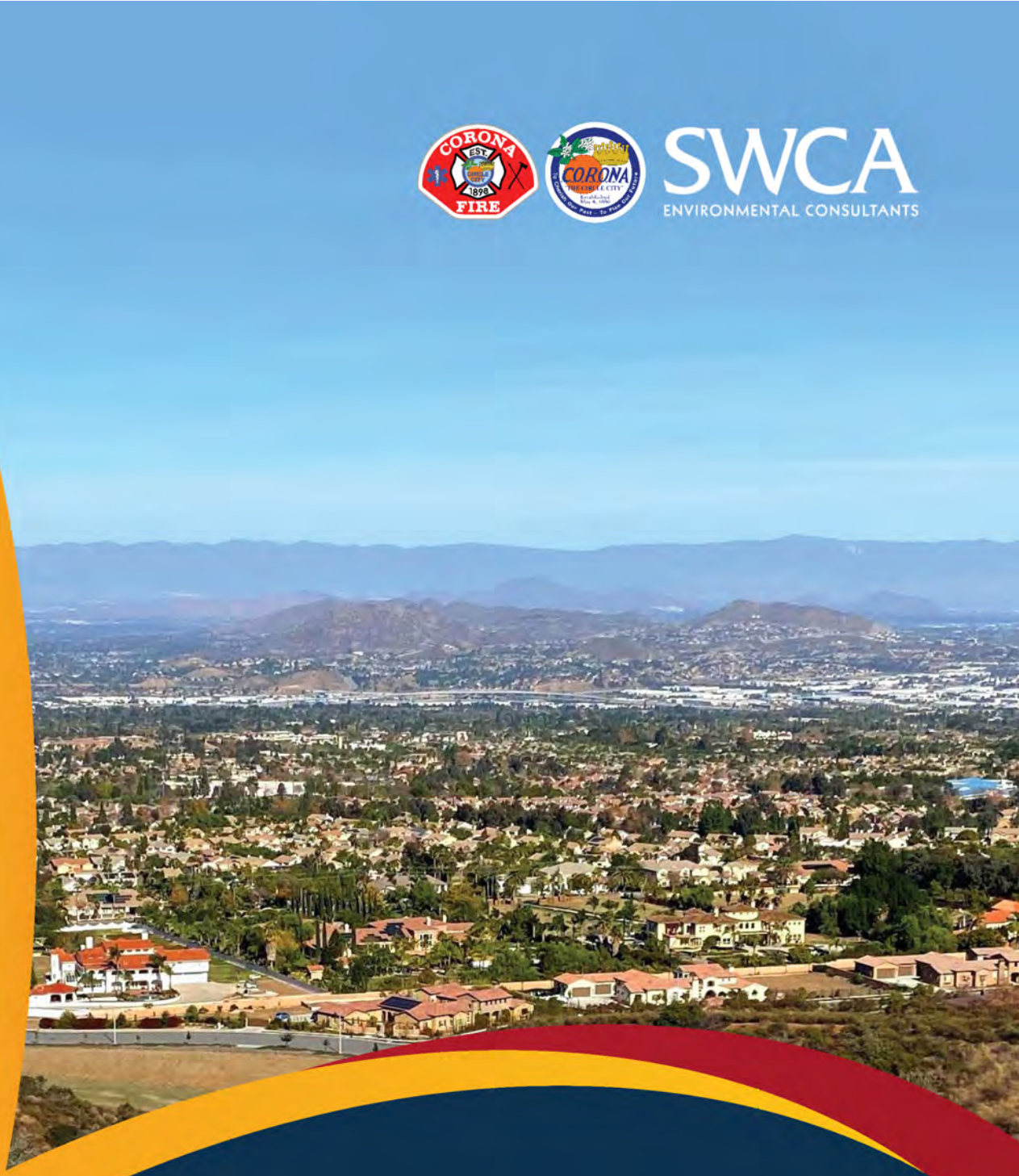

SWCA
ENVIRONMENTAL CONSULTANTS

2021

CITY OF CORONA

Community Wildfire Protection Plan

This CWPP was developed in collaboration with Corona Fire, CAL FIRE, and the USFS.

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EXECUTIVE SUMMARY

This City of Corona Community Wildfire Protection Plan (CWPP) addresses hazards and risks of wildland fire throughout the City of Corona and makes recommendations for fuel reduction projects, public outreach and education, structural ignitability reduction, and fire response capabilities. The City of Corona comprises a diverse landscape but a population with a common concern: the need to prepare for wildfire to reduce the risk of loss of life and property, as well as environmental damage.

Community members are familiar with large fires, as several have occurred in the region and the City of Corona itself in recent years. Fire managers believe the danger is increasing and that large, destructive, fires are likely imminent. This CWPP has been developed to assist the City of Corona in ensuring that a catastrophic wildfire will be avoided in the future by assessing areas at risk and recommending measures to decrease that risk.

The purpose of the CWPP is to assist in protecting human life and reducing property loss due to wildfire throughout the City of Corona. The plan is the result of a community-wide wildland fire protection planning process and the compilation of documents, reports, and data developed by a wide array of contributors. This plan was compiled in 2021 as the City of Corona's first city-specific CWPP. This CWPP has been, and all future updates will be developed in response to the federal Healthy Forests Restoration Act (HFRA) of 2003. The 2021 City of Corona CWPP meets the requirements of the HFRA by addressing the following:

1. Having been developed collaboratively by multiple agencies at the state and local levels in consultation with federal agencies and other interested parties.
2. Prioritizing and identifying fuel reduction treatments and recommending the types and methods of treatments to protect at-risk communities and pertinent infrastructure.
3. Suggesting multi-party mitigation, monitoring, and outreach.
4. Recommending measures and action items that residents and communities can take to reduce the ignitability of structures.
5. Soliciting input from the public on the draft CWPP.

A group of multijurisdictional agencies (federal, state, and local), organizations, and residents joined together as a Task Force to develop this CWPP. These Task Force members have many years of experience working in fire management.

The planning process has served to identify many physical hazards throughout the City of Corona that could increase the threat of wildfire to communities. During development of the 2021 City of Corona CWPP, the community members were engaged in providing input. Public meetings were convened to gather comments. By incorporating public and Task Force input into the recommendations, treatments are tailored specifically for the City of Corona. The CWPP emphasizes the importance of collaboration among multijurisdictional agencies in order to develop fuels mitigation treatment programs to address wildfire hazards. The City of Corona has a committed team of career firefighters and prevention staff, who work arduously to protect the life and property of citizens, but without homeowners taking on some of the responsibility of reducing fire hazards in and around their own homes, these resources are severely

stretched. A combination of homeowner and community awareness, public education, and agency collaboration and treatments is necessary to fully reduce wildfire risk.

A small amount of fire mitigation work has been completed by the City of Corona and other stakeholders. These actions include developing a Suppression Inspection Action Plan and a Wildland Urban Interface Strategic Pre Plan (City of Corona 2017).

Communities located immediately adjacent to wildland fuels, in areas of steep topography, and within canyons that align with prevailing winds need to prepare for fast-paced wildfire spread in these environments. Recommendations for improving wildfire mitigation in these communities may include focusing on actions to reduce the presence of hazardous fuels within wildland urban interface (WUI) communities, encouraging residents to mow borders around their property, encouraging residents to harden their homes to potential flame impingement from fast-moving grass fires, and equipping fire departments to respond quickly to these fast-paced wildfire events.

This CWPP provides background information, a risk assessment, and recommendations. Much of this background information is housed in several appendices to the main document to focus the main document on analysis and action items.

Chapter 1 provides a general overview of CWPPs and describes actions that have been taken to mitigate wildfire risk. Chapter 2 presents an overview of the fire environment and specific information about fuel types. Chapter 3 describes fire behavior, the risk assessment, and summary of community values at risk. Chapter 4 provides recommendations with respect to the three primary goals of the National Cohesive Wildland Fire Management Strategy:

1. Restore and maintain landscapes,
2. Create fire-adapted communities, and
3. Improve wildfire response.

Recommendations outlined under each goal include action plans, monitoring strategies, and funding sources for implementing projects. Chapter 5 describes monitoring strategies and details regarding implementation of actions.

The plan does not mandate implementation of any of the recommendations, but the message throughout this document is that the greatest fire mitigation could be achieved through the joint actions of individual homeowners and local, state, and federal governments. It is important to stress that this document is an initial step in raising public awareness and treating areas of concern and should serve as a tool in doing so. This City of Corona CWPP should be treated as a living document to be regularly updated or immediately following a significant fire event. The plan should continue to be revised to reflect changes, modifications, or new information. These elements are essential to the success of mitigating wildfire risk throughout the City of Corona and will be important in maintaining the ideas and priorities of the plan and the communities in the future.

STORY MAP

The City of Corona opted to develop a story map (online web content) to disseminate information to the public and provide an opportunity for the public to provide input into the plan content. In addition to

facilitating information sharing, the story map also provides the City of Corona with a platform that can be readily revised to keep the CWPP document current. The CWPP is shared on the City of Corona Fire Department webpage: https://corgis.coronaca.gov/cwpp.

We would like to formally thank the Core Team and all stakeholders for contributing their time and expertise throughout the planning process. Your participation has contributed to creating resilient landscapes, implementing public education, reducing structural ignitability, and ensuring safe and effective wildfire response.

CHAPTER 1 – INTRODUCTION

The United States is facing urgent forest and watershed health concerns. While the number of annual wildfires throughout the United States has been slightly decreasing (67,700 fires in 2016 vs. 59,000 fires in 2020), the number of acres burned has been on the rise (Congressional Research Service [CRS] 2021). An average of 7 million acres is burned every year due to wildfire, more than doubling the annual average of acres burned in the 1990s (CRS 2021). Communities are seeing the most destructive wildfire seasons in history. The 2015 fire season had the most acreage impacted in a single year since 1960 at 10.13 million acres. 2020 was the second most extensive year for wildfire with 10.12 million acres burned (CRS 2021). These statistics demonstrate that wildfires are becoming larger and harder to control.

California's Forests and Rangelands 2017 Assessment states that California, like other western states, faces urgent issues concerning frequent and severe pest and wildfire events that are unprecedented and threaten the sustainability of these ecosystems. These issues require reexamination of land and fire management policies and practices as human populations demand more from natural systems and climate change continues (California Department of Forestry and Fire Protection [CAL FIRE] 2018a).

As wildfire severity increases, communities need a plan to help prepare for, reduce the risk of, and adapt to wildland fire events. Community Wildfire Protection Plans (CWPPs) help accomplish these goals. A CWPP provides recommendations that are intended to reduce, but not eliminate, the extreme severity or risk of wildland fire.

This document, the 2021 City of Corona CWPP, reviews, verifies, and/or identifies potential priority projects where mitigation is needed to protect from wildfire the irreplaceable life, property, and critical infrastructure in the City of Corona. The development of the CWPP is rooted in meaningful collaboration among many stakeholders, including local, state, and federal officials.

This 2021 CWPP reviews and presents potential treatments for mitigation of wildfire-related risks in the priority areas but does not attempt to mandate the type and priority for treatment projects that will be carried out by the land management agencies and private landowners. With the responsibility for implementing wildfire mitigation treatments being totally at the discretion of the landowner, the 2021 City of Corona CWPP will only identify potential treatments and a suggested priority for these projects.

GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness. Another goal of the CWPP is to enhance public awareness by helping residents better understand the natural-and human-caused risk of wildland fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as Stated in the HFRA, are:

Collaboration: Local and State government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (Society of American Foresters [SAF] 2004).

Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment that will protect one or more communities at risk (CARs) and their essential infrastructures (SAF 2004).

Treatments of Structural Ignitability: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan (SAF 2004).

It is the intent of this 2021 CWPP to provide a citywide scale of wildfire risk and protection needs and then bring together all of the responsible wildfire management and suppression entities in the City of Corona to address the identified needs and to support these entities in planning and implementing the necessary mitigation measures. Additional information on the planning process is available in Appendix A.

The Task Force developed the following goals and objectives for the CWPP:

- Develop a strong framework of cooperation with stakeholders to support mitigation and wildfire response.
- Promote community involvement in identifying hazards and effective measures to reduce the threat of wildfire.
- Develop achievable mitigation strategies to address wildfire risks and hazards in the wildland urban interface (WUI).
- Align the CWPP with existing and future wildfire and fuels planning for the City of Corona and adjacent land ownership.
- Provide a platform for wildfire mitigation that can support the growth of the City of Corona Fire Safe Council.

NAVIGATION

The plan provides background information, a risk assessment, and recommendations to reduce or mitigate wildfire risk to communities. The CWPP is designed to be used by the residents of the City of

Corona, as well as stakeholders tasked with forest, fire, and emergency management. Some information is therefore highly technical in order to provide sufficient detail to aid in project implementation.

During this CWPP planning process, the plan has been supplemented with online content compiled into a project story map. The story map serves as a synopsis to the larger plan and is designed to make the information in this plan more accessible to the reader as it allows the public and stakeholders to interface with the various map products that have been developed through this planning process. The story map and CWPP will be readily updated as conditions change throughout the City. The story map can be accessed via the City Fire Department webpage.

Prior to developing the CWPP, the City of Corona developed the 2021 City of Corona Wildland Risk/Hazard Assessment that has been used to inform the development of project recommendations. This risk assessment is presented in full in the City of Corona CWPP Story Map.

This CWPP is organized into several chapters with more detailed information compiled into appendixes. Chapter 1 provides an overview of CWPPs and describes the need for a plan; Chapter 2 gives an overview of the fire environment and introduces the reader to fire history information and well as fire response; Chapter 3 describes fire behavior and the risk assessment; Chapter 4 includes detailed mitigation strategies that could be implemented to reduce wildfire risk under the umbrella of the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy), including action plans that outline priorities and recommendations for reducing fuels, initiating public education and outreach, reducing structural ignitability, and improving fire response capabilities; and Chapter 5 provides suggested approaches to monitoring actions.

The CWPP does not require implementation of any of the recommendations; however, these recommendations may be used as guidelines for the implementation process if funding opportunities become available. The recommendations for fuels reduction projects are general in nature; site-specific planning that addresses location, access, land ownership, topography, soils, and fuels would need to be employed upon implementation. Also, it is important to note that the recommendations are specific to WUI areas and are expected to reduce the loss of life and property.

In developing the CWPP, a large amount of background information on the City of Corona was compiled and analyzed, including location and land use data, climate and weather data, baseline vegetation data, historic conditions, population, demographics, CWPP planning process, fire regime and baseline conditions, fire policy, and other supporting background information. This information is presented in Appendix A, Community and CWPP Background.

Additional appendices to this CWPP include maps in Appendix B; the Task Force contact list in Appendix C; the Wildland Fire Risk Assessment Matrix in Appendix D; funding opportunities in Appendix E; and community outreach information in Appendix F. In addition, all recommendation tables are provided in Appendix G.

ALIGNMENT WITH THE NATIONAL COHESIVE STRATEGY

The 2021 CWPP is aligned with the Cohesive Strategy and its Phase III Western Regional Action Plan by adhering to the nation-wide goal "*To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire*." (Forests and Rangelands 2014:3).

The primary, national goals identified as necessary to achieving the vision are:

- **Restore and maintain landscapes:** Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- **Fire-adapted communities:** Human populations and infrastructure can withstand a wildfire without loss of life and property.
- **Wildfire response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

For more information on the Cohesive Strategy, please visit: https://www.forestsandrangelands.gov/strategy/documents/strategy/CSPhaseIIINationalStrategyApr2014.pdf

Alignment with these Cohesive Strategy goals is described in more detail in Chapter 4, Mitigation Strategies.

In addition to aligning with the Cohesive Strategy, the CWPP also incorporates information on post-fire recovery, the significant hazards of a post-fire environment, and the risk that post-fire effects pose to communities (Figure 1.1).

Figure 1.1. CWPP incorporating the three primary goals of the Cohesive Strategy and post-fire recovery and serving as holistic plan for fire prevention and resilience.

ALIGNMENT WITH PLANS AND AGREEMENTS

This CWPP is aligned with multiple local, state, and federal planning documents. These documents or agreements are summarized in Appendix A. In addition, fire policy and legislative direction is also summarized in Appendix A.

TASK FORCE

The City of Corona Fire Department invited engagement from adjacent government agencies in the development of this 2021 City of Corona CWPP. Stakeholder involvement is critical in producing a meaningful document that includes all collaborators' diverse perspectives. The Task Force drives the planning process in its decision making, data sharing, experience, and communication with community members. The project was kicked off on April 8, 2021; the Task Force met for the first time on May 6, 2021, and convened again on June 13, 2021, and August 16, 2021.

The Task Force List is provided in Appendix C.

PROJECT AREA

The project area includes all of the City of Corona as delineated by its geographic and political boundaries (Figure 1.2).

The City of Corona is located roughly 45 miles southeast of Los Angeles County in western Riverside County. It is situated in a valley, bordered by mountains to the south, Lake Mathews to the east, and the Prado Dam to the northwest. Cities adjacent to the City of Corona include Yorba Linda and Anaheim Hills to the west; Chino to the northwest; Norco, Eastvale, and the Jurupa Valley to the north; Riverside to the east; and Moreno Valley and Lake Elsinore to the south. The City of Corona is bordered by various regional and state parks. Limestone Canyon Regional Park is located to the southwest of the city, Chino Hills State Park to the west, and Lake Matthews Estelle Mountain Reserve to the east. The Santa Ana Mountains are located south of the city. Interstate 15 and State Route 91 intersect the city, and State Route 71 connects to State Route 91 at the western terminus of the city (City of Corona 2017).

The City of Corona boundaries encompass 39.2 square miles and a population of approximately 171,000 people. The City of Corona has over 394 acres of recreational areas including parks, outdoor pools, sports fields, basketball courts, tennis courts, skate parks, and playgrounds. The City of Corona has roughly 52,400 housing units, with a large amount located at the WUI.

LAND OWNERSHIP

The City of Corona has relatively uniform land ownership, with most (98%) of the land belonging to private owners (Figure 1.3). To the north, the U.S. Army Corps of Engineers (USACE) is in possession of small portions (1.5%) of land, namely the Prado Reservoir. Within the WUI, outside of the City of Corona limits, the principal owner is the U.S. Forest Service (USFS), Cleveland National Forest. In the western periphery, the State (Chino Hills State Park) is in possession of a very small portion (0.1%) of the remaining land.

Additional detail regarding the project area, such as topography, weather, and vegetation is summarized in Appendix A.

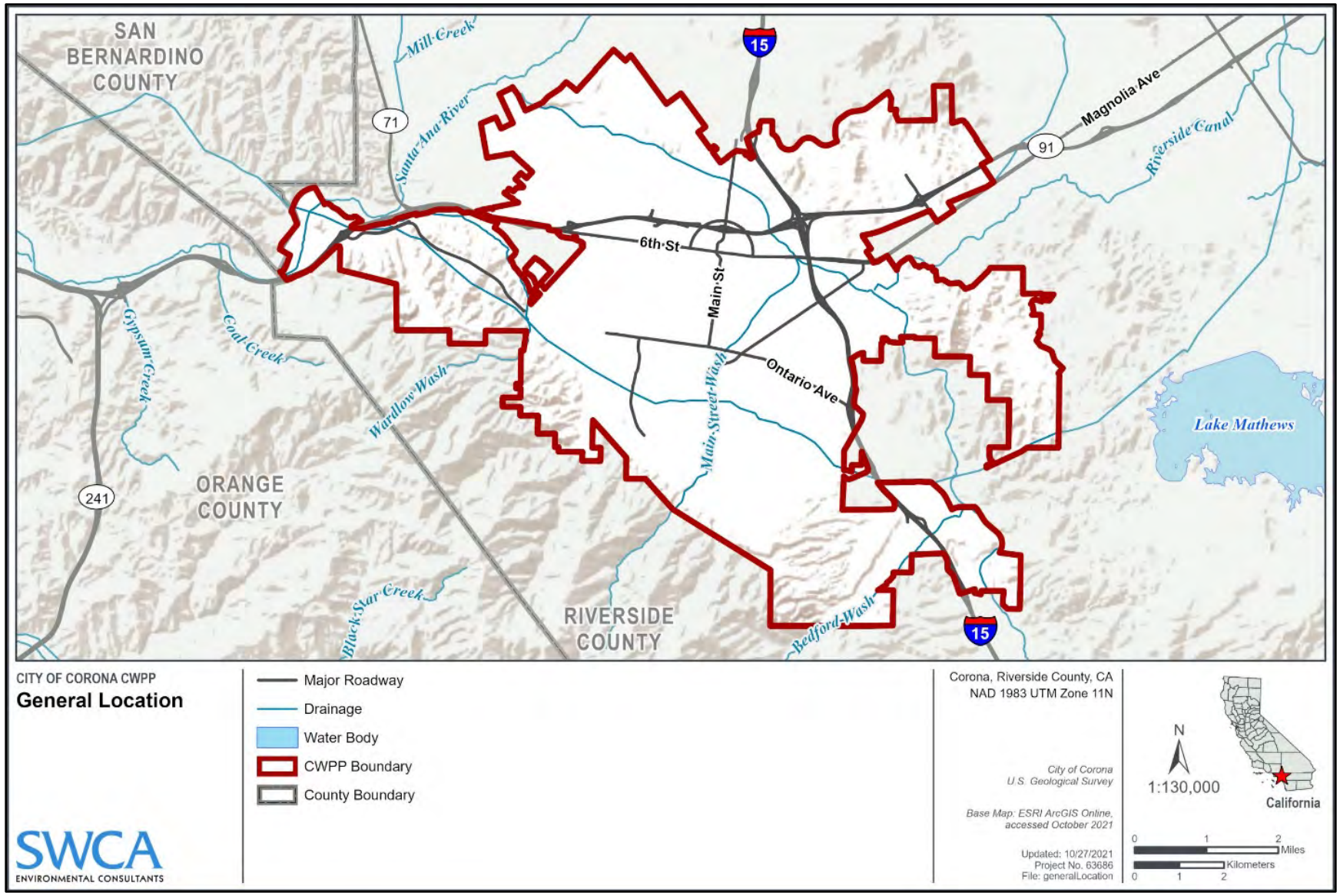

Figure 1.2. City of Corona general location.

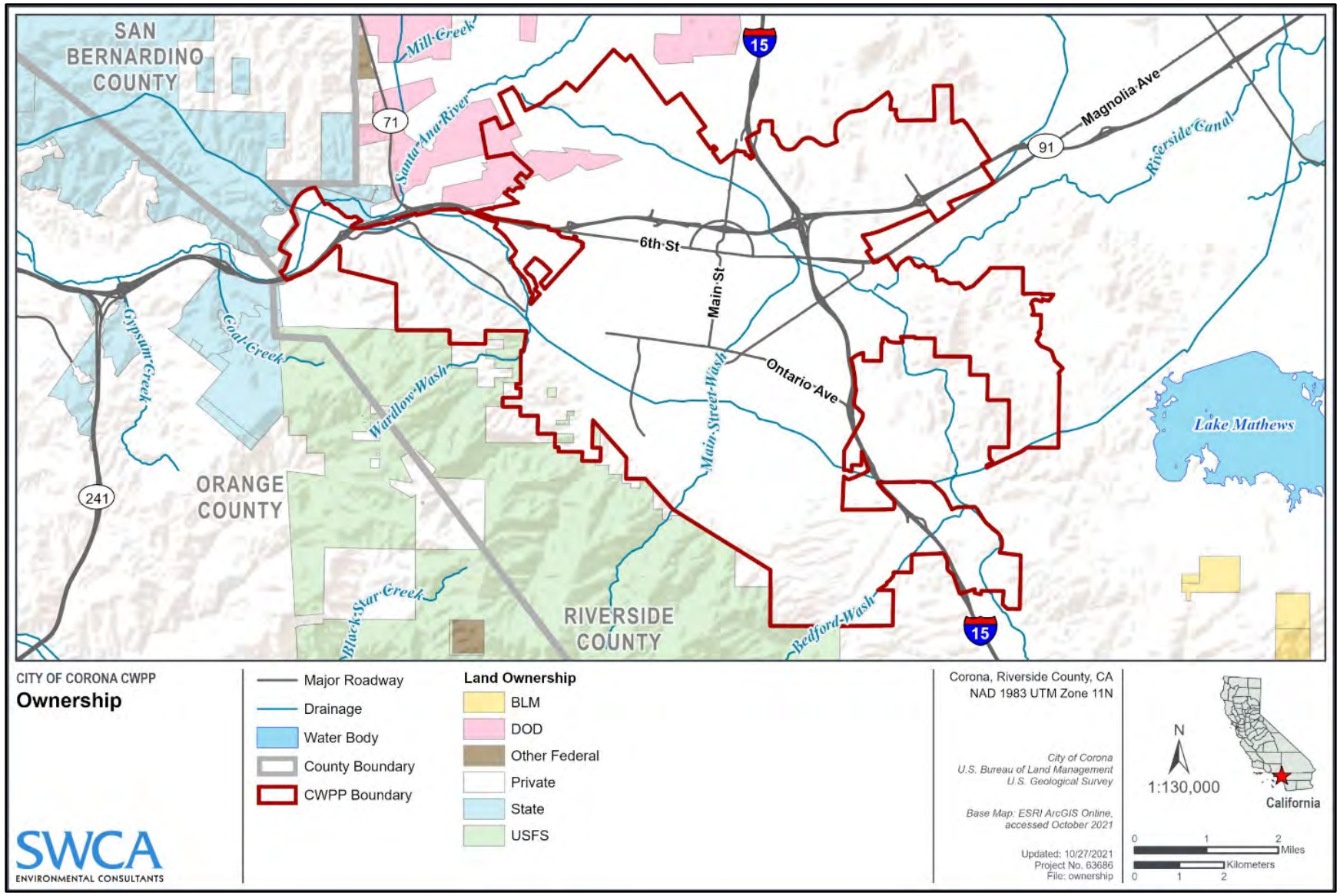

Figure 1.3. City of Corona land ownership.

PUBLIC INVOLVEMENT

A key element in the CWPP process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (Society for American Foresters [SAF] 2004). The draft CWPP was made available for public review from December 13th through December 23rd, 2021. In addition to the CWPP report, the City of Corona developed a CWPP story map (online content) to provide opportunities for information sharing and gathering. The public were invited to view the Story Map prior to public outreach events in the summer, 2021. The story map and draft were announced through several different media outlets for review (Appendix F).

Throughout the planning process several sites, such as the City of Corona's social media accounts and official website, published information about the CWPP story map and draft plan, including announcements in multiple weekly newsletters, a community survey, press release, and informational flyer. In addition, SWCA Environmental Consultants and the City of Corona published and shared a video to advertise the plan and general wildfire awareness.

Several gatherings were held during this planning process, including multiple internal, stakeholder, and client meetings; a fire station open house event; a council presentation; presentations to local community organizations and homeowners associations (HOAs), and a public outreach/educational event. The City of Corona also held a survey contest and awarded the winner with a home hardening package.

More information regarding the details of these online resources (including URLs) can be found in Appendix G. Appendix G also includes a brief summary of the story map including representative photographs of the information available to the public.

During subsequent updates to this plan, the City of Corona will employ more traditional methods of engagement to ensure community members are able to continue to provide substantive input into the document. Recommendations for future community engagement and outreach are provided in Table G.2.

PUBLIC EDUCATION AND OUTREACH PROGRAMS

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue. A primary goal in the City of Corona's General Plan is to "through fire prevention and educational efforts, promote participation, voluntary compliance, and community awareness of fire safety issues in order to reduce the incidence and severity of fire and related emergencies and loss". Detailed information regarding fire education programs that can support existing efforts by the City of Corona is provided in Appendix A.

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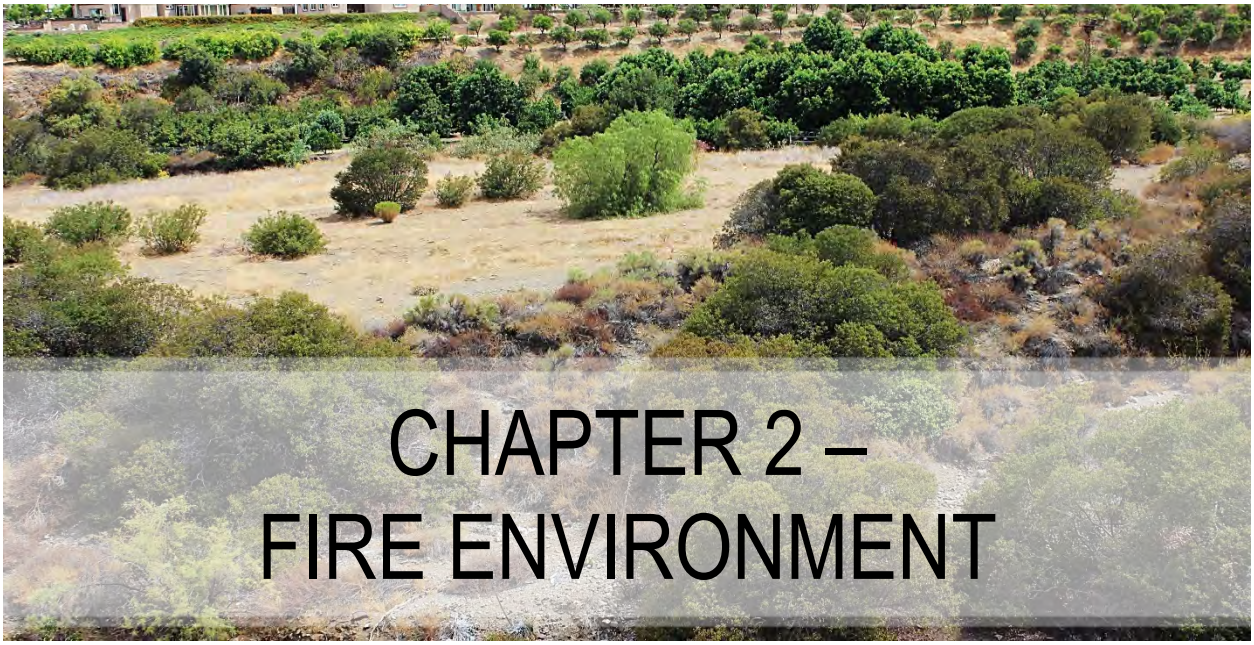


CHAPTER 2 – FIRE ENVIRONMENT

WILDLAND URBAN INTERFACE

A WUI is composed of both interface and intermix communities and is defined as areas where human habitation and development meet or intermix with wildland fuels (U.S. Department of the Interior and U.S. Department of Agriculture [USDA] 2001:752–753). Interface areas include housing developments that meet or are in the vicinity of continuous vegetation. Intermix areas are those areas where structures are scattered throughout a wildland area where the cover of continuous vegetation and fuels is often greater than cover by human habitation.

In addition, the WUI has an area of influence, or influence zone. This area is described with respect to wildland and urban fire; it is an area with a set of conditions that facilitate the opportunity for fire to burn from wildland fuels to the home and or structure ignition zone (National Wildfire Coordinating Group [NWCG] 2021a).

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property. Human encroachment upon wildland ecosystems within recent decades is increasing the extent of the WUI throughout the country as a whole, which is having a significant influence on wildland fire management practices. Combined with the collective effects of aggressive suppression policies, resource management practices, land use patterns, climate change, and insect and disease infestations, the expansion of the WUI into areas with high fire risk has created an urgent need to modify fire management practices and policies and to understand and manage fire risk effectively in the WUI (Pyne 2001; Stephens and Ruth 2005). Mitigation techniques for fuels and fire management can be strategically planned and implemented in WUI areas (Figure 2.3); for example, with the development of defensible space around homes and structures (Figures 2.1 and 2.2).

Figure 2.1. Example of the WUI in the City of Corona.

Figure 2.2. Example of the WUI in the City of Corona.

Cities and counties are continuously challenged to accommodate both current and future residents in need of safe and affordable housing. In California, approximately 180,000 homes need to be constructed annually to meet demand (Department of Housing and Community Development 2018). Over the past few decades, jurisdictions across the state have approved many new housing units. These are often placed within or near wildland areas, creating WUI conditions. Today, more than 46 million residences in 70,000 communities are at risk for WUI fires (U.S. Fire Administration 2021a). When it comes to wildfire, this trend is of special concern since WUI conditions are linked with an increased risk of loss of human

life, property, natural resources, and economic assets. According to the 2018 Strategic Fire Plan for California, “since the turn of the century there has been a steep increase in structures lost compared to the 1990s” (CAL FIRE 2018b).

A CWPP offers the opportunity for collaboration of land managers to establish a definition and a boundary for the local WUI; to better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area; and to prioritize and plan fuels treatments to mitigate for fire risks. At least 50% of all funds appropriated for projects under the Healthy Forests Restoration Act (HFRA) must be used within the WUI area.

The City of Corona Municipal Code contains the Fire Code of the City of Corona and is in Chapter 15.12. WUI policy is detailed in Chapter 4.

Additional Fire Code information is described in Appendix A.

FIRE HISTORY

Fire is a natural part of California’s diverse landscapes and is essential to many ecosystems across the state. Almost all of California’s diverse ecosystems are fire-dependent or fire-adapted. For centuries, many California Native American tribes recognized this interdependence between fire and the ecosystem and used prescribed burning to maintain and restore ecosystem health. However, in the 1800s, a shift in management actions—settlers began enforcing strict fire suppression regimes—led to issues such as dense stand conditions and increased vulnerability to fire. Wildland fire suppression regimes, in conjunction with other management actions such as human expansion into wildlands and climate change, have resulted in an imbalance between wildfire and ecosystem interactions (California Department of Fish and Wildlife 2021a).

Recent Fire Occurrence

Historic wildfire activity and information regarding fire regime are described in detail in Appendix A.

An analysis of the City of Corona’s wildland fire history (1960–2020) shows historic fires occurring in the western portion of the city, within the Fresno canyon area and in the Mabey Canyon area. Fires have also occurred in the Joseph Canyon area and down the Temescal Valley but at a lower frequency (Figures 2.4 and 2.5) (Fire Safe Planning Solutions 2021). From a city perspective, the primary threat is within the historic fire corridors. Fire occurrence within or near the area seems to be cyclical, with long intervals marked with fewer fire events interspersed with short intervals displaying an increase in fire events. For a period of 10 years (2010–2020), a total of 29,300 acres have burned in areas adjacent to the City of Corona. Most of the fires (55.2%) in the past 30 years (1990–2020) have been under 450 acres in size; however, 37.9% of the fires were over 1,000 acres, and four fires were roughly 8,000 acres or larger (Fire Safe Planning Solutions 2021).

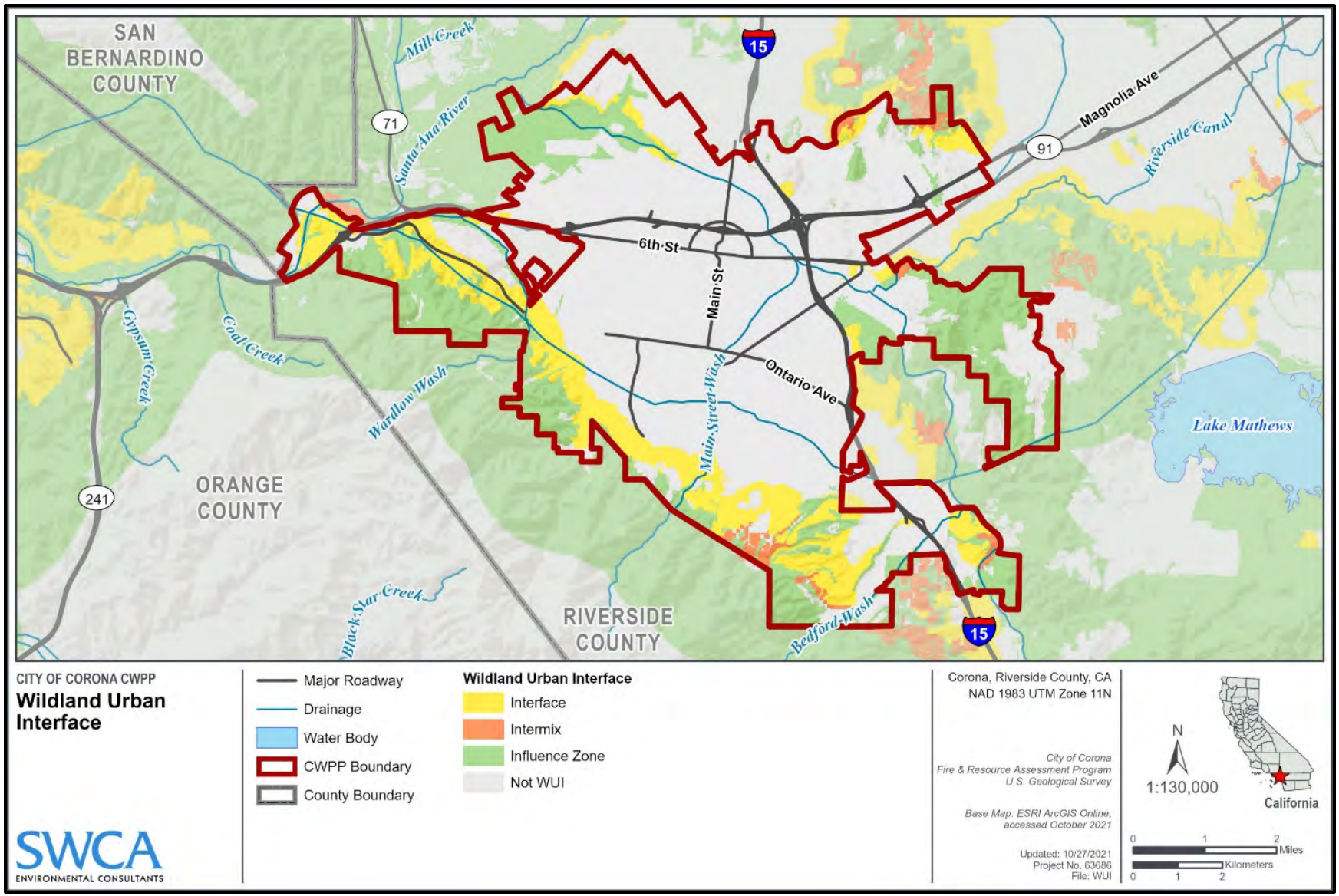


Figure 2.3. WUI delineation for the City of Corona.

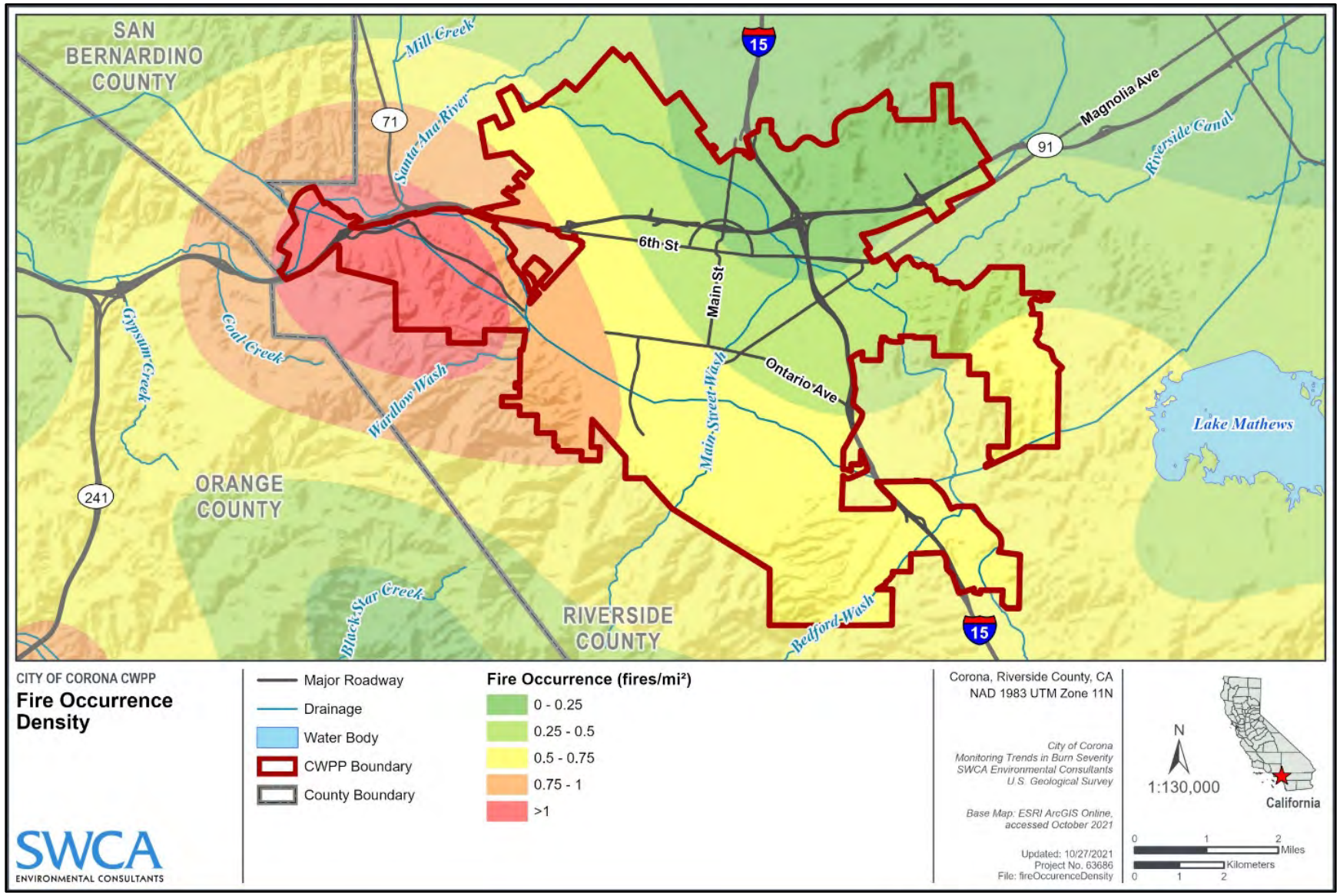


Figure 2.4. Fire occurrence density for the City of Corona from 1900 through 2020.

Note: Fire occurrence density has been determined by performing a density analysis on fire start locations with ArcGIS Desktop Spatial Analyst.

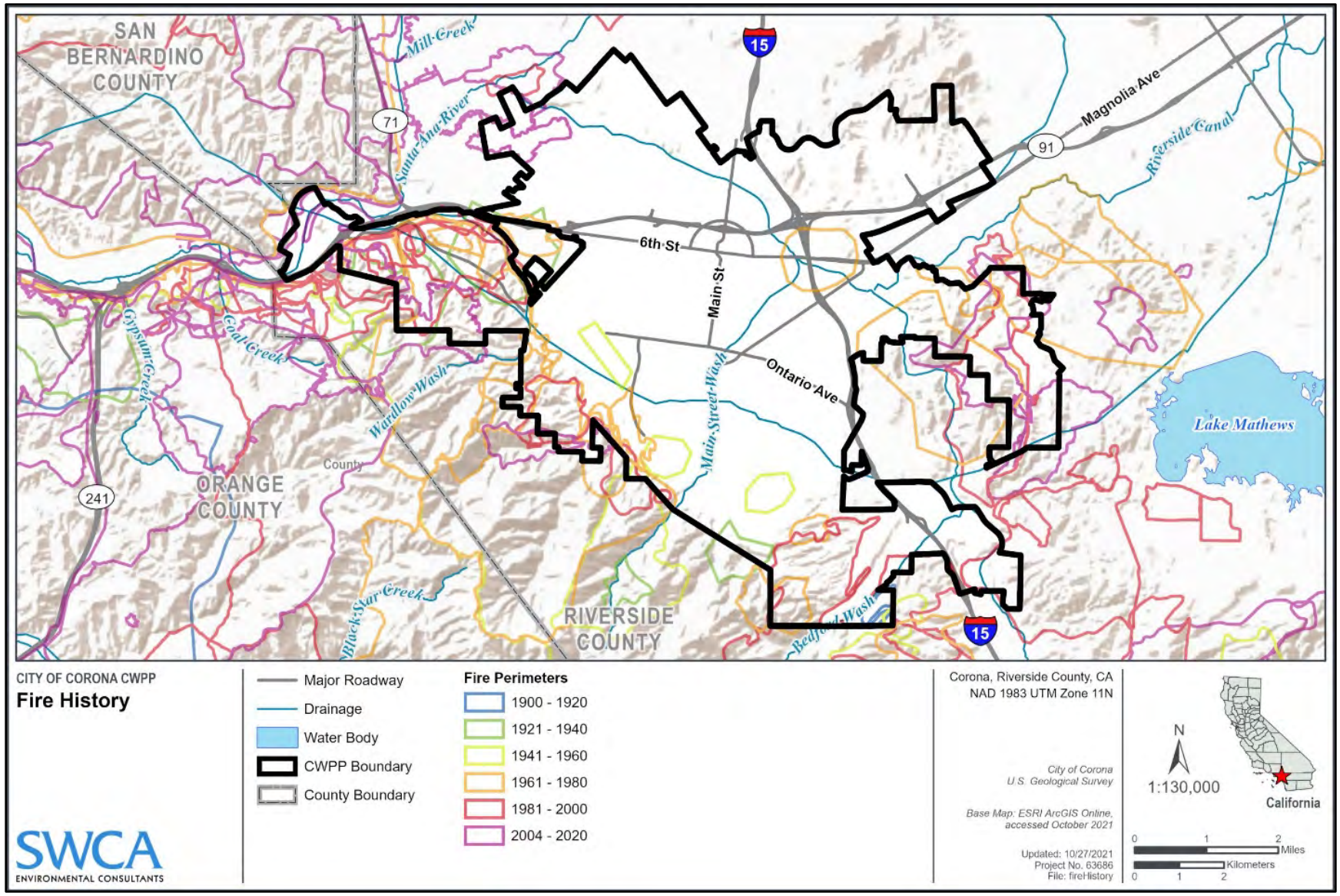


Figure 2.5. Historic fire perimeters for the City of Corona from 1900 through 2020.

Fire history data for the period from 1960 through 2020 suggest a pattern of longer intervals marked with fewer fire events interspersed with shorter intervals displaying an increase in fire events, with a cluster of high-fire years from the period of 1975 to 1983 and again in 2020 (Figure 2.6). In addition to frequency, a considerable number of fires have burned large areas; 14 fires burned 1,000 to 5,000 acres, and four fires burned above 5,000 acres (Figure 2.7). Two of the largest fires have occurred in recent history; the 2020 Blueridge fire burned 13,694 acres, and the 2008 Freeway Complex fire burned 30,305 acres (Fire Safe Planning Solutions 2021).

Most fires occurred within the period of June to September, which is when high temperatures and hot, dry winds are most frequent (Figure 2.8). This trend coincides with California's fire season, which usually occurs between July and November. However, fire seasons are increasing in length. Climate change acts as a key driver of increased fire season duration due to warmer spring and summer temperatures, decreased snowpack, and earlier spring snow melt (CAL FIRE 2021a).

The top three known causes of fire events are arson, equipment use, and playing with fire (Figure 2.9). Residents within the WUI are concerned with the number of fires started by arson, campfires, people playing with fire, and the use of equipment, particularly within the development and improvement of roads, residences, and recreational opportunities in wildland areas (Fire Safe Planning Solutions 2021) Human-caused fires account for approximately 35% of the wildfires recorded for the City of Corona since 1960. Another concern for the residents in the WUI is that the causes for these fires are largely unidentified; approximately 48% of all fires (1960–2020) have an unknown cause. Although the majority of fires take place during the summer months, human-caused ignitions increase the potential for wildfires throughout the entire year (Fire Safe Planning Solutions 2021).

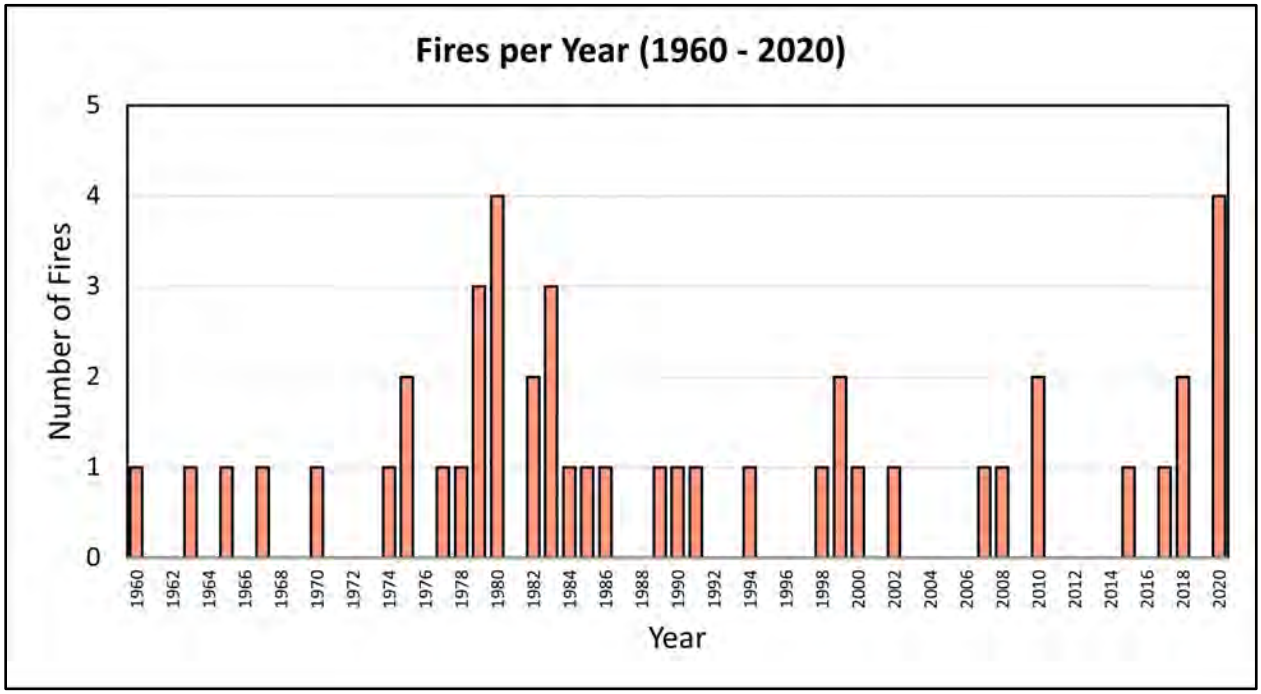


Figure 2.6. Annual wildfire frequency in the City of Corona from 1960 through 2020, based on available data.

Figure 2.7. Fire size statistics for the City of Corona based on fire history data from 1960 through 2020.

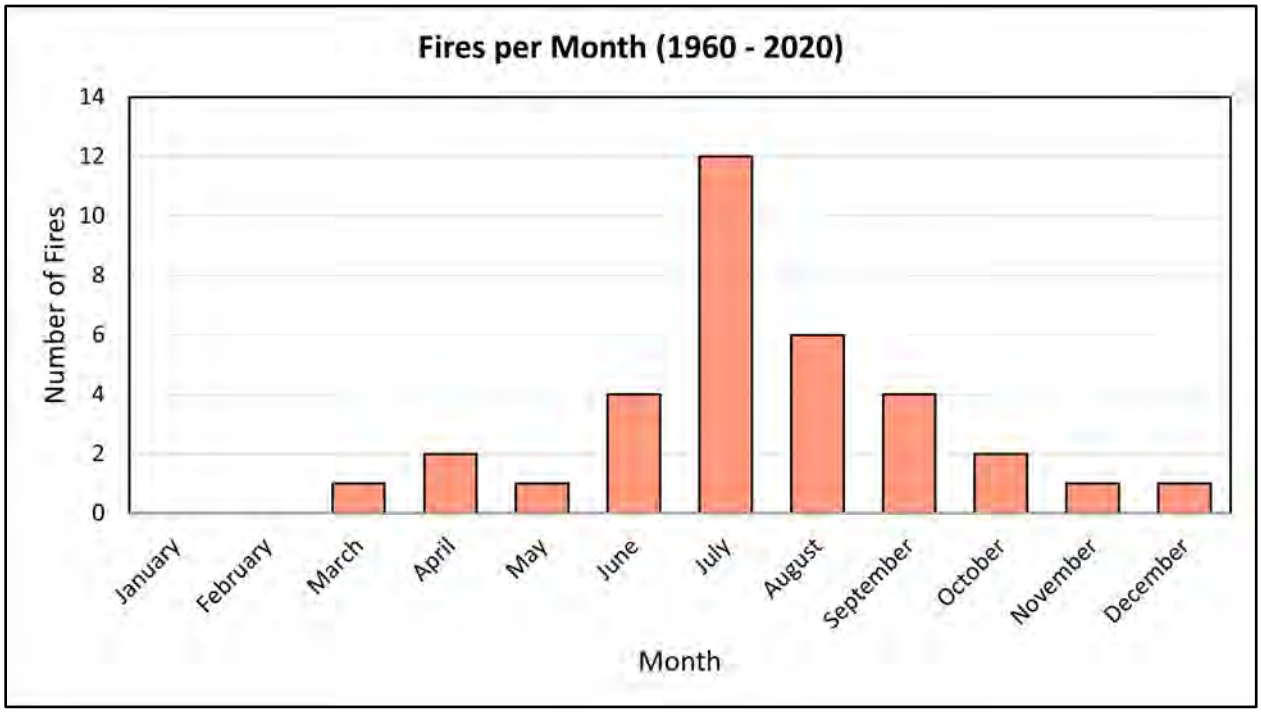


Figure 2.8. Monthly fire frequency in the City of Corona based on data from 1960 to 2020.

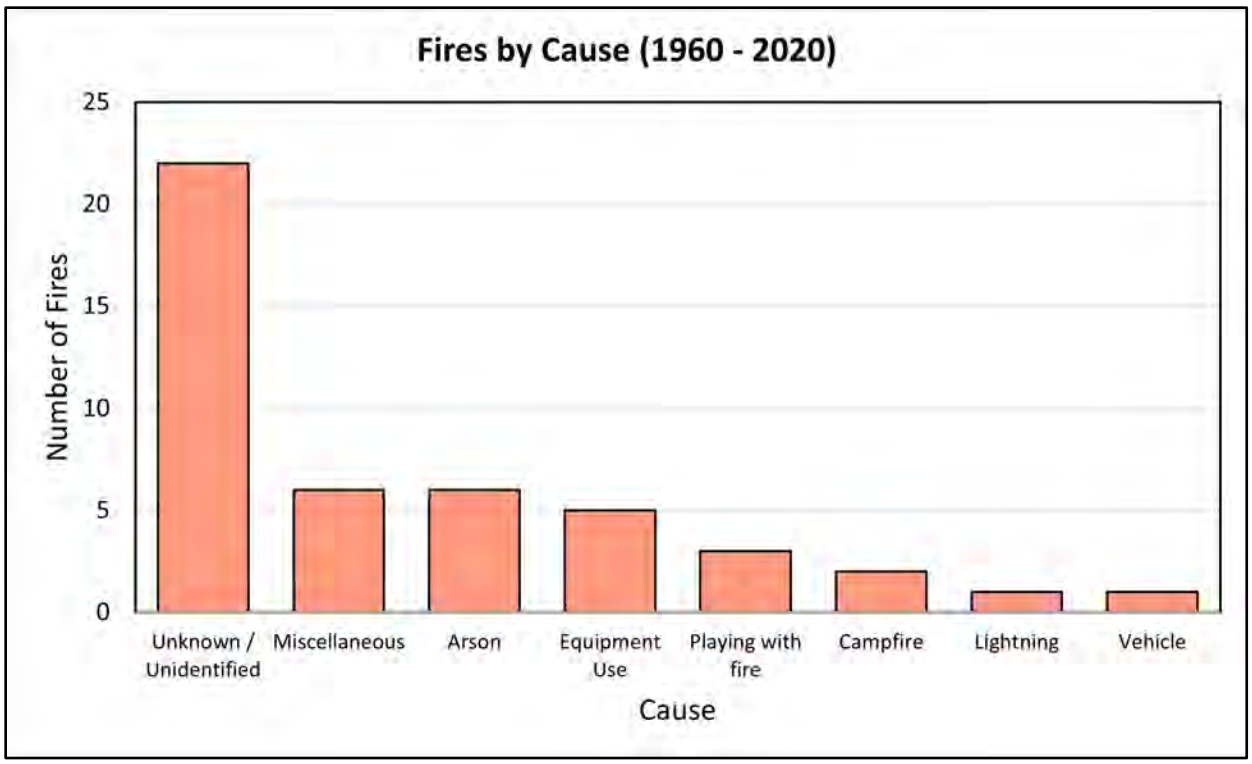


Figure 2.9. Fire causes for the City of Corona from 1960 through 2020.

Past Fire Management Policies and Land Management Actions

Beginning in the early 1900s, the policy for handling wildland fire leaned heavily toward suppression. Over the years, other agencies, such as the Bureau of Land Management, the Bureau of Indian Affairs, and the National Park Service, have followed the lead of the USFS and adopted fire suppression as the proper means for protecting the nation from wildfire. As a result, many areas now have excessive fuel buildups, dense and continuous vegetative cover, and tree and shrub encroachment into open grasslands.

Future Challenges

Frequent drought, suppression-based forest management tactics, and climate change have all worked together to increase forest vulnerability. Removing natural fire from a fire-dependent ecosystem, drought, insects, and diseases have resulted in increased fuel build-up and alterations to vegetation composition. These forest changes can increase the risk of uncharacteristically large high-severity fires (California Department of Fish and Wildlife 2021b). In the past few years, fires have grown to record sizes and are burning earlier, longer, hotter, and more intensely than they have in the past (Westerling et al. 2006; Westerling 2016).

According to the National Interagency Fire Center (NIFC), occurrence of catastrophic wildfires has greatly increased over the last 20 years. Westerling et al. (2006) claim that a study of large (>1,000 acres) wildfires throughout the western United States for the period of 1970 to 2003 saw a pronounced increase in fire frequency since the mid-1980s (1987–2003 fires were four times more frequent than the 1970–1986 average). In addition, the length of the fire season increased by 78 days (comparing 1970–1986

data with that from 1987–2003). An update to Westerling et al.'s 2006 work found that the frequency of large wildfires has continued to increase with each decade since 1970 (Westerling 2016). Within just the last 10 years, a record number of acres have burned, and numbers are continually increasing (NIFC 2021a). In 2020, 58,950 fires were reported nationwide, burning 10.1 million acres (NIFC 2021a). In California, 4,257,863 acres were burned by wildfire in 2020 (CAL FIRE 2020a). With increased fires comes increased suppression costs; 2018 beat all previous records, with federal firefighting costs hitting $3,143,256,000 (NIFC 2021b).

The shifting climate, particularly rising temperatures, changing wind patterns, and increasing temporal and spatial variability of water availability, are considerably escalating wildfire risk across the state. The recurrence of severe fire weather during the autumn months has more than doubled in California since the 1980s, and considering climate change, this prevalence is projected to increase in the future. As stated by California's Fourth Climate Change Assessment, if greenhouse gas emissions continue to increase, California is expected to experience a 50% increase in fires larger than 25,000 acres, as well as a potential 77% increase in average area burned by 2100 (Fire Safe Planning Solutions 2021). The state has already begun to encounter the impacts of increased fire occurrence and severity. In fact, the five largest wildfires in California occurred in the last 3 years, including the August Complex fire (August 2020) and the Dixie fire (July 2021). The August Complex and Dixie fires alone burned a combined total of nearly 2 million acres and well over 2,000 structures (CAL FIRE 2021b). It is clear that catastrophic wildfire events continue to present a significant threat to California's communities.

In addition to direct damage (e.g., structure and property damage) caused by wildfires, wildfires also cause indirect impacts on the environment and ecosystem services. Wildfires are known to deteriorate local and regional air quality, pollute waterways, displace native species (animal and plant), and increase carbon dioxide emissions. The increased carbon dioxide emissions are of special concern since carbon dioxide is a greenhouse gas. Greenhouse gases are implicated in climate change, and climate change is a critical factor exacerbating frequency and severity of wildfires. Moreover, as energy companies responded to the growing threat of wildfire events and likely risk of ignition by electrical transmission equipment, communities across the state were impacted by public safety power shutoff events. Furthermore, utility credit reductions result in higher consumer rates and homeowner's insurance in the WUI is also becoming more difficult and expensive to obtain in California (California Governor's Office of Planning and Research [CA GOPR] 2019).

Additional information on forest health considerations and wildlife are summarized in Appendix A.

FIRE RESPONSE CAPABILITIES

Planning and Decision Support

Wildfires have continued to grow in size and severity over the last decade, requiring fire managers to institute more robust pre-fire planning as well as adapt and improve decision-making tools in order to reduce risk to fire responders and the public and assess impacts on ecological processes.

A primary decision tool utilized by fire managers across all agencies is the Wildland Fire Decision Support System (WFDSS), a system that assists fire managers and analysts in making strategic and tactical decisions for fire incidents (WFDSS 2021). WFDSS combines desktop applications for fire modeling into

one web-based system. It provides a risk-informed decision process and documentation system for all wildland fires, and it also introduces economic principles into the fire decision process in order to improve efficiencies while also ensuring safe and effective wildfire response.

One intent of the WFDSS is to ensure that when fire response decisions are made, they fall in line with agency land and resource management plans. Agencies have recently been moving away from the traditional written fire management plans and instead are developing spatial fire management plans that can be housed within WFDSS (WFDSS 2015). The Cleveland National Forest for example will have all management requirements and strategic objectives for fire management, contained within WFDSS, so that in the event of a fire, incident managers are considering this information when making decisions and developing strategic direction for the wildfire incident (WFDSS 2015).

Fire Resources

California contains many federal, state, and local fire protection organizations that are well integrated through a variety of mutual aid and fire protection agreements and coordinated by organizations such as the California Wildfire Coordinating Group, the Northern and Southern California Geographic Area Coordination Centers (GACCs), and FIRESCOPE. Agencies such as California Emergency Management, USFS, and CAL FIRE form the basis for a very substantial wildfire response capacity that can be deployed in wildfire situations throughout the state. California contains what many regard as the strongest wildfire suppression capability in the nation.

Local Response

The City of Corona Fire Department

The City of Corona's fire department (Corona Fire) has grown from a volunteer organization in 1896 to a full-service, all-risk organization with a 75-square-mile service area. Corona Fire's mission is "to prevent or minimize the loss of life, damage to the environment, and loss of property from the adverse effects of fire, medical emergencies, and hazardous conditions" (City of Corona 2020).

The department is broken into several key functions (City of Corona 2020):

- **Fire Prevention -** The division is responsible for reviewing development site plans and site construction, occupancy inspections, weed abatement, investigating complaints and suspicious fires, and hazardous materials coordination. The Division conducts youth fire setter intervention and fire safety education. In addition, staff assigned to fire stations conduct inspections on occupancy uses.
- **Fire Operations -** The department responds to fires, medical emergencies, and hazardous conditions and provides advanced and basic life support. Specialized teams include search and rescue, hazardous materials response, technical rescue, and tactical emergency medical support. The training division coordinates and provides continuous education and advanced training to operations personnel.
- **Emergency Medical Services -** The division coordinates emergency medical response and Emergency Management System (EMS) public education. The division is responsible for continuous program quality improvement, and skills and license maintenance of department EMT

and paramedic personnel. It also coordinates with hospital emergency departments, health care providers, and the Riverside County EMS Agency.

- **Emergency Management -** This function is charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters. It is responsible for coordinating emergency planning, preparedness, risk reduction, response, and recovery. Emergency communications, facilities, and apparatus are all handled by other departments within the City of Corona.

Corona Fire is responsible for initial attack and suppression of all fires within the City of Corona, which is designated as a Local Responsibility Area (LRA). An LRA is a region where the local government is responsible for fire response. Corona Fire has seven fire stations throughout the city (Figure 2.10). In addition, Corona Fire serves areas beyond the city limits by contracting with Riverside County to provide fire response services to the unincorporated communities of Coronita, El Cerrito, Home Gardens, and Temescal Valley, where Riverside County provides initial attack and Corona Fire provides secondary support (City of Corona 2020).

State Response

California Department of Forestry and Fire Protection (CAL FIRE)

CAL FIRE is responsible for initial fire response within State Responsibility Areas (SRAs), or where the State is responsible for fire response, in California. SRAs fall to the south, southwest, and east of city boundaries, adjacent to the WUI (City of Corona 2020).

Federal Response

Cleveland National Forest

The USFS provides wildfire response and management for over 193 million acres of National Forest System lands (CRS 2021). National Forest lands are considered Federal Responsibility Areas (FRAs). FRAs are regions where the federal government is responsible for fire response. On USFS land, the USFS has the responsibility for initial attack (initial response). Fire response in the Cleveland National Forest is dispatched via the MVICC (GACC 2011). The USFS maintains mutual aid agreements with CAL FIRE, the County of Riverside, and the City of Corona. Under the agreements, agency personnel may respond to incidents outside their agency boundaries (City of Corona 2020).

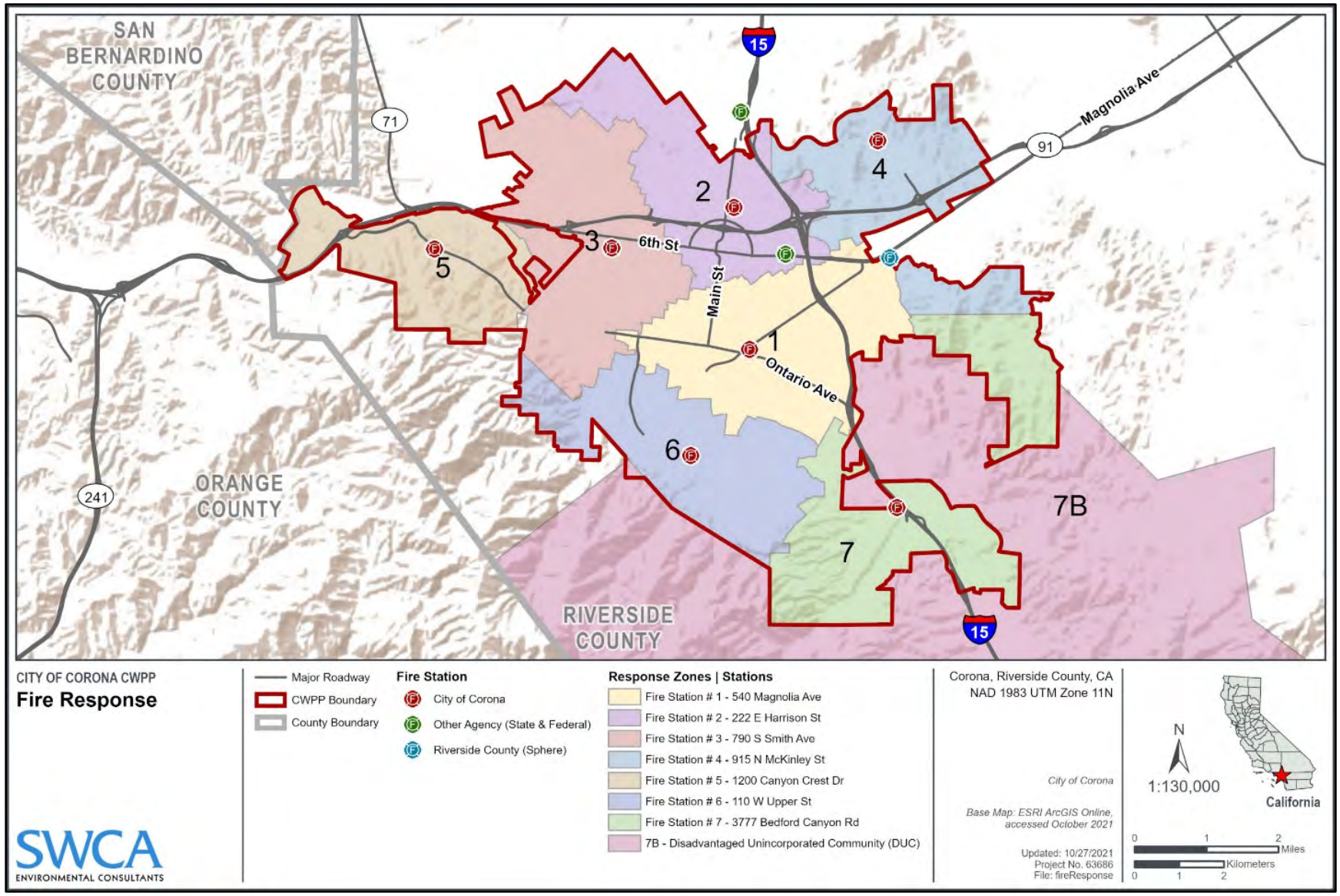


Figure 2.10. Fire response zones and fire station locations.

Mutual Aid

The wildland fire community is well known for its development of mutual aid agreements at the federal, state, and local levels. Such automatic aid agreements allow for closest forces to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted; state resources responding to wildfires on federal land may have their associated costs reimbursed by the responsible federal agency, and the reverse is true for federal resources suppressing a wildfire on state land. More details on mutual aid agreements within the City of Corona are provided in Appendix A.

EVACUATION RESOURCES

Evacuation planning is a joint effort among city and county departments with law enforcement as the lead agency. Evacuation planning is incorporated into the City of Corona's hazard mitigation plan and Safety Element of the General Plan, per AB-747, which requires the City of Corona to identify evacuation routes and their capacity, safety, and viability under a range of emergency scenarios. Provisions for safe evacuation are included in the General Plan goals, which include PS-9.3 (ensure that roadway, bridge, and driveway standards are adequate and appropriately maintained to allow safe access to premises where emergencies take place and safe evacuations wherever needed) and PS-9.4 (maintain safe and accessible evacuation routes throughout the community; take precautions and ensure backup or mitigations for routes crossing high hazard areas [e.g., flood, seismic, high fire, etc.]).

Furthermore, the City of Corona's Emergency Operations Center (EOC) functions to improve both organization and communication of personnel and resources during a major incident or emergency. The EOC operates under the Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS). During an emergency, the EOC will be staffed by various department and agency representatives related to the incident being managed to guarantee coordination between all levels of government (City of Corona 2021a).

As part of emergency management protocols, the City of Corona partnered with International Association of Fire Chiefs and Riverside County/CAL FIRE, adopting the CAL FIRE *Go! Evacuation Guide* protocols for community evacuation. The City of Corona's evacuation page and guide is available at https://www.coronaca.gov/government/departments-divisions/fire-department/emergency-preparedness/ready-set-go/go-evacuation-guide.

Additionally, the City of Corona published the Emergency Response Guide (2016) to guide city employees and visitors in the event of an emergency. The guide includes building plans (maps) with their respective evacuation paths and assembly areas. The guide is accessible here: https://atwork.coronaca.gov/Home/ShowDocument?id=650

Road Systems

Much of the City of Corona is accessible via surfaced roads and highways; however, some communities are accessed only via unsurfaced roads, which are often narrow and windy with many dead-ends. These access roads are particularly hazardous during emergency evacuation, especially where they are lined by thick, dense vegetation. Fuel treatment may be needed along some roads where vegetation is

overhanging and could prevent safe evacuation of residents or safe access by emergency responders. In addition, some communities adjacent to the WUI are limited to one major road in and out (Figure 2.11), which usually terminate in cul-de-sacs (Figure 2.12). These routes may prove hazardous during emergency evacuation, particularly where they are near forested land and steep hillsides (Figure 2.13).

People

The safe and efficient evacuation of people from wildfire requires several factors, including:

- Emergency notification methods: The City of Corona has established an Emergency Notification System that utilizes reverse 911. Residents must register their numbers in the system. Social networking sites such as Facebook, Nextdoor, and Twitter, as well as locally maintained blogs and email distribution lists, are other resources that have become highly valued during wildfires in nearby communities. The City of Corona has the ability to coordinate with the county to activate the Emergency Alerting System (radio, television), as well as the Wireless Emergency Alert System (cell phone), to further assist in alerting the community.
- Preplanning by the public about how to evacuate and where to go: Locked gates, poor or missing signage, and conflicts with emergency vehicles driving into the community versus the public trying to leave complicate evacuation. Uncertainty about where to find temporary refuge can cause families to become separated and delay reunions. Some individuals without transportation or with limited mobility may be accidentally left behind.
- Public awareness: These two items will fail to occur throughout communities at risk (CARs) if the residents are unaware of notification methods: 1) the need for preplanning and 2) the elements that should be included in preplanning. Therefore, public education and outreach on these topics should be part of all efforts conducted by agencies such as fire departments in a wide variety of venues.

Community Emergency Response Team

Developed by the Federal Emergency Management Agency (FEMA), the Community Emergency Response Team (CERT) training is a program that educates community members about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical. Supplemental training modules are available to better assist professional responders in a variety of emergency situations. Advance training includes such topics as animal response, emergency communications, traffic and crowd management, and flood response. The City of Corona Fire Department CERT program prepares individuals for increased self-reliance, which can supplement City of Corona resources in the event of a disaster or other major emergency. CERT volunteers are trained in emergency procedures and can be registered as Disaster Service Workers in accordance with the California Government Code and the City of Corona Municipal Code.

For more information, visit the City's CERT webpage: https://www.coronaca.gov/government/departments-divisions/fire-department/emergency-preparedness/cert-community-emergency-response-team

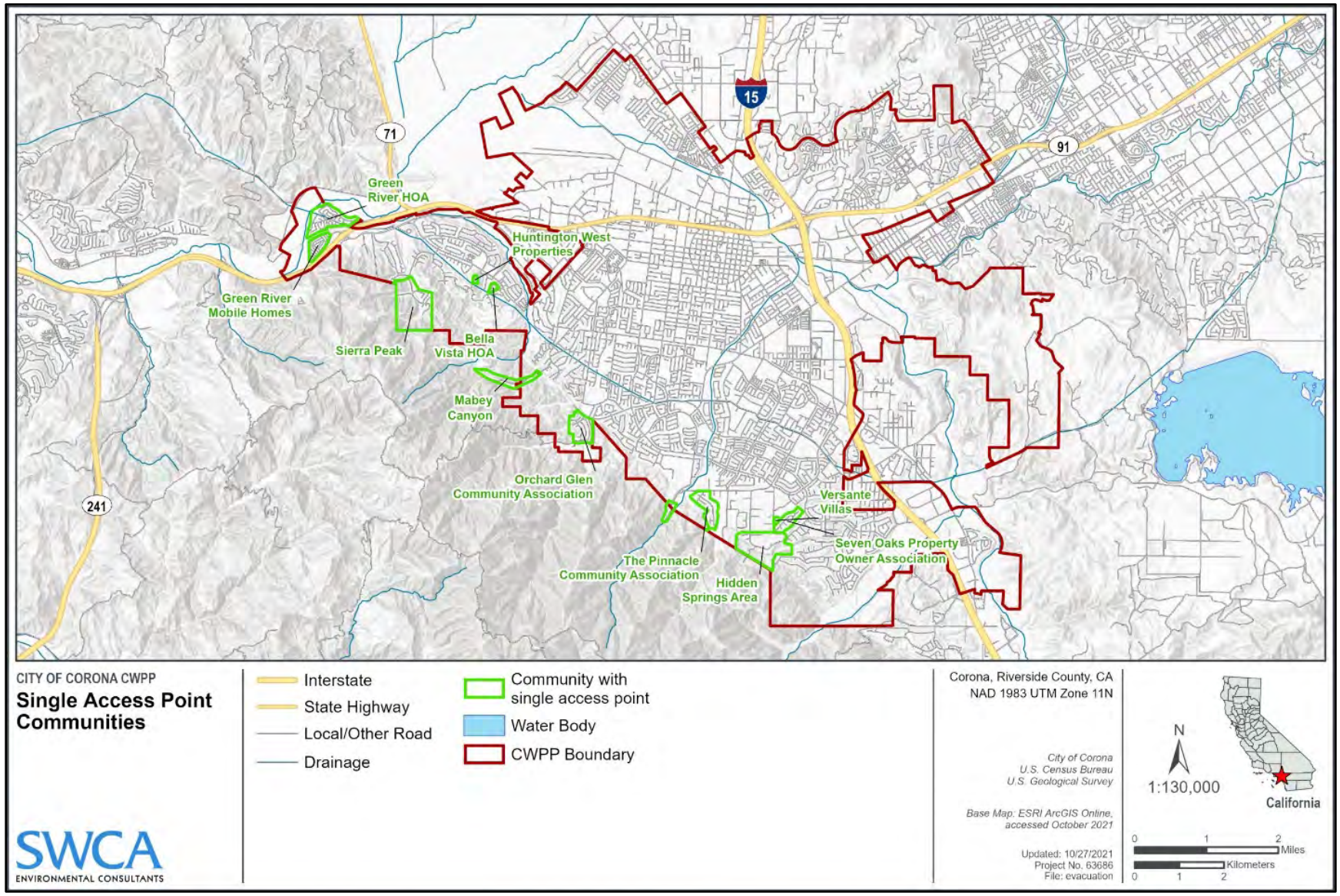


Figure 2.11. Communities in the City of Corona with single access points.

Figure 2.12. Example of a narrow road.

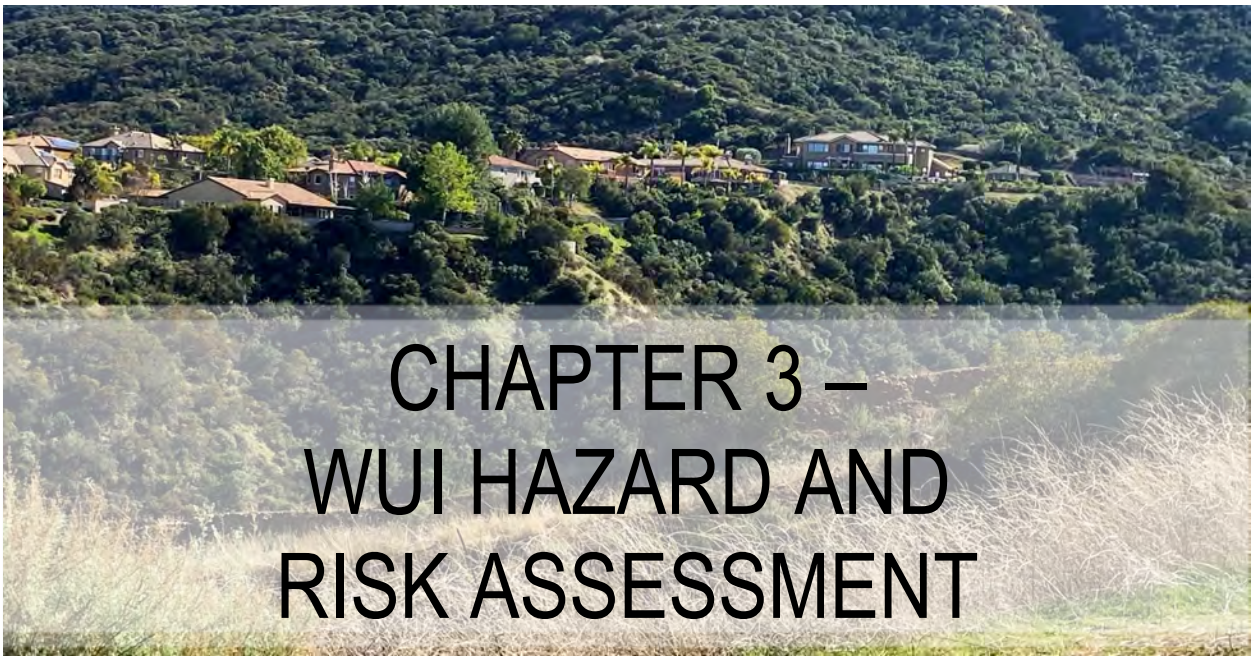
Figure 2.13. Example of a narrow road system with an access gate.

Animals and Livestock

In the event of a wildfire, it is important that residents, fire responders, and the EOC have a plan for evacuation of pets and livestock. Evacuation planning often neglects to describe how animals will be evacuated and where they will be taken. The loading of horses, for example, during a fire and smoke situation, and transport of stock vehicles down narrow roads under stressful situations, can be very difficult. Public education could emphasize the need for individuals to have a plan for the evacuation of pets in addition to their family, ensuring a lack of planning doesn't slow or prevent evacuation.

WATER AVAILABILITY AND SUPPLY

Water supply is consistent throughout the City of Corona and is provided by hydrants. However, some communities located on the edge of the city, specifically those located in or close to the Cleveland National Forest, have inconsistent and limited water supplies.



CHAPTER 3 – WUI HAZARD AND RISK ASSESSMENT

PURPOSE

In 2020 and 2021, the City of Corona developed a Wildland Risk/Hazard Assessment (Firesafe Planning Solutions 2021) in order to inform the development of this CWPP. The purpose of the assessment was to identify and quantify the risks of wildfires in the City of Corona by gathering information on where fires are likely to occur, the intensity at which they might occur, and possible impacts to highly valued resources and assets (HVRAs) within the community. The assessment can be viewed in full in the story map, and components are summarized in this chapter.

Although many definitions exist for hazard and risk, for the purpose of this document, these definitions follow those used by the firefighting community:

> **Hazard** is a fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.
>
> **Risk** is defined as the chance of a fire starting as determined by the presence and activity of causative agents (NWCG 1998).

As described in the Wildland Risk/Hazard Assessment (Firesafe Planning Solutions 2021), wildfire risk analysis is about seeking answers to several important questions (Scott et al. 2013):

- When, where, and how large fires are likely to occur?
- Which assets (life, structures, infrastructure, and ecology) have the most significant exposure to wildfire hazards?
- What are the likely effects of fire within and adjacent to the community at different intensity levels?
- Where might fires cause harm/damage, and where might they lead to benefits?

- How is wildfire risk distributed across the interface/intraface?
- Which areas are most likely to experience loss?
  - How much loss?
  - To which HVRAs?

According to several sources (Miller and Ager 2012; Scott 2006; Thompson and Calkin 2011), the fundamental components for quantifying wildfire risk—likelihood, intensity, and susceptibility to effects—can be visualized as a wildfire risk triangle (Figure 3.1).

Figure 3.1. Wildland risk triangle.

The City of Corona's Wildland Fire Risk and Hazard Assessment describes likelihood as being assessed by fire history, weather history, and topography as a function of the placement of assets relative to the wildland fuels. Intensity is measured by fireline intensity (Appendix B, Map 2), rate of spread, and flame length for current and worst-case wildland fuel configurations. Finally, susceptibility encompasses building construction, infrastructure, access, available water capabilities, and fire response resources (Figure 3.2).

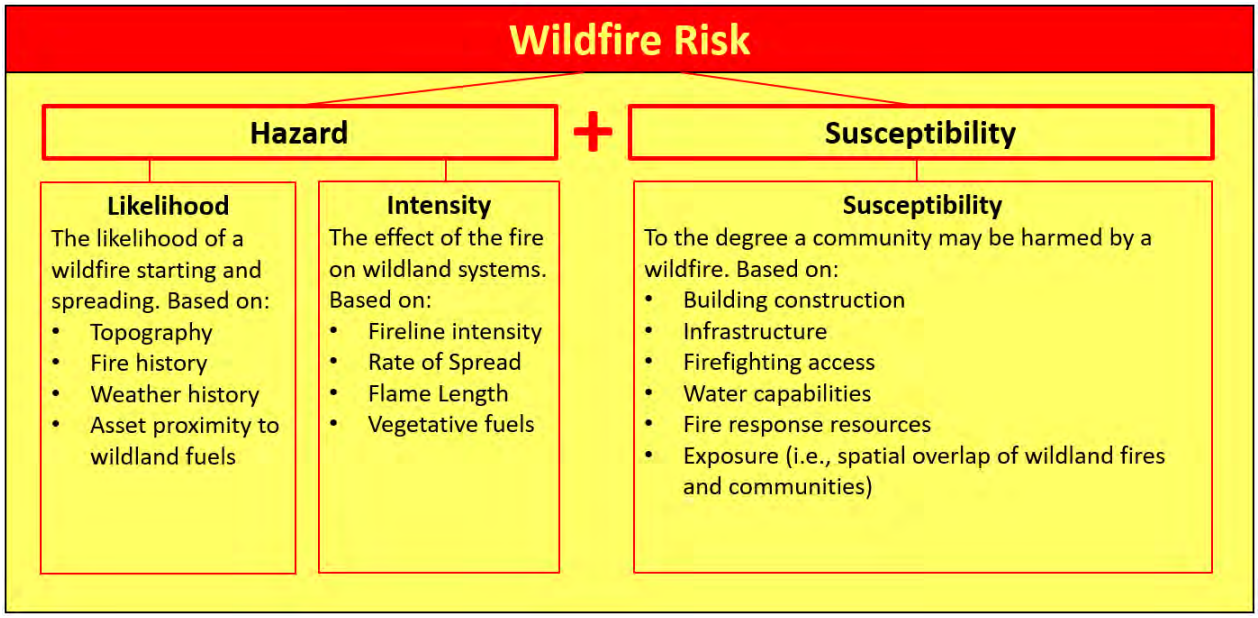


Figure 3.2. Components of wildfire hazard and risk.

FIRE BEHAVIOR

The wildland fire environment consists of three factors that influence the spread of wildfire: fuels, topography, and weather. Understanding how these factors interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the WUI. These factors are discussed in Appendix A and within the City of Corona Wildland Risk/Hazard Assessment.

In the wildland environment, vegetation is synonymous with fuels. When sufficient fuels for continued combustion are present, the level of risk for those residing in the WUI is heightened. Fire spreads in three ways: 1) surface fire spread—the flaming front remains on the ground surface (in grasses, shrubs, small trees, etc.) and resistance to control is comparatively low; 2) crown fire—the surface fire "ladders" up into the upper levels of the forest canopy and spreads through the tops (or crowns) independent of or along with the surface fire, and when sustained is often beyond the capabilities of suppression resources; and 3) spotting—embers are lifted and carried with the wind ahead of the main fire and ignite in receptive fuels; if embers are plentiful and/or long range (>0.5 mile), resistance to control can be very high. Crown fire and spotting activity has been a concern for fire managers, particularly under extreme weather conditions. In areas where homes are situated close to shrubs and trees, potential spotting from woody fuels to adjacent fuels should always be acknowledged.

Treating fuels in the WUI can lessen the risk of intense or extreme fire behavior (Martinson and Omi 2013; Safford et al. 2009). Studies and observations of fires burning in areas where fuel treatments have occurred have shown that the fire either remains on or drops to the surface, thus avoiding destructive crown fire, as long as activity fuels are treated or removed (Graham et al 2004; Pollet and Omi 2002; Prichard et al. 2010; Safford et al. 2012; Waltz et al. 2014). Fuel mitigation efforts therefore should be focused specifically where these critical conditions could develop in or near CARs.

The City of Corona's Wildland Risk/Hazard Assessment provides technical details regarding how fire behavior varies with fuel, terrain, and weather conditions and includes detailed maps of how fire would move across the landscape, given specific ignition points and using wind simulations. To simplify these complex concepts, the following two maps show modeled rates of spread (Figure 3.3) and flame length (Figure 3.4) in a single snapshot of time under existing fuel conditions. Information on model inputs are described in Appendix A, and the Scott and Burgan 40 Fire Behavior Fuel Models map (Map 1) is shown in Appendix B.

Additional information on fire behavior modeling is summarized in Appendix A.

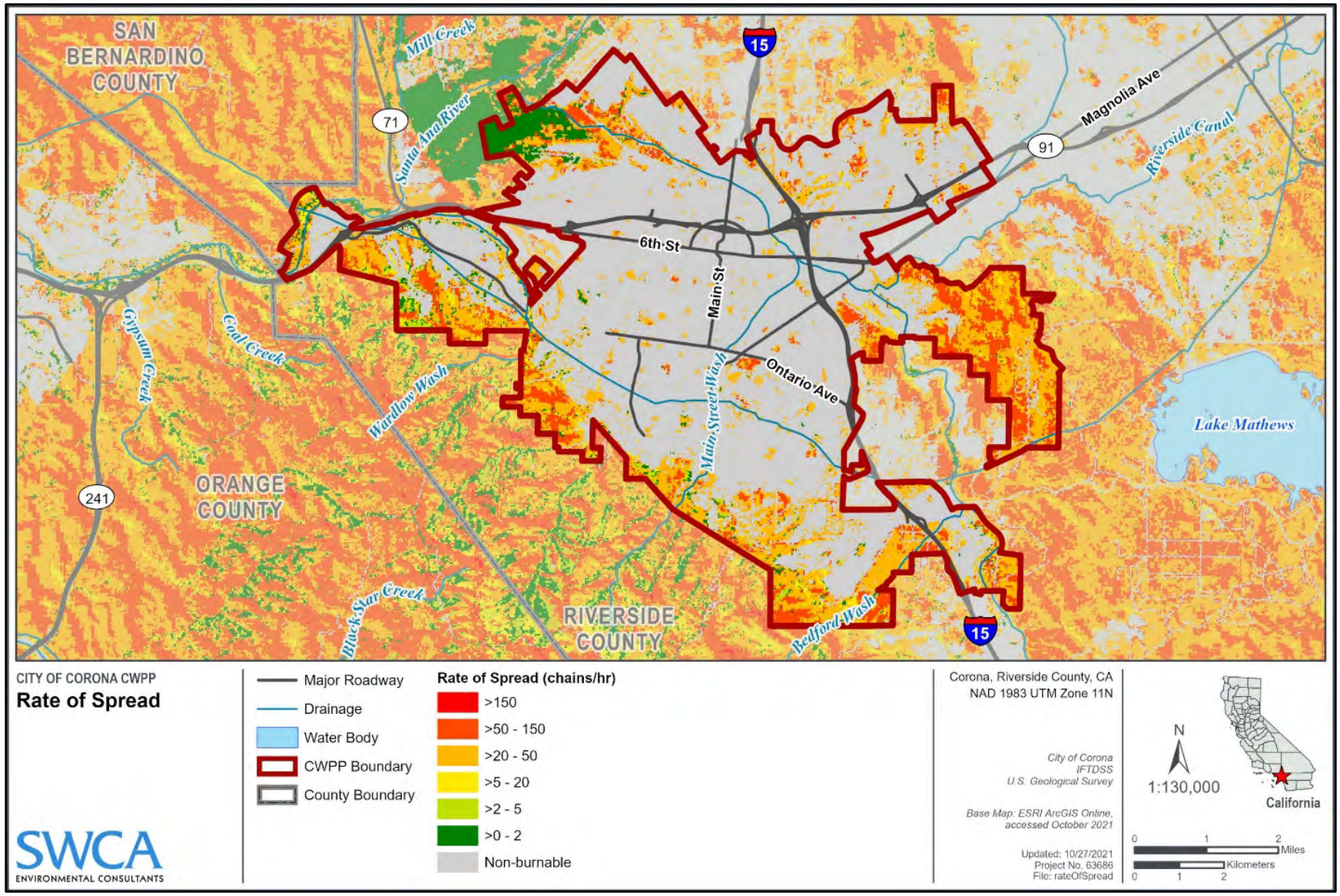


Figure 3.3. Modeled rate of spread under existing fuel and weather conditions.

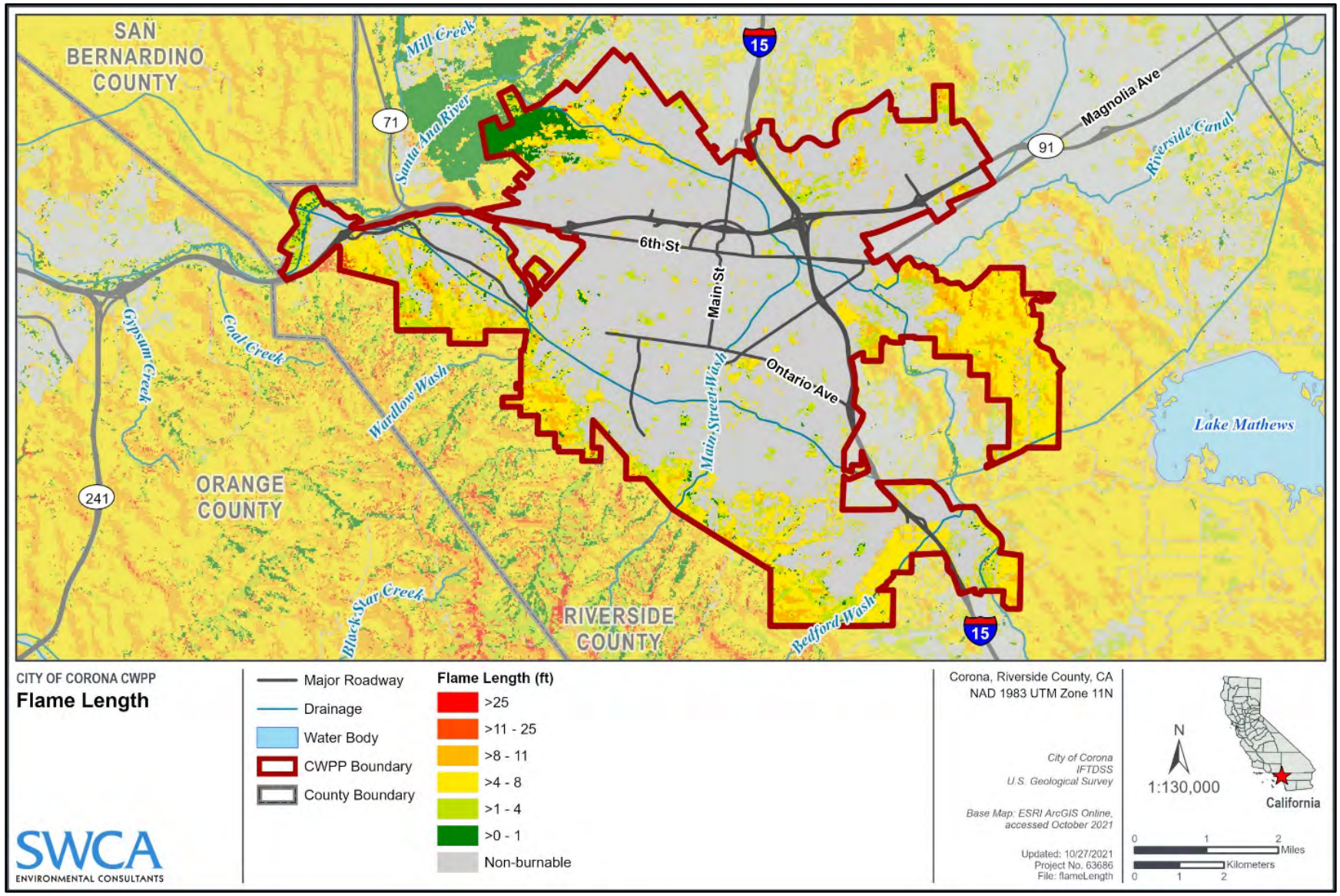


Figure 3.4. Modeled flame length under existing fuel and weather conditions.

RATE OF SPREAD

Figure 3.3 illustrates the rate of spread classifications for the planning area. The rates of spread in the area range from 0 chains/hour up to 150 chains/hour (one chain is approximately 66 feet and is a common measure in wildland firefighting). Low rates of spread are associated with timber-dominated areas in riparian areas or in Cleveland National Forest, while moderate and high rates of spread are associated with grass and shrub fuels. Agricultural areas are modelled with low rate of spread; however, these fuel types may also pose a severe hazard during certain times of the year (prior to harvest or following harvest when residual materials remain). Some areas of the WUI exhibit very steep slopes that can contribute to increased rates of spread and intense fire behavior. The rate of spread, or the speed with which fire is moving away from the point of origin, is influenced by the slope. Fire moves at a faster rate uphill than downhill, thus the steeper the slope the faster the rate of spread. Additionally, steep slopes bring the fuels above the fire closer to a growing fire, making them more susceptible to ignition. Another issue with steep slopes is the possibility of burning debris rolling down the hill and igniting fuel below the main fire. This is illustrated in Figure 3.5.

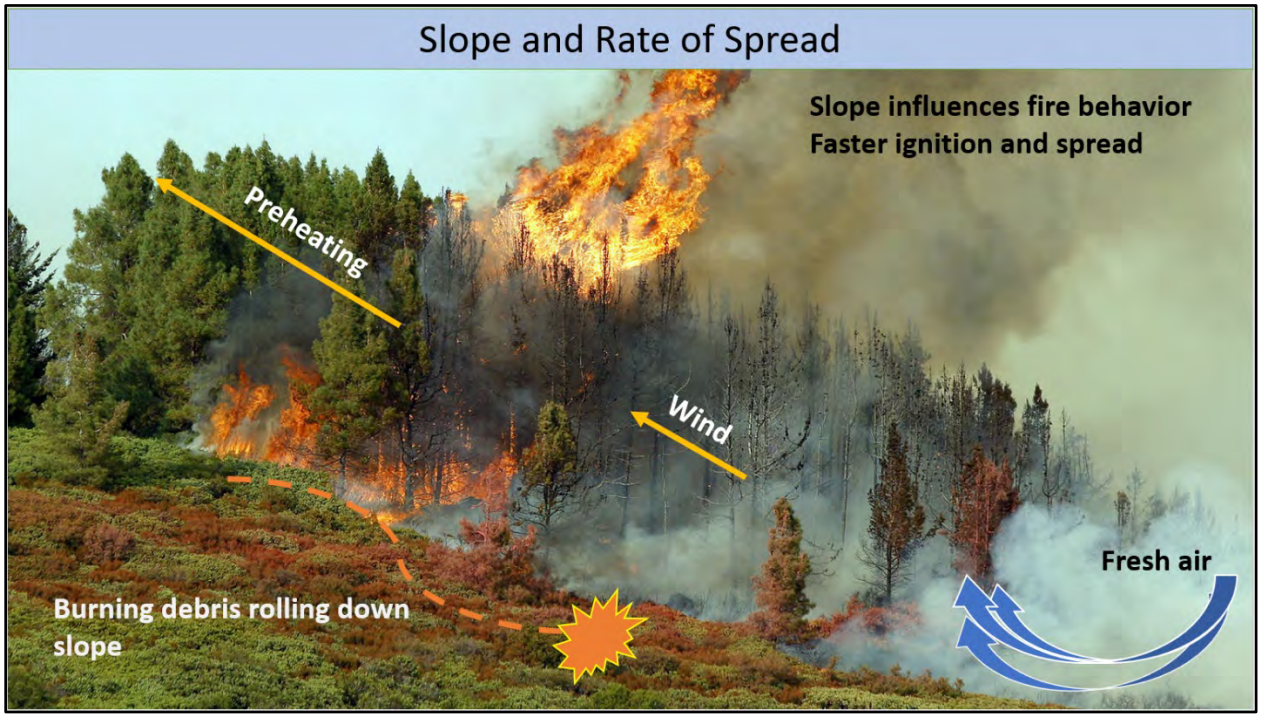


Figure 3.5. Effect of topography on fire behavior.

FLAME LENGTH

Figure 3.4 illustrates the flame length classifications for the planning area. Flame lengths are determined by fuels, weather, and topography. Flame length is a particularly important component when assessing risk because it relates to potential crown fire (Appendix B, Map 3) (particularly important in timber areas) and suppression tactics. Direct attack by hand lines is usually limited to flame lengths less than 4 feet. In excess of 4 feet, indirect suppression is the dominant tactic. Suppression using engines and heavy equipment will move from direct to indirect with flame lengths in excess of 8 feet.

Flame lengths across the planning area range from 0 to more than 25 feet, with the majority of the WUI exhibiting potential flame lengths of 4 to 8 feet. The highest flame lengths are associated with the timber fuels found in the National Forest.

Fire Behavior under Future Climate Projections

The City of Corona General Plan for 2020–2040 recognizes climate change and resiliency as something that needs to be addressed throughout the city: "*Drought will reduce potable water supplies and vegetative cover, which could lead to more frequent wildfires. Wildfires pose a risk to public health, safety, property, and vulnerable populations. Drought and wildfire would threaten existing ecosystems and habitats and increase the risk of landslides and erosion. Extreme heat could result in an increase in wildfires, threatening public health and safety, existing ecosystems and habitats*" (City of Corona 2020:5-79).

Ongoing projects are underway to improve the resilience of the city (City of Corona 2020). The City of Corona has updated its Climate Action Plan (CAP) (LSA Associates, Inc. 2019) to address the potential public health and safety concerns due to drought, wildfire, heat, and flooding. The CAP offers a range of adaptation strategies designed to improve the resiliency of the City in the face of these climate change hazards and protect vulnerable assets and populations susceptible to climate change impacts.

One of the opportunities noted in the City of Corona's General Plan is to include a broad menu of programs to implement the CAP and improve the city's resiliency against the effects of climate change. One way to do this is to understand the threat that wildfire might pose under a climate change scenario and build recommendations through the CWPP to address that threat now and into the future. To meet this need, fire behavior modeling was run under projected climate change conditions to determine how fire behavior may change over time. Figures 3.6 and 3.7 below show rates of spread and flame lengths under a scenario in which temperatures increase by 5%, or approximately five degrees Fahrenheit, and minimum relative humidity decreases by 8%, or approximately 1.67% in value, by the end of the century. More detailed information on this modeling is provided in Appendix A.

Under a climate change scenario, a significant portion of the City of Corona WUI is projected to burn with rates of spread exceeding 50 chains/hour. Much of the elevated rates of spread, when compared with existing conditions, are located close to urban areas.

Flame lengths under a climate change scenario fall primarily in the 8- to 11-foot range, also falling within the areas closest to urban development.

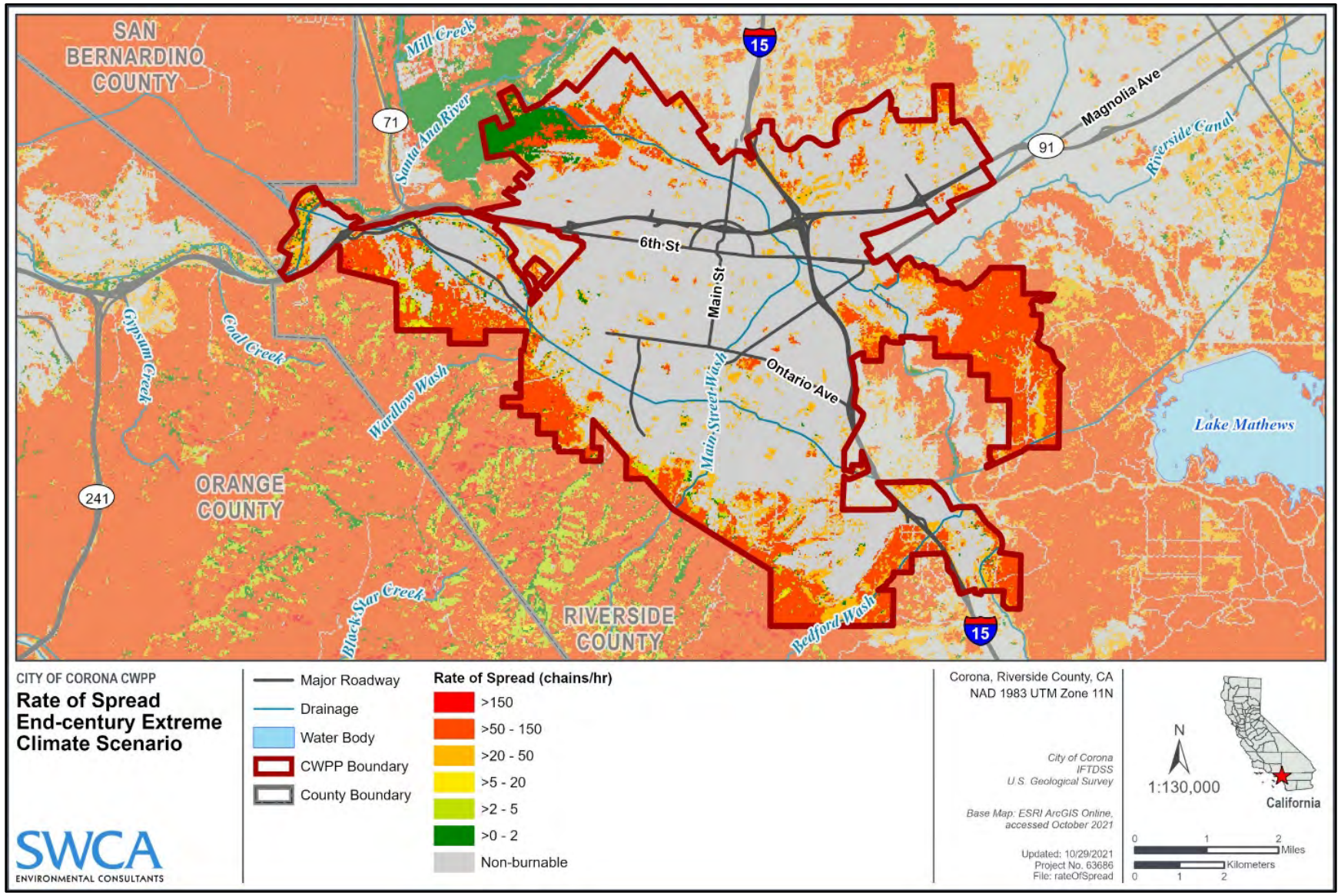


Figure 3.6. Modeled rate of spread under the projected climate change scenario.

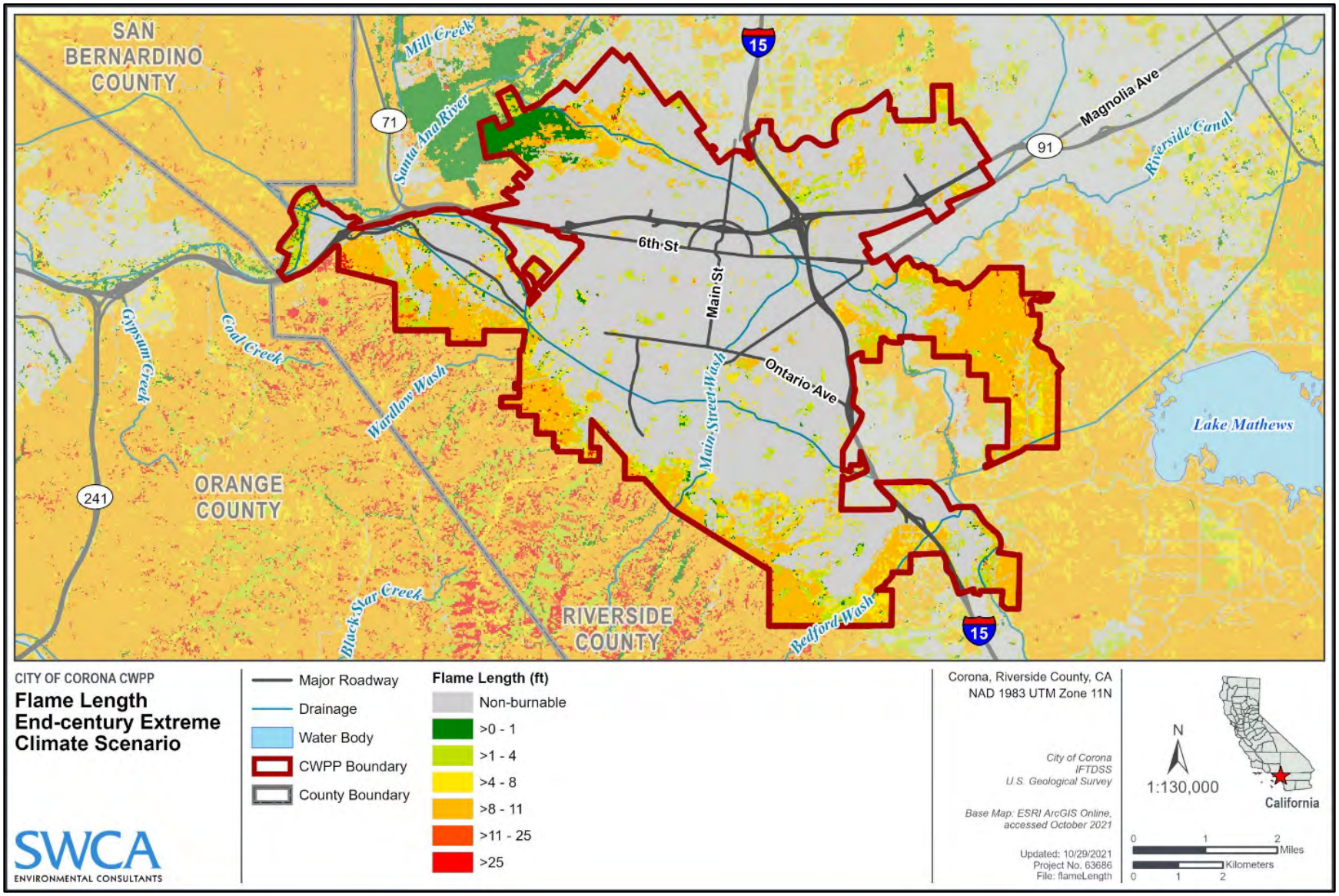


Figure 3.7. Modeled flame length under the projected climate change scenario.

RISK ASSESSMENT

The City of Corona's Wildland Risk/Hazard Assessment discusses wildfire behavior and fuels in detail. The assessment utilizes products generated by CAL FIRE to demonstrate the wildfire threat (or risk) to the community. In this CWPP, "threat" is synonymous with "risk." The risk assessment below is a combination of two factors: 1) fire probability or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined to create five threat classes ranging from low to extreme (Figure 3.9). The second map used in the CWPP is the threat reduction area map, which indicated where (physically) the most significant impact can be made in the mitigation of the wildland fire threat (Figure 3.10). These areas are ranked from low to high in five categories.

As shown in Figure 3.8, a significant portion of the City of Corona's WUI is considered high risk (threat) or greater, with the majority being classified as very high. Land adjacent to the city is also classified as very high to extreme risk, which poses a considerable risk to the City of Corona due to potential fire spread from those wildland fuels. The areas in the northern portion of the city (Rincon/Auburndale and Corona Hills) have more moderate risk due to the more dominant urban composition of the fuels in that area.

COMMUNITY HAZARD ASSESSMENTS

During development of the City of Corona's Wildland Risk/Hazard Assessment (Firesafe Planning Solutions 2021), the Fire Department delineated 10 hazard threat areas and six areas of consideration within the city's WUI (Figure 3.11). These 16 areas represent the areas of greatest risk in the city. Each of these areas was assessed in detail with desktop analysis of fire behavior and on-the-ground hazard assessments that considered access, adjacent fuels, building construction types (Figure 3.8), infrastructure, and fire history. Based on those assessments, each area received a numerical score and associated adjective rating for risk from low to high. The results are summarized below (Firesafe Planning Solutions 2021).

Figure 3.8. City of Corona Public Library.

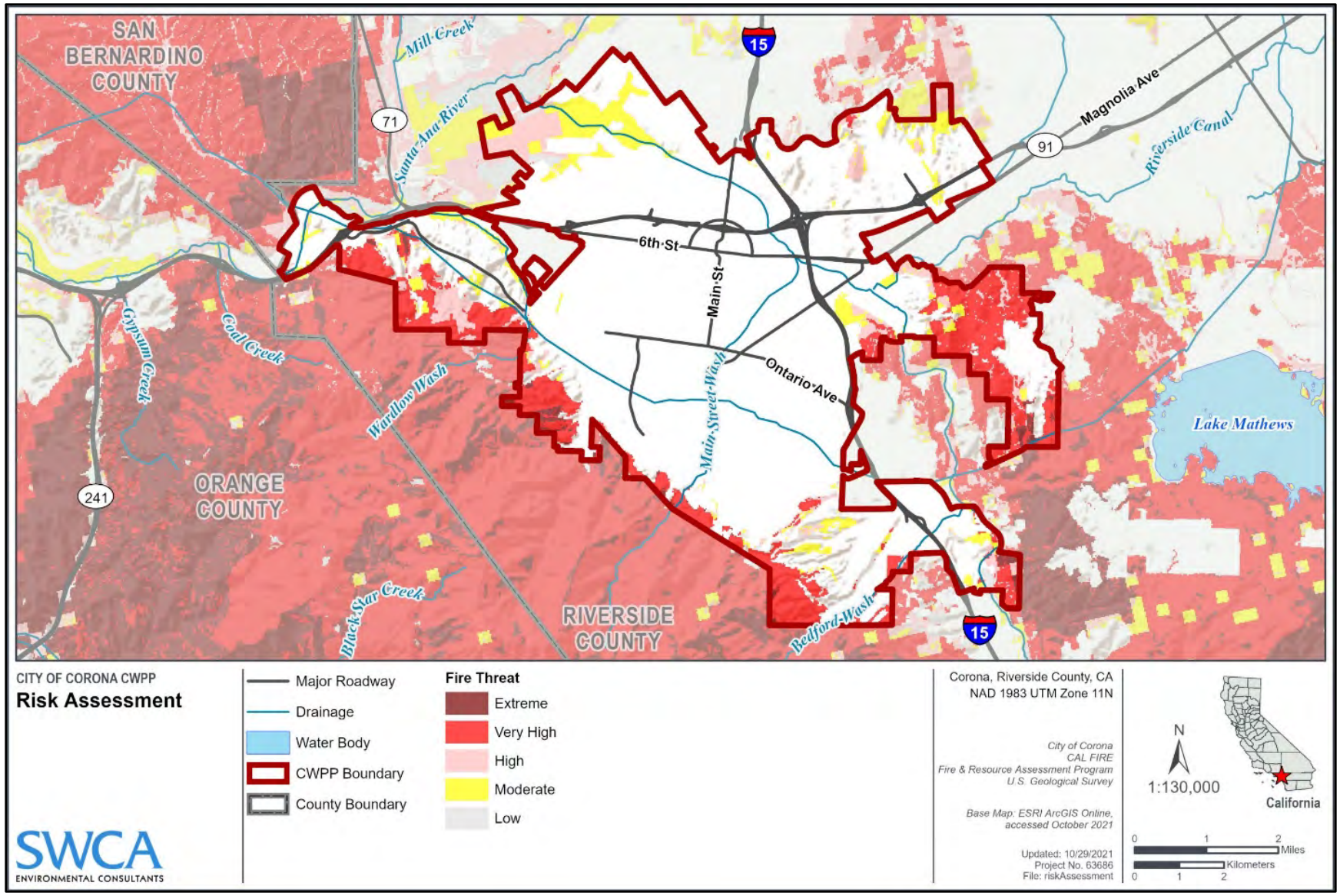


Figure 3.9. Risk assessment.

Source: Firesafe Planning Solutions (2021)

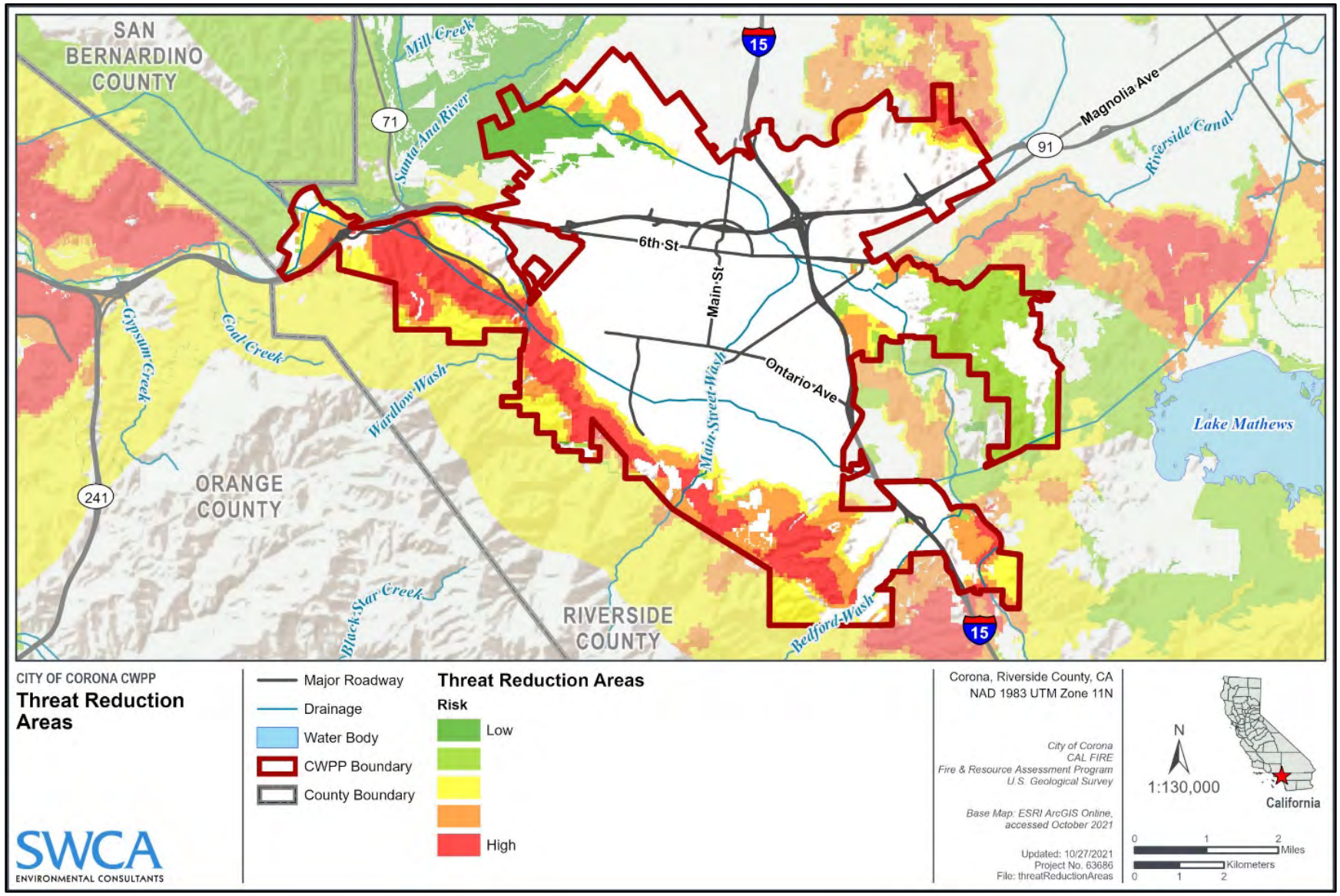


Figure 3.10. Threat reduction areas map.

Source: Firesafe Planning Solutions (2021)

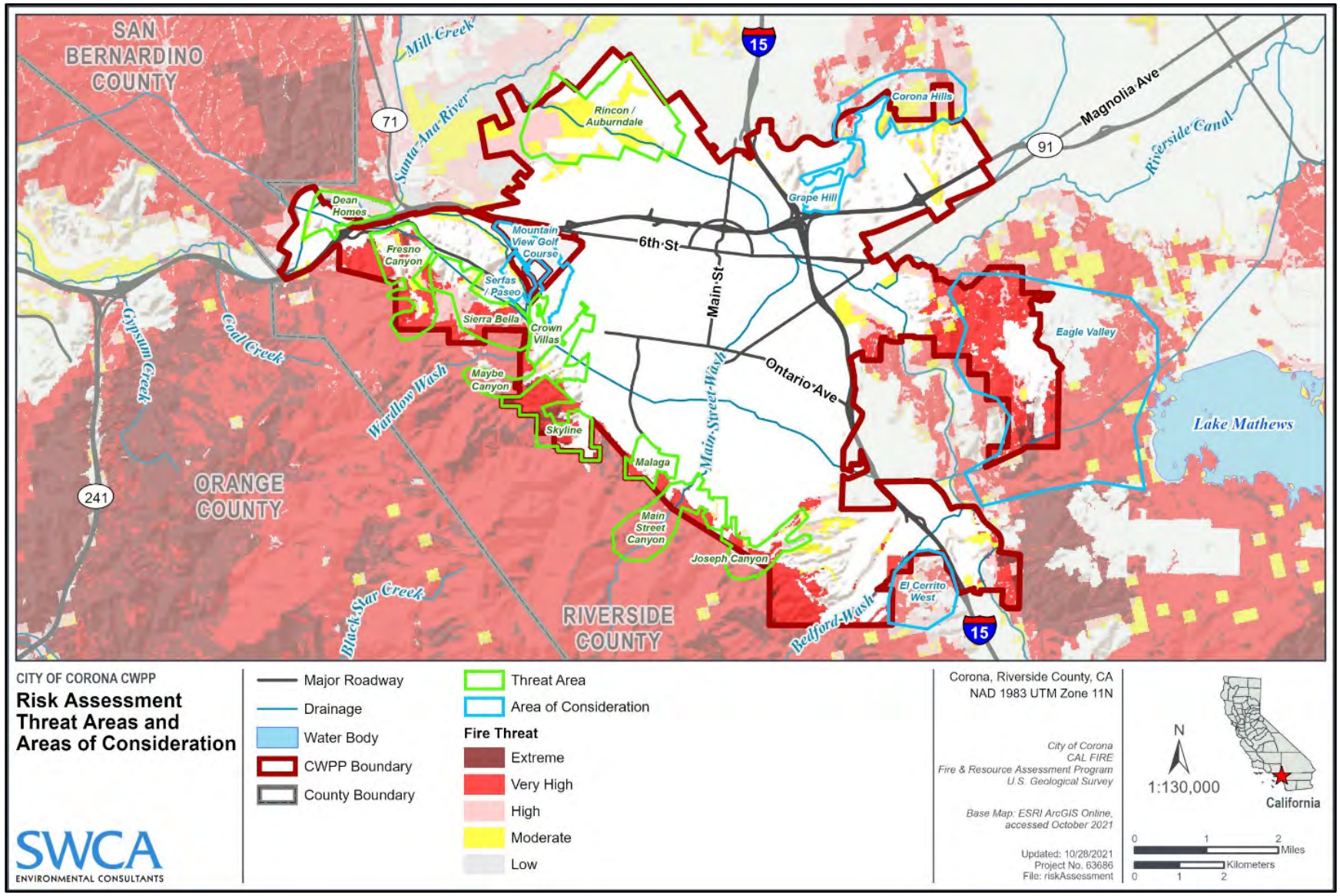


Figure 3.11. City of Corona threat areas and areas of consideration.

Source: Firesafe Planning Solutions (2021)

Table 3.1. Threat Areas List with Assessment Summary

Threat Area	Risk Rating	Fire Station	Positive	Negative
Crown Villa	160 Extreme	#3 - 790 S Smith Ave	• Two or more roads in/out • Road width • Fire access • Utilities underground • Fuels are upslope of most structures	• Alignment with Santa Ana winds • Dense vegetation • Limited defensible space • Steep topography • Limited access due to gates and street configurations • Limited suppression opportunities
Dean Homes	156 Extreme	#5 – 1200 Canyon Crest Dr	• Utilities underground • Water Source • Roofing materials • Fire access	• One road in/out • Area with severe fire weather and wind • Poor separation of adjacent structures • Combustible construction materials • History of ignitions from freeway
Fresno Canyon	125 High	#5 – 1200 Canyon Crest Dr	• Fire access • Roofing materials • Utilities underground • Water source	• Dense vegetation • Limited defensible space • Alignment with Santa Ana winds • Deck with combustible materials • Steep topography • Limited ingress/egress
Joseph Canyon	139 High	#6 – 110 W Upper St	• Surfaced roads • Roofing materials • Reflective street signs	• Problematic topography • Narrow roads lined with vegetation • Alignment with Santa Ana winds • Limited fire access • Dense fuels (north aspect) • Limited fire history • Limited public water access
Main Street Canyon	118 High	#6 – 110 W Upper St	• Low grade, surfaced road • Fire access • Roofing materials • Decking materials • Most fuels are upslope of the structures	• Steep grades and topographic features • One road in/out • Expansive fuel beds • Limited water supply in areas • Potential for entrapment

Threat Area	Risk Rating	Fire Station	Positive	Negative
Malaga	114 High	#6 – 110 W Upper St	• Two or more roads in/out • Roofing materials • Water source • Fire access • Most fuels are upslope of the structures	• Heavy fuel loading • Continuous fuels • Problematic topography • Alignment with diurnal winds • Dead orchards contributing to fuel complex
Maybe Canyon	125 High	#3 - 790 S Smith Ave	• Two or more roads in/out • Roofing materials • Water source • Utilities underground • Most wildland fuels upslope of structures	• Dense brush throughout area, especially in drainages • Steep topography • Deck with combustible materials • Steep canyons throughout area • Potential entrapment of homeowners • Urban tree windrows that create hazard into residential areas
Rincon/Auburndale	153 Extreme	#3 – 790 S Smith Ave	• Road width • Water source • Fire access • Roofing materials	• Heavy fuel loading • Limited defensible space • Steep slopes below structures • Vegetation between structures • Potential human ignitions • Potential spread to structures and Prado Basin • Value at risk: airport
Sierra Bella	123 High	#5 – 1200 Canyon Crest Dr	• Road width • Fire access • Water source • Utilities underground	• Dense vegetation • Steep topography • Area with severe fire weather • Alignment with Santa Ana winds • Limited fuel treatment options due to natural resource areas • Limited ingress/egress • New development

Threat Area	Risk Rating	Fire Station	Positive	Negative
Skyline	117 High	#6 – 110 W Upper St	• Road width • Fire access • Utilities underground • Water source • Most wildland fuels upslope of structures	• One road in/out • Limited defensible space • Problematic topography • Area with history of high fire occurrence • Limited access • Extreme fire behavior potential • Potential development

Table 3.2. Areas of Consideration List with Assessment Summary

Area of Consideration	Risk Rating	Fire Station	Positive	Negative
Corona Hills	102 High	#4 – 915 N McKinley St	• Surfaced road, low grade • Two or more roads in/out • Fire access • Roofing materials	• Alignment with diurnal winds • Limited defensible space • Decks with combustible materials • Narrow driveways • Multiple jurisdiction area • Light flashy fuels
Eagle Valley	182 Extreme	#7 – 3777 Bedford Canyon Rd	• Two or more roads in/out • Roofing materials • Sparsely populated	• Narrow, non-surfaced roads • Limited fire access • Limited water source • Utilities aboveground
El Cerrito	280 Extreme	Closest station-#7	•	• Disadvantaged -unincorporated community • Utilities aboveground • Limited water source • Downslope fuels • Extremely limited defensible space • Heavy fuel loading • Limited fire access • Problematic topography
Grape Hill	106 High	#2 – E Harrison St	• Utilities underground • Two or more roads in/out • Water source • Fire access	• Limited defensible space • Portions of area align with winds • Decks with combustible materials

Area of Consideration	Risk Rating	Fire Station	Positive	Negative
Mountain View	113 High	#3 – 790 S Smith Ave	• Two or more roads in/out • Water source • Fire access • Roofing materials	• Combustible construction materials • Problematic topography • Limited defensible space • Steep slopes below structures • Potential human ignitions
Serfas/Paseo	161 Extreme	#5 – 1200 Canyon Crest Dr	• Road width • Surfaced road, low grade • Fire access • Roofing materials	• Poor separation of adjacent structures • Steep slopes below structures • Alignment with diurnal winds • Heavy fuel loading • No defensible space • Long driveways/inaccessible

VALUES AT RISK

Earlier compilation of the critical infrastructure in the planning area, coupled with the community assessments, public outreach, and Task Force input, has helped in the development of a list of values at risk (VARs) from wildland fire. These data are also supplemented with Highly Valued Resources and Assets (HVRA) data, which is a data set that is being gathered nationwide and available through the Interagency Fuel Treatment Decision Support System (IFTDSS). The public was encouraged to provide additional VARs during the public outreach period, via the story map survey link. Based on feedback provided, this section and the associated mapping was revised.

In addition to critical infrastructure, VARs can also include natural, social, and cultural resources (see Maps 4 and 5 in Appendix B). It is important to note that although an identification of VARs can inform treatment recommendations, a number of factors must be considered in order to fully prioritize areas for treatment; these factors include appropriateness of treatment, land ownership constraints, locations of ongoing projects, available resources, and other physical, social, or ecological barriers to treatment.

The scope of this CWPP does not allow determination of the absolute natural, socioeconomic, and cultural values that could be impacted by wildfire in the planning area. In terms of socioeconomic values, the impact due to wildfire would cross many scales and sectors of the economy and call upon resources locally, regionally, and nationally.

NATURAL VALUES AT RISK

The CWPP planning area and the adjacent Cleveland National Forest have a variety of natural resources of particular concern to land managers, such as rare habitats and listed plant and wildlife species. Public outreach throughout the City of Corona has emphasized the importance of protecting natural/ecological values to the general public (Figure 3.12). Examples of natural values identified by the public and the Task Force include the following:

- Public land (e.g., Cleveland NF)
- Trail systems (e.g., Skyline Drive trails)
- Agricultural land
- Scenic Viewsheds
- Wildlife habitat and sensitive species
- Watersheds and preservation of water quality for the City of Corona.

Figure 3.12. Example of a natural VAR, scenic landscape.

SOCIOECONOMIC VALUES AT RISK

Social values include population, recreation, infrastructure, and the built environment (Figure 3.13). A large portion of housing in the City of Corona falls within the WUI. Examples include the following:

- Communications Infrastructure (e.g., cell phone and radio towers)
- Tourism values (e.g., restaurants, recreational facilities)
- Schools
- Public Safety Infrastructure
- Highways
- Churches
- Care homes, senior housing, day care, and other group homes
- Water storage
- Recreation sites (e.g., golf courses, hot springs, trails, parks)

Figure 3.13. Example of a socioeconomic VAR, a communication tower.

CULTURAL VALUES AT RISK

Many historical landmarks are scattered throughout the City of Corona. Particular cultural VARs that have been identified by the Task Force and the public in the CWPP planning area are the following:

- Sherman Indian Museum
- Corona Heritage Park & Museum
- Corona Historic Civic Center Theater (Figure 3.14)
- Churches (Figure 3.15)
- Evergreen Memorial Historic Cemetery

Figure 3.14. Example of a cultural VAR, the Historic Civic Center.

Figure 3.15. Example of a cultural VAR, a church.

CHAPTER 4 – MITIGATION STRATEGIES

As part of the 2021 CWPP, this plan has been aligned with the Cohesive Strategy and its Phase III Western Regional Action Plan by adhering to the nation-wide goal "*To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.*" (Forests and Rangelands 2014:3).

In order to do this, the CWPP recommendations have been structured around the three main goals of the Cohesive Strategy: restoring and maintaining landscapes, fire-adapted communities, and wildfire response.

This chapter provides guidance for implementing recommendations under each Cohesive Strategy goal. Many of these recommendations can be implemented at the homeowner or community level. Projects requiring large-scale support can be prioritized based on the City of Corona's Wildland Risk/Hazard Assessment.

Recommendation matrixes are used throughout this chapter to serve as an action plan for implementation. Recommendations have been aligned with the strategies in the 2021 California's Wildfire and Forest Resilience Action Plan (California Forest Management Task Force 2021) wherever possible.

COHESIVE STRATEGY GOAL 1: RESTORE AND MAINTAIN LANDSCAPES

Goal 1 of the Cohesive Strategy and the Western Regional Action Plan is Restore and Maintain Landscapes: Landscapes across all jurisdictions are resilient to fire and other disturbances in accordance with management objectives.

> *"Sustaining landscape resiliency and the role of wildland fire as a critical ecological process requires a mix of actions that are consistent with management objectives. The West will use all available methods and tools for active management of the landscape to consider and conserve a*

> *diversity of ecological, social, and economic values. The West will coordinate with all partners and seek continued stakeholder engagement in developing market-based, flexible and proactive solutions that can take advantage of economies of scale. All aspects of wildland fire will be used to restore and maintain resilient landscapes. Emphasis will be placed on protecting the middle lands near communities."* (Western Regional Strategy Committee 2013:14).

In this CWPP, recommendations to restore and maintain landscapes focus on vegetation management and hazardous fuel reduction.

RECOMMENDATIONS FOR HAZARDOUS FUEL REDUCTION

Fuels management of public and private land in the WUI is key to the survival of homes during a wildfire event, as well as the means to meet the criteria of Goal 1. Research has shown how fuel treatments in the WUI can change fire behavior to support suppression activities and protect homes (Evans et al. 2015). The importance of fuels management is reflected in policy at the federal level, with the HFRA requiring that federal land management agencies spend at least 50% of their fuels reduction funds on projects in the WUI.

Fuels should be modified with a strategic approach to reduce the threat that high-intensity wildfires pose to lives, property, and other values. This section provides information on fuel treatment methodologies that can be applied to first protect structures (defensible space), then near community boundaries (fuel breaks, cleanup of adjacent open spaces), and finally in the wildlands beyond community boundaries (larger-scale forest health and restoration treatments).

While not necessarily at odds with one another, the emphasis of each of these treatment types is different. Proximate to structures, the recommendations focus on reducing fire intensity consistent with Firewise and International Fire Code standards. Further into open space areas, treatments tend to emphasize forest health and increasing resiliency to catastrophic wildfire and other disturbances. Cooperators in fuels management should include federal, state, and local agencies as well as interested members of the public. Federal land management plans focus on these more landscape-level treatments, so the CWPP incorporates most federal land management by reference to those land management planning documents. The CWPP focuses primarily on projects within or adjacent to the City of Corona WUI areas.

Table G.1 in Appendix G summarizes the types of treatments recommended throughout the planning area. The majority of the treatments are focused on higher risk areas, as defined by the City of Corona's Wildland Risk/Hazard Assessment (Firesafe Planning Solutions 2021) and Task Force input. Many of these treatment recommendations are general across the communities because similar conditions occur in each threat area. Table G.1 also addresses the requirement for an action plan and assessment strategy by providing monitoring guidelines and a timeline for implementation. This timeline is obviously dependent on available funding and resources, as well as National Environmental Policy Act (NEPA) protocols for any treatments pursued on public land.

Figure 4.1 delineates existing and proposed conceptual treatment areas for each threat area polygon. These areas are delineated based on wildfire threat (see Figure 3.8) and threat reduction (see Figure 3.9) as well as integrating the findings from the City of Corona's Wildfire Risk/Hazard Assessment and identification of communities that only have a single access point (see Figure 2.11). Treatments may

include development of fuel breaks, landscape-level mechanical or prescribed fire treatments, roadside buffers, or actions to address limited ingress and egress. The delineations are conceptual in nature, and actual treatment prescriptions would need to be developed through assessment of conditions on the ground and in consideration of land management goals and objectives.

The treatment lists presented in Appendix G are by no means exhaustive and should be considered purely a sample of required projects for the future management of the planning area. Many projects may be eligible for grant funds available from federal and/or state sources. For a list of funding sources, please refer to Appendix E.

When applying fuel treatments, every effort should be made to align treatments with the State Forest Action Plan Assessment and Strategy (CAL FIRE 2018a, 2018b) with consideration of all appropriate best management practices and sound science.

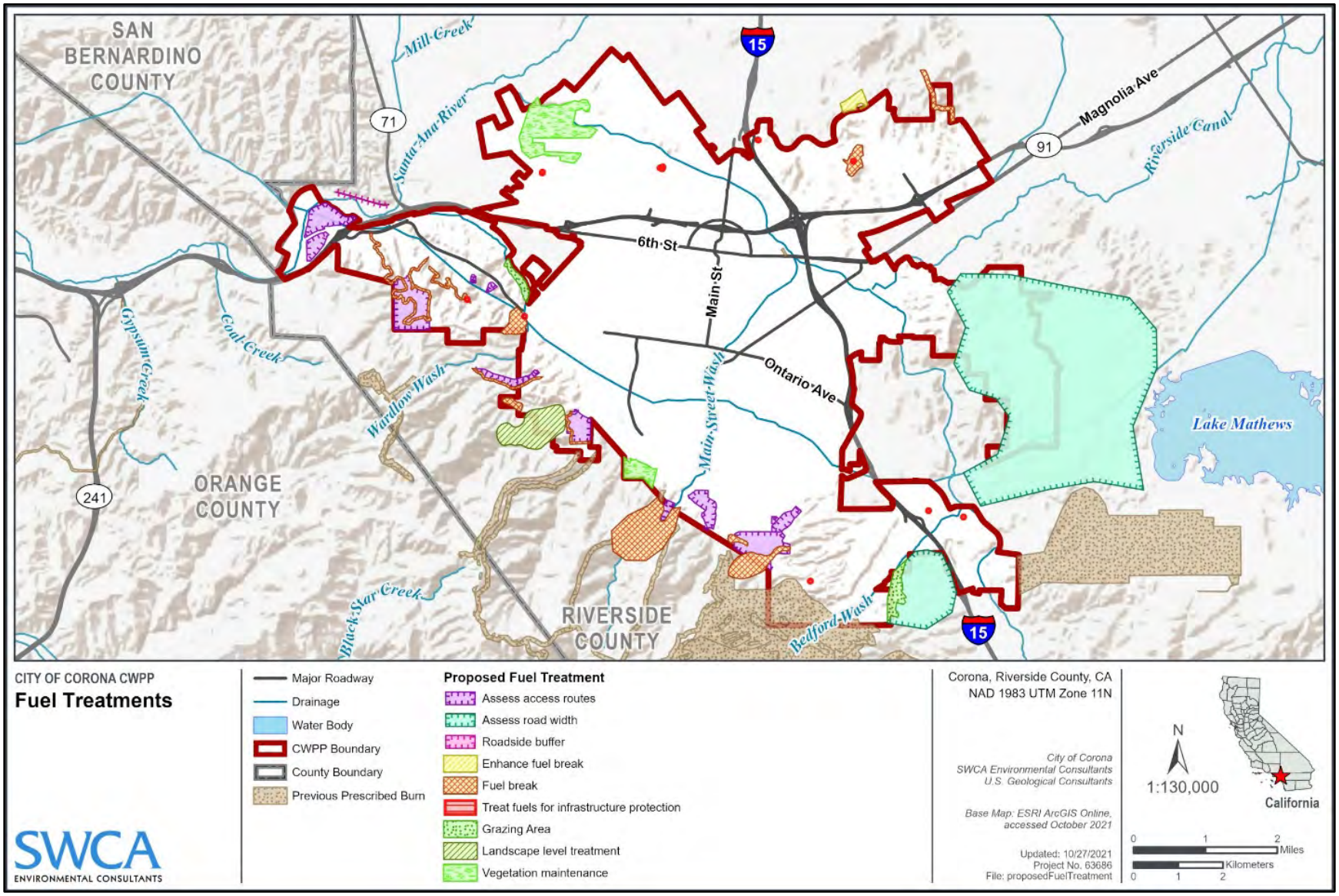


Figure 4.1. Existing and proposed fuel treatments across City of Corona boundaries.

Priority Areas of Interest delineate areas with dense concentrations of values at risk with high potential exposure to wildfire.

Fuels Treatment Scales

Defensible Space

Defensible space is perhaps the fastest, most cost-effective, and most efficacious means of reducing the risk of loss of life and property. Although fire agencies can be valuable in providing guidance and assistance, creating defensible space is the responsibility of the individual homeowner (Figure 4.2).

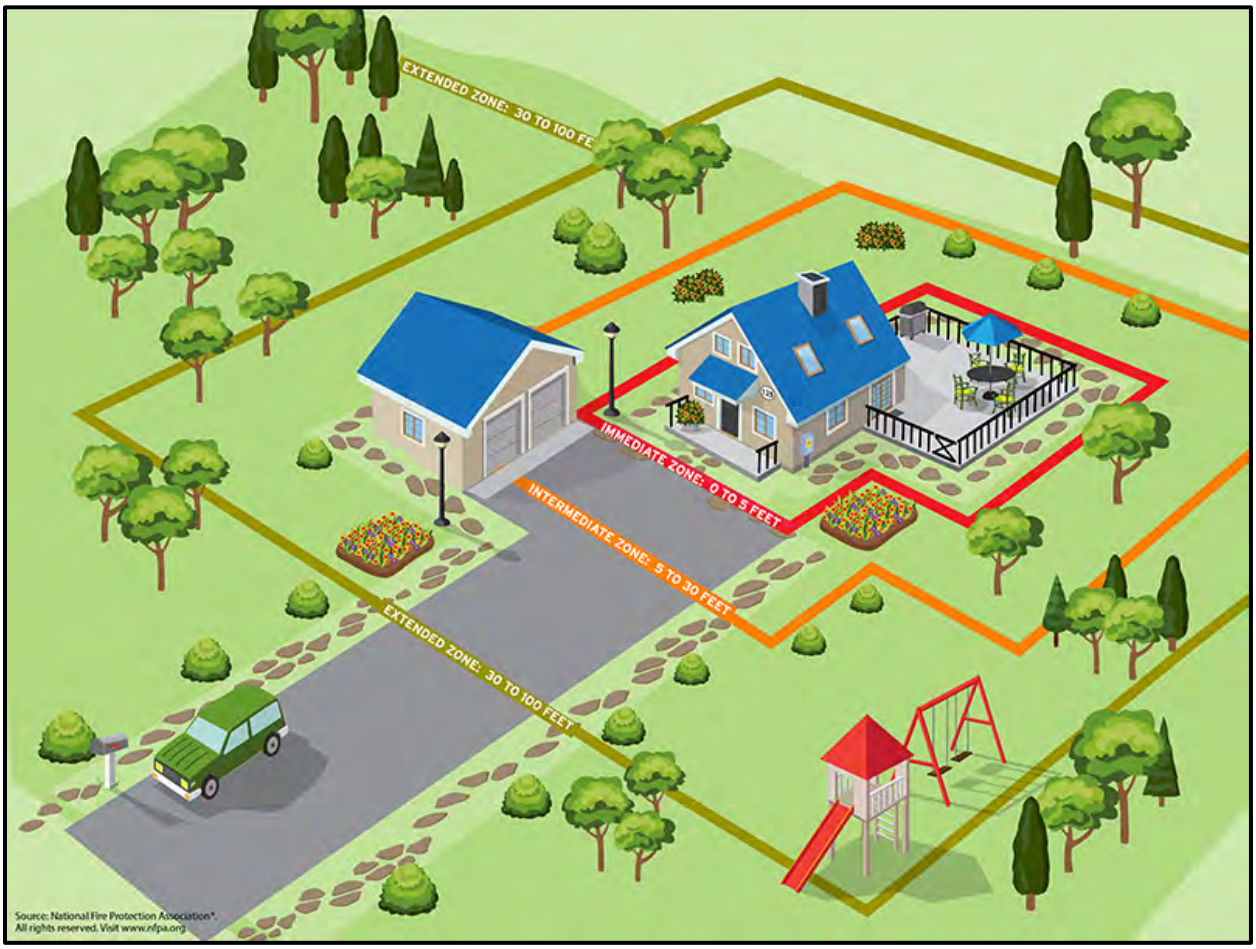


Figure 4.2. Defensible space zones providing clearance between a structure and adjacent woodland or forest fuels.

Source: NFPA

The definition of defensible space via state and local codes, its maintenance by homeowners, and enforcement by fire agencies as needed is a common part of wildfire risk mitigation. The California State Board of Forestry issued General Guidelines for Creating Defensible Space in 2008, following a change in Public Resources Code 4291 that expanded defensible space clearance requirements from 30 to 100 feet around buildings and structures within SRAs or very high fire hazard severity zones within LRAs. The guidelines were updated again in January 2021 to require an ember-resistant zone within 5 feet of the home. Some aspects about WUI defensible space that are often overlooked include:

- Greater defensible space may be needed due to local conditions, such as slope, fuel density, building materials, or location.
- Fuel reduction has more to do with disrupting fuel continuity so that the spread of fire is impeded, rather than creating a denuded zone around a home. For example, pruning the lower limbs of trees creates a break between ground fuels and tree canopies, reducing the chances that a fire will move from a ground fire to a crown fire.
- Communities may wish to develop defensible space areas that are greater than 100 feet for even better protection; the code sets only a minimum distance. However, expanding treatments beyond property lines can only be done with if allowed by state law, local ordinance, rule, or regulation.
- Defensible space also provides a safer environment within which firefighters can work. This environment is more than vegetation clearance; defensible space also involves emergency vehicle access, water supply, and clear street signs and addresses. All of these factors, and many more as identified by previous community-level CWPPs, affects the usefulness of defensible space in structure protection.
- Vegetation fuel reduction projects require compliance with all federal, state, or local environmental protection laws.

The City of Corona Fire Code requires hazardous vegetation and fuels around all applicable homes/structures to be maintained in accordance with the following laws and regulations:

- Public Resources Code Section 4291.
- California Code of Regulations Title 14, Division 1.5, Chapter 7, Subchapter 3.
- California Government Code Section 51182.
- City of Corona Municipal Code Title 8, Chapter 8.24 and Title 15, Chapter 15.12

The three codes are fundamentally similar and detail mandatory defensible space requirements for any person who owns, leases, controls, operates, or maintains a building in an SRA or in a very high fire hazard severity zone within an LRA. The requirements include but are not limited to:

1. 100 feet of clearance from each side and from the front and rear of the home/structure.
    a. More intense fuel reductions being utilized between 5 and 30 feet around the structure.
    b. May require greater clearance by state law, local ordinance, rule, or regulation.
    c. May require greater clearance as needed by insurance company.
2. Removal of vegetation around chimneys or stovepipes.
3. Removal of dead vegetation or debris.
4. Maintenance of a home/structure's roof to be free of leaves, branches, or other vegetative debris.

Additionally, the Public Resources Code was amended in January 2021 to require an ember-resistant zone within 5 feet of the home/structure on or before January 1, 2023. This translates to having a clearance of 5 feet between the home/structure and any materials that would likely be ignited by embers (CAL FIRE 2021c).

Effective defensible space consists of creating an essentially fire-free zone adjacent to the home, a treated secondary zone that is thinned and cleaned of surface fuels, and (if the parcel is large enough) a transitional third zone that is basically a managed forest area. These components work together in a proven and predictable manner. Zone 0 keeps fire from burning directly to the home; Zone 1 reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember production; and Zone 2 provides the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition (see Figure 4.2).

It should be emphasized that defensible space is just that—an area that allows firefighters to work effectively and with some degree of safety to defend structures. While defensible space may increase a home's chance of surviving a fire on its own, a structure's survival is not guaranteed, with or without firefighter protection. Nevertheless, when these principles are consistently applied across a neighborhood, everybody benefits. The three zones for defensible space actions are described below (CAL FIRE 2021c):

Zone 0 – Immediate Zone- Ember Resistant: This zone is not currently required by State law. However, as of January 1, 2023, Assembly Bill 3074 will require the Board of Forestry and Fire Protection to develop the regulation for Zone 0. While not yet required, Zone 0 has been proven to be the most important defensible space zone for protecting your home against wildfire. This zone consists of the immediate area around a home and is defined as 0 to 5 feet from the property structure, including areas under and around all structure attachments, such as sheds or decks. Zone 0 requires the most stringent wildfire fuel reduction methods as actions taken within this zone can directly influence whether a property ignites. Recommendations for treating Zone 0 include (CAL FIRE 2021c):

- Use non-combustible landscaping materials, such as gravel in place of mulch.
- Clear all dead and dying debris from around a structure, including branches, dead leaves, pinecones, pine needles, grasses, and shrubs. Remember to check areas where the debris can accumulate, such as gutters, stairways, porches, and roofs.
- Clear all branches or vegetation within 10 feet of any chimney or stovepipe outlet.
- To keep vegetation within the 5-foot buffer around all structures, make sure plants are thoroughly watered, and keep non-woody, low-growing plant species if possible.
- Limit the use of combustible materials, such as outdoor furniture, on decks or patios.
- Relocate firewood or lumber to Zone 2.
- Replace structures attached to a home, such as fencing or gates, with non-combustible materials.
- If possible, keep garbage receptacles outside of Zone 0.
- If possible, keep all vehicles, boats, ATVs, and any other machines outside of Zone 0.

Zone 1 – Intermediate Zone- Clean and Green: Zone 1 consists of the first 30 feet from structures, including home, decks, garages, etc. If a property line extends less than 30 feet, Zone 1 would be the distance from structures to property line. This zone features fuel reduction efforts and serves as a transitional area between Zones 0 and 2. Recommendations for treating Zone 1 include (CAL FIRE 2021c):

- Remove all dead and dying vegetation, including vegetation debris such as leaf litter. Be sure to check roof and gutters as well.
- Maintain a minimum buffer of 10 feet between a chimney and any vegetation, including dead or overhanging branches. Be sure to remove all branches that hang over the roof.
- Maintain trees by trimming them regularly and keeping a minimum 10-foot buffer between tree canopies.
- Relocate fire or lumber to Zone 2.
- Trim or remove any flammable vegetation near windows.
- Remove any items or vegetation that could catch fire and ignite other property structures, such as vegetation under decks or stairs.
- Separate any items that could ignite, such as trees, shrubs, swing sets, patio furniture, etc.

Zone 2 – Extended Zone- Reduced Fuel: This zone encompasses an area 30 feet from a structure out to 100 feet, or the property line, whichever is closer. This zone addresses fuel reduction to prevent wildfires from spreading. Recommendations for treating Zone 2 include (CAL FIRE 2021c):

- Maintain all grasses to reach a maximum height of 4 inches.
- For shrubs or trees, maintain a distance between plants of at least two times a plant's size between. Additional space between vegetation is needed for properties on slopes.
    - Flat to mild slope (less than 20%): Minimum distance of 10 feet between trees and two times the size of other plants. Example: For shrubs 2 feet in diameter, at least 4 feet are needed between shrubs.
    - Mild to moderate slope (20%–40%): Minimum distance of 20 feet between trees and four times the size of other plants. Example: For shrubs 2 feet in diameter, at least 8 feet are needed between shrubs.
    - Moderate to steep slope (greater than 40%): Minimum distance of 30 feet between trees and six times the size of other plants. Example: For shrubs 2 feet in diameter, at least 12 feet are needed between shrubs.
- Create vertical space between vegetation by clearing all branches at least 6 feet from the ground for isolated trees, or for trees with nearby shrubs, clear at least 3 times the shrub height.
    - Example: A 4-foot shrub is growing near a tree; a clearance of 12 feet (3 × 4) is needed between the top of the shrub and the lowest tree branch.
- Vegetation debris such as dead leaves, branches, twigs, pinecones, etc., may be allowed up to 3 inches in depth. However, it is best to remove vegetation debris.
- All wood or lumber piles must have a 10-foot buffer of bare mineral soil in all directions; no vegetation is allowed.

In addition to the recommendations listed above, CAL FIRE suggests maintaining a clearance zone of 10 feet around any outbuildings or liquid propane gas storage tanks, and an additional 10-foot clearance zone with no flammable vegetation (CAL FIRE 2021c).

Specific recommendations should be based on the hazards adjacent to a structure such as slope steepness and fuel type. In 2015, the City of Corona implemented the Suppression Inspection Action Plan, which facilitates the completion of hazard reduction inspections (City of Corona 2017). The Fire Prevention Division provides fire safety inspections, new construction inspections, a hazardous materials disclosure program, and weed abatement and fuel modification.

Homeowners are encouraged to take advantage of local resources for fire prevention and mitigation. Firewise guidelines are excellent resources but creating defensible space does not have to be an overwhelming process. Assisting neighbors may be essential in many cases. Homeowners should consider assisting the elderly, sharing ladders for gutter cleaning, and assisting neighbors with large thinning needs. Homeowner actions have been found to also motivate neighbors to act, increasing the scope of the wildfire mitigation across a community (Evans et al. 2015). Adopting a phased approach can make the process more manageable and encourage maintenance (Table 4.1).

Table 4.1. Example of a Phased Approach to Mitigating Home Ignitability

Year	Project	Actions
1	Basic yard cleanup (annual)	Dispose of clutter in the yard and under porches. Remove dead branches from yard. Mow and rake. Clean off roofs and gutters. Remove combustible vegetation near structures. Coordinate disposal as a neighborhood or community. Post 6-inch reflective address numbers visible from road.
2	Understory thinning near structures	Repeat basic yard cleanup. Limb trees up to 6–10 feet. Trim branches back 15 feet from chimneys. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
3	Understory thinning on private property along roads and drainages	Limb trees up to 6–10 feet. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
4	Overstory treatments on private property	Evaluate the need to thin mature or diseased trees. Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness.
5	Restart defensible space treatment cycle	Continue the annual basic yard cleanup. Evaluate need to revisit past efforts or catch those that were bypassed.

Fuel Breaks and Open Space Cleanup

The next location priority for fuels treatments should be where the community meets wildland. This may be the outer margins of a town or an area adjacent to occluded open spaces such as a park. Fuel breaks (also known as shaded fuel breaks) are strips of land where fuel (for example, living trees and brush, dead branches, leaves or downed logs) has been modified or reduced to limit the fire's ability to spread

rapidly. Fuel breaks should not be confused with firebreaks, which are areas where vegetation and organic matter are removed down to mineral soil. Shaded fuel breaks may be created to provide options for suppression resources or to provide opportunities to introduce prescribed fire. In many cases, shaded fuel breaks may be created by thinning along roads. This provides access for mitigation resources and firefighters, as well as enhancing the safety of evacuation routes.

Larger-scale Treatments

Farther away from WUI communities, the emphasis of treatments often becomes broader. While reducing the buildup of hazardous fuels remains important, other objectives are often included, such as forest health and resiliency to catastrophic wildfire and climate change considerations. Wildfires frequently burn across jurisdictional boundaries, sometimes on landscape scales. As such, these larger treatments need to be coordinated on a strategic level. This requires coordination between projects and jurisdictions, as is currently occurring.

Land managers have carried out numerous forest restoration projects across the Cleveland National Forest and Santa Ana Mountains, and have ongoing projects planned on public land that are designed to reduce hazardous fuels to protect communities and resources, while restoring fire-adapted communities. Figure 4.1 shows existing fuel treatments that have been completed or planned across the City of Corona. This information is derived from CAL FIRE and the USFS. The reader is referred to agency websites and the Federal Register for the latest information on planned or ongoing actions on federal land within the city. Figure 4.1. also includes areas delineated as priority areas of interest. These are areas of high concentrations of HVRAs that coincide with high potential exposure to wildfire, based on the City of Corona's risk assessment (see Figure 3.8). These are areas where land managers should consider employing mitigation measures to protect life, property, and other values.

Fuel Treatment Methods

Since specifics of the treatments are not provided in detail in Table G.1, different fuels reduction methods are outlined in the following narrative.

Several treatment methods are commonly used for hazardous fuels reduction, including manual treatments, mechanized treatments, prescribed fire, and grazing (Table 4.2). This brief synopsis of treatment options is provided for general knowledge; specific projects will require further planning. The appropriate treatment method and cost will vary depending on factors such as the following:

- Diameter of materials
- Proximity to structures
- Acreage of project
- Fuel costs
- Steepness of slope
- Area accessibility
- Density of fuels
- Project objectives

It is imperative that long-term monitoring and maintenance of all treatments is implemented. Post-treatment rehabilitation such as seeding with native plants and erosion control may be necessary.

Table 4.2. Summary of Fuels Treatment Methods

Treatment	Comments
Machine mowing	Appropriate for large, flat, grassy areas on relatively flat terrain.
Manual treatment with chipping or pile burning	Requires chipping, hauling, and pile burning of slash in cases where lop and scatter is inappropriate. Pile burning must comply with smoke management policy.
Brush mastication	Brush species tend to re-sprout vigorously after mechanical treatment. Frequent maintenance of treatments is typically necessary. Mastication tends to be less expensive than manual (chainsaw) treatment and eliminates disposal issues.
Timber mastication	Materials up to 10 inches in diameter and slopes up to 30% can be treated. Eliminates disposal issues. Environmental impact of residue being left on-site is still being studied.
Prescribed fire	Can be very cost effective for public land but not close to the city. Ecologically beneficial. Can be used as training opportunities for firefighters. May require manual or mechanical pretreatment. Carries risk of escape. Unreliable scheduling due to weather and smoke management constraints.
Feller buncher	Mechanical treatment on slopes more than 30% or of materials more than 10 inches in diameter may require a feller buncher rather than a masticator. Costs tend to be considerably higher than masticator.
Grazing (goats)	Can be cost effective. Ecologically beneficial. Can be applied on steep slopes and shrubby and flashy fuels. Requires close management.

Manual Treatment

Manual treatment refers to crew-implemented cutting with chainsaws. Although manual treatment can be more expensive than mechanized treatment, crews can access many areas that are too steep or otherwise inaccessible with machines. Treatments can often be implemented with more precision than prescribed fire or mechanized methods allow. Merchantable materials and firewood can be removed, while non-merchantable materials are often lopped and scattered, chipped, or piled and burned on-site. Care should be exercised to not increase the fire hazard by failing to remove or treat discarded material in a site-appropriate manner.

Strategic timing and placement of fuels treatments is critical for effective fuels management practices and should be prescribed based on the conditions of each particular treatment area. Some examples of this would be to place fuel breaks in areas where the fuels are heavier and perpendicular to the path of prevailing winds and to mow grasses just before they cure and become flammable. In areas where the vegetation is sparse and not continuous, fuels treatments may not be necessary to create a defensible

area where firefighters can work. In this situation, where the amount of fuel to carry a fire is minimal, it is best to leave the site in its current condition to avoid the introduction of exotic species.

Mechanized Treatments

Mechanized treatments include mowing, mastication (ground-up timber into small pieces), and whole tree felling. These treatments allow for more precision than prescribed fire and are often more cost-effective than manual treatment.

Mowing, including ATV and tractor-pulled mower decks, can effectively reduce grass fuels adjacent to structures and along highway rights-of-way and fence lines. For heavier fuels, several different masticating machines can be used, including drum- or blade-type masticating heads mounted on machines and ranging in size from a small skid-steer to large front-end loaders. Some masticators can grind standing timber up to 10 inches in diameter. Other masticators are more effective for use in brush or surface fuels. Mowing and mastication do not actually reduce the amount of on-site biomass but alter the fuel arrangement to a less combustible profile.

In existing fuel break areas maintenance is crucial especially in areas of encroaching shrubs or trees. In extreme risk areas more intensive fuels treatments may be necessary to keep the fire on the ground surface and reduce flame lengths. Within the fuel break, shrubs should be removed, and the branches of trees should be pruned from the ground surface to a height of 4 to 8 feet, depending on the height of the fuel below the canopy, and thinned with a spacing of at least two to three times the height of the trees to avoid movement of an active fire into the canopy.

Prescribed Burning

Prescribed burning is also a useful tool to reduce the threat of extreme fire behavior by removing excessive standing plant material, litter, and woody debris while limiting the encroachment of shrubby vegetation. Where possible, prescribed fire could occur on public land since fire is ecologically beneficial to this fire-adapted vegetation community and wildlife habitat. However, there is minimal opportunity to apply prescribed fire within or close to city limits. Prescribed burning requires detailed planning and coordination. In 2019, the CAL FIRE Prescribed Fire Working Group developed the CAL FIRE Prescribed Fire Guidebook with the intent of educating CAL FIRE employees on how the department utilizes prescribed fire to reduce fuels at a landscape scale while improving ecosystem health in California (CAL FIRE 2019a). Prescribed burn permits are offered through the City of Corona Fire Department (City of Corona 2021b).

Impacts of Prescribed Fire on Communities

Prescribed burning produces smoke that is composed of toxic particulate and gaseous pollutants. Inappropriate management of prescribed fires can be bothersome to residents, and it can negatively affect community health. Smoke from burning vegetation produces air pollutants that are regulated by both the U.S Environmental Protection Agency (EPA) and the State of California (EPA 2019). Additionally, smoke can increase ambient air pollution levels to a point where it exceeds air quality standards (California Air Resources Board [CARB] 2003). Therefore, effective smoke management is a vital component of planning and conducting prescribed fires.

The CARB has smoke management guidelines to protect the health and welfare of Californians from the impacts of smoke (CARB 2001).

In addition, the NWCG released the NWCG Smoke Management Guide for Prescribed Fire in 2020 (NWCG 2020). This plan is designed to act as a guide to all those who use prescribed fire. Smoke management techniques, air quality regulations, public perception of prescribed fire, foundational science behind prescribed fire, modeling, smoke tools, air quality impacts, and more are all discussed in this plan. The document is meant to pair with NWCG's Interagency Prescribed Fire Planning and Implementation Procedures Guide for planning and addressing smoke when prescribed fire is used (NWCG 2020). To view the plan, please visit: https://www.nwcg.gov/sites/default/files/publications/pms420-3.pdf.

Management of Nonnative Plants

The California Department of Food and Agriculture maintains a list of noxious weeds rated from A to C based on the current degree of infestation of the species and the potential for eradication (California Department of Food and Agriculture 2021a). Fuel treatment approaches should always consider the potential for introduction or proliferation of invasive nonnative species as a result of management actions.

Grazing

Fuel modifications targeted toward decreasing both vertical and horizontal continuity in fuels is critical as a prevention method against fire proliferation. The primary objectives for these modifications are treating surface fuels and producing low-density and vertically disconnected stands. Goat grazing is an effective, nontoxic, nonpolluting, and practically carbon-neutral vegetation treatment method. A goat grazing system typically consists of a high density of goats enclosed by a metallic or electrified fence guided by herders. Goats feed on a variety of foliage and twigs from herbaceous vegetation and woody plants (Lovreglio et al. 2014).

In partnership with Environmental Land Management Inc., the City of Corona is utilizing goats for wildfire prevention (Figure 4.3). Goats provide resourceful, environmentally sound, and cost-effective vegetation abatement. Fuel mitigation projects are scheduled for various areas of the city. The most recent projects, which started around July 2021, covered 17 acres south of Adobe Avenue, east of Paseo Grande, and north of Foothill Parkway and 19 acres south of Green River Road between Canyon Crest Drive and Nicholas Place. The goats can clear roughly 1 acre per day (City of Corona 2021c).

Figure 4.3. Goats clearing vegetation in the City of Corona.

Fuel Breaks

Because fuel breaks may not stop a fire under extreme fire behavior or strong winds, they should be considered a mitigating measure rather than a fail-safe method for fire containment. Furthermore, fuel break utility is contingent upon regular maintenance, as regrowth in a fuel break can quickly reduce its effectiveness and vegetation in this ecosystem is known to quickly re-sprout and reestablish. Maintenance of existing breaks could be more cost efficient than installation of new features.

It is not possible to provide a standard treatment prescription for the entire landscape because fuel break dimensions should be based on the local fuel conditions and prevailing weather patterns. For example, in some areas, clearing an area too wide could open the landscape to strong winds that could generate more intense fire behavior and/or create wind throw.

Strategic placement of fuel breaks is critical to prevent fire from moving from wildland fuels into adjacent neighborhoods. For effective management of most fuels, fuel breaks should be prescribed based on the conditions in each treatment area. Some examples of this would be to place fuel breaks in areas where fuels are heavier or in areas with easy access for fire crews. In areas where the vegetation is discontinuous, fuel treatments may not be necessary. In these situations, it is best to leave sites in their current conditions to avoid the introduction of more flammable, exotic species that may respond readily following disturbance.

Well-managed fuels reduction projects often result in ecological benefits to wildlife and watershed health. Simultaneously, planning and resource management efforts should occur when possible while reducing fuels to ensure that the land remains viable for multiple uses in the long term. The effectiveness of any fuels reduction treatment will increase over time with a maintenance and monitoring plan. Monitoring will also ensure that objectives are being met in a cost-effective manner.

COHESIVE STRATEGY GOAL 2: FIRE-ADAPTED COMMUNITIES

Goal 2 of the Cohesive Strategy/Western Regional Action Plan is Fire-Adapted Communities: Human populations and infrastructure can withstand a wildfire without loss of life and property. The basic premise of this goal is:

> *"Preventing or minimizing the loss of life and property due to wildfire requires a combination of thorough pre-fire planning and action, followed by prudent and immediate response during a wildfire event. Post-fire activities can also speed community recovery efforts and help limit the long-term effects and costs of wildfire. CWPPs should identify high-risk areas and actions residents can take to reduce their risk. Fuels treatments in and near communities can provide buffer zones to protect structures, important community values and evacuation routes. Collaboration, self-sufficiency, acceptance of the risks and consequences of actions (or non-action), assisting those who need assistance (such as the elderly), and encouraging cultural and behavioral changes regarding fire and fire protection are important concepts. Attention will be paid to values to be protected in the middle ground (lands between the community and the forest) including watersheds, viewsheds, utility and transportation corridors, cultural and historic values, etc."* (Western Regional Strategy Committee 2013:15).

In this CWPP, recommendations for fire-adapted communities include public education and outreach actions and actions to reduce structural ignitability.

RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Just as environmental hazards need to be mitigated to reduce the risk of fire loss, so do human hazards. Lack of knowledge, lack of positive actions, and negative actions all contribute to increased risk of loss in the WUI.

Most residents in the WUI understand the risk that wildfire poses to their communities. However, it is important to continually engage the community as a partner in order to expand wildfire mitigation options across land ownership (McCaffrey 2004, 2020; McCaffrey and Olsen 2012; Winter and Fried 2000).

Methods to improve public education could include increasing awareness about fire department response and resource needs; providing workshops at demonstration sites showing Firewise landscaping techniques or fuels treatment projects; organizing community cleanups to remove green waste; publicizing availability of government funds for treatments on private land; and, most importantly, improving communication between homeowners and local land management agencies to improve and build trust, particularly since the implementation of fuel treatments and better maintenance of existing treatments needs to occur in the interface between public and private land.

The City of Corona's Fire Prevention Division already carries out many public outreach activities throughout the city (Figures 4.4 and 4.5) and is a great resource for information and contacts regarding wildfire mitigation and wildfire prevention.

Table G.2 in Appendix G lists recommendations for improving public education and outreach.

Figure 4.4. CWPP community outreach activities.

Figure 4.5. CWPP community outreach activities.

RECOMMENDATIONS FOR REDUCING STRUCTURAL IGNITABILITY

Table G.2 in Appendix G provides a list of community-based recommendations to reduce structural ignitability that should be implemented throughout the CWPP planning area. Reduction of structural

ignitability depends largely on public education that provides homeowners the information they need to take responsibility for protecting their own properties. A list of action items that individual homeowners can follow is provided below. Carrying out fuels reduction treatments on public land may only be effective in reducing fire risk to some communities; if homeowners have failed to provide mitigation efforts on their own land, the risk of home ignition remains high and firefighter lives are put at risk when they carry out structural defense.

Preparing for wildland fire by creating defensible space around the home is an effective strategy for reducing structural ignitability as discussed under Cohesive Strategy Goal 1: Resilient Landscapes. Studies have shown that burning vegetation beyond 120 feet of a structure is unlikely to ignite that property through radiant heat (Butler and Cohen 1996), but fire bands that travel independently of the flaming front have been known to destroy houses that had not been impacted by direct flame impingement. Hardening the home to ignition from embers, including maintaining vent coverings and other openings, is also strongly advised to protect a home from structural ignitability. Managing the landscape around a structure by removing weeds and debris within a 30-foot radius and keeping the roof and gutters of a home clean are two maintenance measures proven to limit combustible materials that could provide an ember bed and ignite the structure.

California Building Code Chapter 7A and California Fire Code Chapter 49: The 2017 City of Corona Hazard Mitigation Plan (City of Corona 2017) requires that new development in or adjacent to high fire hazard severity zones complies with the current adopted edition of the California Building Code Chapter 7A and the California Fire Code Chapter 49. Collectively, these two codes establish minimum standards for the protection of life and property by increasing the ability of a home/building located in any high fire hazard severity zones or WUI to resist the intrusion of flames or embers released by a vegetation fire. The City of Corona also requires that an additional fuel modification plan be submitted for review and approval by Corona Fire (City of Corona 2017).

Assembly Bill 38: Assembly Bill 38 (2019) amended sections of the Civil, Government, and Public Resources Codes to set forth a comprehensive wildfire mitigation financial support program, which facilitates cost-effective home/structure hardening and retrofitting to create fire-resistant homes, businesses, and public structures. The amendments require the State Fire Marshal, in consultation with the Director of Forestry and Fire Protection and the Director of Housing and Community Development to identify building retrofits and hardening measures eligible for financial assistance under the program. Additionally, the amendments require that CAL FIRE identify defensible space, vegetation management, and fuel treatment procedures eligible for financial assistance. Wildfire hazard areas eligible for financial assistance under the program include LRAs situated within very high fire hazard severity zones and SRAs within any fire hazard severity zone (CA GOPR 2020).

Action Items for Homeowners to Reduce Structural Ignitability

Low or No Cost Investment (<$50)	Regularly check fire extinguishers.
	Maintain defensible space for 30 feet around home. Work with neighbors to provide adequate fuels mitigation in the event of overlapping property boundaries.
	Make every effort to keep lawn mowed and green during fire season.
	Screen vents with non-combustible meshing with mesh opening not to exceed nominal 1/4-inch size, but recommended 1/8-inch size.
	Ensure that house numbers are easily viewed from the street.
	Keep wooden fence perimeters free of dry leaves and combustible materials. If possible, non-combustible material should link the house and the fence.
	Keep gutters free of vegetative litter. Gutters can act as collecting points for fire brands and ashes.
	Store combustible materials (firewood, propane tanks, grills) away from the house; in shed, if available.
	Clear out materials from under decks and/or stacked against the structure. Stack firewood at least 30 feet from the home, if possible.
	Reduce your workload by considering local weather patterns. Because prevailing winds in the area are often from the west-southwest, consider mitigating hazards on the west corner of your property first, then work around to cover the entire area.
	Seal up any gaps in roofing material and enclose gaps that could allow fire brands to enter under the roof tiles or shingles.
	Remove flammable materials from around propane tanks.

Minimal Investment (<$250)	When landscaping in the home ignition zone (HIZ) (approximately 30 feet around the property), select non-combustible plants, lawn furniture, and landscaping material. Combustible plant material like junipers and ornamental conifers should be pruned and kept away from siding. If possible, trees should be planted in islands and no closer than 10 feet to the house. Tree crowns should have a spacing of at least 18 feet when within the HIZ. Vegetation at the greatest distance from the structure and closest to wildland fuels should be carefully trimmed and pruned to reduce ladder fuels, and density should be reduced with approximately 6-foot spacing between trees crowns.
	Box in eaves, attic ventilation, and crawl spaces with non-combustible material.
	Work on mitigating hazards on adjoining structures. Sheds, garages, barns, etc., can act as ignition points to your home.
	Enclose open space underneath permanently located manufactured homes using non-combustible skirting.
	Clear and thin vegetation along driveways and access roads so they can act as a safe evacuation route and allow emergency responders to access the home.
	Purchase or use a National Oceanic and Atmospheric Administration weather alert radio to hear fire weather announcements.
Moderate to High Investment (>$250)	Construct a non-combustible wall or barrier between your property and wildland fuels. This could be particularly effective at mitigating the effect of radiant heat and fire spread where 30 feet of defensible space is not available around the structure.
	Construct or retrofit overhanging projections with heavy timber that is less combustible.
	Replace exterior windows and skylights with tempered glass or multilayered glazed panels.
	Invest in updating your roof to non-combustible construction. Look for materials that have been treated and given a fire-resistant roof classification of Class A. Wood materials are highly combustible unless they have gone through a pressure-impregnation fire-retardant process.
	Construct an all weather surface turnaround in your driveway to improve access and mobilization of fire responders.
	Treat construction materials with fire-retardant chemicals.
	Install a roof irrigation system.
	Replace wood or vinyl siding with nonflammable materials.
	Relocate propane tanks underground.

COHESIVE STRATEGY GOAL 3: WILDFIRE RESPONSE

Goal 3 of the Cohesive Strategy/Western Regional Action Plan is Wildfire Response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions:

> *"A balanced wildfire response requires integrated pre-fire planning with effective, efficient, and coordinated emergency response. Pre-fire planning helps tailor responses to wildfires across jurisdictions and landscape units that have different uses and management objectives. Improved prediction and understanding of weather, burning conditions, and various contingencies during wildfire events can improve firefighting effectiveness, thereby reducing losses and minimizing risks to firefighter and public health and safety. Wildfire response capability will consider the responsibilities identified in the Federal Response Framework. Local fire districts and municipalities with statutory responsibility for wildland fire response are not fully represented throughout the existing wildland fire governance structure, particularly at the NWCG, NMAC, and GACC levels."* (Western Regional Strategy Committee 2013:15).

This section provides recommended actions that jurisdictions could undertake to improve wildfire response.

RECOMMENDATIONS FOR IMPROVING FIRE RESPONSE CAPABILITIES

Educating the public so they can reduce dependence on fire departments is essential because these resources are often stretched thin due to limited personnel. Education to enhance community preparedness is a key factor in supporting local fire departments in fire response, particularly educating residents about emergency notifications and evacuation protocols so that residents are able to safely evacuate an area while emergency responders prepare to protect life and property.

Table G.3 in Appendix G provides recommendations for improving firefighting capabilities. Many of these recommendations are general in nature.

RECOMMENDATIONS FOR THREAT AREAS AND AREAS OF CONSIDERATION WITHIN THE CITY OF CORONA

The recommendations provided in Tables G.1, G.2, and G.3 in Appendix G were developed to be applied generally across the City of Corona to address common hazards or wildfire response concerns. The City of Corona's risk assessment identified specific hazards associated with 16 areas within the city's WUI, and based on those assessments, additional tables of recommendations (Tables G.4 and G.5) are also included in Appendix G.

POST-FIRE RESPONSE AND REHABILITATION

The recent increase in severe fires has highlighted the numerous complexities of post-fire response. Research indicates that high-severity burn areas may produce erosion and runoff rates 5 to 10 times higher than the rates produced by moderate-severity burn areas (Sierra Nevada Conservancy 2021). Following a fire, heavy rains may result in widespread floods carrying trees, boulders, and soil through canyons, ultimately damaging communities and critical infrastructure. The Sierra Nevada Conservancy reports that cleaning out water reservoirs costs between $5 and $10 million each time due to sediment buildup. Furthermore, letting the hydro plant sit idle costs about $200,000 per day (Sierra Nevada Conservancy 2021). Therefore, post-fire damage can interrupt water utility services for extended periods of time and cost millions to repair.

The Canyon 1 Fire burned 2,661 acres of the Cleveland National Forest in September 2017. Parts of the burned areas have extremely erosive soils on steep hillsides. The fire burned nearly all the vegetation and topsoil, resulting in an increased risk of erosion, flash flooding, and debris flow in and downslope of the burned area (City of Corona Fire Department 2018). The surrounding areas were subject to evacuations due to the increased risk of debris flow and flash flooding, even a year following the fire (City of Corona 2018). Creating a plan that outlines steps for agencies, municipalities, and the City of Corona to follow will streamline post-fire recovery efforts and reduce the inherent stress to the community.

There are many facets to post-fire recovery, including but not limited to:

- Ensuring public health and safety—prompt removal of downed and hazard trees, addressing watershed damage, and mitigating potential flooding.
- Rebuilding communities and assessing economic needs—securing the financial resources necessary for communities to rebuild homes, business, and infrastructure.
- Restoring the damaged landscape—restoration of watersheds, soil stabilization, and tree planting.
- Reducing fire risk in the future—identifying hazard areas and implementing mitigation.
- Prioritizing the needs of vulnerable and disadvantaged communities during response and disaster recovery efforts.
- Reducing post fire recovery time by replanting native species.
- Ensuring fire protection measures enhance sustainability of restoration projects.
- Retaining downed logs for erosion control and habitat maintenance.
- Evaluating and updating disaster recovery plans every 5 years to respond to changing needs and characteristics of the community.
- Coordinating with planning, housing, health and human services, and other local, regional or state agencies to develop contingency plans for meeting short-term, temporary housing needs of those displaced during a catastrophic wildfire event.
- Incorporating forecasted impacts from climate change intro trends and projections of future risk and consideration of policies to address identified risk.

- Updating codes and ordinances to specify procedures and standards for planning and permitting the reconstruction of buildings destroyed by wildfire.

Recovery of the vegetated landscape is often more straightforward than recovery of the human environment. Assessments of the burned landscape are often well-coordinated through the use of interagency crews who are mobilized immediately after a fire to assess the post-fire environment and make recommendations for rehabilitation efforts.

For the community impacted by fire, however, there is often very little planning at the local level to guide their return after the fire. Residents impacted by the fire need assistance making insurance claims; finding temporary accommodation for themselves, pets, and livestock; rebuilding or repairing damaged property; removing debris and burned trees; stabilizing the land for construction; mitigating potential flood damage; repairing infrastructure; reconnecting to utilities; and mitigating impacts to health. Oftentimes, physical impacts can be mitigated over time, but emotional impacts of the loss and change to surroundings are long-lasting and require support and compassion from the community.

AFTER THE FIRE

Rebuilding and recovery from wildfire can vary greatly across income levels and demographics. Rural areas, low-income neighborhoods, and immigrant communities generally do not have the necessary resources to cover insurance and rebuilding expenses that occur after a fire. Due to this, many of these areas take more time to recover than those with appropriate access to resources. In addition, the occurrence of wildfire can worsen existing mental health conditions and lead to post-traumatic stress (PTS), low self-esteem, and depression for at-risk populations (CA GOPR 2020).

Returning Home

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

When driving, watch for trees, brush, and rock which may have been weakened or loosened by the fire. Be aware of any damage or debris on roads and driveways. Traffic may be delayed, or lanes closed due to firefighter operations. Use extreme caution around trees, power poles, and any other tall objects that may have been weakened by the fire (CAL FIRE 2020b).

Even if the fire did not damage your house, do not expect to return to normal routines immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Request that the fire department or utility companies turn the utilities back on once the area is secured. Similarly, water supply systems may have been damaged; do not drink from the tap until you have been advised that it is safe to do so. Finally, keep a “fire watch”; look for smoke or sparks in houses and other buildings.

Once at home check for the following (CAL FIRE 2019b):

- Check the roof and exterior areas for sparks or embers

- Check grounds for hot spots, smoldering stumps, and vegetation
- Check for fire damage to your home, turn off all appliances and make sure the meter is not damaged before turning on the main circuit breaker
- Check the attic and throughout your house for any hidden burning sparks or embers
- Do not drink water from the faucet until emergency officials say it is okay, water supply systems can be damaged and become polluted during wildfires
- Discard any food that has been exposed to heat, smoke, flood water, or soot.
- If you have a propane tank or natural gas, leave valves closed until the supplier or utilities can inspect your system.
- If you have a solar electrical system, this system should be inspected by a licensed technician to verify that the solar panels and electrical wiring are safe for continued operation
- Consult local experts on the best way to restore and plant your land with fire-safe landscaping
- Contact 911 if any danger is perceived

Ash contains toxic substances and may be irritating to the eyes, nose, throat, and skin. Ash is harmful to breathe and may trigger asthma attacks. Follow these tips to reduce your exposure to ash (California Department of Public Health 2017):

- Do not allow children to play in ash and wash off children's toys before children play with them.
- Immediately was any part of your body that touches ash to avoid irritation.
- Wash fruits and vegetables from your garden thoroughly before eating them.
- Keep pets out of ash areas.
- Frequently clean indoor surfaces by wet mopping.
- Wear protective clothing and a respirator when working outside.

Insurance Claims

Your insurance agent is the best source of information for submitting a claim. It is recommended you take photos of your home in preparation of an emergency and keep the photos in a safe place as this will make the insurance claim process easier. Most expenses incurred during the time you are forced to live elsewhere may be reimbursed, so be sure to keep all receipts. Additional items that may be covered are extra transportation costs to and from work or school, telephone installation, furniture rental, extra food costs, and water damage. Do not start any repairs without the approval of your claims adjuster (California Department of Insurance 2021).

Community Safety: Post-Fire Floods and Debris Flows

There are numerous natural hazards after a wildfire. Perhaps most dangerous are potential flash floods and landslides following rainfall in a burned area upstream of a community. Wildfires increase risk of flooding because burned soil is unable to absorb rainfall and it becomes hydrophobic. Factors that contribute to flooding and debris flows are steep slopes, heavy rainfall, weak or loose rock and soil,

and improper construction and grading. Even small rainfall can cause a flash flood, transporting debris and damaging homes and other structures. Listen and look for emergency updates, weather reports, and flash flood warnings (California Department of Conservation 2019). Develop an evacuation plan with your family and stay away from waterways, storm channels, and arroyos. Be aware of your risk, pay attention to weather forecasts, listen to local authorities, and have a household inventory with copies of critical documents (California Department of Water Resources 2021).

Mobilizing Your Community

Wildfires that produce extensive damage require a community-scale response for recovery efforts. The local Emergency Manager will collaborate with county, state and federal partners to manage disaster response and urgent needs. Still, mobilizing a response and recovery team or a group of teams in a community can function as a vital part of the recovery procedure. Coordinated and informed direction throughout community-level volunteers and all levels of government are necessary for successful recovery (California Silver Jackets Team [SJT] 2019).

As opposed to wildfire response, post-fire response is not typically managed by a unified state or federal team. Rather, each organization and each tier of government acts on its own authority. This produces a greater demand for coordination at the local level and the sharing of information between organizations to coordinate recovery efforts (California SJT 2019).

Residents throughout California are encouraged to join forces to create local Fire Safe Councils (FSCs) to minimize and prevent wildfire losses. FSCs are community-based organizations that mobilize residents to protect their properties, communities, and environments from disastrous wildfires. FSCs educate homeowners about community wildfire preparedness activities while collaborating with local fire officials to plan and implement projects that increase the wildfire resilience of their communities (California Fire Safe Council 2021).

In addition, each community is encouraged to create its own type of a Post-Fire Coordination Group (PFCG) to direct the response to any ensuing post-wildfire natural hazards and aid in determining post-fire mitigation actions. The PFCG should work directly with local, county, state, or federal agencies, emergency response officials, and others to aid in a coordinated response. Primary duties of the PFCG include coordinating the exchange of information among agencies and the risk assessment, assembling and exchanging geospatial data, assisting public communications, and coordinating with elected officials (California SJT 2019).

Communities are also encouraged to establish a post-fire coordinator. The post-fire coordinator is appointed by the community to assist a coordinated response to a wildfire and to aid the community's post-fire recovery efforts. The post-fire coordinator is likely to collaborate with local, county, state, and federal organizations that participate in emergency response and post-fire recovery efforts. It is important that the post-fire coordinator have demonstrated management, internet, and social media skills, community knowledge, and experience with government agencies and programs (California SJT 2019).

The recovery coordinator should become familiar with representatives from local, county, state, and government agencies that will be helping with coordination or funding of post-fire recovery. The following resources may be helpful for the post-fire and volunteer coordinators (California SJT 2019):

1. Housing
    a. FEMA
    b. Federal Housing Administration
    c. California Department of Housing and Community Development
    d. The Salvation Army
2. Debris Removal
    a. California Department of Resources Recycling and Recovery
    b. USACE
3. Debris Modeling
    a. U.S. Geological Survey
4. Hazardous Waste and Pollution
    a. California Environmental Protection Agency
5. Pets and Livestock
    a. American Society for the Prevention of Cruelty to Animals
    b. California Department of Food and Agriculture
6. Food
    a. USDA Supplemental Nutrition Assistance Program
    b. California Department of Social Services, Disaster CalFresh
7. Social Services
    a. California Employment Development Department
    b. FEMA Disaster Unemployment Assistance
    c. U.S. Administration for Children and Families
    d. Office of Access and Functional Needs
    e. California Foundation for Independent Living Centers
8. Farm Rehabilitation
    a. Farm Service Agency
    b. USDA Rural Development Disaster Assistance
    c. Natural Resources Conservation Service (NRCS) General Environmental Quality Incentives Program Financial Assistance
9. General
    a. The American Red Cross
    b. California Governor's Office of Emergency Services
    c. USFS
    d. National Park Service
    e. CAL FIRE

Any large wildfire will also involve an Incident Command System (ICS), an appropriately sized team assigned to aid in post-fire recovery. Learn more are https://www.nps.gov/articles/wildland-fire-incident-command-system-levels.htm.

Communication

After a team is assembled and immediate tasks are identified, find the best way to spread information in your community. You may distribute flyers, set up a voicemail box, work to find pets or livestock that have been displaced, develop a mailing list for property owners, hold regular public meetings, etc. It is important that a long-term communications plan is developed (California SJT 2019). Applying the following steps can aid in successful communication (California SJT 2019):

- Convey post-wildfire hazards to the public.
- Develop and maintain emergency notification systems that allow authorized official to alert residents of emergency situations.
- Public meetings to inform the public about programs and services available in the community.
- Determine the best way to relay information, e.g., phone calls, radio, TV, or social media.
- Find out how emergency response teams, local officials, and volunteers will communicate with the community.

Post-Fire Rehabilitation and Resources

Wildfires that cause extensive damage necessitate dedicated efforts to avert issues afterwards. Loss of vegetation increases soil susceptibility to erosion; water runoff may increase and lead to flooding; sediments and debris may be transported downstream and damage properties or saturate reservoirs putting endangered species and water reserves at risk (USFS 2021a). Following a fire, the primary priority is emergency stabilization to prevent additional damage to life, property, or natural resources. The soil stabilization work starts immediately and may proceed for up to a year. The rehabilitation effort to restore damage caused by the fire starts after the fire is out and may persist for various years. For the most part, rehabilitation efforts focus on the lands not likely to recover naturally from wildfire damage (USFS 2021a).

The USFS's post-fire emergency stabilization program is called the Burned Area Emergency Response (BAER) program. The goal of the BAER program is to discover post-wildfire threats to human life and safety, property, and critical natural or cultural resources on USFS lands and take appropriate actions to mitigate unacceptable risks (USFS 2021b). BAER groups are composed of trained professionals in different fields: soil scientists, engineers, hydrologists, biologists, botanists, archaeologists, and others who quickly assess the burned area and advise emergency stabilization treatments (USFS 2021b).

The NRCS Emergency Watershed Protection (EWP) program provides technical and financial services for watershed repair on **public (state and local) and private land**. The goal is reduced flood risk via funding and expert advice for land treatments. The EWP program can provide up to 75% of funds; remaining funds can be paid with in-kind volunteer labor (Coalition for the Upper South Platte [CUSP] 2016). This funding is used by the State Emergency Rehabilitation Team to develop specific recovery and treatment plans.

Examples of potential treatments include (USFS 2021b):

- Hillside stabilization (for example, placing bundles of straw parallel to the slope to slow erosion)
- Hazard tree cutting
- Felling trees perpendicular to the slope contour to reduce runoff
- Mulching areas seeded with native vegetation
- Stream enhancements and construction of catchments to control erosion, runoff, and debris flows
- Planting or seeding native species to limit spread of invasive species.

A comparison of potential hillside, channel, and road treatments is available at https://www.afterwildfirenm.org/post-fire-treatments/which-treatment-do-i-use.

The effectiveness of various treatments is described at https://www.fws.gov/fire/downloads/ES_BAR/Post-Fire_Hillslope_Treatment_Synthesis.pdf.

Specific Treatment Details

Hillslope Treatments

Cover Applications:

- Dry mulch provides immediate ground cover with mulch to reduce erosion and downstream flow.
- Wet mulch (hydromulch) provides immediate cover to hold moisture and seeds on slopes using a combination of organic fibers, glue, suspension agents, and seeds (most effective on inaccessible slopes).
- Slash spreading provides ground cover to reduce erosion by felling trees in burned areas.
- Seeding reduces soil erosion over time with an application of native seed mixtures (most successful in combination with mulching). Breaking up and loosening topsoil to break down the hydrophobic layer on top of the soil is also effective.

Erosion Barrier Applications:

- Erosion control mat: organic mats staked on the soil surface to provide stability for vegetation establishment.
- Log erosion barrier: trees felled perpendicular to the hillslope to slow runoff.
- Fiber rolls (wattles): rolls placed perpendicular to the hillslope to reduce surface flows and reduce erosion.
- Silt fencing: permeable fabric fencing installed parallel to the slope contour to trap sediment as water flows down the hillslope.

Channel Treatments

- Check dam: small dams built to trap and store sediment in stream channels.

- In-channel tree felling: felling trees in a staggered pattern in a channel to trap debris and sediment.
- Grade stabilizer: structures made of natural materials placed in ephemeral channels for stabilization.
- Stream bank armoring: reinforcing streambanks with natural materials to reduce bank cutting during stream flow.
- Channel deflector: an engineered structure to direct flow away from unstable banks or nearby roads.
- Debris basin: constructed to store large amounts of sediment moving in a stream channel.

Road and Trail Treatments

- Outsloping and rolling dips (water bars) alter the road shape or template to disperse water and reduce erosion.
- Overflow structures protect the road by controlling runoff and diverting stream flow to constructed channels.
- Low water stream crossing: culverts replaced by natural fords to prevent stream diversion and keep water in the natural channel.
- Culvert modification: upgrading culvert size to prevent road damage.
- Debris rack and deflectors: structure placed in a stream channel to collect debris before reaching a culvert.
- Riser pipes filter out debris and allow the passage of water in stream channels.
- Catchment-basin cleanout: using machinery to clean debris and sediment out of stream channels and catchment basins.
- Trail stabilization: constructing water bars and spillways to provide drainage away from the trail surface.

These treatments and descriptions are further detailed at https://afterwildfirenm.org/post-fire-treatments/treatment-descriptions

For more information about how to install and build treatments, see the Wildfire Restoration Handbook at https://www.rmfi.org/sites/default/files/hero-content-files/Fire-Restoration-HandbookDraft_2015_2.compressed_0.pdf

Timber Salvage

Many private landowners may decide to harvest trees killed in the fire, a decision that can be highly controversial. Any remaining trees post-fire can be instrumental for soil and wildlife habitat recovery. Furthermore, burned soils are especially susceptible to soil compaction and erosion. Therefore, timber salvage must be performed by professionals. Several programs assist landowners with timber salvage, including the NRCS Environmental Quality Incentives Program (EQIP) (CUSP 2016).

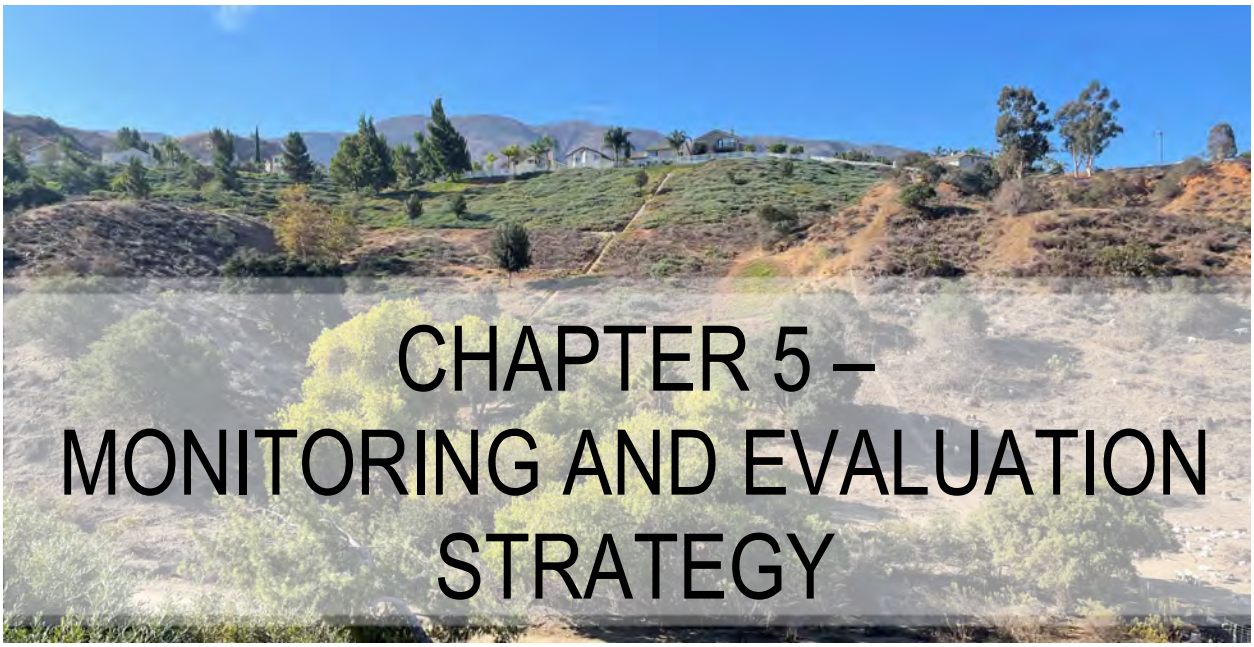
Invasive Species Management and Native Revegetation

Wildfire provides opportunity for many invasive species to dominate the landscape because many of these species thrive on recently burned landscapes. It is imperative that landowners prevent invasive establishment by eradicating weeds early, planting native species, and limiting invasive seed dispersal (CUSP 2016).

Planting native seeds is an economical way to restore a disturbed landscape. Vegetation provides protection against erosion and stabilizes exposed soils. In order to be successful, seeds must be planted during the proper time of year and using correct techniques. Use a native seed mixture with a diversity of species and consider the species' ability to compete with invasive species. Before planting, the seedbed must be prepared with topsoil and by raking to break up the hydrophobic soil layer. If you choose to transplant or plant native species, consider whether the landscape has made a sufficient recovery to ensure the safety of the individuals (CUSP 2016).

Long-Term Community Recovery

On non-federal land, recovery efforts are the responsibility of local governments and private landowners. Challenges associated with long-term recovery include homes that were severely damaged or were saved but are located in high-severity burn areas. Furthermore, homes saved but located on unstable slopes or in areas in danger of flooding or landslides present a more complicated challenge. Economically, essential businesses that were burned or were otherwise forced to close pose a challenge to communities of all sizes. Given these complications, rebuilding and recovery efforts can last for years, with invasive species control and ecosystem restoration lasting even longer (CUSP 2016). It is critical that a long-term plan is in place and there is sufficient funding and support for all necessary ecosystem and community recovery. To learn about more post-fire recovery resources, visit the After the Flames website here: https://aftertheflames.com/resources/.



CHAPTER 5 – MONITORING AND EVALUATION STRATEGY

Developing an action plan and an assessment strategy that identifies roles and responsibilities, funding needs, and timetables for completing highest-priority projects is an important step in organizing the implementation of the 2021 City of Corona CWPP. Table G.1 in Appendix G identifies tentative timelines and monitoring protocols for fuels reduction treatments, the details of which are outlined below.

All stakeholders and signatories to this CWPP desire worthwhile outcomes. We also know that risk reduction work on the ground, for the most part, is often not attainable in a few months—or even years. The amount of money and effort invested in implementing a plan such as this requires that there be a means to describe, quantitatively or qualitatively, if the goals and objectives expressed in this plan are being accomplished according to expectations. The Story Map includes all the recommendations outlined in Appendix G in a searchable Implementation Tracking System that provides real-time progress updates. That matrix also includes potential obstacles to implementation and strategies to overcome obstacles. In addition, the CWPP Hub Site includes an interactive tracking sheet that the city is using to track project accomplishments and plan future projects.

In addition to applications on the Story Map and Hub Site, this section presents a suite of recommended CWPP monitoring strategies intended to help track progress, evaluate work accomplished, and assist planners in adaptive management.

The strategies outlined in this section consider several variables:

- Do the priorities identified for treatment reflect the goals stated in the plan? Monitoring protocols can help address this question.
- Can there be ecological consequences associated with fuels work? We may be concerned about soil movement and/or invasive species encroachment post-treatment. Relatively cost-effective monitoring may help clarify changes.

- Vegetation will grow back. Thus, fuel break maintenance and fuels modification in both the home ignition zone and at the landscape scale require periodic assessment. Monitoring these changes can help decision-makers identify appropriate treatment intervals.

As the CWPP evolves over time, it may be necessary to track changes in policy, requirements, stakeholders, and levels of preparedness. These can be significant for any future revisions and/or addendums to the CWPP.

Table 5.1 identifies recommended monitoring strategies, both quantifiable and non-quantifiable, for assessing the progress of the CWPP and increasing sustainability. It must be emphasized that these strategies are 1) not exhaustive and 2) dependent on available funds and personnel to implement them.

There are many resources for designing and implementing community based, multi-party monitoring that could support and further inform a monitoring program for the CWPP (Egan 2013). Multiparty monitoring involves a diverse group consisting of community members, community-based groups, regional and national interest groups, and public agencies. This approach increases understanding of the effects of restoration efforts and trust among restoration partners. Multiparty monitoring may be more time-consuming due to the collaborative nature of the work; therefore, a clear and concise monitoring plan must be developed.

Table 5.1. Recommended Monitoring Strategies

Strategy	Task/Tool	Lead	Remarks
Project tracking system	Online web app to track hazardous fuels projects spatially, integrating wildfire risk layer to show progress towards wildfire hazard and risk reduction. Web app would include attribute tables that outline project details	Task Force	Interactive tool will be easily updated and identify areas that require additional efforts
Photographic record (documents pre- and post-fuels reduction work, evacuation routes, workshops, classes, field trips, changes in open space, treatment type, etc.)	Establish field global positioning system (GPS) location; photo points of cardinal directions; keep photos protected in archival location	Task Force member	Relatively low cost; repeatable over time; used for programs and tracking objectives
Number of acres treated (by fuel type, treatment method)	GPS/GIS/fire behavior prediction system	Task Force member	Evaluating costs, potential fire behavior
Number of home ignition zones/defensible space treated to reduce structural ignitability	GPS	Homeowner	Structure protection
Number of residents/citizens participating in any CWPP projects and events	Meetings, media interviews, articles, numbers accessing story map	Task Force member	Evaluate culture change objective
Number of homeowner contacts (brochures, flyers, posters, etc.)	Visits, phone	Agency representative	Evaluate objective
Number of jobs created	Contracts and grants	Task Force member	Evaluate local job growth

Strategy	Task/Tool	Lead	Remarks
Education outreach: number, kinds of involvement	Workshops, classes, field trips, signage	Task Force member	Evaluate objectives
Emergency management: changes in agency response capacity, increased agreements	Collaboration	Agency representative	Evaluate mutual aid
Codes and policy changes affecting CWPP	Qualitative	Task Force	CWPP changes
Number of stakeholders	Added or dropped	Task Force	CWPP changes
Wildfire acres burned, human injuries/fatalities, infrastructure loss, environmental damage, suppression and rehabilitation costs	Wildfire records	Task Force	Compare with 5- or 10-year average

An often overlooked but critical component of fuel treatment is monitoring. It is important to evaluate whether fuel treatments have accomplished their defined objectives and whether any unexpected outcomes have occurred. In addition to monitoring mechanical treatments, it is important to carry out comprehensive monitoring of burned areas to establish the success of fuels reduction treatments on fire behavior, as well as monitoring for ecological impacts, repercussions of burning on wildlife, and effects on soil chemistry and physics. Adaptive management is a term that refers to adjusting future management based on the effects of past management. Monitoring is required to gather the information necessary to inform future management decisions. Economic and legal questions may also be addressed through monitoring. In addition, monitoring activities can provide valuable educational opportunities for students.

The monitoring of each fuel's reduction project would be site-specific, and decisions regarding the timeline for monitoring and the type of monitoring to be used would be determined by project and land management agency. Monitoring and reporting contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base about how natural resource management decisions affect both the environment and the people who live in it.

The most important part of choosing a monitoring program is selecting a method appropriate to the people, place, and available time. Several levels of monitoring activities meet different objectives, have different levels of time intensity, and are appropriate for different groups of people. They include the following:

Minimum—Level 1: Pre- and Post-project Photographs

Appropriate for many individual homeowners who conduct fuels reduction projects on their properties.

Moderate—Level 2: Multiple Permanent Photo Points

Permanent photo locations are established using rebar or wood posts, global positioning system (GPS)-recorded locations, and photographs taken on a regular basis. Ideally, this process would continue over several years. This approach might be appropriate for more enthusiastic homeowners or for agencies conducting small-scale, general treatments.

High—Level 3: Basic Vegetation Plots

A series of plots can allow monitors to evaluate vegetation characteristics such as species composition, percentage of cover, and frequency. Monitors then can record site characteristics such as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols based on the types of vegetation present and the level of detail needed to analyze the management objectives.

Intense—Level 4: Basic Vegetation Plus Dead and Downed Fuels Inventory

The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974), an appropriate photo series (Ottmar et al. 2000), or fire monitoring (Fire Effects Monitoring and Inventory System [FIREMON]) plots.

TIMELINE FOR UPDATING THE CWPP

The HFRA allows for maximum flexibility in the CWPP planning process, permitting the Task Force to determine the time frame for updating the CWPP; it is suggested that a formal revision be made on the fifth anniversary of signing and every 5 years following. The Task Force members are encouraged to meet on an annual basis to review the project list, discuss project successes, and strategize regarding project implementation funding. Updates to the story map are encouraged more frequently, in order to provide the public the most up to date information on wildfire planning and mitigation.

IMPLEMENTATION

The CWPP makes recommendations for prioritized fuels reduction projects and measures to reduce structural ignitability and carry out public education and outreach. Implementation of fuels reduction projects need to be tailored to the specific project and will be unique to the location depending on available resources and regulations. On-the-ground implementation of the recommendations in the CWPP planning area will require development of an action plan and assessment strategy for completing each project. This step will identify the roles and responsibilities of the people and agencies involved, as well as funding needs and timetables for completing the highest-priority projects (SAF 2004). Information pertaining to funding is provided in Appendix E.

ABBREVIATIONS AND ACRONYMS

AFG	Assistance to Firefighters Grants
ATV	all-terrain vehicle
BAER	Burned Area Emergency Response
CA GOPR	California Governor's Office of Planning and Research
CAL FIRE	California Department of Forestry and Fire Protection
CAP	climate action plan
CAR	community at risk
CARB	California Air Resources Board
CERT	Community Emergency Response Team
CIG	Conservation Innovation Grants
Cohesive Strategy	National Cohesive Wildland Fire Management Strategy
CRS	Congressional Research Service
CSS	coastal sage scrub
CUSP	Coalition for the Upper South Platte
CWPP	Community Wildfire Protection Plan
DHS	Department of Homeland Security
EMPG	Emergency Management Performance Grant
EMS	Emergency Management System
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FIREMON	Fire Effects Monitoring and Inventory System
FMAG	Fire Management Assistance Grant
FP&S	Fire Prevention and Safety
FRA	Federal Responsibility Area
FSC	Fire Safe Council
GACC	Geographic Area Coordination Center
GIS	geographic information system
GPS	global positioning system
GSOB	goldspotted oak borer
HFRA	Healthy Forests Restoration Act
HMGP	Hazard Mitigation Grant Program
HOA	homeowners association
HVRAs	highly valued resources and assets
ICARP	Integrated Climate Adaptation and Resiliency Program

IFTDSS	Interagency Fuel Treatment Decision Support System
LRA	Local Responsibility Area
MVICC	Monte Vista Interagency Command Center
NEPA	National Environmental Policy Act
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
PDM	Pre-disaster Mitigation
PFCG	Post-Fire Coordination Group
RCFD	Riverside County Fire Department
SAF	Society of American Foresters
SAFER	Staffing for Adequate Fire and Emergency Response
SHB	short hole borer
SJT	Silver Jackets Team
SRA	State Responsibility Area
SWCA	SWCA Environmental Consultants
UCANR	University of California Division of Agriculture and Natural Resources
ULI	Urban Land Institute
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
VDEP	Vegetation Departure
WFDSS	Wildland Fire Decision Support System
WUI	wildland urban interface

GLOSSARY

Aspect: Cardinal direction toward which a slope faces in relation to the sun (NWCG 2021b).

Active Crown Fire: A crown fire in which the entire fuel complex is involved in flame but the crowning phase remains dependent on heat released from surface fuel for continued spread. An active crown fire presents a solid wall of flame from the surface through the canopy fuel layers. Flames appear to emanate from the canopy as a whole rather than from individual trees within the canopy. Active crown fire is one of several types of crown fire and is contrasted with **passive crown fires**, which are less vigorous types of crown fire that do not emit continuous, solid flames from the canopy (SWCA).

Available Canopy Fuel: The mass of canopy fuel per unit area consumed in a crown fire. There is no post-frontal combustion in canopy fuels, so only fine canopy fuels are consumed. It is assumed that only the foliage and a small fraction of the branchwood is available (Twisp 2021).

Available Fuel: The total mass of ground, surface, and canopy fuel per unit area available for fire consumption, including fuels consumed in postfrontal combustion of duff, organic soils, and large woody fuels (Twisp 2021).

Backfiring: Intentionally setting fire to fuels inside a control line to contain a fire (Twisp 2021).

Biomass: Organic material. Also refers to the weight of organic material (e.g., biomass roots, branches, needles, and leaves) within a given ecosystem (Twisp 2021).

Burn Severity: A qualitative assessment of the heat pulse directed toward the ground during a fire. Burn severity relates to soil heating, large fuel and duff consumption, consumption of the litter and organic layer beneath trees and isolated shrubs, and mortality of buried plant parts (SWCA).

Canopy: The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result (SWCA).

Chain: Unit of measure in land survey, equal to 66 feet (20 m) (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances. Popular in fire management because of its convenience in calculating acreage (example: 10 square chains equal 1 acre) (New Mexico FFA 2021).

Climate Adaptation: Adaptation is an adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (CA GOPR 2020).

Climate Change: A change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (CA GOPR 2020).

Community Assessment: An analysis designed to identify factors that increase the potential and/or severity of undesirable fire outcomes in WUI communities (SWCA).

Communities at Risk: Defined by the Healthy Forest Restoration Act of 2003 as “Wildland-Urban Interface Communities within the vicinity of federal lands that are at high risk from wildfire.”

- CAL FIRE expanded this definition for California to include all communities (regardless of distance from federal land) for which a significant threat to human life or property exists as a result of a wildland fire event. California uses the following three factors to determine at risk communities: 1) high fuel hazard, 2) probability of a fire, and 3) proximity of intermingled wildland fuels and urban environments that are near fire threats (CA GOPR 2020).

Community Emergency Response Team (CERT): The CERT program educates volunteers about disaster preparedness for the hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT offers a consistent, nationwide approach to volunteer training and organization that professional responders can rely on during disaster situations, allowing them to focus on more complex tasks.

Community Wildfire Protection Plan (CWPP): A planning document that seeks to reduce the threat to life and property from wildfire by identifying and mitigating wildfire hazards to communities and infrastructure located in the WUI. Developed from the Healthy Forest Restoration Act of 2003. Addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection (SWCA).

Conditional Surface Fire: A potential type of fire in which conditions for sustained conditional surface fire active crown fire spread are met but conditions for crown fire initiation are not. If the fire begins as a surface fire, it is expected to remain so. If it begins as an active crown fire in an adjacent stand, it may continue to spread as an active crown fire (Twisp 2021).

Contain: A tactical point at which a fire's spread is stopped by and within specific containment features, constructed or natural; also, the result of stopping a fire's spread so that no further spread is expected under foreseeable conditions. For reporting purposes, the time and date of containment. This term no longer has a strategic meaning in federal wildland fire policy (Twisp 2021).

Control: To construct a fireline or use natural features to surround a fire and control spot fires and to reduce a fire’s burning potential to a point that it no longer threatens further spread or resource damage under foreseeable conditions. For reporting purposes, the time and date of control. This term no longer has a strategic meaning in federal wildland fire policy (Twisp 2021).

Cover Type: The type of vegetation (or lack of it) growing in an area, based on cover type minimum and maximum percent cover of the dominant species, species group or non-living land cover (such as water, rock, etc.). The cover type defines both a qualitative aspect (the dominant cover type) as well as a quantitative aspect (the abundance of the predominant features of that cover type) (Twisp 2021).

Creeping Fire: A low-intensity fire with a negligible rate of spread (Twisp 2021).

Crown Fire: A fire that advances at great speed from crown to crown in tree canopies, often well in advance of the fire on the ground (National Geographic Society 2021).

Defensible Space: An area around a structure where fuels and vegetation are modified, cleared, or reduced to slow the spread of wildfire toward or from a structure. The design and distance of the defensible space is based on fuels, topography, and the design/materials used in the construction of the structure (SWCA).

- In California, according to Public Resources Code Section 4291, “defensible space” refers to a 100-foot perimeter around a structure in which vegetation (fuels) must be maintained in order to reduce the likelihood of ignition. This space may extend beyond property lines, or 100 feet as required by State law as well as local ordinances, rules, and regulations (CA GOPR 2020).

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil (SWCA).

Ecosystem: An interacting natural system including all the component organisms together with the abiotic environment and processes affecting them (SWCA).

Environmental Conditions: That part of the fire environment that undergoes short-term changes: weather, which is most commonly manifest as windspeed, and dead fuel moisture content (Twisp 2021).

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area. When escape routes deviate from a defined physical path, they should be clearly marked (flagged) (SWCA).

Evacuation: The temporary movement of people and their possessions from locations threatened by wildfire (SWCA).

Federal Responsibility Area (FRA): A term specific to California, designating areas where the federal government is responsible for fire response efforts. These areas include land under federal ownership (CA GOPR 2020).

Fire-Adapted Communities: A fire-adapted community collaborates to identify its wildfire risk and works collectively on actionable steps to reduce its risk of loss. This work protects property and increases the safety of firefighters and residents (U.S. Fire Administration 2021b).

Fire Behavior: The manner in which fuel ignites, flame develops, and fire spreads and exhibits other related phenomena as determined by the interaction of fuels, weather, and topography (Frames 2021).

Fire Break: Areas where vegetation and organic matter are removed down to mineral soil (SWCA).

Fire Environment: The characteristics of a site that influence fire behavior. In fire modeling, the fire environment is described by surface and canopy fuel characteristics, windspeed and direction, relative humidity, and slope steepness (Twisp 2021).

Fire Frequency: A broad measure of the rate of fire occurrence in a particular area. For historical analyses, fire frequency is often expressed using the fire return interval calculation. For modern-era analyses, where data on timing and size of fires are recorded, fire frequency is often best expressed using fire rotation (SWCA)

Fire Hazard: Fire hazard is the potential fire behavior or fire intensity in an area, given the type(s) of fuel present—including both the natural and built environment—and their combustibility (CA GOPR 2020).

Fire Hazard Severity Zones: Fire hazard severity zones are defined based on vegetation, topography, and weather (temperature, humidity, and wind), and represent the likelihood of an area burning over a 30- to 50-year time period without considering modifications such as fuel reduction efforts. In California, CAL FIRE maintains fire hazard severity zone (FHSZ) data for the entire state. There are three classes of fire hazard severity ratings within FHSZs: Moderate, High, and Very High (CA GOPR 2020).

Fire History: The chronological record of the occurrence of fire in an ecosystem or at a specific site. The fire history of an area may inform planners and residents about the level of wildfire hazard in that area (SWCA).

Fire Intensity: A general term relating to the heat energy released in a fire (SWCA).

Fireline Intensity: Amount of heat release per unit time per unit length of fire front. Numerically, the product of the heat of combustion, quantity of fuel consumed per unit area in the fire front, and the rate of spread of a fire, expressed in kilowatts per minute (SWCA). This expression is commonly used to describe the power of wildland fires, but it does not necessarily follow that the severity, defined as the vegetation mortality, will be correspondingly high (Twisp 2021).

Fire Prevention: Activities such as public education, community outreach, planning, building code enforcement, engineering (construction standards), and reduction of fuel hazards that is intended to reduce the incidence of unwanted human-caused wildfires and the risks they pose to life, property, or resources (CA GOPR 2020).

Fire Regime: A measure of the general pattern of fire frequency and severity typical to a particular area or type of landscape: The regime can include other metrics of the fire, including seasonality and typical fire size, as well as a measure of the pattern of variability in characteristics (SWCA).

Fire Regime Condition Class: Condition classes are a function of the degree of fire regime condition class departure from historical fire regimes resulting in alterations of key ecosystem components such as composition structural stage, stand age, and canopy closure (Twisp 2021).

Fire Return Interval: Number of years (interval) between two successive fires in a designated area (SWCA).

Fire Risk: “Risk” takes into account the intensity and likelihood of a fire event to occur as well as the chance, whether high or low, that a hazard such as a wildfire will cause harm. Fire risk can be determined by identifying the susceptibility of a value or asset to the potential direct or indirect impacts of wildfire hazard events (CA GOPR 2020).

Fire Severity: A qualitative measure of the immediate effects of fire on the fire severity ecosystem. It relates to the extent of mortality and survival of plant and animal life both aboveground and belowground and to loss of organic matter. It is determined by heat released aboveground and belowground. Fire severity is dependent on intensity and residence dependent of the burn. For trees, severity is often measured as the percentage of basal area removed. An intense fire may not necessarily be severe (Twisp 2021).

Flammability: The relative ease with which fuels ignite and burn regardless of the quantity of the fuels (SWCA).

Flame Length: The length of flames in the propagating fire front measured along the slant of the flame from the midpoint of its base to its tip. It is mathematically related to fireline intensity and tree crown scorch height (Twisp 2021).

Foliar Moisture Content: Moisture content (dry weight basis) of live foliage expressed as a percent. Effective foliar moisture content incorporates the moisture content of other canopy fuels such as lichen, dead foliage, and live and dead branchwood (Twisp 2021).

Forest Fire: Uncontrolled burning of a woodland area (National Geographic Society 2021).

Fuel Break: A natural or human-made change in fuel characteristics that affects fire behavior so that fires burning into them can be more readily controlled (NWCG 2021c).

Fuel Complex: The combination of ground, surface, and canopy fuel strata (Twisp 2021).

Fuel Condition: Relative flammability of fuel as determined by fuel type and environmental conditions (SWCA).

Fuel Continuity: A qualitative description of the distribution of fuel both horizontally and vertically. Continuous fuels readily support fire spread. The larger the fuel discontinuity, the greater the fire intensity required for fire spread (Twisp 2021).

Fuel Loading: The volume of fuel in a given area generally expressed in tons per acre (SWCA). Dead woody fuel loadings are commonly described for small material in diameter classes of 0 to 0.25, 0.25 to 1, and 1 to 3 inches and for large material greater than 3 inches (Twisp 2021).

Fuel Management/Fuel Reduction: Manipulation or removal of fuels to reduce the likelihood of ignition and to reduce potential damage in case of a wildfire. Fuel reduction methods include prescribed fire, mechanical treatments (mowing, chopping), herbicides, biomass removal (thinning or harvesting or trees, harvesting of pine straw), and grazing. Fuel management techniques may sometimes be combined for greater effect (SWCA).

Fuel Model: A set of surface fuel bed characteristics (load and surface area to fuel model volume ratio by size class, heat content, and depth) organized for input to a fire model (Twisp 2021).

Fuel Modification: The manipulation or removal of fuels (i.e., combustible biomass such as wood, leaves, grass, or other vegetation) to reduce the likelihood of igniting and to reduce fire intensity. Fuel modification activities may include lopping, chipping, crushing, piling and burning, including prescribed burning. These activities may be performed using mechanical treatments or by hand crews. Herbicides and prescribed herbivory (grazing) may also be used in some cases. Fuel modification may also sometimes be referred to as “vegetation treatment” (CA GOPR 2020).

Fuel Moisture Content: This is expressed as a percentage or fraction of oven dry fuel moisture content weight of fuel. It is the most important fuel property controlling flammability. In living plants, it is physiologically bound. Its daily fluctuations vary considerably by species but are usually above 80% to 100%. As plants mature, moisture content decreases. When herbaceous plants cure, their moisture content responds as dead fuel moisture content, which fluctuates according to changes in temperature, humidity, and precipitation (Twisp 2021).

Fuel Treatment: The manipulation or removal of fuels to minimize the probability of ignition and/or to reduce potential damage and resistance to fire suppression activities (NWCG 2021d). Synonymous with fuel modification.

Grazing: There are two types of grazing: 1) traditional grazing, and 2) targeted grazing. Traditional grazing refers to cattle that are managed in extensive pastures to produce meat. Targeted grazing involves having livestock graze at a specific density for a given period of time for the purpose of managing vegetation. Even though both kinds of grazing manage fuel loading in rangeland and forested

land, targeted grazing is different in that its sole purpose is to manage fuels. Targeted grazing is done by a variety of livestock species such as sheep, goats, or cows (UCANR 2019).

Ground Fire: Fire that burns organic matter in the soil, or humus; usually does not appear at the surface (National Geographic Society 2021).

Ground Fuels: Fuels that lie beneath surface fuels, such as organic soils, duff, decomposing litter, buried logs, roots, and the below-surface portion of stumps (Twisp 2021).

Hazard: A "hazard" can be defined generally as an event that could cause harm or damage to human health, safety, or property (CA GOPR 2020).

Hazardous Areas: Those wildland areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems (SWCA).

Hazardous Fuels: A fuel complex defined by type, arrangement, volume, condition, and location that poses a threat of ignition and resistance to fire suppression (NWCG 2021e).

Hazardous Fuels Reduction: Any strategy that reduces the amount of flammable material in a fire-prone ecosystem. Two common strategies are mechanical thinning and controlled burning (Twisp 2021).

Hazard Reduction: Any treatment that reduces the threat of ignition and spread of fire (SWCA).

Highly Valued Resources and Assets: Landscape features that are influenced positively and/or negatively by fire. Resources are naturally occurring, while Assets are human-made (IFTDSS 2021).

Ignition: The action of setting something on fire or starting to burn.

Incident: An occurrence or event, either natural or human-caused, which requires an emergency response to prevent loss of life or damage to property or natural resources (Twisp 2021).

Influence Zone: An area that, with respect to wildland and urban fire, has a set of conditions that facilitate the opportunity for fire to burn from wildland fuels to the home and or structure ignition zone (NWCG 2021a).

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and to prevent further extension of the fire (SWCA).

Ladder Fuels: Fuels that provide vertical continuity allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease (SWCA).

Litter: Recently fallen plant material that is only partially decomposed and is still discernible (SWCA).

Local Responsibility Area (LRA): A term specific to California, designating areas where the local government is responsible for wildfire protection. The LRA includes incorporated cities, cultivated agricultural land, and portions of the desert. LRA fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to local government (CA GOPR 2020).

Local Agency Very High Fire Hazard Severity Zone: Specific to California, this means an area designated by a local agency upon the recommendation of the CDF Director pursuant to Government Code Sections 51177(c), 51178 and 51189 that is not a state responsibility area and where a local agency, city, county, city and county, or district is responsible for fire protection (City Clerk 2021).

Manual Treatments: Felling and piling of fuels done by hand. The volume of material generated from a manual fuel treatment is typically too small to warrant a biomass sale; therefore, collected material is disposed of by burning or chipping. The work can be performed by either a single individual or a large organized crew with powered equipment (UCANR 2021a).

Mechanized Treatments: Mechanical treatments pulverize large continuous patches of fuel to reduce the volume and continuity of material. Mechanical treatments can be applied as either mastication or chipping treatments. Both treatments shred woody material, but mastication leaves residue on-site, while chipping collects the particles for transportation off-site. Similar to hand treatments, mechanical treatments can target specific areas and vegetation while excluding areas of concern. In addition, mechanical treatment is easily scalable to large areas (>30 acres) with little added cost (UCANR 2021b).

Mitigation: Action that moderates the severity of a fire hazard or risk (SWCA).

Mutual Aid: Assistance in firefighting or investigation by fire agencies, regardless of jurisdictional boundaries (NWCG 2021f).

National Cohesive Strategy: The National Cohesive Wildland Fire Management Strategy is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress toward the three goals:

- Resilient Landscapes
- Fire-Adapted Communities
- Safe and Effective Wildfire Response

Vision: 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 (Forests and Rangelands 2021).

Native Revegetation: The process of replanting and rebuilding the soil of disturbed land (e.g., burned) with native plant species (USDA 2005).

Native Species: A species that evolved naturally in the habitat, ecosystem, or region as determined by climate, soil, and biotic factors (USDA 2005).

Overstory: The portion of trees in a forest that forms the upper or uppermost layer (SWCA).

Passive Crown Fire: A type of crown fire in which the crowns of individual trees or small groups of trees burn but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire encompasses a wide range of crown fire behavior, from occasional torching of isolated trees to nearly active crown fire. Passive crown fire is also called torching or candling. A fire in the crowns of the trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface (SWCA).

Prescribed Burning: Any fire ignited by management actions under specific, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. Usually, a written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition (USFS 2021c).

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually, it is expressed in chains or acres per hour for a specific period in the fire's history (NWCG 2021g).

Resilience: Resilience is the capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience (CA GOPR 2020).

Response: Movement of an individual firefighting resource from its assigned standby location to another location or to an incident in reaction to dispatch orders or to a reported alarm (SWCA).

Safety Element: One of the seven mandatory elements of a local general plan (a county plan that forms the foundation for future development), the safety element must identify hazards and hazard abatement provisions to guide local decisions related to zoning, subdivisions, and entitlement permits. The element should contain general hazard and risk reduction strategies and policies supporting hazard mitigation measures (CA GOPR 2020).

Slash: Debris left after logging, pruning, thinning, or brush cutting. Slash includes logs, chips, bark, branches, stumps, and broken trees or brush that may be fuel for a wildfire (SWCA).

Slope Percent: The ratio between the amount of vertical rise of a slope and horizontal distance expressed as a percentage. A 100-foot rise to 100-foot horizontal distance equals 100% (NWCG 2021h).

State Responsibility Area (SRA): A term specific to California, designating areas where the state has financial responsibility for wildland fire protection. Incorporated cities and land under federal ownership are not included in the SRA. Land under federal ownership is in the federal responsibility area (CA GOPR 2020).

Structural Ignitability: The ability of structures (such as homes or fences) to catch fire (SWCA).

Suppression: The most aggressive fire protection strategy, it leads to the total extinguishment of a fire (SWCA).

Surface Fire: A Fire that typically burns only surface litter and undergrowth (National Geographic Society 2021).

Surface Fuel: Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants (SWCA).

Topography: The arrangement of the natural and artificial physical features of an area.

Total Fuel Load: The mass of fuel per unit area that could possibly be consumed in a hypothetical fire of the highest intensity in the driest fuels (Twisp 2021).

Tree Crown: The primary and secondary branches growing out from the main stem, together with twigs and foliage (SWCA).

Understory: Low-growing vegetation (herbaceous, brush, or reproduction) growing under a stand of trees, as well as the portion of trees in a forest stand below the overstory (SWCA).

Understory Fire: A fire burning in the understory, more intense than a surface fire with flame lengths of 1 to 3 m (Twisp 2021).

Values and Assets at Risk: The elements of a community or natural area considered valuable by an individual or community that could be negatively impacted by a wildfire or wildfire operations. These values can vary by community and can include public and private assets (natural and human-made), such as homes, specific structures, water supply, power grids, natural and cultural resources, and community infrastructure, as well as other economic, environmental, and social values (CA GOPR 2020).

Vulnerable Community: Vulnerable communities experience heightened risk and increased sensitivity to natural hazard and climate change impacts and have less capacity and fewer resources to cope with, adapt to, or recover from the impacts of natural hazards and increasingly severe hazard events because of climate change. These disproportionate effects are caused by physical (built and environmental), social, political, and/ or economic factor(s), which are exacerbated by climate impacts. These factors include, but are not limited to, race, class, sexual orientation and identification, national origin, and income inequality (CA GOPR 2020).

Wildfire: A “wildfire” can be generally defined as any unplanned fire in a “wildland” area or in the WUI (CA GOPR 2020).

Wildfire Exposure: During fire suppression activities, an exposure is any area/property that is threatened by the initial fire, but in within the National Fire Incident Reporting System (NFIRS), a reportable exposure is any fire that is caused by another fire, i.e., a fire resulting from another fire outside that building, structure, or vehicle, or a fire that extends to an outside property from a building, structure, or vehicle (U.S. Fire Administration 2021c).

Wildfire Influence Zone: A wildland area with susceptible vegetation up to 1.5 miles from the interface or intermix WUI (CA GOPR 2020).

Wildland: Those unincorporated areas covered wholly or in part by trees, brush, grass, or other flammable vegetation (CA GOPR 2020).

Wildland Fire: Fire that occurs in the wildland as the result of an unplanned ignition (CA GOPR 2020).

Wildland Fuels (aka fuels): Fuel is the material that is burning. It can be any kind of combustible material, especially petroleum-based products, and wildland fuels. For wildland fire, it is usually live, or dead plant material but can also include artificial materials such as houses, sheds, fences, pipelines, and trash piles. In terms of vegetation, there are 6 wildland fuel types (Fuel Type: An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.) The six wildland fuel types are (NWCG 2021i):

1. Grass
2. Shrub
3. Grass-Shrub

4. Timber Litter
5. Timber-Understory
6. Slash-Blowdown

Wildland Urban Interface (WUI): The WUI is the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (U.S. Fire Administration 2021d). In the absence of a CWPP, Section 101 (16) of the Healthy Foresters Restoration Act defines the wildland urban interface as " (I) an area extending ½ mile from the boundary of an at-risk community; (II) an area within 1 ½ miles of the boundary of an at-risk community, including any land that (1) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; (2) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or (3) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; (III) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuels reduction to provide safer evacuation from the at-risk community." A CWPP offers the opportunity to establish a localized definition and boundary for the WUI (USFS 2021d)

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APPENDIX A:

Community and CWPP Background Information


SWCA

CONTENTS

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FIRE MANAGEMENT POLICY

The primary responsibility for WUI fire prevention and protection lies with property owners and local and State governments. Property owners must comply with existing State statutes and local regulations. These primary responsibilities should be carried out in partnership with the federal government and private sector areas. The current Federal Fire Policy States that protection priorities are 1) life, 2) property, and 3) natural resources. These priorities often limit flexibility in the decision-making process, especially when a wildland fire occurs within the WUI.

LEGISLATIVE DIRECTION

Municipal Direction - Fire Code

The City of Corona Municipal Code contains the Fire Code of the City of Corona and is found in Chapter 15.12 Fire Code. The Fire Code of the City of Corona is adapted from the 2019 California Fire Code as well as the 2018 International Fire Code and amended as appropriate to suit the needs of the city. This chapter is cited as the Fire Code of the City of Corona and referred to as the Fire Code. The fire code is effective within the boundaries of the City of Corona, including private land. Implementation, administration, and enforcement of the provisions of the Fire Code are carried out by the City of Corona Fire Department (City of Corona 2017). You can find more information on the fire code here: https://codelibrary.amlegal.com/codes/corona/latest/overview

State Direction

The 2021 California Wildfire and Forest Resilience Action Plan recognizes that California faces continued and urgent threats from catastrophic wildfire. The purpose of this plan is to provide a foundation for supporting healthy, resilient, fire adapted forests. The plan is organized into four overarching goals which break down into sub-goals and their correlated action items. Some of the goals/strategies specific to wildfire include:

- **Increase Fuel Breaks:** Reduce the risk of wildfire and slow fire spread within the WUI.
- **Protect Wildfire-Prone homes and Neighborhoods:** Expand and extend defensible space programs.
- **Improve Utility related wildfire risk:** Ensure electrical corporations are compliant with wildfire regulations.
- **Create Fire-Safe Roadways**: Ensuring emergency evacuation routes and acts as a fuel break.

Like the 2014 national strategy, California's 2019 Strategic Plan, California's Wildfire and Forest Resilience Action Plan, and Federal Emergency Management Agency (FEMA) Disaster Mitigation Act of 2000, all mandate community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multiagency cooperation. In compliance with Title 1 of the HFRA, a CWPP must be mutually agreed upon by the local government, local fire departments, and the State agency responsible for forest management. As outlined in HFRA, this CWPP

is developed in consultation with interested parties and the federal agencies managing land surrounding the at-risk communities.

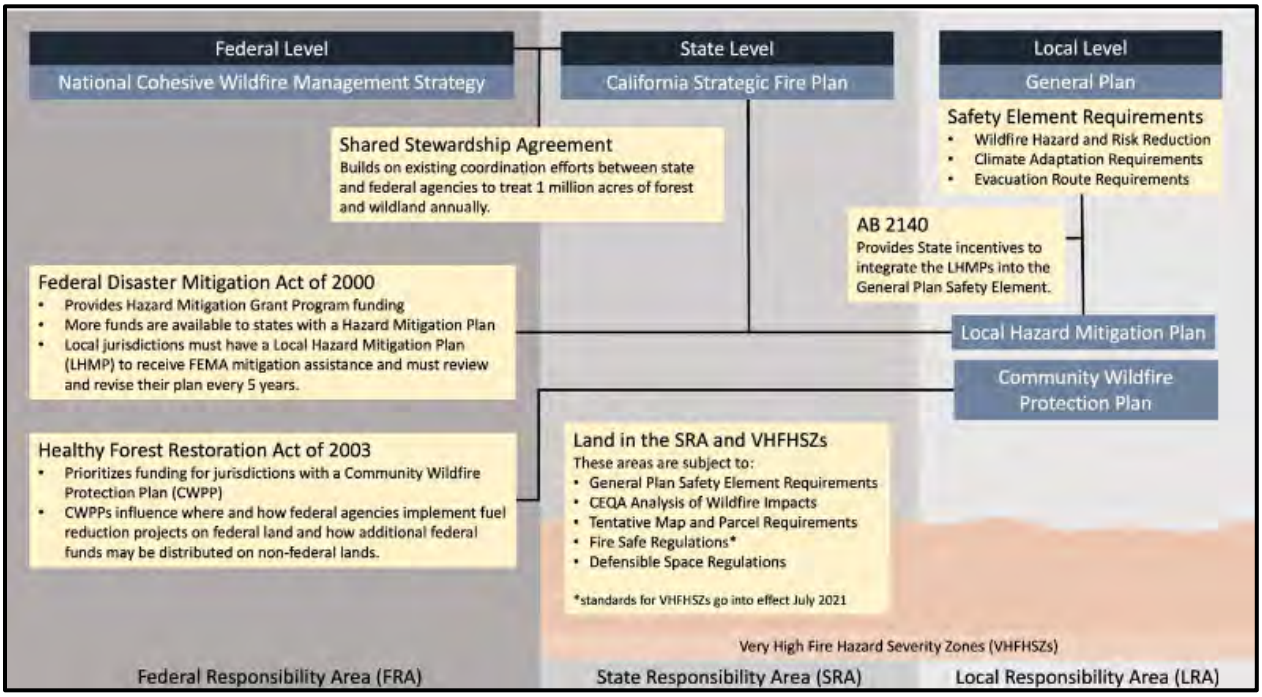

Figure A.1. California's wildfire regulatory framework.
Source: CA GOPR (2020)

California Bills and Regulations

Assembly Bill 1823: This CWPP is in alignment with the requirement stipulated by Assembly Bill (AB) 1823 (2019). The Bill requires that on or before July 1, 2022, the State Board of Forestry and Fire Protection to develop criteria for and maintain a “Fire Risk Reduction Community” list of local agencies located in a State Responsibility Area (SRA) or a very high hazard severity zone that meet best practices for local fire planning. The existing law requires the State board to consider specific factors when developing the criteria for the list, including recently developed or updated community wildfire protection plans (CWPPs) (California’s Governor’s Office of Planning and Research [CA GOPR] 2020).

Senate Bill 1241: Senate Bill 1241 (2012) revised the safety element stipulations in State law to instruct all cities and counties whose planning area is within the SRA or a very high fire hazard severity zone to address and include specific information concerning wildfire hazards and risk, and strategies and policies to address and minimize unreasonable risks associated with wildfire. The specific requirements are codified in chapter 311 of the Bill. As a result, CAL FIRE maintains fire hazard severity zone maps and data for the entire State. Three classes of fire hazard severity classifications exist: moderate, high, and very high. Fire hazard severity considers the amount of vegetation, temperature, wind, humidity, and topography, and represents the likelihood of an area burning over a 30 to 50-year interval (CA GOPR 2020).

Senate Bill 379: Senate Bill 379 (2015) amended GC § 65302(g)(4) to require that all general plans in California address climate change adaptation and resilience as part of the safety portion of the plan. This amendment requires local jurisdictions to add this change as part of the next revision to their local hazard mitigation plan or, if a local hazard mitigation plan has not been adopted, the safety element must be reviewed and updated to include applicable climate adaptation and resilience strategies (CA GOPR 2020). The CWPP should be integrated into the Safety Element of the City of Corona General Plan, during the next scheduled revision.

Senate Bill 246: As established by Senate Bill 246 in 2015, the Integrated Climate Adaptation and Resiliency Program (ICARP) is the leading program responsible for coordinating response to climate change impacts on a local, regional, and State scale. ICARP utilizes the Adaptation Clearing House, an online database of climate resources, and coordinates with the Technical Advisory Council to aid in facilitation of resiliency efforts. It is recommended by the CA Office of Planning and Research that climate change related safety updates be made in alignment with ICARP vision, principals, definitions, and wildfire requirements where applicable (CA GOPR 2020).

PRC Section 4291: Public Resources Code Section 4291 details mandatory defensible space requirements for any person who owns, leases, controls, operates, or maintains a building in the SRA or in the very high fire hazard severity zone within the Local Responsibility Area (LRA). The requirements include but are not limited to 100 feet of defensible space around homes, removal of vegetation debris from the perimeter and the roof of homes/structures, and removal of vegetation from chimneys or stovepipes. This code was updated in January 2021 to require an ember-resistant zone within 5 feet of the home/structure on or before January 1, 2023.

California Building Code Chapter 7A & California Fire Code Chapter 49: The 2017 City of Corona HMP requires that new development in or adjacent to high fire hazard severity zones complies with the current adopted edition of the California Building Code Chapter 7A and the California Fire Code Chapter 49. Collectively, these two codes establish minimum standards for the protection of life and property by increasing the ability of a home/building located in any high fire hazard severity zone or WUI to resist the intrusion of flames or embers released by a vegetation fire. The City of Corona also requires that an additional fuel modification plan be submitted for review and approval by the City of Corona Fire Department (City of Corona 2017).

Assembly Bill 38: Assembly Bill 38 (2019) amended sections of the Civil, Government, and Public Resources Codes to set forth a comprehensive wildfire mitigation financial support program, which facilitates cost-effective home/structure hardening and retrofitting to create fire-resistant homes, businesses, and public structures. The amendments require the State Fire Marshal, in consultation with the Director of Forestry and Fire Protection and the Director of Housing and Community Development to identify building retrofits and hardening measures eligible for financial assistance under the program. Additionally, the amendments require that CAL FIRE identify defensible space, vegetation management, and fuel treatment procedures eligible for financial assistance. Wildfire hazard areas eligible for financial assistance under the program include LRAs situated within very high fire hazard severity zones and SRAs within any fire hazard severity zone (CA GOPR 2020).

Federal Direction

In response to a landmark fire season in 2000, the National Fire Plan (NFP) was established to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient firefighting capacity for the future. The NFP was followed by a report in 2001 entitled *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-year Comprehensive Strategy*, which was updated in 2002 to include an implementation plan. This plan was updated once more in 2006, with a similar focus on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, mitigating risks to communities, providing economic benefits, and improving fire prevention and suppression strategies. The 2006 implementation plan also emphasizes information sharing and monitoring of accomplishments and forest conditions, a long-term commitment to maintaining the essential resources for implementation, a landscape-level vision for restoration of fire-adapted ecosystems, the importance of using fire as a management tool, and continued improvements to collaboration efforts (Forests and Rangelands 2006). Progress reports and lessons learned reports for community fire prevention are provided annually.

In 2003, the U.S. Congress recognized widespread declining forest health by passing the Healthy Forests Restoration Act (HFRA), and President Bush signed the act into law (Public Law 108–148, 2003). The HFRA was revised in 2009 to address changes to funding and provide a renewed focus on wildfire mitigation (H.R. 4233 - Healthy Forest Restoration Amendments Act of 2009). The HFRA expedites the development and implementation of hazardous fuels reduction projects on federal land and emphasizes the need for federal agencies to work collaboratively with communities. A key component of the HFRA is the development of Community Wildlife Protection Plans (CWPPs), which facilitates the collaboration between federal agencies and communities in order to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. A CWPP also allows communities to establish their own definition of the WUI, which is used to delineate priority areas for treatment. In addition, priority is placed upon municipal watersheds, critical wildlife habitat, and areas impacted by wind throw, insects, and disease. Communities with an established CWPP are given priority for funding of hazardous fuels reduction projects carried out in accordance with the HFRA.

In 2014, the final stage of the development of a national cohesive strategy for wildfire was developed: *The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy* (Forests and Rangelands 2014). The national strategy takes a holistic approach to the future of wildfire management:

To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.

In order to achieve this vision, the national strategy goals are:

- **Restore and maintain landscapes**: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- **Fire-adapted communities**: Human populations and infrastructure can withstand a wildfire without loss of life and property.
- **Wildfire response**: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions. (Forests and Rangelands 2014:3)

PAST PLANNING EFFORTS

There are several existing documents relating to fire management in the City of Corona. This CWPP is meant to supplement and not replace any other existing plans. See Chapter 2 for information on agency fire management planning and the growing use of spatial fire planning and decision support tools.

Municipal and County

City of Corona Local Hazard Mitigation Plan: In 2017 the City of Corona developed the 2017 City of Corona Local Hazard Mitigation Plan. The purpose of this plan is to review past disasters within the city, identify current and potential hazards, and set mitigation priorities (City of Corona 2017). The plan includes an overview of the planning process, mitigation actions and updates, hazard identification and risk assessment, capabilities assessment, and future mitigation goals and strategies. This plan notes that the City of Corona's weather (hot and arid with Santa Ana winds), topography (steep terrain and box canyons), and vegetation contribute to high wildfire risk (City of Corona 2017).

City of Corona Wildland Risk/Hazard Assessment: In 2021, Firesafe Planning Solutions conducted a wildland risk/hazard assessment for the City of Corona. The purpose of the assessment is to evaluate the level of risk wildland fire poses to communities in the city. The assessment identifies several factors contributing to the level of risk, which include asset location, fire history, wind direction, weather, fuel type, topography, construction materials, points of ingress and egress, defensible space, site accessibility, and water source. Contingent on the previous factors, each community is given an overall risk rating. The rating and the assessment are used to assist communities to develop cost-effective mitigation strategies (Firesafe Planning Solutions 2021).

City of Corona Climate Action Plan: In 2019, LSA Associates prepared a Climate Action Plan Update for the City of Corona. The plan addresses the potential public health and safety concerns due to wildfire, heat, drought, and flooding. The plan offers various adaptation strategies devised to reduce greenhouse gas emissions, including the use of renewable energy to power buildings, waste recycling, and improving access to sustainable transportation modes. The City of Corona, through the plan update, has created objectives and policies that improve the resiliency of the city when challenged by climate change hazards and protect populations susceptible to climate change effects (LSA Associates, Inc 2019).

City of Corona Department of Water and Power Electric Utility Wildfire Mitigation Plan: In 2019 the City of Corona published the City of Corona Department of Water and Power Electric Utility Wildfire Mitigation Plan (City of Corona 2019). This plan was developed with the intention of reducing the potential of wildfire caused by power-line ignitions. The plan reviews objectives, roles and responsibilities in regard to wildfire prevention and wildfire response and recovery, wildfire risk, wildfire prevention strategies, and utility de-energization and restoration (City of Corona 2019).

2020-2040 City of Corona General Plan: In 2020 the City of Corona produced the 2020-2040 City of Corona General Plan. This plan provides information on land use. Housing, community design, noise, community health, and environmental resources (City of Corona 2020). It is Stated within the plan that cyclical drought and wet years in southern California have resulted in increased wildfire frequency. CAL FIRE identifies fire hazard severity zones for all communities in California based on weather, terrain, fuels, and other pertinent factors. In the City of Corona, CAL FIRE has mapped three hazard ranges

(moderate, high, and very high). The majority or land surrounding the city has been designated by CAL FIRE as a "very high" hazard severity zone (City of Corona 2020). In addition, requiring vegetation clearance standards and fuel modification plans is listed as a goal to reduce wildfire risk (City of Corona 2020).

County of Riverside Multi-Jurisdictional Local Hazard Mitigation Plan: In 2018 Riverside County created the 2018 County of Riverside Multi-Jurisdictional Local Hazard Mitigation Plan. This plan was created to review past disasters, predict the potential of future disasters, and determine mitigation priorities (Riverside County 2018). The document provides an overview of Riverside County and communities, a description of the planning process, updates to mitigation goals, a risk assessment, capabilities assessment, goals and strategies, and implementation measures. CALFIRE rated the City of Corona as a Very High Fire Hazard Severity Zone (Riverside County 2018).

Riverside County Emergency Operations Plan: In 2019 Riverside County developed the 2019 Riverside County Emergency Operations Plan (Riverside County 2019). This plan was designed to act as a guideline or reference for organizing and coordinating disaster response. The plan provides a general overview of the County, a hazard analysis, potential hazard situations, phases of emergency management, emergency management roles, and disaster recovery. The County of Riverside deemed the City of Corona "most vulnerable" to wildland fire (Riverside County 2019).

Mutual Aid or Shared Stewardship Agreements

The City of Corona Fire Department also maintains mutual aid arrangements with nearly a dozen public agencies (local, State, and federal) for fire prevention and suppression, hazardous materials, mutual threat, active shooter tactical response, and other emergencies (City of Corona 2020).

In addition, the department is also involved in the SOLAR cooperative plan. SOLAR is a typical program for communications, mapping, training, and determination of facilities, and dispatch locations. The plan includes all agencies with fire protection responsibility where four counties coalesce, approximately at the wildland-interface areas adjacent to State routes 55, 57, 71, 91, and 241 (City of Corona 2020).

In 2020, the State of California and the U.S. Forest Service (USFS) signed a shared stewardship agreement to commit to collaborative forest management and set landscape scale priorities. The shared stewardship agreement includes a commitment to coordinate and share tools, processes, and innovative approaches in respect to fire management. You can find the stewardship agreement here: https://www.gov.ca.gov/wp-content/uploads/2020/08/8.12.20-CA-Shared-Stewardship-MOU.pdf

State

Strategic Fire Plan: In 2018 the California Department of Forestry and Fire Protection, also known as CALFIRE, along with the State Board of Forestry and Fire Protection, developed the Strategic Fire Plan for California (CAL FIRE 2018b). The plan was developed to create a more wildfire resistant environment and community, to increase the understanding of wildfires, and increase cooperation amongst local, State, federal, tribal, and private partnerships. Goals outlined within the plan include identifying natural resources at risk, integrating fire and fuels management tactics with landowners, and implementing post-fire assessments and programs (CAL FIRE 2018b).

California's Forests and Rangelands 2017 Assessment: In 2017, CAL FIRE published California's Forests and Rangelands 2017 Assessment. CAL FIRE's Fire and Resource Assessment Program evaluates the amount and size of California's forests and rangelands and analyzes their conditions to establish management and regulatory guidelines. The assessment is used to delineate priority landscapes that aid in focusing investments and other programs to ameliorate issues. The goal of the assessment is to meet both State and federal mandates for natural resource inventories and planning (CAL FIRE 2018a).

California State Hazard Mitigation Plan: In 2018 the California Office of Emergency Services released the latest California State Hazard Mitigation Plan. The intention of the plan was to provide a current update of all past and potential hazards and disasters within California and outline mitigation strategies, risk reduction methods, goals, objectives, strategies, and priorities (CA Office of Emergency Services 2018). Mitigation strategies recommended include strengthening inter-agency coordination, incorporating climate change into future planning efforts, and establishing a mitigation registry (CA Office of Emergency Services 2018).

Community Wildfire Prevention & Mitigation Report: In 2019 CAL FIRE published the Community Wildfire Prevention & Mitigation Report in response to executive order N-05-19. Executive order N-05-19 directs CAL FIRE and other State agencies to recommend administrative, regulatory, and policy changes to prevent and mitigate wildfires. The order stresses taking necessary actions to protect vulnerable populations and identifying backlogs in fuels treatments projects. CAL FIRE identified 35 priority projects that could be implemented right away to reduce public safety risk for over 200 communities. Potential projects included removal of dead trees, vegetation clearing, creation of ingress and egress paths, and creation of fuel breaks and community defensible spaces (CAL FIRE 2019c).

Fire Hazard Planning Technical Advisory: In 2020 the Fire Hazard Planning Technical Advisory was updated. This plan is part of the General Plan Technical Advice Series. The plan was developed with the goal of reducing fire risk, increasing reliance, and providing a planning framework specifically for fire hazards (CA GOPR 2020). The plan provides an overview of risks and fire hazards to communities within California, fire hazard planning guidance, State and federal policy background, and example policies. In regard to fire planning guidance, the plan recommends implementing public outreach with the community, performing fire hazard and risk assessments, and implementing policy aligned with these goals (CA GOPR 2020).

California Cooperative Forest Management Plan: In 2020 the California Cooperative Forest Management Plan (CCFMP)was developed to be used by CALFIRE, the USFS, and the NRCS. This plan is more of a template for fire management plans. The plan outlines topics which should be discussed while planning for fires such as road systems, property history and conditions, wildlife, water resources, and others (CAL FIRE 2020c).

California's Wildfire and Forest Resilience Action Plan: In 2021 the California Forest Management Task Force developed California's Wildfire and Forest Resilience Action Plan (CA Forest Management Task Force 2021). The purpose of the plan was to sustain economic strength of the forests, improve forest health and resilience, and increase the level of fire safety within communities. The plan is broken up into four major goals and strategies to achieve said goals (CA Forest Management Task Force 2021). The goals include increasing the pace and scale of forest health projects, strengthening the protection of

communities, managing the forest to achieve the State's economic and environmental goals, and driving innovation while measuring progress. Strategies supporting community risk reduction (CA Forest Management Task Force 2021).

Wildfire and Forest Resilience Task Force Organizational Charter: In 2021 the California Wildfire and Forest Resilience Task Force developed the Wildfire and Forest Resilience Task Force Organizational Charter. The Charter was created to provide a framework for accomplishing goals and actions within the 2021 California Wildfire and Forest Resilience Action Plan (CA Wildfire & Resilience Task Force 2021). The deliverables will be distributed amongst five working groups: Forest Management, Wildfire Adapted Communities, Regional Frameworks, Communications, and Monitoring, Reporting, and Assessment (CA Wildfire & Resilience Task Force 2021).

Vegetation Management Program: In addition to planning documents, CALFIRE operates a Vegetation Management Program which focuses on addressing resource management and wildfire fuel hazards within SRA lands (CAL FIRE 2021d). The program has three management objectives with various sub-goals. The management objectives include the reduction of conflagration of fires, optimization of soil and water productivity, and the protection and improvement of intrinsic floral and faunal species (CAL FIRE 2021d).

California Vegetation Treatment Program: Furthermore, the State of California operates the California Vegetation Treatment Program developed by the Board of Forestry and Fire Protection to create healthy fire regimes, reduce hazardous vegetation that increases wildfire risk, and reduce risk within communities. Prescribed burning, prescribed herbivory, herbicides, mechanical treatments, and manual treatments are used for vegetation management. In addition, the California Vegetation Treatment Program Implementation Database provides current and approved projects. To learn more about this program, visit https://bof.fire.ca.gov/projects-and-programs/calvtp/.

Federal

U.S. Army Corps of Engineers

The Prado Dam and Reservoir, which are located northwest of the City of Corona, are owned, and managed by the U.S. Army Corps of Engineers (USACE), Los Angeles District. The Dam is a flood risk mitigation project that serves as a regulating structure on the Santa Ana River. The Dam encompasses over 11,500 acres, which include 4,100 acres of riparian habitat and 4,823 acres of recreation areas. The principal authorized purpose of the Dam is flood risk mitigation, followed by water conservation and recreational use. The existing guiding document for the Dam is the 1976 Prado Dam Master Plan, however, the plan is outdated and does not reflect recent conditions. The Master Plan was in the process of renewal in the 1990's and again in 2005 but funding issues have stagnated its progress. In 2016, USACE received funding to move the update forward, and in 2017 USACE held the first stakeholder meeting. The goal of the meeting was to provide an overview of the update and to receive feedback from the stakeholder agencies. In their update, USACE aims to address, among other things, natural resources, cultural resources, land use, global climate change, and public safety (USACE 2017).

USFS

In 2005, the Cleveland National Forest published the Land Management Plan (Forest Plan). The purpose of the Forest Plan is to establish land and resource management guidelines that result in the social, ecological, and economical sustainability of the national forest. The Fire Management program of the Forest Plan has four areas of responsibility: management and administration, fire pre-suppression and preparedness, wildland fire suppression, and hazardous fuel reduction. Suppression of wildland fires is the top priority for the program; all wildland fires on national forests are considered a threat to communities. Fire personnel implement aggressive fire suppression and prevention strategies near communities to protect life and property from wildland fire and ensuing floods. Additionally, managers focus on establishing community defense zones around structures, fuel breaks, and vegetation treatment to maintain forest health within community protection areas as the second priority for the program. The management and administration component provides oversight and guidance of all fire management activities including forest fires, community protection, and educating the public. Fire pre-suppression and preparedness activities involve the enforcement of County, State, and federal fire laws relating to hazard abatement near structures, for both public and private lands in the national forest. Hazardous fuels management include the use of prescribed burns to clear dry, dead plant material, which lead to better protection of communities within and near the national forest boundary (USFS 2021b).

In 2018 the USFS developed the Pacific Southwest Region Fire and Aviation Management Strategic Plan. The plan was created to be a guiding document for all decisions within Pacific Southwest Region Fire, Fuels, and Aviation Management Programs (USFS 2018a). The plan provides vision focus areas along with corresponding strategies and tactics. For example, Vision Focus Area #2, Natural Resources Integration, suggests the lead agency for the region “establish and maintain predictive service units in support of fire management for restoring and sustaining healthy ecosystems” as a strategy for Natural Resource Integration (USFS 2018a).

PUBLIC LAND MANAGEMENT PUBLIC LAND MANAGEMENT

LAND MANAGEMENT STRATEGIES

Between 2020 and 2021, utility companies in California expect to spend approximately 11 billion dollars on wildfire risk mitigation after the record breaking 2020 fire season. The funds are being spent on annual wildfire mitigation plans which include mitigation recommendations and strategies. Some of the activities expected to be implemented include ensuring proper vegetation clearance around utility infrastructure, system hardening, and increased equipment inspection and repair (Balaraman 2021).

In 2020, California and the federal government signed an agreement of the shared stewardship for California forests and rangelands. The agreement sets many goals for the State of California and the federal government to accomplish together (CA Office of the Governor 2020).These goals include; treating at least 1 million acres of California lands per year to reduce the risk of wildfires, developing a 20-year cooperative forest management plan which will outline projects and priorities, encouraging and increasing the use of sustainable land management practices such as prescribed fire, increase the forest

management workforce and in turn increase the pace and scale of forest management, and prioritizing forest health benefits such as carbon sequestration and healthy watersheds. Funding for this agreement will be provided from The Great American Outdoors Act (CA Office of the Governor 2020).

Forest managers in the region are addressing land management objectives through the use of prescribed fire, mechanical, and manual treatments to promote more resilient forest lands. Private, State, and federal lands are interspersed creating a matrix of land ownership, which is often a hurdle to implementation of landscape level treatments. By working with private landowners, forest managers are enhancing landscape-scale efforts to create more resilient forest communities.

Federal Land

Cleveland National Forest

The Cleveland National Forest spans an area of 460,000 acres, mainly of chaparral, with a few riparian areas, and is managed by the USFS. The Forest encompasses the Santa Ana Mountains, with elevations ranging from 3,045 feet to 5,689 feet at the summit of Santiago Peak. The Mountains represent the largest intact natural landscape remaining in coastal Southern California. In addition, the Mountains contain ecological reserves and important wildlife corridors which are protected by the Nature Conservancy (The Nature Conservancy 2021).

The USFS, in conjunction with the California Department of Forestry and Fire Protection, the Bureau of Land Management, and numerous other state, county, and local fire control organizations, keep a continuous state of readiness in an effort to minimize fire-related damages. The Cleveland National Forest Land Management Plan Strategy (Forest Plan) is the guiding policy document for forest and fire management on the forest (USFS 2021e).

The management of wildfire ignitions for multiple resource objectives (managing naturally burning fires in forests as a tool for helping to restore forest health and mitigating the escalating costs of fire suppression) is practiced on federal land but depends upon a thorough assessment of risk to values at risk in the WUI. Depending on the location and nature of a wildfire, USFS policies outline appropriate management responses to guide district personnel in the application of specific suppression techniques (USFS 2021f). All large wildfire response would be based upon assessment using Wildland Fire Decision Support System (WFDSS).

State Land

State Responsibility Area (SRA) is a legal term defining the area where the State has financial responsibility for the prevention and suppression of wildfire. There is only a small section of SRA land within the City of Corona, located along the southwestern border (see Table A.1.). However, there are many SRA sections surrounding the city. Most SRA lands fall along the southeastern border of the city, with some sections on the southwestern border as well. Within the SRA, The California Department of Forestry and Fire Protection (CAL FIRE) is responsible for fire prevention and suppression (CAL FIRE 2021e).

All very high fire hazard zone SRAs are located to the south and southwest of the city, on the interface between the Cleveland National Forest and the city boundary.

PLANNING PROCESS

The SAF, in collaboration with the National Association of Counties and the National Association of State Foresters, developed a guide entitled *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (SAF 2004) to provide communities with a clear process in developing a CWPP. The guide outlines eight steps for developing a CWPP and has been followed in preparing the CCWPP:

Step One: Convene Decision-makers. Form a Task Force made up of representatives from the appropriate local governments, local fire authorities, and State agencies responsible for forest management.

Step Two: Involve Federal Agencies. Identify and engage local federal representatives and contact and involve other land management agencies as appropriate.

Step Three: Engage Interested Parties. Contact and encourage active involvement in plan development from a broad range of interested organizations and stakeholders.

Step Four: Establish a Community Base Map. Work with partners to establish a base map(s) defining the community's WUI and showing inhabited areas at risk, wildland areas that contain critical human infrastructure, and wildland areas at risk for large-scale fire disturbance.

Step Five: Develop a Community Risk Assessment. Work with partners to develop a community risk assessment that considers fuel hazards; risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other values at risk; and local preparedness capability. Rate the level of risk for each factor and incorporate this information into the base map as appropriate.

Step Six: Establish Community Priorities and Recommendations. Use the base map and community risk assessment to facilitate a collaborative community discussion that leads to the identification of local priorities for treating fuels, reducing structural ignitability and other issues of interest, such as improving fire response capability. Clearly indicate whether priority projects are directly related to the protection of communities and essential infrastructure or to reducing wildfire risks to other community values.

Step Seven: Develop an Action Plan and Assessment Strategy. Consider developing a detailed implementation strategy to accompany the CWPP as well as a monitoring plan that will ensure its long-term success.

Step Eight: Finalize Community Wildfire Protection Plan. Finalize the CWPP and communicate the results to community and key partners.

LOCATION AND GEOGRAPHY

The City of Corona encompasses an area of 39.2 square miles and is located approximately 45 miles southeast of Los Angeles in western Riverside County (City of Corona 2017).

The City of Corona is adjacent to various local and State parks as well as the Skyline Drive trails area and the Cleveland National Forest. Limestone Canyon Regional Park is located to the southwest of the city, Chino Hills State Park to the west, and Lake Matthews Estelle Mountain Reserve to the east. The Saddleback Mountains are located to the south of the city, which contain the highest peak in surrounding area (USFS 2021g). Interstate 15 and State Route 91 intersect the northeast portion of the city, and State Route 71 connects to State Route 91 at the western edge of the city.

Most of the land in the City of Corona is privately owned (84%). The next biggest landowner after the City of Corona is the USACE, with 5% of the land in the city boundary. The USFS is in possession of 3% of the land. The last owner is the State (Chino Hills State Park), which owns 0.1% of the land (Table A.1).

Table A.1. Breakdown of Primary Land Ownership in the City of Corona

Land Ownership	~Percentage of the City
Private	84%
City of Corona	6%
Riverside County	3%
Orange County	1%
USACE	5%
USFS	3%
State	0.1%

Source: City of Corona

Figure A.2. Typical landscape surrounding the City of Corona, showing mountains, a valley, and chaparral vegetation.

ROADS AND TRANSPORTATION

There are several transport routes that run through the City of Corona. State Route 91 runs in an east–west orientation and connects the City with Anaheim and Yorba Linda to the west, and Riverside to the east. Interstate 15 intersects the city in a north–south orientation and provides access to the cities of Norco, Eastvale, and Jurupa Valley to the north, and runs through the Temescal Valley to the South.

Figure A.3. Photograph showing the steep grade of a WUI community

TOPOGRAPHY

The CWPP project area rests at the foothills of the Santa Ana Mountains. While elevation is relatively homogenous throughout most of the city, it does impact the interface to the east, south and west. As the elevation varies, it affects wildland fuels, wind speed and direction, and the configuration of the interface (Firesafe Planning Solutions 2021).

The City of Corona has various canyons that interface with the western wildland interface, but there are also canyons on the southern and easterly interfaces. Most of the canyons line up with the southwest/northeast wind flow, but Fresno and Temescal Canyons are perpendicular to the southwest/northeast flow (Firesafe Planning Solutions 2021).

Many of the slopes located in the southern and southwest interfaces are over 50 degrees. In general, steeper slopes burn faster and hotter, increasing the potential for damage (Firesafe Planning Solutions 2021).

POPULATION

The following information is drawn primarily from U.S. census data and the City of Corona. In 2019, the population estimate of the City of Corona was 169,868 persons, an increase of 11.5% over the 2010 census numbers of 152,374 (U.S. Census Bureau 2019). As of 2021, there were 52,399 housing units in the city (City of Corona 2021d). The city has a population density of 3,925 people per square mile (U.S. Census Bureau 2019).

RECREATION

Outdoor recreation is extremely popular in the City of Corona, with the Limestone Canyon Regional Park, Chino Hills State Park, Santa Ana Mountains, Lake Mathews Estelle Mountain Reserve, city parks, and historical landmarks throughout the city, attracting thousands of visitors. Hiking, camping, fishing, bicycling, horse riding, and nature viewing are popular on public land (USFS 2021h).

During peak seasons and large events, a significant number of people can congregate in a relatively small space, which constitutes a large population to evacuate.

Figure A.4. Cyclists on a trail in Chino Hills State Park.
Source: https://www.californiabeaches.com/attraction/chino-hills-State-park/

CLIMATE AND WEATHER PATTERNS

Differences in topographical characteristics along the WUI to the east, south, and west contribute to slope variability within the planning area. Shifts in elevation affect wildland fuels, wind speed and direction, and the configuration of the interface (downslope fuels). Corona has various canyons that interface with the western wildland interface (Cleveland National Forest), but there are also canyons on the southern and easterly interfaces.

Annual rainfall affects the quantity of fuel and the State of the fuel in the summer and fall. Annual precipitation data from the past 30 years suggests a cycle of consecutive drought years followed by one or two wet years. Fire occurrence is associated with drought years; however, fires have also occurred on wet years but with less frequency (Fire Safe Planning Solutions 2021).

The City of Corona has a warm Mediterranean climate, characterized by mild to cool winters and hot summers. Most of the rainfall in the city occurs during winter and early spring (Figure A.5). In addition to high temperatures and dry conditions, the City of Corona is also in the direct path of the Santa Ana winds. The Santa Ana winds are strong, hot, and dry winds that originate to the east of the city and travel southwest. Santa Ana winds drove the three largest fires in the vicinity of the City of Corona (2020 Blue Ridge, 2008 Freeway Complex, 2006 Sierra fires).

High temperatures coupled with the Santa Ana winds creates potential for severe fire risk. This usually occurs when precipitation levels are low (Fire Safe Planning Solutions 2021). Since the Santa Ana winds generally occur in the beginning of fall, extended drought conditions contribute to an increased potential for severe fire weather.

The City of Corona is subject to periods of high heat, where temperatures reach 118 to 120 degrees Fahrenheit. It is not uncommon for the temperature to reach over 100 degrees during the summer. These periods may exacerbate fire behavior.

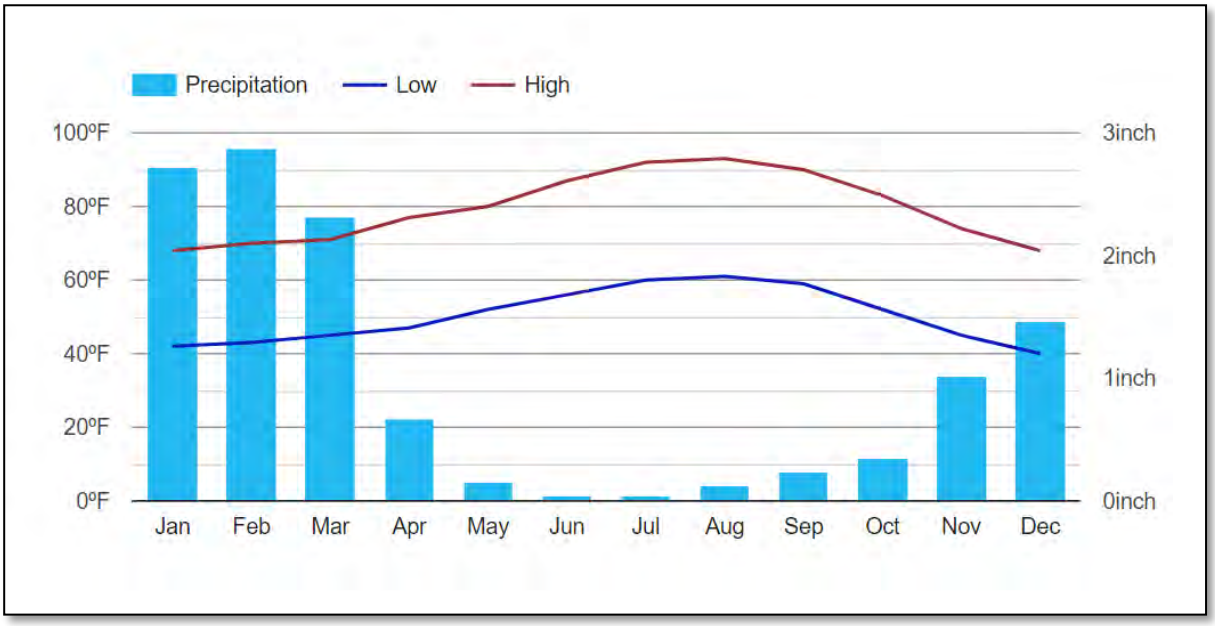

Figure A.5. City of Corona climate data from 1981 through 2010.

Source: U.S. Climate Data https://www.usclimatedata.com/climate/corona/california/united-States/usca0252

Table A.2. Mean Annual Temperature and Precipitation in the City of Corona

Source	Location	Temperature Max	Temperature Min	Mean Precipitation	Period of Record
U.S. Climate Data	Longitude: -117.566, Latitude: 33.8753	79	50	12.01	1981-2010

Throughout the State of California, average annual precipitation is about 12 inches and average annual temperatures range from 50 to 79 degrees Fahrenheit. The mean precipitation within the County (Riverside County) is typically light and ranges from as low as 0.02 inches in June to 1.51 inches in February, with an annual average of 7.8 inches (NOAA 2021a, 2021b). Temperatures within the County reach a peak in July with an average of 86.1 degrees. January is the coldest month with an average temperature of 51.9 degrees (NOAA 2021c).

VEGETATION AND LAND COVER

Vegetation zones within the City of Corona are primarily a function of location, elevation, slope, aspect, substrate, and associated climatic regimes. However, since much of the city is heavily developed, vegetation composition is fairly uniform (Figure A.6).

While most of the city is highly urbanized, the Temescal Mountains host a diverse array of plant species in distinctive natural plant communities. Open space areas that surround the city—including Chino Hills State Park, Cleveland National Forest, Lake Mathews Estelle Mountain Reserve, and Prado Basin—support a variety of plants and animals native to California. The combination of terrain, drainages and creeks, and other natural features provide opportunities for habitat and wildlife species (City of Corona 2020).

While largely urbanized, the City of Corona contains significant expanses of vegetation along its periphery and within its sphere of influence areas. Natural vegetation communities in the city primarily consist of coastal sage scrub, grassland, and chaparral. Riparian scrub, woodland, forest with interspersed meadows and marshes, and grassland exist on the edges of the city and sphere of influence. Native plant communities include coastal sage scrub, southern willow scrub, and coast live oak. Areas like Eagle Valley are dominated by agricultural land, predominantly grazing. Scrub and Montane coniferous forest can be found in portions of the sphere of influence as well (City of Corona 2020).

Dominant vegetation types within the city are described based on a large spatial scale and represent the overall community structure that will play a general role in fire occurrence and behavior. Although the vegetation types are outlined and described for the entire city in this plan, site-specific evaluations of the vegetative composition and structure in each area of focus should be taken into consideration when planning fuels treatments.

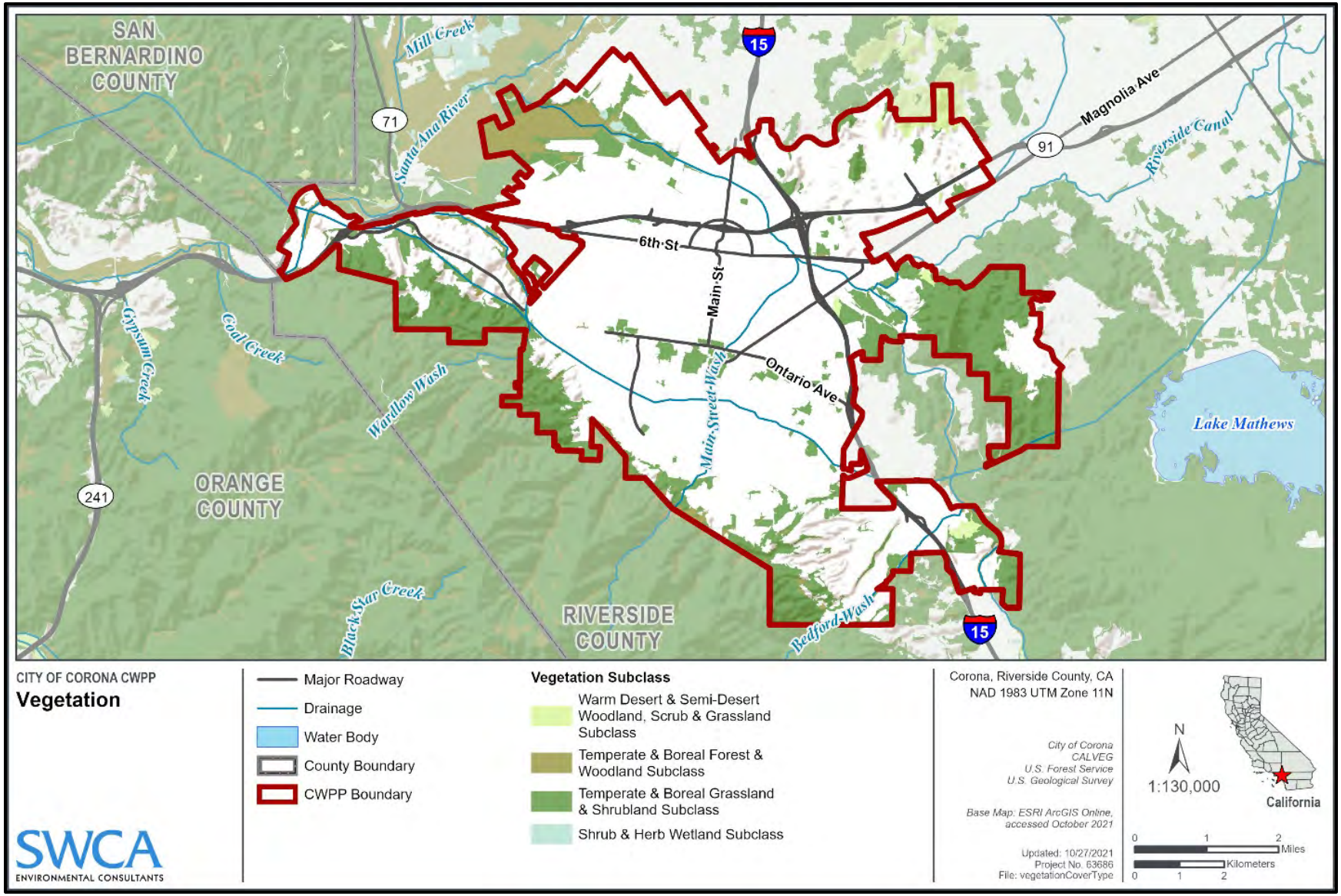

Figure A.6. City of Corona existing vegetation cover.

The major vegetation types in the City of Corona are listed in Table A.3 were sources from the USFS CALVEG product and are described below the table in more detail using the NatureServe United States Ecological Systems categories (NatureServe 2020a). Other types of land cover (e.g., developed) also exist in the city and are not described in more detail as they do not play a significant role in fire behavior.

Table A.3. Major Vegetation Types within the City of Corona

Existing Vegetation Type	Acres	Percent
Temperate & Boreal Grassland & Shrubland Subclass	5,784	83%
Temperate & Boreal Forest & Woodland Subclass	882	13%
Warm Desert & Semi-Desert Woodland, Scrub & Grassland Subclass	249	3.4%
Shrub & Herb Wetland Subclass	56	0.6%

Source: USFS CALVEG https://data.fs.usda.gov/geodata/edw/edw_resources/meta/S_USA.EVMid_R05_SouCoast.xml

TEMPERATE & BOREAL GRASSLAND & SHRUBLAND SUBCLASS COMMUNITIES

Most of the vegetation in the City of Corona consists primarily of temperate and boreal grassland and shrubland communities. These types of communities occur in areas of moderately wet to dry Mediterranean climates. Grasslands and shrublands within the city are composed almost entirely of mesomorphic (plants which are neither adapted to particularly dry nor particularly wet environments) grasses and shrubs, but may also include scattered trees. The grassland and shrubland communities vary from open grasslands to dense bunch or sod grasses, usually scattered with trees and shrubs, to low open to dense shrublands and soft chaparral scrub (NatureServe 2020a).

TEMPERATE & BOREAL FOREST & WOODLAND SUBCLASS COMMUNITIES

The most common forested community consists of temperate and boreal forest and woodlands. This ecological system occurs in a broad range of climactic conditions, from warm-temperate to very cold subarctic conditions. Tree species diversity is typically low in temperate forests and woodlands. Temperate and boreal forest and woodlands is generally dominated by broad-leaved deciduous and needle-leaved trees, with some broad-leaved evergreens in warmer environments. Trees usually range in height from 10 to 30 meters (NatureServe 2020b).

WARM DESERT & SEMI-DESERT WOODLAND, SCRUB & GRASSLAND SUBCLASS COMMUNITIES

Warm Desert & Semi-Desert Woodland, Scrub & Grassland communities exist in the city along Temescal Valley and areas adjacent to Lake Matthews Estelle Mountain Reserve. These communities occur in dry, warm-temperate, tropical, and subtropical climates. These communities consist primarily of xeromorphic (drought-adapted plants) plants, and vary from open to closed woodlands, open shrub-scrub to

complexes of succulents, and thornscrub, though scattered tall succulents may be present (NatureServe 2020c).

SHRUB & HERB WETLAND SUBCLASS COMMUNITIES

Shrub and herb wetland communities constitute a very small percentage (0.6%) of vegetation land cover. This variety is noted in the northern part of the city, in areas frequently inundated by the Temescal Wash. The shrub and herb wetland subclass includes fresh and saltwater marshes, wet meadows, wet shrublands, and open bogs. This community is dominated by grasses and shrubs, with or without scattered trees, occasionally with a wet moss layer, halophytic (plants adapted to saline conditions) plants, with seasonally to annually saturated (flooded) soils (NatureServe 2020d).

INVASIVE PLANT SPECIES

Nonnative vegetation includes grassland and other ruderal plant communities. Tamarisk and giant reed infestations have affected local waterways and places where water collects. Rated “High” on the California Invasive Plant Council list, these two species cause severe ecological impacts on native plant species. Tamarisk and giant reed are heavy water users, provide little nest or foraging habitat, are difficult to control, and can grow into dense monocultures that block access to water for larger wildlife. Infestations can take over areas, outcompete native plants, and reduce habitat quality. The Santa Ana River-Orange County Weed Management Area is a coalition that helps prevent and control the spread of invasive weeds on both private and public lands (City of Corona 2020).

FOREST HEALTH CONSIDERATIONS

Insects

Native insect epidemics within plant communities are usually part of a natural disturbance cycle similar to wildfire. They are often cyclic in nature and are usually followed by the natural succession of vegetation over time. Of primary interest are those that attack tree species because of the implications for fire management.

In addition to native insect epidemics, exotic pests also pose a significant threat to forest ecosystems. Invasive species are organisms that are introduced into an area beyond their natural range and become pests in the new environment. They are also referred to as exotic pests, alien, non-native, or introduced pests. The majority of introductions have been unintentional and accidental. Having evolved in a different environment, these invasive species may have few natural enemies in their new locations, which can often lead to rapid population increases that can out-compete native species for resources.
The introduction of exotic pests is likely to cause economic, environmental, and agricultural harm as well as harm to human health (California Department of Food and Agriculture 2021b). In general, traits of invasive species include fast growth, rapid reproduction, rapid adaptability, tolerating a wide range of environmental conditions, and utilizing a variety of different foods (California Department of Food and Agriculture 2021b).

Insect epidemics in California forests continue to persist. In 2019, USFS's annual aerial survey showed tree mortality in 2.2 million acres out of 41 million acres that were surveyed. Tree mortality is strongly correlated with extreme and prolonged drought and subsequent bark beetle attacks (USFS 2019). Stands of trees that have been killed by insects have varying degrees of associated fire danger depending on the time lapse following an insect attack and structure of the dead fuels that remain. However, forests with a large degree of mortality following an insect attack may have the potential to experience extremely high fire danger, especially if a large degree of needle cover remains in the canopy.

Insects that have infested or have the potential to infect the forests within and around the CWPP planning area are discussed below.

Goldspotted Oak Borer (GSOB) (*Agrilus auroguttatus*) is an invasive pest contributing to the current oak tree mortality occurring in many areas of San Diego County. Isolated areas of infestation have been confirmed in Riverside, Orange, Los Angeles, and San Bernardino Counties in Southern California, including in the Cleveland National Forest (University of California Division of Agriculture and Natural Resources [UCANR] 2021c). Due to the distribution of the host (live oak), GSOB has the potential to spread further north in California and cause similar tree mortality (California State Parks 2021). GSOB attack coast live oak (*Q. agrifolia*), canyon live oak (*Q. chrysolepis*), and California black oak (*Q. keloggii*). GSOB larvae feed under the bark primarily at the interface of the sapwood and phloem of the main stem and larger branches. Larvae kill patches and strips of phloem, resulting in limb and branch die back and, eventually, tree death.

Shot Hole Borers (SHBs) kuroshio (*Euwallacea kuroshio*) and polyphagous (*Euwallacea whitfordiodendrus)* attack and kill healthy tress in southern California. SHBs develop through four life stages: egg, larva, pupa, and adult. Adult females bore through tree bark, create galleries (tunnels), and introduce *Fusarium euwallacea,* a fungus. The female lays eggs in the galleries and the *Fusarium* fungus grows and spreads throughout the galleries. When the eggs hatch, the larvae eat the fungus. SHB tunneling in conjunction with fungal growth injure the tree vascular system and weaken tree structure, resulting in gradual death of the entire tree. One or both SHBs are known to feed and reproduce in southern California in about 60 tree species (e.g., coast live oak, valley oak, sycamore, and big leaf maple) (UCANR 2021d).

Other invasive insects in California include the redhaired pine bark beetle (*Hylurgus ligniperda*), Asian long-horned beetle (*Anoplophora glabripennis*), light brown apple moth (*Epiphyas postvittana*), and gypsy moth (*Lymantria dispar*) (USFS and CAL FIRE 2008).

Diseases

Diseases of trees, such as parasitic plants, fungi, and bacteria, can also affect forests in and around the City of Corona CWPP planning area. These diseases impact forest systems by degrading the productivity and health of the forest. Some of the more common forest diseases that are found in the project area region are described below. Trees that are killed by disease have the similar potential to increase fire hazards.

Foamy Bark Canker (*Geosmithia pallida*) is a pest complex of oaks in southern California that is caused by the fungus *Geosmithia pallida,* which is carried by the native western oak bark beetle. It was first reported causing dieback and death of trees from Riverside to San Luis Obispo. Symptoms include

discoloration on the trunk and main branches where burrowing western oak bark beetle entry holes are found (California Forest Pest Council 2014).

Sudden Oak Death (*Phytophthora ramorum*) is the primary cause of tree mortality in coastal California. *Phytophthora ramorum* is one of several species of related water mold parasites. Sudden Oak Death is characterized by the development of seeping cankers on the trunk, foliage dieback, and eventual death of infected trees. The parasite has a wide host range, with more than 45 California tree and shrub species susceptible to infection. However, the most susceptible species are coast live oak (*Quercus agrifolia*) and tanoak (*Lithocarpus densiforus*), which exhibit strong systemic infection and high mortality rates (University of California Riverside 2021).

Mycosphaerella molleriana **and** ***Readeriella spp.*** Common fungal parasites of blue gum eucalyptus trees in central and southern California. These parasites cause leaf spot and stem lesions; damage appears as tree dieback from the top downward (California Forest Pest Council 2014).

Maple Leaf Scorch (*Xylella fastidiosa*) disease on big leaf maple is thought to be caused by the xylem-limited bacterium (*Xylella fastidiosa*). This disease is mainly distributed in northern California (California Forest Pest Council 2014).

Mistletoe (*Arceuthobium* spp., *Phoradendron* spp.). are parasitic plants that gradually degrade tree vigor and may eventually kill their hosts over a long period of time following further infestation. Essential water and nutrients within the host are used by the mistletoe, thus depriving the host of needed food. Dwarf mistletoe is found on juniper, piñon pine, ponderosa pines, and firs. It is host-specific (i.e., the species that infects piñon does not infect other trees). True mistletoe is common on junipers in the Southwest. Both types of mistletoe spread from tree to tree and are difficult to control. Dwarf mistletoe spreads its seed by shooting berries; true mistletoe seeds are spread by birds. In residential areas, pruning can sometimes be effective on smaller trees. Heavy infestations in large trees can be controlled only by cutting down the trees and removing them to stop the spread of the mistletoe to other trees nearby (USFS and CAL FIRE 2008).

White Pine Blister Rust *(Cronartium ribicola).* White pine blister rust is a non-native disease caused by a fungus that first arrived in America in the early twentieth century from Asia and Europe. The complex life history of the fungus ultimately results in a lethal infestation of the host tree. The branch and stem canker that result from infestation can result in top kill, branch die-back, and eventually tree mortality.Hosts: Sugar pine, western white pine, other white pines; currants, and gooseberries (Ribes spp.); some paintbrushes and louseworts (Castilleja and Pedicularis spp.) (USFS and CAL FIRE 2008).

Western Gall Rust (*Endocronartium harknessii* (*Peridermium harknessii*)) Hosts: Very common on lodgepole and Monterey pine; also occurs on many other pine species, especially ponderosa, Jeffrey and knobcone pine, rare on western white pine; no alternate hosts (USFS and CAL FIRE 2008).

WILDLIFE

The Cleveland National Forest to the south and west of the City of Corona is a haven for many species of wildlife, including blacktail jackrabbits, opossums, long tail weasels, desert cottontails, ringtail cats, coyotes, mule deer, gray foxes, bobcats, and mountain lions (USFS 2021i).

In addition, the Santa Ana Mountains in the Cleveland national forest represent the largest intact natural landscape remaining in costal southern California. The Santa Ana Mountains serves as critical habitat for threatened songbirds such as least Bell's vireo (*Vireo bellii pusillus)* and the California gnatcatcher (*Polioptila californica*) as well as the San Diego coast horned lizard (*Phrynosoma coronatum*) and the endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*).Red-tailed hawks, coastal cactus wrens, black-shouldered kites, foxes, bobcats, and mountain lions all reside in the terrain around the Santa Ana Mountains (The Nature Conservancy 2021).

Threatened and Endangered Species

Sensitive biological resources are natural habitats and wildlife species in decline, including those that have been afforded special protections or recognition by federal, State, or local conservation agencies. The City of Corona and its SOI have many biological resources, although most have been found or could be present in undeveloped areas of the sphere and not necessarily within the city itself. These resources include 12 sensitive natural communities, five designated critical habitats for threatened or endangered species, 64 special status plant species, 59 special-status wildlife species, and several wildlife movement corridors. A comprehensive discussion and mapping of resources are presented in the General Plan EIR Technical Study (City of Corona 2020).

The Cleveland National Forest adjacent to the City of Corona is home to several threatened and endangered species, including two songbirds, one crustacean, and one lizard. Treatments on federal land would be subject to the National Environmental Policy Act (NEPA) and associated analysis of impacts to these species. Treatments in areas that may impact threatened and endangered species would require application of certain mitigation measures to prevent degradation to habitat.

FIRE BEHAVIOR MODELS

Figures 3.3. and 3.4 in Chapter 3 were developed to provide a snapshot of potential fire behavior under existing conditions, and Figures 3.6 and 3.7 present projected fire behavior under a climate change scenario. The following outlines the process that was followed to develop those maps.

LANDFIRE

LANDFIRE is a national remote sensing project that provides land managers a data source for all inputs needed for FARSITE, FlamMap, and other fire behavior models. The database is managed by the USFS and U.S. Department of the Interior and is widely used throughout the United States for land management planning. More information can be obtained from http://www.landfire.gov.

FARSITE

FARSITE is a computer model based on Rothermel's spread equations (Rothermel 1983); the model also incorporates crown fire models. FARSITE uses spatial data on fuels, canopy cover, crown bulk density, canopy base height, canopy height, aspect, slope, elevation, wind, and weather to model fire behavior across a landscape. FARSITE is a spatial and temporal fire behavior model. FARSITE is used to

generate fuel moisture and landscape files as inputs for FlamMap. Information on fire behavior models can be obtained from http://www.fire.org.

FLAMMAP

Like FARSITE, FlamMap uses a spatial component for its inputs but only provides fire behavior predictions for a single set of weather inputs. In essence, FlamMap gives fire behavior predictions across a landscape for a snapshot of time; however, FlamMap does not predict fire spread across the landscape. FlamMap has been used for the CCWPP to predict fire behavior across the landscape under extreme (97% worst case) weather scenarios. For this CWPP assessment, the model was run within the Interagency Fuel Treatment Decision Support System (IFTDSS) modeling platform.

FIRE BEHAVIOR MODEL INPUTS

Fire Regimes

Fires are characterized by their intensity, the frequency with which they occur, the season in which they occur, their spatial pattern or extent, and their type. Combined, these attributes describe the fire regime.

Chapparal

Well over 100 shrub species have been noted in chapparal; most of these shrubs have elliptical or round leaves. However, a few species, particularly chamise (*Adenostoma fasciculatum*)—the most widespread of chaparral shrubs, have needle-thin leaves which enhances its flammability. When chaparral communities burn, fire spreads through the shrub canopy, typically resulting in a stand-replacement crown fire (USFS 2018b). According to the USFS, the estimated historical fire-return intervals for chamise-redshank and mixed chaparral range from 30 to 90 years (USFS 2018b). However, fires now occur more frequently in southern California chaparral environments because of human encroachment into wildlands. Although chaparral vegetation is fire-adapted and regrows quickly after fire, either from underground seeds or sprouting from stem bases, altered fire regimes may adversely impact the regenerative cycles of chaparral species. The repetition of fires at short intervals (<10 years) that kill juvenile plants before they produce seed can decrease populations of shrub species that usually follow fire disturbances. Additionally, invasive grasses frequently colonize chaparral stands that are in recovery and persist until the shrubs close the canopy; however, if fire occurs during the grass succession phase, competition from chapparal shrub species is reduced and can allow grass seeds to survive and propagate a cycle of more frequent fires and decreased shrub cover (USFS 2021j).

Coastal Sage Scrub

Coastal sage scrub (CSS) communities are dominated by drought-deciduous shrubs, along with stem and leaf succulents in some areas. The community is also distinguished by an understory of perennial and annual grasses and forbs within the open spaces between shrubs. Composition of CSS communities are highly varied at both local and regional scales and is oftentimes intermixed with chaparral vegetation. Common shrub species associated with coastal sage scrub include the highly flammable California sagebrush (*Artemisia californica*) and black sage (*Salvia mellifera*). Similar to chaparral vegetation,

CSS communities recover quickly after a fire, either from underground rootstocks or from seeds in the soil. Fire spread in CSS communities is also similar to those for chaparral communities—fire spreads through the shrub canopy. However, in CSS communities, grass and forb cover is usually higher after a fire than in chaparral communities due to the more open canopy of CSS communities. Even though CSS communities are resilient to fire, there is a limit to this resilience as fires become more frequent and severe. Short fire return intervals in CSS communities seem more likely to significantly alter community composition or cause community shifts than long fire intervals. Frequent burning over short time periods can terminate or dramatically reduce some shrub and subshrub species and has been associated with an elevated transition rate from CSS communities to grassland. These community shifts may result in increased fire potential and increased susceptibility to invasion by exotic grasses and forbs. Invasive grasses and forbs may be favored by frequent fire, which can further diminish the fire return interval, and may also preclude germination of shrub seedlings (Diffendorfer et al. 2002).

Southern Oak Woodland

Southern oak woodlands are dominated by coast live oak (*Quercus agrifolia*), usually with Engelmann oak (*Q. engelmannii*) and occasionally with Douglas-fir (*Pseudotsuga macrocarpa*). Oaks are also prominent members in chaparral communities; canyon live oak (*Q. chrysolepis*), gray pine (*Pinus sabiana*), manzanita (*Arctostaphylos* spp.), chamise (*Adenostoma fasciculatum*), and wedgeleaf ceanothus (*Ceanothus cuneatus*) are typical associates of coast live oak in chaparral habitats. Fire plays an important role in southern oak woodland ecosystems; enhanced oak recruitment and sprout growth are typically noted after a fire (UCANR 1994). However, oak survival is largely dependent on tree species, location, fire frequency, adjacent vegetation types, and fire severity. Generally, oak trees are adapted to moderate-frequency, low-intensity fires, not the high-frequency, high-severity fires noted in recent times. In communities where oak is associated with chaparral and grassland, fire may spread quickly through the shrub canopy; if fire intensity is high and tress are in a closed stand the fire may spread through large lateral branches or the crown (Steinberg 2002).

Riparian Communities

Lowland riparian environments in southern California have been altered extensively by human utilization. As a result of these modifications, species composition and spatial dimensions of riparian plant communities have changed. In most cases, native riparian vegetation has been eliminated completely. Studies suggest that fire frequency and severity are increasing in many riparian environments where non-native plants constitute a significant part of the plant community (Webb et al., 2019). Native riparian trees such as sycamores, willows, and cottonwoods typically do not recover well from high-intensity crown fires, contrarily, invasives such as saltcedar (*Tamarix* spp.), giant reed (*Arundo donax*), and Russian olive (*Elaeagnus angustifolia*) recover quickly from even the highest-intensity fires (UCANR 2009). Non-native vegetation alters fuel properties such as flammability and continuity, and fuel loading, which leads to increased fire risk. Giant reed (*Arundo donax*) is the most common non-native plant in riparian habitats of southern California; it grows high and dense and becomes dry and highly flammable in the fall. Fires in these riparian areas are extensive and severe, and fire spreads easily from the surface into the canopies of the tallest native trees (UCANR 2009).

Fuels

The fuels in the planning area are classified using Scott and Burgan's (2005) Standard Fire Behavior Fuel Model classification system. This classification system is based on the Rothermel surface fire spread equations, and each vegetation and litter type is broken down into 40 fuel models.

The general classification of fuels is by fire-carrying fuel type (Scott and Burgan 2005):

(NB) Non-burnable
(GR) Grass
(GS) Grass-Shrub
(SH) Shrub
(TU) Timber-Understory
(TL) Timber Litter
(SB) Slash-Blowdown

Table A.4 provides a description of each fuel type.

Map 1 in Appendix B illustrates the fuels classification throughout the planning area.

Table A.4. Fuel Model Classification for CCWPP Planning Area

1.	**Nearly pure grass and/or forb type (Grass)**
i.	**GR1:** Grass is short, patchy, and possibly heavily grazed. Spread rate is moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (0.40 ton/acre).
ii.	**GR2:** Moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (1.10 tons/acre).
iii.	**GR3:** Very coarse grass, average depth 2 feet. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
2.	**Mixture of grass and shrub, up to about 50% shrub cover (Grass-Shrub)**
i.	**GS1:** Shrubs are about 1 foot high, low grass load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (1.35 tons/acre).
ii.	**GS2:** Shrubs are 1–3 feet high, moderate grass load. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (2.1 tons/acre).
3.	**Shrubs cover at least 50% of the site; grass sparse to non-existent (Shrub)**
i.	**SH1:** Low fuel load, depth about 1 foot, some grass fuels present. Spread rate very low (0–2 chains/hour); flame length very low (0–1 feet).
ii.	**SH2:** Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuels present. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load (5.2 tons/acre).
iii.	**SH7:** Very heavy shrub load, possibly with pine overstory. Fuel bed depth 4–6 feet. Spread rate high (20–50 chains/hour); flame length very high (12–25 feet).
4.	**Grass or shrubs mixed with litter from forest canopy (Timber-Understory)**
i.	**TU1:** Fuel bed is low load of grass and/or shrub with litter. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load (1.3 tons/acre).
ii.	**TU3:** Fuel bed is moderate litter load with grass and shrub components. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
iii.	**TU5:** Fuel bed high load conifer with shrub understory. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).

5.	**Dead and downed woody fuel (litter) beneath a forest canopy (Timber Litter)**
i.	**TL1:** Low to moderate load, fuels 1–2 inches deep. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
ii.	**TL2:** Low load, compact. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
iii.	**TL3:** Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 foot); fine fuel load (0.5 ton/acre).
iv.	**TL4:** Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 foot).
v.	**TL5:** High load conifer litter. Spread rate slow (2–5 chains/hour); flame length low (1–4 foot).
vi.	**TL6:** Moderate load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 foot).
vii.	**TL7:** Heavy load. Spread rate low (2–5 chains/hour); flame length low (1–4 feet).
viii.	**TL8:** Long needle litter; long needle fuel. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
ix.	**TL9:** Very high load fluffy dead and downed fuel littler. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).
6.	**Insufficient wildland fuel to carry wildland fire under any condition (Non-burnable)**
i.	**NB1:** Urban or suburban development; insufficient wildland fuel to carry wildland fire.
ii.	**NB3:** Agricultural field, maintained in non-burnable condition.
iii.	**NB8:** Open water.
iv.	**NB9:** Bare ground.

Notes: Based on Scott and Burgan's (2005) 40 Fuel Model System.

Topography

Topography is important in determining fire behavior. Steepness of slope, aspect (direction the slope faces), elevation, and landscape features can all affect fuels, local weather (by channeling winds and affecting local temperatures), and rate of spread of wildfire. There are some steep slopes in the City of Corona that would influence fire behavior and spread.

Weather

Of the three fire behavior components, weather is the most likely to fluctuate. Accurately predicting fire weather remains a challenge for forecasters. As winds and rising temperatures dry fuels in the spring and summer, conditions can deteriorate rapidly, creating an environment that is susceptible to wildland fire. The modeling for Figures 3.3 and 3.4 in Chapter 3 were completed under 97th percentile weather conditions, based on analysis of historic weather in the project area.

Climate Change Scenario

The following outlines the procedure that was followed in order to run a climate change scenario for fire behavior in the City of Corona (Figures 3.6 and 3.7 in Chapter 3). In brief, climate projection values were calculated from CalAdapt data, then fuel moisture content values were calculated from those projected values using NWCG tables, and fire behavior outputs were modeled using those fuel moisture content values in IFTDSS.

Climate projection tables were downloaded from CalAdapt (https://www.cal-heat.org/download/), and the average minimum relative humidity and maximum temperature values for the time frames and 2081 to 2099, or end-century, were calculated. The tables were filtered for year-round values and the 95th percentile model (the most extreme values modeled) and then the projected average minimum relative humidity and projected average maximum temperature records were averaged. The averaged values equaled 19.1% for minimum relative humidity and 105.30 degrees Fahrenheit for maximum temperature.

When compared with average historical values from CalAdapt, which are 20.77% minimum relative humidity and 100.25 degrees Fahrenheit maximum temperature, these end-century projections represent a decrease of 1.67% minimum relative humidity – a difference of 8%, and an increase of 5.05 degrees Fahrenheit in maximum temperature – a difference of 5%.

The projected averaged humidity and temperature values were used to determine dead fuel moisture values for 1-hour, 10-hour, and 100-hour fuels, using the tables from https://www.nwcg.gov/publications/pms437/fuel-moisture/dead-fuel-moisture-content. Table A was used to determine the reference fuel moisture value of two, from a dry bulb temperature range of 90 to 109 degrees Fahrenheit and a relative humidity range of 15% to 19%. Then Table C was used to determine the 1-hour fuel moisture correction value of one, with assumptions of unshaded areas, an aspect of north, a slope of 0 to 30 degrees, L level (fires within 1,000 feet above or below the area elevation), and a time of day of 12:00 to 13:59, or 12 p.m. to 2 p.m.

The reference fuel moisture value of two and the fuel moisture correction value of one were added together to equal three, the 1-hour fuel moisture content value. Two points were added to the 1-hour fuel moisture content value to determine the 10-hour fuel moisture value of five, and four points were added to the 1-hour fuel moisture content value to determine the 100-hour fuel moisture value of seven. Calculated fuel moisture content values are summarized in Table A.5.

Table A.5. Calculated fuel moisture content values for climate scenario fire behavior modeling.

Timeframe	Reference Fuel Moisture Content Value	1-Hour Fuel Moisture Content Value	10-Hour Fuel Moisture Content Value	100-Hour Fuel Moisture Content Value
End-century (2081–2099)	2	3	5	7

The fuel moisture content values calculated from the NWCG tables were used as input parameters in IFTDSS to run custom fire behavior outputs – crown fire activity, fireline intensity, flame length, and rate of spread. Table A.6 shows the full set of parameters used for the IFTDSS modeling. Wind, wind speed, wind direction, and fuel conditioning values were the same as from the IFTDSS auto97th fire behavior outputs. Values of 30 for live herbaceous fuels and 60 for live woody fuels were used as these are the lowest values the IFTDSS application will accept – generating the most extreme fire behaviors possible.

Table A.6. Parameters used for climate scenario fire behavior outputs in IFTDSS.

					Dead Fuel Moisture			Live Fuel Moisture	
Time Frame	Wind	Wind Speed	Wind Direction	Fuel Conditioning	1-Hour	10-Hour	100-Hour	Live Herbaceous	Live Woody
End-century (2081–2099)	Blowing uphill	20 MPH	225 degrees (SW)	On – Extreme	3	5	7	30	60

PUBLIC EDUCATION AND OUTREACH PROGRAMS

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue.

LOCAL AND STATE PROGRAMS

City of Corona Fire Department

The City of Corona Fire Department's Prevention and Emergency Management Divisions aim to reduce potential fire hazards through education. The Divisions offer a wide range of services including, an emergency notification system, educational videos about fire prevention and preparedness, community emergency response team training, the fire explorer program, community presentations, and fire station tours (City of Corona Fire Department 2021). The City of Corona has partnered with the International Association of Fire Chiefs and Riverside County/CAL FIRE to promote the national Ready, Set, Go program and is the only City in the county to have an active Youth Firesetter Intervention Program. The city has a robust Community Information division committed to keeping our community informed of significant incident information and updates 24 hours per day, seven days per week if warranted.

Figure A.7. The City of Corona actively works with City schools and youth on wildfire prevention and awareness programs.

Riverside County

Riverside County Fire Department (RCFD) offers many education programs that teach fire prevention safety and disaster preparedness. Interested individuals are encouraged to contact the Public Information and Media Relations Bureau to learn more about the educational programs. The County also utilizes Firewise and Ready, Set, Go! literature to support these education efforts. Additionally, RCFD's Public Information and Media Relations Bureau Posts updates and incident information on social media pages 24 hours a day, seven days a week (RCFD 2021).

California Department of Forestry and Fire Protection (CAL FIRE)

CAL FIRE is an all-risk emergency services provider which specializes in wildfire response. CAL FIRE is responsible for wildfire response on all California SRA lands except for six counties (Kern, Los Angeles, Marin, Orange, Santa Barbara, and Ventura). In addition, CAL FIRE provides a plethora of fire education resources to ensure Californians are prepared for wildfire. These educational materials include but are not limited to…

- CALFIRE Fire and Emergency Response Guide
- California Fire Plan Overview
- CALFIRE Cooperative Emergency Response
- Ready Set Go! Wildfire Action Plan
- Are you Ready? Defensible Space and Home Hardening
- Are you Set? Wildfire Preparedness
- Defensible Space Guide
- Before, During, and After a Wildfire

NATIONAL PROGRAMS

Ready, Set, Go!

The Ready, Set, Go! Program, which is managed by the International Association of Fire Chiefs, was launched in 2011 at the WUI conference. The program seeks to develop and improve the dialogue between fire departments and residents, providing teaching for residents who live in high-risk wildfire areas—and the WUI—on how to best prepare themselves and their properties against fire threats (Ready, Set, Go! 2016). The City of Corona utilizes the Ready, Set, Go! Program for public outreach with a focus on making communities "fire adapted".

The City of Corona's Ready, Set, Go! Program page is here:
https://www.coronaca.gov/government/departments-divisions/fire-department/emergency-preparedness/ready-set-go

CAL FIRE's Ready for Wildfire Ready, Set, Go! Program page is here:
https://www.readyforwildfire.org/prepare-for-wildfire/ready-set-go/

Defensible space is a major part of creating fire-adapted communities. Parameters for developing defensible space around a home are described on the City of Corona's Ready, Set, Go! webpage and the CAL FIRE Ready for Wildfire webpage, and are illustrated in Figure 4.2. The tenets of Ready, Set, Go! as included on the CAL FIRE Ready for Wildfire website are (CAL FIRE 2019d):

Ready – Take personal responsibility and prepare long before the threat of a wildland fire so your home is ready in case of a fire. Create defensible space by clearing brush away from your home. Use fire-resistant landscaping and harden your home with fire-safe construction measures. Assemble emergency supplies and belongings in a safe place. Plan escape routes and ensure all those residing within the home know the plan of action.

Set – Pack your emergency items and create a wildland fire action plan so your family knows what to do and how to evacuate. Stay aware of the latest news and information on the fire from local media, your local fire department, and public safety.

Go – Follow your personal wildland fire action plan. Doing so will not only support your safety but will allow firefighters to best maneuver resources to combat the fire.

National Fire Protection Association

The NFPA is a global non-profit organization devoted to eliminating death, injury, property, and economic loss due to fire, electrical, and related hazards. Its 300 codes and standards are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation around the world.

The NFPA develops easy-to-use educational programs, tools, and resources for all ages and audiences, including Fire Prevention Week, an annual campaign that addresses a specific fire safety theme. The NFPA's Firewise Communities program (www.firewise.org) encourages local solutions for wildfire safety by involving homeowners, community leaders, planners, developers, firefighters, and others in the effort to protect people and property from wildfire risks.

The NFPA is a premier resource for fire data analysis, research, and analysis. The Fire Analysis and Research division conducts investigations of fire incidents and produces a wide range of annual reports and special studies on all aspects of the nation's fire problem.

National Interagency Fire Center

The National Interagency Fire Center (NIFC) provides a wide array of fire resources and services. The NIFC also has a training branch where training curriculums are developed to be used across the nation. For those too young to participate in the standard trainings, the NIFC offers FireWorks, an educational program designed for kids K-12. The program teaches children topics such as wildland fire science, ecosystem fluctuations, human interaction on the environment, and other environmental science topics (NIFC 2021c). The NIFC also provides public education resources such as the following (NIFC 2021d):

- Wildfire Readiness – Home
- Wildfire Readiness – Business

- Wildfire Readiness – Farm and Ranch
- Weekend Wildfire Preparedness
- What to Do if a Wildfire is Approaching
- Wildfire Risk – Community
- Prepare and Protect Your Home
- Prepare Your Community
- One Less Spark, One Less Wildfire
- Only You Can Prevent Wildfires

U.S. Fire Administration's WUI Toolkit

The U.S. Fire Administration is an entity of the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) that aids in the preparation for and response to fire. Their WUI toolkit consists of a list of websites and other information regarding risk assessment, public outreach, and community training. Find the toolkit here: https://www.usfa.fema.gov/wui_toolkit/wui_training.html.

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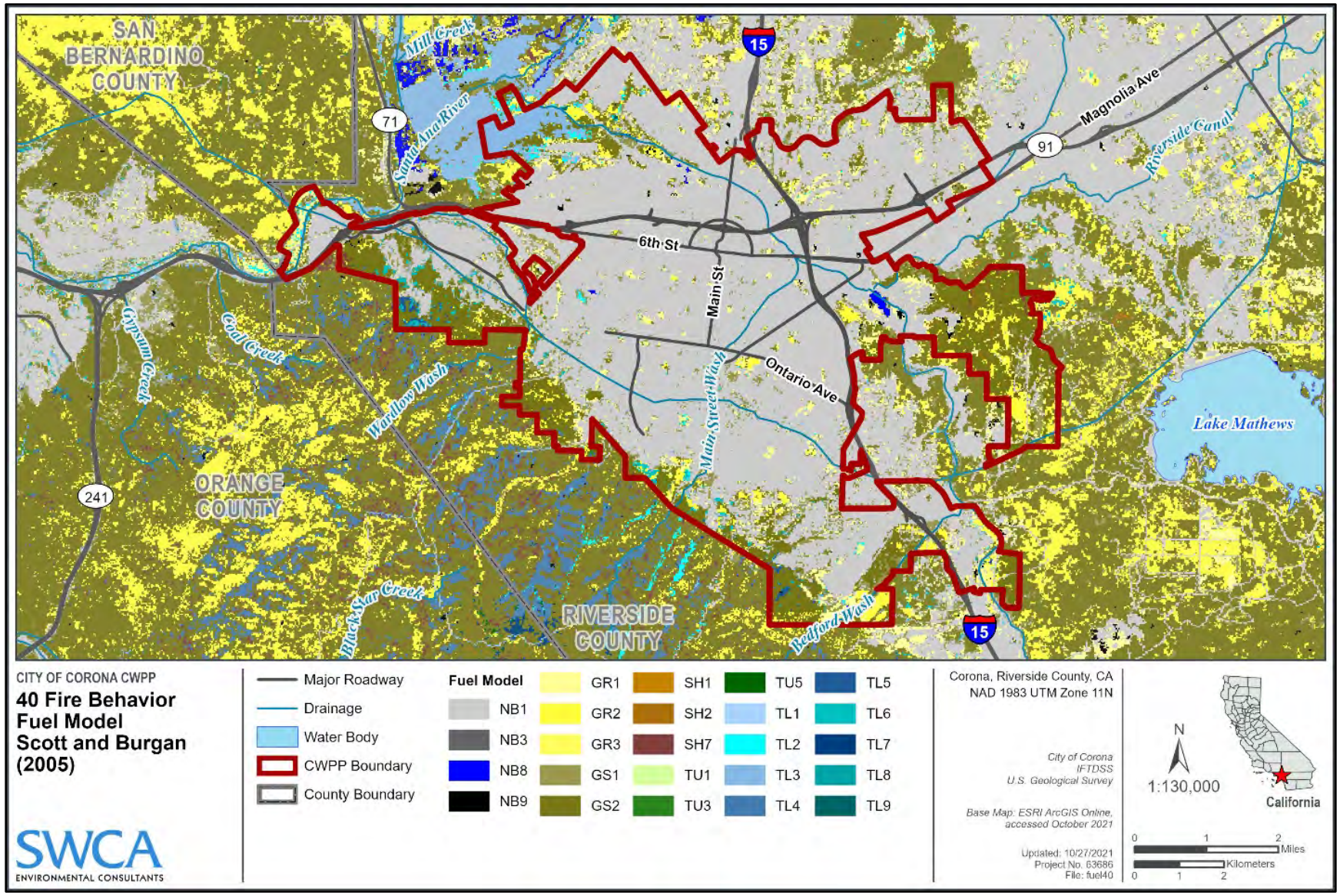
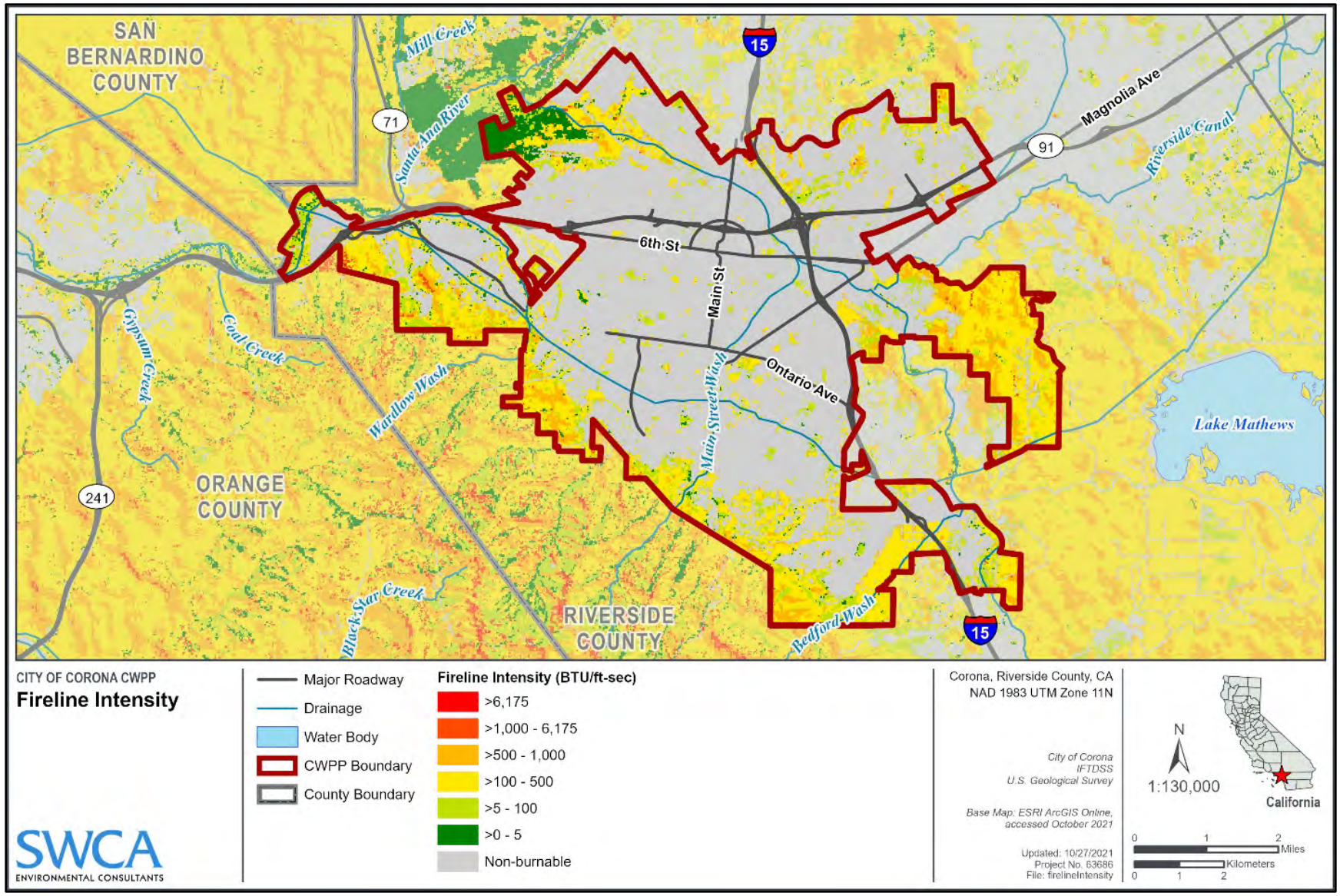
APPENDIX B:

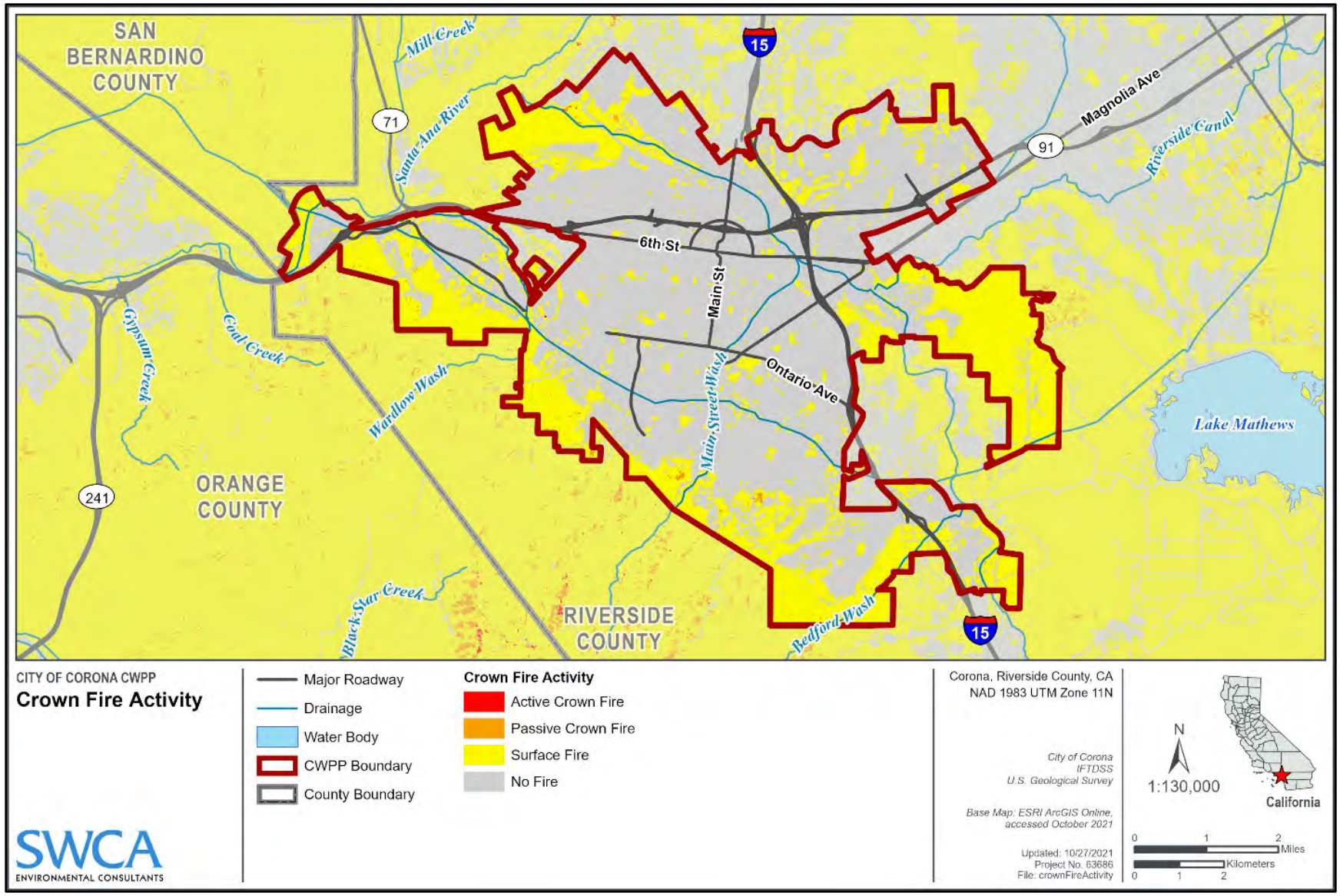
Additional Mapping



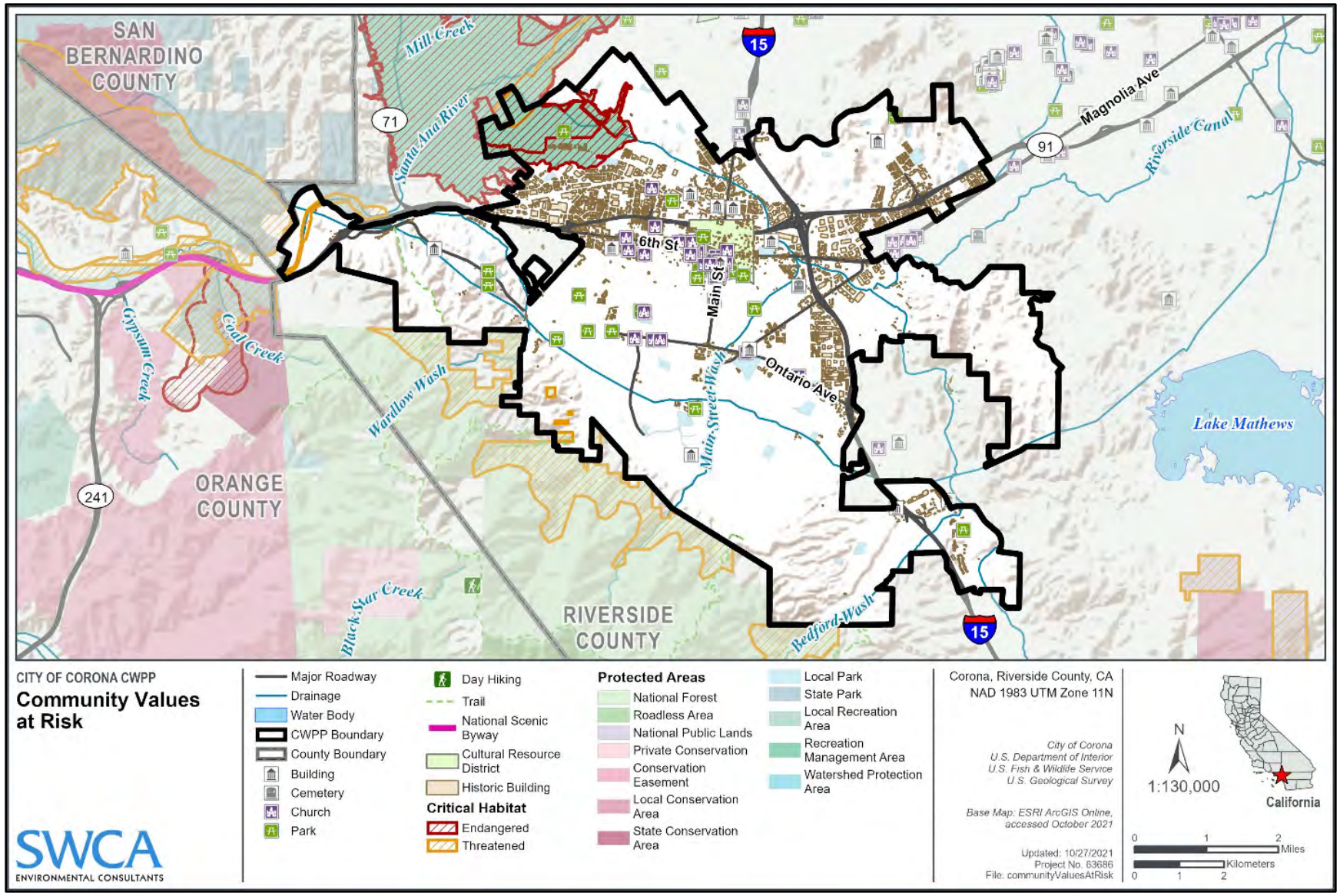
Map 1. Scott and Burgan 40 Fire Behavior Fuel Models.



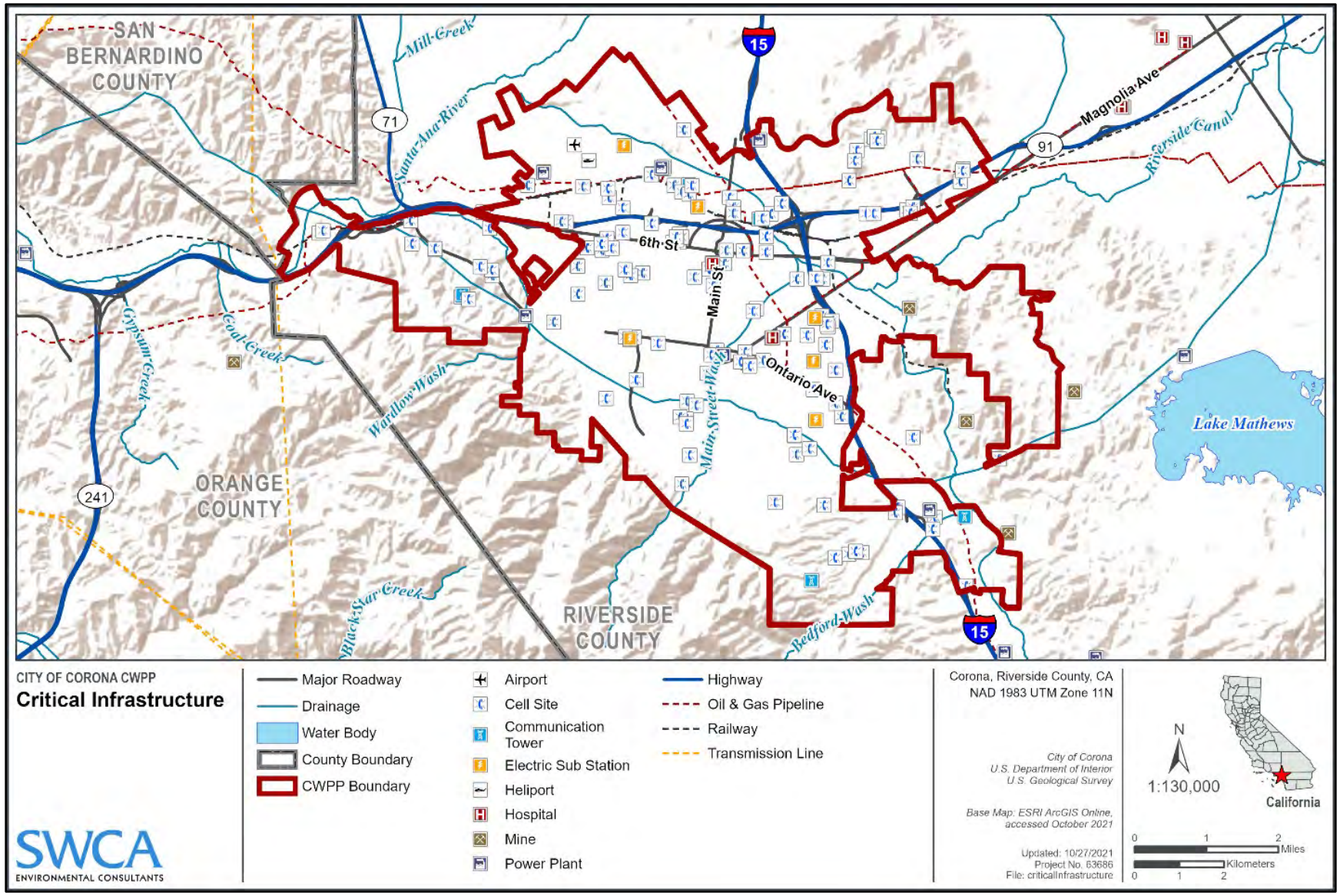
Map 2. Risk assessment inputs: fireline intensity.



Map 3. Risk assessment inputs: Crown Fire activity.



Map 4. Values at risk.



Map 5. Critical infrastructure.

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APPENDIX C:

Task Force List


SWCA

Name	Position	Organization
Chief Brian Young	Fire Chief	City of Corona
Deputy Chief Justin McGough	Deputy Fire Chief	City of Corona
Gina Moran-McGough	Emergency Services Coordinator	City of Corona
Cindi Schmitz	Fire Marshal	Cit of Corona
Chief Scott Grasmick	Acting Forest Fuels Officer	Cleveland National Forest
Jake Rodriguez	Recreation and Lands Officer	Cleveland National Forest
Cyrus Galvan	Trabuco Ranger District Fuels Technician	Cleveland National Forest
Chief Jeff Veik	Deputy Chief-West Operations	CAL FIRE – Riverside
Victoria Amato	Project Manager	SWCA Environmental Consultants
Arianna Porter	Assistant Project Manager	SWCA Environmental Consultants
Breanna Plucinski	Fire Planner	SWCA Environmental Consultants
Aaron Roper	GIS Specialist	SWCA Environmental Consultants

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APPENDIX D:

Wildland Fire Risk Assessment Matrix

CITY OF CORONA FIRE DEPARTMENT
735 PUBLIC SAFETY WAY • CORONA, CA 92880 • (951) 736-2220 • FAX (951) 736-2497
www.CoronaCA.gov

Wildland Fire Risk Assessment Matrix

Name of Assessed Area:

Date:
Inspector:

1. Subdivision Design	Points	Hazard	Mitigation	Notes:
a. Ingress and egress (Main Road)				
Two or more roads in/out	0			
One road in/out	25			
b. Road width (Main Road)				
Greater than 24 feet	0			
Between 20 and 24 feet	2			
Less than 20 feet wide	5			
c. All-season road condition (Main Road)				
Surfaced, grade less than 5%	0			
Surfaced, grade greater than 5%	2			
Non-surfaced, grade less than 5%	2			
Non-surfaced, grade greater than 5%	5			
Other than all-weather	5			
d. Fire Service Access (Driveways for SFR)				
Less than 300 ft, with turnaround	0			
Greater than 300 ft, with turnaround	2			
Less than 300 ft, no turnaround	4			
Greater than 300 ft, no turnaround	5			
e. Street signs (Main Road)		0		
Present (4 in. in size and reflectorized)	0			
Not present	5			
2. Vegetation (Fuel Models, 200 ft and beyond)	Points	Hazard	Mitigation	Notes:
a. Predominant vegetation				
Light (grass, forbs)	5			
Medium (light brush and small trees)	10			
Heavy (dense brush, timber and hardwoods)	20			
Slash (timber harvest residue)	25			
b. Defensible space (0 to 300 ft)				
More than 100 ft of fuel mod from building	0			
71-100 ft of fuel mod from the building	10			
30-70 ft of fuel mod from the building	25			
Less than 30 ft	50			

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3. Topography	Points	Hazard	Mitigation	Notes:
a. Slopes below structures				
Less than 9%	1			
Between 10-20%	4			
Between 21-30%	7			
Between 31-40%	8			
Greater than 41%	10			
b. Alignment with Wind				
General area does not align with predominant	0			
Portions of area align with winds	5			
Full alignment with diurnal winds	10			
Full alignment with Santa Ana winds	20			
4. Additional Rating Factors	Points	Hazard	Mitigation	Notes:
Topo that adversley affects wildland fire beh	0-5			
Area of history of higher fire occurence	0-5			
Area of unusually severe fire weather and wind	0-5			
Separation of adjacent structures	0-5			
5. Roofing Materials	Points	Hazard	Mitigation	Notes:
a. Construction material				
Class A roof (metal, tile) all	0			
Class B roof (composite) or Class A	3			
Class C roof (wood shingle) one or more	15			
6. Existing Building construction	Points	Hazard	Mitigation	Notes:
a. Materials (predominant)				
Noncombustible siding/deck	0			
Noncombustible siding/wood deck	5			
Some combustible siding and deck	10			
Mostof undersides/raised decks w/ comb mat	25			
b. Setback from slopes > 30%				
Not applicable	0			
More than 30 ft. to slope	1			
Less than 30 ft to slope	5			
c. Spark Arrestors				
Not applicable	0			
Some Chimneys do not have spark arrestors	5			
Wood burning outdoor BBQ/fire pits no arrestor	5			
d. Eaves				
All eaves are boxed or 1-hr fire protection	0			
Some eaves are boxed or 1-hr fire protection	5			
No eaves are boxed or 1-hr fire protection	10			

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e. Venting				
All vents protected with 1/8" noncomb mesh	0			
All vents protected with 1/4" noncomb mesh	5			
All vents protected with 1/2" noncomb mesh	8			
Some vents are unprotected	10			
f. Auxiliary Structures				
All fences, gazebos and trellis are 10 ft or more from the home or are constructed with noncombustible material.	0			
Some fences, gazebos and trellis are less than 10 ft from the home and constructed with combustible material	10			
7. Available Fire Protection	Points	Hazard	Mitigation	Notes:
a. Water source availabilty (onsite)				
1,000 GPM hydrants less than 1,000 ft apart	0			
1,000 GPM hydrants > 1,000 ft from interface	5			
Supply (500 GPM or more) > 1,000 from interface	10			
No water source (500 GPM) or more avaiable	30			
b. Fixed fire protection				
Sprinkler system all homes	0			
Sprinkler system more than 50% of homes	5			
None	10			
8. Utilities (Gas and Electric)	Points	Hazard	Mitigation	Notes:
a. Placement				
All underground utilities	0			
One underground, one aboveground	3			
All aboveground	5			
Total for Risk Assessments	Points	Hazard	Mitigation	Notes:
Total				

Low Hazard: <39 points
Moderate Hazard: 40-100 points
High Hazard: 101-150 points
Extreme Hazard: 151 + points

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APPENDIX E:

Funding Sources

FUNDING RESOURCES

The following section provides information on federal, State, and private funding opportunities for conducting wildfire mitigation projects.

FEDERAL FUNDING INFORMATION

Source: Pre-disaster Mitigation (PDM) Grant Program

Agency: Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA)

Website: http://www.fema.gov/government/grant/pdm/index.shtm

Description: The DHS includes FEMA and the U.S. Fire Administration. FEMA's Federal Mitigation and Insurance Administration is responsible for promoting pre-disaster activities that can reduce the likelihood or magnitude of loss of life and property from multiple hazards, including wildfire. The Disaster Mitigation Act of 2000 created a requirement for States and communities to develop pre-disaster mitigation plans and established funding to support the development of the plans and to implement actions identified in the plans. This competitive grant program, known as PDM, has funds available to State entities, tribes, and local governments to help develop multi-hazard mitigation plans and to implement projects identified in those plans. The Pre-Disaster Mitigation program is currently in process of transitioning to the Building Resilient Infrastructure and Communities (BRIC) program. BRIC will support States, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency. You can find more information on the BRIC program here: https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

Source: Hazard Mitigation Grant Program (HMGP)

Agency: FEMA

Website: https://www.fema.gov/grants/mitigation/hazard-mitigation

Description: The HMGP provides funding to State, local, tribal, or territorial governments (and individuals or businesses if the community applies on their behalf) to rebuild with the intentions to mitigate future losses due to potential disasters. This grant program is available after a presidentially declared disaster.

Source: Hazard Mitigation Grant Program (HMGP) – Post Fire

Agency: FEMA

Website: https://www.fema.gov/grants/mitigation/post-fire

Description: The HMGP Post Fire grant program provides assistance to communities for the purpose of implementing hazard mitigation measures following a wildfire. Mitigation measures may include:

- Soil stabilization
- Flood diversion
- Reforestation

Source: Flood Mitigation Assistance (FMA) Grant

Agency: FEMA

Website: https://www.fema.gov/grants/mitigation/floods

Description: The Flood Mitigation Assistance Program is a competitive grant program that provides funding to States, local communities, federally recognized tribes, and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program. FEMA chooses recipients based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project.

Source: Emergency Management Performance Grant (EMPG)

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/emergency-management-performance

Description: The EMPG program provides funding to State, local, tribal, and territorial emergency management agencies with the overall goal of creating a safe and resilient nation. The two main objectives of the program are 1) closing capability gaps that are identified in the State or territory's most recent Stakeholder Preparedness Review (SPR); and 2) building or sustaining those capabilities that are identified as high priority through the Threat and Hazard Identification and Risk Assessment (THIRA)/SPR process and other relevant information sources. The grant recipient and Regional Administrator must come to an agreement on program priorities, which are crafted based on National, State, and regional priorities.

Source: Fire Management Assistance Grant (FMAG)

Agency: FEMA

Website: https://www.fema.gov/assistance/public/fire-management-assistance

Description: Fire Management Assistance is available to State, local, and tribal governments for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands, which threaten such destruction as would constitute a major disaster. The Fire Management Assistance declaration process is initiated when a State submits a request for assistance to the FEMA Regional Director at the time a "threat of major disaster" exists. The entire process is accomplished on an expedited basis and a FEMA decision is rendered in a matter of hours. Before a grant can be awarded, a State must demonstrate that total eligible costs for the declared fire meet or exceed either the individual fire cost threshold, which applies to single fires, or the cumulative fire cost threshold, which recognizes numerous smaller fires burning throughout a State.

Source: Regional Catastrophic Preparedness Grants

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/regional-catastrophic

Description: The Regional Catastrophic Preparedness Grant program provides funding to increase collaboration and capacity in regard to catastrophic incident response and preparation.

Source: Emergency Forest Restoration Program (EFRP)

Agency: USDA Farm Service Agency (FSA)

Website: https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/emergency-forest-restoration/index

Description: The Emergency Forest Restoration Program (EFRP) helps the owners of non-industrial private forests restore forest health damaged by natural disasters. The EFRP does this by authorizing payments to owners of private forests to restore disaster damaged forests. The local FSA County Committee implements EFRP for all disasters with the exceptions of drought and insect infestations. Eligible practices may include debris removal, such as down or damaged trees; site preparation, planting materials, and labor to replant forest stand; restoration of forestland roads, fire lanes, fuel breaks, or erosion-control structures; fencing, tree shelters; wildlife enhancement.

To be eligible for EFRP, the land must have existing tree cover; and be owned by any nonindustrial private individual, group, association, corporation, or other private legal entity.

Source: Emergency Conservation Program (ECP)

Agency: USDA Farm Service Agency (FSA)

Website: https://www.fsa.usda.gov/programs-and-services/conservation-programs/emergency-conservation/index

Description: The Emergency Conservation Program (ECP) helps farmers and ranchers to repair damage to farmlands caused by natural disasters and to help put in place methods for water conservation during severe drought. The ECP does this by giving ranchers and farmers funding and assistance to repair the damaged farmland or to install methods for water conservation. The grant could be used for restoring conservation structures (waterways, diversion ditches, buried irrigation mainlines, and permanently installed ditching system).

Source: Environmental Quality Incentives Program (EQIP)

Agency: National Resources Conservation Service (NRCS)

Website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/co/programs/financial/eqip/

Description: The Environmental Quality Incentives Program (EQIP) is a voluntary program authorized under the Agricultural Act of 2014 (2014 Farm Bill) that helps producers install measures to protect soil, water, plant, wildlife, and other natural resources while ensuring sustainable production on their farms, ranches, and working forest lands.

Source: Emergency Watershed Protection (EWP) Program

Agency: NRCS

Website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/

Description: The program offers technical and financial assistance to help local communities relieve imminent threats to life and property caused by floods, fires, windstorms, and other natural disasters that impair a watershed.

Eligible sponsors include cities, counties, towns, conservation districts, or any federally recognized Native American tribe or tribal organization. Interested public and private landowners can apply for EWP Program recovery assistance through one of those sponsors.

EWP Program covers the following activities:

- Debris removal from stream channels, road culverts, and bridges
- Reshape and protect eroded streambanks
- Correct damaged drainage facilities
- Establish vegetative cover on critically eroded lands
- Repair levees and structures
- Repair conservation practices

Source: Funding for Fire Departments and First Responders

Agency: DHS, U.S. Fire Administration

Website: https://www.usfa.fema.gov/grants/

Description: Includes grants and general information on financial assistance for fire departments and first responders. Programs include the Assistance to Firefighters Grant Program, Reimbursement for Firefighting on Federal Property, State Fire Training Systems Grants, and National Fire Academy Training Assistance.

Source: Tribal Environmental General Assistance Program (GAP)

Agency: U.S. Environmental Protection Agency (EPA)

Website: https://www.epa.gov/tribal-pacific-sw/epa-region-9-tribal-environmental-gap-funding

Description: Funding under this program is used to aid Native American tribes in establishing and implementing their own reservation-specific environmental protection programs. To find out more about this funding opportunity please contact Tribal Branch Manager, Jeremy Bauer, at bauer.jeremy@epa.gov.

Source: Specific EPA Grant Programs

Agency: EPA

Website: https://www.epa.gov/tribal-pacific-sw/epa-region-9-tribal-environmental-gap-funding

Description: Various grant programs are listed under this site. Listed below are examples of grants offered:

- Multipurpose Grants to States and Tribes: https://www.epa.gov/grants/multipurpose-grants-States-and-tribes
- Environmental Education Grants: https://www.epa.gov/education/grants
- Environmental Justice Grants: https://www.epa.gov/environmentaljustice/environmental-justice-grants-funding-and-technical-assistance

Source: Conservation Innovation Grants (CIG)

Agency: NRCS

Website: https://www.nrcs.usda.gov/wps/portal/nrcs/site/ca/home/

Description: CIG State Component. CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program (EQIP) funds are used to award competitive grants to non-federal governmental or nongovernmental organizations, tribes, or individuals. CIG enables the NRCS to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with federal, State, and local regulations. The NRCS administers the CIG program. The CIG requires a 50/50 match between the agency and the applicant. The CIG has two funding components: national and State. Funding sources are available for water resources, soil resources, atmospheric resources, and grazing land and forest health.

Source: Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program

Agency: USFS

Website: https://www.fs.usda.gov/managing-land/urban-forests/ucf

Description: USFS funding will provide for Urban and Community Forestry Programs that work with local communities to establish climate-resilient tree species to promote long-term forest health. The other initiative behind this program is to promote and carry out disaster risk mitigation activities, with priority given to environmental justice communities. For more information, contact a USFS Regional Program Manager.

Source: Catalog of Federal Funding Sources; Land Resources

Agency: Multiple

Website: https://ofmpub.epa.gov/apex/wfc/f?p=165:512:6483383318137:::512::

Description: The Land Finance Clearing House is a catalogue of federal funding sources for all things land related.

Examples of the types of grants found at this site are:

- Forest and Woodlands Resource Management Grant: https://sam.gov/fal/a798ad78cac749639b48270db3e86fdc/view?index=cfda&page=2&organization_id=100011100
- Environmental Education Grant: https://www.epa.gov/education/grants
- Public Assistance Grant Program: https://www.fema.gov/assistance/public
- Hazard Mitigation Grant: https://www.fema.gov/grants/mitigation/hazard-mitigation

Source: Catalog of Federal Funding Sources; Water Resources

Agency: Multiple

Website: https://ofmpub.epa.gov/apex/wfc/f?p=165:12:6483383318137:::12::

Description: The Water Finance Clearing House is a catalogue of federal funding sources for all things water related.

Examples of the types of grants found at this site are:

- Water Conservation Field Services Program: https://www.usbr.gov/waterconservation/
- California Community Development Block Grant: https://www.hcd.ca.gov/grants-funding/active-funding/cdbg.shtml
- California Clean Water State Revolving Fund Program (CWSRF): https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/index.html

Source: Firewise Grants

Agency: Multiple

Website: http://www.firewise.org

Description: Many different Firewise Communities activities are available to help homes and whole neighborhoods become safer from wildfire without significant expense. Community cleanup days, awareness events, and other cooperative activities can often be successfully accomplished through partnerships among neighbors, local businesses, and local fire departments at little or no cost.

The kind of help you need will depend on who you are, where you are, and what you want to do. Among the different activities that individuals and neighborhoods can undertake, the following often benefit from seed funding or additional assistance from an outside source:

- Thinning/pruning/tree removal/clearing on private property—particularly on very large, densely wooded properties
- Retrofit of home roofing or siding to non-combustible materials
- Managing private forest
- Community slash pickup or chipping
- Creation or improvement of access/egress roads
- Improvement of water supply for firefighting
- Public education activities throughout the community or region

Source: The National Fire Plan (NFP)

Agency: U.S. Department of the Interior and USDA

Website: http://www.forestsandrangelands.gov/

Description: Many States are using funds from the NFP to provide funds through a cost-share with residents to help them reduce the wildfire risk to their private property. These actions are usually in the form of thinning or pruning trees, shrubs, and other vegetation and/or clearing the slash and debris from this kind of work. Opportunities are available for rural, State, and volunteer fire assistance.

Source: Staffing for Adequate Fire and Emergency Response (SAFER)

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/firefighters/safer

Description: The purpose of SAFER grants is to help fire departments increase the number of frontline firefighters. The goal is for fire departments to increase their staffing and deployment capabilities and ultimately attain 24-hour staffing, thus ensuring that their communities have

adequate protection from fire and fire-related hazards. The SAFER grants support two specific activities: (1) hiring of firefighters and (2) recruitment and retention of volunteer firefighters. The hiring of firefighters activity provides grants to pay for part of the salaries of newly hired firefighters over the five-year program.

Source: The Fire Prevention and Safety Grants (FP&S)

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/firefighters/safety-awards#:~:text=Awards%20%20%20%20Organization%20%20%20,%20%20%241%2C499%2C957%20%2016%20more%20rows%20

Description: FP&S offers support to projects that enhance the safety of the public and firefighters who may be exposed to fire and related hazards. The primary goal is to target high risk populations and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire-prevention and public-safety education campaigns, juvenile fire-setter interventions, media campaigns, and arson prevention and awareness programs. In fiscal year 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include firefighter safety research and development.

Source: GSA-Federal Excess Personal Property

Agency: USFS

Website: https://gsaxcess.gov/

Description: The Federal Excess Personal Property (FEPP) program refers to USFS-owned property that is on loan to State Foresters for the purpose of wildland and rural firefighting. Most of the property originally belonged to the Department of Defense (DoD). Once acquired by the USFS, it is loaned to State Cooperators for firefighting purposes. The property is then loaned to the State Forester, who may then place it with local departments to improve local fire programs. State Foresters and the USFS have mutually participated in the FEPP program since 1956.

Source: Assistance to Firefighters Grants (AFG)

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/firefighters.

Description: The AFG program provides resources to assist fire departments in attaining critical resources such as training and equipment.

STATE FUNDING INFORMATION

Source: CALFIRE Grant Programs

Agency: CALFIRE

Website: https://www.fire.ca.gov/grants/

Description: The CALFIRE Grant Program offers a range of forest-related grants with differing scopes and funding details. Some of the Grants include:

- Forest Health Grants: https://www.fire.ca.gov/grants/forest-health-grants/

- California Forest Improvement Program: https://www.fire.ca.gov/grants/california-forest-improvement-program-cfip/
- Fire Prevention Grants Program: https://www.fire.ca.gov/grants/fire-prevention-grants/
- Urban & Community Forestry Grant Programs: https://www.fire.ca.gov/grants/urban-and-community-forestry-grant-programs/
- Wildfire Resilience and Forestry Assistance Grant- Prop 68: https://www.fire.ca.gov/programs/resource-management/resource-protection-improvement/landowner-assistance/forest-stewardship/

Source: California Fire Safe Council Grant Programs

Agency: California Fire Safe Council

Website: https://cafiresafecouncil.org/grants-and-funding/apply-for-a-grant/

Description: The California Fire Safe Council provides a range of federal, State, and private funding sources in addition to administering the USFS State Fire Assistance (SFA) Grant Programs.

Source: California Environmental Protection Agency (EPA) Loans and Grants

Agency: Multiple

Website: https://calepa.ca.gov/loansgrants/

Description: The California EPA Loans and Grants hosts a wide variety of California EPA grants specifically for California. While these funding sources may not tie directly to fuel management or fire recovery, there is a wide array of funding opportunities for water and air resources which are directly impacted by wildfire.

Source: Northern California Forests and Watersheds Program

Agency: Multiple

Website: https://www.nfwf.org/programs/northern-california-forests-and-watersheds

Description: The National Fish and Wildlife Foundations and the USFS have partnered to restore and enhance National Forests and watersheds affected by wildfires in northern California. This program will administer an initial $6 million in grants to projects that increase wildfire resiliency for northern California National Forests and watersheds.

Source: Adaptation Clearinghouse

Agency: Multiple

Website: https://resilientca.org/

Description: This resource has numerous wildfire-related resources such as funding opportunities, assessments, case studies, educational materials, data and tools, example plans and strategies, and additional policy guidance.

Source: State of California's Grants Portal

Agency: Multiple

Website: https://www.grants.ca.gov/

Description: The California Grants Portal helps users identify the latest grants that could support fire hazard planning or related implementation efforts that support wildfire risk mitigation, fuels management, and other related projects.

Source: California Air Resources Board Funding Wizard

Agency: Multiple

Website: https://fundingwizard.arb.ca.gov/web/

Description: The Funding Wizard aggregates current federal, State, regional, private, and other funding opportunities for environmental and sustainability projects.

Source: Wildfire Resilience Program

Agency: California State Coastal Conservancy

Website: https://scc.ca.gov/wildfire-resilience-program/

Description: The Wildfire Resilience Program supports local partners to develop and apply projects that improve forest health and minimize the risk of catastrophic fire in areas where people are living near wildlands. Eligible projects include outreach, education, and training, as well as preparation of Regional Priority Plans that identify and prioritize for fire protection and forestry improvement projects.

PRIVATE FUNDING INFORMATION

Source: State Farm Good Neighbor Citizenship Grants

Agency: State Farm

Website: https://www.Statefarm.com/about-us/corporate-responsibility/community-grants/good-neighbor-citizenship-grants

Description: State Farm funding is directed at:

- Auto and roadway safety
- Teen Driver Education
- Home safety and fire prevention
- Disaster preparedness
- Disaster recovery

Source: The Urban Land Institute (ULI)

Website: http://www.uli.org

Description: ULI is a 501(c)(3) nonprofit research and education organization supported by its members. The institute has more than 22,000 members worldwide, representing the entire spectrum of land use and real eState development disciplines, working in private enterprise and public service. The mission of the ULI is to provide responsible leadership in the use of land to enhance the total environment. ULI and the ULI Foundation have instituted Community Action Grants that could be used for Firewise Communities activities. Applicants must be ULI members or part of a ULI District Council. Contact actiongrants@uli.org or review the web page to find your District Council and the application information.

Source: Environmental Systems Research Institute (ESRI)

Website: http://www.esri.com/grants

Description: ESRI is a privately held firm and the world's largest research and development organization dedicated to geographic information systems. ESRI provides free software, hardware, and training bundles under ESRI-sponsored Grants that include such activities as conservation, education, and sustainable development, and posts related non-ESRI grant opportunities under such categories as agriculture, education, environment, fire, public safety, and more. You can register on the website to receive updates on grant opportunities.

Source: National Forest Foundation; Innovative Finance for National Forests Grant Program

Website: https://www.nationalforests.org/grant-programs/innovative-finance-for-national-forests-grant-program

Description: The Innovative Finance for National Forests Grant Program aims to bring in non-USFS funds to increase forest resilience. There are three main topics for funding: Wildfire Resilience and Recovery, Sustainable Recreation Access and Infrastructure, and Watershed Health. In addition, three types of projects are funded. Pilot Programs with on-the-ground implementation, Scaling Projects to deliver backlogs of unfunded work, and Research and Development to provide to new forest information.

Source: StEPP Foundation

Website: https://steppfoundation.org/

Description: StEPP is a 501(c)(3) organization dedicated to helping organizations realize their vision of a clean and safe environment by matching projects with funders nationwide. The StEPP Foundation provides project oversight to enhance the success of projects, increasing the number of energy efficiency, clean energy, and pollution prevention projects implemented at the local, State, and national levels for the benefit of the public. The website includes an online project submittal system and a Request for Proposals page.

Source: Matching Awards Program

Agency: National Forest Foundation (NFF)

Website: https://www.nationalforests.org/grant-programs/map

Description: The NFF is soliciting proposals for its Matching Awards Program (MAP) to provide funds for direct on-the-ground projects benefitting America's National Forests and Grasslands. By pairing federal funds provided through a cooperative agreement with the USFS with non-federal dollars raised by award recipients, MAP measurably multiplies the resources available to implement stewardship projects that benefit the National Forest System.

Source: Patagonia Environmental Grants and Support

Agency: Patagonia

Website: https://www.patagonia.com/how-we-fund/

Description: Patagonia supports innovative work that addresses the root causes of the environmental crisis and seeks to protect both the environment and affected communities. Patagonia focuses on places where they have built connections through outdoor recreation and through their network of retail stores, nationally and internationally.

Source: Leonardo DiCaprio Foundation Grants

Agency: Leonardo DiCaprio Foundation

Website: https://www.rewild.org/

Description: The foundation supports projects around the world that build climate resiliency, protect vulnerable wildlife, and restore balance to threatened ecosystems and communities.

Source: U.S. Endowment for Forestry and Communities

Agency: EPA, NRCS, USFS, U.S. Department of Defense, U.S. Economic Development Agency

Website: https://www.usendowment.org/

Description: As the nation's largest public charity dedicated to keeping our working forests working and ensuring their bounty for current and future generations, the Endowment deploys the creativity and power of markets to advance their mission: The Endowment works collaboratively with partners in the public and private sectors to advance systemic, transformative and sustainable change for the health and vitality of the nation's working forests and forest-reliant communities.

OTHER FUNDING INFORMATION

The following resources may also provide helpful information for funding opportunities:

- Western Forestry Leadership Coalition: https://www.thewflc.org/
- USDA Information Center: https://www.nal.usda.gov/main/information-centers
- USFS Fire Management website: http://www.fs.fed.us/fire/
- Insurance Services Office Mitigation Online (town fire ratings): http://www.isomitigation.com/
- National Fire Protection Association: http://www.nfpa.org
- National Interagency Fire Center, Wildland Fire Prevention/Education: https://www.nifc.gov/fire-information/fire-prevention-education-mitigation
- DHS U.S. Fire Administration: https://www.usfa.fema.gov/index.html

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APPENDIX F:

Community Outreach


SWCA

PUBLIC OUTREACH

Table F.1 presents examples of the public outreach completed as part of the CWPP development. Figures F.1 through F.3 show examples of online posts.

Table F.1. Public Outreach Resources

Resource Description	Location	URL	Figure Number	Date Published
Social Media Posts	Facebook, Instagram, Twitter	N/A	F.1–F.3	September 2021
Video Announcement	YouTube, Facebook, Instagram, Twitter	Link	F.3	August 5, 2021
Press Release	City of Corona Website	Link	F.4	August 10, 2021
CWPP Flyer	City of Corona Website	Link	F.5	August 4, 2021
ArcGIS Story Map	City of Corona Fire Department Webpage	Link	F.6–F.9	August 10, 2021

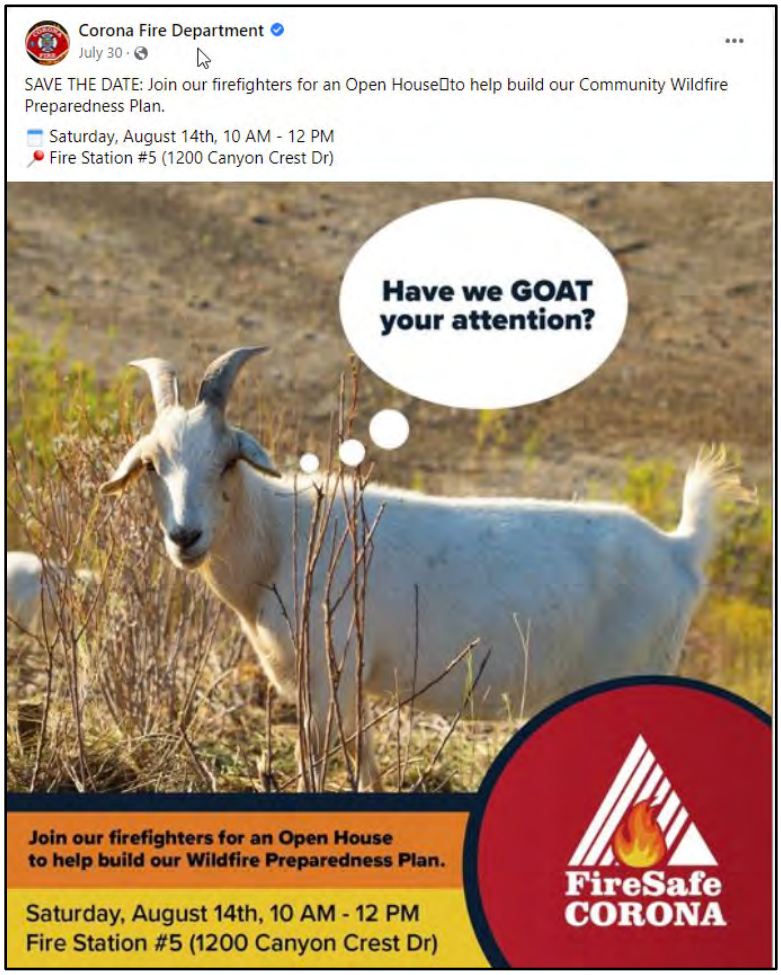

Figure F.1. CWPP outreach event save the date post.

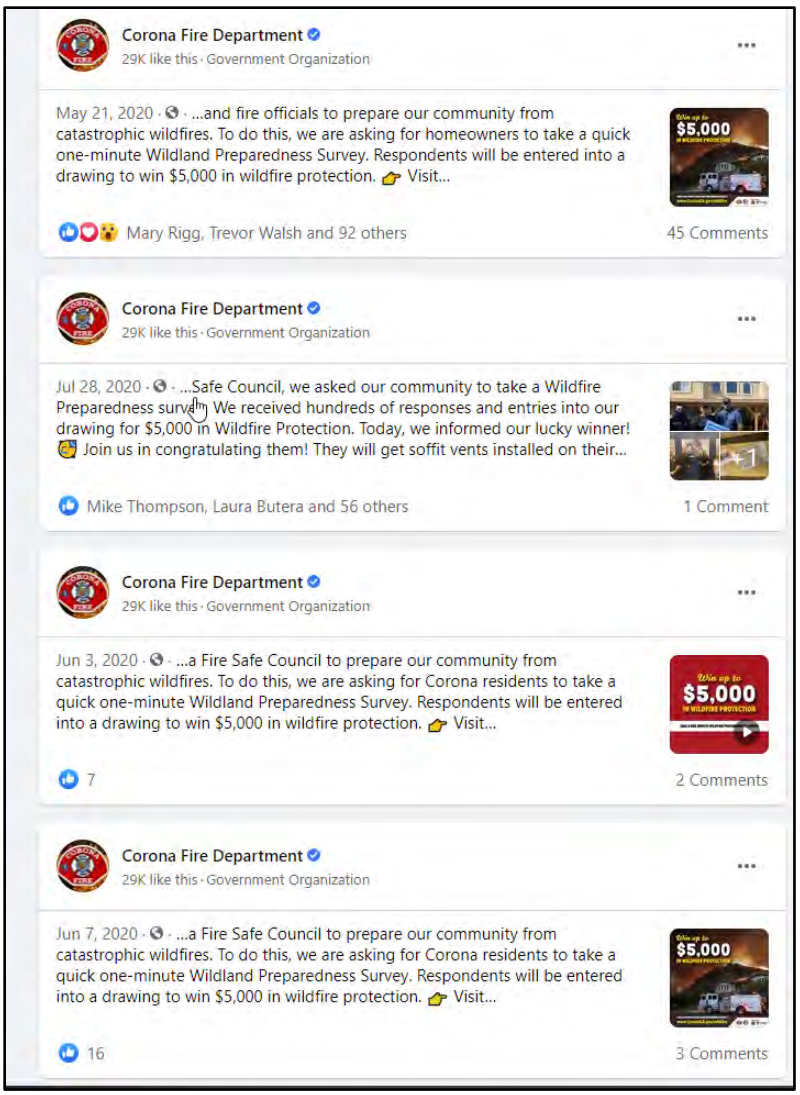

Figure F.2. CWPP survey and home hardening drawing posts.

Figure F.3. CWPP announcement video.

PRESS RELEASE

Corona Fire Department

CITY OF CORONA 951-736-2220 | www.CoronaCA.gov

August 10, 2021

For Immediate Release

CITY OF CORONA COMMUNITY WILDFIRE PROTECTION PLAN

Corona, CA – The City of Corona has contracted SWCA Environmental Consultants to develop the 2021 City of Corona Community Wildfire Protection Plan (CWPP) in coordination with regional stakeholders. A CWPP is a plan designed to identify and mitigate wildfire hazards to communities and infrastructure located in the wildland-urban interface (WUI), which is an area located between wildland and occupied communities. The CWPP makes recommendations for hazardous fuels reduction, public outreach and education, structural ignitability reduction, and fire response capabilities.

The development of the City's CWPP is founded in facilitated collaboration among local, state, and federal officials, as well as non-governmental stakeholders and private citizens. The CWPP is designed to assist the City and landowners in ensuring that a future catastrophic wildfire is mitigated by assessing areas at risk and recommending measures to decrease those risks. The CWPP acknowledges the City is surrounded by a fire prone environment with significant fire history. The Community Wildland Protection Plan enhances community preparedness and readiness for City residents.

The City is interested in your involvement and participation in the planning process and will be hosting a Community Wildfire Protection Plan Fire Department Open House at Fire Station #5, located at 1200 Canyon Crest Dr, Corona, CA 92882 on **August 14th from 10 a.m. to 12 p.m.**, where Core Team members will be sharing information about the wildfire risk assessment; gathering feedback from residents about wildfire concerns; providing information on mitigation measures homeowners can take to address wildfire risk; and soliciting feedback from the community on actions that the City could take to improve wildfire preparedness.

Later this Fall, the public will be invited to provide feedback and input on the Draft Plan.

In order to encourage public engagement in the planning process, the City has chosen to use an ArcGIS Hub Site as a communication tool to provide information and gather community input about the project. Within this Hub Site there will be a Story Map, an interactive project website designed to tell a story with maps. Together these resources will provide a platform for the Plan and will facilitate easy updates of information as conditions change in the City. The Hub Site can be found at [https://corgis.coronaca.gov/cwpp].

The CWPP will be a guiding document for fire and emergency managers, as well as agencies who manage land within the City. The CWPP is designed to serve City of Corona residents, and we encourage your interest and engagement in the process. For more information, please contact the Corona Fire Safe Council at firesafecorona@coronaca.gov.

Media Contact
Cindi Schmitz
Fire Marshal, Corona Fire Department
951-736-2464
Cindi.Schmitz@CoronaCA.gov

Figure F.4. CWPP press release.

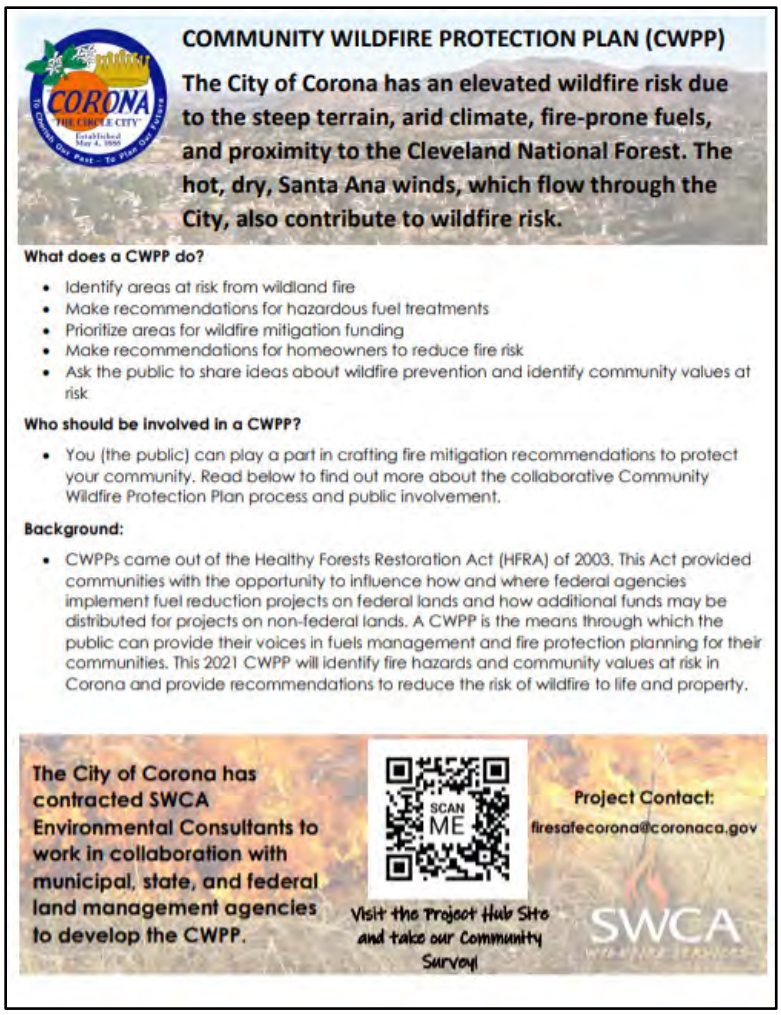

Figure F.5. CWPP flyer.

STORY MAP

The City of Corona developed the CWPP story map (online content, link in Table G.1) to accommodate engagement with the public. The story map provides opportunities for both information sharing and gathering between the public and the Task Force. The story map has several tabs, each demonstrating information from various chapters in the CWPP document. The introductory tab presents the purpose of the story map, project history, instructions for navigating the content, and the National Cohesive Wildland Fire Management Strategy framework (Figure F.6). Next, the public involvement tab invites viewers to view the City of Corona CWPP video announcement, participate in the CWPP community survey, and view the CWPP informational flyer. The fire environment, values at risk, WUI hazard and risk assessment, mitigation strategies, and monitoring and evaluation strategies tabs present the bulk of the CWPP content (Figures F.6–F.8). These tabs introduce the WUI concept, fire regimes and fire history in the city, information regarding city fire planning and response, city values at risk from wildfire, areas with high versus low risk, wildfire mitigation actions, and monitoring strategies for applied treatments.

The story map also links the viewer to the CWPP document and contact information for the City of Corona contractor planning team. The figures below (F.6–F.8) demonstrate the spatial information that is conveyed through the story map. Each map is interactive, with several clickable layers providing information on numerous aspects of wildfire, including but not limited to communities in high-risk areas, vegetation and fuels, current mitigation projects, and fire behavior.

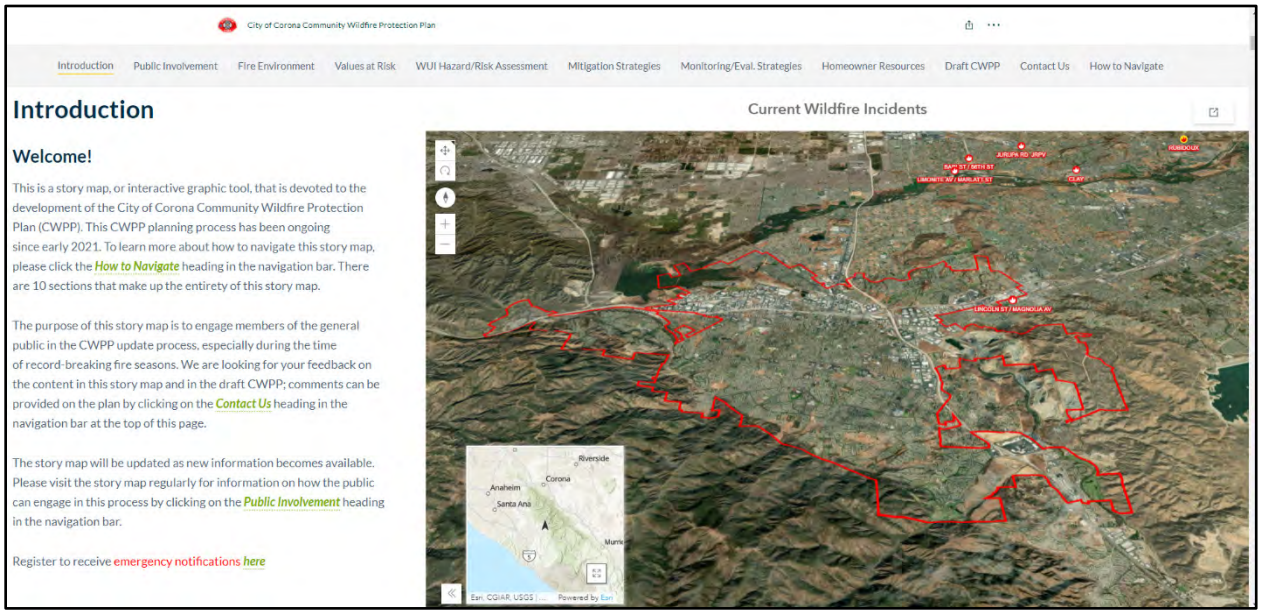

Figure F.6. CWPP story map introduction tab sample.

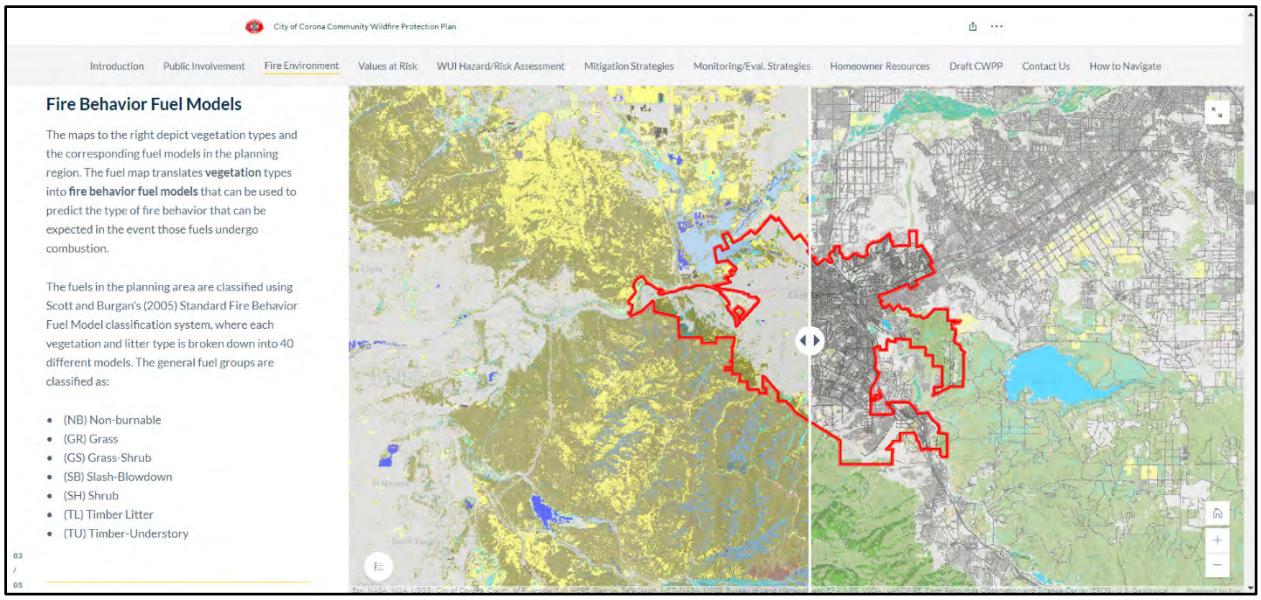

Figure F.7. Story map fire behavior fuel models tab sample.

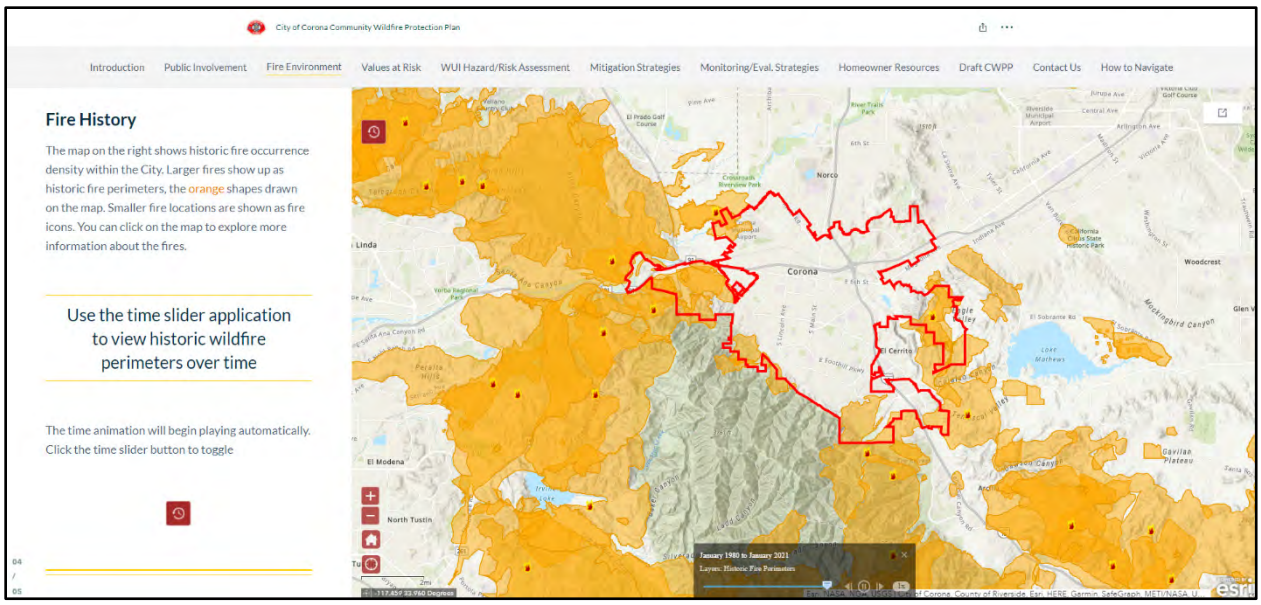

Figure F.8. Story map fire history tab sample.

The story map tool allowed the project team to assess the number of views per day. Figure F.9 shows the average number of views per day and related graphical information. The number of views from August 10, 2021 (when the story map was originally posted for Task Force review) through January 4, 2022 (the public comment period closed on 12/23/21) was 1,399, and the average number of views per day was just over 9 (see Figure F.9).

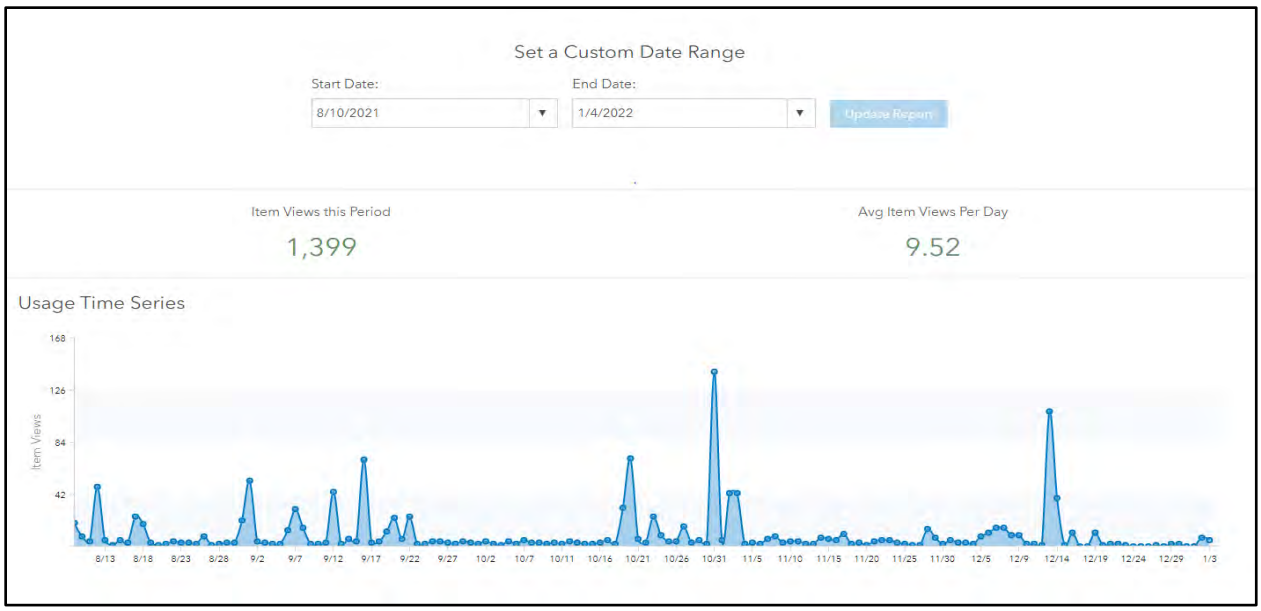

Figure F.9. Story map views from August 10, 2021, through January 4, 2022.

APPENDIX G:

Mitigation Recommendations

Table G.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Treatments)

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/ Maintenance Requirements	Funding Sources
1		Increase capacity to complete and maintain needed hazardous fuels projects across multiple jurisdictions	PS-9.5- Work cooperatively with City of Corona departments, community groups, and individual homeowners to ensure that vegetation management is being maintained in the designated fuel modification areas.	City and adjacent state and federal lands (public and private)	State and Local	• Collaboratively identify vegetation and fuels management needs based on the risk/hazard assessment. • Develop equipment needs to accomplish work (including maintenance) and seek funding for purchase. • Create an educational tool for land /property owners re: various methods, techniques, and cost for various fuel treatments. • Cultivate and support partnerships with NGOs and volunteer groups to support implementation of projects. • Encourage residents to submit “overgrown vegetation issue” reports via the City of Corona’s eTRAKIT site. • Continue with the Fire Departments annual weed abatement program.	• Create resilient landscapes and address potential for extreme wildfire behavior in and around the WUI. • Create and maintain accountability with local landowners.	Winter 2022	H	• Set up a standing multi-agency meeting every fall to review accomplishments and address future needs.	• PDM Grant Program • HMGP • HMGP – Post Fire • FMAG • Regional Catastrophic Preparedness Grants • Specific EPA Grant Programs • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • Firewise Communities • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs • Tribal Environmental General Assistance Program (GAP) • National Fire Plan (NFP) • Patagonia Environmental Grants and Support • Funding for Fire Departments and First Responders • GSA-Federal Excess Personal Property • Assistance to Firefighters Grants (AFG) • National Interagency Fire Center (NIFC)
2		Collaborate with local HOAs to develop fuel break measures and associated access improvements for increased community protection.		City Prioritize highest risk areas as identified in the risk assessment.		To ensure defensible space in WUI will be maintained require property owners and HOAs to establish sufficient structure clearance around all structures. • Work with HOAs to identify needed access improvements. • Conduct periodic site inspections.	• Create resilient landscapes and address potential for extreme wildfire behavior in and around communities. • Create and maintain accountability with local landowners.	Second half of 2022/ Ongoing	H	• Carry out a 2-year review of accomplishments in improving defensible space. • Repeat NFPA1144 assessments every 5 years to document improvements in defensible space.	• Agency budgets • Firewise Communities • CAL FIRE Grant Programs • California Fire Safe Council Grant Programs

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/ Maintenance Requirements	Funding Sources
3		Identify mitigation projects within areas of high exposure potential	PS-10.6- Require fuel modification plans and vegetation clearance standards for development in very high fire hazard severity zones to protect structures from wildfire, protect wildlands from structure fires, and provide safe access routes for the community and firefighters within the project boundary, which may be extended pursuant to required findings when in accordance with state law, local ordinance, rule or regulation and no feasible mitigation measures are possible.	Prioritize highest risk areas as identified in the risk assessment.	State and Local	Utilize the fire behavior modeling to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire responders could more safely suppress future wildfire. Focus on following treatments: • Removing ladder fuels to reduce extreme fire behavior, intensity, and rates of spread. • Carry out understory vegetation management to minimize surface to canopy continuity. • Treat small patches of land tucked into residential areas. • Create mosaics of vegetation types and stand ages to reduce horizontal and vertical continuity of vegetation to limit fire spread. • Prepare to treat fine fuels that establish in fuel treatment areas. Preferentially treat hazardous fuel types first- e.g., chapparal.	• Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential. • Consider a full tool kit of mitigation measures.	Second half of 2022/ Ongoing	H	• Carry out a 2-year review of accomplishments in reducing hazardous fuels. • Calibrate fuel model based on treatment effectiveness at altering fuel loading. • Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.	• PDM Grant Program • HMGP • HMGP – Post Fire • FMAG • Regional Catastrophic Preparedness Grants • Specific EPA Grant Programs • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • Firewise Communities • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs
4		Inspect Firewise treatments on individual properties/ structures		All	City	Conduct Firewise Community-based assessments of individual homes. The professional assessment would help identify the most critical actions that an individual could take. Assessments could also include marking trees and shrubs suggested for removal.	• Reduce risk of home ignitions. • Empower homeowners to take the most effective actions. • Allow funding to address a larger number of homes.	Second half of 2022/ Ongoing	H	• Conduct on-site inspections with owners; identify and mark trees or shrubs for removal within the 100-foot safety zone. • Develop a community task force to carry out assessments of properties.	• Agency budgets • HMGP – Post Fire • Emergency Management Performance Grant (EMPG) • FMAG • Specific EPA Grant Programs • Firewise Communities • NFP • Fire Prevention and Safety (FP&S) grants • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs • State Farm Good Neighbor Citizenship Grants
5		Identify needed road maintenance and strategic road buffers		Highest-risk roadways as identified in the risk assessment.	City, County, State, Interstate	<u>Roadway improvements:</u> • While increasing roadway width may not be feasible in many locations, creation of passing areas where possible should be prioritized • Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing) <u>Road right-of-way vegetation improvements:</u> • Frequent maintenance of right-of-way. • Treat surface fuels for a minimum 10-foot buffer and up to 30 feet where possible. • Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles. • Control for invasive species that may contribute to rapid fire spread (i.e., weeds and grasses).	• Provide for safe and effective wildfire response capabilities • Create a strategic fuel break along roadways to create potential firebreak	Ongoing	H	• Regular maintenance needed to ensure the roads are drivable for emergency response vehicles.	• Pre-disaster Mitigation (PDM) Grant Program • Hazard Mitigation Grant Program (HMGP) • Hazard Mitigation Grant Program (HMGP) – Post Fire • Fire Management Assistance Grant (FMAG) • Regional Catastrophic Preparedness Grants • Specific U.S. Environmental Protection Agency (EPA) Grant Programs • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • Firewise Communities • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/ Maintenance Requirements	Funding Sources
6		Protect rare species habitats		City and adjacent state and federal lands (public and private)	Local/State/ Federal	Work with land management agencies to ensure all fuels treatments are aligned with environmental regulations relating to protection of sensitive species.	• Balance the reduction of hazardous fuels with the protection of highly sensitive resources.	Ongoing	H	• Monitor accomplishments in addressing species protections while reducing wildfire risk.	• Agency budgets
7		Improve and maintain existing fuel breaks and potential fire containment features	PS-9.6- Work cooperatively with CAL FIRE, USFS, Department of Corrections, and other agency stakeholder to advocate for the installation and maintenance of fire breaks in wildland areas surrounding the City of Corona.	Highest-risk areas as identified in the risk assessment.	City, County, State, Federal	Strategic placement of fuel breaks will help to limit the spread of wildland fire and increase access to difficult areas. Fuel break prescriptions should be site specific depending on the fuel type, topography, soils, adjacent land management practices and environmental regulations (NEPA/California Environmental Quality Act). The prescriptions will incorporate use of best management practices for habitat protection (i.e., protection of vulnerable species and habitat and prevention of invasive species). • Look for opportunities to develop and/or increase fire breaks to double as access within the WUI or difficult to access areas and look for opportunities to widen some public trails to better serve as fuel breaks/fire access roads on lands adjacent to WUI. • Encourage clearance of an additional width when possible. • Create additional buffer zones between existing development and the forest, ensuring fire suppression access. Maintain existing fire breaks and buffers (Figure 4.1). • Work with adjacent landowners to develop internal capacity to help enhance fire access-through road and trail improvements on those lands.	• Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. • Create a fuel arrangement unlikely to support crown fire • Ensure the protection of vulnerable ecosystems and values at risk.	Ongoing	M	• Regular maintenance needed to ensure the fuel break remains clear of vegetation. • Monitor for invasive species. • Continued management of fire breaks maintained by grazing, brush breaking, controlled burns.	• PDM Grant Program • HMGP • HMGP – Post Fire • FMAG • Regional Catastrophic Preparedness Grants • Specific EPA Grant Programs • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • Firewise Communities • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs
8		Integrate wildfire management with meeting other resource management objectives		State and Public Lands	USFS/ County/ City	• Leverage information from the development of the CWPP and the hazard mitigation plan to combine fuel reduction and habitat restoration projects. • Maximize funding sources through integrating fuel projects with other land management goals, including ecological restoration, habitat improvements and recreation.	• Restore degraded landscapes to build a more resilient fire environment.	Ongoing	M	• Periodic review of accomplishments in reducing hazardous fuels and success at meeting other resource management objectives.	• Agency Budgets
9		Consider use of prescribed burning where appropriate		Cleveland National Forest SRA	USFS CAL FIRE	• Utilize prescribed burn planning that follows agency and regulator protocols. • Closely follow plan prescriptions. • Utilize prescribed burn program to provide training for local fire department personnel and volunteers.	• Protect communities and infrastructure by reducing fuel loads. • Increase capacity and training for fire departments.	Ongoing	M	• Carry out inventory each year of number and acreage of prescribed fire completed. • Collaboratively set goals for upcoming year. • Establish training needs and funding.	• PDM Grant Program • HMGP • FMAG • Funding for Fire Departments and First Responders • AFG • CAL FIRE Grant Programs

Table G.2. Recommendations for Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
1		Establish a Fire Safe Council		City of Corona	City Fire Department	• Work with California Fire Safe Council to establish.	• Reduce wildfire risk through by raising awareness and providing education to community members in addition to aiding in fuel mitigation projects.	End of 2022	H	• Yearly updates to educational materials if necessary	• Agency budgets • Firewise Communities • California Fire Safe Council Grant Programs • FP&S grants • NIFC
2		Identify **vulnerable populations** located in the WUI	PS- 9.7- Encourage and provide fire safety education and support programs for residents of all ages to promote participation, fire prevention, voluntary compliance, and community awareness/ preparedness	Prioritize high-risk areas	Fire Department, HOAs, community leaders	• The City of Corona needs to identify vulnerable populations (elderly, disabled, low income) who may need additional help to mitigate home hazards and to evacuate during a wildfire. • Utilize the Integrated Climate Adaptation and Resiliency Program resource guide- Defining Vulnerable Communities in the Context of Climate Adaptation (ca.gov) • Seek grant opportunities to support assistance for vulnerable populations.	• Protect life and property of the most vulnerable members of the community.	Second half of 2022/ Ongoing	H	• Annual review of number of actions taken to address vulnerable populations	• Agency budgets • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • Firewise Communities
3		Identify **evacuation Routes**		All communities where appropriate. Prioritize high-risk areas based on risk assessment	Fire Department/ GIS/Maintenance Services	• Identify parcel-owners along primary evacuation routes. • Seek grant opportunities to support priority project implementation.	• Protect life and lessen high-risk fire behavior along important roads. • Fuel treatments adjacent to roads can reduce fire behavior along important travel routes used for ingress by emergency vehicles and egress by residents.	Second half of 2022	H	• Annual Maintenance	• PDM Grant Program • HMGP • EMPG • Regional Catastrophic Preparedness Grants • Fire Management Assistance Grant (FMAG) • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • CAL FIRE Grant Programs • Wildfire Resilience Program • State Farm Good Neighbor Citizenship Grants • National Forest Foundation; Innovative Finance for National Forests Grant Program
4		Improve enforcement of **Defensible Space** Standards	PS-9.5- Work cooperatively with City of Corona departments, community groups, and individual homeowners to ensure that vegetation management is being maintained in the designated fuel modification areas	Prioritize high-risk areas based on risk assessment	Fire Department, HOAs. Private landowners	• Create a defensible space program. Include pre-determined inspection frequency and education/outreach efforts. • Develop staffing plan to support enforcement and seek funding to implement the plan. • Educate homeowners on real actions that could mitigate their wildfire hazard and risk. • Provide tax incentives for defensible space actions. • Work with insurance companies to determine the potential to provide incentives for defensible space associated with reduced insurance premiums. • Increase green waste pickup/disposal options.	• Reduce loss of life and structures through defensible space.	Second half of 2022/ Ongoing	H	• Annual program evaluation and updates as necessary.	• Agency budgets • PDM Grant Program • HMGP • HMGP – Post Fire • Firewise Communities • Emergency Forest Restoration Program • National Fire Plan (NFP) • Staffing for Adequate Fire and Emergency Response (SAFER) • NIFC

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
5		Improve **agency coordination of outreach** both private and public	PS- 11.7- Sponsor and support the public education programs and outreach efforts referencing community hazards, emergency preparedness, and response protocols and procedures. Target and partner with community groups, schools, religious institutions, and business associations (NIMS).	All jurisdictions	All agencies, insurance brokers	• Agency coordinated meeting to ensure a consistent message. • Platform for raising cross-boundary issues. Utilize the story map where appropriate for inter-agency communications and messaging. • Engaging insurance agency in dialogue. • Provide incentives for mitigation actions.	Provides a consistent message regarding wildfire activity, fire prevention goals, actions for homeowners. Reduce redundancy and improve efficiency. Align insurance company requirements with City codes and ordinances. • Possible incentives of homes that have completed wildfire mitigation (AB 38).	Ongoing	H	• Annual agency coordination meeting to assess priorities and action items.	• Agency budgets • Firewise Communities
6		Implement **Community events** focused on populations at risk		Prioritize high-risk areas based on risk assessment	Fire Department, community service groups.	• City chipper program. • A community-led day of yard cleanup with fire mitigation in mind may encourage large numbers within the community to carry out mitigation measures and implement defensible space. • Residents would assist elderly, disabled, or vulnerable residents.	Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.	Second half of 2022/ Ongoing	H	• Annual review of number of events implemented. • Set goals for next year.	• Agency budgets • Firewise Communities
7		Increase **Firewise/ Ready Set Go!** Workshops		Private land, HOAs Prioritize high-risk areas based on risk assessment	HOAs Fire Department	• Offer hands-on workshops to highlight individual home vulnerabilities and how-to techniques to reduce ignitability of common structural elements. • Home assessments conducted in a neighborhood often include groups of neighbors participating with the assessor to learn from each other's homes. Homeowners get a better understanding by viewing a home other than their own and feel more comfortable asking questions as a group. • Can be requested by an HOA. • Utilize a train-the-trainer model. Develop a team of trained citizens that could perform hazard assessments within their community. Seek funding to pay volunteer fire departments to assist. • Ready, Set, Go! Literature is provided to homeowners during assessments.	Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.	Second half of 2022/ Ongoing	H	• Annual review of number of events implemented. • Set goals for next year.	• Agency budgets • Firewise Communities • PDM Grant Program

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
8		Educate the public on how to **mitigate risk and damage from wildfire**		All communities where appropriate. Prioritize highest threat areas as identified in the risk assessment	Fire Department, HOA, private landowners	• Increase education through community training classes as well as YouTube videos on defensible space, fire safe landscaping, structural hardening components, and WUI building construction requirements. • Create wildfire education documents to distribute. • Create education material on evacuations. • Focus on events that draw all populations from the City of Corona, with a focus on populations at risk. • Ensure that all interactions result in follow up engagement by collecting contact information for residents interested in action. • Provide a printed list of mitigation measures to homeowners. Utilize Ready, Set, GO! Literature. Utilize list of actions broken down by cost. • Use existing signage to spread seasonally adjusted fire prevention messages along highways and in public open space areas to reduce human ignitions. • Promote the use of existing electronic signs at firehouses and other locales to display fire prevention information, safety messages, and fire danger ratings linked to safety actions.	• Reduce wildfire risk through community action. Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fires.	Second half of 2022/ Ongoing	H	• Yearly updates to materials	• Agency budgets • Firewise Communities • PDM Grant Program • HMGP – Post Fire • Specific EPA Grant Programs • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • FP&S grants • NIFC
9		Create robust program/dashboard to track, maintain, and prioritize wildfire mitigation projects.		Prioritize high-risk areas based on risk assessment	Fire department, GIS, IT	• Create a program for tracking the completion of wildfire mitigation projects. • Redesign website to make wildfire education more prominent. • Utilize the Story Map as a one-stop-shop for all wildfire mitigation. • Utilize Survey 123 technology for tracking accomplishments.	• Reduce wildfire risk through wildfire mitigation projects in the City of Corona.	Second half of 2022/ Ongoing	H	• Annual assessment of program success.	• Agency budgets • Conservation Innovation Grants (CIG)
10		Identify **priority ignition concerns**.		All extreme threat areas as delineated in the risk assessment	Public agencies, Fire Department, Department of Emergency Management	Utilize fire history data to identify areas with frequent fire starts and develop strategy to reduce incidence of ignitions. Convene a working group to develop strategies to reduce human starts: • Education campaign • Signage • Fire response plans • Law enforcement	• Reduce unnecessary ignition through unlawful or irresponsible behavior.	Ongoing	M	• Annual evaluation of priority ignition concerns. • 5-year re-run of risk assessment to determine success in mitigating hazards. • Review fire history data on a 2-year frequency to monitor trends.	• Agency budgets • Pre-disaster Mitigation (PDM) Grant Program • Hazard Mitigation Grant Program (HMGP) • Emergency Management Performance Grant (EMPG) • Firewise Communities • Fire Prevention and Safety (FP&S) grants • State Farm Good Neighbor Citizenship Grants • National Interagency Fire Center (NIFC)

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
11		Identify wildfire risk reduction through **mitigation projects**.		Prioritize high-risk areas based on risk assessment	Fire Department, Community Development, GIS, IT	• Support the existing vegetation management program. • Use the risk assessment and identified priority projects in the CWPP for implementation. • Outreach to HOAs; identify existing fuel treatment and assist in planning and prioritizing where new treatments or existing treatments would be effective.	• Reduce wildfire risk through fuels reduction.	Ongoing	M	• Annual fuels reduction planning coordination.	• PDM Grant Program • HMGP • HMGP – Post Fire • FMAG • Regional Catastrophic Preparedness Grants • Specific EPA Grant Programs • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • Firewise Communities • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs
12		Improve **wildfire preparedness** through safe and effective emergency response.	PS-9.3- Ensure that roadway, bridge, and driveway standards are adequate and appropriately maintained to allow safe access to premises where emergencies take place and safe evacuations wherever needed. PS-9.4- Maintain safe and accessible evacuation routes throughout the community; take precautions and ensure backup or mitigations for routes crossing high hazard areas (e.g., flood, seismic, high fire, etc.).	Prioritize high-risk areas based on risk assessment	Fire Department, Emergency Management Department	• Develop a plan to effectively utilize the CERT program. • Use the risk assessment to focus efforts on evacuation strategies for vulnerable populations in the City of Corona.	• Protect life through emergency response education.	Second half of 2022/ Ongoing	M	• Annual updates to education materials.	• Environmental Systems Research Institute (ESRI) • Specific EPA Grant Programs • Firewise Communities • NIFC
13		Increase **Structural Hardening-** although newer construction is built to current standards, there is a large percentage of construction prior to 2008 and the WUI code that exists within the City of Corona.	PS-10.1- Locate, when feasible, new essential public facilities outside of high fire risk areas; if not feasible, require construction and other methods to harden and minimize damage for existing/planned facilities in such areas. PS-10.2- Require all improved and new homes, structures, and facilities in the very high fire hazard severity zones to adhere to additional fire safe design standards consistent with state law and local practice.	Prioritize high-risk areas based on risk assessment	Fire Department, Prevention and Community Development, HOAs	• Continue to develop and adopt the latest building standards and codes (including City Fire Code; Public Resources Code Section 4291 and amendment; CA Code of Regulations Title 14, Division 1.5, Chapter 7, subchapter 3; and CA Government Code Section 51182). • Retrofit existing structures. • Research and utilize new law to help with retrofits. • Develop a home inspection program which includes information on risk reduction. • Opportunities for tax breaks to harden your home. • Surveys sent to homeowners to inform the Fire Department and other groups about public perceptions of risk, as well as priority areas in which to focus efforts. • Open a line of dialogue between the fire department and residents regarding actions they can take to reduce their wildfire risk. Utilize the story map for two-way communication and engagement.	• Reduce wildfire risk and loss of structures through home hardening and community education.	Ongoing	M	• Annual updates to standards as necessary.	• Agency budgets • PDM Grant Program • HMGP • Firewise Communities • NIFC

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
14		Increase **staffing** to address wildfire mitigation workload.	PS-8.2- Ensure that fire staff at all levels are sufficient in number and appropriately trained to effectively plan and respond to all types of fire and related emergencies in the community.	Prioritize understaffed programs that provide the most impact.	Fire Department, City Administration, Finance	• Establish fuels mitigation crew • Pursue continuous and repeat interactions with residents.	• Reduce wildfire risk through greater capacity in the City of Corona for wildfire projects.	Winter 2022	M	• Annual assessment of capacity needs.	• Agency budgets • PDM Grant Program • EMPG • Regional Catastrophic Preparedness Grants • Firewise Communities • SAFER • GSA-Federal Excess Personal Property
15		Improve **sustainability of mitigation actions by residents.**		Prioritize high-risk areas based on risk assessment	All agencies	To encourage engagement in mitigation actions and sustain engagement, entities should: • Provide recognition and incentives • Assist and facilitate actions by providing services for treating and removing slash • Identify barriers to engagement and address • Track progress and identify areas requiring support	• Increase sustainability for mitigation actions and combat fatigue amongst residents.	Ongoing	M	• Annual evaluation of program effectiveness and updates as necessary. • Accomplishment tracking through the story map. • Regularly update content to keep messaging fresh and relevant.	• Agency budgets • Firewise Communities
16		Improve enforcement of the **California WUI code (Fire/ Building Code)**	PS-9.1- Continue to review and adopt the most recent edition of the California Building Standards Code (Title 24), including local amendments, to ensure the use of the latest technology and building standards in the City of Corona. PS-10.4-Require new and rehabilitated homes and structures to meet or exceed City of Corona fire prevention standards and state law, including building access, construction design, sprinklers, and others as required by Corona Fire.	Prioritize high-risk areas based on risk assessment	Fire Department, Planning and Development Department	• The Fire Code applies only to new construction and requires that structures meet the parameters of the Code in order to secure building permits. Following permitting and final there is no current enforcement of those code parameters. Develop a process to better identify when permits come into the City of Corona to flag them for special home hardening requirements. • Use education campaign to encourage WUI code actions even for those properties that are not required to adhere to it.	• Reduce wildfire risk through greater adoption of Firewise and structure hardening measures.	Ongoing	M	• Annual review of process and address hurdles.	• Agency budgets • Firewise Communities • Specific EPA Grant Programs • NIFC
17		**Integrate CWPP components/ findings** into existing plans (LHMP, EOP, structure protection plan, etc.)	PS-11.2- Maintain emergency and hazard mitigation plans; update and define roles of City of Corona departments and other partnering agencies in the event of an emergency or disaster, ensuring interagency coordination and collaboration with the Operational Area (SEMS). PS-11.8- Facilitate planning efforts to ensure expeditious and coordinated recovery processes following any serious emergency/ disaster	All jurisdictions	City Fire Department, City Emergency Management Department	• Review relevant existing planning documents and, where applicable, incorporate CWPP findings and components during planning document updates.	• Incorporate wildfire planning into broader-scale emergency management planning for the City of Corona.	2023	M	Yearly updates to materials	• Agency budgets

Table G.3. Fire Response Capability Recommendations

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
1		Develop strategies to enhance safe wildfire response in areas with poor ingress and egress.	PS-9.3- Ensure that roadway, bridge, and driveway standards are adequate and appropriately maintained to allow safe access to premises where emergencies take place and safe evacuations wherever needed.	Prioritize high-risk areas based on risk assessment	Fire Department	• Address narrow access concerns for wildfire apparatus through road improvements, new egress points, or development of response plans. • Identify alternative apparatus for access into narrow areas. • Identify potential areas that threaten entrapment of response crews and develop response plans and/or safety zones. • Map all weak bridges and develop alternative ingress/egress or response plan. • Identify areas with limited all-weather access and develop response plan. • Work with HOAs and Community Associations to address locked gates and access concerns.	• Improve fire-fighting response if smaller more agile vehicles are available to navigate narrow unimproved roads	Ongoing	H	• N/A	• PDM Grant Program HMGP • EMPG • Regional Catastrophic Preparedness Grants • Fire Management Assistance Grant (FMAG) • Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program • CAL FIRE Grant Programs • Wildfire Resilience Program • State Farm Good Neighbor Citizenship Grants • National Forest Foundation; Innovative Finance for National Forests Grant Program
2		Enhance emergency notification and information dissemination capabilities	PS-11.7- Sponsor and support the public education programs and outreach efforts referencing community hazards, emergency preparedness, and response protocols and procedures. Target and partner with community groups, schools, religious institutions, and business associations (NIMS).	City of Corona	City Emergency Management, City Fire Department, County, State	• Build on current emergency notification and information dissemination capabilities to ensure redundant and alternate means of alerting the public. • Promote ongoing education programs to increase registrations on the emergency notification system • Improve reverse 911 system • Leverage emerging County wide system • Add amateur radio operators to reverse 911	• Alert the public to emergencies, spread information about ongoing incidents.	End of 2022	H	• Annual review of effectiveness • Post-incident lessons learned	• Agency budgets • PDM Grant Program • HMGP • EMPG • Firewise Communities • FP&S grants • State Farm Good Neighbor Citizenship Grants • NIFC
3		Develop and coordinate an online comprehensive emergency preparedness, response, and recovery plan for wildfire.	PS-8.3- Maintain mutual aid, automatic aid, and other multi-agency cooperative agreements to ensure that urban fire, wildfire, tactical response, hazmat, and other services are available at all times. PS-8.5- Conduct periodic fire-related exercises with City of Corona public safety personnel and those of nearby jurisdictions, and the state to remain prepared for situations requiring multi-jurisdictional coordinated response.	City of Corona	Fire Department, City Emergency Management	Create an online dashboard for use by emergency management agency decision support. Dashboard would be created in a story map or “hub” format and would include: • Break dashboard into sections of the emergency management cycle: preparedness, response, recovery • Identify roles and responsibilities for each agency/partner under each section of the cycle • Include BMPs for each section of the cycle • Include coordination plan for interagency communications before, during and after an event • Include a tracking module to track actions needed and status • Include a funding matrix to support implementation of actions • Align actions as closely as possible with the City, County, and State hazard mitigation plans. • Consider additional and broader spectrum wildland fire agreements – i.e., expand existing wildland fire agreements with CAL FIRE	• Improve fire response and readiness.	Spring 2022	H	• Would be an active and live platform, updated in real time and reviewed on an annual basis	• Agency budgets • PDM Grant Program • EMPG • FMAG • Regional Catastrophic Preparedness Grants • Funding for Fire Departments and First Responders • Conservation Innovation Grants (CIG) • FP&S grants • California Fire Safe Council Grant Programs

Project Number	Status	Project Description	Alignment with General Plan Safety Element (2020-2040)	Location	Land Ownership	Methodology/Approach	Serves To:	Timeline	Priority	Monitoring/Maintenance Requirements	Funding Sources
4		Develop a coordinated approach between the fire department and water department to identify needed improvements to the water distribution system, initially focusing on areas of highest wildfire hazard as determined in the risk assessment and areas with limited water pressure or no existing water supply.	PS-10.8- Coordinate with the Department of Water and Power to ensure that adequate water supply and flows are available for firefighting; where inadequate, ensure provision of off-site water supply and transport.	Prioritize high-risk areas based on risk assessment	City of Corona	• Initiate a detailed study of feasible locations for water development improvements. • Install hand pumps or other methods independent of the grid for accessing private well water. • Evaluate and consider heli-hydrants through the interface.	• Improve fire-fighting response if water is more readily available or closest locations could be identified on a GIS map on a tablet/computer. • Alleviate public and agency concern for limited water supply in some WUI areas.	2023	M	• Convene annually • Document number of meetings held • Document number of actions taken	• Pre-disaster Mitigation (PDM) Grant Program • Hazard Mitigation Grant Program (HMGP) • Emergency Management Performance Grant (EMPG) • Regional Catastrophic Preparedness Grants • Emergency Watershed Protection (EWP) Program • Catalog of Federal Funding Sources; Water Resources • CAL FIRE Grant Programs • Wildfire Resilience Program • California Fire Safe Council Grant Programs • Northern California Forests and Watersheds Program • National Forest Foundation; Innovative Finance for National Forests Grant Program
5		Increase NWCG qualifications throughout the FD	PS-8.2- Ensure that fire staff at all levels are sufficient in number and appropriately trained to effectively plan and respond to all types of fire and related emergencies in the community.	City of Corona	Fire Department	• NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to all personnel every Fall with an option to attend on weekends. • Provide minimum wildland PPE for all firefighters.	• Provide for safe and effective wildfire response	Ongoing	M	Annual review of training opportunities and barriers to attendance	• EMPG • Regional Catastrophic Preparedness Grants • Funding for Fire Departments and First Responders • Fire Prevention and Safety (FP&S) grants • GSA-Federal Excess Personal Property • Assistance to Firefighters Grants (AFG) • California Fire Safe Council Grant Programs
6		Be proactive in addressing future wildfire challenges with climate change.	Climate Action Plan/Climate resiliency in General Plan- The CAP addresses climate change by providing strategies, programs, and projects that reduce GHG emissions and adapt to changing climate conditions and build resiliency.	City of Corona and adjacent jurisdictions	City, County, State, Federal	Convene a working group tasked with the following: • Assess impact of climate change on wildfire potential through modeling of fire behavior under various climate scenarios. • Establish fuel treatment plans to mitigate climate related influences on wildfire risk in existing vegetation communities. • Establish plans and build infrastructure for water supply needs to alleviate future drought emergencies.	• Enhance wildfire response as conditions change.	Ongoing	M	• Meet annually to review plans and assess status of wildfire risk. • Re-run the fire behavior analysis to determine change in wildfire risk.	• Agency budgets • PDM Grant Program • HMGP • EMPG • Regional Catastrophic Preparedness Grants • EWP Program • Leonardo DiCaprio Foundation Grants • U.S. Endowment for Forestry and Communities
7		Reduce incidence of frequent ignitions		Prioritize high-risk areas based on risk assessment	City/Private	Utilize fire history data to identify areas with frequent fire starts and develop strategy to reduce incidence of ignitions. Convene a working group to develop strategies to reduce human starts: • Education campaign • Signage • Fire response plans • Law enforcement	• Reduce ignition frequency	Ongoing	M	• Review fire history data on a 2-year frequency to monitor trends.	• Agency budgets • PDM Grant Program • HMGP • EMPG • Firewise Communities • FP&S grants • State Farm Good Neighbor Citizenship Grants • National Interagency Fire Center (NIFC)

Table G.4. Threat Area Recommendations

Threat Area	CAR Rating (Based on NFPA 1144)	Recommendations
Crown Villa	160 – Extreme	• Install strategic fuel breaks to break up fuel continuity in close proximity to homes. Prioritize areas with fuels downslope of homes. • Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – Partner with HOAs- Crown Ridge Community Association, Crown Villas Owners Association. • Emphasize through education campaign the need for increased defensible space on lands with steep slopes and homes with minimal setbacks from slope. • Work with HOAs to ensure that all gates are accessible by fire apparatus and locks could be disabled in event of evacuations
Dean Homes	156 – High	• Install road buffers or turn outs to ensure space for emergency response vehicles. • Build a secondary evacuation/response road. • Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – Partner with HOAs. • Provide resources on retrofitting opportunities. • Install strategic fuel breaks as close to residential areas or along roads to prevent fire spread influenced by path of Santa Ana winds; work with CAL FIRE and open space managers to identify treatment locations. • Encourage private homeowners to remove undesirable vegetation in interface areas. Provide resources to assist with slash removal.
Fresno Canyon	125 – High	• Install strategic fuel breaks as close to residential areas as possible and aligned where possible perpendicular to dominant wind directions to prevent fire spread influenced by path of Santa Ana winds. Where possible extend fuel break further into wildlands along topographic features. • Assess current fuel loads in greenbelt areas and establish monitoring and maintenance schedule. • Assess species composition of interface areas and adjust vegetation maintenance regime as cover types change. • Increase community outreach and education in regard to home hardening and defensible space. • Provide resources on retrofitting opportunities (for decks and wooden attachments) and emphasize actions needed to enhance structure hardening (i.e., screening open eaves). • Enforce vegetation clearance code requirements around private property – Partner with Montenero Community Association and Sierra Peak HOAs. • Carryout feasibility study for additional escape routes south of San Ramon Drive. • Emphasize through education campaign the need for increased defensible space on lands with steep slopes and homes with minimal setbacks from slope.

Threat Area	CAR Rating (Based on NFPA 1144)	Recommendations
Joseph Canyon	139 – High	• Install roadside buffers to ensure clearance along roads for evacuations and access space for emergency response vehicles. • Install turnaround spaces along Joseph Canyon Road • Implement fuel reduction or thinning projects on adjacent National Forest lands. • Implement fuel breaks in areas where fuels are downslope of homes or evacuation routes. • Increase community outreach and education in regard to home hardening and defensible space to protect against ember intrusion. • Install strategic fuel breaks as close to residential areas as possible and aligned where possible perpendicular to dominant wind directions to prevent fire spread influenced by path of Santa Ana winds. • Where water supply is limited and fire risk is high, install water tanks for fire response.
Main Street Canyon	118 – High	• Carryout feasibility assessment to install a secondary evacuation/response road to access Main Street Canyon Road. • Implement hazardous fuel removal or thinning projects around vulnerable homes upcanyon. Work with National Forest and CAL FIRE to identify potential fuel treatment locations. • Where water supply is limited and fire risk is high, install water tanks for fire response. • Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – no HOA to work with • Increase public education and awareness of fire risk and evacuation protocols, especially for homes off of Main Street Canyon Road. • Encourage private homeowners to remove undesirable vegetation in interface areas. Provide resources to assist with slash removal.
Malaga	114 – High	• Install strategic fuel breaks to prevent fire spread influenced by diurnal winds and problematic topography. • Implement hazardous fuel removal or thinning projects around vulnerable structures. • Increase community outreach and education in regard to home hardening and defensible space to protect against ember intrusion. • Work with orchard landowners to remove/maintain fuel hazards. • Carryout feasibility assessment to install a secondary evacuation/response road to access Lords Canyon Road. • Remove undesirable vegetation in interface areas in conjunction with HOA- Brentridge Community Association.

Threat Area	CAR Rating (Based on NFPA 1144)	Recommendations
Maybe Canyon	125 – High	• Install strategic fuel breaks as close to residential areas as possible and aligned where possible perpendicular to dominant wind directions to prevent fire spread influenced by canyon winds. Work with National Forest and CAL FIRE. • Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – Partner with HOAs- New American Homes (I, II and III), Ridgecrest HOA and Crown Ridge HOA. • Provide resources on retrofitting opportunities for decks and other attachments. • Carryout feasibility study for additional access via drainage areas. • Work with 2 homeowners located along dead-end Mabey Canyon Road to ensure they are prepared to leave early in event of evacuation. Encourage preparedness actions. • Install fuel break along interface with forest and Mabey Canyon Road. • Carryout urban tree treatments to reduce continuity of windrows along main routes. • Emphasize through education campaign the need for increased defensible space on lands with steep slopes and homes with minimal setbacks from slope.
Rincon/ Auburndale	153 – Extreme	• Implement fuel reduction or thinning projects- work with USACE for treatments in the Prado Basin • Increase community outreach and education in regard to home hardening and defensible space, with focus on potential ember intrusion. • Enforce vegetation clearance code requirements around private property – no HOAs to work with. • Install fuel breaks/implement vegetation management around at-risk structures, especially infrastructure and airport. • Carryout feasibility assessment to install a secondary evacuation/response road to access Stagecoach Road. • Encourage private homeowners to remove undesirable vegetation in interface areas. Provide resources to assist with slash removal.
Sierra Bella	123 – High	• Install strategic fuel breaks as close to residential areas as possible and aligned where possible perpendicular to dominant wind directions to prevent fire spread influenced by path of Santa Ana winds. • Enforce vegetation clearance code requirements around private property – Partner with HOAs- Sierra Summit Communities, Sierra Bella HOA, Skyview Ridge Estates HOA. • Emphasize through education campaign the need for increased defensible space on lands with steep slopes and homes with minimal setbacks from slope. • Work with adjacent land managers on options for breaking up fuel continuity (goats, mechanical fuel treatments). • Prioritize treatments on areas fully encircled by wildland fuels.

Threat Area	CAR Rating (Based on NFPA 1144)	Recommendations
Skyline	117 – High	• Increase community outreach and education in regard to home hardening and defensible space to protect against ember intrusion. • Carryout feasibility assessment to install a secondary evacuation/response road. • Install strategic fuel breaks to defend against fires spread due to problematic topography and fuel loading. Work with the National Forest. • Increase public education and awareness of fire risk and evacuation protocols. • Remove undesirable vegetation in interface areas in conjunction with HOA- Orchard Glen HOA.

Table G.5. Areas of Consideration Recommendations

Area of Consideration	CAR Rating (Based on NFPA 1144)	Recommendations
Corona Hills	102 – High	• Increase community outreach and education in regard to home hardening and defensible space, especially related to maintenance of flashy fuels. • Enforce vegetation clearance code requirements around private property – Partner with HOAs: Cliff Haven, Montea at Corona Ranch, Cantebria at Corona Ranch, Part Vista Association, La Tierra at Corona Ranch, Corona Ranch Properties. • Provide resources on retrofitting opportunities. • Install fuel breaks to prevent fire spread influenced by diurnal winds. • Install road buffers or turnouts where needed to ensure space for emergency vehicles. • Pre-season planning and coordination between response agencies.
Eagle Valley	182 – Extreme	• Install road buffers or turnouts where needed to ensure space for emergency vehicles. • Work with utility companies to identify wildfire threat associated with lines and conduct feasibility analysis on potential to underground. • Install fire response access routes.
El Cerrito	280 – Extreme	• Work with utility companies to identify wildfire threat associated with lines and conduct feasibility analysis on potential to underground. • Where water supply is limited and fire risk is high, install water tanks for fire response. • Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – Partner with HOAs. • Install road buffers or turnouts where needed to ensure space for emergency vehicles. • Install fuel breaks around at risk structures.

Area of Consideration	CAR Rating (Based on NFPA 1144)	Recommendations
Grape Hill	106 – High	• Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – Partner with HOAs: Corona Ranch Terrace Properties, La Paloma HOA. • Provide resources on retrofitting opportunities. • Look for opportunities to enhance recreational trails to provide hazardous fuels reduction • Install fuel breaks perpendicular to dominant wind direction to prevent fire spread. • Treat around infrastructure.
Mountain View	113 – High	• Install fuel breaks around at risk structures. • Increase community outreach and education in regard to home hardening and defensible space. • Increase education on fire prevention in areas populated by homeless residents. • Enforce vegetation clearance code requirements around private property – Partner with HOAs. • Provide resources on retrofitting opportunities.
Sefas/Paseo	161 – Extreme	• Increase community outreach and education in regard to home hardening and defensible space. • Enforce vegetation clearance code requirements around private property – Partner with HOAs: Corona Monterey Village. • Implement fuel reduction or thinning projects in open space (grazing). • Install fuel breaks around at risk structures. • Work with landowners to recognize risk associated with narrow driveways and unposted bridges