasses and can be used to suppress annual grasses (Lerner 2007). Similar to goats, sheep have the ability to access steeper slopes in an efficient manner. Sheep have an intermediate diet, as they have no preference for grasses, forbs, or shrubs and commonly consume large amounts of green grass during rapid growth stages but avoid dry mature grass (Bush 2006). In addition to their diet making them versatile for grazing, sheep can also be utilized with other species such as cattle or goats for diversity fuel treatment (Bush 2006). Substantial amounts of invasive plant seed, such as yellow starthistle, can effectively be removed from the landscape by the use of time-controlled, short-duration, high-intensity grazing in early spring (Bush 2006). However, since predation of sheep by animals such as coyotes is common, consideration needs to be given to anti-predation techniques. Portable electric fences can be effectively used to control sheep flocks and help prevent predation of the animals.
- **Cattle:** Management of cattle herd population density is necessary to limit impacts especially as they relate to soil compaction and erosion, plant cover retention, water quality, and animal waste concentrations. However, the steepness of the terrain significantly influences the distribution of cattle which tend to prefer level to gently rolling hills (Bush 2006). Cattle may be better suited to larger expanses for fuels treatment rather than small confined areas to avoid unnecessary impacts. Cattle are considered grazers and have a

diet dominated by grasses and grass-like plants such as forbs (Bush 2006). Invasive plant species, such as yellow starthistle and medusahead can effectively be removed from the landscape by the use of time-controlled, short-duration, high-intensity grazing in early spring for yellow star thistle and in late spring for medusahead (Bush 2006). Water availability and water supply also need to be considered with cattle to ensure they do not cause environmental damage to watercourses or impact water quality. Utilizing grazing for invasive species management needs to be carefully monitored to ensure the timing is correct to prevent regrowth. Fencing or cattle guards should be used to ensure cattle don't escape and unintentionally graze not prescriptive areas or interfere with adjacent land uses.

1.1.1.2 Best Management Practices for Grazing

The following BMPs should be implemented, where feasible, when utilizing grazing as a vegetation management technique. Measures addressing the BMPs below should be incorporated into grazing plans. Additional BMPs are provided in Section 7.

- Identify and assess streams, watercourses, and sensitive biological and cultural resources in potential grazing areas prior to turn-out and install exclusionary fencing where necessary;
- Routinely monitor grazing activities in riparian areas to minimize the potential for stream bank damage, soil compaction, and soil deposition into streams and watercourses;
- Prior to grazing in Environmentally Sensitive Habitat (ESH) areas or riparian areas, identify thresholds that would trigger a cessation of grazing activity;
- Avoid grazing in unstable slope areas or implement measures to minimize impacts to slope stability (e.g., reducing herd size to retain vegetation, avoiding grazing where saturated soil conditions exist);
- Consider vegetation type, terrain, access fire history, and management goals when selecting grazing animals.
- Consider the timing and level of grazing practices to promote plant recruitment (e.g., timing prior to seed set of annual grasses to promote perennial species establishment);
- Minimize the spread of invasive plants and pathogens through the use of quarantine periods, holding areas, clean stock water, and personnel, equipment and vehicle sanitation.

1.1.2 Hand Labor Techniques

Hand labor involves pruning, cutting or removal of trees or other vegetation by hand or using hand-held equipment. Other hand labor treatments involve removing dead wood, piling material, and spreading chips/mulch. Hand labor is most effective in small treatment areas or areas with difficult access where the use of heavy equipment is infeasible. Hand labor also allows for selective management or removal of targeted vegetation and is typically used in conjunction with other techniques. Manual treatment may also include lop and scatter. Lop and scatter involves cutting vegetation (using hand tools, chainsaws, weed whips, and mowers) and cut vegetation is then reduced in size by cutting into lengths no longer than 6 inches long. The cut vegetation is then left on the ground within the project area no greater than 12 inches in depth. Minimal ground disturbance results using this method since the root structure of vegetation is left intact and biomass generated from vegetation treatment is left on site.

Proper training and supervision of hand labor forces is necessary to reduce the dangers to workers using sharp tools on steep and/or unstable terrain, or where other environmental hazards exist. Hand tools include, but are not limited to, shovels, Pulaski hoes, McLeod fire tools, line trimmers, weed wrenches, chain saws, pruning shears, and loppers. Personal protection equipment typically includes long pants and long-sleeved shirts, gloves, safety goggles, hard hats, chaps, and sturdy boots.

1.1.2.1 Best Management Practices for Hand Labor

The following BMPs should be implemented, where feasible, when utilizing hand labor vegetation management techniques. In all circumstances, tools and equipment should be utilized only for their intended use. Additional BMPs are provided in Section 7.

- Ensure equipment operators and project personnel have appropriate personal protective equipment and are properly trained in equipment use;
- Ensure that appropriate fire safety measures are implemented;
- For safety purposes, provide necessary signage alerting the public to active operations;
- Ensure that vehicles and equipment arrive at the treatment area clean and weed-free;
- Prune trees according to ISA and American National Standards Institute (ANSI) A300 standards;
- Protect retained trees and vegetation from tool and equipment damage;
- Sanitize tools between project areas to prevent the spread of pathogens;
- Service and fuel tools only in areas that will not allow grease, oil, fuel, or other hazardous materials to pass into streams or retained vegetation;
- Remove from the treatment area and properly dispose of all refuse, litter, trash, and non-vegetative debris resulting from vegetation treatment operations, and other activity in connection with vegetation treatment operations; and
- When lopping and scattering, the goal is for each piece to lay flat and as close as feasibly possible to the ground surface. Pieces that are left elevated have a much slower rate of decomposition and will contribute to the fuel loading.

1.1.3 Mechanical Techniques

Mechanical practices include all methods that employ motorized heavy equipment to remove or alter vegetation. Mechanical practices rearrange vegetation structures, compact or chip material, and move material to landings, staging areas, or burn piles. Mechanical equipment is usually equipped with either rubber tires or tracks, although skids and cables are also used. In some instances, two or more pieces of heavy equipment will work in concert to achieve a management standard. Mechanical equipment includes, but is not limited to, masticators, tractors, and chippers. Chippers are moved around as work occurs and placement is dependent on the ability to minimize the distance vegetation must be hauled to the chipper.

A tractor or similar equipment may be used to crush vegetation using a blade that is kept slightly off the ground. A variety of attachments may also be used, including rollers (e.g., brush hog), a horizontal cutting blade (which operates similar to a large mower), or a set of chains to flail the material being treated. The blade cuts or breaks off the shrub tops, knocks down larger shrubs, and compacts the treated material, which is left to dry so that it can be subsequently scattered or piled and burned. Under this treatment technique, soil is disturbed where the equipment travels and where some shrubs are uprooted. Flailing treatment involves the use of tractors with affixed or towed mowing heads that cut or flail small diameter material, especially grasses. Some attachments include an articulated arm or boom that can reach 10 feet to 15 feet from a vehicle (Tiger mower).

Masticator attachment on a bobcat

Masticating equipment installed on Bobcats, wheeled or crawler-type tractors, excavators, or other specialized vehicles, is used to cut or shred shrubs and trees into small pieces that are then scattered across the ground, where they act as mulch. Shrubs and sapling-size trees are typically masticated with Bobcats and crawler-type tractors, while excavators are often used when larger trees are removed. Bobcats typically operate on slopes with gradients less than 20%, while excavators and tractors can operate on slopes with gradients up to 45%.

Other attachments to tractors and equipment have been developed that use a gravity roller to crush vegetation into mulch. The attachment is held by cables that can be rolled down and winched up a hillside, allowing for some degree of directional aiming through the use of cables at each end. The gravity roller is filled with water to provide the weight necessary to crush the vegetation, and cutting surfaces are arranged on the roller to resemble tire tread. The "Brontosaurus" is a type of grinding machine with an articulated arm that tends to grind off woody material, and in some cases shattering roots of shrubs, more than cutting them.

Constraints to mechanical equipment use include steep slopes, dense tree cover that prohibits travel, saturated soils, and dry, high fire hazard weather conditions where equipment use could result in ignition. Use of mechanical equipment may also result in damage to retained vegetation. Use of mechanical equipment should consider the terrain, access, vegetation type, and treatment recommendation to effectively treat vegetation and minimize impact potential. Supervision and specialized training are also necessary. The use of mechanical equipment is often done in conjunction with other treatment techniques, particularly hand labor (prior to mechanical treatment) and prescribed fire (following mechanical treatment.)

1.1.3.1 Best Management Practices for Mechanical Techniques

The following BMPs should be implemented, where feasible, when utilizing mechanical vegetation management techniques. In all circumstances, equipment should be utilized only for its intended use.

- Utilize low ground-pressure equipment, to the extent feasible;
- Ensure equipment operators and project personnel are properly trained in equipment use;
- Ensure that appropriate fire safety measures are implemented;
- For safety purposes, provide necessary signage and patrol alerting the public to active operations and area closures;
- Ensure that vehicles and equipment arrive at the treatment area free of soil, weeds, and seeds;
- Control fugitive dust resulting from equipment use by watering disturbed areas;
- Protect retained trees and vegetation from potential damage resulting from heavy equipment use through the use of tree protection devices, training of equipment operators, and designing projects to reduce potential impacts, among other methods;
- To minimize impacts on soil stability, leave stumps from removed trees and shrubs intact. Where feasible, re-use existing roads, trails, skid trails, and predesignated routes for equipment travel;
- Limit the size and quantity of equipment to that which is necessary to meet the identified vegetation management standard;

- Re-grade or re-contour any areas subject to soil disturbance from heavy equipment, including dragging or skidding of trees or other material. Install soil stabilization structures and devices as needed;
- Avoid heavy equipment use on unstable slope areas, documented slope instability areas, and slopes with gradients exceeding 50%.
- Service and fuel heavy equipment only in areas that will not allow grease, oil, fuel, or other hazardous materials to pass into streams or riparian vegetation;
- Remove from the treatment area and properly dispose of all refuse, litter, trash, and non-vegetative debris resulting from vegetation treatment operations, and other activity in connection with vegetation treatment operations;
- Ensure that hazardous materials spill kits are available on all heavy equipment.

1.1.4 Prescribed Fire

Prescribed fires reduce the volume of fuel through combustion and are conducted under specific regulations when conditions permit both adequate combustion and proper control. Prescribed fire is the use of fire in a planned setting with low to moderate intensity fire and defined goals. Application of prescribed fire occurs in conjunction with specific land management objectives such as reducing fuel loads, increasing overall forest or habitat health, and/or protecting communities from wildfire (USDA 2018). Other land management objectives prescribed fire can accomplish are controlling undesirable vegetation, preparing sites for harvesting/seeding, controlling plant pathogens and pests, improving wildlife habitat, improving plant production or quality, removing debris, restoring ecological sites, and maintaining native plants diversity and composition. Prescribed fire can occur in small designated areas or over larger expanses. There are two types of prescribed fire – pile burning, and broadcast burning. Both pile and broadcast burning are often implemented in conjunction with hand labor and mechanical treatment methods as a means of treating vegetative debris, or in advance of an herbicide treatment to enhance the effectiveness of the application.

Prescribed burning can be a cost-effective way to quickly reduce a large volume of woody material remaining after other fuel treatment operations. A broadcast burn produces a more uniform treatment and minimizes areas of great burn intensity. Alternatively, tractors or hand crews can create piles of material on flat or gently sloping ground that can be burned during wet conditions (pile burn), although the volume of fuel in the piles can produce localized heat which may impact adjacent retained vegetation.

Prescribed burning requires proper planning and the development and approval of a prescription or burn plan, which is typically developed by the local fire protection district in consideration of fuel reduction requirements, local weather conditions, and available resources for fire management. Burning activities should consider and be managed in accordance with wildlife and habitat needs. Consideration also needs to be given to existing barriers, cultural resources, threatened or endangered species, smoke, and weather conditions. The following sections summarize the planning needs for implementing prescribed burns.

1.1.4.1 Pile Burning

Pile burning is fairly common and often applied in forest settings. Small pile burning is typically conducted at or near the treatment area. Pile burning involves stacking hand or machine-cut vegetation into piles and allowing the material time to dry out. Piles should be free of dirt, debris, and stumps. The material should be piled soon after cutting with the butt end of branches and limbs toward the outside of the pile so that branches are overlapping and forming a series of dense layers. The top of the pile should be covered with a small sheet of heavy paper (e.g., butcher paper) to keep the pile interior dry. One or two limbs should be placed atop the paper to keep it in place. The dry interior portion of the pile should be ignited at the appropriate time using a weed burner or other igniting tool. Alternatively, tractors or hand crews can create piles of material on the flat or gently-sloping ground that can be burned during wet conditions (pile burn), although the volume of fuel in the piles can produce localized heat, which may impact adjacent retained vegetation. Piles burns should be lit when weather conditions allow such as in winter and spring and are confined to the footprint of the pile. Burns should be divided over multiple days to allow for a halt of burning activities if conditions fall out of prescription (USDA 2018).

An alternative to pile burning is the utilization of an air curtain burner. Air curtain burners allow for more complete combustion of wood waste and were developed to reduce the particulate matter (PM), or smoke, which results from burning. Using a technology called an "air curtain," the smoke particles are trapped and reburned, resulting in a cleaner (less PM) burn. Where feasible, the use of an air curtain burner is recommended to dispose of wood waste. Air curtain burners may be available as a shared resource between County and other nearby municipal or land management agencies and can be temporarily sited at work locations to facilitate wood waste treatment.

1.1.4.2 Broadcast Burning

Broadcast burns are usually done in larger areas where a maximum amount of fuel treatment can take place and can be used to control noxious weeds and treat cut material (slash) on the ground surface in areas treated by other techniques, or reduce surface and/or ladder fuels beneath tree canopies (understory burning). Broadcast burning can create a mosaic pattern of vegetation and allow for the regeneration of different plant species (USDA 2018). Broadcast burning can also be used to break up the continuity of vegetation in order to promote diversity in ecosystems or reduce fuel loading. Treatment boundaries are often roads, trails, or other non-burnable features, reducing the number of firebreaks that need to be created. This approach reduces labor costs and preparation time and minimizes soil disturbance and the potential for soil erosion. Prescribed burns can be used in all vegetation types, where conditions allow for effective control (USDA 2018).

Broadcast burning may occur throughout the year; however, it is usually conducted during the late spring months when the ground is still wet or during fall or winter after plants have completed their yearly growth cycle and their moisture content has declined. Spring burns are sometimes preferred to ensure a greater measure of public safety; however, there may be impacts on animal and plant reproduction. Fall burns are more closely aligned with the natural fire cycle found in California. Piles of vegetation may be burned any time after the vegetation has dried. “Cool” burn prescriptions, using techniques such as backfiring, chevron burning, and flank firing, as well as timing the fires during periods of high humidity and high fuel moisture content, typically results in incomplete combustion; therefore, existing vegetation is partially retained.

Prescribed burns must be conducted by trained fire protection personnel. Utilizing personnel and equipment from neighboring fire districts provides the added benefit of joint training under prescribed rather than emergency conditions. Timing is critical to the use of this treatment technique due to variances in weather conditions and the necessity to time treatments to minimize impacts to plant and animal species. Fuel moisture content must be determined to assess if the treatment area is safe to burn. There are typically more appropriate burn days in the spring and early summer months when there is a greater chance of atmospheric conditions conducive to smoke dilution and dispersion.

1.1.4.3 Prescribed Fire Planning

Prescribed burning requires proper planning and the development and approval of a prescription or burn plan, which is typically developed by the local fire protection district in consideration of vegetation management requirements, local weather conditions, and available resources for fire management. Utilizing prescribed fire as a management tool should consider the following:

- **Burn Plan/Prescription:** A site-specific prescription and burn plan is developed that establishes goals and procedures for the prescribed burn and considers unique site characteristics. The prescription identifies geographic burn units, limits of the burn area, locations of control lines, acceptable fuel moisture ranges and weather conditions, required personnel and equipment, and evaluates potential impacts to resources in compliance with CEQA. This may be prepared in coordination with CAL FIRE.
- **Smoke Management Plan:** The California Air Resource Board (CARB) and the South Coast Air Quality Management District (South Coast AQMD) require preparation of a smoke management plan detailing the location of sensitive receptors and measures to be implemented to maximize smoke dilution and minimize smoke production. Current air quality regulations within the jurisdiction of the South Coast AQMD limit open burning for range management projects less than 10 acres and controlled burns less than 10 acres, or that produce less than one ton of particulate emission to require Burn Authorization on a Burn Day. Open burning for range management projects or controlled burns that exceed 10 acres or produce more than one ton of emissions are required to obtain approval prior to any burn activities and submit a Smoke Management Plan. Additionally, approval must be obtained from a local Fire Protection Agency. In addition to the preparation and approval of a smoke management plan, the South Coast AQMD requires notification of the burn and that burning is conducted on a permissive burn day. The South Coast AQMD selects burn days based on air quality, weather conditions, and wind patterns; provides the burn's acreage allocation the morning of the burn and provides the "all clear" designation prior to initiation of the burn. Regulations regarding burning can be found in the South Coast AQMD Rule 444.
- **Pre-Broadcast Burn Site Preparation:** Hand labor or mechanical treatment techniques are often conducted prior to initiation of a prescribed burn to remove and treat larger material (trees, shrubs, slash). Treatment of larger material is done to reduce its size and spatial arrangement and to remove ladder fuels that may allow for crown fire transition. Site preparation also includes the establishment of fire lines needed to control the fire if they do not already exist. These fire lines are typically constructed using bulldozers or by hand using scraping tools. Occasionally they are "burned in" with a strip of fire under conditions that limit fire spread.
- **Burn Notification:** Notifying the local or surrounding communities, local fire departments, media, and South Coast AQMD is an essential component to avoid potential misinterpretation of the prescribed burn as a wildfire. Notification to interested and affected parties and the media is also repeated on the day of the prescribed burn. Printed materials or interpretive signs are made available at the site and distributed to neighboring communities explaining the reason for the prescribed burn, the type of burn being conducted, and the intended result of the prescribed burn. Prescribed fires generate high levels of public safety concerns over the chance of fire escape from control lines, and the rapid distribution rate of smoke, ash, and particulate matter may raise additional concerns from the public many miles downwind from the actual burn site.
- **Post Burn Follow-up and Evaluation:** Following completion of the prescribed burn, the results are evaluated to determine if the need exists for additional treatment based on established prescriptions and whether erosion control BMPs are necessary. The burn plots should also be monitored and evaluated for invasive species establishment and long-term effectiveness in achieving the goals for each individual burn plot.

1.1.4.4 Best Management Practices for Prescribed Fire

The following BMPs should be implemented, where feasible, when utilizing prescribed fire. In all circumstances, equipment should be utilized only for its intended use. Additional BMPs are provided in Section 7.

- Ensure equipment operators and project personnel are properly trained in equipment use;
- Ensure that appropriate fire safety measures are implemented;
- For safety purposes, provide necessary signage and patrol alerting the public to active operations and area closures;
- Burn piles size should be no larger than necessary to avoid soil sterilization;
- Minimize excess dragging of cut materials to piles to minimize soil disturbance;
- Piles that cannot be burned before the commencement of fire season should be compacted to the extent possible; and
- Protect retained trees and vegetation from potential damage by pre-treating adjacent fuels.

1.1.5 Chemical Techniques

Chemical techniques involve the use of herbicides to kill vegetation or prevent growth and are typically used in combination with other types of fuel reduction treatments. Herbicides do not remove any vegetation from a treatment area; therefore, dead plant material remains unless otherwise treated. Application of herbicides and other chemicals is typically performed by hand and can include sponging, spraying, or dusting chemicals onto undesirable vegetation. Hand application provides flexibility in application and is ideally suited for small treatment areas. Roadside application of herbicides may employ a boom affixed to or towed behind a vehicle.

Herbicide application requires specific storage, training, and licensing to ensure proper and safe use, handling, and storage. Only personnel with the appropriate license are allowed to use chemicals to treat vegetation. Herbicide application is also only applied per a prescription prepared by a licensed pest control advisor. Personal protection equipment is essential to limit personnel exposure to chemicals and includes long pants and long-sleeved shirts, gloves, safety goggles, hard hats, sturdy boots, face masks, and, in some instances, respirators.

1.1.5.1 Herbicides

The application of herbicides may be used on its own or as a secondary vegetation treatment technique following manual (hand labor) or mechanical removal for controlling sprout growth and regeneration. The advantage of herbicide treatments is that they typically result in high kill rates and can prevent treated plants from setting seed. Thus, in the long run, targeted plants are eliminated as their “seed bank” is eventually eliminated. Some disadvantages include the necessity of applicators to be trained and then licensed by the State of California, the cost of application and safety equipment, the cost of the herbicide itself, the potential to affect non-target vegetation and/or wildlife, and public concern regarding potential health impacts from herbicide use. In spite of these disadvantages, herbicides, or herbicides in combination with hand/mechanical removal, are the most widely used and effective techniques for controlling certain types of vegetation.

Herbicides are broadly classified into two basic types: pre-emergent and post-emergent. Pre-emergent herbicides are sprayed directly onto the ground and prevent plants from germinating and/or growing. As such, they have a larger potential to impact seeds of desired species remaining in the soil, and often have longer persistence times in the environment. Post-emergent herbicides are applied directly onto the plants, often during the early phases of their growth, killing them before they have the chance to mature and set seed. With proper equipment and training, herbicides can be applied selectively, minimizing impacts on seeds of desired species residing in the soil. However, should the target vegetation be intermixed with growing desired vegetation, the chance of affecting desired vegetation would be increased.

Different plants vary in their response to any particular herbicide and can also vary in their response depending upon which stage of their life cycle the herbicide is applied. Herbicides applied during the “bolting” phase (when flowing stalks are being produced) may have greater kill rates than the same chemical applied during the rosette stage or the flowering stage. Some herbicides are specific to particular groups of plants (e.g., Fusillade affects only grasses), while others can kill nearly all kinds of plants. Still, others are permitted for use in California, while others are not. Systemic herbicides (as opposed to contact herbicides) are likely the most effective for control of highly flammable/rapidly spreading species due to their ability to spread via translocation into root tissue.

Herbicide application should be used following removal of all trees and other perennial species that have the ability to regenerate from root fragments when removal of all plant material is not feasible. Herbicide use should be limited to localized applications rather than foliar applications to eliminate the possibility of drift and impacts to neighboring desirable vegetation. A wide range of herbicides are available for such types of treatment. Herbicide labels and material safety data sheets list susceptible target plant species and provide proper direction in the use and handling of the products. Herbicides should be applied in accordance with state and federal law.

1.1.5.2 Cut and Daub

Cut and daub treatment is recommended for larger highly flammable/rapidly spreading plants, such as large trees and shrubs, to control regrowth and kill the portion of the plant remaining belowground. Cut and daub involves the cutting of plant stalks or trunks and then the direct application of an appropriate systemic herbicide directly to the cambium layer of the freshly cut stump or stem. Other related methods include drill and fill, where holes are drilled into the trunk of a tree and herbicide is injected, or the glove method, where an herbicide-soaked glove is used to apply directly to plant foliage or freshly cut stumps. It is critical that the herbicide treatment occur immediately after the plants are severed so that the herbicide is carried into the plant tissue. If enough time elapses to allow the cut surface of the severed plant to dry out, a fresh cut should be made prior to herbicide application.

1.1.5.3 Best Management Practices for Chemical Techniques

The following BMPs should be implemented, where feasible, when applying herbicide. In all circumstances, equipment should be utilized only for its intended use. Additional BMPs are provided in Section 7.

- Herbicide use should be considered only when other treatment techniques are determined to be infeasible or ineffective in achieving desired management and maintenance standards;
- A state-licensed pest control advisor and/or the Los Angeles County Agricultural Commissioner should be consulted to identify the appropriate site-specific herbicide application approach to meet vegetation management standards;
- Consider the timing of herbicide applications to minimize impacts to adjacent retained vegetation and nearby resources, and for maximum effectiveness (typically between June 15 and November 15, with a potential extension through December 31 or until local rainfall greater than 0.5 inch is forecasted within a 24-hour period from planned application);

- Only herbicides and surfactants that have been approved for aquatic use by the United States Environmental Protection Agency (EPA) and are registered for use by the California Department of Pesticide Regulation (CDPR) should be used for aquatic vegetation control work;
- Herbicide application should be consistent with Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label instructions and use conditions issued by the United States EPA and CDPR;
- The lowest recommended rate to achieve vegetation management objectives of both herbicides and surfactants should be utilized to achieve desired control;
- An indicator dye should be added to the tank mix to help the applicator identify areas that have been treated and better monitor the overall application;
- No application to plants whose base is submerged in stream channels;
- Follow safe procedures for transporting, mixing, loading, and proper disposal of herbicides; and
- Minimize the use of foliar (spray) applications, prioritizing localized or direct applications.

2 Best Management Practices for Vegetation Management

The following Best Management Practices are recommended to minimize potential adverse impacts from vegetation management activities. Additional requirements, standards, or conditions may be necessary based on project specific analyses conducted during the environmental review process or as required by County, State, or Federal regulatory agencies. In general, projects should consider the following BMPs during design, layout, and prescription development.

2.1 Fire Protection

All operations conducted in the Plan Area associated with project implementation should adhere to the fire protection standards outlined in Title 14, California Code of Regulations, Chapter 4, Subchapters 4, 5, and 6, Article 8 (Fire Protection). Per State code, projects are required to take precautions to reduce the chance of ignitions, including checking fire forecast conditions, monitoring weather, maintaining spark arrestors, and having fire guards with appropriate suppression equipment on hand. Under particularly dangerous conditions, all activities with a risk of wildfire ignition are halted. The following fire protection BMPs are provided to augment current practices:

- During vegetation management project operations that require a vehicle, machine, tool, or equipment powered by an internal combustion engine operated on hydrocarbon fuels, suitable and serviceable tools for firefighting purposes shall be provided and maintained. Equipment should be located at a point accessible in the event of a fire and should include one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each person at the operation can be equipped to fight fire.
- All equipment with an internal combustion engine using hydrocarbon fuels shall be equipped with a spark arrestor, as defined in California Public Resources Code Section 4442.
- Establish internal project communication procedures for reporting fires or call 911 in emergencies.
- Comply with applicable standards restricting spark-generating equipment usage and spark arrestor requirements. Additionally on Red Flag Warnings, High to Extreme Fire Danger days, and in High Wildfire Risk Areas, the timing and type of activities should be limited to activities that would not exacerbate fire risk or cause unintentional ignitions.
- Identify staging areas before initiating operations. Staging areas should be contained within already disturbed areas or non-vegetated areas (e.g., roads, parking lots) and should account for vehicle parking and tool/equipment storage.

2.2 Pests/Pathogens

Pest and pathogen BMPs should be incorporated into project planning and implementation efforts. These practices encompass protection of the residual vegetation from mechanical damage and quarantine and sanitation practices. Outbreaks of known invasive pathogens such as the Invasive Shothole Borer (ISHB), and unknown pests and pathogens pose a threat to Plan Area forests. Sanitation of tools and equipment on project sites should be conducted to reduce the spread of pests and diseases following treatments in areas of a known infestation. If soil is collected on equipment, rinsing the equipment on-site with a portable water tank or water truck, or at a designated rinsing station, can remove soil-borne pathogens and prevent transport to new sites. Additionally, certain pathogen-specific measures have been developed to deal with regional pathogens, ISHB. These measures should be implemented in the Plan Area, where applicable. Specific measures can be found at: https://ucanr.edu/sites/pshb/management/.

2.3 Slope Stability, Erosion Control, and Water Quality

Vegetation management activities have the potential to affect soil stability. Soil stability may be indirectly affected by the removal of overstory vegetative cover, which reduces rainfall interception and thereby increases its surface erosion potential. This may result in the detachment and transportation of soil particles across the soil surface. Soil stability may also be directly affected by the use of heavy equipment, tools, hand crews, or livestock, all of which can loosen, dislodge, or compact soils. This too can increase the potential for detachment and transportation of soil particles across the soil surface.

A procedure has been developed by the California State Board of Forestry (California State Board of Forestry 1990) to estimate a surface soil erosion hazard rating that considers soil characteristics (texture, depth to restrictive layer, percent of coarse surface fragments), slope, vegetative cover, and precipitation. The hazard rating is designed to evaluate the susceptibility of the soil within a given location to erosion. This rating should be determined and considered on a site-specific basis when determining the needs for erosion control BMPs in the Plan Area. In addition, areas, where erosion has occurred in the past due to vegetation management activities, should be avoided, or alternative methods implemented to minimize potential impacts to soil stability.

There are various erosion control practices and devices available for slowing the rate of erosion. Recent research indicates that mechanical rehabilitation treatments, including straw mulch, hay bales, and jute rolls are more predictable for reducing soil erosion and post-fire hydrological problems than seeding or other treatments (Robichaud et. al. 2010). Mulching may introduce exotic/weed seeds (Kruse et. al. 2004) if brought in from off-site (as opposed to chipped on-site material), so erosion potential should be high before the decision to use this material is finalized.

Erosion and Sediment Control BMPs include:

- Hydraulic Mulch Velocity Dissipation Devices
- Silt Fence
- Sandbag Barrier
- Hydroseeding
- Slope Drains
- Sediment Basin Straw Bale Barrier
- Soil Binders
- Streambank Stabilization
- Sediment Trap
- Storm Drain Inlet Protection
- Straw Mulch
- Compost Blankets
- Check Dam
- Active Treatment Systems
- Geotextiles and Mats
- Soil RougheningFiber Rolls
- Temp Silt Dike
- Wood Mulching
- Non-vegetation Stabilization
- Gravel Bag Berm
- Compost Socks and Berms
- Earth Dikes and Drainage Swales
- Street Sweeping and Vacuuming Biofilter Bags

In the event that a wildfire event occurs in the Plan Area, stabilization of soils in the burn area is a primary concern, especially in areas with steep slope gradients. Erosion control BMPs should be installed as soon as possible and prior to the onset of the winter period.

2.3.1 Access Roads

In areas where existing dirt access roads will be retained, waterbreaks[1] and drainage structures should be constructed to minimize erosion potential. All waterbreaks and drainage structures should be installed no later than the beginning of the winter period (October 15 to April 1). Outside the winter period, waterbreaks and drainage structures should be installed before sunset if the National Weather Service forecast is a “chance” (30% or more) of rain within the next 24 hours. Waterbreaks should be constructed immediately upon conclusion of the use of access roads that do not have permanent and adequate drainage structures. Distances between waterbreaks should adhere to the standards outlined in Table D-1. Access roads should be closed to public vehicle travel following the completion of vegetation treatment operations.

Table D-1: Maximum Distance between Waterbreaks

Estimated Erosion Hazard Rating	Road Slope Gradient (percent)			
	≤10	11–25	26–50	>50
Extreme	100	75	50	50
High	150	100	75	50
Moderate	200	150	100	75
Low	300	200	150	100

Source: 2022 California Forest Practice Rules (14 CCR, Chapters 4, 4.5, and 10).

2.4 Watercourses

Considerations need to be taken when vegetation management projects take place in or near watercourses. Vegetation management activities within a riparian zone may require additional permitting. The intent is to assure that work done will avoid or limit, to the extent feasible, negative impacts on creeks and watercourses. The primary measure to minimize impacts on creeks and watercourses in the Plan Area is avoidance, meaning all work should be conducted outside of riparian areas where feasible. Should it be necessary to conduct vegetation management activities within riparian areas, all necessary agency permits would need to be obtained. Additionally, the following BMPs should be implemented:

- Preserve creeks and riparian corridors in a natural state.
- Preserve and enhance creek-side vegetation and wildlife.
- Prevent activities that would contribute significantly to flooding, erosion, or sedimentation, or that would destroy riparian areas or would inhibit their restoration.
- Control erosion and sedimentation.
- Protect drainage facilities.

[1] A waterbreak (or waterbar) is a shallow trench with a parallel berm or ridge on the downslope side, angled downward across a road and installed to control surface runoff.

2.5 Air Quality

The following BMPs should be implemented, where feasible, to minimize potential negative effects on air quality:

- Control fugitive dust resulting from equipment use by watering disturbed areas.
- Limit the size and quantity of equipment to that which is necessary to meet the identified vegetation management standard.
- Limit traffic speeds on dirt roads to 15 miles per hour.
- Clean construction vehicles and equipment to prevent dust, silt, mud and dirt from being tracked onto paved roadways.
- Limit vehicle idling time to a maximum of 5 minutes for vehicles and equipment, except where idling is required for the equipment to perform its task.
- Develop and implement a burn plan and associated smoke management plan for prescribed burning activities.

2.6 Reforestation/Revegetation

Revegetation of areas subject to vegetation management can minimize the potential for erosion by stabilizing soils. Revegetation is recommended only in areas where disturbed and/or bare soil exists following vegetation treatment operations as a measure to stabilize soils. The need for revegetation should be determined during project planning and design or subsequent monitoring efforts and should consider slope, soil type, access, irrigation and maintenance needs, and other BMPs being implemented on-site. Qualified professionals (e.g., landscape architects, revegetation specialists) should be consulted to develop site-specific revegetation plans, as appropriate. Revegetation may include hydroseeding, direct seeding, or container plant installation. Plant species selection should be consistent with revegetation goals and should consider erosion protection value (e.g., deep-rooted species). Undesirable species should not be used for revegetation purposes.

2.7 Special-Status Plant and Wildlife Species

Vegetation treatment activities have the potential to impact special-status plant or wildlife species via ground disturbance, vegetation removal or management, or the use of vegetation management tools and equipment. To minimize the potential for impacts on special-status species, measures should be implemented, depending on the species present in the identified treatment area. In general, these measures include conducting pre-operations biological surveys, identifying and marking avoidance or buffer areas, conducting biological monitoring during vegetation management operations, and establishing work windows to avoid and minimize adverse effects on nesting birds and special-status plants and animals. Additionally, where feasible, projects should avoid impacts to riparian areas, Environmentally Sensitive Habitat (ESH) areas, and Critical Habitat areas. Project proponents should engage qualified biologists during project design and implementation.

Special-status Plants

- All vehicles and equipment should be inspected and cleaned of weed seed prior to entering a project site to reduce the spread of noxious weed seeds.
- Conduct pre-operations surveys for rare plants prior to vegetation management during the appropriate time of year when target species are evident and identifiable. If no rare plants are noted in the project area

during the survey, no further rare plant avoidance or minimization measures would be necessary. If rare plant populations are observed during the survey, all populations should be documented and flagged for avoidance. Flagging may include high visibility pin flag or tape, or orange mesh construction fencing, will be temporary, and will include all individuals of the rare plant population observed. Crews should be educated on the purpose and need of avoidance of habitat areas within exclusion zones.

Special-status Wildlife

- For the protection of nesting birds, including raptors, limit vegetation treatment to the non-nesting season for birds. If vegetation clearing must occur during the bird breeding season, a qualified biologist should conduct pre-operations surveys for nesting birds no more than one week prior to vegetation treatment activities. If no nests are observed during the survey, no further measures would be necessary. If active nests are observed, avoidance buffers appropriate for the species of bird should be implemented.
- Buffers should remain in place until the activities are complete, the young have fledged, or if the qualified biologist determines that the proposed activities will not result in impacts to nesting, rearing, or breeding success.
- For the protection of other special-status species, pre-operations surveys should be conducted by a qualified biologist. Buffers or treatment exclusion areas identified by the biologist should be avoided during vegetation treatment activities. Other measures identified by the biologist (e.g., movement of nests, modifications to treat types or timeframes) should be implemented as necessary.

2.8 Cultural Resources

It is anticipated that cultural resources surveys will be conducted prior to implementation of vegetation management projects. Artifacts or features identified during surveys should be flagged and equipment excluded. Should exclusion be infeasible, equipment limitations should be implemented (e.g., use of rubber-tired equipment to lift trees off the ground). Exclusion or limitation of equipment should be specified during the specific project planning and permitting stage. A qualified archaeologist should be consulted to approve work area boundaries and allowable work in the vicinity of cultural resources. At the completion of operations, any flagging used for cultural resource site identification should be promptly removed to minimize the potential for discovery and impact.

2.9 Recreation Resources

Temporary impacts to recreation resources in the Plan Area may result from vegetation treatment project implementation. Temporary closures or use restrictions may be necessary for the safe operation of equipment and to ensure public safety. To minimize potential negative effects of vegetation treatment projects on recreation resources, the following BMPs have been identified:

- Restore disturbed areas to pre-operation conditions (e.g., clear blocked trails, re-contour damaged trails to minimize the potential for erosion or the creation of unauthorized trails).
- Repair, replace, or reinstall damaged, removed, or relocated infrastructure (e.g., signs, gates, picnic tables).
- Minimize the extent or duration of closures by phasing work and/or conducting work outside of peak visitation periods, where feasible.
- Where feasible, conduct operations on weekdays during daytime hours (8 am to 5 pm).

- Control public access by posting detours, installing and maintaining appropriate and adequate signage, using flaggers/monitors where necessary, closing work areas via exclusionary fencing, and providing monitors to ensure access control measures are maintained and effective.
- Disseminate information regarding planned project activities via websites, social media, in-park signage, and/or via outreach to regular known user groups.

2.10 Tree Protection

The general management standards outlined in this CWPP are associated with oak woodlands and other hardwood stands where canopy retention is an overall goal. However, retained trees near vegetation management activities may be subject to impacts. The following protection measures are provided to minimize impacts to retained trees:

- Avoid disturbance to tree root zones. Root damage and soil compaction can occur through improper operation of equipment while maneuvering over the root zone. Avoid operation in the root zone under saturated soil conditions and avoid contacting above-ground roots. Use existing access roads or trails where available to reduce soil compaction.
- Avoid “skin-ups” on the boles of retained trees caused by contact with equipment, falling trees, or vegetative material being yarded for removal from the site. “Skin-ups” often expose the inner bark and cambium of the residual tree. Such wounds deplete the energy reserves of the tree in order to isolate the injury and create an easy entry point for pests and pathogens.
- Avoid disturbance to tree crowns during operations. If limb removal is necessary for equipment operation, limbs should be pruned according to ANSI A300 standards.
- Avoid piling chips, soil, or other materials against the trunk/bole of retained trees.
- For tree removal operations, directionally fell trees away from the retained trees, or in a direction that would cause the least amount of damage to the surrounding tree crowns. Torn branches, like skin-ups, deplete the energy reserves of the tree in order isolate the injury, and create an easy entry point for pests and pathogens.
- For pile burning activities, site piles a sufficient distance from retained trees to minimize crown and trunk scorching and heat damage to roots.
- For broadcast burning activities, treat surface fuels and/or prune lower limbs of trees such that flame lengths and fireline intensities are low enough to minimize crown and trunk scorching.