FINAL

Community Wildfire Protection Plan

Monterey, Carmel-by-the-Sea, and Pacific Grove

NOVEMBER 2023

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MONTEREY FIRE DEPARTMENT

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
CAL FIRE	California Department of Forestry and Fire Protection
CERT	Community Emergency Response Team
CWPP	community wildfire protection plan
FHSZ	Fire Hazard Severity Zone
GIS	geographic information system
MFD	Monterey Fire Department
Plan Area	Cities of Monterey, Carmel-by-the-Sea, and Pacific Grove
SRA	State Responsibility Area
USFS	U.S. Forest Service
WUI	wildland–urban interface

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1 Introduction

The Cities of Monterey, Carmel-by-the-Sea, and Pacific Grove (Plan Area) are located on the Monterey Peninsula in Monterey County. The Plan Area landscape exhibits a complex wildfire environment that presents risks to communities, public and firefighter safety, land use practices, and the built and natural environments. Although this area has not faced many damaging wildland fires, the local microclimate, wind patterns, vegetation types, and existing built environment can exacerbate wildfire risk. With the increased severity and frequency of wildfires in California, community wildfire planning is increasingly important to help prepare for and adapt to wildfire. Community wildfire protection plans (CWPPs) are a tool to help reduce the severity and impact of wildfires and increase community resilience. This CWPP is the first to cover the Plan Area.

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 has been developed by the Monterey Fire Department (MFD), in coordination with the Cities of Monterey, Carmel-by-the-Sea, and Pacific Grove, with input and direction from interested parties, agency representatives, and community members. This CWPP is intended to serve as a fire protection planning document that presents the community's 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.

1.1 StoryMap

An ArcGIS StoryMap was created to accompany this CWPP and serves as an interactive mapping tool and hub for all project data and analysis. This tool was used to disseminate project information to the public and provide a platform for community members to get involved in plan development. Additionally, the StoryMap serves as an adaptive approach to community wildfire planning and allows for revisions as the plan progresses to keep the CWPP up to date. References to the StoryMap are made throughout this document to allow for a concise but effective CWPP and ensure the written CWPP remains current as edits to the StoryMap are made.

The CWPP StoryMap is accessible at the following link: https://ims.dudek.com/MontereyCarmelPacificGroveCWPP.

1.2 Purpose and Need

The Monterey Peninsula community and MFD recognize the potential for significant loss of life, property, and resources from wildland fire. The Plan Area, through MFD and city efforts, has a history of proactively addressing wildfire risk reduction through implementation of various pre-fire mitigation programs. Additionally, the Monterey Fire Safe Council has taken on a leading role in furthering plans and programs throughout Monterey County intended to mitigate wildfire risk. Through coordination and collaboration in recent years, MFD and the representative cities in the Plan Area have identified the need for a CWPP for the Monterey Peninsula.

The frequency and intensity of wildfires has increased throughout California, and the Plan Area and surrounding region are no exception. Monterey County has a significant wildfire history (see Exhibit 1), with an average of four wildfires per year and 17,000 acres burned annually since 1911 (County of Monterey 2023). To date, no significant

Exhibit 1. Major Wildfires in Monterey County History

Source: Monterey County Fire Safe Council 2023.

wildfires have burned into the Plan Area (CAL FIRE 2022). However, significant and record-breaking wildfires have burned in recent years within the surrounding areas, such as Los Padres National Forest, Ventana Wilderness, and Big Sur, as well as multiple smaller fires within local open space areas, such as Del Monte Forest, Jacks Peak County Park, along the Highway 101 corridor, and within private property. Wildfires in the surrounding area affect the Plan Area through smoke and air quality impacts and through the risk of fires spreading or spotting into the Plan Area.

The Plan Area has approximately 4,545 acres of wildland–urban interface (WUI), as shown in Table 1. The WUI is the geographic area where urban development either abuts, intermingles, or intermixes with wildland vegetation. These areas are particularly vulnerable to wildfire threats due to proximity to wildland vegetation and terrain that is capable of supporting a wildfire. Further, the Plan Area contains approximately 4,544 acres of land designated as High or Very High Fire Hazard Severity Zones (FHSZs) (as designated by the California Department of Forestry and Fire Protection [CAL FIRE]), which represents approximately 57% of the Plan Area (see Table 2). FHSZs are geographical areas designated by CAL FIRE (pursuant to California Government Code Sections 51175–51189 and Public Resources Code Sections 4201–4204) as areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors.

In addition to a significant amount of land that is considered at risk of wildfire, the Plan Area has many older neighborhoods that were not developed with wildfire concerns at the forefront. As wildfires have become more frequent, severe, and impactful to communities, new communities and homes are required to build to more stringent fire protection standards that are not present in older neighborhoods and structures. For example, many older homes constructed with wood siding or wood shake roofs with varying degrees of defensible space are present throughout the Plan Area, some of which are accessed by narrow and windy streets that can make evacuation difficult.

Table 1. Wildland-Urban Interface in the Plan Area

Plan Area City	Acres of Wildland–Urban Interface	Percent of City
Pacific Grove	691	38
Carmel-by-the-Sea	334	49
Monterey	3,520	63
Total	**4,545**	**56**

Table 2. Fire Hazard Severity Zones in the Plan Area

City	Fire Hazard Severity Zone (FHSZ)	Acres	Percent of City
Pacific Grove	Non FHSZ	927	51
	Moderate	194	11
	High	618	34
	Very High	87	5
Carmel-by-the-Sea	Non FHSZ	0	0
	Moderate	53	8
	High	404	60
	Very High	219	32
Monterey	Non FHSZ	1905	35
	Moderate	413	7

Table 2. Fire Hazard Severity Zones in the Plan Area

City	Fire Hazard Severity Zone (FHSZ)	Acres	Percent of City
	High	1885	34
	Very High	1331	24

1.3 Community Wildfire Protection Plan Goals

The guiding principles and goals shown in Table 3 were developed for the CWPP, through a collaborative approach with MFD; the Cities of Monterey, Carmel-by-the-Sea, and Pacific Grove; and the Working Group. Goals for the CWPP were developed in consideration of local priorities and concerns, as well as the National Cohesive Wildland Fire Management Strategy, which focuses on three key areas: restoration and maintenance of landscapes, fire-adapted communities, and response to fire.

Table 3. Community Wildfire Protection Plan Goals

Guiding Principle	Goal
An informed community	Community members will be informed about wildfire risks through educational outreach efforts and will work together to create fire-adapted neighborhoods and communities.
Cohesive fire adaptation built on partnerships	Adjacent jurisdictions and affiliated organizations will be included in fire adaptation and management efforts to create a network of fire-safe communities.
Hardened infrastructure	Infrastructure will be hardened against wildfire to allow for safe access and the ability of structures and landscapes to withstand wildfire.
Healthy, fire-adapted ecosystems	Landscapes and open space areas will be maintained with ecosystem health, environmental protection, and respect for cultural significance as a priority.
Coordinated response to wildfires	The Monterey Fire Department and mutual aid partners will have the capacity to respond to wildfire emergencies while maintaining firefighter and community safety.
Sufficient funding and resources	Wildfire management efforts will be supported through sufficient financial investment and staffing.

1.4 Plan Development

Exhibit 2 shows the process taken to develop the CWPP. MFD is the main entity responsible for overseeing the CWPP's development, in coordination with the Cities of Monterey, Carmel-by-the-Sea, and Pacific Grove, as well as interested parties. The project involved review of existing information, community and interested party engagement, a hazard risk analysis, assessment of community scale risks, and development of an action plan and recommended priority projects. City staff served on the project Working Group, participated in community engagement and public workshops, and provided key insights into each city's issues and concerns related to wildfire. Implementation of the CWPP will require collaborative efforts between neighboring jurisdictions, landowners/managers, community groups, and the public.

Exhibit 2. CWPP Process

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2 Executive Summary

2.1 Plan Area

The Plan Area encompasses the Cities of Monterey, Pacific Grove, and Carmel-by-the-Sea (see Figure 1). The Plan Area has an estimated population of 49,000, with approximately 30,218 people in Monterey, approximately 15,090 people in Pacific Grove, and approximately 3,220 people in Carmel-by-the-Sea (U.S. Census 2022).

2.2 Fire Protection

2.2.1 Monterey Fire Department

MFD provides a complete range of fire protection, prevention, and educational services in the Plan Area (Monterey, Pacific Grove, and Carmel-by-the-Sea), as well as Sand City, the Naval Postgraduate School, La Mesa Village, and the Monterey Regional Airport. MFD has been providing fire services since 1882 and began as a brigade formed by a group of citizens. In 1890, MFD was officially chartered by the City of Monterey and has since grown to serve Monterey and surrounding communities. Due to fire service contracts and tourism, MFD services a population exceeding 100,000. MFD operates out of six fire stations in Monterey, Pacific Grove, and Carmel-by-the-Sea, shown in Table 4.

MFD employs approximately 83 full-time employees and responds to an average of over 8,500 incidents annually. Staffing consists of 25 personnel per shift plus a Division Chief, a minimum staffing of 22 personnel per shift plus a Division Chief, and administrative staffing of one fire chief, one assistant chief, three division chiefs, one training division chief, one deputy fire marshal, up to two part-time fire inspectors, and administrative support personnel. Front line fire apparatus includes six engines, one 100-foot tractor-drawn aerial truck, one urban search and rescue truck and trailer, one type 3 wildland unit, one aircraft rescue fire-fighting truck, one 37-foot fire boat, and one command vehicle. MFD also will staff one Office of Emergency Services fire engine in its fleet. Numerous reserve apparatus provide back-up capabilities to the front-line fleet (MFD 2023).

Table 4. Monterey Fire Department Plan Area Fire Stations

Station Number	Location
Station No. 11	600 Pacific Street, Monterey
Station No. 12	582 Hawthorne Street, Monterey
Station No. 13	401 Dela Vina Avenue, Monterey
Station No. 14	600 Pine Avenue, Pacific Grove
Station No. 15	On 6th Avenue between Mission and San Carlos Streets, Carmel-by-the-Sea
Station No. 16	150 Olmsted Way, Monterey Regional Airport

2.2.2 Monterey County Regional Fire District

The Monterey County Regional Fire District responds to structure, wildland, vehicle, and other types of fires in a service area of approximately 400 square miles with a population of about 40,000 residents, consisting of unincorporated areas of Monterey County. A map of the Monterey County Regional Fire District service area can be found at the following link: https://www.mcrfd.org/files/b503d8e7c/MCRFD+Map+2017.pdf. The Monterey County Regional Fire District staffs seven fire stations with 70 full-time employees and is also supported by volunteer firefighters. The Monterey County Regional Fire District also participates in the Monterey County Fire Service Mutual Aid system (Monterey County Regional Fire District 2023).

2.2.3 Presidio of Monterey Fire Department

The Presidio of Monterey Fire Department provides fire and emergency services to federal properties within its jurisdiction, which includes the U.S. Army Garrison Presidio of Monterey, the former Fort Ord U.S. Army installation (Fort Ord National Monument), and the housing areas at Ord Military Community, Presidio of Monterey, and La Mesa. The Presidio of Monterey Fire Department has mutual aid agreements with the Monterey County Regional Fire District, MFD, the Salinas Fire Department, the Seaside Fire Department, the Marina Fire Department, and the North County Fire Protection District (U.S. Army Garrison Presidio of Monterey 2023).

2.2.4 U.S. Forest Service

The U.S. Forest Service (USFS) Monterey Ranger District has jurisdiction in the Los Padres National Forest. USFS provides wildland fire suppression across national forest lands within Monterey County and also participates in mutual aid. USFS provides engine crews, hand crews, helitack crews, hotshots, and smoke jumpers. In addition to fire suppression, USFS also facilitates fuel 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 Los Padres National Forest lands and lands managed by USFS partners. The Pacific Southwest Region Fire and Aviation Management is responsible for wildland fire protection in the northeast portion of the Plan Area (USDA 2022).

2.2.5 California Department of Forestry and Fire Protection

CAL FIRE is charged with wildland fire protection for State Responsibility Areas (SRAs) within Monterey County. The San Benito-Monterey Unit of CAL FIRE encompasses over 3 million acres, of which 2.1 million acres are an SRA, representing one of the largest state responsibility jurisdictions in CAL FIRE. According to the Unit Strategic Fire Plan for San Benito-Monterey, "The San Benito-Monterey Unit is operationally divided into three divisions and further into seven battalions offering a wide variety of programs which includes: Fire Prevention, Resource Management, Law Enforcement, Air Attack, Helitack, Conservation Camp, Emergency Command Center (communications), and Cooperative Fire Protection" (CAL FIRE 2020). CAL FIRE also "maintains several Automatic and Mutual Aid Agreements" (CAL FIRE 2020).

2.2.6 Mutual Aid

MFD and surrounding agencies participate in mutual aid and automatic aid agreements. 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. Fire agencies in Monterey County are party to a countywide mutual aid agreement, including the following:

Cities

- Monterey
- Pacific Grove
- Carmel-by-the-Sea
- Seaside
- Salinas
- King City
- Del Rey Oaks
- Greenfield
- Soledad
- Gonzales
- Marina
- Sand City

Fire Protection Districts

- Pebble Beach Community Services District
- Carmel Highlands Fire Protection District
- Monterey County Regional Fire District
- North Monterey County Fire District
- Aromas Tri-County Fire District
- Cachagua Fire Protection District
- Cypress Fire Protection District
- South Monterey County Fire Protection District

Volunteer Fire Departments/Brigades

- Big Sur Volunteer Fire Brigade
- Mid-Coast Volunteer Fire Department
- San Ardo Volunteer Fire Department

State

- CAL FIRE
- Department of Corrections-Correctional Training Facility Soledad
- California National Guard-Camp Roberts

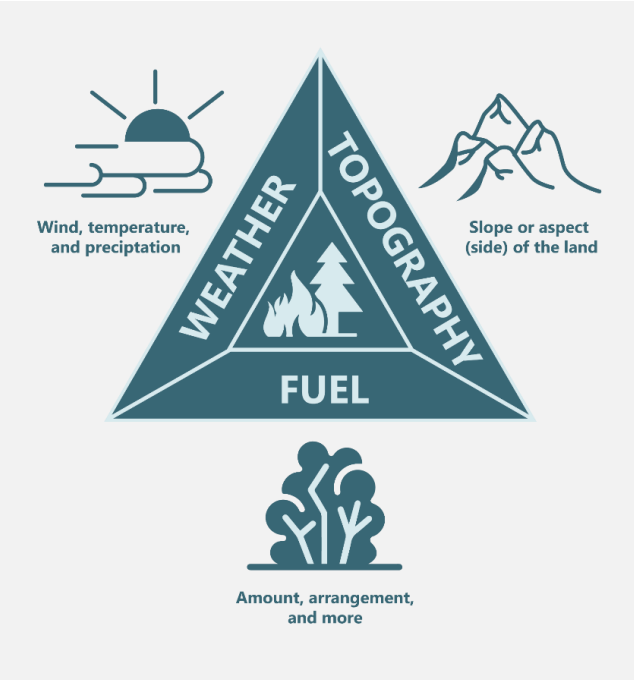
Federal

- Presidio of Monterey Fire Department
- Fort Hunter Liggett Fire Department

2.3 Existing Wildfire Conditions

Wildfire conditions can be described through the local fire environment and fire regimes. The fire environment describes the surrounding conditions that interact to influence wildfire behavior, and the fire regime is a general pattern of fire occurrence in a particular location or vegetation type. The main components that contribute to the fire environment, and, thus, wildfire behavior, include weather (temperature, wind, relative humidity), fuel conditions, and topography (see Exhibit 3). Wildfire conditions in the Plan Area are summarized below, and the project StoryMap includes detailed descriptions of the Plan Area wildfire conditions, including interactive maps that depict Plan Area slopes, vegetation cover, canopy cover, building density, fire history, and other factors that contribute to the local fire environment and fire regime.

Exhibit 3. Fire Behavior Triangle.



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, the majority falling between November and April (U.S. Climate Data 2023). Fog is often present during the summer months as a result of warm air from inland areas meeting cold marine air. Peak fire season is considered to be in the fall when air temperatures are highest and relative humidity drops (CAL FIRE 2020). This leads to the drying of vegetation and higher potential for wildfire spread. 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.

On average, the prevailing daytime wind direction is from the northwest blowing in from the Pacific Ocean. This brings cool, moist air into the region, developing a pattern referred to as the "marine layer," which produces fog and low clouds over the Monterey Peninsula. Wildfire hazard is greatly reduced when fog is present due to an increase in relative humidity and higher fuel moistures. The presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, onshore winds are from the northwest and at night, gentler offshore winds, derived from cooler air masses moving downslope, are from the east and travel from higher elevations to the coast. During the summer season, the diurnal winds can be slightly stronger than the winds during the winter season due to greater pressure gradient forces. These stronger onshore winds can contribute to fire hazard when appropriate conditions exist for wildfire ignition and spread, as observed during the 1987 Morse Fire, when strong onshore winds in combination with prolonged drought contributed to extreme wildfire behavior. Surface winds can also be influenced locally by topography and slope variations. The varied topography of the Monterey Peninsula affects wind velocity and patterns.

The region also experiences occasional offshore wind events from the east generally referred to as Santa Lucia winds. Santa Lucia winds are caused by high-pressure systems that form over the Great Basin area of Nevada and

Utah. These high-pressure systems create a gradient between the inland and coastal areas of California, leading to a rush of air from the high-pressure areas to the east to the lower-pressure area along the California coast. As the wind moves across the Santa Lucia mountains and descends to lower elevations, it becomes compressed and heated, pushing the marine layer far out to sea, leading to an increase in temperature and a decrease in relative humidity. This dry, warm wind can pick up speed as it moves through narrow canyons and passes, further contributing to its destructive potential. While stronger offshore wind events are more likely to occur to the south in the Big Sur region, the Monterey Peninsula is subject to infrequent periods of extreme fire weather. Santa Lucia winds are most likely to occur in the late fall and early winter, clearing out marine fog and creating dangerous fire weather conditions.

From a regional perspective, the Plan Area often experiences unique weather conditions compared to surrounding areas. This climate pattern is commonly referred to as a microclimate, meaning weather of neighboring inland or higher elevation areas often differs drastically from the Plan Area, largely dependent of the extent of the marine layer. Therefore, wildfire hazard is highly dynamic throughout the greater region and is highly dependent on localized weather conditions.

Vegetation

Monterey Pine Forests

Vegetation in the Plan Area is dominated by Monterey pine forest, one of three remaining native stands in California. Monterey pines (*Pinus radiata*) often grow tall and straight and can reach heights of 100 feet at maturity (60–80 years). Associated understory vegetation with this forest type includes young Coast live oak (*Quercus agrifolia*), coastal scrub, and native and non-native grasses. Broadly, Monterey pine forests in the Plan Area can be classified into three types:

- **Monterey Pine Forest with Grassy Understory:** These forests generally possess an open canopy, allowing substantial light to reach the forest floor. The understory is dominated by grasses and forbs including brome (Bromus), rattlesnake grass (Briza maxima), wild oats (Ava fatua), rushes (Juncaceae), and sedges (Carex). Coast live oak (Quercus agrifolia), California huckleberry (Vaccinium ovatum), and manzanita (Arctostaphylos) are often interspersed throughout this forest type.
- **Monterey Pine with Mesic Understory:** This forest type often exists where the forest floor retains moisture. This may occur in drainages, shaded areas, or when forest canopies are closed and prevent light from reaching the understory. The understory in this forest type is lush and often consists of shrubs including poison oak (Toxicodendron diversilobum), salal (Gaultheria shallon), bush monkeyflower (Diplacus aurantiacus), California blackberry (Rubus ursinus), and woodrose (Rosa gymnocarpa). Herbaceous plants are also observed in this forest type including nettles (Urtica dioica), yerba buena (Clinopodium douglasii), toothwort (Cardamine californica), and grasses.
- **Monterey Pine with Hard Shrub Understory:** This forest type is predominantly found near Huckleberry Hill and is dominated by understory shrubs with hard leaves including California huckleberry (*Vaccinium ovatum*), shaggy-barked manzanita (*Arctostaphylos rudis 'Vandenberg'*), and hooker's manzanita (*Arctostaphylos hookeri*). Herbaceous plants are common around shrubs and in openings.

Wildfire hazard in Monterey pine forests is influenced by the structural and compositional characteristics of vegetation or "fuels." High hazard forest stands generally include substantial ladder fuels, which are defined as understory fuels that can create vertical continuity between surface fuels (grasses and needle litter) and the tree

canopy. Ladder fuels can create a pathway for low severity surface fires into the upper tree canopy, resulting in extreme fire behavior known as crown fire. Crown fires pose significant threats due to greater wildfire intensity and rapid spread rates. Extreme wildfire behavior such as fast-moving crown fires is also more likely in dense forest stands where the distance between tree canopies is minimal, allowing fire to easily transition through the tree canopy. The composition of forest fuels also impacts wildfire severity in this forest type. Wildfire hazard in Monterey pine forests is influenced by the species present (many plants in the Plan Area possess volatile compounds that increase combustibility), forest health, age of fuels, and the abundance of invasive species.

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).

Canopy thinning via selective removal of trees within a stand can achieve desired horizontal spacing between retained tree canopies to minimize potential crown fire spread. Thinning from below, a technique in which trees are removed from the lower forest/stand canopy, can reduce the severity and intensity of wildfires by reducing crown bulk density and increasing crown base height (Graham et al. 1999). Thinning or removal of overstory trees can result in higher mid-flame wind speeds and decreased fine fuel moisture, which can increase surface flame lengths, resulting in crown fires and increased fire intensities. However, sufficient treatment of surface fuels (understory, slash, and ladder fuels) results in a reduction in fire behavior sufficient to outweigh these effects (Graham et al. 1999; Agee and Skinner 2005). A major goal of these treatments is to create stand conditions that function as a shaded fuel break. Table 5 summarizes the effects and advantages associated with fuel management in tree-dominated vegetation types.

Table 5. 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 is less with prescribed fire compared to 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
Keep big trees of resistant species	Less mortality for same fire intensity	Generally restores historic structure	Less economical; may keep trees at risk of insect attack

The state of Monterey pine forests within the Plan Area and adjacent areas varies depending on attributes, including terrain and soils, fire history, and varying degrees of forest management. Monterey pines are highly dependent on disturbance for seedling establishment and regeneration. Historically, wildfires (natural or human caused) were the main form of disturbance in this ecosystem. Fires naturally remove surface vegetation and litter, exposing bare mineral soil, which is highly beneficial for germination and seedling establishment. Historical low- to moderate-severity wildfires would also remove hazardous dead and dying vegetation, improving the overall forest heath and wildfire resilience. However, wildfire exclusion has resulted in overstocked forests with many trees reaching the end of their lifespan. In many areas, ladder fuels are abundant, and Monterey pine regeneration is limited. These

conditions reduce plant vigor and susceptibility to pest attacks and infestations increases. Infestations of pitch canker (*Fusarium circinatum*) are known to occur within the Plan Area and adjacent areas. This disease can contribute to wildfire hazards by increasing dead surface fuel loads and hindering firefighting efforts.

Non-native and Invasive Species

Non-native and invasive species can increase the frequency of fires by providing more continuous fuels that are more easily ignited (Brooks et al. 2004). Eucalyptus (*Eucalyptus globulus*), French broom (*Genista monspessulana*), and invasive grasses are of primary concern in the Plan Area.

Of the non-native trees present in the planning area, eucalyptus present the greatest hazard. Eucalyptus stands are composed of fuel structures ranging from fine to heavy and may include an understory of grass; brush; eucalyptus seedlings, saplings, and small trees; and eucalyptus leaf, twig, branch, and bark litter. Fuel buildup in eucalyptus stands is very rapid, exceeding that of other tree species, and its litter (dead leaves and debris) is especially flammable (Agee et al. 1973; NPS 2006; Wolf and DiTomaso 2016). Like other hazardous species, eucalyptus also has a higher content of volatile organic compounds. Eucalyptus leaves produce a volatile (Gabbert 2014), highly combustible oil, and flammable gasses may be released from trees at very high temperatures, further increasing fire hazard (Gross 2013).

French broom is highly invasive and is observed in forested and disturbed areas throughout the Plan Area. French broom infestations produce large amounts of dry matter, which can create a serious fire hazard (DiTomaso 1998). This species also produces prolific seed banks, which contributes to its widespread abundance. Broom burns readily and carries fire to the tree canopy layer, increasing both the frequency and intensity of fires in invaded areas. Invasive grasses in the Plan Area are widespread and include species such as rattlesnake grass (*Briza maxima),* annual brome species (*Bromus*), pampas grass (*Cortaderia selloana*), and Jubata grass (*Cortaderia jubata*). Invasive grasses resemble flashy fuels, which can ignite easily and increase wildfire rate of spread.

Urban Vegetation

Urban vegetation greatly contributes to the unique aesthetic within the Plan Area. Many residents take pride in the Plan Area's extensive urban forest. However, the characteristics and presence of urban vegetation significantly impact the potential for wildfires and their spread within urban environments. The type, density, and condition of vegetation in urban areas influence the availability of fuel for fires. When urban areas contain dense and highly flammable vegetation like dry grasses, shrubs with volatile oils, or trees with combustible foliage, the risk of fires igniting and spreading rapidly increases. Additionally, the accumulation of dead leaves, branches, and plant debris contributes to fuel loads and elevates fire hazard. Urban vegetation also influences the ignition and spotting potential of wildfires. Wind-carried embers and burning debris can ignite new fires in urban areas, especially when highly flammable vegetation is near structures. This raises the risk of embers landing on or near buildings, leading to fire spread within urban areas and an increased likelihood of structure ignitions.

Strategic management of urban vegetation can serve as a protective buffer, limiting the extent of wildfire spread. By ensuring well-maintained green spaces, properly spaced and pruned trees, and the intentional use of fire-resistant plants, defensible space can be created. This defensible space acts as a barrier, safeguarding structures from nearby flammable vegetation. The choice of plants also significantly influences the wildfire hazard associated with urban vegetation. Different plant species and their maintenance levels determine their fire resistance. While no plant is entirely fireproof, certain characteristics, such as the following, greatly diminish the risk of wildfire hazard:

- Leaves have a high moisture content.
- Little dead material is present, and the plant does not accumulate dry and dead material within the plant.
- Sap and resin content is low.
- The plant does not produce a significant amount of leaf litter.

In contrast, certain urban species possess features that increase their ignitability. These include the accumulation of fine, dry, or dead material within the plant and the presence of volatile organic compounds, which can increase fire intensity.

Terrain

Terrain affects wildfire movement and spread. Flat areas typically result in slower fire spread, absent windy conditions. Topographic features such as saddles, canyons, and chimneys may form unique circulation conditions that concentrate winds and funnel or accelerate fire spread (i.e., land formations that collect and funnel heated air upward along a slope). Steep terrain typically results in faster upslope fire spread due to the preheating of uphill vegetation. 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. Various terrain features can also influence fire behavior, as summarized in Table 6.

Table 6. 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.

Table 6. Effects of Topographic Features on Fire Behavior

Topographic Feature	Effect
Saddle	Potential for rapid rates of fire spread; fires pushed 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.

2.4 Key Findings

2.4.1 Hazard/Risk Analysis

The wildfire hazard assessment conducted in support of this CWPP involved an evaluating field conditions, processing and analyzing spatial datasets in a geographic information system (GIS), conducting GIS-based modeling of wildfire behavior and wildfire hazard, and analyzing existing plans and data sets related to wildfire hazard. Following field evaluations and concurrent with GIS data analysis, fire hazard and fire behavior modeling was conducted to evaluate wildfire hazard and risk to communities. These analyses modeled potential wildfire behavior under average (50th percentile) and extreme weather conditions (97th percentile). Modeling efforts as further described in Appendix A, Wildfire Hazard and Risk Assessment Methodology for Monterey, Carmel-by-the-Sea, and Pacific Grove Community Wildfire Protection Plan, considered the terrain, vegetation, and weather unique to the Plan Area. For a visual representation of this assessment, please refer to the Wildfire Hazard and Risk Assessment and Community Relative Wildfire Risk Ranking sections in the StoryMap.

Wildfire hazard is variable throughout the Plan Area depending on fuels, terrain, weather, and community characteristics. Under average weather conditions (50th percentile), wildfire behavior was modeled to mostly low-moderate severity as a result of higher fuel moisture and lower wind speeds. Crown fires under this scenario are infrequently observed in select areas. However, extreme wildfire (flame lengths greater than 11 feet) was observed throughout the Plan Area and adjacent areas during extreme weather conditions with high winds and low fuel moistures (97th percentile). The occurrence of crown fire under extreme conditions is widespread throughout the Plan Area, resulting in rapid rates of spread and substantial hazard from flying embers with spotting distances of up to 0.5 miles from torching trees. The results of this analysis highlight a clear potential for destructive wildfires in the Plan Area.

Wildfire Risk to Communities

Fire Hazard Severity Zones

CAL FIRE's Fire and Resources Assessment Program database includes map data documenting areas of significant fire hazards in the state. These maps categorize geographic areas of the state into different FHSZs. The classifications include Moderate, High, and Very High FHSZs. CAL FIRE uses FHSZs to classify anticipated fire-related hazards for the entire state and includes classifications for SRAs, Local Responsibility Areas, and Federal Responsibility Areas. Fire hazard severity classifications consider vegetation, topography, weather, crown fire production, and ember production and movement.

CAL FIRE is currently in the process of updating the FHSZ map for SRA lands, with an updated LRA mapping effort to follow. The upcoming LRA mapping effort will include Moderate, High, and Very High wildfire hazard designations. The FHSZs utilizing the updated SRA data and existing LRA data for the Plan Area are shown in Figure 2.

Wildland–Urban Interface

The Cities of Monterey, Carmel-by-the-Sea, and Pacific Grove all include areas classified as the WUI (see Figure 3). The WUI includes areas of urban and suburban development within the vicinity of wildland vegetation. The wildland fire risk associated with WUI areas includes propagation of fire via house-to-house fire spread, landscaping-to-house fire spread, or ember intrusion. Refer to the StoryMap to view the distribution of the WUI in the Plan Area. WUI communities within the Plan Area are provided in Table 7.

Table 7. Wildland-Urban Interface Communities in the Plan Area by City

City	Community Name
Monterey	Presidio West
	Skyline
	Monterey Vista South
	Monterey Vista North
	Old Town South
	Alta Mesa
	Glenwood
	La Mesa Village
	Aguajito Oaks
	Deer Flats North
	Deer Flats South
	Fisherman Flats
	Casanova Oak Knoll
	Ryan Ranch West
	Ryan Ranch East
Carmel-by-the-Sea	Southeast
	Northeast
	Northwest
Pacific Grove	Del Monte Park
	Sunset Drive
	Pacific Grove Acres East
	Pacific Grove Acres West
	Forest Grove
	Seaview
	Glen
	Second Addition
	Third Addition
	Fifth Addition West
	Asilomar Dunes

Many of the WUI communities at risk contain relatively old homes that reflect the building materials and/or codes in effect at the time of construction. As such, large numbers of homes are at increased risk of ignition due to structure vulnerabilities (e.g., wood shake roofs and siding, open eaves, unscreened crawlspace, and attic vents), which research has shown to be important in most home losses during wildfires. Most WUI neighborhoods feature high building density, with the highest building density WUI communities located in Carmel-by-the-Sea and Pacific Grove. House-to-house fire spread is more likely in areas with high building density due to the proximity of structures. In these dense areas, flames, radiant heat, and embers facilitate fire moving from one structure to the next. This can lead to a more extensive fire incident referred to as an urban conflagration. The potential for house-to-house fire spread in densely developed communities is strongly influenced by the materials and techniques used in building construction. For example, houses constructed with wooden materials that have large vents and single pane windows are more easily ignited compared to those constructed with ignition-resistant materials (as identified in Chapter 7A of the California Building Code). Many WUI communities in the Plan Area also feature narrow, steep, and windy streets accessing multiple homes. These conditions can result in congested evacuations and increase the difficulty for emergency responders and fire apparatus to quickly reach impacted areas.

Parcels within the Plan Area have varying degrees of defensible space, or the buffer between structures and grasses, trees, shrubs, or any wildland area adjacent to the home. Defensible space has been proven to reduce structural ignitability from direct flames, radiant heat, and flying embers, while also providing safer conditions for firefighters to conduct structural protection during wildfires. Many homeowners face challenges when attempting to create adequate defensible space on their properties, including the 100-foot zone extending into another person's property, the cost of implementing some of these upgrades being prohibitive, limited availability of contractors to complete this work, lack of knowledge of how to properly create defensible space, and what vegetation should and should not be used in each zone.

Community Relative 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, including community proximity to high hazard vegetation, dominant vegetation type, potential ember exposure, terrain, urban vegetation, emergency response time, and emergency access and evacuation capacity. Communities within the Plan Area and their relative risk ranking are provided below in Table 8. The distribution of communities facing very high and high risks varies across the three cities. Monterey possesses the greatest proportion of communities ranked as very high or high risk (48%), followed by Carmel-by-the-Sea (43%), and Pacific Grove (21%) (see Figure 4).

Table 8. Relative Risk Ranking of Plan Area Communities

City	Community	Risk Ranking Score
Monterey	Skyline	32 (Very High)
	Aguajito Oaks	32 (Very High)
	Monterey Vista North	27.5 (Very High)
	La Mesa Village	27 (Very High)
	Glenwood	26.5 (Very High)
	Monterey Vista South	26.5 (Very High)
	Deer Flats South	26.5 (Very High)

Table 8. Relative Risk Ranking of Plan Area Communities

City	Community	Risk Ranking Score
	Fisherman Flats	26.5 (Very High)
	Presidio West	25.5 (Very High)
	Ryan Ranch East	23.5 (High)
	Casanova Oak Knoll South	22.5 (High)
	Alta Mesa	21.5 (High)
	Old Town South	21.5 (High)
	Ryan Ranch West	18 (Moderate)
	Deer Flats North	17.5 (Moderate)
	Old Town North	14 (Moderate)
	Casanova Oak Knoll North	10 (Low)
	Navy	7 (Low)
	Presidio East	6 (Low)
	New Monterey South	5.5 (Low)
	New Monterey East	4 (Very Low)
	Del Monte Beach	4 (Very Low)
	Downtown	3 (Very Low)
	Oak Grove	3 (Very Low)
	Naval Postgraduate School	2.5 (Very Low)
	Del Monte Grove Laguna Grande	1 (Very Low)
	Villa Del Monte	0 (Very Low)
Carmel-by-the-Sea	Southeast	27 (Very High)
	Northwest	27 (Very High)
	Northeast	11 (High)
	Old Mission Tract	8 (Low)
	Central	6 (Low)
	Beach Tract	6 (Low)
	Scenic	6 (Low)
Pacific Grove	Del Monte Park	28.5 (Very High)
	Glen	24.5 (High)
	Forest Grove	24.5 (High)
	Pacific Grove Acres East	21.5 (High)
	Seaview	15.5 (Moderate)
	Sunset Drive	18.5 (Moderate)
	Hillcrest	16.5 (Moderate)
	Pacific Grove Acres West	16.5 (Moderate)
	Second Addition	15.5 (Moderate)
	Fifth Addition West	15.5 (Moderate)
	Country Club Heights	8.5 (Moderate)
	Third Addition East	7 (Low)
	Asilomar Dunes	6.5 (Low)
	Beach Tract	6 (Low)

Table 8. Relative Risk Ranking of Plan Area Communities

City	Community	Risk Ranking Score
	Pacific Grove Retreat	5 (Low)
	Downtown	5 (Low)
	First Addition	5 (Low)
	Fourth Addition	5 (Low)
	Fifth Addition East	4 (Very Low)

2.4.2 Community Engagement

The project involved a three-prong community engagement approach. Public input is a crucial component in CWPPs to ensure that the findings and recommendations presented fit the concerns, needs, and desires of the Plan Area and communities therein to help make them safer and more wildfire resilient. To ensure that the project reached the most community members, the public outreach for this project involved a Working Group, public survey, and an in-person community workshop for each city. A complete analysis of community engagement results can be found in Appendix B.

Working Group

The CWPP Working Group was formed to bring together a diverse representation of MFD staff and city staff to help advise the CWPP's developmental process (Table 9). Six Working Group meetings were held between January and July 2023, with each meeting facilitated by the consultant team. During the series of Working Group meetings, members were introduced to the project and 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. Key insight gathered from the Working Group meetings are summarized in Table 10.

Table 9. Working Group Members

Name	Title	Jurisdiction/Department
Gaudenz Panholzer	Fire Chief	Monterey Fire Department
Jeff Field	Division Fire Chief	Monterey Fire Department
Cheryl Kouretas	Fire Department Senior Admin Analyst	Monterey Fire Department
Carmyn Priewe	Deputy Fire Marshal	Monterey Fire Department
Laurie Huelga	Public Information Officer	City of Monterey
JD Sheldon	Fire Engineer	Monterey Fire Department
Christy Sabdo	Associate Planner	City of Monterey Planning
Louie Marcuzzo	Park Operations Manager	City of Monterey
Sam Mazza	Retired Fire Chief	Monterey Fire Department
Thys Norton	Assistant Urban Forester	City of Monterey – Urban Forestry
Cathy Madalone	Police Chief	Pacific Grove Police Department
Dan Gho	Public Works Director	City of Pacific Grove – Public Works

Table 9. Working Group Members

Name	Title	Jurisdiction/Department
Anastacia Wyatt	Community Development Director	City of Pacific Grove
Brandon Swanson	Director of Community Planning and Building	City of Carmel-by-the-Sea – Planning
Aaron Campbell	Code Compliance Officer	City of Carmel-by-the-Sea
Jeff Watkins	Acting Police Chief	City of Carmel-by-the-Sea
Tom Ford	Administrative Analyst	City of Carmel-by-the-Sea

Table 10. Working Group Key Insights

Topics	Working Group Insight
Community Wildfire Protection Plan Applicability	Findings from this plan can help inform safety and housing elements with new goals and policies.
Regulatory Barriers	Current tree ordinances make it difficult for hazardous trees to be removed with often vague language. Balance between removing hazardous vegetation and balancing environmental priorities is crucial for this community. Community members need more education on what is considered a hazardous tree and what the removal process entails.
Community Partnerships	Coalition/relationship building between neighborhood associations, community groups, government agencies, cultural groups, and more is necessary ongoing work to have project success.
Outreach	Communication and education are very important for these communities. Education and the methods of communication need to match the needs and demographics on the communities being served by this plan.
Fuel Treatment Areas	The Working Group discussed and compiled list of priority treatment areas based on modeling and community expertise.

Public Survey

For a broad understanding of how community members feel and are impacted by wildfire, an online survey using the SurveyMonkey platform was disseminated. The survey had 25 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 507 responses, with 468 of them being usable for analysis. The distribution of survey response from each Plan Area city are as follows:

- Monterey: 42%
- Pacific Grove: 25%

- Carmel-by-the-Sea: 24%
- Other: 9%

Key Results

When asked how concerned residents were about wildfire on a scale from 1 to 10, the average response from all residents was 7. However, when breaking it down by city, Carmel-by-the-Sea had the highest average worry of 7.4, Pacific Grove had the lowest average worry of 5.5, and Monterey was in the middle at 6.8.

When looking at the main concerns faced by residents, the top responses were fuels/vegetation on neighboring properties, limited evacuation routes, and fuels/vegetation on their own properties. When asked about barriers that would prevent community members from evacuating, the top barriers were not knowing when to leave, where to get proper evacuation information, and not having anywhere to stay when they did evacuate. Additionally, when asked if folks felt prepared to evacuate, most (86%) of respondents felt completely or partially prepared, and 14% indicated they were not prepared to evacuate.

When asked what desired actions community members would want to see to make the Plan Area safer from wildfire, the top responses were fuel management projects on public lands, fuel management projects on private lands, and defensible space creation and maintenance.

Additionally, when asked what techniques were most favorable, 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 treatments all having an approval rating of 65% or higher. However, using herbicide as a vegetation management technique had majority disapproval, with only 23% of respondents in support of this activity. These results help identify the most approved methods for action in each community to help MFD match up a technique with a given community.

Community Workshops

In addition to the quantitative data received from the public survey, community workshops were conducted to get more in-depth information on how wildfire impacts community members' lives and how actions can be taken to make them feel safer. A total of three in-person public workshops were held, one in each Plan Area city, to capture the opinions and perspectives of the greatest number of residents and community members throughout the Plan Area. These workshops covered a brief overview of the project and included activities aimed at garnering discussion and gaining input from community members through passive and active activities.

Passive Activities

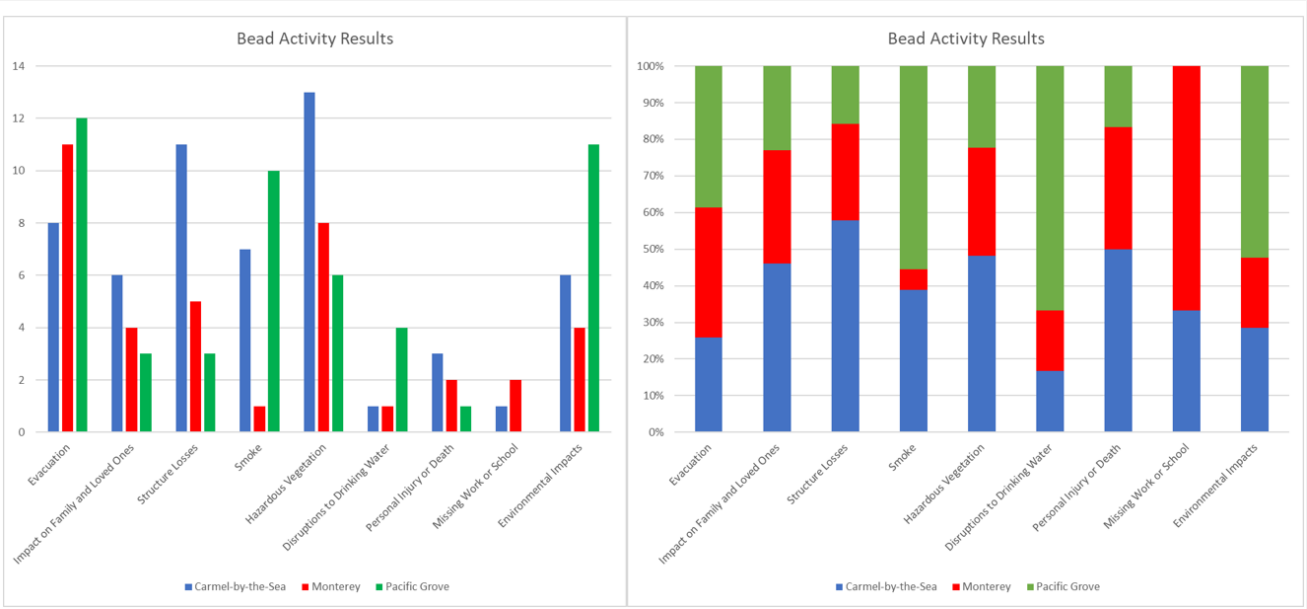
One passive activity included a map activity where community members could identify areas of concern, including limited evacuation routes and hazardous vegetation. Results of the map activity have been incorporated into the project StoryMap. Many of the identified hazard areas reflected areas that participants lived in or were familiar with.

An additional passive activity allowed residents to identify their top concerns related to wildfire by placing beads representing their concerns in corresponding jars. The responses received during these activities gave great insight into the perspective of attendees at the workshops; however, data gaps exist as community members representing

all portions of the Plan Area were not present. This is especially true for the eastern half of Monterey, including Deer Flats and Fisherman Flats.

As shown in Exhibit 4, the bead activity helped reveal that the top concerns for many of the community members were evacuation and hazardous vegetation. The graph on the left side shows the actual number of beads placed into each jar, and the right graph shows the distribution of the beads placed throughout the three cities. The right graph helps further demonstrate the concerns that resonate more within each city.

Exhibit 4. Bead activity results



Small Group Discussions

Small 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 five topics:

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

Small group discussions were set up with a facilitator and notetaker who rotated to the various groups of participants and encouraged discussion of each topic in terms of challenges and opportunities that could either help or harm a community in preparing for wildfire. Table 11 highlights key insights from each workshop. Many overlapping themes from each workshop were revealed, specifically around the need for better outreach, education, and desire for action. However, there were also some nuances unique to each workshop, as presented in this table and in the word clouds found in Appendix B.

Table 11. Community Group Discussion Takeaways

City	Main Takeaways
Carmel-by-the-Sea	Communication was a key priority for Carmel-by-the-Sea residents. This involves many facets, including knowing where to get proper evacuation information, how to harden their homes and create defensible space, and how community members can get involved in helping make their community safer. Some key actions that resonated with community members include the following: ▪ Utilizing more avenues for education and outreach like Nextdoor, door to door, real estate agents, radio, Pinecone Weekly, mail, social media, texts/reverse 9-1-1, schools, and religious organizations ▪ Having more workshops to help build consensus on opposing perspectives within wildfire preparation, including helping residents have a better understanding of what they can do to prepare ▪ Revising city ordinances to allow for removal of hazardous vegetation
Monterey	Responsibility and coordination were themes that resonated with Monterey residents, from knowing who you can trust as a source for wildfire information, to wanting a deeper understanding of a community's risks, to a better picture of how different organizations coordinate around wildfire. Some of the key actions that resonated with community members include the following: ▪ Utilizing academic institutions like the University of California or the California State University Systems for more research on modeling defensible space ▪ Having more education to clearly define the desired role of different parties before/during a wildfire, including residents, community groups, and utilities; this includes residents having a clear understanding of the California Department of Forestry and Fire Protection's "Ready, Set, and Go!" steps, wider community buy in, engagement with community groups, and the creation of Firewise Communities ▪ Coordinating with neighbors, specifically neighbors with mobility challenges, to ensure that communities are working together in the event of an evacuation ▪ Focusing on outreach and engagement through multiple avenues from door tags, reverse 9-1-1, social media, inspections, community fire drills, community chipper programs, and more
Pacific Grove	Having a holistic approach to wildfire preparation and management was stressed amongst Pacific Grove residents. In addition to the themes listed for the other cities, this group wanted to ensure that actions taken would be in accordance with the community's environmental values. Some key actions and tools include the following: ▪ Having better education of how homeowners can balance hardening their home and creating defensible space in an environmentally friendly way, including permeable hardscape ▪ Providing access to tools to help residents during a wildfire, such as air purifiers

2.5 Key Strategies for Wildfire Resilience

The following describes priority project types and active community programs that should be pursued in the Plan Area to mitigate wildfire risk to communities.

Community Programs

- **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 MFD can be found at https://www.monterey.org/city_hall/fire/preparedness/cert_program.php.
- **Firewise Communities –** The Firewise Community program is a national community wildfire risk mitigation program administered by the National Fire Protection Association's Firewise USA program. This 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. A Firewise Community is one that has taken appropriate measures to become more resistant to wildfire structural damage. Firewise techniques include minimizing the risk of home ignition by carefully landscaping around residential structures, such as thinning trees and brush and choosing fire-resistant plants, selecting ignition-resistant building materials, and positioning structures away from slopes.
- **AlertMontereyCounty –** AlertMontereyCounty is an emergency notification system that allows the County of Monterey to alert individuals of existing or potential emergencies. Through Aware and Prepare, the County of Monterey can alert individuals by landline, cell phone, and email. Individuals can register for emergency alerts at https://member.everbridge.net/453003085611217/new.
- **Monterey County Fire Safe Council** – The Monterey County Fire Safe Council provides education, supports community emergency planning, and helps create fire-adaptive communities through mitigation actions. Some of the education programs the Monterey Fire Safe Council offers are Ready! Set! Go! developed by CAL FIRE, Firewise USA, and One Less Spark–One Less Wildfire. The Monterey County Fire Safe Council also provides "Wildfire and You" workshops covering topics including evacuation, vegetation management, and home hardening. Interested residents can register for this workshop at https://workshops.firesafemonterey.org/courses/wild-fire-and-you.

Vegetation Management

Vegetation management plays a major role in reducing the potential for damaging and destructive wildfires through removing, rearranging, and maintaining the spatial distribution of fuels. The following lists the objectives of vegetation management in the Plan Area.

- Reduce wildfire hazard to mitigate risks to communities
- Reduce the likelihood of ignitions and extreme fire behavior to enhance public and firefighter safety

- Implement practices to avoid or minimize impacts to natural resources
- Maintain an active role in regional efforts to reduce wildfire on the Monterey Peninsula

Vegetation management may be conducted through a variety of general treatment types depending on the specific management goals, environmental constraints, and community acceptance. Treatment techniques include manual, mechanical, grazing, prescribed fire, and chemical treatments. For a detailed description of these treatment techniques and best management practices, see Appendix C. Vegetation management projects can be performed at the landscape, community, or parcel level and include the following:

- Ladder Fuels Reduction: Removal or reduction of fuels that provide vertical continuity allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease
- Community Fuel Breaks: Strategic areas of fuels reduction near communities to reduce fire intensity near communities and provide conditions favorable for effective fire suppression
- Roadside Fuels Reduction: Reduction of flashy and small diameter vegetation within 30 feet of roadways to decrease the likelihood of fires igniting along roadways and reduce fire behavior to increase the capacity for safe evacuation
- Forest Thinning: Strategic removal of trees to create conditions non-conducive to rapid wildfire spread; trees removed often include trees that are small diameter or dead and dying
- Defensible Space: Fuels reduction within 100 feet of structures intended to reduce structural ignitability and increase the capacity for structure protection; vegetation management actions to create defensible space can be found at https://www.firesafemonterey.org/defensible-space.html
- Invasive Species Management: Removal or control of invasive species through grazing, mechanical, or chemical removal in addition to management practices designed to minimize further spread of invasives

Monterey Fire Department Defensible Space Inspections

MFD conducts wildland fire safety inspections for all properties within the Cities of Monterey, Pacific Grove, Carmel-by-the-Sea, and Sand City. These defensible space inspections are performed annually to help minimize fire spread and growth and reduce potential loss in the event a wildland fire occurs. All properties are inspected, including residential, commercial, and vacant lots. Once the inspection has been completed, a notice is left if any corrective actions should be taken by the owner/occupant. The notices are in the form of an adhesive notice left on or near the front door. Vacant lot notices are mailed to the property owner. Follow-up re-inspections occur in 30 days to ensure that owners are properly preparing their properties and following state and local regulations. The status of a property can be determined by visiting monterey.org/city_hall/departments/fire and clicking the button to check the fire defensible space status map.

City of Monterey Greenbelt Fuels Reduction Plan

The City of Monterey has identified eight specific areas in the city greenbelt system with high fire hazard due substantial fuel loads. These areas include the Skyline Forest, Veterans Park, Monte Vista, Carmelo Street, Don Dahvee, Josselyn Canyon, Fisherman Flats, and Old Capitol Site greenbelts. If a wildfire were to occur in these greenbelts, it could have severe impacts to WUI communities and natural resources.

To address this issue, the city's urban forestry division has implemented a fuels reduction program, which operates on a 5-year rotating maintenance cycle and aims to remove undergrowth, promote the growth of native plants, and

decrease the amount of fuel available for wildfires. The management of fire fuel hazards involves various measures, including but not limited to thinning out vegetation; removing trees, with a focus on dead and dying ones; trimming or pruning trees or large shrubs in defensible spaces to reduce fuel continuity both vertically and horizontally; removing exotic or invasive plants; and employing prescribed grazing techniques, using goats and sheep, to reduce and eliminate vegetation in areas with high fire risk due to dry conditions.

George Washington Park Perimeter Fuels Reduction

Fuels reduction activities are conducted annually within 100 feet of the homes surrounding the park. The management area is "U"-shaped and generally forms a 30- to 40-foot-wide strip around the perimeter of the park, beginning on the east side of the park at Gibson Avenue, wrapping around the north end of the park, and ending on the west side of the park near the intersections of 17 Mile Drive and Melrose Drive. The width of the strip widens to 100 feet at the northwest corner of the park where there is a strip of homes that back up to the park boundary. Within this strip, vegetation management actions are performed to adhere to CAL FIRE's defensible space requirements.

CAL FIRE San Benito Monterey Unit Fuels Reduction Projects

CAL FIRE San Benito Monterey Unit conducts a variety of fuels reduction projects in state responsibility area lands adjacent to the Plan Area. The Pebble Beach Fuels Reduction Project includes strategic fuel reduction treatments across 176 acres in Pebble Beach. Activities performed include the following: chipping, grazing, mastication, thinning (manual), thinning (mechanical), and removal of small diameter trees (less than 6 inches diameter at breast height).

Other ongoing CAL FIRE fuels reduction programs in adjacent ownerships include the Pescadero Canyon Fuel Reduction Grazing Project, High Meadows Fuel Reduction Program, Outlook Fire Road Maintenance Program, and Jack's Peak Goat Grazing and Mastication Program.

Take Action

Terrain, vegetation, and climatic conditions in the Plan Area combine to create a unique situation capable of supporting high-intensity, and sometimes damaging wildfires. There are two main components to reducing structural ignitability: vegetation management through defensible space and structural hardening. Plan Area residents are encouraged to implement these practices proven effective in mitigating losses from wildfires.

Defensible Space: Defensible space is an effective means of reducing the risk of loss of life and property due to wildfire in the WUI. 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 the fire and provide access to structures. A defensible space zone that is around the 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). The following three zones are identified for defensible space areas.

- **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 based on local regulations.

Structural Hardening: Vegetation management and defensible space are key components to an overall fire protection strategy; however, 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 Very High FHSZs within the Plan Area, hardening of existing structures is voluntary. Adopting mandatory home hardening provisions of building and fire codes is problematic because existing, 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 project story map.

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3 Action Plan

This section identifies recommended actions and projects to be implemented in the Plan Area that would minimize wildfire impacts to the community. Appendix D identifies priority projects that were identified during the CWPP development projects. Projects and actions identified in this section and Appendix A 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 (see Appendix E).

MFD, along with Plan Area interested parties and community members, intend to assess project progress annually and invite agencies, landowners, and involved community members to submit projects that would minimize wildfire risk and promote community wildfire protection. Project identification and implementation is an ongoing process, and additional projects will be evaluated by MFD. 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.

3.1 Plan Monitoring and Management

Long-term monitoring and management of the CWPP is necessary to ensure successful implementation of the plan, as well as to identify new or additional projects for reducing overall community wildfire risk. Consistent review and monitoring of projects and project areas (e.g., vegetation management areas) is also important for identifying areas that need follow-up maintenance. The following actions by MFD are intended to ensure consistent monitoring of the CWPP:

- **Maintain the 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. The CWPP should be reviewed annually with an edit cycle every 3 to 5 years.
- **Review and expand on the vegetation management projects identified in this CWPP.** The prioritized list/map of vegetation management projects included in Appendix D of this CWPP should be reviewed at least annually and updated accordingly. Requests from project proponents to update the priority projects list should be considered in a timely manner.
- **Collaborate with interested parties to maintain the CWPP.** Set up a standing committee to address the long-term management and maintenance of this CWPP.

3.2 Action Plan

The following guiding principles, goals, and action items constitute the Action Plan for implementing the CWPP. The Action Plan should be implemented to serve and protect lives, property, critical infrastructure, and Plan Area resources threatened by wildland fire. MFD and partner cities recognize the catastrophic impacts of wildfire in the Plan Area community. This CWPP is intended to reduce wildfire hazards and risk through implementation of the action items outlined in this section.

Table 12. Action Plan

Guiding Principle 1: An informed community			
Goal: Community members will be informed about wildfire risks through educational outreach efforts and will work together to create fire-adapted neighborhoods and communities.			
Action	**Responsible Party/Partnerships**	**Priority (Low-Med-High)**	**Cost ($–$$$)**
Conduct biannual educational seminars to educate residents on wildfire preparedness and mitigation; educational topics may include, but are not limited to the following: ▪ Defensible Space ▪ Structural Hardening and Retrofits ▪ Evacuation ▪ Invasive Species Removal	MFD	High	$
Create educational materials depicting proper defensible space guidelines specific to homes within a Monterey pine/oak woodland forest	MFD	High	$
Maintain the project StoryMap as a hub for information sharing amongst community members and interested parties	MFD/consultant	High	$
Provide information and resources to community groups, neighborhood associations, homeowners' associations, etc. to pursue National Fire Protection Association Firewise USA Program Community Certifications to reduce wildfire risk at a local level	MFD, Monterey, PG, CBTS	High	$
Conduct outreach specific to vulnerable communities (frontline populations and communities) to provide education regarding wildfire hazards, emergency communications, and evacuation procedures in the Plan Area (outreach should address emergency notifications, materials, training and communications for non-English speakers, social networks, and community advisory councils and should engage local leaders where possible)	MFD, Monterey, PG, CBTS, Monterey County Fire Safe Council	Low/Med	$
Collaborate with Monterey County Fire Safe Council to leverage existing constituents to disseminate educational information	MFD	Med	$
Leverage existing resources and groups, such as the cities' Community Emergency Response Team (CERT), to disseminate information on wildfire risk, mitigation strategies, and evacuation procedures	MFD, Monterey, CBTS	Med	$
Host practice evacuation events throughout the Plan Area on an annual basis	MFD, Monterey, PG, CBTS	Low	$$$
Conduct public outreach/education in communities where vegetation management projects are proposed prior to initiation of work	MFD, Monterey, PG, CBTS	High	$

Table 12. Action Plan

Coordinate with the landowners near the Deer Flats community to develop strategies for conducting fuels reduction projects across multiple land ownerships	MFD, Monterey, County, City of Forester	Med	$$
Guiding Principle 2: Cohesive fire adaptation built on partnerships			
Goal: Adjacent jurisdictions and affiliated organizations will be included in fire adaptation and management efforts to create a network of fire-safe communities.			
Action	**Responsible Party/Partnerships**	**Priority (Low-Med-High)**	**Cost ($ - $$$)**
Support collaborative vegetation management projects across ownership boundaries that reduce fire hazard and protect natural and agricultural resources	MFD, Monterey, PG, CBTS, Pebble Beach Community Services District, Presidio, La Mesa, NSAM	Med	$
Collaborate with Pebble Beach Community Services District and CAL FIRE to create cohesive wildfire mitigation strategies that foster a holistic approach to wildfire risk reduction	MFD, Monterey, PG, CBTS, Pebble Beach Community Services District	High	$
Collaborate with the U.S. Army Garrison Presidio of Monterey and the U.S. Naval Postgraduate School to create cohesive wildfire mitigation strategies	MFD, Monterey, NSAM, La Mesa, Presidio	High	$
Consult with local tribes during wildfire mitigation planning	MFD, Monterey, PG, CBTS, local tribal council	Med	$
Collaborate with the Monterey County Fire Safe Council to prioritize community wildfire mitigation projects	MFD, Monterey, PG, CBTS, Monterey County Fire Safe Council	Med	$
Work with recreational facilities, campgrounds, and other guest-oriented businesses to develop evacuation preplans and preparedness for wildfire	MFD, Monterey, PG, CBTS	Low	$
Coordinate with interested parties (U.S. Forest Service, CAL FIRE, County of Monterey, Presidio, land trusts, and others) to facilitate information and data sharing, resource sharing, coordination of management activities, property access, grant funding, and cost-sharing opportunities	MFD, Monterey, PG, CBTS, regional partners as indicated	Med	$$
Update the City of Monterey General Plan Safety Element to address wildfire risk and identify goals and policies to implement risk reduction strategies, such as vegetation treatment targets (e.g., acres treated per year), defensible space requirements, and development requirements beyond Chapter 7A; and discuss requirements for areas within the City's High and Very High Fire Hazard Severity Zones as identified in Figure 14 of the General Plan	MFD, Monterey	High	$$
Update the City of Monterey General Plan Public Facilities Element to provide recent information regarding Monterey Fire Department's role and communities served	MFD, Monterey	Med	$

Table 12. Action Plan

Partner with universities and research institutions to support or conduct wildfire-related projects or research that would benefit the Plan Area	MFD, Monterey, PG, CBTS	Low	$
Develop an evacuation plan for the Community Hospital of the Monterey Peninsula	MFD, Community Hospital of the Monterey Peninsula, Monterey County Office of Emergency Services	Low	$$
Guiding Principle 3: Hardened infrastructure			
Goal: Infrastructure will be hardened against wildfire to allow for safe access and the ability of structures and landscapes to withstand wildfire.			
Action	**Responsible Party/Partnerships**	**Priority (Low-Med-High)**	**Cost ($ - $$$)**
Identify critical infrastructure and facilities in need of structural hardening	MFD, Monterey, PG, CBTS	Med	$
Conduct roadside fuels reduction along major roadways and roads identified as evacuation routes by each city (see Appendix D for recommended roadside fuel treatment projects)	MFD, Monterey, PG, CBTS	High	$$
Identify and remove hazardous trees along major evacuation corridors	MFD, Monterey, PG, CBTS	Med	$$
Revaluate City Tree Ordinances to expedite maintenance or the removal of trees that pose wildfire hazards (e.g., allow for Monterey Fire Department tree inspection to determine wildfire hazard)	MFD, Monterey, PG, CBTS	Med	$
Develop a coordinated evacuation plan for the Plan Area	MFD, Monterey, PG, CBTS, Monterey County Department of Emergency Management	Med	$
Evaluate opportunities for engaging Plan Area residents and landowners in structural retrofit programs	MFD, Monterey, PG, CBTS	Med	$$
Encourage structural retrofits for Plan Area structures through assessments, community education, and grant funding opportunities	MFD, Monterey, PG, CBTS	Low	$$$
Install evacuation signage/lighting along designated evacuation routes	MFD, Monterey, PG, CBTS	Low	$$$
Facilitate emergency vehicle access and evaluate the need for road maintenance on private and public roads	MFD, Monterey, PG, CBTS	Med	$$
Coordinate with those with jurisdiction over roadways (e.g., the California Department of Transportation, cities, landowners) to establish road maintenance agreements	MFD, Monterey, PG, CBTS	Med	$$
Establish staging areas and shelter-in-place sites throughout the Plan Area where the potential exists for	MFD, Monterey, PG, CBTS	Low	$$$

Table 12. Action Plan

road blockage due to wildfire, flood, downed trees, and other emergencies			
Conduct structural hardening retrofits at the Westland House of the Community Hospital of the Monterey Peninsula	MFD, Monterey, Montage Health	Low	$
Guiding Principle 4: Healthy, fire-adapted ecosystems			
Goal: Landscapes and open space areas will be maintained with ecosystem health, environmental protection, and respect for cultural significance as a priority.			
Action	**Responsible Party/Partnerships**	**Priority (Low-Med-High)**	**Cost ($ - $$$)**
Implement vegetation treatment activities identified in Appendix C	MFD, Monterey, PG, CBTS	High	$$$
Ensure appropriate environmental review is conducted prior to implementing fuels reduction projects	MFD, Monterey, PG, CBTS	High	$$
Consult with a qualified biologist and/or Registered Professional Forester when designing fuels treatment prescriptions	MFD, Monterey, PG, CBTS	High	$$
Promote Monterey pine regeneration through fuels reduction projects in Monterey pine forests (projects may include raking and removing/reducing the pine needle and leaf litter layer to expose mineral soil to promote seedling establishment in treated areas)	MFD, Monterey, PG, CBTS	Med	$$
Develop a French broom removal program to increase the scale of invasive species management and reduce hazardous ladder fuels across the Plan Area	MFD, Monterey, PG, CBTS	Med	$$$
Remove dead and down woody debris annually following winter storms and prior to June 1 of each year	MFD, Monterey, PG, CBTS	Med	$$$
Conduct annual monitoring of vegetation management project areas and implement treatment maintenance as needed (monitoring efforts can identify areas in need of additional vegetation management treatments)	MFD, Monterey, PG, CBTS	High	$$
Consider the use of cultural burning	MFD, Monterey, PG, CBTS	Low	$$$
Develop post-fire rehabilitation guidelines in cooperation with appropriate federal, state, and local agencies; and ensure that post-fire rehabilitation guidelines focus on reducing the importation or spread of invasive species and focus on restoring native habitats where applicable	MFD, Monterey, PG, CBTS	Low	$$$

Table 12. Action Plan

Guiding Principle 5: Coordinated response to wildfires			
Goal: The Monterey Fire Department and mutual aid partners will have the capacity to respond to wildfire emergencies while maintaining firefighter and community safety.			
Action	**Responsible Party/Partnerships**	**Priority (Low-Med-High)**	**Cost ($ - $$$)**
Hold annual meetings with mutual aid partners to discuss emergency response goals and ensure targets are being met	MFD, various partner agencies, Monterey County Department of Emergency Management	High	$
Prepare annual reports of incidents and responding mutual aid partners	MFD	Med	$
Identify additional resources needed to adequately respond to wildfires and achieve response target goals	MFD	Med	$
Guiding Principle 6: Sufficient funding and resources			
Goal: Wildfire management efforts will be supported through sufficient financial investment and staffing.			
Action	**Responsible Party/Partnerships**	**Priority (Low-Med-High)**	**Cost ($ - $$$)**
Evaluate staffing capacity annually and identify staffing needs to ensure an adequate capacity for widespread community wildfire mitigation projects	MFD	High	$
Identify and pursue grant funding opportunities for wildfire projects and apply for appropriate grants or cost-share programs (wildfire projects may include those associated with vegetation management, structural retrofits [structural hardening], planning, and community education or engagement; see Appendix F for potential funding opportunities)	MFD, Monterey, PG, CBTS	Med	$$
Pursue efforts to get Plan Area communities on California's Fire Risk Reduction Communities List to be prioritized for California Department of Forestry and Fire Protection Fire Prevention Grant Funding	MFD, Monterey, PG, CBTS	Low	$$
Pursue the development of a Home Hardening Grant Program	MFD, Monterey, PG, CBTS	Low	$$
Collaborate with the Monterey County Fire Safe Council to obtain grant funding for community wildfire mitigation projects	MFD, Monterey, PG, CBTS, Monterey County Fire Safe Council	Med	$
Increase the number of properties inspected in the Plan Area annually and set inspection targets for the Monterey Fire Department	MFD	High	$

Table 12. Action Plan

Empower neighborhood councils, community groups, homeowners' associations, etc. to pursue grant funding for community-scale retrofits	MFD, Monterey, PG, CBTS	Med	$
Evaluate opportunities for subsidies or incentive programs for property owners to complete and maintain defensible space vegetation management work	MFD, Monterey, PG, CBTS	Low	$

Notes: MFD = Monterey Fire Department; Monterey = City of Monterey; PG = City of Pacific Grove; CBTS = City of Carmel-by-the-Sea; County = County of Monterey; HOA = homeowners' association; CAL FIRE = California Department of Forestry and Fire Protection; NSAM = Naval Support Activity Monterey.

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4 Community Wildfire Protection Plan Authorization

The Monterey, Carmel-by-the-Sea, and Pacific Grove 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 and private property within the Plan Area. This CWPP is intended to better protect the community from the threat of wildfires by promoting community-level risk reduction projects.

The following entities mutually agree with the contents of the Monterey, Carmel-by-the-Sea, and Pacific Grove CWPP:

Signed by:
Andrew Miller 9/13/2024 | 11:20 AM PDT
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Name: Monterey Fire Department **Title:** Fire Chief

DocuSigned by:
Hans Uslar 9/13/2024 | 11:54 AM PDT
320BEC1519DD42C...
Name: Hans Uslar **Title:** City Manager
City of Monterey

DocuSigned by:
Chip Rerig 9/13/2024 | 9:08 AM PDT
3B6A0[illegible]
Name: Chip Rerig **Title:** City Administrator
City of Carmel-by-the-Sea

Signed by:
Matthew Mogensen 9/13/2024 | 11:11 AM PDT
80923D1285A44B5...
Name: Matthew Mogensen **Title:** City Manager
City of Pacific Grove

4/12/2024
Name: George Nunez, Jr. **Title:** Uni t Chief
CAL FIRE San Benito-Monterey Unit

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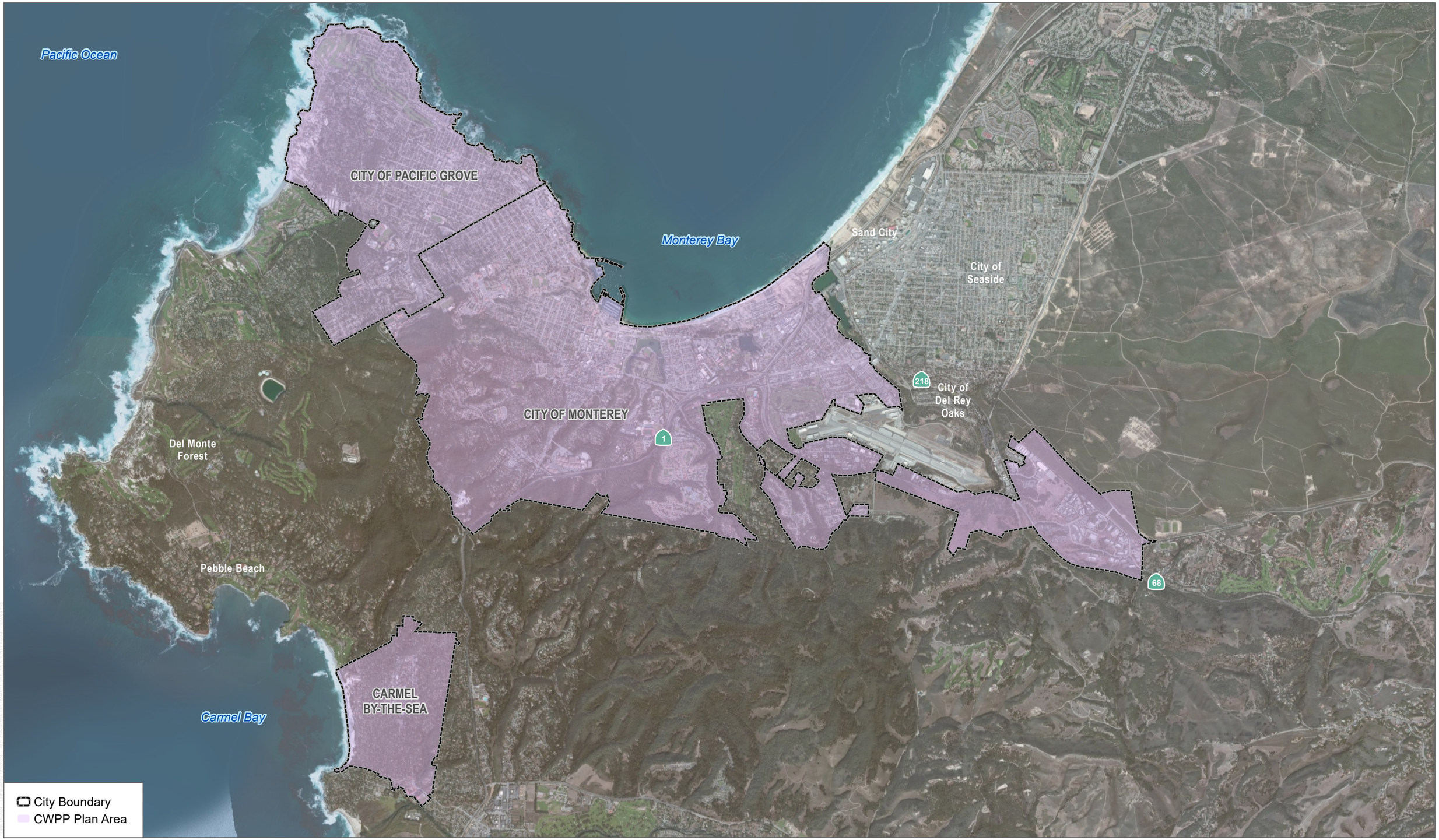

SOURCE: Esri Clarity Basemap 2022, OpenStreetMap

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0 2,000 4,000 Feet

FIGURE 1

Plan Area

Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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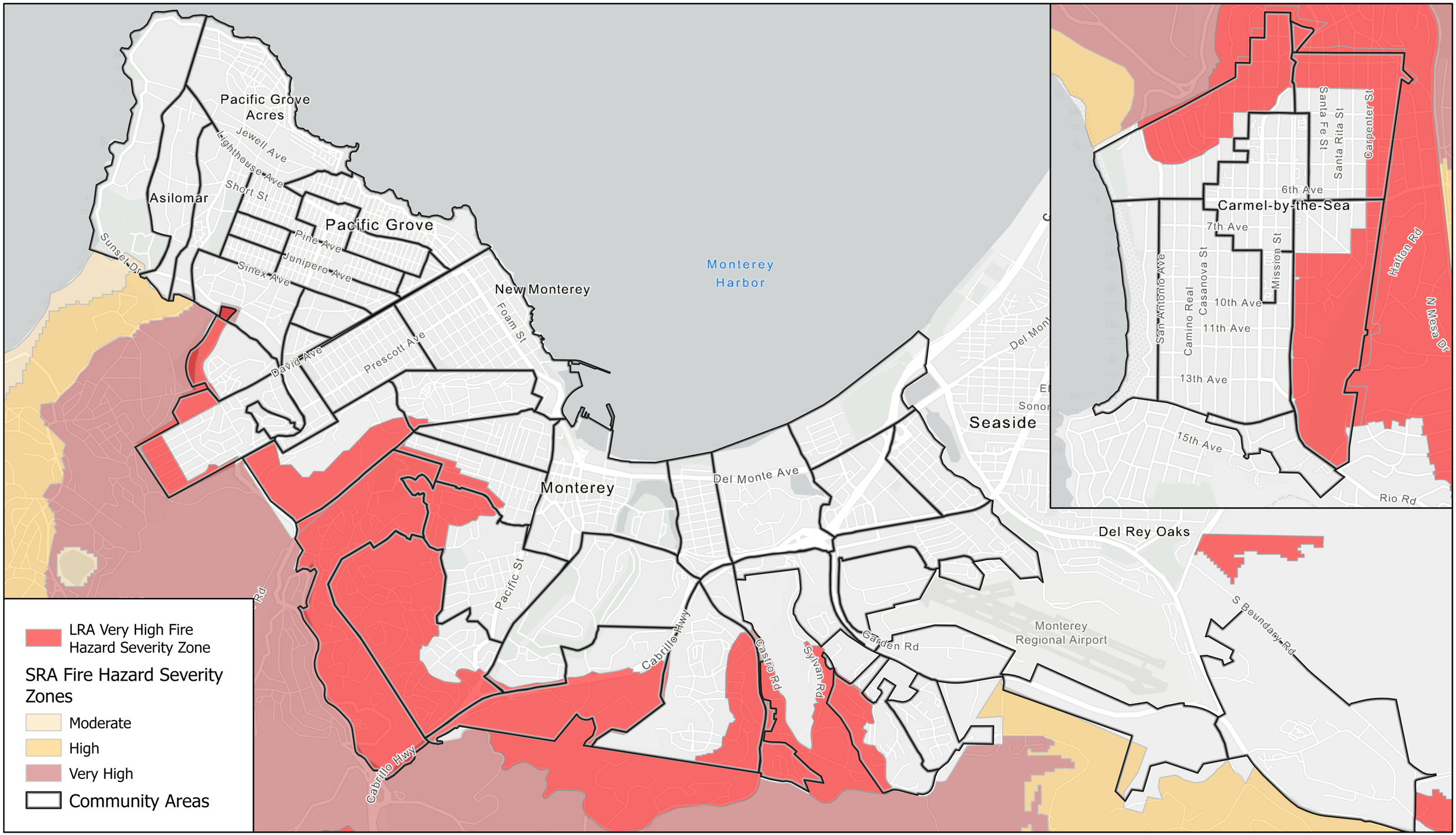

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FIGURE 2

Fire Hazard Severity Zones

Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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FIGURE 3
Wildland-Urban Interface
Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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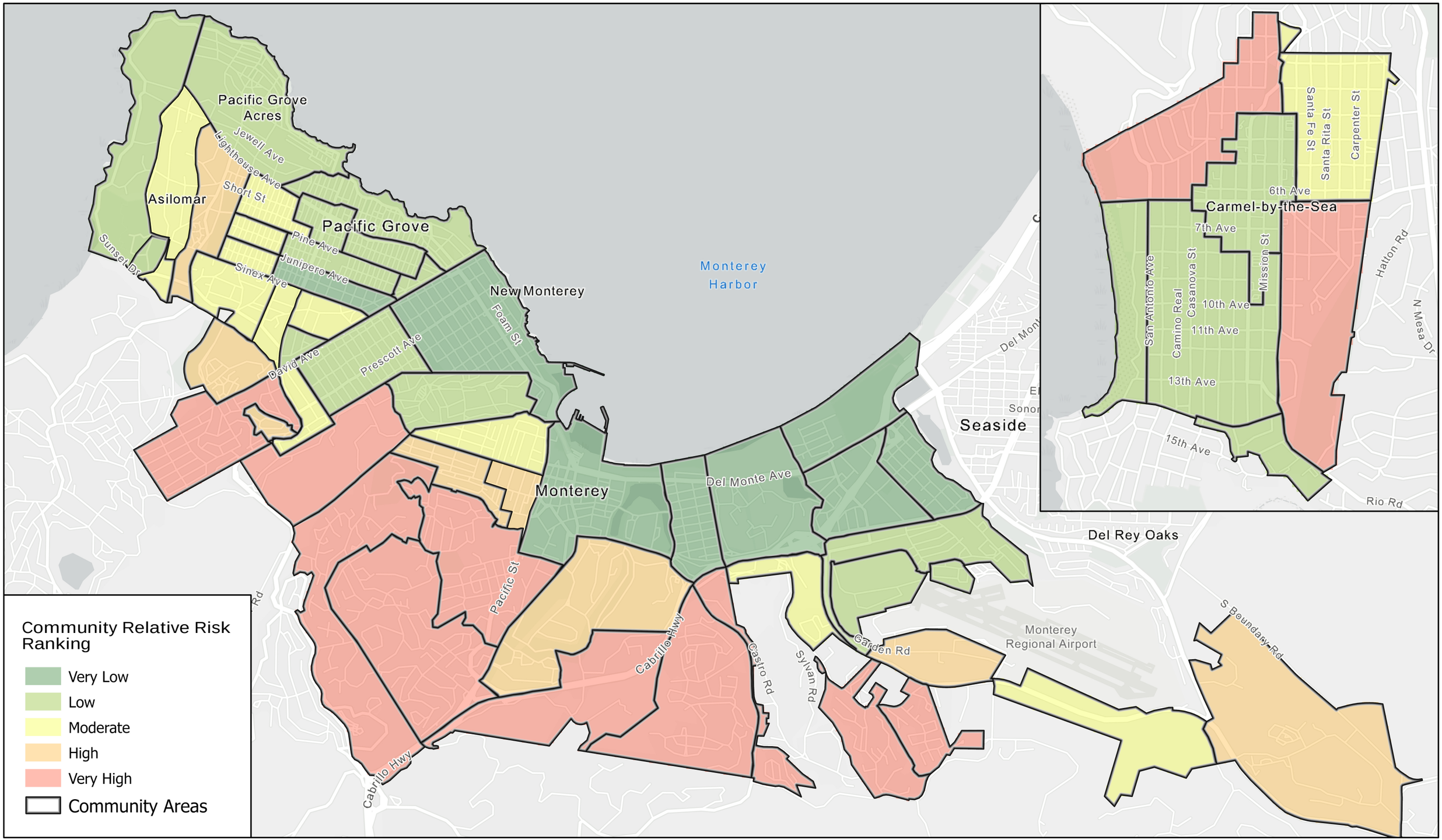

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FIGURE 4

Community Relative Risk Ranking

Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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Appendix A

Wildfire Hazard and Risk Assessment Methodology for Monterey, Carmel-by-the-Sea, and Pacific Grove Community Wildfire Protection Plan

Table of Contents

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TABLES

EXHIBITS

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1 Wildfire Risk Assessment

A Wildfire Risk Assessment (WRA) was conducted for the Plan Area (Cities of Monterey, Pacific Grove, and Carmel-by-the-Sea) and surrounding regions (Pebble Beach and other unincorporated areas) using the Interagency Fuel Treatment Decision Support System (IFTDSS) program (USDOI and USDA 2022). 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 WRA 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

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 (see Table 1) and simulates head, backing, and flanking fire front (see Section 1.1.2, 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 1.1.4, Integrated Hazard).

To initiate the modeling effort, a Landscape Base file was selected 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 was sourced from the 2016 LANDFIRE dataset embedded in the IFTDSS application. LANDFIRE base data is provided in raster format, with a ground resolution of 30 meters.[1] The 2016 Landscape Base file was evaluated to confirm fuel model accuracy.

The 2016 LANDFIRE data is the most current publicly available data in IFTDSS and includes a remap of vegetation/fuels in disturbance areas. LANDFIRE remapped disturbance areas between 2009 and 2016 (including wildfires) such that the data represents pre-disturbance conditions. The 2016 LANDFIRE dataset was evaluated for the Plan Area and compared with available fire history datasets. The 2016 LANDFIRE dataset represents fuel conditions present prior to major fires that occurred in the Plan Area from 2017 through 2021 (e.g., 2018 Woolsey Fire). The pre-burn conditions represented in this dataset include mature, sometimes decadent vegetation communities that can support higher-severity wildfires. No modifications to the 2016 LANDFIRE dataset were made. Future LANDFIRE datasets are anticipated to include the results of remapping efforts, as described, allowing for this WRA to be repeated in the future.

From a wildfire modeling perspective, the Plan Area exhibits characteristics that result in inaccuracies in the LANDFIRE Landscape file and most specifically the fuel model. LANDFIRE fuel models are determined through

[1] Individual mapping unit in the Landscape Base file representing an area measuring 30 meters by 30 meters on the ground.

satellite imagery and are generally most accurate when representing large continuous tracts of natural vegetation. The Plan Area includes patches of natural vegetation intermixed with communities and 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 (for example, Downtown Carmel) were assigned vegetative fuel models even though the ground surface is non-burnable. This is due to the considerable amount of street trees in the Plan Area, which misguide the designated surface fuel model selection.

The 2019 National Land Cover Database (NLCD) was used to modify the fuel model in the assessment area to accurately represent fuel models in urbanized areas. The NLCD is created in cooperation with the Multi-Resolution Land Characteristics Consortium, a partnership of federal agencies that produce nationally consistent land cover datasets for the United States. The NLCD includes an impervious surfaces layer, which allows for the identification of urban ground cover, including paved areas and structures. Impervious surfaces were overlayed for the assessment area and assigned to Fuel Model NB1 (Urban/Suburban) using the Landscape edit feature in IFTDSS. Irrigated and maintained golf course holes were also set to Fuel Model NB1. This resulted in an overall increase in non-burnable areas in the assessment area and a more accurate picture of surface fuel models. The fuel model was then re-examined to identify errors in the NLCD impervious surfaces layer. Areas of natural vegetation improperly classified as urban areas were assigned fuel models based on vegetation conditions observed during the field visit. The LANDFIRE fuel model dataset was further edited to reflect the California Department of Forestry and Fire Protection (CAL FIRE) state responsibility area fuel model designations for Monterey pine (*Pinus radiata*) forests. This data was obtained from CAL FIRE's 2022 State Responsibility Area Fire Hazard Severity Zone intermediary datasets (CAL FIRE 2022). The edited fuel model allows for better accuracy when modeling wildfire hazard and risk in the assessment area, especially within the wildland-urban interface.

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.

Table 1. Wildfire Behavior Modeling Inputs

Model Input	97th Percentile	50th Percentile
Wind Speed	26 mph	6 mph
Wind Direction	40 degrees	N/A
Wind Type	Gridded	Uphill
1-Hour Fuel Moisture	5%	12%
10-Hour Fuel Moisture	7%	15%
100-Hour Fuel Moisture	11%	18%
Herbaceous Fuel Moisture	40%	60%
Live Woody Fuel Moisture	60%	80%
Crown Fire Calculation Method	Scott/Reinhart	Scott/Reinhart
Spotting Probability	40%	15%

Note: N/A = not available.

Wind speed, wind direction, and fuel moisture values were determined through local Remote Automated Weather Stations, historic wildfire reports, the National Fuel Moisture Database for the CAL FIRE San Benito-Monterey Unit using the Pebble Beach sampling site, and guidance from local fire officials. National Fuel Moisture Database data was processed to determine 97th and 50th percentile fuel moisture values (1-hour, 10-hour, and 100-hour fuel

moistures, live herbaceous moisture, and live woody moisture), wind speeds, and wind directions. The 97th percentile values, reflecting extremely low fuel moisture and very high wind speeds, were used for peak weather (August–October) scenarios. Wind data for 50th and 97th percentile weather was obtained from the Ford Ord #1 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. Uphill winds were utilized to model fire behavior during 50th percentile weather conditions.

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, as identified in Table 1). 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% and 15% for 97th and 50th percentile weather conditions, respectively. 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 12 hours, the maximum value in IFTDSS.

1.1.1 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 14,107 modeled fires were run for the LBP analysis. In this example, if a pixel burned 850 times over the model run period (with 14,107 fire simulations), it would have a burn probability of 0.06, (850 / 14,107 = 0.06). If a pixel burned 14,107 times in 14,107 fire simulations, it would have a burn probability of 1.0, (14,107 / 14,107 = 1.0). If a pixel never burned during the 14,107 fire simulations, it would have a burn probability of 0 (0/14,107 = 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)

1.1.2 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 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

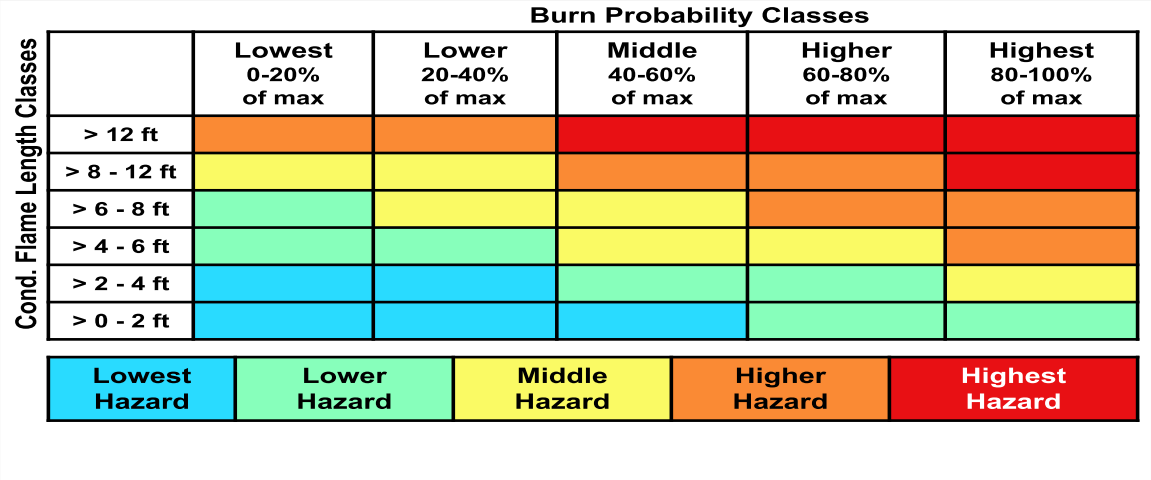
If an ember lands within the fire perimeter (already burned) or non-burnable fuels, the ember is discarded, and spotting does not occur.

1.1.4 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 and conditional flame length classes for determining Integrated Hazard



1.1.5 Landscape Fire Behavior

A Landscape fire behavior assessment was conducted in IFTDSS to map basic fire behavior outputs, including flame length and rate of spread. The assessment was performed under both 97th and 50th percentile weather conditions using the inputs provided in Table 1.

1.1.6 Ember Hazard Assessment

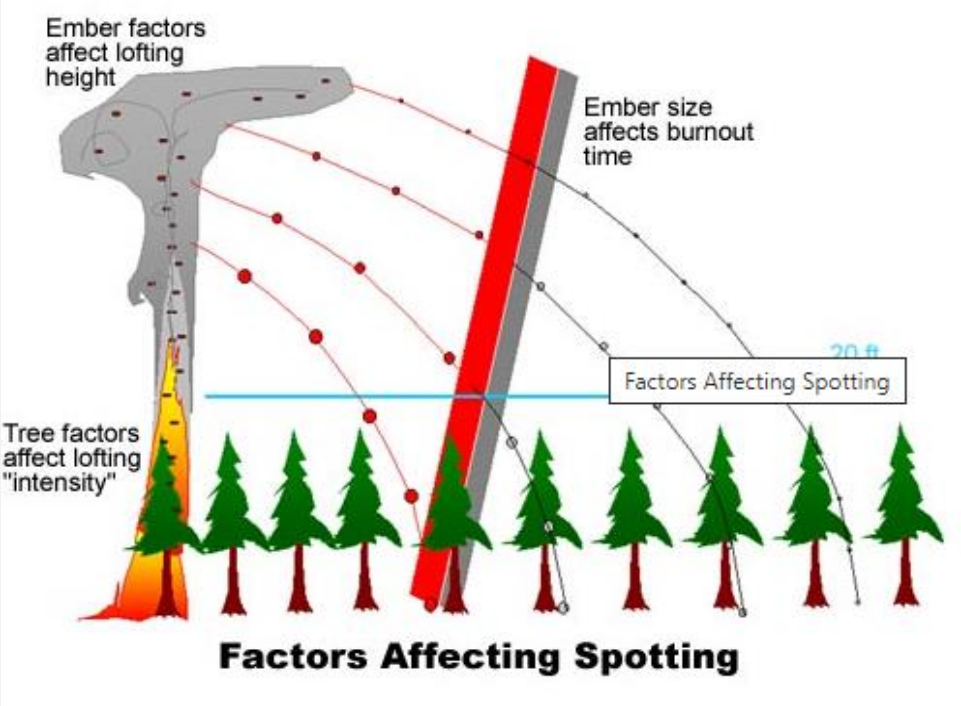
FlamMap was used to model spot fire potential for an area encompassing the Plan Area plus a buffer of approximately 2 miles. "Spotting" is the launching of embers that result in spot fires increasing the spread of a fire. In FlamMap, spotting is only simulated from torching trees when a passive or active crown fire is modeled. Spotting only occurs in trees where an active or passive crown fire is initiated. FlamMap does not model independent crown fires. The spotting component of FlamMap is intended to compute the maximum spotting distance from a given point on a fire front if torching occurs. The maximum spotting distance is determined by particle size, burnout rate, time, or distance traveled, as identified in Exhibit 2. Smaller particles are lofted higher and transported farther but will burnout sooner than larger particles. FlamMap does not simulate the number of embers, exact location of embers, or location of resulting spot fires.

Potential ember impacts at the project site were modeled using the MAXSPOT output from FlamMap. This output provides the maximum distance a fire brand should travel corresponding to weather and fuel moisture inputs provided in (Appendix).

To create the ember exposure map, the FlamMap MAXSPOT output was buffered to each fire brand pixel's maximum spread distance. This process was conducted for each pixel resulting in many overlapping circles of different sizes.

The number of overlapping circles was then counted for each pixel using the Count Overlapping Features Tool in ArcGIS Pro. The number of overlaps for each pixel is compared to other pixels to create the ember exposure map (see StoryMap: *Ember Exposure*). Areas with more overlap identify locations where embers are more likely to land during a wildfire. However, since the maximum spotting distance buffer for each fire brand pixel was applied in all directions instead of only the downwind direction (embers are likely to spot predominantly downwind), the exposure map should not be utilized as a quantitative assessment, but rather a means to generally compare ember impacts throughout the assessment area.

Exhibit 2. Spotting diagram



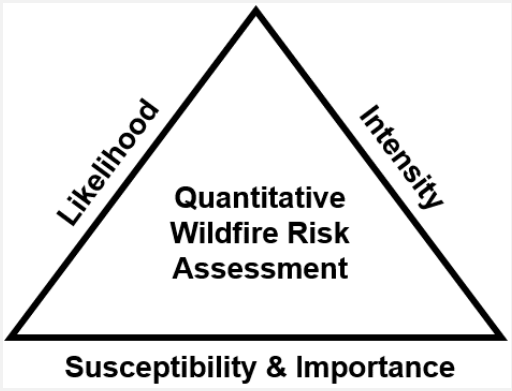
Source: Finney and McHugh 2019.

1.2 Wildfire Risk Assessment

Following the Wildfire Hazard Assessment, a Quantitative Wildfire Risk Assessment (QWRA) was conducted to evaluate wildfire risk for the Plan Area. A QWRA aids in land management by characterizing the predicted benefits and threats from a wildfire on Highly Valued Resources or Assets (HVRAs) across a landscape. Results from a QWRA can be used to identify and prioritize potential fuel treatment areas.

The QWRA considers both the threats and benefits of wildfire. Some resources may benefit from fire (e.g., fire-dependent plant species and landscapes that have departed from the historical fire regime), and others may be threatened by fire (e.g., communities). The QWRA first looks at the level of exposure of HVRAs to wildfire by comparing burn probability, conditional flame length, and integrated hazard outputs with the location of HVRAs across the analysis area. It then calculates the likelihood of a wildfire occurring and the susceptibility of HVRAs to potential wildfire intensity to determine risk (Exhibit 3). The following sections describe the QWRA process.

Exhibit 3. Quantitative wildfire risk assessment diagram.



1.2.1 Highly Valued Resources or Assets

HVRAs include natural resources or human-made assets. They can be positively or negatively affected by fire. HVRAs are categorized as either Primary HVRAs or Sub-HVRAs. Primary HVRAs are the overall categories in which the Sub-HVRAs are sorted. Sub-HVRAs are the geospatial component of Primary HVRAs. For example, if a Primary HVRA is Communities, a Sub-HVRA would be Low-Density Communities, a subset of Communities found in the Plan Area.

Communities was selected as the Primary HVRA for the QWRA. Sub-HVRAs include low- density, moderate density, and high-density communities. These communities may experience varying degrees of risk from wildfire due to differences in their composition and proximity to high hazard areas. Table 2 summarizes the HVRAs used in the QWRA.

Table 2. Primary HVRAs and Sub-HVRAs

Primary HVRA	Sub-HVRA
Communities	Low Density (>0–28 people per square mile)
	Medium Density (>28–250 people per square mile)
	High Density (>250 people per square mile)

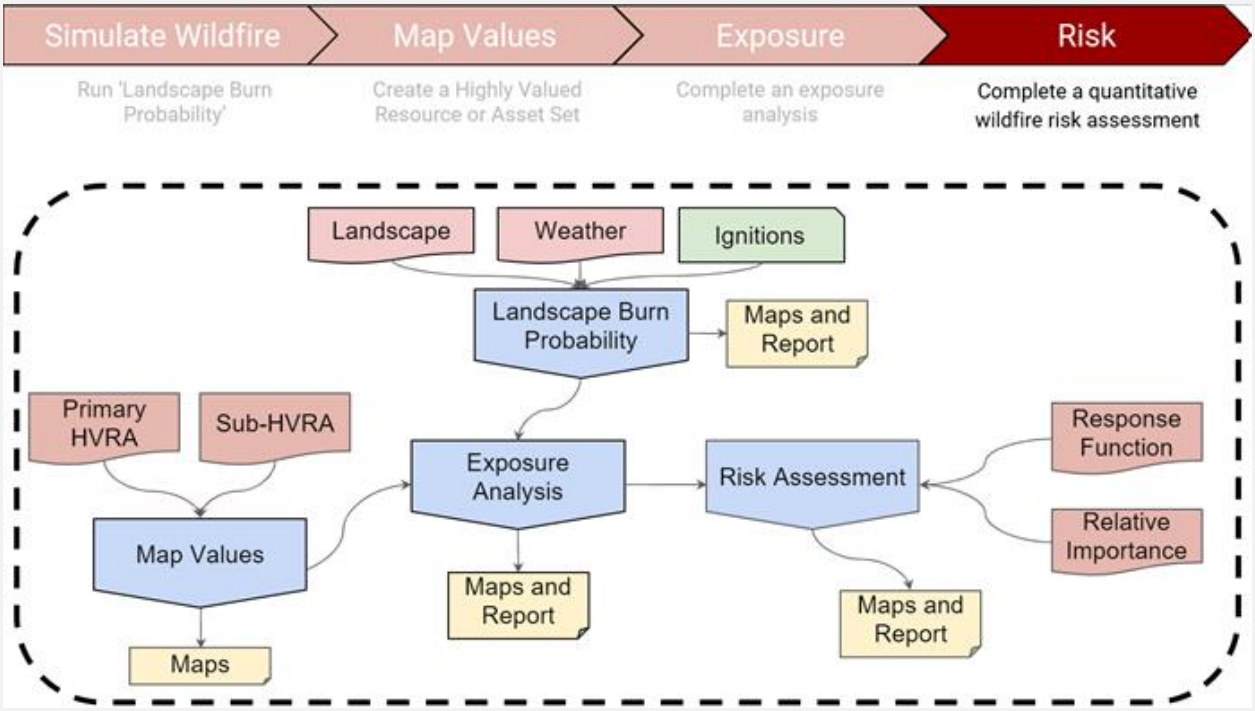
Note: HVRA = Highly Valued Resources or Assets.

The QWRA process is initiated by completing an exposure analysis (EA). EA is an assessment of wildfire hazard (likelihood and intensity) where HRVAs are located. The EA quantifies the LBP model outputs where they overlap with HVRAs. It compares burn probability, conditional flame length, and integrated hazard with the HVRAs across the analysis area. The EA was run for the Communities HVRA. The EA calculates the following for each HVRA:

- Mean burn probability
- Mean conditional flame length
- Mean integrated hazard
- Mean of product of burn probability and conditional flame length
- Relative extent
- Expected burn area

Model outputs for the EA map the intersection of HVRAs and LBP model outputs to identity the mean integrated hazard class for both the Primary and Sub-HVRAs. For this analysis, EA outputs were not exported as distinct datasets, but, rather, the outputs were incorporated into the QWRA described in the following section. Exhibit 4 provides a gpahical representation of the QWRA process.

Exhibit 4. Quantitative wildfire risk assessment flowchart



1.2.2 Quantitative Wildfire Risk Assessment

The QWRA was initiated by selecting the completed EA for Communities (which contained all the necessary inputs from the LBP analysis and the HVRA). The QWRA analysis then quantified and prioritized wildfire risk based on the susceptibility or response of the Sub-HVRA to wildfire (Response Function) and the quantitative weight to differentiate the importance of the HVRAs (Relative Importance).

Outputs for the QWRA focus on the overall change in value (Net Value Change [NVC]), whether positive or negative, on a given pixel in the analysis area. NVC has two outputs: Conditional Weighted NVC (CwNVC) (see Section 1.2.2.1, below) and Expected Weighted NVC (EwNVC) (see Section 1.2.2.2, below). NVC assesses the modeled impacts from wildfire on a given HVRA based on the HVRA's proximity to different integrated hazard classifications. It highlights the likely effects of a fire on HVRAs.

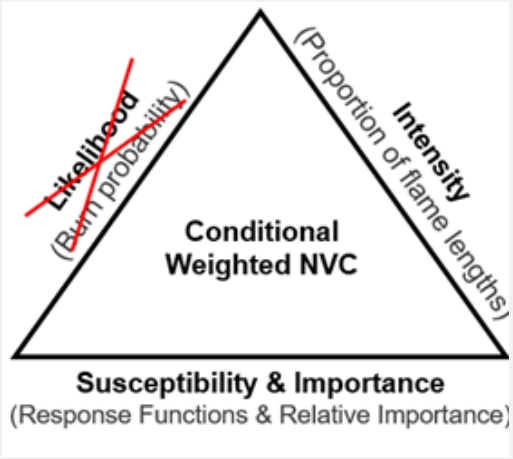
1.2.2.1 Conditional Weighted Net Value Change

CwNVC is a product of fire intensity, susceptibility, and importance (Exhibit 5). It highlights the likely effects of fire on HVRAs with the assumption that a fire will or has occurred. The CwNVC aids in planning scenarios where the presence of fire is assumed, and the goal is to understand the anticipated threats or benefits from fire. For example, CwNVC outputs could be evaluated where it is desirable to assess the impact of a wildfire on HVRAs. CwNVC is calculated using the following:

- Proportion of flame lengths (LBP output)
- Sub-HVRAs
- Response functions
- Relative importance
- Relative extent

CwNVC is calculated for every pixel in the analysis area and considers any overlapping HVRAs. Positive values are considered benefits, and negative values are considered threats. Values of zero are neither and can occur if no HVRAs are present, fire intensity is neutral, or the summation of the NVC is zero. CwNVC is used to calculate EwNVC.

Exhibit 5. Conditional weighted net value change.



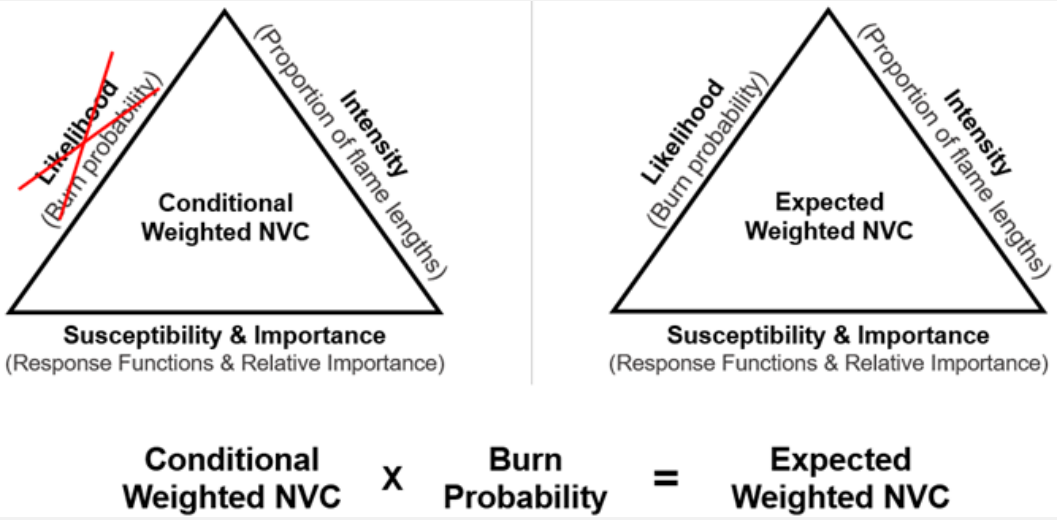
1.2.2.2 Expected Weighted Net Value Change

EwNVC analyzes the likelihood of a fire occurring and its effect on HVRAs. EwNVC is a product of CwNVC and burn probability (Exhibit 6). It determines the risk to HVRAs by intersecting wildfire hazard with the likelihood of occurrence and the potential impact on HVRAs. EwNVC is used for planning scenarios where the likelihood of a fire occurring needs to be considered (as opposed to CwNVC, which assumes a fire will occur). EwNVC is calculated based on the following:

- Burn probability (LBP output)
- Proportion of flame lengths (LBP output)
- Sub-HVRAs
- Response functions
- Relative importance

EwNVC is calculated for every pixel in the analysis area. Positive values indicate the HVRA is benefited by fire, and negative values indicate the HVRAs are threatened by fire (at-risk). As EwNVC is a product of CwNVC and burn probability, it is best used for planning scenarios where the likelihood of a fire occurring needs to be considered. EwNVC can be used to determine where best to implement fuels treatment projects.

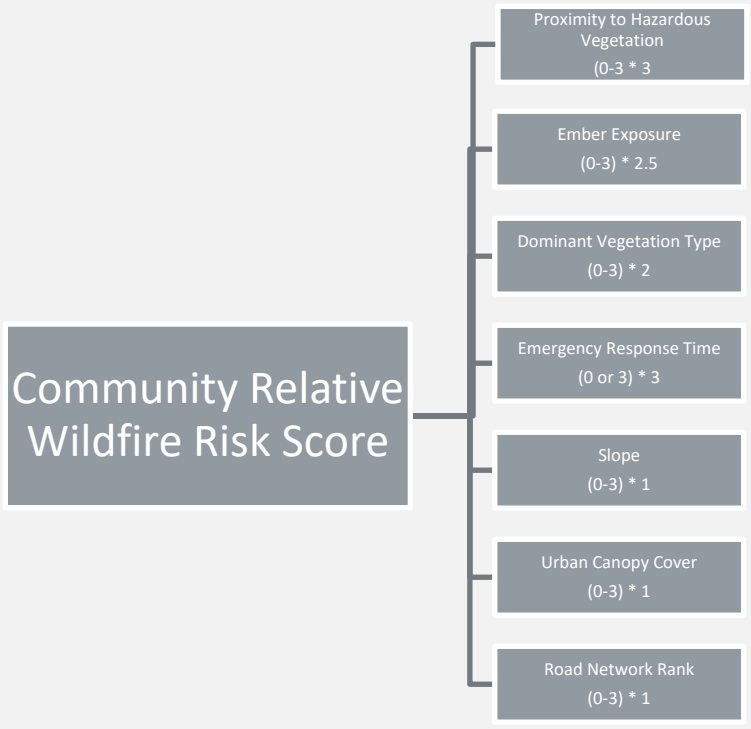
Exhibit 6. Expected weighted net value change.



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 5-meter raster environment Exhibit 7 depicts the conceptual framework for calculating wildfire hazard.

Exhibit 7. 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 and Weighting	Ranking Range
Proximity to Hazardous Vegetation (3)	Hazardous vegetation posing threats to communities was obtained from the Conditional Net-Value Change model results, selecting for vegetation identified as High, Higher, or Highest threat. The area of hazardous vegetation within the community and the 1,000-foot adjacent areas was compared to the overall community area to develop the input score.
Ember Exposure (2.5)	The Ember Hazard Zone layer was overlayed with community boundaries to determine the proportion of the community within the Ember Hazard Zone.
Dominant Vegetation Type (2)	Dominant vegetation within a community's vicinity was determined through the edited Fuel Model dataset. Dominant fuel models were binned as either urban, herbaceous, shrub, or timber fuels and ranked from 0 to 3, respectively.
Slope (1)	Average slope was determined within urbanized areas using a 30-meter digital elevation model (DEM) from the 2020 LANDFIRE landscape file. Urbanized areas were identified using the edited Fuel Model dataset, selecting for areas mapped as non-burnable.
Urban Canopy Cover (1)	Canopy cover data from the California Forest Observatory was overlayed with urbanized areas to determine average urban canopy cover. Communities with greater urban canopy cover were assigned higher ranking.
Emergency Response Time (3)	Emergency response time data was obtained from the Community Risk Assessment and Standards of Cover Study (Citygate Associates 2022). Communities outside of a 4-minute emergency response time were assigned a value of 3. Communities within the 4-minute emergency response window were assigned a value of 0.
Road Network Rank (1)	Street data obtained from the Monterey County geographic information system portal was utilized to determine community road network ranks. Road features including dead ends, road widths less than 20 feet, and whether the community includes a secondary access were considered. Communities with these features were assigned a relative ranking from 0 to 3 depending on the extent of these road network features.

The maximum community risk value observed within the Plan Area was 32, with a minimum value of 0. The total range of observed hazard values were binned into 5 classes including Very Low, Low, Moderate, High, and Very High using the natural breaks classification method in ArcGIS Pro. The wildfire hazard classification value breaks are provided below in Table 4.

Table 4. Community Relative Risk Ranking Classification Values

Hazard Score	Classification	Hazard Score	Classification
0–4	Very Low	>19–25	High
>4–11	Low	>25–32	Very High
>11–19	Moderate		

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.

Citygate Associates. 2022. Community Risk Assessment and Standards of Cover Study. City of Monterey. April 29, 2022.

Finney, M., and C. McHugh. 2019. FlamMap: Fire Mapping and Analysis System. Version 6.0 [software]. http://www.firelab.org/document/flammap-software.

USDOI (US Department of the Interior) and USDA (US Department of Agriculture). 2022 (version 3.4.1.3). Interagency Fuels Treatment Decision Support System (IFTDSS). https://iftdss.firenet.gov/.

Appendix B
Community Outreach

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 wildfire resilient. 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 Stakeholder Working Group

The CWPP Stakeholder Working Group was formed to bring together a diverse representation of Monterey Fire Department staff and City staff to help advise the CWPP's developmental process (Table B-1). Six Working Group meetings were held between January and July 2023, 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. Key insight gathered from the Working Group meetings are summarized in Table B-2.

Table B-1. Working Group Members

Name	Title	Jurisdiction/ Department
Gaudenz Panholzer	Fire Chief	Monterey Fire Department
Jeff Field	Fire Division Chief	Monterey Fire Department
Cheryl Kouretas	Fire Department Senior Admin Analyst	Monterey Fire Department
Carmyn Priewe	Deputy Fire Marshal	Monterey Fire Department
Laurie Huelga	Public Information Officer	City of Monterey
JD Sheldon	Fire Engineer	Monterey Fire Department
Christy Sabdo	Associate Planner	City of Monterey Planning
Louie Marcuzzo	Park Operations Manager	City of Monterey
Sam Mazza	Retired Fire Chief	Monterey Fire Department
Thys Norton	Assistant Urban Forester	City of Monterey – Urban Forestry
Cathy Madalone	Police Chief	Pacific Grove Police Department
Dan Gho	Public Works Director	City of Pacific Grove – Public Works
Anastacia Wyatt	Community Development Director	City of Pacific Grove
Brandon Swanson	Director of Community Planning and Building	City of Carmel-by-the-Sea – Planning
Aaron Campbell	Code Compliance Officer	City of Carmel-by-the-Sea
Jeff Watkins	Acting Police Chief	City of Carmel-by-the-Sea
Tom Ford	Administrative Analyst	City of Carmel-by-the-Sea

Table B-2. Working Group Key Insights

Topics	Working Group Insight
Community Wildfire Protection Plan Applicability	Findings from this plan can help inform safety and housing elements with new goals and policies.
Regulatory Barriers	Current tree ordinances make it difficult for hazardous trees to be removed with often vague language. Balance between removing hazardous vegetation and balancing environmental priorities is crucial for this community. Community members need more education on what is considered a hazardous tree and what the removal process entails.
Community Partnerships	Coalition/relationship building between neighborhood associations, community groups, government agencies, cultural groups, and more is necessary ongoing work to have project success.
Outreach	Communication and education are very important for these communities. Education and the methods of communication need to match the needs and demographics on the communities being served by this plan.
Fuel Treatment Areas	The Working Group discussed and compiled list of priority treatment areas based on modeling and community expertise.

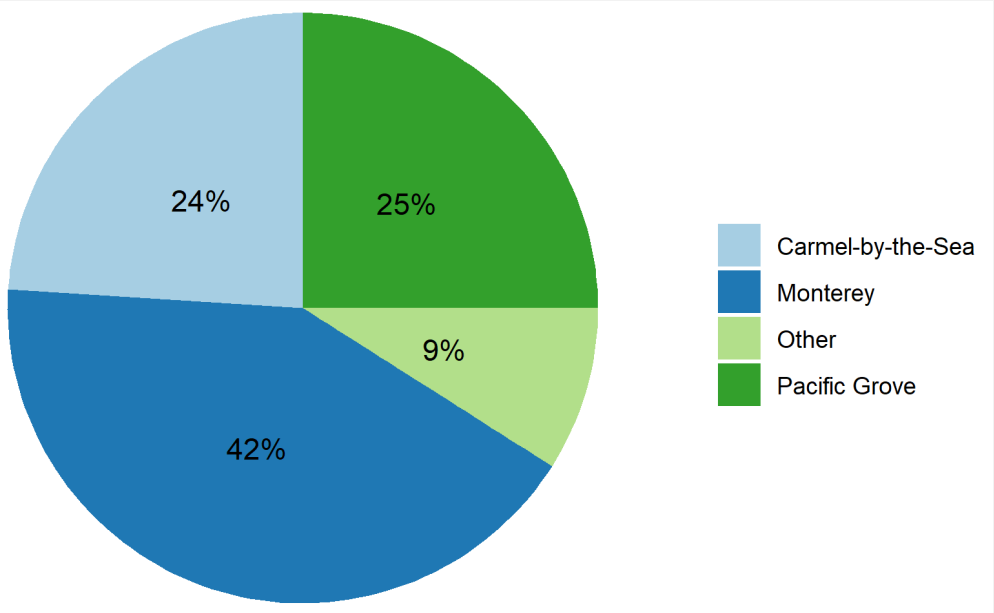
2 Public Survey

For a broad understanding of how community members feel and are impacted by wildfire, we sent out an online survey using the SurveyMonkey platform. The survey had 25 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 507 responses, with 468 of them being usable for analysis. The distribution of survey response from each Plan Area city are depicted in Exhibit B-1.

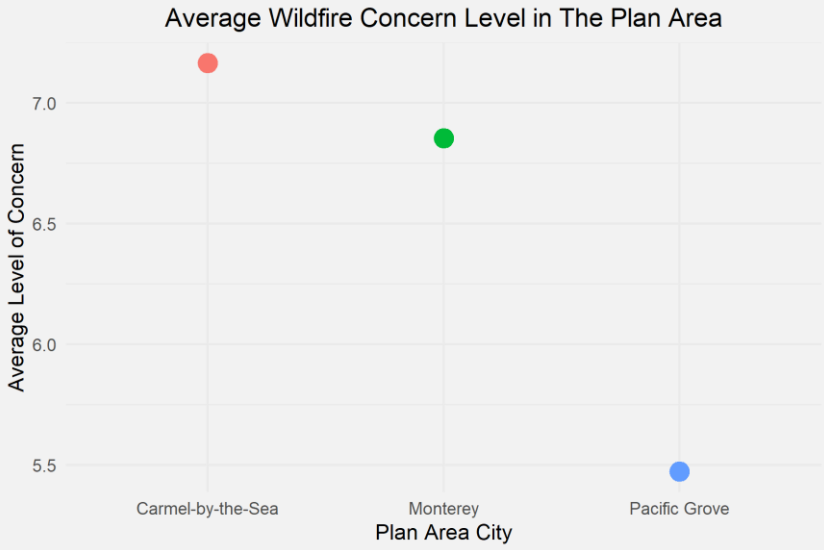
Exhibit B-1. Community wildfire survey responses distribution



2.1 Key Results

Although our survey covered a wide range of topics regarding wildfire, the key findings will focus on each city's wildfire concerns, desired actions, and methods to complete the desired action. When asked how concerned residents were about wildfire on a scale from 1 to 10, the average response from all residents was 7. However, when breaking it down by city, Carmel-by-the-Sea had the highest average worry of 7.4, Pacific Grove had the lowest average worry of 5.5, and Monterey was in the middle at 6.8 (Exhibit B-2).

Exhibit B-2. Overall wildfire concern level



When looking at the main concerns faced by residents, the top responses were fuels/vegetation on neighboring properties, limited evacuation routes, and fuels/vegetation on their own properties. When we specifically asked about barriers that would prevent community members from evacuating, the top barriers were not knowing when to leave, where to get proper evacuation information, and not having anywhere to stay when they did evacuate. Additionally, when asked if folks felt prepared to evacuate, most (86%) of our respondents felt completely or partially prepared, and 14% indicated they were not prepared to evacuate.

When asked what desired actions community members would want to see to make the Plan Area safer from wildfire, the top responses were fuel management projects on public lands, fuel management projects on private lands, and defensible space creation and maintenance.

Additionally, when asked what techniques were most favorable, 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 65% or higher. However, using herbicide as a vegetation management technique had majority disapproval, with only 23% of respondents in support of this activity. These results help identify the most approved methods for action in each community to help the Monterey Fire Department match up a technique with a given community.

In addition to the results or the entire Plan Area, data analysis was performed to identify concerns and desired actions from each city. These subsets were chosen to help identify action items based on the worries and desires from each city (Exhibits B-3 through B-8).

Carmel-by-the-Sea

Exhibit B-3. Carmel-by-the-Sea top wildfire concerns

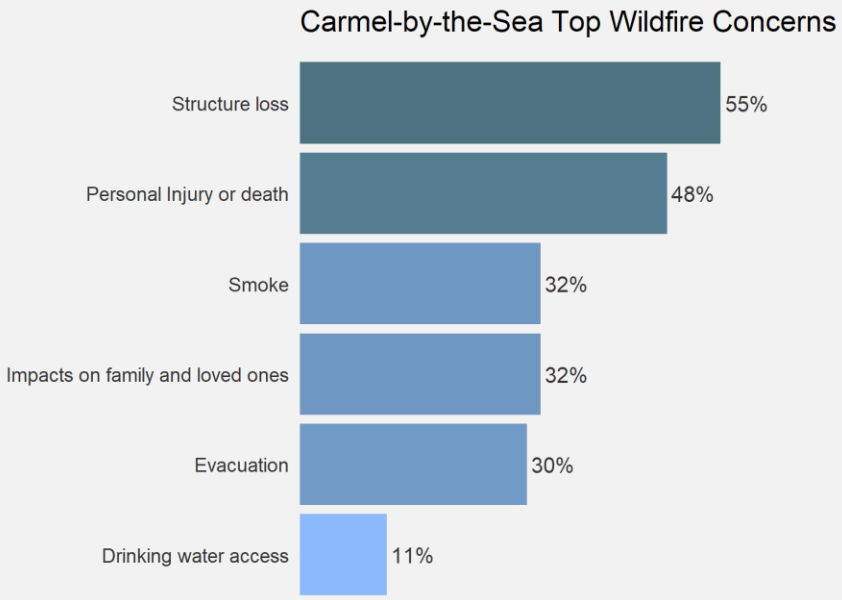
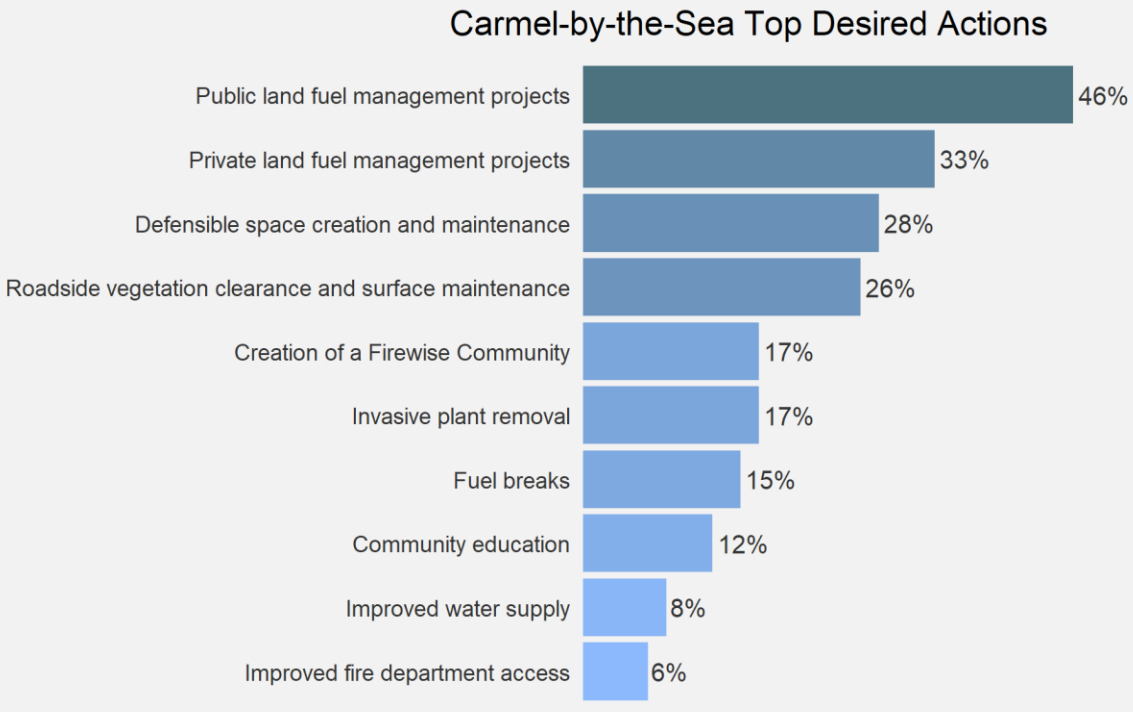


Exhibit B-4. Carmel-by-the-Sea top desired actions



Monterey

Exhibit B-5. Monterey top wildfire concerns

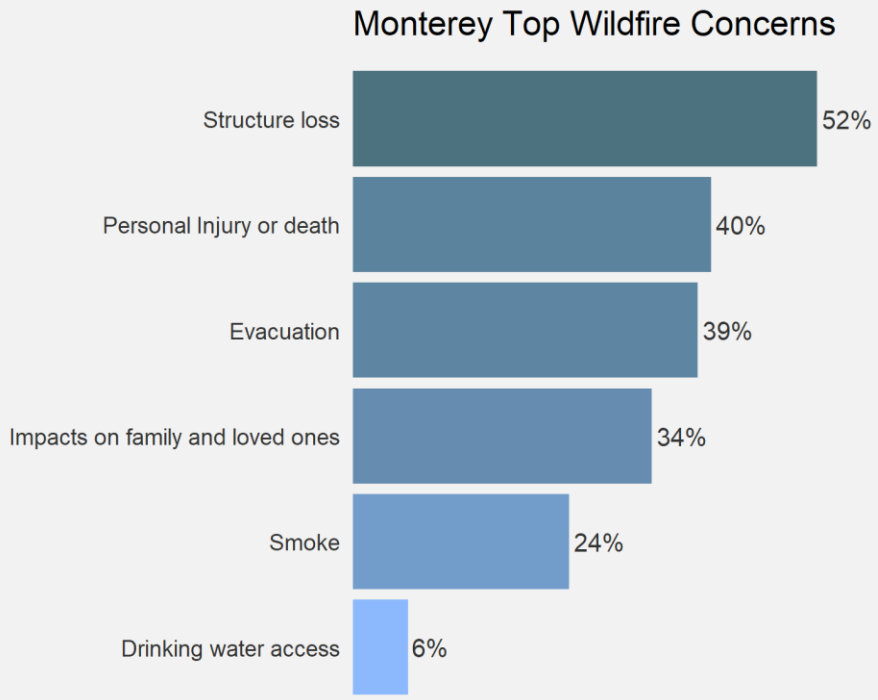
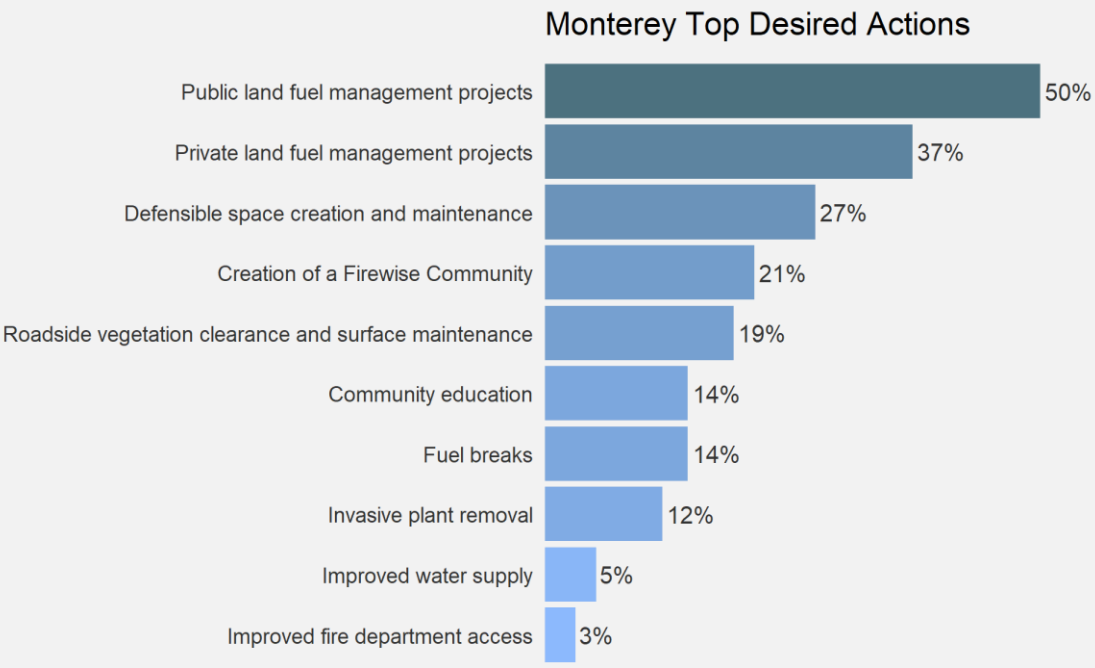


Exhibit B-6. Monterey top desired actions



Pacific Grove

Exhibit B-7. Pacific Grove top wildfire concerns.

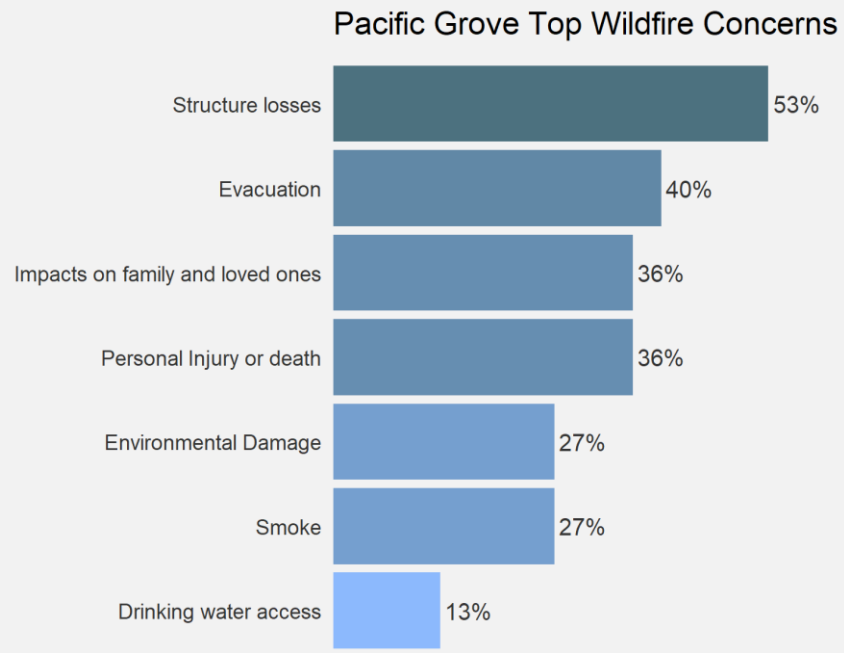
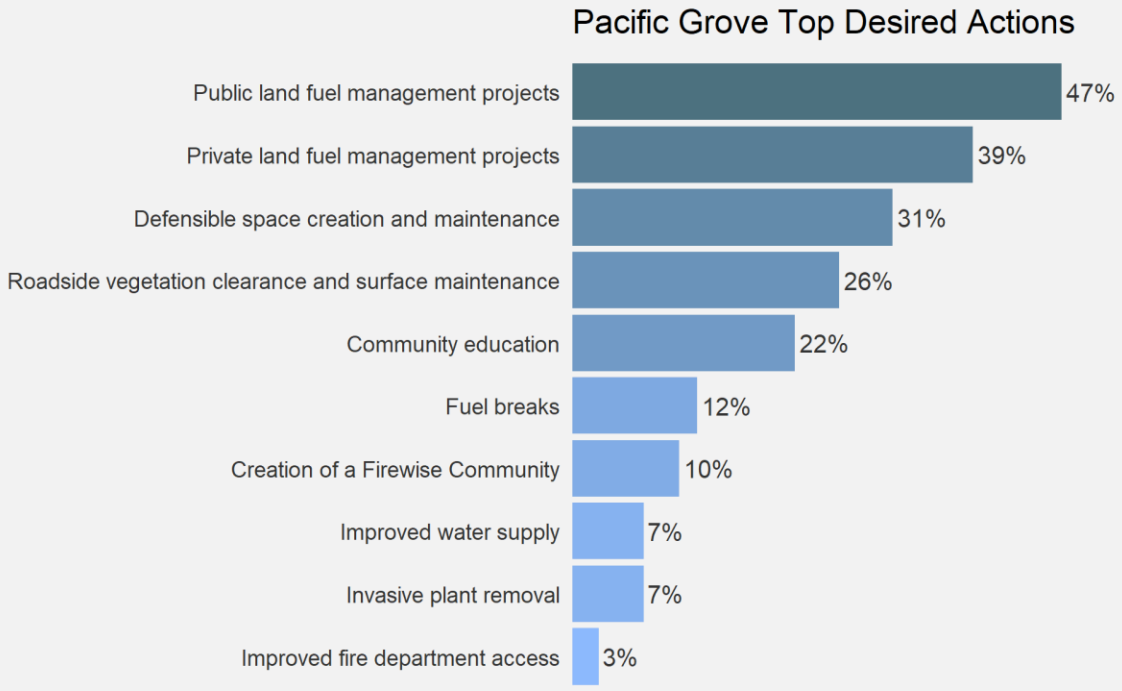


Exhibit B-8. Pacific Grove top desired actions .



3 Community Workshops

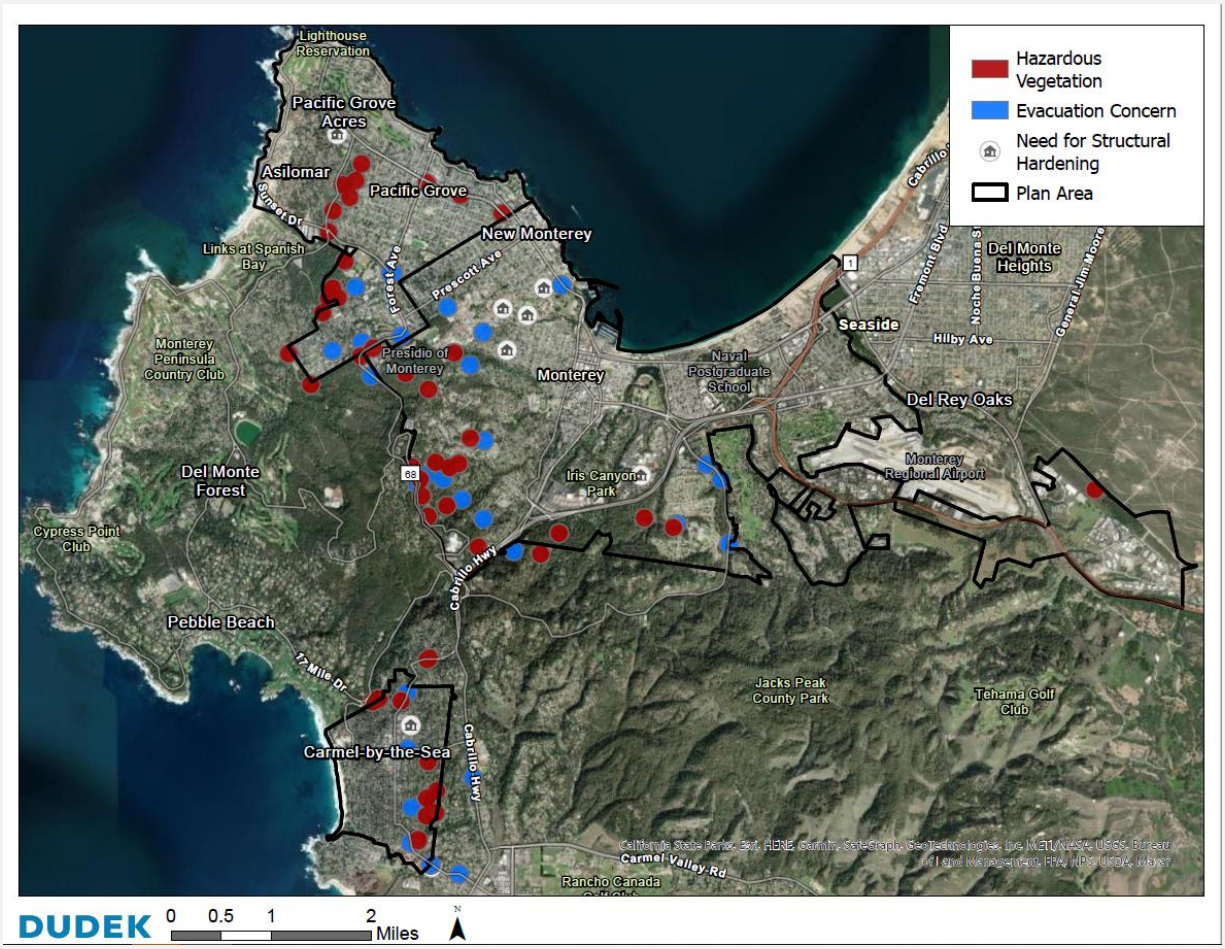
In addition to the quantitative data received from the public survey, community workshops were conducted to get more in-depth information on how wildfire impacts community members' lives and how actions can be taken to make them feel safer. We hosted one workshop each in the Cities of Carmel-by-the-Sea, Monterey, and Pacific Grove to ensure that we could encapsulate the opinions and perspectives of the greatest number of residents and community members possible. These workshops covered a brief overview of the project and included activities aimed at garnering discussion and gaining input form community members through passive and active activities focused on getting input through passive and active activities.

3.1 Passive 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 B-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. This is especially true for the eastern half of Monterey, including Deer Flats and Fisherman Flats.

Figure B-1. Map Activity Points.

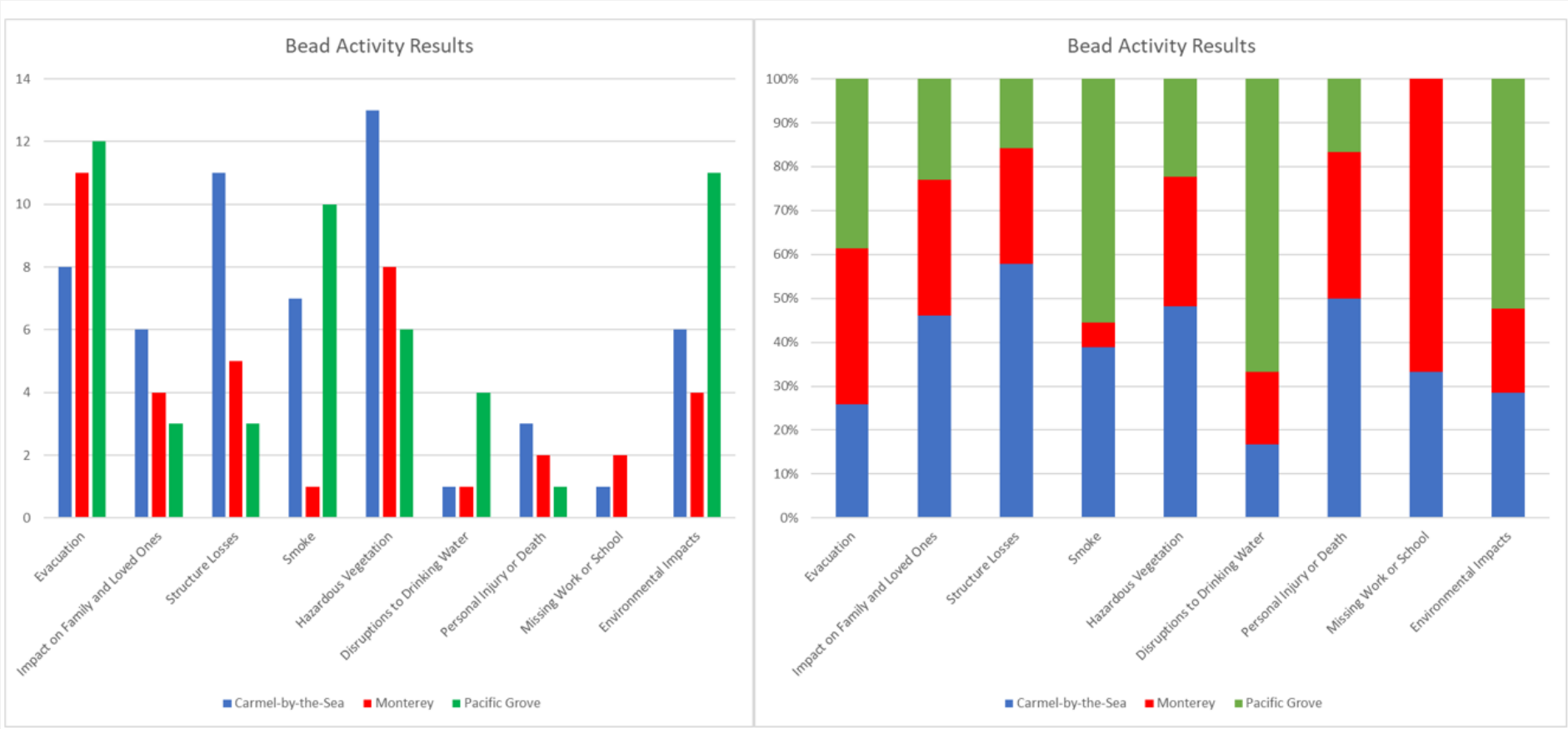


3.1.2 Bead Activity

This activity allowed residents to identify their top concern. This involved community members identifying their top concern on a poster board with various wildfire concerns listed. They then took a bead that is the same color as the concern and put it in a corresponding jar. Results are shown in Exhibit B-9.

As shown in Exhibit 9, the bead activity helped reveal that the top concerns for many of the community members were evacuation and hazardous vegetation. The graph on the left side shows the actual number of beads placed into each jar, and the right graph shows the distribution of the beads placed throughout the three cities. The right graph helps further signify the concerns that resonate more within each city.

Exhibit B-9. Bead activity results. .



4 Community Group Discussions

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 five topics:

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

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, as shown in Exhibit B-10 for example. This framing really helped garner input that can directly feed into actions items from the CWPP. Table B-3 highlights some key insights from each workshop. There were a lot of overlapping themes from each workshop, specifically around the need for better outreach, education, and desire for action. However, there were also some nuisances presented in this table and in the word clouds below (Exhibit B-11).

Exhibit B-10. Community group discussion poster.

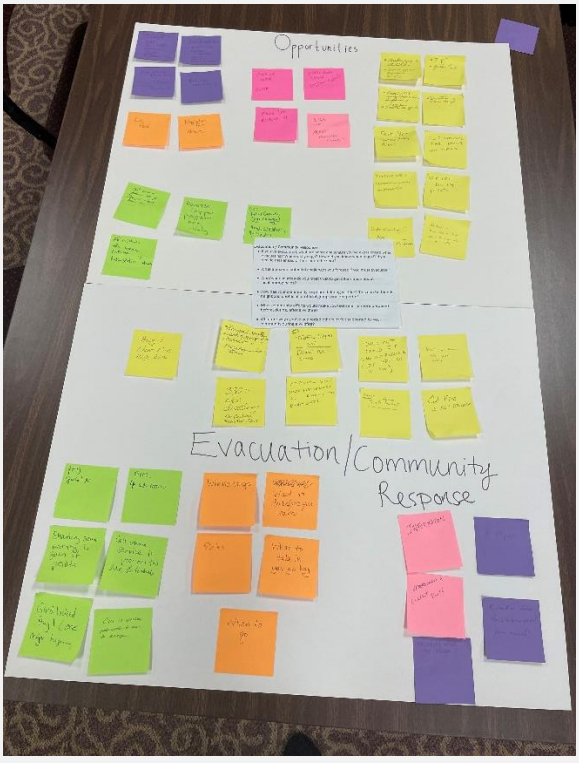


Table B-3 Community Group Discussion Takeaways

City	Main Takeaways
Carmel-by-the-Sea	Communication was a key priority for Carmel-by-the-Sea residents. This involves many facets, including knowing where to get proper evacuation information, how to harden their homes and create defensible space, and how community members can get involved in helping make their community safer. Some key actions that resonated with community members include the following: ▪ Utilizing more avenues for education and outreach like Nextdoor, door to door, real estate agents, radio, Pinecone Weekly, mail, social media, texts/reverse 9-1-1, schools, and religious organizations ▪ Having more workshops to help build consensus on opposing perspectives within wildfire preparation, including helping residents have a better understanding of what they can do to prepare ▪ Revising city ordinances to allow for removal of hazardous vegetation
Monterey	Responsibility and coordination were themes that resonated with Monterey residents, from knowing who you can trust as a source for wildfire information, to wanting a deeper understanding of a community's risks, to a better picture of how different organizations coordinate around wildfire. Some of the key actions that resonated with community members include the following: ▪ Utilizing academic institutions like the University of California or the California State University Systems for more research on modeling defensible space ▪ Having more education to clearly define the desired role of different parties before/during a wildfire, including residents, community groups, and utilities; this includes residents having a clear understanding of the California Department of Forestry and Fire Protection's "Ready, Set, and Go!" steps, wider community buy in, engagement with community groups, and the creation of Firewise Communities ▪ Coordinating with neighbors, specifically neighbors with mobility challenges, to ensure that communities are working together in the event of an evacuation ▪ Focusing on outreach and engagement through multiple avenues from door tags, reverse 9-1-1, social media, inspections, community fire drills, community chipper programs, and more
Pacific Grove	Having a holistic approach to wildfire preparation and management was stressed amongst Pacific Grove residents. In addition to the themes listed for the other cities, this group wanted to ensure that actions taken would be in accordance with the community's environmental values. Some key actions and tools include the following: ▪ Having better education of how homeowners can balance hardening their home and creating defensible space in an environmentally friendly way, including permeable hardscape ▪ Providing access to tools to help residents during a wildfire, such as air purifiers

To help synthesize to the feedback presented in the table above into a more succinct format, we decided to take the insights from the community workshop discussions and try to simplify them into key themes. This was done by taking all the Post-it notes that were used during all the discussions from the workshops and then simplifying each Post-it note into a single-word response. Then a word cloud generator was used to compile all the words. A word cloud helps signify the most important themes or takeaways by making the size of the word correspond to how many times that word was used. Therefore, themes or words that were used more often appear bigger than words or themes that were not used as much. This visualization tool is particularly useful in this case because it helps

quickly identify the similarities and differences between the cities when discussing the same topic. Below are the word clouds for each of the discussion topics for each city (Exhibit B-11). As you can see, many of the word clouds have similar keywords, like communication or education, but there are still nuances and slight differences between each of them.

Exhibit B-11. Community group discussion word clouds.

A. Home Hardening

Carmel-by-the-Sea

Monterey

Pacific Grove

B. Fire Experience		
		
Carmel-by-the-Sea	Monterey	Pacific Grove

C. Wildfire Planning

Carmel-by-the-Sea

Monterey

Pacific Grove

D. Defensible Space

Carmel-by-the-Sea

Monterey

Pacific Grove

Appendix C

Vegetation Management Techniques and Best Management Practices

1 Vegetation Management Techniques

As identified in the community wildfire protection plan, 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 best management practices (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 minimization of 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 star-thistle (*Centaurea solstitialis*), 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 star-thistle and medusahead (*Elymus caput-medusae*) 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 do not 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.

- 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 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

1.2 Hand Labor Techniques

Hand labor involves pruning, cutting, or removing 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. 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.

1.2.1 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.

- 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 International Society of Arboriculture and American National Standards Institute 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
- When lopping and scattering, lay each piece 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)

1.3 Mechanical Techniques

Mechanical techniques include all methods that employ motorized heavy equipment to remove or alter vegetation. Mechanical techniques 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.

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.)

1.3.1 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 by using tree protection devices, training 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, reuse 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
- Regrade or recontour 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

1.4 Prescribed Fire Techniques

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 that 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.

1.4.1 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. Pile burns should be lit when weather conditions allow, such as in winter and spring, and should be 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, 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 particulate matter) 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.

1.4.2 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 to 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 to promote diversity in ecosystems or

reduce fuel loading. Treatment boundaries are often roads, trails, or other nonburnable 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.

1.4.3 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, and required personnel and equipment, and evaluates potential impacts to resources in compliance with the California Environmental Quality Act. This may be prepared in coordination with the California Department of Forestry and Fire Protection.
- **Smoke Management Plan:** The California Air Resources Board and the South Coast Air Quality Management District (SCAQMD) 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 SCAQMD limit open burning for range management projects less than 10 acres and controlled burns less than 10 acres, or that produce less than 1 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 1 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, SCAQMD requires notification of the burn and that burning is conducted on a permissive burn day. SCAQMD 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 SCAQMD 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 SCAQMD 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.

1.4.4 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.

- 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 pile size should be no larger than necessary to avoid soil sterilization
- Minimize excess dragging of cut materials to piles to minimize soil disturbance
- Compact, to the extent possible, piles that cannot be burned before the commencement of fire season
- Protect retained trees and vegetation from potential damage by pretreating adjacent fuels

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.

1.5.1 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 nontarget 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 flowering 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., Fusilade 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.

1.5.2 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.

1.5.3 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.

- Consider herbicide use only when other treatment techniques are determined to be infeasible or ineffective in achieving desired management and maintenance standards
- Consult a state-licensed pest control advisor and/or the Los Angeles County Agricultural Commissioner 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 inches is forecasted within a 24-hour period from planned application)
- For aquatic vegetation control work, use only herbicides and surfactants that have been approved for aquatic use by the United States Environmental Protection Agency and are registered for use by the California Department of Pesticide Regulation
- Apply herbicides consistent with Federal Insecticide, Fungicide, and Rodenticide Act label instructions and use conditions issued by the United States Environmental Protection Agency and California Department of Pesticide Regulation
- To achieve desired control, utilize the lowest recommended rate to achieve vegetation management objectives of both herbicides and surfactants
- Add and indicator dye to the tank mix to help the applicator identify areas that have been treated and better monitor the overall application
- Avoid application to plants whose base is submerged in stream channels
- Follow safe procedures for transporting, mixing, loading, and properly disposing of herbicides
- Minimize the use of foliar (spray) applications, prioritizing localized or direct applications

2 Best Management Practices for Vegetation Management

The following BMPs 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.
- Internal project communication procedures for reporting fires shall be established. 9-1-1 shall be called in emergencies.
- Applicable standards restricting spark-generating equipment usage and spark arrestor requirements shall be complied with. 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.
- Staging areas shall be identified 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 pests, such as the invasive shothole borer (*Scolytus rugulosus*), 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 pest-specific measures have been developed to deal with regional pests, such as invasive shothole borer. 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 (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 should be 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 the following:

- Hydraulic mulch velocity dissipation devices
- Silt fences
- Sandbag barriers
- Hydroseeding
- Slope drains
- Sediment basins
- Straw bale barriers
- Soil binders
- Streambank stabilization
- Sediment traps
- Storm drain inlet protection
- Straw mulch
- Compost blankets
- Check dams
- Active treatment systems
- Geotextiles and mats
- Soil roughening
- Fiber rolls
- Temporary silt dikes
- Wood mulching
- Non-vegetation stabilization
- Gravel bag berms
- 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 C-1. Access roads should be closed to public vehicle travel following the completion of vegetation treatment operations.

Table C-1. Maximum Distance between Waterbreaks

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

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 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 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. If vegetation clearing must occur during the bird breeding season, a qualified biologist should conduct pre-operations surveys for nesting birds no more than 1 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, recontour 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 a.m. to 5 p.m.)

- 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 outreach to regular known user groups

2.10 Tree Protection

The general management standards outlined in the community wildfire protection plan 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 aboveground 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 American National Standards Institute 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 fire line intensities are low enough to minimize crown and trunk scorching.

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Appendix D

Prioritized Vegetation Management Projects

A list of prioritized vegetation management projects is presented in Table D-1. The locations of existing fuel breaks and fuel treatment projects and the locations of some recommended projects are provided in Figures D-1 through D-3.

Table D-1. Priority Vegetation Management Projects

Project Description	Coordinating Agencies/Entities
All Plan Area Cities	
Vegetation Management and Defensible Space	
Increase defensible space compliance in the Plan Area through engagement with property owners and through MFD inspection and enforcement efforts.	MFD, Monterey, PG, CBTS
Create and maintain defensible space around historic and community structures in the Plan Area.	MFD, Monterey, PG, CBTS
Encourage the use of prescribed herbivory across the Plan Area to reduce or maintain fuel loads.	MFD, Monterey, PG, CBTS, County Parks, State Parks
Roadside Fuels Reduction	
Conduct roadside fuels reduction along major roadways and evaluate City-identified evacuation routes for hazardous vegetation and fuels reduction needs. See Figures D-1, D-2, and D-3 for high priority areas for roadside fuels reduction. Update this list and identified evacuation routes as local evacuation plans are developed. ▪ Highway 11, 2 ▪ Highway 681, 3 ▪ Viejo Road ▪ Barnet Segal Lane ▪ Aguajito Road (portion within Monterey)1 ▪ Garden Road1 ▪ Josselyn Canyon Road ▪ Camino Del Monte ▪ Junipero Avenue2 ▪ Ocean Avenue2 ▪ 8th Avenue2 ▪ Olmsted Road ▪ Monhollan Road ▪ Congress Avenue ▪ Skyline Forest Drive ▪ Scenic Drive ▪ 17 Mile Drive3 ▪ Forest Lodge Road3 ▪ Lighthouse Ave3 ▪ Central Avenue3	MFD, Caltrans, Monterey County Parks, Monterey, CBTS, PG
Routinely manage roadside vegetation on all public and private roads in the Plan Area to reduce ignition potential and create fire-safe evacuation and fire access corridors.	MFD, Caltrans, Monterey County Parks, Monterey, CBTS, PG, HOAs, neighborhood councils/associations

Table D-1. Priority Vegetation Management Projects

Project Description	Coordinating Agencies/Entities
Prescribed Fire	
Evaluate the potential use of prescribed fire in the Plan Area to restore appropriate fire return intervals in fire-adapted vegetation communities.	MFD
Evaluate the potential use of prescribed fire for cultural purposes.	MFD, Native American tribal groups
City of Monterey	
Forest Health/Resilience	
Develop a Forest Management Plan for the La Mesa Village.	MFD, Monterey, U.S. Army Garrison Presidio of Monterey
Roadside Fuels Reduction	
Pursue the creation of shaded fuel breaks along Olmsted and Monhollan Road to protect the Deer Flats and Fish Flats communities from wildfires encroaching from the south.	MFD, Caltrans, County Parks, CAL FIRE San Benito Monterey Unit, HOAs
Vegetation Management & Defensible Space	
Conduct fuels reduction within the Huckleberry Hill Nature Preserve, including thinning, chipping, and fuel breaks (as identified in County CWPP).	MFD, Monterey, U.S Army Garrison Presidio of Monterey
Provide input and assist with coordinating roadside and defensible space fuels reduction in La Mesa Village and explore opportunities to expand and connect treatment sites with treatment areas outside of La Mesa Village.	MFD, Monterey, U.S Army Garrison Presidio of Monterey
Conduct fuels reduction objectives identified in City of Monterey Greenbelt Fuel Reduction Plan and explore opportunities to expand treatment areas.	MFD, Monterey
Conduct fuels reduction work within the Old Capitol Site in accordance with the Old Capitol Site Forest Management Plan.	MFD, Monterey
Create defensible space surrounding the Westland House of Community Hospital of the Monterey Peninsula.	MFD, Monterey, Westland House of Community Hospital of the Monterey Peninsula
City of Pacific Grove	
Forest Health/Resilience	
Conduct forest restoration projects in George Washington Park, including pine restoration to encourage Monterey pine regeneration as described in the park's Forest Management Plan.	MFD, PG
Vegetation Management and Defensible Space	
Create a shaded fuel break along the perimeter of the Del Monte Park neighborhood to increase defensible space and reduce community wildfire risks.	MFD, PG, Pebble Beach Community Services District, CAL FIRE San Benito Monterey Unit
Conduct fuels reduction within the Perimeter Management Zone within George Washington Park as described in the park's Forest Management Plan.	MFD, PG

Table D-1. Priority Vegetation Management Projects

Project Description	Coordinating Agencies/Entities
Conduct fuels reduction within Rip Van Winkle Open Space.	MFD, PG
City of Carmel-by-the-Sea	
Forest Health/Resilience	
Develop a Forest Management Plan for the Mission Trails Preserve with a focus on forest health and ladder fuels reduction.	MFD, CBTS, Friends of Mission Trails Nature Preserve
Vegetation Management and Defensible Space	
Collaborate with Pebble Beach to develop a fuels reduction plan for Pescadero Canyon near the boundary of CBTS.	MFD, CBTS, Pebble Beach
Conduct fuels reduction within Forest Hill Park.	MFD, CBTS

Notes: MFD = Monterey Fire Department; Monterey = City of Monterey; PG = City of Pacific Grove; CBTS = City of Carmel-by-the-Sea; County = County of Monterey; State Parks = California Department of Parks and Recreation; Caltrans = California Department of Transportation; HOA = homeowners' association; CAL Fire = California Department of Forestry and Fire Protection; CWPP = community wildfire protection plan.

1 Monterey locally designated evacuation route.
2 Carmel-by-the-Sea locally designated evacuation route.
3 Pacific Grove locally designated evacuation route.

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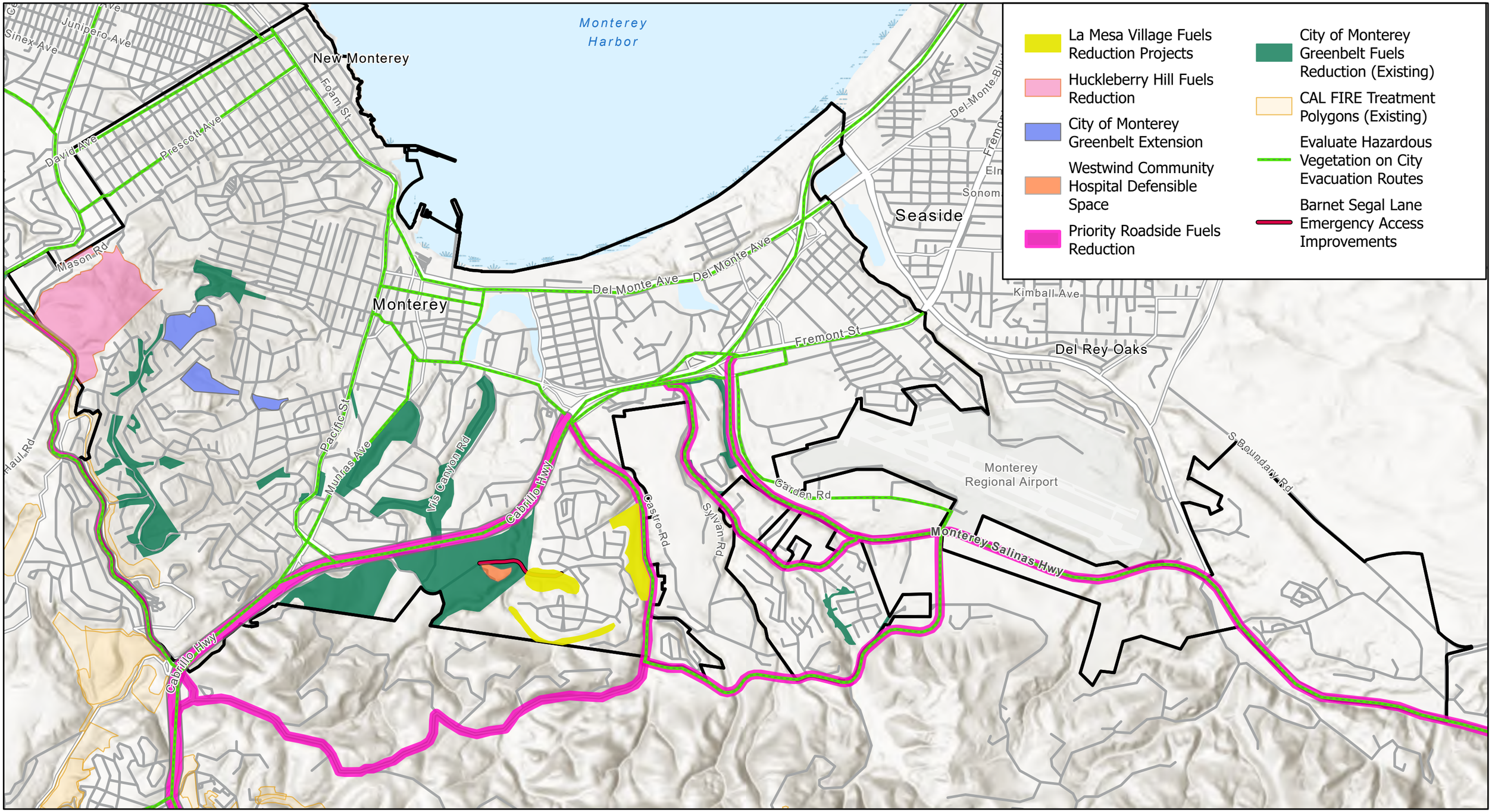

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FIGURE D-1

Monterey Existing and Priority Projects

Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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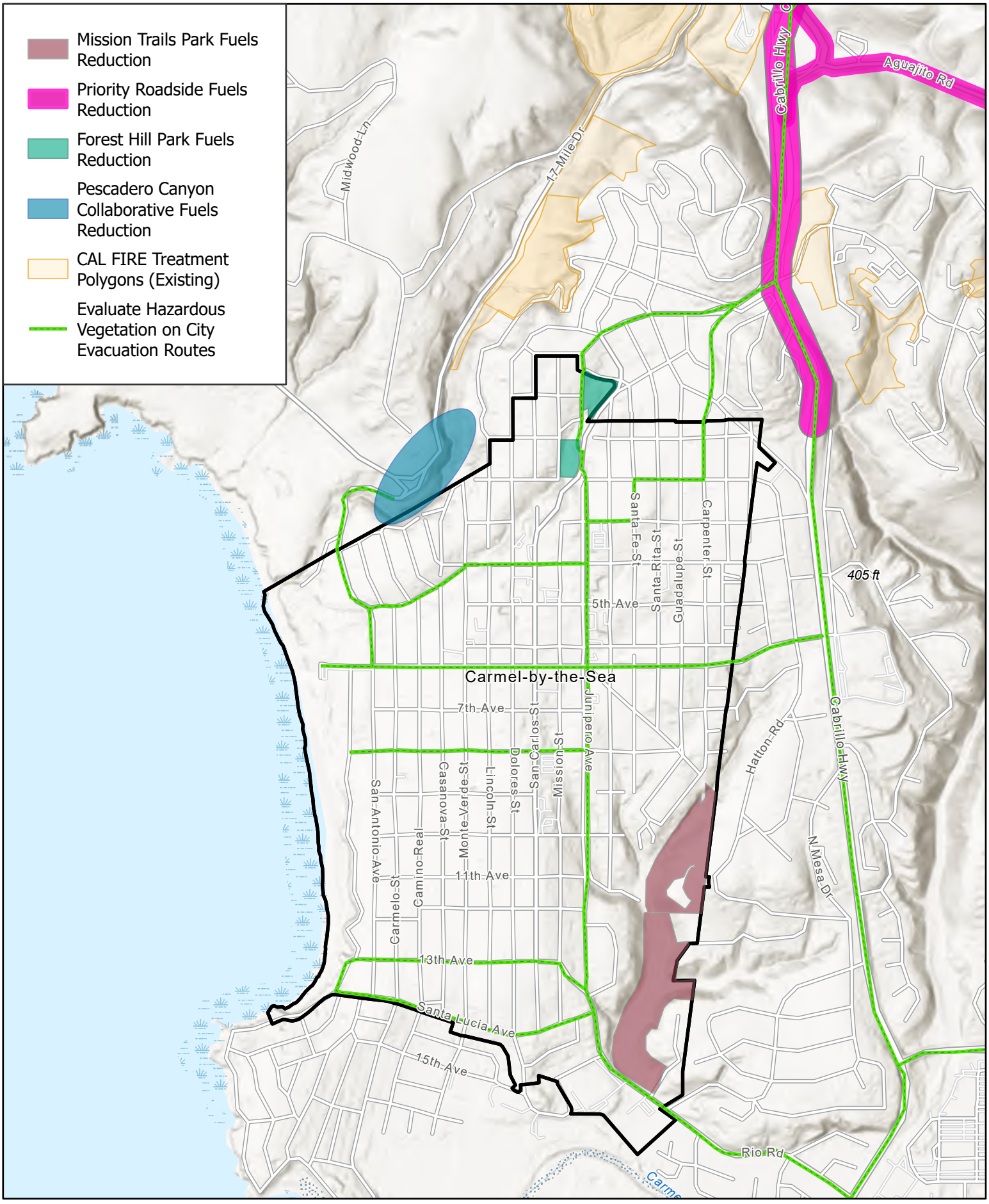

FIGURE D-2

Carmel-by-the-Sea Existing and Priority Projects

Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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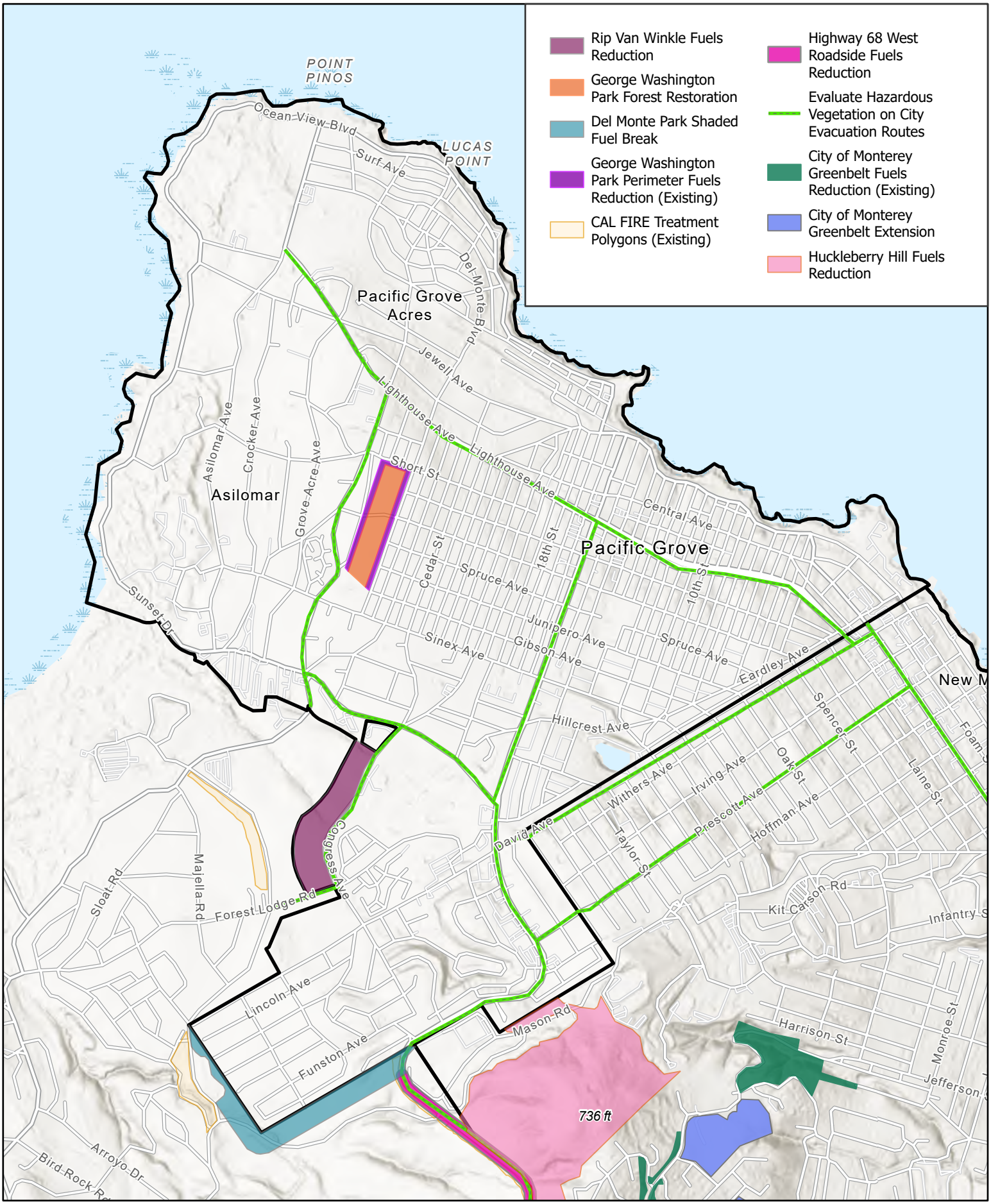

FIGURE D-3

Pacific Grove Existing and Priority Projects

Community Wildfire Protection Plan - Monterey, Pacific Grove, and Carmel-by-the-Sea

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Appendix E

Planning and Regulatory Environment

1 Planning and Regulatory Environment

This section describes existing plans, codes, and standards relevant to wildfire protection and fuels management in the Plan Area.

1.1 Federal

1.1.1 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 community wildfire protection plan (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.

1.1.2 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 U.S. Forest Service (USFS) and the Department of the Interior are working to implement the key points outlined in the National Fire Plan (U.S. Government 2000).

1.1.3 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.

1.1.4 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.

1.1.5 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.

1.1.6 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.

1.1.7 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.

1.1.8 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).

1.1.9 Los Padres National Forest Fire Management Plan

The 2008 LPNF Fire Management Plan is a strategic document that addresses the fire management program and guides fire management activities based on the 2006 Los Padres National Forest Land Management Plan (LPNF Management Plan). The Monterey Ranger District is responsible for management of USFS lands in Monterey County. Fire prevention planning and management focuses on maintaining defensible space around structures/improvements, and strategically treating hazardous fuels to interrupt fire spread and enhance suppression efforts.

1.1.10 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.

1.1.11 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

1.1.12 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.

1.1.13 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.

1.1.14 International Wildland-Urban Interface Code

The International Wildland-Urban Interface Code is published by the International Code Council and addresses wildfire issues in the wildland-urban interface (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.

1.1.15 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.

1.2 State

1.2.1 California Strategic Fire Plan

The 2018 Strategic Fire Plan for California reflects the California Department of Forestry and Fire Protection's (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.

1.2.2 CAL FIRE Strategic Fire Plan

In 2019 CAL FIRE released its Strategic Plan. The plan is updated from the 2012 CAL FIRE Strategic Plan and focuses on the department's mission, vision, and values. The Strategic Fire Plan is the state's roadmap for reducing wildfire risk. By emphasizing what needs to be done before a fire occurs, the Strategic Fire Plan seeks to reduce firefighting costs and property losses, increase firefighter safety, and contribute to ecosystem health. Four goals were identified in the plan: (1) improve the core capabilities, (2) enhance internal operations, (3) ensure health and safety, (4) and build an engaged, motivated, and innovative workforce (CAL FIRE 2019a).

1.2.2.1 Unit Strategic Fire Plan San Benito-Monterey

The San Benito-Monterey Unit serves the state lands in and surrounding the Plan Area. The Unit Strategic Fire Plan was developed with input from key stakeholders, and intends of meeting the goals set by both the stakeholders and the California Strategic Fire Plan. Pre-fire management projects are designed to reduce costs and losses, especially during periods of severe fire weather. With the use of fire resistant landscaping, mechanical fuels treatment, prescribed burns, building construction standards, infrastructure, land use planning, and escape plans, the Unit strives to keep what would otherwise be a large, catastrophic fire, to smaller fire with less intensity, reducing suppression costs and property loss.

1.2.3 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.

1.2.4 California State Multi-Hazard Mitigation Plan

Approved by the Federal Emergency Management Agency (FEMA) in September 2018 as an Enhanced State Mitigation Plan, the 2018 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.

1.2.5 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.

1.2.6 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 1246 address vegetation clearance standards for electrical utilities. They include standards for clearing around energy lines and conductors.

1.2.7 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.

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.

1.2.8 2019 California Fire Code with July 2021 Supplement

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.

1.2.9 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.

1.2.10 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.

1.2.11 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.

1.3 Local

1.3.1 Monterey County CWPP

The Monterey County CWPP was developed in 2010 and updated in 2016 by the Monterey Fire Safe Council, in collaboration with a Working Group, CAL FIRE, USFS, the Bureau of Land Management, and other stakeholders. The Monterey County CWPP serves as an advisory document to guide wildfire prevention and preparedness throughout the County. The Monterey County CWPP includes wildfire planning recommendations at a county-wide scale, including hazardous fuel mitigation activities and methods for reducing structural ignitability.

1.3.2 County of Monterey Multi-Jurisdictional Hazard Mitigation Plan

The Monterey County Office of Emergency Services developed the updated Monterey County Multi-Jurisdictional Hazard Mitigation Plan in 2022. Developing the plan included partnerships with incorporated cities and unincorporated county areas, as well as Special Purpose Districts. Each participating planning partner has prepared a jurisdiction-specific annex to this plan, which identifies localized hazards and mitigation strategies. Wildfire is identified as a high risk throughout the County.

1.3.3 City of Monterey General Plan

The City of Monterey General Plan serves as the City's main policy document and governs the City's physical shape and character. Monterey's General Plan was adopted in 2005 and is reviewed on an annual basis. In addition, the City has adopted specific area plans for various commercial and residential neighborhoods. The following goals and policies of the General Plan relate to wildfire and fire safety.

Safety Element

- **Goal d.** Minimize the loss of life and property from fire.
  - **Policy d.1.** Achieve the greatest practical level of built-in fire protection to confine fires.
  - **Policy d.2.** Achieve effective emergency access to all developments, installations, and fire protection equipment for emergency apparatus and for evacuation.
  - **Program d.2.1.** Discourage all dead end roads and cul-de-sacs longer than 700 feet.
  - **Program d.2.2.** Encourage alternative second access roads as emergency access for roads greater than 700 feet in length.
  - **Program d.2.3.** Locate all installations or processes considered hazardous in the safest possible areas or on individual parcels.
  - **Program d.2.4.** In hazardous fire areas, require fire retardant roofing and access to steep lots, and consider brush clearance and planting of non-flammable vegetation.
  - **Policy d.3.** Maintain a cost-effective, high level of fire protection service.
  - **Policy d.4.** Continue to work with fire protection agencies that provide fire service to unincorporated areas through mutual aid. Encourage those areas that desire fire protection services which are beyond "outside legitimate mutual aid" to annex to the City of Monterey for fire protection services instead of using contractual or automatic aid agreements.
  - **Policy d.5.** Cooperate with fire protection agencies to obtain and maintain mutual aid agreements that will augment the City's fire protection services. Continue mutual aid with the California Department of Forestry that obtain adequate aid for larger, open-range type fires involving brush, trees and grass that require specialized tactics and equipment.
  - **Policy d.6.** Work with Cal-Am to ensure adequate water pressure for fire fighting.
- **Figure 14,** Showing Fire Hazard Severity Zones
- **Figure 15**, Showing Evacuation Routes
- **Policy e.2.** Continue to work with the airport district through a fire mutual aid agreement
- **Goal h.** Ensure prompt and effective services to cope with local emergencies.
  - **Policy h.1.** Continue to provide high quality fire, police, and emergency medical services.
  - **Policy h.2.** Continue to develop emergency plans to respond to large-scale natural or man-made disasters, such as fires, earthquakes, floods, nuclear attack, terrorist attack, or releases of hazardous materials.

Public Facilities Element

- **Goal c.** Maintain facilities to provide a cost-effective, high level of fire protection service.

- **Policy c.1.** Require built-in fire protection for new and existing structures to minimize the need for additional fire facilities.
- **Policy c.2.** Identify cost-effective fire station locations using contractual or automatic aid agreements.
- **Policy c.3.** Continue to monitor and evaluate the need for a new fire station to serve the Monterey-Salinas Highway (68) and Ryan Ranch areas. Explore opportunities to co-locate at the airport's fire station to provide this additional service.
- **Policy c.4.** Provide for adequate fire facilities through capital funding.
- **Policy c.5.** Develop a plan to upgrade or replace the fire administration building
- **Policy m.2.** Encourage continued development of the City's water supply system to meet established fire flow standards (including reservoirs, mains, and hydrants).

1.3.4 City of Monterey Greenbelt Fuel Reduction Plan

This Greenbelt Fuel Reduction Plan identifies fuel reduction recommendations for eight areas within the City's greenbelt system—the Skyline Forest, Veterans Park, Monte Vista, Carmelo Street, Don Dahvee, Josselyn Canyon, Fisherman Flats, and Old Capitol Site greenbelts. The plan identifies these as areas where fire hazard is high due to high fuel loads. Wildfire in these greenbelts could result in substantial impacts to natural resources, as well as substantial health, safety, and welfare impacts to the built/human environment adjacent to these areas.

1.3.5 City of Monterey Community Risk Assessment and Standards of Cover Study

The City of Monterey Community Risk Assessment and Standards of Cover Study is a comprehensive assessment of current services and desired service levels for emergency response. The assessment was conducted to assist the City and Fire Department in ensuring a safe, effective, and appropriately sized response force for fires, medical emergencies, and other events requiring a specialized emergency response throughout the Cities of Monterey, Pacific Grove, Carmel-by-the-Sea, and Sand City, as well as at THE Monterey Regional Airport, Naval Support Activity Monterey, and La Mesa Village military housing.

1.3.6 City of Carmel-by-the-Sea General Plan

The Carmel-by-the-Sea General Plan, adopted June 2003, is a comprehensive statement of the planning goals and policies for the city and its surrounding Sphere of Influence. Carmel's General Plan has been combined with its Local Coastal Land Use Plan to ensure coordination of these two policy documents. The LCP sets forth goals, objectives, and policies that govern the use of land and water in Carmel-by-the-Sea consistent with the California Coastal Act of 1976. The Environmental Safety Element identifies fire as an issue of local significance and discusses the fire hazards in the city, factors that contribute to fire susceptibility, state and local regulations, and proactive fire safety measures being taken by the city to minimize wildfire concerns, such as tree inspections, pruning, and removal; sprinkler requirements; and roof requirements. The General Plan identifies narrow roads and limited water supply as potential challenges to emergency response in the city. The following goals (G), objectives (O), and policies (P) in the General Plan relate to wildfire and fire safety.

Environmental Safety Element

- **O8-3** Provide public education about what to do in case of emergencies and means available to avoid or minimize their effects.
- **P8-14** Educate the public regarding seismic, geologic, flood, fire, tsunami, and other potential disasters, by preparing periodic news articles for local media outlets, such as Carmel Pine Cone.
- **P8-15** Publicize the system of emergency and evacuation routes serving the City.
- **P8-16** Encourage property owners to retrofit older structures with fire detection and/or warning systems.
- **G8-2** Provide protection from natural hazards.
- **O8-4** Prevent or reduce the potential for life loss, injury, and property damage from fire hazards.
- **P8-17** Avoid and discourage locating public structures and utilities in high severity fire hazard zone.
- **P8-18** Ensure adequate water supply for fire emergencies.
- **P8-19** Encourage new development located in or adjacent to fire hazard areas to incorporate fire preventative site design, access, landscaping and building materials, and other fire suppression techniques.
- **P8-20** Control excessive buildup of flammable vegetative material on vacant lots and within and adjacent to high severity fire hazard zones (such as Mission Trails and Pescadero Canyon – refer to Figure 8.4), especially following wet springs.
- **P8-21** Develop and provide funding and/or incentives for removal of flammable vegetative material particularly in high fire severity areas around Mission Trails and Pescadero Canyon (e.g., free chipping day, free collection day for tree limbs).
- **Figure 8.6** Evacuation Routes

1.3.7 City of Pacific Grove General Plan

The Pacific Grove General Plan, adopted in 1994, is a comprehensive, integrated, and internally consistent statement of Pacific Grove's development policies for the city and its Sphere of Influence. It is the principal policy document for guiding future conservation and development of the city. The Health and Safety Element identifies the Del Monte Forest and Lynn "Rip" Van Winkle Open Space as areas that pose wildland fire hazard to Pacific Grove communities. The following goals, programs, and policies in the General Plan relate to wildfire and fire safety.

Health and Safety Element

- **GOAL 2** Provide aid to the community as needed in the event of natural or man-made disasters.
  - **Program I** Identify alternative water sources for firefighting purposes for use during a disaster.
- **GOAL 4** Prevent loss of life, injury, and property damage from fires, release of hazardous materials, natural disasters, and exposure to other hazardous conditions.
- **GOAL 5** Ensure an adequate level of fire and medical emergency service to the community.
  - **POLICY 13** Require new development to provide all necessary water service, fire hydrants, and roads consistent with Fire Department standards and City requirements which relate to the project.
  - **POLICY 14** Require new development to comply with the minimum fire-flow rates contained in Appendix III-A in the most recent and locally-adopted edition of the Uniform Fire Code.
  - **POLICY 15** Require all construction to meet the applicable current City codes for fire and life safety.

  - Program O Review the application of the City's requirements for on-site fire suppression systems, including sprinklers and pumps, in all new construction.
- POLICY 16 Ensure adequate fire equipment access through the development review process.
- POLICY 17 Ensure adequate water fire-flow throughout the city.
  - Program P Regularly monitor fire-flow to ensure adequacy.
  - Program Q Schedule the improvement of water mains in the City's Capital Improvements Program (CIP).
- POLICY 18 Maintain an ongoing fire and life safety inspection program for all occupancies, except one- and two-family dwellings.
  - Program R Continue to inspect all occupancies annually, except one- and two-family dwellings.
- POLICY 19 Maintain an ongoing comprehensive hazard abatement program that requires property owners to remove fire hazards, including vegetation, hazardous structures and materials, and debris, as directed by the Fire Department. Special conditions may apply in natural areas or where endangered species occur.
  - Program S Continue the current annual weed abatement program.
  - Program T Continue and improve current fire prevention practices, including the current annual city fuel reduction program, in close cooperation with the City Forester.
  - Program U Incorporate a fire safety component in the forestry management plan which takes into consideration the preservation of natural forest characteristics.
  - Program V Require businesses that manufacture, store, use, or transport significant quantities of hazardous and toxic materials to annually identify such materials and their quantities and to notify the Fire Department of any changes in such materials or activities.
  - Program W Maintain a current inventory of hazardous and toxic materials by location, for use by the Fire Department and the Community Development Department.
  - Program X Continue all existing health, safety, and education programs.
- POLICY 20 Endeavor to achieve and maintain an overall fire insurance (ISO) rating of 3 or better.
  - Program Y Monitor fire and emergency response times, staffing levels, facilities, and equipment.
- POLICY 21 Maintain an average response time of three minutes for Priority 1 (emergency) calls.
  - Program Z Work with the 911 reporting system to shorten response time.
- POLICY 22 Maintain a high level of fire apparatus performance.
  - Program AA Include replacement of aging fire apparatus in the City's Capital Improvements Program (CIP)
  - Program BB Remove fire hydrants from Mermaid Avenue. The street is too narrow, and there is inadequate flow from the hydrants.
- POLICY 23 Maintain and enhance the current level of emergency medical service to the community.
  - Program CC Maintain all line, full-time fire personnel as certified Emergency Medical/ Defibrillator Technicians (EMT-D).
  - Program DD Conduct a service level/cost-analysis study to determine if an increase in Fire Department personnel's current level of training would improve current emergency medical services. Implement findings as appropriate.

- **POLICY 24** Ensure that training programs sensitize emergency personnel to the special needs of persons with disabilities

- **Figure 10-2** Evacuation Routes

1.3.8 Pebble Beach Community Services District Fire Defense Plan

The 2009 Fire Defense Plan for the Pebble Beach Community Services District is included in the CAL FIRE San Benito-Monterey Unit Fire Plan. The 2009 Fire Defense Plan addresses fire and life safety related to wildland fires within the Del Monte Forest area of Pebble Beach. The plan addresses emergency access and hazardous fuel treatment standards for open space areas and undeveloped vacant parcels. The plan outlines roadside fuel treatment methods, firebreak maintenance criteria, road and access gate identification standards, and environmental protection and targets fuel break areas.

1.3.9 Cypress Fire Protection District Fire Defense Plan

The Cypress Fire Protection District, in collaboration with CAL FIRE, developed a landscape hazardous fuel reduction project in the form of a Fire Defense Plan. The plan addresses the threat of wildland fire within and around the Cypress Fire Protection District by identifying and prioritizing those actions determined by CAL FIRE to provide the greatest fire protection within the WUI. The goal of the Cypress Fire Defense Plan is to reduce the threat to life, property, and resources resulting from wildland fire within the district. This will be accomplished by reducing surface fuels, ladder fuels, and canopy density and will create conditions that improve fire suppression effectiveness.

2 Environmental Review

2.1 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 community wildfire protection plan recommendation on federal land within the wildland–urban interface defined in a community wildfire protection plan are afforded expedited NEPA review. The federal agency carrying out the proposed action or that owns the land (e.g., U.S. Forest Service) typically conducts the NEPA review and decides the appropriate level of NEPA analysis to be conducted. 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.

2.2 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 Public Resources Code 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 (California Public Resources Code, Section 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.

2.2.1 California Vegetation Treatment Program

The California Vegetation Treatment Program (CalVTP) was developed by the California Board of Forestry and Fire Protection 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. 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.

Initial planning efforts for fuel management projects conducted under this community wildfire protection plan should examine the project's location relative to the CalVTP Treatable Landscape to determine suitability for analysis under the CalVTP Program EIR.

2.3 California Coastal Act

The California Coastal Act defines the Coastal Zone, which is under the jurisdiction of the California Coastal Commission. The Coastal Zone covers both land and water, and the California Coastal Commission has the authority to regulate construction, buildings, housing, roads, fire, and erosion abatement, and to issue fines within the Coastal Zone. Local governments are required to prepare Local Coastal Programs under the California Coastal Act, which guide development within the Coastal Zone. Projects proposed within the Coastal Zone generally must obtain a Coastal Development Permit.

2.4 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, the Regional Water Quality Control Board, and the California Department of Fish and Wildlife. It is anticipated that the U.S. Army Corps of Engineers may require a fill permit under Section 404 of the Clean Water Act. The California Department of Fish and Wildlife 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 Section 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 F
Funding Opportunities

Funding

Funding is critical to implementing projects identified in this CWPP. MFD, in coordination with partner cities and Plan Area landowners, should consider pursuing grant funding opportunities to facilitate implementation of CWPP projects. Development of funding sources and 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:

- **Monterey County Fire Relief Fund Grants:** The Monterey County Fire Relief Fund was created to help individuals and families impacted by current and future wildfires throughout Monterey County. At this time, grants are focused on relief and recovery efforts. Grants from this special purpose fund will support nonprofit organizations assisting with relief, recovery and rebuilding efforts. More information can be found at https://www.cfmco.org/monterey-county-fire-relief-fund-grants/.
- **California Department of Forestry and Fire Protection (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/.
- **Environmental Quality Incentives Program (EQIP):** 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 EQIP can be found at https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/.
- **Catastrophic Fire Recovery EQIP Fund Pool:** A cost-share program for working landscapes that can addresses fire recovery. Fire recovery may be cost-shared up to 90%, often on parcels 1 acre or more or smaller parcels with natural resource concerns. Neighbors can collaborate to meet acreage requirements. More information can be found at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ca/programs/financial/eqip/?cid=stelprdb1247015.
- **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:** 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/2022-sfa-grant-opportunity/.
- **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/2021/12/03/rfp-for-wildfire-resilience-projects-announced/.
- **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 State Responsibility Area (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/grants-and-funding/2021-county-coordinators-grant-opportunity/.
- **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/2021-county-evacuation-route-grant-opportunity/.
- **United States Department of Agriculture (USDA) 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, 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.
- **Federal Emergency Management Agency (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 (HMGP):** 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 (BRIC) 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.