AUGUST 2025

CITY OF ESCONDIDO

COMMUNITY WILDFIRE PROTECTION PLAN

Working together to build fire-adapted communities, resilient to wildfire

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The entities listed below participated in the development of and/or reviewed and are in support of the City of Escondido Community Wildfire Protection Plan:

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EXECUTIVE SUMMARY

WHAT IS THE ESCONDIDO COMMUNITY WILDFIRE PROTECTION PLAN (CWPP) AND WHY DOES IT MATTER?

The 2025 City of Escondido Community Wildfire Protection Plan (CWPP) is a comprehensive, locally driven strategy to reduce wildfire risk, protect lives and property, and foster community resilience. Building on lessons learned from recent fire seasons and informed by the latest science and stakeholder input, the CWPP provides a framework for wildfire preparedness, mitigation, and adaptation tailored to Escondido's unique landscape and community values.

WHO DEVELOPED THE PLAN AND HOW WAS THE COMMUNITY INVOLVED?

The CWPP was collaboratively developed by a Core Team led by the City of Escondido and the Escondido Fire Department, with input from local experts, emergency management professionals, and community stakeholders. The planning process included public meetings, surveys, and workshops, ensuring broad engagement and meaningful input from residents, property owners, and partner organizations. The draft plan has been made available for public review and comment, and all feedback will be considered in finalizing the plan.

WHAT AREA DOES THE PLAN COVER, AND WHO DOES IT PROTECT?

The planning area encompasses the entire City of Escondido and the adjacent Rincon del Diablo Fire Protection District, totaling approximately 79 square miles. This area includes a diverse mix of urban neighborhoods, rural communities, critical infrastructure, open space preserves, and wildland-urban interface (WUI) zones. The CWPP aims to protect roughly 151,000 residents, thousands of homes and businesses, and a wide range of natural, cultural, and economic assets.

See Chapter 1 for more information on the planning area.

WHAT ARE THE MAIN WILDFIRE RISKS AND CHALLENGES IN ESCONDIDO?

Escondido faces a heightened wildfire risk stemming from its Mediterranean climate, rugged topography, and extensive ignitable vegetation, all of which are compounded by ongoing development within the WUI (defined in Chapter 2). The region is particularly vulnerable to fast-moving, destructive wildfires, which pose significant threats to homes, infrastructure, and sensitive natural habitats. Santa Ana wind events pose a further threat, historically having led to highly destructive wildfire throughout in the region. Factors such as limited defensible space in certain neighborhoods, overgrown and unmanaged vegetation, challenging evacuation routes, and an increased likelihood of human-caused ignitions further intensify these risks.

For more information about the fire environment in Escondido, see Chapter 2.

HOW DOES THE CWPP ADDRESS WILDFIRE RISK AND BUILD RESILIENCE?

The CWPP provides a thorough assessment of wildfire hazards and risks, combining field-based community hazard evaluations with advanced quantitative wildfire risk modeling. The plan identifies and

prioritizes high-risk areas and communities, and outlines actionable mitigation strategies across three core goals:

Restoring and maintaining resilient landscapes through hazardous fuel reduction, ecological restoration, and invasive species management.

Promoting fire-adapted communities by supporting defensible space, home hardening, public education, and targeted outreach to vulnerable populations.

Enhancing wildfire response capabilities by strengthening interagency coordination, improving emergency access and water supply, and supporting fire department staffing and training.

WHAT DID THE FINDINGS OF THE QUANTITATIVE WILDFIRE RISK ASSESSMENT REVEAL ABOUT WILDFIRE RISK IN ESCONDIDO?

The Quantitative Wildfire Risk Assessment for the 2025 Escondido CWPP used advanced wildfire modeling and spatial data to identify areas of highest risk, particularly along the city's eastern and northern edges where homes, infrastructure, and wildland fuels converge. These analyses showed that, while the urban core faces lower direct risk, neighborhoods near open space and steep terrain are especially vulnerable to intense wildfire behavior and rapid fire spread. Field assessments complemented these findings and helped validate local conditions, also allowing for the identification of additional areas of elevated risk that were not captured through the desktop risk assessment due to data limitations.

WHAT ARE SOME KEY RECOMMENDATIONS AND PRIORITIES?

The CWPP's recommendations are organized within the plan according to the three goals outlined above. Some examples of recommended actions include but are not limited to:

- Implementing fuel breaks and green waste programs in WUI areas

- Conducting defensible space inspections and supporting home hardening

- Enhancing public education and community engagement, including outreach to at-risk residents

- Improving evacuation planning and signage, especially in remote and high-risk communities

- Investing in fire response infrastructure, equipment, and interagency coordination

- Monitoring and adapting strategies based on ongoing evaluation and changing conditions

See Chapter 4 for a comprehensive description of the recommended wildfire mitigation measures identified for the City of Escondido through this planning process.

HOW WILL PROGRESS BE MEASURED AND THE PLAN KEPT CURRENT?

A robust monitoring and evaluation framework is included to track implementation, assess outcomes, and guide adaptive management. The Core Team will oversee annual reviews, update priorities as needed, and ensure the plan remains responsive to new data, evolving risks, and community needs. Major updates are scheduled every 5 years, with interim revisions as necessary after significant fire events or policy changes.

See Chapter 5 for information regarding CWPP monitoring and implementation.

DOES THE CWPP HAVE REGULATORY AUTHORITY?

The CWPP is a non-regulatory, voluntary plan that provides guidance and a collaborative framework for wildfire mitigation. Its effectiveness depends on the joint actions of city officials, local agencies, partner organizations, and property owners. The plan's true value lies in fostering shared responsibility, informed decision making, and coordinated action across the Escondido community.

WHY IS ONGOING COLLABORATION AND ADAPTATION IMPORTANT?

Wildfire risk in Escondido is dynamic, shaped by climate, development, and social factors. Building and maintaining resilience requires a sustained commitment to learning, adaptation, and partnership.
By working together, the City of Escondido, its residents, and its partners can reduce wildfire risk, protect what matters most, and create a safer, more resilient future for all.

HOW IS THE PLAN ORGANIZED?

Chapter 1: Introduction
Introduces the purpose, scope, and collaborative development process of the CWPP, outlining the planning area and core team.

Chapter 2: Fire Environment
Describes Escondido's climate, topography, vegetation, and fire history, highlighting factors that influence local wildfire behavior.

Chapter 3: Risk-Hazard Assessment
Presents a detailed assessment of wildfire hazards and risks using both field evaluations and advanced risk modeling.

Chapter 4: Mitigation Strategies
Outlines prioritized recommendations for reducing wildfire risk, including fuels management, public outreach, and response enhancements.

Chapter 5: Monitoring and Evaluation
Establishes a framework for tracking progress, evaluating outcomes, and adapting strategies to ensure the CWPP remains effective and current.

Chapter 6: Homeowner Actions and Resources
Provides practical guidance and resources for residents to create defensible space, harden homes, and prepare for wildfire emergencies.

Appendix A: Planning Process and Background Information
Details the legislative context, planning approach, and compliance with state and federal CWPP requirements.

Appendix B: Community Information
Offers supporting data on local infrastructure, evacuation resources, and recreational assets relevant to wildfire planning.

Appendix C: Community Field Assessments
Summarizes on-the-ground wildfire hazard assessments for neighborhoods and key areas within the planning area.

Appendix D: Supporting Maps

Includes maps illustrating wildfire hazards, risk zones, and other spatial data used throughout the CWPP.

Appendix E: Funding Sources

Lists local, state, federal, and private funding opportunities to support wildfire mitigation and community resilience projects.

Appendix F: Project Outreach

Documents the community outreach process, including public engagement activities and survey results.

Appendix G: Pre-Fire Fuel Treatment Types and Methods

Describes common fuel reduction strategies and best practices for vegetation management in fire-prone areas.

Appendix H: Post-Fire Response and Restoration

Provides guidance on post-fire hazards, recovery strategies, and resources for ecological and community restoration.

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

The United States is facing growing challenges to forest and watershed health, driven in large part by increasingly severe wildfires. Since 2000, both the total acreage burned and the average fire size have risen sharply. Between 2013 and 2022, wildfires burned an average of 7.2 million acres annually, more than double the average from the 1990s (NIFC 2024). Some years stand out as especially destructive, including 2007, 2012, 2015, and 2020. The 2015 fire season holds the record for the most acreage burned in a single year since modern recordkeeping began in 1960, with 10.13 million acres lost, followed closely by 10.12 million acres in 2020. In 2024, 64,897 wildfires burned 8.92 million acres nationwide, approximately 27% above the 10-year national average (NIFC 2024).

The California's Forests and Rangelands: 2017 Assessment remains the most recent comprehensive statewide evaluation, identifying major challenges such as increased wildfire severity, prolonged drought, pest outbreaks, and ecosystem degradation.

An updated assessment is in progress through the California Department of Forestry and Fire Protection (CAL FIRE FRAP 2017) Fire and Resource Assessment Program (FRAP), with draft chapters under review and public release expected in late 2025. A new interactive viewer is also being developed to display wildfire severity and vegetation trends from 2015 to 2023.

In the meantime, strategic guidance documents such as the Fire and Resource Assessment Program (CAL FIRE FRAP 2017) and the California Wildfire and Forest Resilience Action Plan (2021) continue to inform policy and implementation. These plans call for accelerated, coordinated vegetation management, fuel reduction, and fire-adapted community planning, with progress tracked by the California Wildfire and Forest Resilience Task Force.

California faced a particularly severe fire season in 2024, with 8,110 wildfires burning 1,077,771 acres statewide. The fires destroyed 1,837 structures and damaged 644 others, with one reported civilian fatality. (CAL FIRE 2024a; 2025e) San Diego County has a long and well-documented history of significant wildfires that have repeatedly impacted the region, including the City of Escondido. The area's combination of coastal foothills, chaparral ecosystems, and expanding wildland-urban interface (WUI) makes it especially susceptible to fast-moving and destructive fires, particularly during Santa Ana wind events.

Over the past two decades, Escondido and its surrounding communities have faced multiple fire events that led to evacuations, property loss, and regional emergency coordination. These incidents have underscored the need for robust wildfire preparedness, interagency planning, and ongoing community engagement.

More broadly, Southern California's wildfire regime continues to evolve in response to prolonged drought, dense fuel accumulation, and climate-driven changes in wind and precipitation patterns. While large fires in nearby counties have gained national attention in recent years, the risk factors influencing Escondido's fire vulnerability remain consistent with regional trends.

Historically, fire played a critical role in shaping California's ecosystems. Prior to Euro-American settlement, an estimated 1.8 million acres burned annually, much of it through low-intensity lightning strikes or cultural burning practices led by Indigenous communities (Kolden 2007). The legacy of fire suppression has significantly altered these dynamics, leading to hazardous fuels build-up and increasing the likelihood of severe fire behavior under modern conditions (Calkin et al. 2015; Stephens et al. 2007). These realities make proactive fire management and planning more important than ever.

1.2   THE ROLE OF CWPPs

As wildfire severity and frequency continue to increase, communities must proactively plan for, mitigate, and adapt to wildfire risks. A community wildfire protection plan (CWPP) provides a locally driven framework for identifying hazards, reducing risk, and strengthening fire resilience through coordinated action.

This CWPP for the City of Escondido functions as both a strategic planning document and a community action guide.

This plan follows a customized format designed to reflect local priorities and planning context while fully meeting the requirements for CWPPs established by CAL FIRE and the Office of the State Fire Marshal (OSFM). Although it does not adopt the optional structure of the California CWPP Toolkit (CAL FIRE 2024b), it aligns with all state criteria, including:

- Collaborative development with public engagement

- Assessment of wildfire hazards and risks

- Identification and prioritization of fuel reduction and community protection actions

- Strategies to reduce structural ignitability

- Formal approval by the City of Escondido, Escondido Fire Department, and CAL FIRE San Diego Unit

- An approach that ensures the plan remains locally relevant while satisfying all state requirements for an approved CWPP.

In addition, the plan includes clear goals and objectives, a defined planning area, implementation roles and responsibilities, and an overview of fire response capabilities.

The Escondido CWPP aligns with CAL FIRE's San Diego Unit Fire Plan and supports statewide resilience strategies by integrating defensible space, home hardening, vegetation management, public outreach, and interagency coordination. Drawing from recent wildfire experiences at the local and state levels, this plan aims to foster a safer, more fire-adapted community.

1.3 GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to help local communities strengthen their capacity for wildfire mitigation while working in partnership with government agencies to identify high-risk areas. A CWPP guides the prioritization of wildfire mitigation, fire suppression efforts, and emergency preparedness activities. It also plays a critical role in increasing public awareness by helping residents better understand both natural and human-caused wildfire risks that threaten lives, safety, and the local economy.

Under the Healthy Forests Restoration Act of 2003 (HFRA), a CWPP must meet the following minimum requirements (Society of American Foresters 2004):

- Collaboration: Local and state government representatives must develop the CWPP collaboratively, in consultation with federal agencies and other interested parties.

- Prioritized Fuel Reduction: The plan must identify and prioritize areas for hazardous fuel reduction and recommend appropriate treatment types and methods to protect communities at risk and critical infrastructure.

- Structural Ignitability Treatments: The CWPP must include recommendations for actions that property owners and communities can take to reduce the ignitability of structures within the planning area.

Additional information on the planning process is available in Appendix A.

1.4 ALIGNMENT WITH THE NATIONAL COHESIVE WILDLAND MANAGEMENT STRATEGY

The 2025 CWPP update for the City of Escondido aligns with the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) (WFLC 2014), the Phase III Western Regional Action Plan, and CAL FIRE's California CWPP Toolkit (OSFM 2022) criteria and requirements. It supports the national vision "to safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire."

The Cohesive Strategy (Figure 1.1) outlines three primary national goals essential to achieving this vision:

Restore and Maintain Landscapes: Promote fire-resilient landscapes across all jurisdictions, managed according to ecological and land use objectives.

Promote Fire-Adapted Communities: Support communities and infrastructure that are prepared for wildfire and capable of withstanding fire events without major loss of life or property.

Enhance Wildfire Response: Encourage coordinated, risk-informed wildfire response across jurisdictions to improve safety and effectiveness.

Figure 1.1. The three primary goals of the National Cohesive Wildland Fire Management Strategy, with the addition of post-fire recovery.

Escondido's CWPP incorporates these three core goals along with planning for post-fire recovery. The plan acknowledges the hazards that follow wildfire and the elevated risks they pose to public safety, infrastructure, and ecosystem health. Together, these components form a comprehensive framework for wildfire adaptation and long-term community resilience.

This CWPP supports these goals through locally informed strategies outlined in Chapter 4, Mitigation Strategies.

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

1.5   ALIGNMENT WITH PLANS AND AGREEMENTS

This CWPP update is aligned with multiple local, state, and federal planning efforts, which are summarized in more detail in Appendix A. These plans and strategies collectively aim to reduce wildfire risk, protect communities and natural resources, and enhance overall fire resilience throughout the Escondido area and greater San Diego County.

Key plans and documents that inform and support this CWPP include:

- City of Escondido Local Hazard Mitigation Plan
- City of Escondido General Plan – Community Protection
- San Diego County Multi-Jurisdictional Hazard Mitigation Plan
- San Diego County General Plan – Safety Element
- CAL FIRE San Diego Unit Strategic Fire Plan

- CAL FIRE California Strategic Fire Plan (Statewide)
- San Diego County Operational Area Emergency Operations Plan
- San Diego Association of Governments (SANDAG) Regional Plan and wildfire resilience initiatives
- Fire Safe Council of San Diego County – CWPP Guidance and Local Fuel Treatment Priorities

CWPPs from Surrounding Communities and Local Jurisdictions:

- Vista Fire Protection District CWPP (2023)
- Fire Safe Council Of Ramona West End (2024)
- Deer Springs Fire Protection District CWPP (updated 2022)
- San Marcos CWPP (2024)
- Valley Center CWPP

- Harmony Grove/Elfin Forest CWPP (2022)
- Fallbrook CWPP (2022)
- Palomar Mountain CWPP
- Julian CWPP (2023)
- Alpine/Viejas CWPP (2023)
- Olivenhain Fire Safe Council CWPP (2023)

1.6   CORE TEAM

The development of the 2025 Escondido CWPP update was guided by the City of Escondido and the Escondido Fire Department. Central to this process was a dedicated Core Team, comprising fire department leadership, emergency management professionals, administrative staff, and representatives from local, state, and federal agencies. This diverse group played a vital role in shaping a meaningful and actionable CWPP by contributing to key decision making, data sharing, field assessments, and community engagement efforts. By bringing together a wide range of perspectives and expertise, the Core Team ensured that the planning process was collaborative, inclusive, and responsive to the needs of the community.

Table 1.1. City of Escondido Core Team List

Name	Title
John Tenger	Fire Chief
Kevin Beverly	Battalion Chief
Tyler Batson	Division Chief (Training & EMS)
Brian Salazar	Battalion Chief
Jeff Murdock	Emergency/Disaster Preparedness Manager
La Vona Koretke	Deputy Fire Marshal
Laura Costello	Administrator

The project officially kicked off on June 20, 2025, followed by the first Core Team meeting on June 24, 2025. The team reconvened for Core Team Meeting #2 on July 16–17, 2025, and held Core Team Meeting #3 on August 12, 2025. The Core Team and SWCA will present the final CWPP at the October 15 2025 City Council Meeting.

1.7   PLANNING AREA

The planning area (Figure 1.2) encompasses the entire City of Escondido, California, as defined by its geographic and political boundaries, along with the adjacent Rincon del Diablo Fire Protection District (FPD), which receives fire and emergency medical services through a longstanding contract with the City (Figure 1.3) (City of Escondido 2023).

Located in northern San Diego County, approximately 30 miles northeast of downtown San Diego and 18 miles inland from the coast, Escondido spans about 37 square miles. The Rincon del Diablo FPD adds another 42 square miles of unincorporated, primarily rural and semi-rural territory to the planning area, bringing the total service area to roughly 79 square miles (Rincon del Diablo FPD 2024). While emergency response is provided by the City of Escondido Fire Department, administrative oversight for the Rincon del Diablo FPD is maintained by the Rincon del Diablo Municipal Water District, a special district that also manages local water service. This combined jurisdiction encompasses a diverse mix of land uses, including urban neighborhoods, commercial centers, agricultural areas, large-lot residential development, and extensive WUI zones.
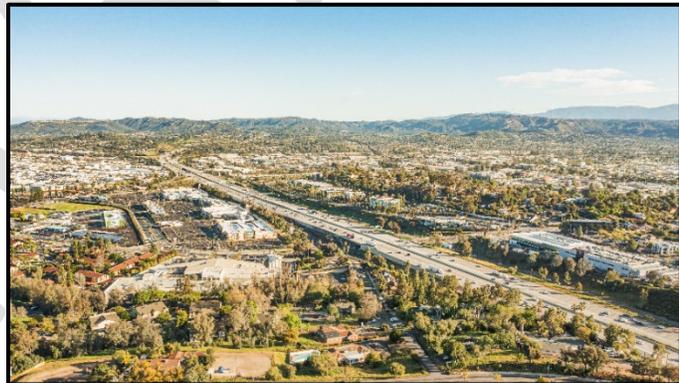
Escondido and the surrounding Rincon del Diablo FPD area are characterized by rugged terrain, coastal foothills, and significant open space. Notable natural features such as Daley Ranch, Lake Wohlford, and the San Pasqual Valley support native vegetation communities like chaparral, coastal sage scrub, and oak woodland, ecosystems that are both fire-adapted and fire-prone (California Native Plant Society [CNPS] 2022; SANDAG 2023). According to the 2022 U.S. Census estimate, Escondido is home to approximately 151,000 residents and more than 47,000 households (San Diego Parks Department 2025; U.S. Census Bureau 2022). These landscape characteristics, coupled with population density and continued development, contribute to the area's overall wildfire risk.
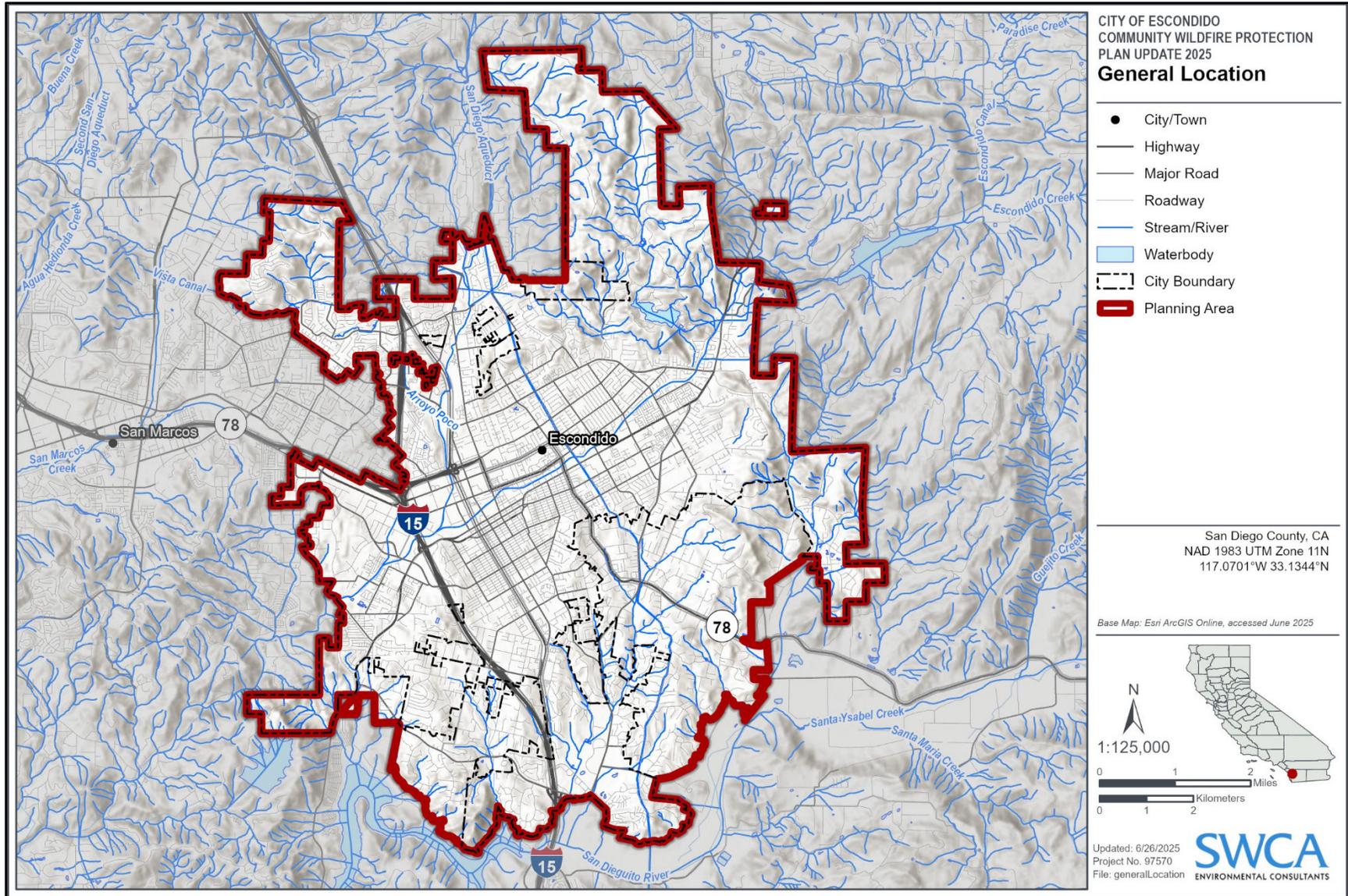
Figure 1.2. City of Escondido CWPP planning area.
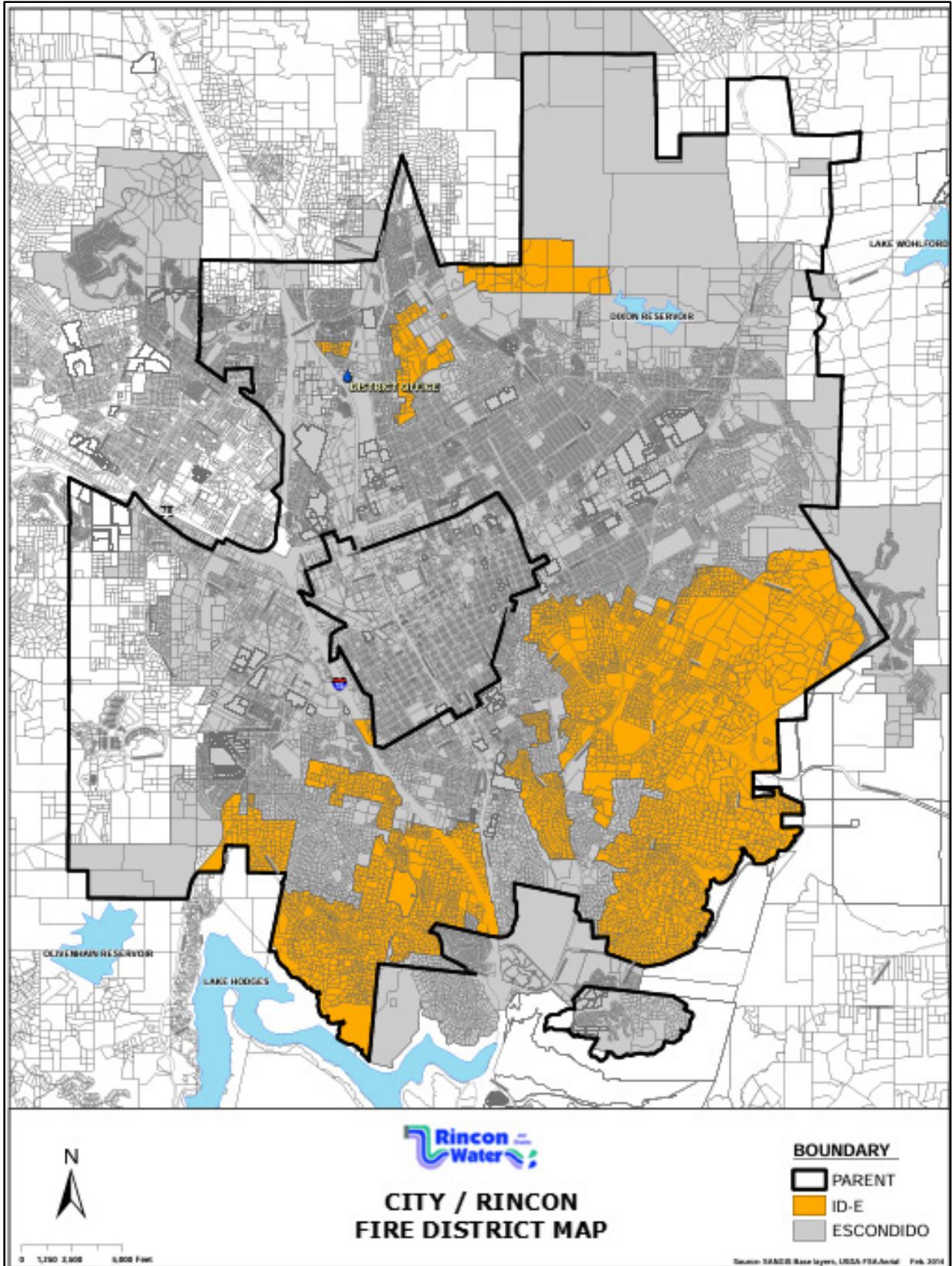
Figure 1.3. Rincon del Diablo service area.

https://rinconwater.org/fire-district/our-history/

1.7.1 Community Values

A primary goal of the CWPP is to identify, prioritize, and protect the wide range of values and assets within the city of Escondido that are at risk from wildfire. These community values are identified collaboratively through research and input from the Core Team, publicly available data sources, and feedback gathered during stakeholder engagement and public outreach efforts.

Values at risk include natural, cultural, and socioeconomic resources, along with human life and property. The area's natural resources, including open space preserves, sensitive habitats, and watershed areas hosting native vegetation and wildlife reflect Escondido's natural importance to the surrounding region and its biodiversity. Parks and trails allow for a deepened connection between residents and natural resources and are essential in providing recreational opportunities and social gatherings. Cultural values such as historic buildings and cemeteries are present, and due to their irreplaceable nature, are key resources to consider when discussing fire protection. Socioeconomic values such as public safety infrastructure and critical facilities such as hospitals, schools, fire stations, police stations, care centers and utilities form the backbone of civic life, providing essential services and maintaining the community's well-being.

While the scope of this CWPP does not include a comprehensive valuation of all assets potentially affected by wildfire, it provides a framework for understanding what the community considers important to protect and prioritizes mitigation measures to reduce the vulnerability of those highly valued resources and assets (HVRAs).

1.7.2 Social Vulnerability

The Federal Emergency Management Agency (FEMA) defines social vulnerability as the susceptibility of social groups to the negative impacts of natural hazards, such as wildfires. These impacts may include disproportionate injury, death, property loss, or disruption of livelihoods. A single hazard event can have significantly different consequences for different individuals, even when the hazard itself affects an entire community equally. Certain populations may be more vulnerable due to factors such as income level, age, language access, health status, or housing conditions. (FEMA 2022)

For example, older adults may face greater difficulty evacuating during a wildfire, increasing the risk of injury or entrapment. Similarly, lower-income households may lack the financial means to retrofit their homes for defensible space or structural hardening, leaving them more exposed to wildfire damage. Language barriers or lack of access to transportation can also limit awareness of evacuation orders and response capabilities during emergencies.

In Escondido, social vulnerability varies across neighborhoods based on income levels, housing types, age demographics, and proximity to the WUI. According to regional data and U.S. Census information, parts of Escondido with higher proportions of renters, seniors, and lower-income households may be more at-risk during wildfire events. These communities may experience more difficulty preparing for, responding to, and recovering from a fire.

The CWPP incorporates an equity lens to help identify and prioritize areas where socially vulnerable populations overlap high wildfire risk. This approach supports the development of targeted outreach strategies, evacuation planning, and mitigation investments that serve the most at-risk communities. These maps cover the following indicators:

- Age
- Disability
- Limited English proficiency
- Minority populations
- Mobile homes
- No vehicle access
- Poverty
- Overall Social Vulnerability Index

1.7.2.1 Communities at Risk Designation (Federal and State)

The National Fire Plan was established to reduce wildfire risk to communities, with an initial list of high-risk Wildland-Urban Interface (WUI) communities published in the Federal Register in 2001. This list was developed through collaboration between federal and state agencies, focused on communities adjacent to federal lands, and has not been formally updated at the federal level since its release (USDA 2001). In California, responsibility for maintaining and expanding this list has transitioned to the State Forester (CAL FIRE Director). Due to California's unique fire-prone landscape, CAL FIRE has broadened the scope to include communities beyond those bordering federal lands (California State Forester 2014).

Within Escondido, several communities were identified as high-risk WUI areas in the original 2001 Federal Register list and have since been reaffirmed or further defined in subsequent CAL FIRE assessments, including the 2025 Fire Hazard Severity Zone (FHSZ) maps. Recognized communities at elevated wildfire risk include:

- Felicita Park Area
- Del Dios
- San Pasqual Valley
- Citracado/West Escondido Foothills
- Lake Hodges Area
- El Norte Parkway Foothills
- East Valley Parkway Corridor
- Midway/La Honda Drive Area
- North Broadway Foothills

These areas face increased wildfire exposure due to factors such as steep topography, dense native vegetation, and proximity to open space or undeveloped wildlands. While not all were included in the original federal list, current state-level data and hazard mapping confirm their continued designation as communities at risk.

In addition to these recognized areas, this CWPP identifies additional at-risk neighborhoods based on local fire history, spatial hazard modeling, field assessments, and stakeholder input. For more detail on community-specific risk profiles and prioritization, refer to Chapter 3 and Appendix C.

1.7.3 Land Ownership

1.7.3.1 Public and Institutional Ownership

Land ownership within the City of Escondido's approximately 23,880-acre planning area is predominantly private, consisting of residential, commercial, and agricultural properties. These privately held lands are interspersed with public and institutional holdings that support critical functions such as recreation, habitat conservation, watershed protection, and wildfire risk reduction. Table 1.2 and Figure 1.4 provide the distribution of land ownership across the planning area.

Table 1.2. Public and Institutional Land Ownership Within the Planning Area

Owner	Acres within Planning Area
City of Escondido	4,790.16
San Diego County	417.54
Bureau of Land Management	40.76
Other Federal	9.76
State of California	13.33
State (Caltrans)	507.78
School Districts	516.94
Other Special Districts	604.05
Water Districts	30.60

City of Escondido (4,790 acres)

The City of Escondido is the largest public landowner in the planning area, managing several key WUI areas that support fire resilience, ecological management, and public recreation. Major sites include Daley Ranch (3,058 acres), Lake Wohlford, Lake Dixon, and surrounding habitat corridors and trails. These lands are actively managed for fuel reduction, habitat restoration, and community access.

San Diego County (418 acres)

The County of San Diego holds property within the Escondido area for public infrastructure and services, including regional parks, roadways, and flood control. County-owned lands are primarily located near foothill areas and along the southern boundary of the planning area.

School Districts (517 acres)

Local school districts manage over 500 acres of land for educational facilities and associated infrastructure. While most of these areas are developed, some sites include open space or vegetated edges that may intersect WUI zones.

Other Special Districts (604 acres)

Special district holdings include land owned by fire protection, community services, and other local agencies. These lands vary in use and location and represent important partners in wildfire planning and preparedness.

Water Districts (31 acres)

Water agencies within the planning area manage a small amount of land associated with reservoir facilities and watershed protection zones. These properties support both utility infrastructure and fire prevention objectives.

State Lands (521 acres)

State-owned properties include approximately 508 acres under California Department of Transportation (Caltrans) management, primarily for transportation corridors and rights-of-way, along with 13 acres of other state lands. These areas are generally undeveloped but may require vegetation management to reduce wildfire risk near critical infrastructure.

Federal Lands (51 acres)

Federal landholdings within the planning area include approximately 41 acres managed by the Bureau of Land Management (BLM) and 10 acres under other federal agencies. While limited in area, these parcels may require coordination for fuel reduction and cross-jurisdictional planning efforts.

Conservation and Regional Partnerships

Nonprofit organizations such as The Escondido Creek Conservancy and the San Dieguito River Valley Conservancy are active within and near the planning area. These groups hold conservation easements, conduct ecological restoration, and collaborate on wildfire resilience, habitat connectivity, and long-term land stewardship.

Although federal ownership within the city is limited, nearby open space areas such as the San Pasqual Valley and Lake Hodges contribute significantly to regional wildfire mitigation and conservation goals. These areas are supported by ongoing interagency and nonprofit partnerships.

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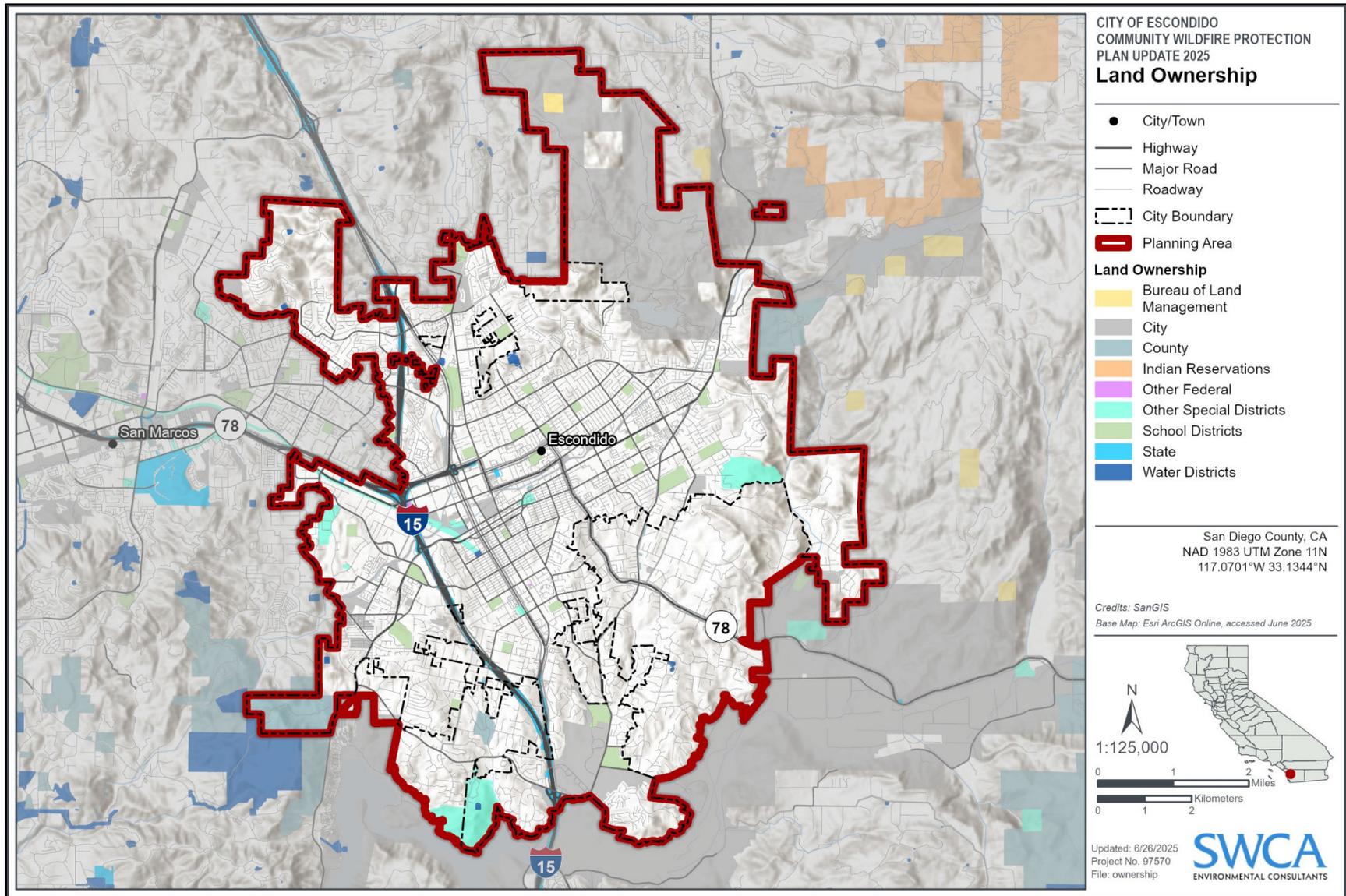
Figure 1.4. City of Escondido land ownership.

Note: Land ownership data used in this map were obtained from the California State Geoportal. Please note that these data may contain discrepancies.

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1.8   PUBLIC INVOLVEMENT

A key element in the CWPP process is the meaningful discussion it fosters among community members about priorities for local fire protection and forest management (Society of American Foresters 2004). The draft CWPP was available for public review from August 15 through August 29, 2025. During this period, the City and project team hosted public meetings and events to gather community input, as detailed in Appendix F, which provides a full description of the outreach process and summarizes community survey results.

Every effort was made to engage a broad cross section of the community through multiple communication channels, including social media posts, an online community survey, and an online public comment form. In-person outreach included participation in Escondido's annual National Night Out on August 5, 2025. A public outreach meeting was also held on September 9, 2025, from 6:00 to 7:30 p.m. to present the CWPP and discuss its recommendations. Community members were encouraged to participate in all outreach activities and were provided with several opportunities to share feedback, including through the community survey and the public review period for the draft CWPP.

Recommendations for future community engagement and outreach are provided in Chapter 4, Table 4.4.

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue. Detailed information on these programs is provided in Appendix B.

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CHAPTER 2   FIRE ENVIRONMENT

2.1   WILDLAND-URBAN INTERFACE

The wildland-urban interface (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 (USDA 2001). 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

According to the HFRA and the CAL FIRE California CWPP Guide/Toolkit, CWPPs must identify and map the WUI. For this plan, WUI boundaries were established using CAL FIRE's FRAP 2019 WUI datasets. A 1.5-mile buffer was applied to the WUI boundary to represent the broader influence zone, areas where conditions exist that can facilitate the spread of fire from wildland fuels to homes and other structures.

The WUI represents an environment where fire can move readily between structural and vegetative fuels, increasing the risk of wildland fire ignitions and the potential loss of life and property. As human development continues to expand into wildland ecosystems, the extent of the WUI grows, influencing fire management practices across the city.

Figure 2.1 illustrates the WUI for the Escondido CWPP planning area, broke up into influence zone, intermix, and interface.
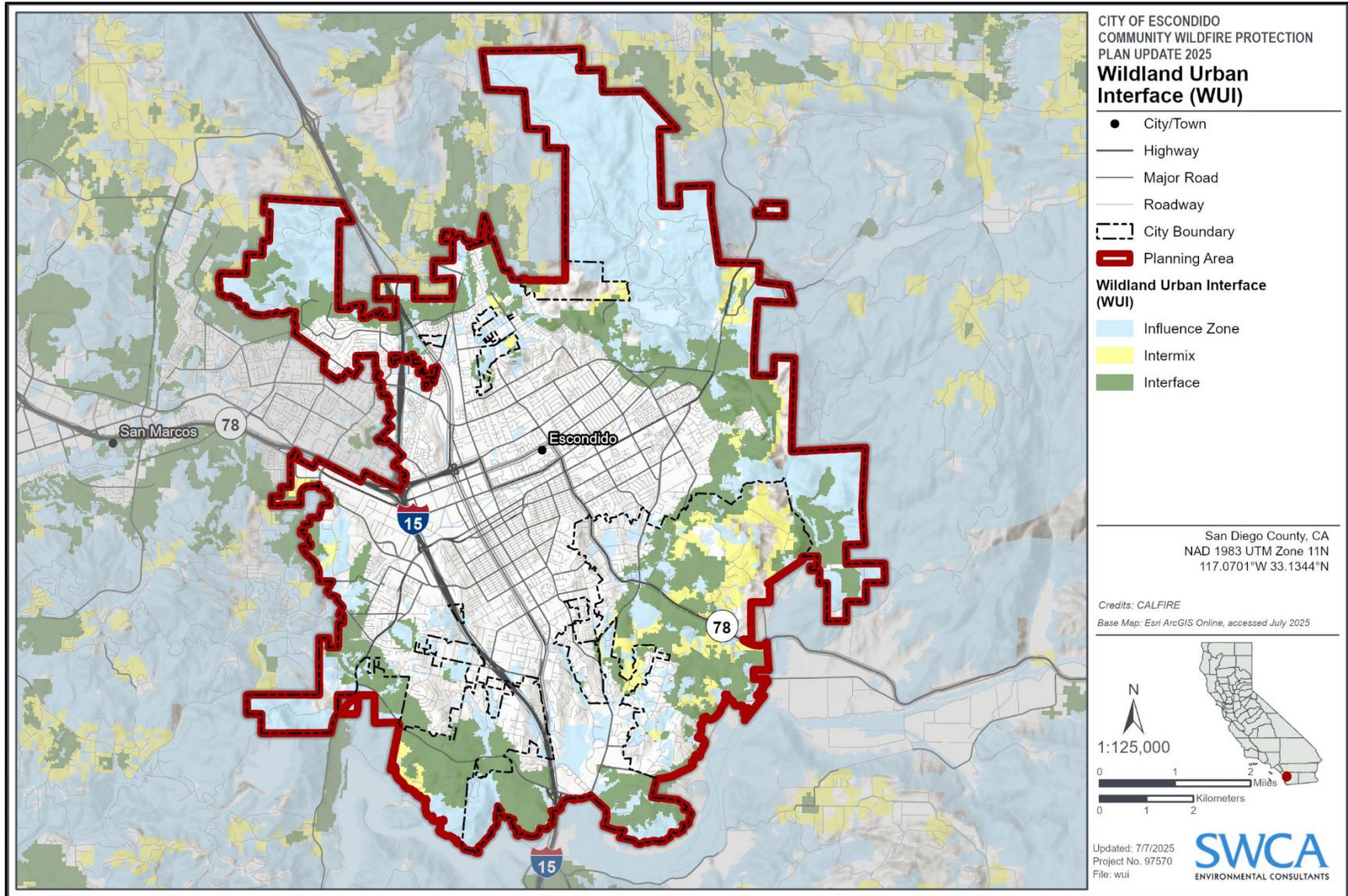
Figure 2.1. Escondido CWPP WUI delineations.

2.1.1   WUI Land Use

California cities continue to face critical challenges in providing safe, affordable housing. By 2030, an estimated 2.5 million new homes will be needed statewide, with at least 1 million designated for low-income households (California Department of Housing and Community Development 2022). Many of these new housing units are being constructed near wildland areas, increasing development within the WUI. Across the United States, more than 46 million homes in approximately 70,000 communities are at risk of wildfire due to their location in the WUI (USFS n.d).

According to CAL FIRE's Strategic Fire Plan, California has seen a significant increase in the number of structures destroyed by wildfire, underscoring the growing vulnerability of communities in the WUI (CAL FIRE 2018). In recent years, large and destructive fires have occurred more frequently in areas where housing and wildland vegetation overlap, placing additional strain on emergency response systems and public safety infrastructure.

To address these challenges, the City of Escondido has adopted a comprehensive fire code that sets minimum safety standards for buildings, operations, and land use. The code emphasizes fire prevention, protection, life safety, and the regulation of hazardous materials (City of Escondido 2025a). Additionally, the County of San Diego has strengthened its fire and building codes, resulting in a measurable reduction in structure loss compared to areas governed by less stringent regulations. These updates include ignition-resistant construction standards, required fuel modification zones, residential fire sprinkler systems, and minimum water supply requirements such as strategically located water tanks. Together, these measures help reduce wildfire risk to homes and improve community resilience in fire-prone areas.

2.1.2   Vegetation

The City of Escondido contains a diverse mosaic of native vegetation communities that shape wildfire behavior across the landscape. (City of Escondido, 2012; 2001) These plant communities are especially important in the WUI, where undeveloped open space meets residential and commercial development. Dominant vegetation types include chaparral, coastal sage scrub, oak woodland, grasslands, and riparian corridors. Each exhibits distinct fire ecology and natural fire return intervals that influence landscape-level fire patterns (Los Padres Forest Watch, 2019)

Although many of these communities are fire-adapted, their structure, species composition, and ecological function can be altered by extended fire exclusion or the spread of invasive species (Agee 2005). These shifts may disrupt natural fire regimes and increase the likelihood of high-intensity fire (Syphard, Keely, et al. 2006). The presence and condition of native vegetation play a key role in determining wildfire behavior and ecosystem resilience.

For further detail on how vegetation influences modeled fire behavior in Escondido, see the Quantitative Wildfire Risk Assessment section in Chapter 3.

2.1.2.1   Chaparral

Chaparral is the most extensive vegetation type within Escondido's WUI. It is characterized by dense, evergreen shrubs such as chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos* spp.), ceanothus (*Ceanothus* spp.), and scrub oak (*Quercus berberidifolia*). These communities are adapted to infrequent, stand-replacing fires with natural fire return intervals ranging from 30 to 100 years (Zedler et

al. 1983). Chaparral supports rich biodiversity and post-fire regeneration strategies, including seed banks and resprouting mechanisms.

2.1.2.2 Coastal Sage Scrub

Found at lower elevations and on south- and west-facing slopes, coastal sage scrub includes species such as California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), and white sage (*Salvia apiana*). Historically, this community burned at intervals of 20 to 40 years (Keeley 2006; Minnich and Dezzani 1998). Coastal sage scrub is adapted to periodic fire but is highly vulnerable to conversion by invasive grasses when fire occurs too frequently, reducing native cover and habitat value.

2.1.2.3 Oak Woodland

Oak woodlands occur along foothills and valley margins and are dominated by coast live oak (*Quercus agrifolia*), Engelmann oak (*Quercus engelmannii*), and associated species such as sycamores (*Platanus racemosa*). These systems historically experienced low- to moderate-severity fires every 10 to 25 years (Stephens et al. 2007). Fire plays an important ecological role in promoting acorn germination and maintaining a diverse herbaceous understory. Extended fire exclusion can lead to denser understories and increased competition for water and light.

2.1.2.4 Riparian Corridors

Riparian areas support a mix of moisture-tolerant native vegetation, including willows (*Salix* spp.), mule fat (*Baccharis salicifolia*), cottonwoods (*Populus fremontii*), and sycamores. While native riparian plants are typically less flammable due to higher moisture content, the encroachment of nonnative species such as *Arundo donax*, *Tamarix* spp., and *Eucalyptus* increases vegetation density and alters fire behavior in these corridors (Brooks et al. 2004; Coffman et al. 2010). These areas also serve as critical habitat and migration corridors for sensitive species.

2.1.2.5 Nonnative Grasslands

Grasslands in Escondido are composed of both native perennial bunchgrasses and widespread nonnative annual grasses, including red brome (*Bromus madritensis*) and ripgut brome (*Bromus diandrus*). These communities historically experienced frequent low-intensity fires every 5 to 10 years, often due to lightning or Indigenous land stewardship (Anderson 2005). Native grasslands are typically more resilient to fire, while nonnative grasslands are prone to rapid ignition and can carry fire across the landscape more easily, especially under windy conditions.

Understanding the structure and fire ecology of these vegetation types is essential for effective land management, conservation, and community protection.

2.2   TOPOGRAPHY

Topography significantly influences fire behavior by affecting the rate and direction of fire spread. Fires tend to accelerate as they move upslope due to increased exposure to wind, preheating of fuels above the flame front, and enhanced heat transfer (National Wildfire Coordinating Group [NWCG] 2024; Pyne et al. 1996). The interaction between topography and wind plays a crucial role in wildfire dynamics. Valleys

and canyons can funnel winds, increasing wind speed and flame lengths, while ridges can alter wind patterns and create unpredictable fire behavior (Countryman 1972). In Escondido, topography further amplifies wildfire risk. Steep slopes can dramatically increase the rate of fire spread. Narrow canyons and drainage corridors concentrate heat and wind, intensifying fire behavior and making suppression more difficult, especially when the topographic features align with wind direction. These conditions are further compounded by seasonal Santa Ana winds, which funnel through the region during late summer and fall. Under these wind-driven conditions, wildfires can spread rapidly across fuel-rich landscapes and pose serious threats to developed areas (Billmire et al. 2014).

The City of Escondido, with elevations ranging from approximately 650 to 2,800 feet above mean sea level (amsl), exhibits a varied and complex topography (City of Escondido 2022). The landscape is composed of rolling inland foothills, granite outcroppings, and steep terrain dissected by a network of valleys and drainages that primarily flow southwest toward the Pacific Ocean. These contours shape local microclimates and influence vegetation distribution, fuel moisture, and fire behavior (U.S. Geological Survey 2022;John et, al 2024). This terrain supports a range of land uses, including residential, commercial, and industrial development in flatter areas, agriculture in floodplains and gentle drainages, and recreation in the open space preserves and rugged hills surrounding the city.

2.3   CLIMATE AND WEATHER PATTERNS

Escondido has a hot-summer Mediterranean climate, with increasing aridity in inland valleys and foothills, including the Escondido Valley (PRISM 2022; Western Regional Climate Center [WRCC] 2023). The city receives about 15 inches of annual precipitation, with 65% to 70% falling between December and March during cooler, frontal storm systems (National Oceanic and Atmospheric Administration [NOAA] 2023). Summers from July through September are typically hot and dry, contributing only 5% to 10% of yearly rainfall. While occasional summer thunderstorms may occur due to monsoonal moisture, significant rainfall is rare (WRCC 2023).

Located at an elevation of approximately 650 feet amsl, Escondido lies downstream of the higher Palomar and Laguna Mountains, where winter storms often bring snow above 5,000 to 7,000 feet amsl. Snowmelt and runoff from these areas affect local watersheds, influencing erosion, sedimentation, and flash flood potential.

Annual precipitation is highly variable. Wet years like 2011, 2017, 2019, and 2023 contrast sharply with drought years such as 2012–2016, 2018, and 2020–2022. This variability reflects broader Southern California climate patterns and is increasingly influenced by atmospheric rivers, narrow bands of tropical moisture that can deliver intense rainfall. A recent example is Tropical Storm Hilary in August 2023, which brought several inches of rain to inland San Diego County in under 48 hours, causing localized erosion and debris flow in foothill areas (NBC San Diego 2023).

Persistent high-pressure systems dominate Escondido's summer climate, blocking mid-latitude storms and contributing to prolonged heat and dryness. At times, monsoonal moisture from the Gulf of California can trigger brief but intense thunderstorms, which may lead to flash flooding, erosion, or lightning-induced wildfires.

To assess wildfire-related climate conditions, this CWPP references the 1991–2020 climate normals published by the National Centers for Environmental Information (NCEI), following World Meteorological Organization standards (NCEI 2021). These 30-year averages provide a stable baseline for evaluating fire season trends, fuel moisture, and ignition potential. Supplemental data from 2021–2023 are also included in Table 2.1, capturing recent variations in temperature and precipitation (California Public Utilities Commission [CPUC] 2023; WRCC n.d.). In this CWPP, *supplemental data* refer to observational climate data from two Escondido weather stations: NOAA's Cooperative Observer Program station ("Escondido 1") and the WRCC's station 042863 ("Escondido 2"), gathered via NOAA's Climate Data Online and WRCC databases. These provide a current snapshot of Escondido's climate conditions beyond the normals and reflect short-term variability that may influence fire behavior and planning decisions. This combined climate context supports seasonal fire behavior modeling, fuel treatment planning, and risk mitigation strategies throughout the CWPP.

Table 2.1. Escondido Climate Normals

Station	Period of Record	Average High Temp (°F)	Average Low Temp (°F)	Mean Annual Temp (°F)	Average Precipitation (inches)
Escondido 1 (~650 feet)	1931–1979	77	54	65	15
Escondido 2 (WRCC site, ~650 feet)	1979–2013	77	53	65	15
NCEI Climate Normals	1991–2020	77	53	65	14.7
Supplemental Data	2021–2023	78	54	66	11.7

2.3.1 Influence of Santa Ana Winds

Santa Ana winds are one of the most significant contributors to wildfire ignition, spread, and severity in Southern California, including the City of Escondido (Westerling et al. 2006). These strong, dry offshore winds typically occur between September and April, with peak activity in the fall and early winter. They are driven by high-pressure systems over the Great Basin that force air toward the coast, accelerating as it moves through mountain passes and canyons (Raphael 2003). In addition, Santa Ana conditions are characterized not only by high wind speeds and gusts, but also by extremely low humidity, which significantly elevates wildfire risk.(Billmire 2014).

In Escondido, the topography of the surrounding foothills and canyons, including areas near Daley Ranch, Lake Wohlford, and the San Pasqual Valley, makes the city especially vulnerable to the effects of

Santa Ana winds. As these winds descend to lower elevations, they compress and warm, which significantly lowers humidity levels and rapidly dries out vegetation (Moritz et al. 2010). This process results in extremely flammable fuels, even if conditions were relatively moist just days earlier (Dennison et al. 2008).

When combined with dry fuels, steep terrain, and dense development in the WUI, Santa Ana winds can quickly turn a small ignition into a fast-moving wildfire. Historical examples include the 2003 Cedar Fire, the 2007 Witch Creek Fire, and the 2014 Cocos Fire. Each of these fires caused significant damage in the region and were intensified by Santa Ana conditions (California Fire Coordination Group 2004; NWS San Diego 2016; AlertSanDiego 2014)

Santa Ana wind events are especially dangerous because they often occur at the end of the dry season when vegetation is already stressed. These wind patterns can also happen outside of the traditional fire season, catching communities off guard. Suppression efforts become more difficult during these events due to unpredictable wind shifts, long-distance ember transport, and rapid fire spread (Jin et al. 2015).

To prepare for these conditions, local and regional fire agencies rely on Red Flag Warnings, wind forecasting tools, and pre-positioned firefighting resources. Public outreach efforts also encourage residents to maintain defensible space, harden their homes, and be ready to evacuate when fire weather conditions are expected. Strategies for building greater preparedness and resilience in relation to Santa Ana wind events are outline in Chapter 4, Mitigation Strategies.

2.4   FIRE HISTORY

2.4.1 Past Management

Fire has historically played an important role in maintaining the health and diversity of California's ecosystems (Sugihara et al. 2006). Many of these landscapes are fire-adapted or fire-dependent. Indigenous tribes used fire intentionally to manage vegetation, promote wildlife habitat, and support ecosystem balance (Anderson 2005; Lake and Long 2014). The arrival of European settlers in the 1800s, however, brought about strict fire suppression policies that disrupted these traditional practices and altered natural fire cycles.

In many forested ecosystems, prolonged fire exclusion has led to unnatural fuel accumulation and increased fire severity. The chaparral-dominated landscapes of Southern California, including those around Escondido, face a different challenge related to excessive fire frequency. These shrublands evolved with infrequent, high-intensity fires at intervals of 30 to 100 years (Fotheringham 2001). When fires occur too frequently, the native shrub community cannot recover, and flammable, fast-spreading nonnative grasses can invade and dominate the landscape (D'Antonio and Vitousek 1992; Zedler et al. 1983).

As a result, wildfire resilience strategies in Escondido must emphasize fire prevention, ignition reduction, structural hardening, and targeted suppression (California Wildfire and Forest Resilience Taskforce 2025). Prescribed burning is less appropriate in these areas because it can accelerate vegetation type conversion in sensitive habitats.

2.4.2 Recent Fire Occurrence

Escondido and nearby communities are highly vulnerable to wildfire due to steep surrounding terrain, flammable native (and nonnative) vegetation, development along the WUI leading to an increased presence of humans, and recurring Santa Ana wind events (City of Escondido 2025b; Moritz et al. 2010).

In 2003, the region experienced two major fires: the Cedar Fire and the Paradise Fire (CAL FIRE 2023a; 2023b). Together, these fires burned more than 300,000 acres across San Diego County, destroyed approximately 2,500 homes, and caused 17 fatalities. They also forced the evacuation of hundreds of thousands of residents. These fires were pushed westward by strong Santa Ana winds, which funneled flames from rural canyons deep into urban neighborhoods (CAL FIRE 2003a; CAL FIRE 2003b).

The Witch Creek Fire in 2007 remains one of the most destructive wildfires in California history. It ignited east of Escondido and spread rapidly, burning nearly 198,000 acres and entering Escondido city limits. The fire destroyed over 1,100 homes, injured 40 firefighters, and caused the deaths of two civilians (CAL FIRE 2025b; CAL FIRE 2007). Historical wildfire occurrences within Escondido's municipal boundary are shown in Figure 2.2.

In 2014, the Cocos Fire ignited near San Marcos and quickly spread into western Escondido. The fire burned nearly 2,000 acres and destroyed more than 40 structures, many of them homes (CAL FIRE 2015). This event further highlighted the speed at which fires can move into developed areas under dry and windy conditions.

2.4.3 Future Challenges

In January 2025, Southern California experienced an unprecedented winter fire event. Numerous fires, including the Palisades Fire and Eaton Fire, burned more than 37,000 acres, destroyed over 17,000 structures, and led to the evacuation of at least 170,000 people (CAL FIRE 2025d; 2025f). These fires were driven by a combination of prolonged drought, heavy brush and grass growth from earlier rains, record-strength Santa Ana winds, and an unstable jet stream pattern (CAL FIRE 2025

c; CAL FIRE 2025d). Winter wildfires are historically rare in Southern California, but this event has increased concern that wildfire is now a year-round threat. In response, state lawmakers called for year-round staffing for firefighting agencies (CA WFRTF 2024).

Escondido is especially at risk under similar conditions. Repeated droughts followed by rainy periods have allowed grass and shrublands to flourish, only to dry out and become hazardous fuels during hot, windy periods. Further, shortened fire return intervals (more frequent fire occurrences) have caused changes in the natural vegetative structure, leading to reduced fire resilience and potentially greater ignitability (Keeley and Brennan 2012; Syphard et al. 2019). The city's foothill areas are particularly vulnerable when downslope Santa Ana winds pass through eastern San Diego County. Homes near undeveloped and densely vegetated open space, especially those with limited defensible space or a high presence combustible material, face increased exposure to potential ignitions from flames and embers (CAL FIRE 2022; National Fire Protection Association [NFPA] 2023).
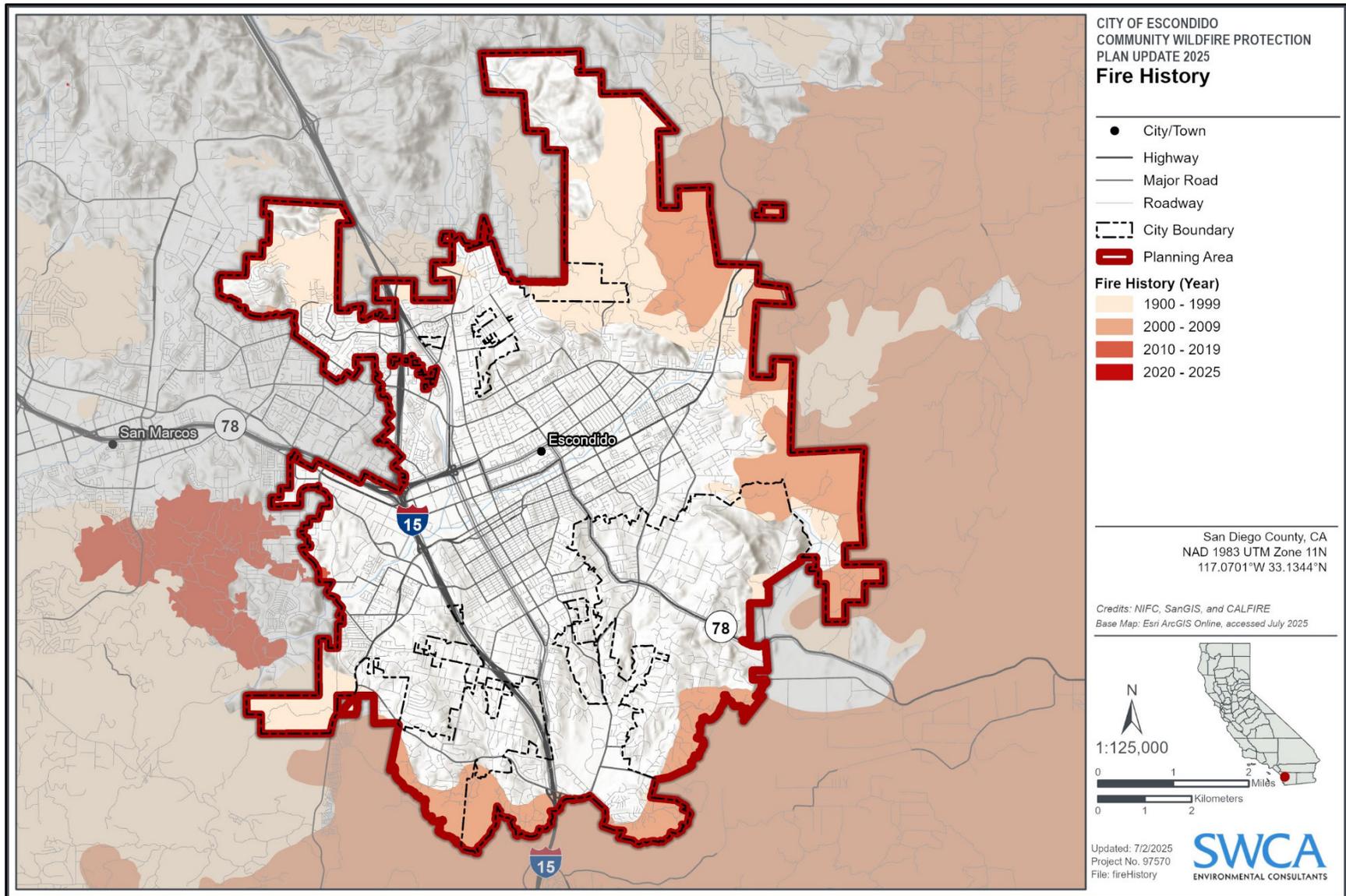
Figure 2.2. City of Escondido fire perimeter history, 1900 through 2025.

2.5   FIRE RESPONSE CAPABILITIES

Fire protection services in Escondido are primarily provided by the Escondido Fire Department, which serves the incorporated city limits. Surrounding unincorporated areas, including rural and semi-rural communities, are served by the Rincon del Diablo Fire Protection District (FPD). Rincon del Diablo FPD contracts with the Escondido Fire Department for full fire and emergency medical service coverage, creating a unified response area of approximately 50 square miles across city and adjacent lands (RDFFPD 2024) (see Figure 2.3).

Rincon del Diablo Municipal Water District plays a key administrative and logistical role in supporting the Rincon del Diablo FPD. The water district is the legal governing authority for the fire district and manages administrative functions such as budgeting, contracting, and infrastructure planning. This relationship enables integrated coordination between water supply systems and fire protection services, which is especially critical for maintaining reliable hydrant networks, ensuring water availability, and supporting long-term emergency planning in the wildland-urban interface.

Both agencies are responsible for wildfire prevention, suppression, and emergency response within their jurisdictions. They share training resources, collaborate on pre-fire planning, and operate under a joint fire service model that enhances response capabilities across the region.

Figure 2.4 outlines the fire protection districts that surround the planning area.

2.5.1   Interagency Coordination

The Escondido Fire Department and Rincon del Diablo FPD operate within a broader fire protection framework that divides land into Local, State, and Federal Responsibility Areas. Most of the planning area falls within State Responsibility Areas (SRAs), where the California Department of Forestry and Fire Protection (CAL FIRE) is the lead agency for wildland fire protection. (CAL FIRE 2023c; Escondido Public Library 2017) Coordination between the Escondido Fire Department, Rincon del Diablo FPD, CAL FIRE, the U.S. Forest Service (USFS), and the San Diego County Fire Authority is supported by mutual aid agreements and participation in regional response systems. (Cal OES 2014; San Diego County 2022)
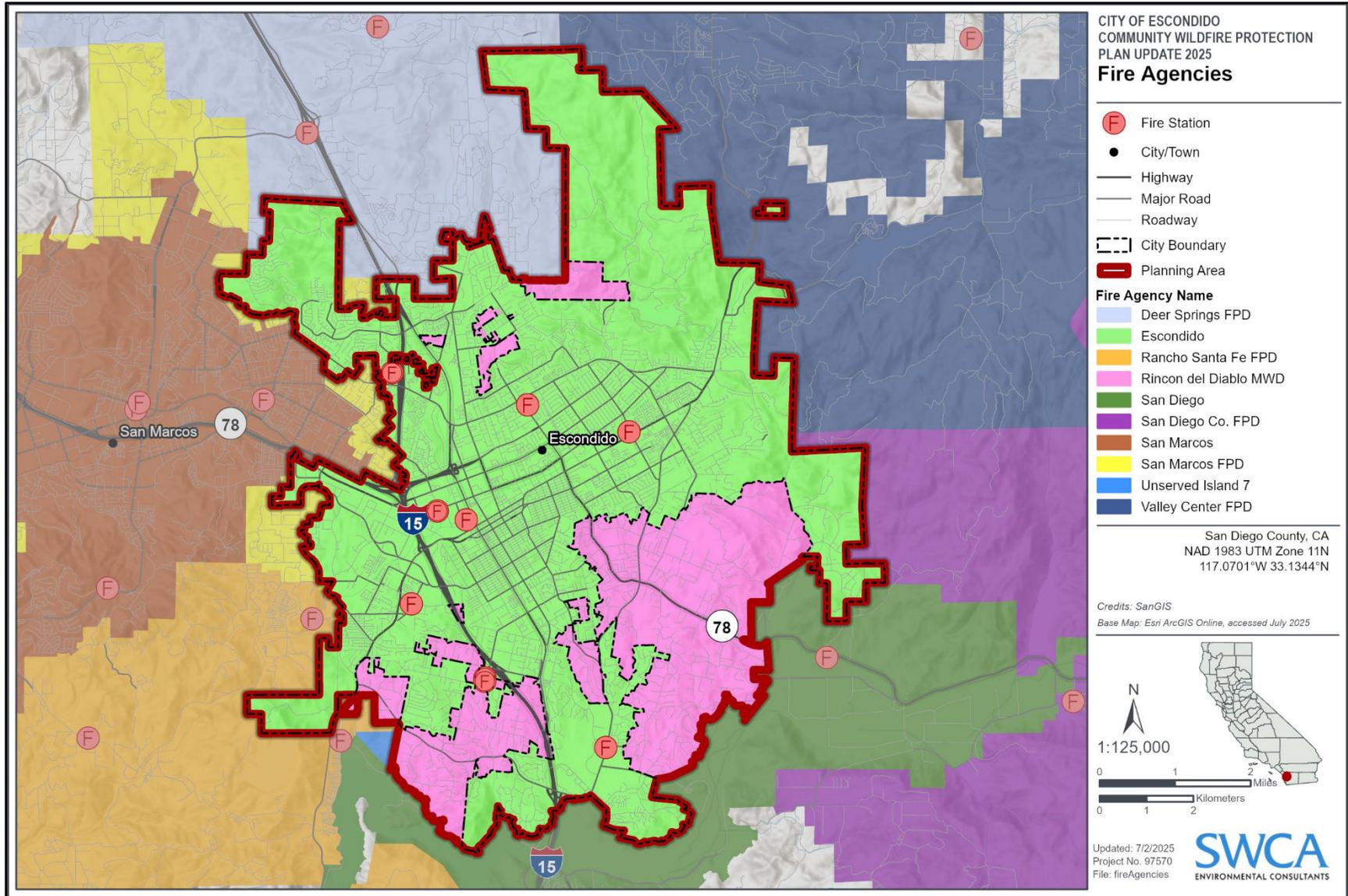
Figure 2.3. Fire agencies in and around Escondido.
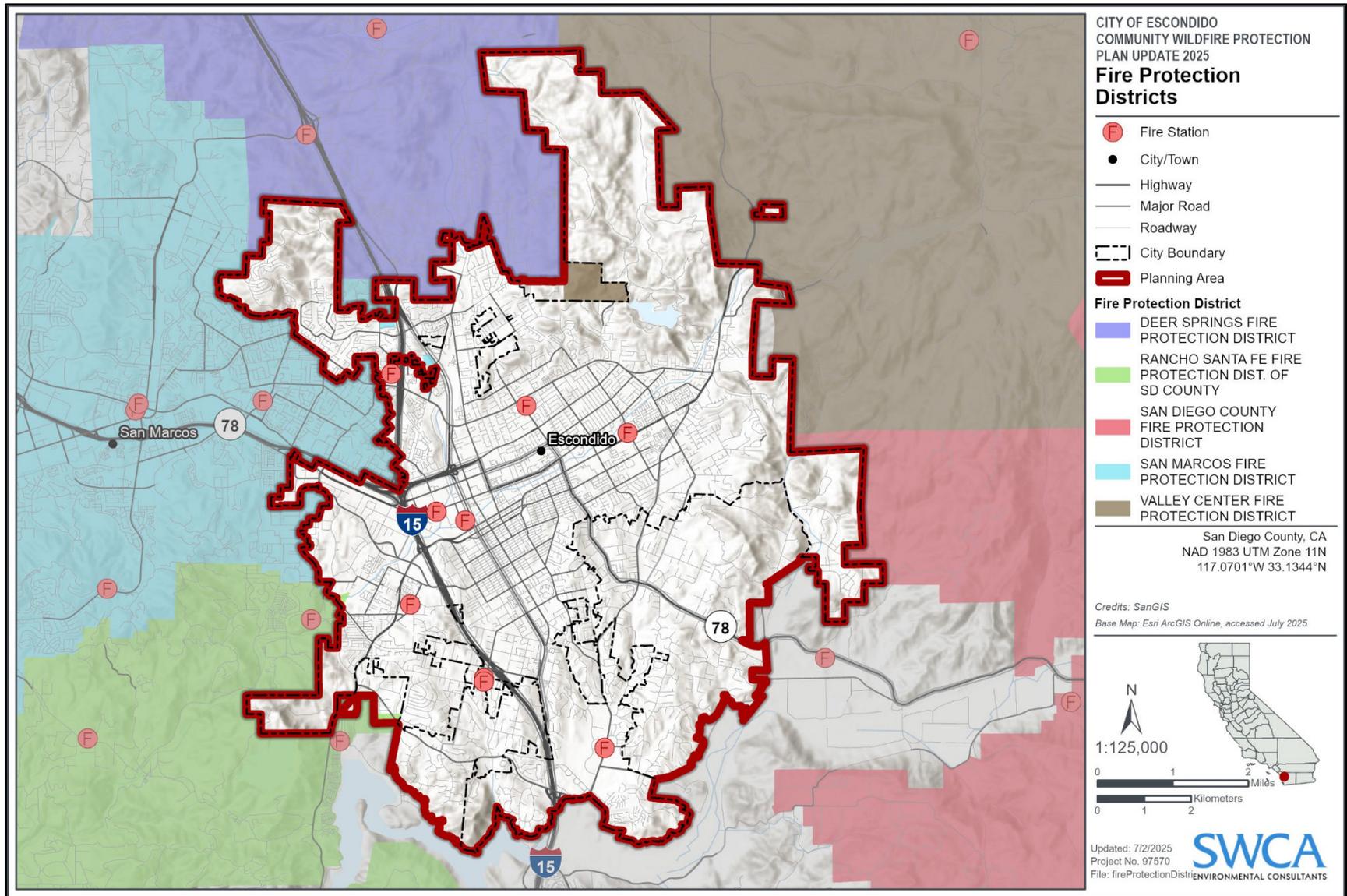
Figure 2.4. Fire protection districts in Escondido.

These agreements ensure that personnel and equipment can be deployed rapidly during major incidents, improving efficiency and safety across jurisdictional boundaries.

2.5.2   State Response

The CAL FIRE San Diego Unit provides wildfire suppression, prevention, and resource management in SRAs surrounding Escondido. CAL FIRE operates a network of fire stations, air bases, and conservation camps and works closely with local and federal partners. In addition to suppression, the CAL FIRE San Diego Unit supports:

- Vegetation management and fuel break construction

- Prescribed fire planning and implementation

- Defensible space inspections and enforcement

- Fire prevention grants and community outreach

- Public education campaigns such as Ready, Set, Go! and Firewise USA®

CAL FIRE also provides support for incidents in Local Responsibility Areas (LRAs) and Federal Responsibility Areas (FRAs) through established cooperative agreements (CAL FIRE 2025j).

2.5.3   Federal Response

Approximately 41 acres of BLM land in or near Escondido fall under FRA jurisdiction. Wildfire response and land management on these parcels are overseen by BLM and USFS. Although limited in size, these lands are located near high-risk areas such as the San Pasqual Valley and Lake Wohlford and require close coordination with CAL FIRE and local agencies.

Under cooperative fire agreements, CAL FIRE typically leads initial attack when wildfires affect multiple jurisdictions. Federal resources provide scalable support during extended or complex incidents and contribute to the region's overall wildfire readiness. (San Diego County 2025).

2.5.3.1 Aerial Water Sources and Support

Aerial firefighting plays a critical role in suppressing wildfires in difficult terrain or during rapid fire spread. Helicopters and fixed-wing aircraft provide valuable support for initial attack and structure defense, especially when ground access is limited.

Helicopters may collect water from a variety of sources, including:

- Local reservoirs and lakes such as Lake Wohlford, Lake Dixon, and Lake Hodges

- Creeks, ponds, and riparian areas, provided they are accessible and safe for dipping

- Portable dip tanks staged near the fire line and supplied by water tenders

All helicopter dip sites must be large, deep, and free of obstructions to ensure safe operations. These locations are vetted and approved by aerial supervisors prior to use.

Fixed-wing airtankers are typically loaded at dedicated air attack bases with water, gel, or long-term fire retardant. The Ramona Air Attack Base, approximately 25 miles southeast of Escondido, is the closest base supporting CAL FIRE airtankers and air attack aircraft. This is the oldest airtanker base in California and remains the primary site for rapid aerial response in the region. (San Diego County 2025; KPBS 2025)

During large-scale incidents, additional aircraft may be deployed from:

- Hemet-Ryan Air Attack Base
- San Bernardino Tanker Base
- March Air Reserve Base, Victorville, or McClellan Reload Base for Very Large Airtankers (VLATs)

Temporary helibases may also be established near active fires to reduce turnaround times and improve logistical support for helicopter operations.

2.5.3.2 Aerial Firefighting Agencies

Aerial firefighting in Escondido and the greater San Diego region is primarily managed by CAL FIRE's San Diego Unit Aviation Program. CAL FIRE operates a mixed fleet of aircraft, including:

- Helicopters, such as Bell UH-1H Super Hueys and Sikorsky S-70i Firehawks
- Fixed-wing airtankers and OV-10 Bronco air attack aircraft

These resources are deployed from Gillespie Field Helitack Base in El Cajon and Ramona Air Attack Base, depending on fire behavior and aircraft availability. In addition to CAL FIRE, the San Diego County Sheriff's Office Aviation Unit (ASTREA) may assist with water bucket operations from helicopters based at Gillespie Field, especially for localized support.

All aerial operations are coordinated through CAL FIRE San Diego Unit in partnership with the Federal Interagency Communication Center (CAL FIRE 2025b). The assignment of aircraft and selection of water sources depend on fire location, terrain, weather conditions, and operational priorities (CAL FIRE 2025a).

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CHAPTER 3   RISK-HAZARD ASSESSMENT

3.1   PURPOSE

The completion of a Quantitative Wildfire Risk Assessment (QWRA) provides land use managers, fire officials, and planners with critical information to develop targeted strategies for reducing wildfire threats. This assessment not only informs land use and mitigation planning efforts but also supports outreach and education initiatives to engage community members in minimizing fire-related risks. For this CWPP update, areas of high wildfire hazard and risk are identified using the QWRA process through the modeling of fire behavior, burn probability, and fire intensity, along with evaluating the exposure and susceptibility of structures, critical infrastructure, and HVRAs.

Stakeholder and expert input further guide the QWRA process, ensuring recommended fuel treatments are prioritized according to wildfire risk. For further details on fuels treatments and other risk reduction activity, refer to Chapter 4 (Mitigation Strategies) and Appendix G (Pre-Fire Fuel Treatment Types and Methods).

The QWRA provides a community- and landscape-level overview of wildfire risk and is not intended for use at smaller scales (such as for a property-level analysis). It is also not recommended for use in determining insurance rates or policies. This QWRA is a model, and as such contains inherent biases, missing data, and other shortcomings, though every effort has been made to include the best available data and use the most robust scientific processes. Also note that just because an area is shown as high or low risk does not mean that that area will be burned or not burned in a wildfire; a low-risk area may still be affected by wildfire under certain conditions. This QWRA is also not intended for use during active wildfire events, but rather only as a tool for pre-fire planning. It is not recommended that this QWRA be used for any other purpose than what is stated here.

In addition to the desktop QWRA, this CWPP also leverages a field wildfire hazard and risk assessment, completed in July 2025, which is discussed below and in Appendix C.

3.2   FIELD-BASED COMMUNITY HAZARD ASSESSMENTS

Community Hazard Assessments were conducted in July 2025 using an adapted version of the NFPA Wildland Fire Risk and Hazard Severity Form 1144 (see Appendix C). This form is based on the *NFPA Standard for Reducing Structure Ignition Hazards from Wildland Fire*, 2013 edition. The purpose of the Community Hazard Assessment and subsequent ratings is to identify fire hazard and risks and prioritize areas requiring mitigation and more detailed planning. These assessments should not be seen as tactical pre-suppression or triage plans. The Community Hazard Assessment supports recommendations for mitigation of structural ignitability, community preparedness, and public education.

Each area was rated based on conditions within the community and immediately surrounding structures, including access, adjacent vegetation (fuels), defensible space, adjacent topography, roof and building characteristics, available fire protection, and placement of utilities. Each score was given a corresponding adjective qualitative rating of low, moderate, high, or extreme (Table 3.1).

Table 3.1. Field-Based Community Hazard Assessment Summaries

Community Name	Total Risk Score	Hazard Rating
Avenida Del Diablo/Quail Glen/Del Dios Highlands	86%	Extreme
El Norte Hills/Eureka/La Honda/Lake Wohlford/Dixon	78%	High
Emerald Heights/High Point/Country Club	72%	High
Hidden Trails	76%	High
Idaho East/Rancho San Pasquel/Mountain View/Orange Glen	83%	Extreme
Iris	78%	High
Kauana Loa	75%	High
Lake Hodges/Lomas Serenas	90%	Extreme
Summit/Ryan/Sonata	98%	Extreme
Kit Carson Park	83%	Extreme
Rincon/North Broadway	74%	High

Note: More detailed information is provided in Appendix C.

3.3   EXISTING INFORMATION

3.3.1 California Fire Hazard Severity Zones

In accordance with the Public Resources Code (PRC) 4202, CAL FIRE maintains Fire Hazard Severity Zone (FHSZ) data for the entire state. The FHSZs rely on the most advanced scientific data and are determined by considering key factors such as vegetation, topography, and weather (CAL FIRE 2023a). In 2025, CAL FIRE released updated FHSZ maps for LRAs. These maps guide city development

standards by increasing requirements for new buildings to include fire-resistant features and defensible spaces in high-risk areas. New construction in these zones must comply with ignition-resistant standards, and property sellers must disclose hazard designations during real estate transactions. While the maps won't affect insurance coverage, the City Council must adopt them through an ordinance (City of Escondido 2025c). (CDI 2021)

The updated CAL FIRE FHSZ mapping (Figure 3.1) indicates that the vast majority of undeveloped WUI areas along the perimeter of the city are classified as Moderate, High, or Very High FHSZ. The northern border predominantly falls under the Very High hazard category, transitioning to a mix of High and Moderate zones toward the city's urban core. In contrast, the eastern and western borders of the city form a more continuously developed corridor that is unrated (not marked as Moderate, High, or Very High hazard). Meanwhile, the southern city border is largely designated as Very High hazard, interspersed with enclaves of additional Very High, High and Moderate zones, surrounded by developed areas with lower, undesignated hazard levels

It should be understood that FHSZs assess wildfire hazard, not risk. According to CAL FIRE, "hazard" reflects the likelihood and expected fire behavior based on physical conditions, while "risk" considers the potential damage under current conditions, including mitigation measures. While FHSZs are useful for assessing hazards, this CWPP goes further by evaluating both hazard and risk to better guide fire planning and mitigation efforts across the city.

3.3.2   CPUC Fire Threat Mapping

The California Public Utilities Commission (CPUC) fire threat mapping was developed to identify areas of elevated wildfire risk specifically for utility planning and risk reduction activities. Created in collaboration with CAL FIRE, emergency services, utilities, and other stakeholders, the map divides utility service territories into three risk tiers: Tier 1 (Acceptable), Tier 2 (Elevated), and Tier 3 (Extreme). These tiers are used to guide where enhanced fire safety regulations and mitigation measures are required. Figure 3.2 shows that small portions along the northern and western perimeters of the city are designated as Tier 3 threat zones. A larger portion of Tier 2 threat areas is found surrounding the city's perimeter in all directions except the continuous urban band along State Route 78. There are no Tier 1 threat zones in the planning area.

While the CPUC fire threat map includes some elements of wildfire risk, it is narrowly focused on the potential for utility infrastructure, such as overhead power lines, to ignite and contribute to wildfires. As such, the map's risk designations are directly tied to the presence and operation of utility assets, rather than providing a comprehensive assessment of wildfire risk to broader community values or natural resources. This targeted approach ensures that utilities prioritize risk reduction where their infrastructure poses the greatest threat, but it may not fully address wildfire risks in areas without utility infrastructure or where other values are at stake (CPUC 2025a, 2025b).
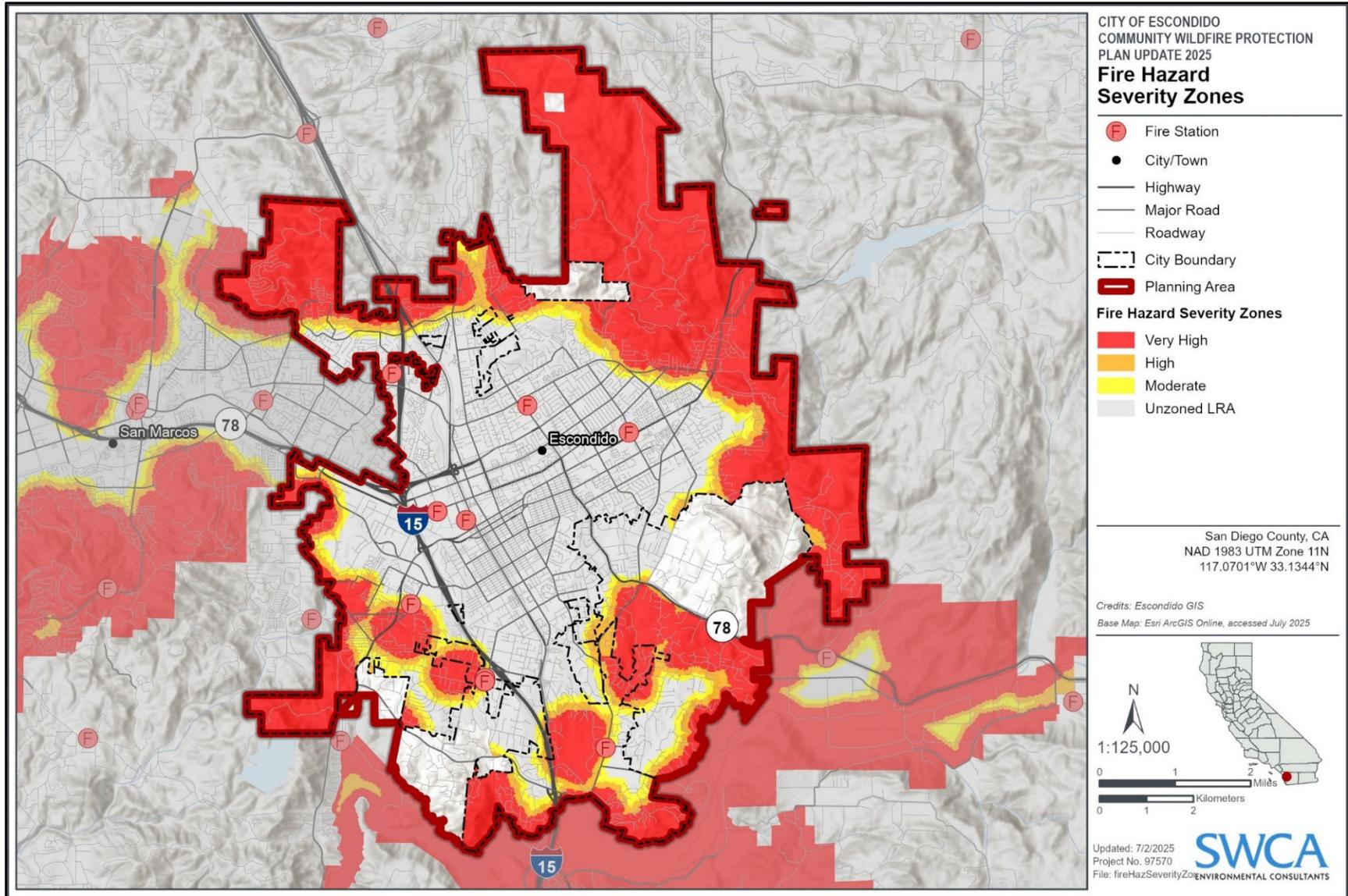
Figure 3.1. LRA FHSZs in the City of Escondido CWPP planning area.
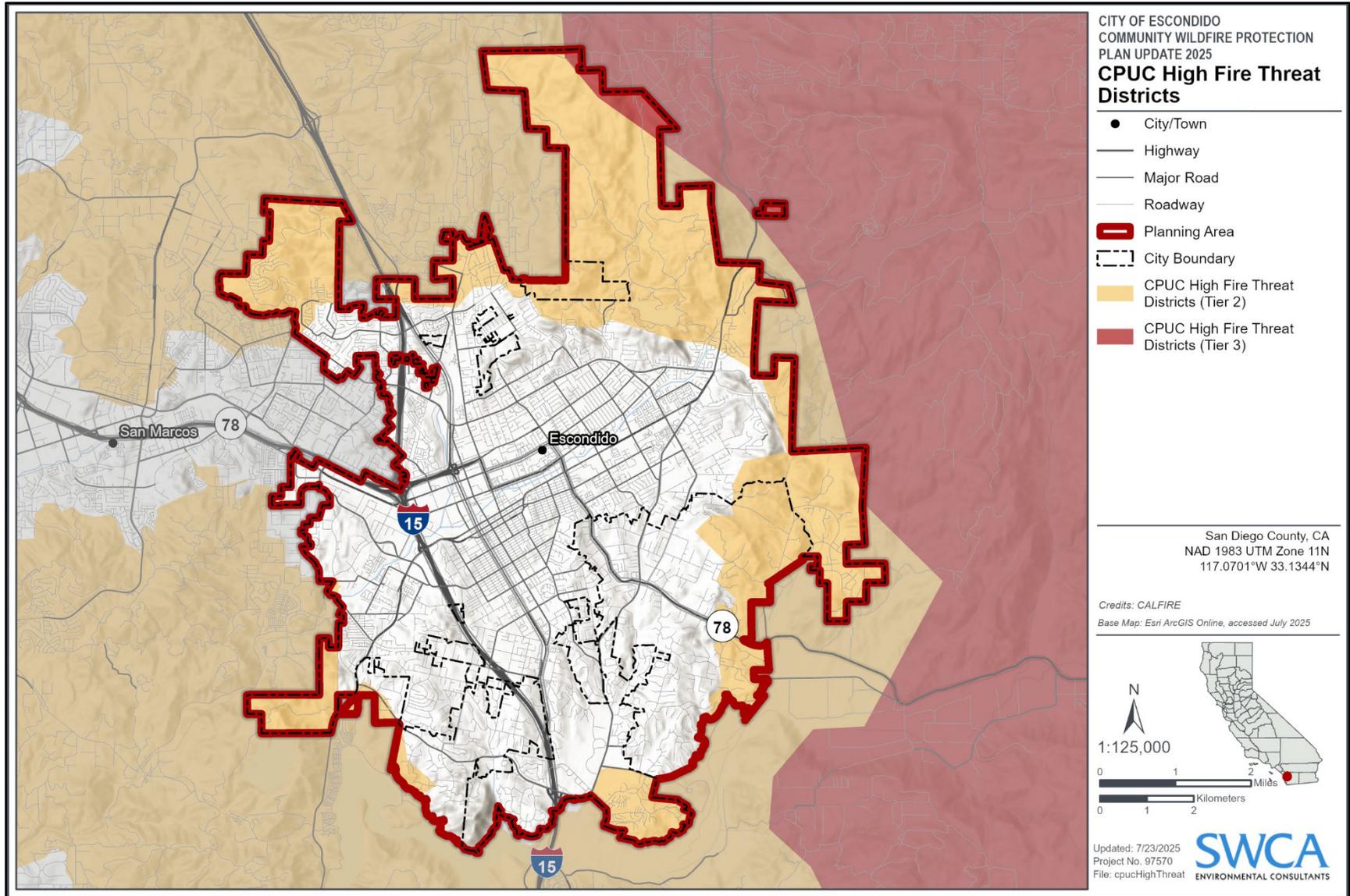
Figure 3.2. Tier 3 threat zones for the City of Escondido CWPP planning area.

3.3.3 Assessing Hazards vs. Risk

SWCA's QWRA evaluates key factors such as flame length (intensity), burn probability, buildings, and HVRAs. Flame length is modeled by analyzing vegetation type, density, and condition; topography, including slope, aspect, and elevation; and meteorological conditions like wind, temperature, and humidity. Burn probability is generated by running thousands of simulations, considering ignition locations, fire size, weather patterns, fuel types, and topography. These flame length and burn probability outputs represent hazards, while buildings and HVRAs represent exposed values or "assets at risk."

This QWRA categorizes the landscape into four risk levels: Low, Moderate, High, and Very High. In comparison, CAL FIRE's FHSZs reflect vegetation, topography, and weather patterns to indicate burn likelihood and potential fire behavior, ranging from Moderate to Very High hazard levels. Updated FHSZs incorporate land use changes, recent fire history, new wind data, and local climate information (CAL FIRE 2023.

The primary distinction between SWCA's QWRA and CAL FIRE's FHSZs is that FHSZs assess only wildfire hazard, while SWCA's QWRA accounts for both hazard and the likelihood of resulting damage (risk). While the CPUC fire threat district mapping incorporates risk, it does not provide the level of comprehensive risk to structures and values discussed within the SWCA QWRA.

Regulatory background regarding the development and updates of FHSZs are summarized in Appendix A.

3.4   QUANTITATIVE WILDFIRE RISK ASSESSMENT

3.4.1 FRAMEWORK

The QWRA is a specialized tool for evaluating the risk that wildland fires pose to communities within the city. In this context, risk is defined as a combination of hazard and vulnerability (Figure 3.3). For the purposes of this document, risk is conceptualized using four key factors within the QWRA Framework (Scott et al. 2013):

- **Burn Probability**: The likelihood of a 30-square-meter pixel burning within a specified time period.
- **Intensity**: The rate of energy release during combustion, which can be measured by flame length, a direct indicator of fire intensity.
- **Exposure**: The proximity of HVRA to hazards within the landscape, such as homes located in the WUI.
- **Susceptibility**: The degree to which an HVRA are likely to be damaged by wildfire.

Figure 3.3. QWRA Framework.

Derived from Scott et al. (2013).

3.4.2 Process Overview

Flame length (intensity) and burn probability were assessed using established models including FARSITE, FlamMap, BehavePlus, and FireFamily Plus, integrated within the Interagency Fuel Treatment Decision Support System (IFTDSS) and processed through ArcGIS Pro Spatial Analyst tools. The QWRA data were sourced primarily from LANDFIRE and supplemented by additional local datasets as available (LANDFIRE 2023).

SWCA generated a landscape file for the city in IFTDSS, with Core Team input guiding the refinement of fuel models, response functions, and relative importance values, resulting in tailored fire behavior outputs and risk scoring. The datasets, including flame lengths, building footprints, HVRAs, and burn probability, were processed and reclassified in ArcGIS Pro. The raster calculator in ArcGIS Pro then produced the Conditional Net Value Change (cNVC) and Expected Net Value Change (eNVC) risk outputs, with the eNVC serving as the final risk layer in the QWRA. The cNVC evaluates wildfire impacts to values under the assumption that a fire occurred (i.e., it assumes 100% probability), whereas the eNVC evaluates the likelihood of impacts to values based on fire probability (IFTDSS n.d.(a)).

3.4.3 Data Collection

The spatial data required for this QWRA are summarized in Table 3.2. It's important to note that burn probability considers factors such as landscape characteristics (e.g., topography and fuels), weather conditions (e.g., humidity and wind), and historical ignition patterns. Similarly, flame length calculations incorporate fuel types, topography, and weather conditions.

Table 3.2. Spatial Data Inputs for the QWRA

Inputs	Source	Type/Subtype
Burn Probability	• IFTDSS, LANDFIRE	Hazard/Probability
Flame Length	• IFTDSS, LANDFIRE	Hazard/Intensity
Critical Infrastructure HVRAs	• Natural Gas Pipelines EIA (Energy Information Administration) • Transmission Lines EIA • Cellular Towers Federal Communication Commission (FCC) • Power Plants EIA • Substations Homeland Infrastructure Foundation-Level Data (HIFLD)	Vulnerability/Exposure
Building Footprint HVRAs	• Microsoft	Vulnerability/Exposure

3.4.3.1 Identification of Hazards and Vulnerability

Fuels

Accurate prediction of wildfire behavior depends fundamentally on the characterization of surface fuels, which serve as the primary input for mathematical fire spread models. The USFS's Rocky Mountain Research Station has developed a comprehensive set of standard fire behavior fuel models. These models provide a consistent framework for describing the properties of wildland fuels, including load, size, arrangement, and moisture content, across a wide array of vegetation types and environmental conditions.

The fuel models are broadly described under the follow acronyms, which have specified fuel codes to represent more specific fuel types:

- **NB** – **Nonburnable:** Areas with insufficient wildland fuel to carry fire (e.g., urban, water, bare ground).

- **GR** – **Grass:** Areas where grass is the primary carrier of fire.

- **GS** – **Grass-Shrub:** Areas with a mix of grass and shrubs, both contributing to fire spread.

- **SH** – **Shrub:** Areas dominated by shrub vegetation as the main fuel.

- **TU** – **Timber-Understory:** Forested areas where surface fuels include a mix of litter, grass, and/or shrubs beneath trees.

- **TL** – **Timber Litter:** Forested areas where dead and down woody material (litter) is the primary surface fuel.

- **SB** – **Slash-Blowdown:** Areas with heavy dead and down woody debris, often from logging (slash) or wind events (blowdown).

Most of the Escondido CWPP planning area (53.5%) is classified as NB1, representing urban or developed zones, such as roads, buildings, and other infrastructure, primarily within the city center and major corridors. While these do not support wildland fire spread in existing fire behavior models, they can contribute to destructive urban fires. GS2 (13.4%), moderate grass-shrub fuels, are mainly found on the

city's northern and eastern outskirts, where dry grasses and shrubs dominate. SH5 (10.2%), consisting of dense, dry-climate shrublands, occurs in patches along the city's boundary, especially in undeveloped foothills and canyons. GS1 (8.9%), sparse grass-shrub, appears in scattered locations, typically along the urban-wildland edge where grass cover is patchy. GR2 (5.3%), continuous grasslands, are found in open areas, especially to the southeast and southwest of the city. The remaining 8.7% is a mix of other grass, shrub, timber-understory, and timber litter models, occurring in smaller pockets throughout the planning area (Scott and Burgan 2005).

Table 3.3 and Figure 3.4 present tabular and geographically referenced data for the modeled fuel types within the Escondido CWPP planning area.

Table 3.3. Fuel Model Types, Acreages, and Percentages of Planning Area

Fuel Model	Fuel Model Name	Acres within Planning Area	Percent of Planning Area
NB1	Urban/Developed (Nonburnable)	16,526.45	53.52%
GS2	Moderate Load, Dry Climate Grass-Shrub	4,135.13	13.39%
SH5	High Load, Dry Climate Shrub	3,135.03	10.15%
GS1	Low Load, Dry Climate Grass-Shrub	2,749.70	8.90%
GR2	Low Load, Dry Climate Grass	1,640.86	5.31%
Other	**(all remaining fuel types combined)**	**2,694.55**	**8.73%**

Source: Scott and Burgan (2005)
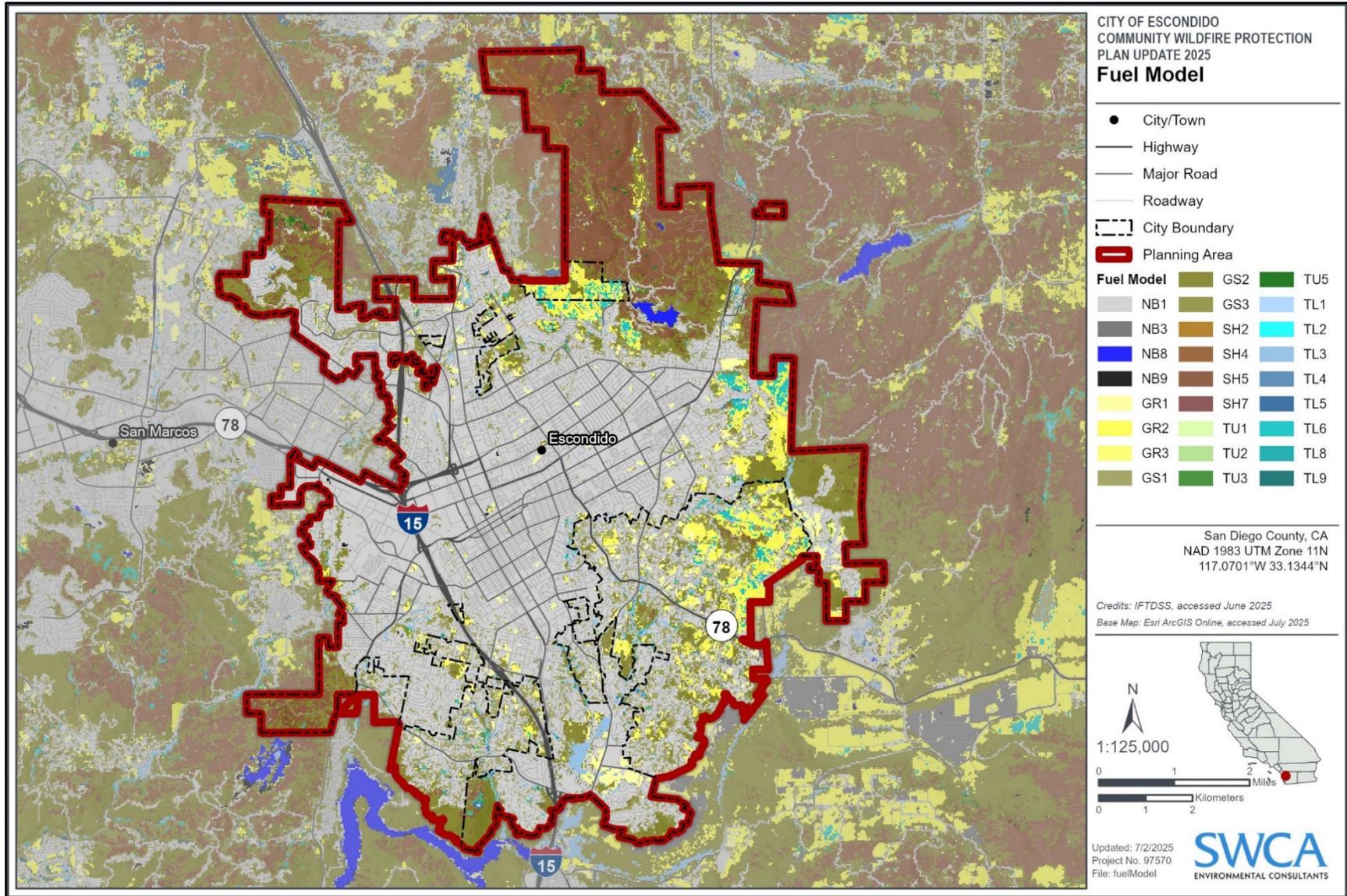
Figure 3.4. Fire behavior fuel models throughout the Escondido CWPP planning area.

Burn Probability

Burn probability considers several factors, including fire size, frequency, rate of spread, and weather conditions (IFTDSS n.d.(b)). Figure 3.5 illustrates the likelihood of a specific location on the landscape burning, which is represented as burn probability. For example, a 20% burn probability means that one in five ignitions under very high fire danger conditions would reach and burn that location.

Within the city limits of Escondido, the burn probability distribution indicates that the urban core is largely classified as nonburnable due to dense development and limited vegetation. Notably, this represents a limitation in existing wildfire behavior models that they do not consider urban fuels to be burnable, even though recent fires demonstrate the potential for fire to transition from wildland to urban fuels. Therefore, the model was adapted with a .25 miles buffer around building footprints to more accurately consider risk to structures. Toward the city's edges, particularly in the southern, eastern, and northeastern peripheries, the probability of wildfire increases. These peripheral areas are primarily classified within the lowest (0%–20%) and lower (20%–40%) burn probability categories. The middle (40%–60%), higher (60%–80%), and highest (80%–100%) burn probability zones are mostly outside the city boundary, although they are important to consider due to connective fuels that could facilitate fire spread into the city limits.

Flame Length

Flame lengths are determined by fuels, weather, and topography. Flame length is a measure of the intensity of the hazard in the QWRA equation. Direct attack by hand crews is usually limited to flame lengths less than 4 feet. For flames between 4 and 8 feet, indirect suppression (dozers, engines, etc.) is the dominant tactic. In excess of 8 feet, control efforts will be extremely challenging (USFS 2011)

Figure 3.6 illustrates the flame length classifications for the City of Escondido.

Similar to the burn probability maps, within the city limits of Escondido, the flame length distribution shows that the central, urbanized areas are predominantly classified as nonburnable. Moving outward toward the city's periphery, particularly along the southern, eastern, and some northern boundaries, flame lengths begin to increase. Most of these peripheral areas fall within the >0–1-foot and >1–4-foot flame length categories, with some sections reaching >4–8 feet, especially where there is more natural vegetation. The highest flame lengths (>8 feet, and especially >11–25 feet or >25 feet, indicated by orange and red) are generally along city boundary, though there are several large patches exhibiting elevated modeled flame lengths, particularly in the Lake Dixon/Daley Ranch, Emerald Heights, and Del Dio Highlands County Preserve areas.

Vulnerability

RESPONSE FUNCTIONS

Response functions (RFs) measure the susceptibility of HVRAs to wildfire, indicating how fire affects these resources based on fire intensity (IFTDSS n.d.(c)). Defined by experts, RFs assign a relative value change score ranging from -100 to +100, where -100 represents significant loss and +100 denotes substantial benefit. The RFs assigned to each HVRA are based on flame length classes, which represent different levels of fire intensity. Generally, the longer the flame length, the higher the intensity and the flame's impact to structures and HVRAs.
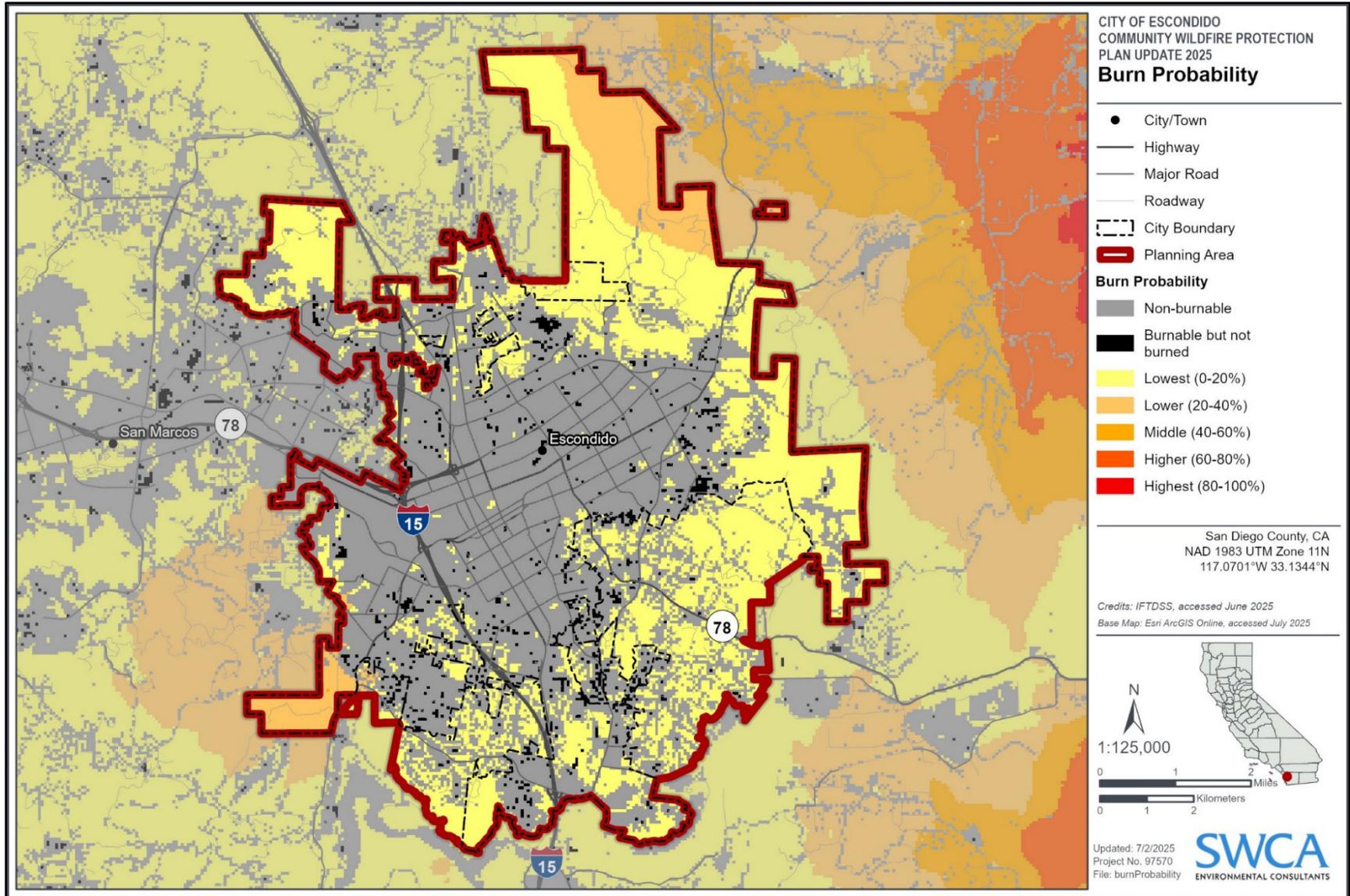
Figure 3.5. Burn probability in the City of Escondido CWPP planning area.
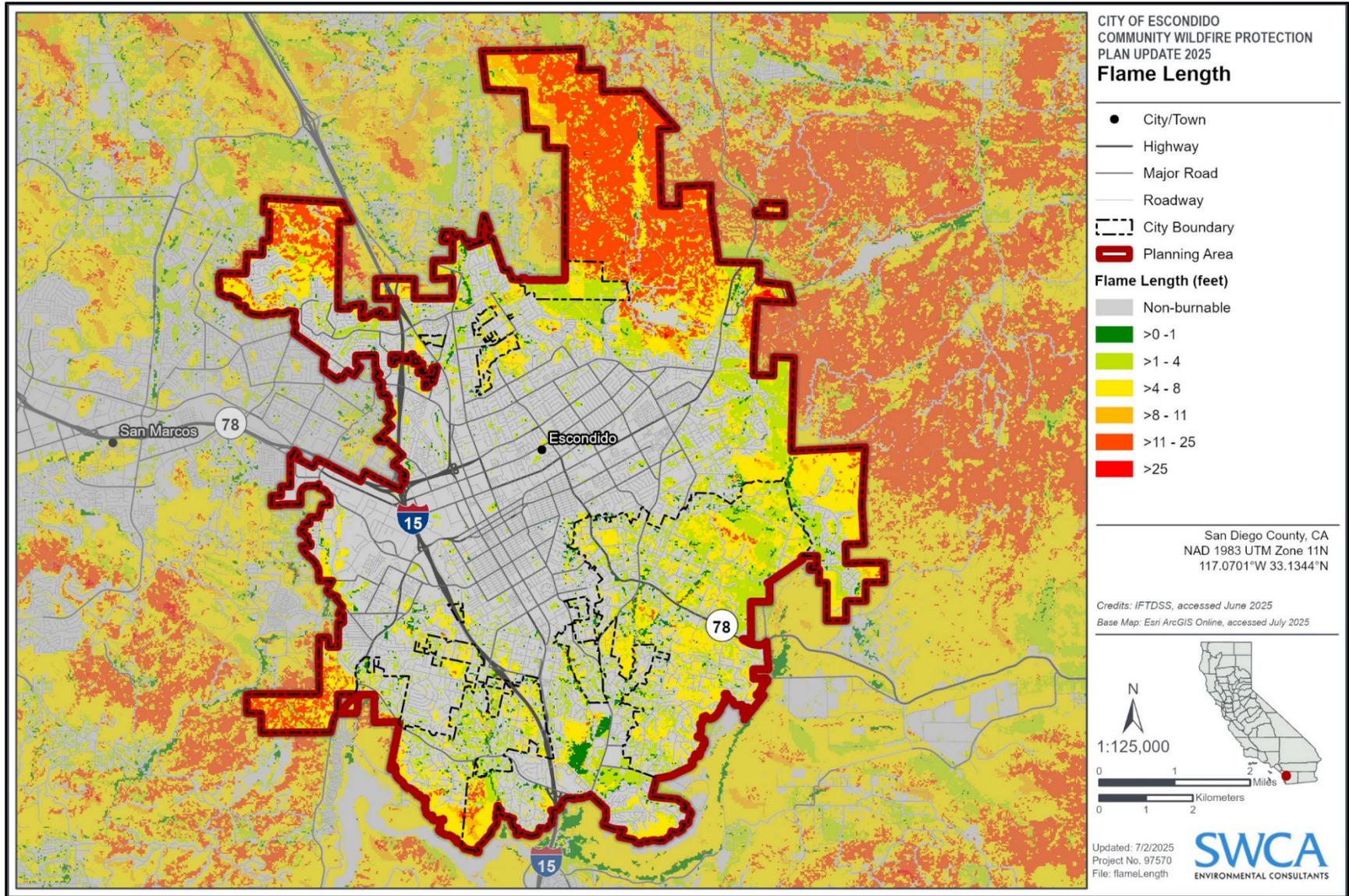
Figure 3.6. Flame length in the City of Escondido CWPP planning area.

3.4.4 Highly Valued Resources and Assets (HVRAs)

3.4.4.1 Infrastructure

The infrastructure dataset (Figure 3.7 and Figure 3.8) for the QWRA was developed through a comprehensive process that combined data from critical infrastructure inventories, community assessments, and Core Team input. This dataset was further supplemented with HVRA data acquired from the Homeland Infrastructure Foundation-Level Data (HIFLD). The identified infrastructure HVRAs are categorized into two main groups: Energy and Communication (Figure 3.7) and Water and Transportation (Figure 3.8). The Energy and Communication category includes key infrastructure within the Escondido planning area, such as power plants, substations, communication sites, and major utility lines, all mapped in relation to the city's boundaries and primary transportation routes. The Water and Transportation category highlights the distribution of transportation and water infrastructure across Escondido, including the network of highways, major roads, railroads, bridges, streams, rivers, dams, and waterbodies within the planning area.

Critical infrastructure was buffered by 60 meters to address areas classified as 'unburnable' around these assets. Frequently, a nonburnable space exists between HVRAs and adjacent fuels; adding this buffer effectively classifies the HVRAs adjacent to fuels as 'burnable' features. Though the fire spread models do not simulate structure burning ('urban' fuels show as 'unburnable') this allows the risk to be projected into the most threatened developments on the edge of the WUI.

3.4.4.2 Buildings

The Microsoft Building Footprints (Figure 3.9) dataset was used to identify the locations and extents of structures, including residences and businesses, across the planning area. This dataset, created using artificial intelligence (AI) algorithms applied to high-resolution satellite imagery, provides detailed polygonal representations of buildings (ArcGIS Online 2022). Incorporating these data into the QWRA allows for accurate mapping of structures across the landscape and helps assess the exposure of built environments to wildfire risks.

Since the model typically classifies the immediate areas around buildings as 'unburnable,' building footprints were buffered by 0.25 mile to ensure this area is treated as 'burnable' in the analysis.
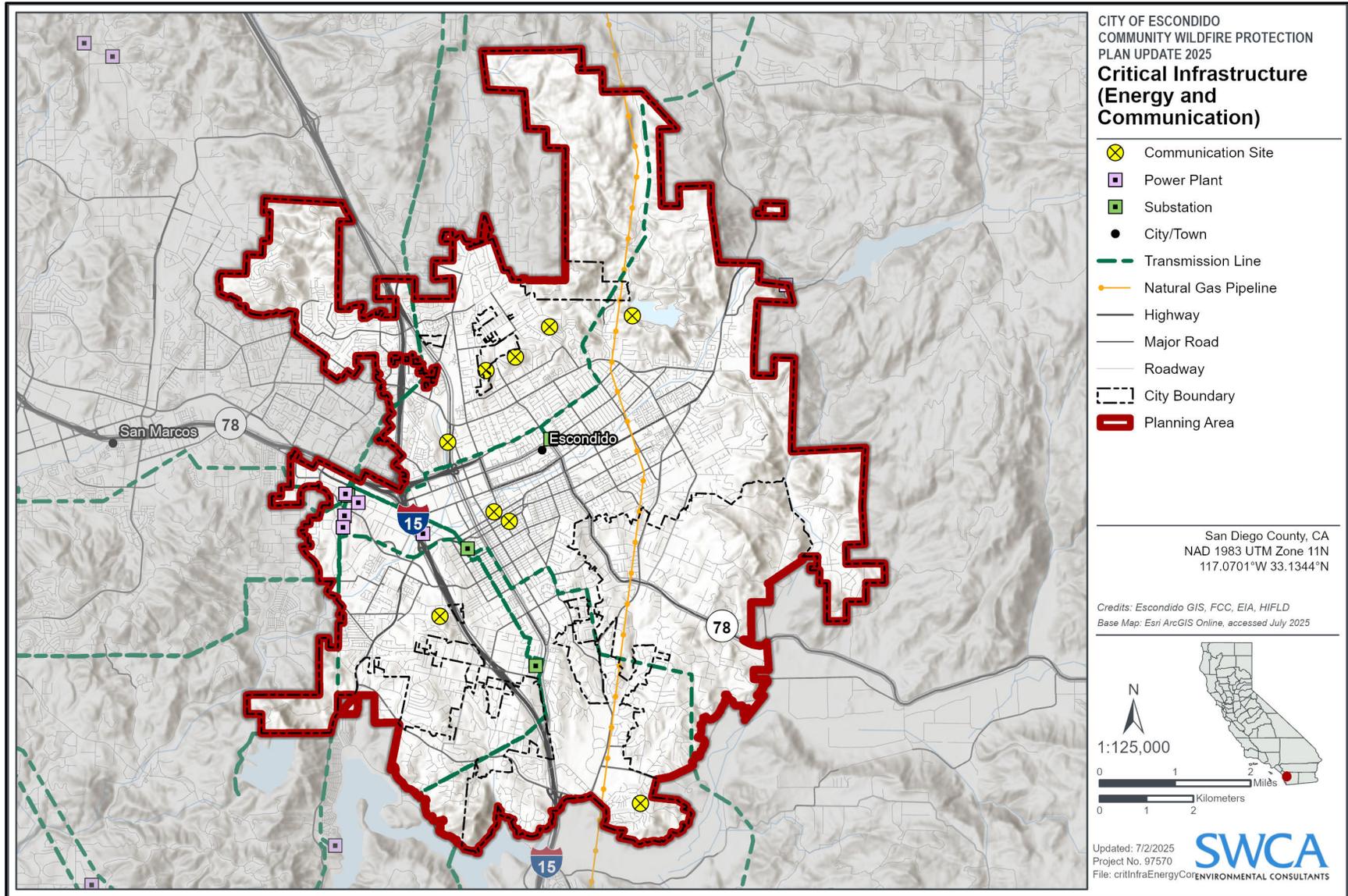
Figure 3.7. City of Escondido CWPP planning area QWRA input – HVRA: Critical Infrastructure (Energy and Communication).
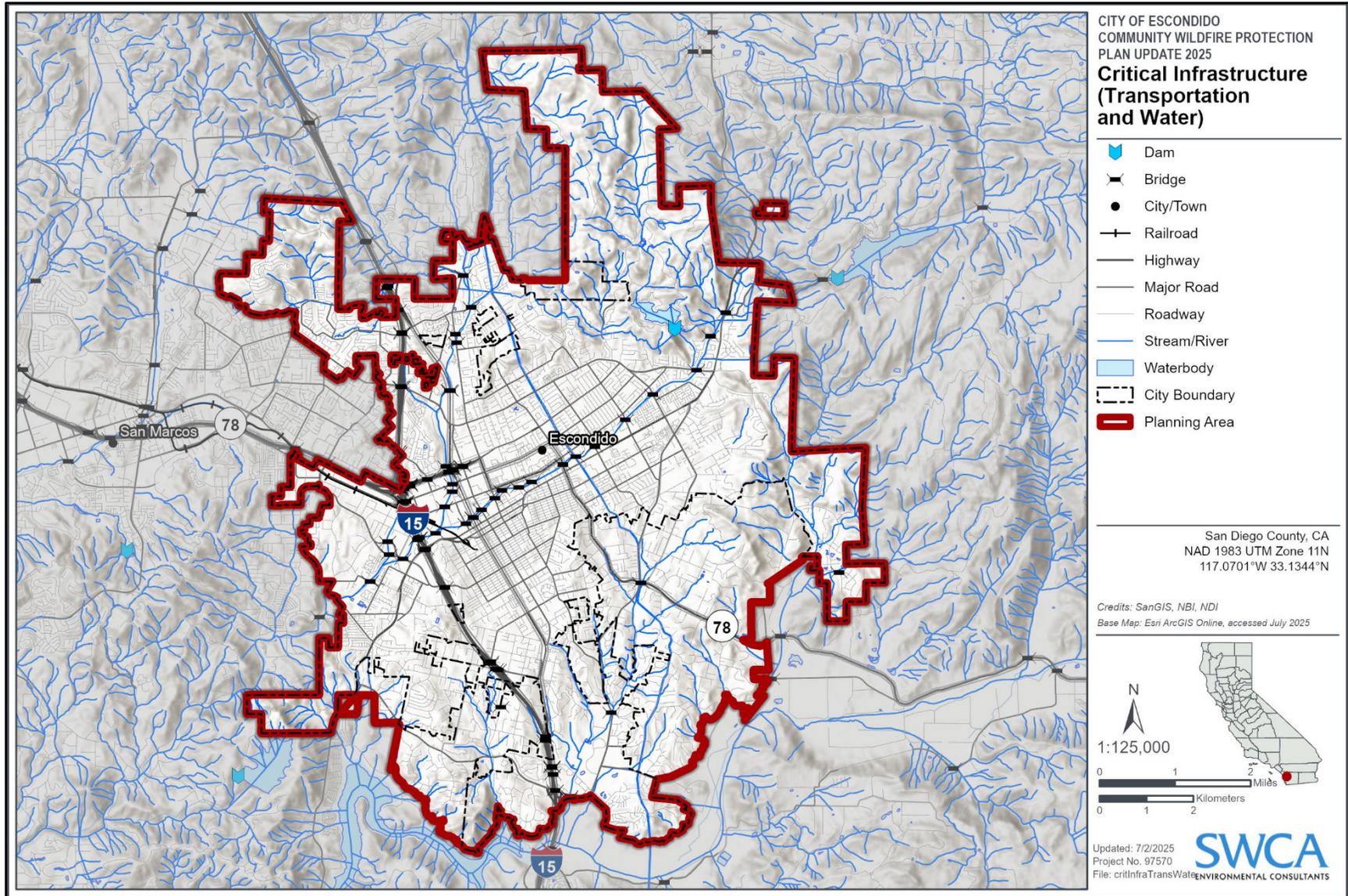
Figure 3.8. City of Escondido CWPP planning area QWRA input – HVRA: Critical Infrastructure (Transportation and Water).
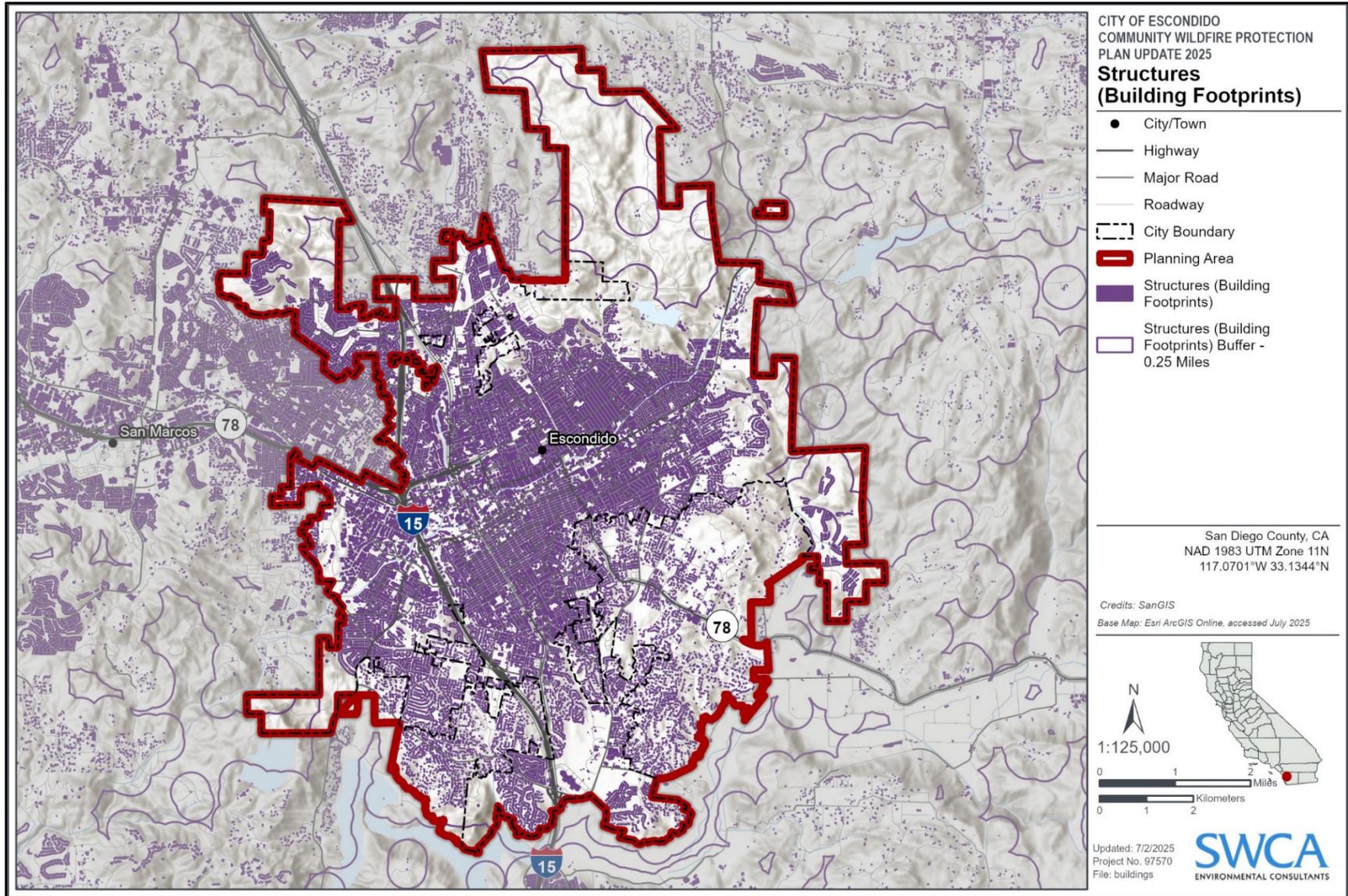
Figure 3.9. City of Escondido CWPP planning area QWRA input – Building Footprints.

3.4.5 Risk Modeling and Scoring

3.4.5.1 Landscape Fire Behavior

Landscape fire behavior modeling was executed in IFTDSS (FlamMap) using the Automatic 97th Percentile Landscape Fire Behavior (Auto 97th) parameters (IFTDSS n.d.(d)). The Auto 97th setting models fire behavior under very high fire weather conditions. Auto 97th uses data from nearby remote automated weather stations (RAWS) to determine conditions for fuel moisture and wind speed and direction.

Weighting and Relative Importance

To develop a quantitative risk product (Wildfire Risk to Structures and Infrastructure), the HVRAs must be weighted with a relative importance value (Scott et al. 2013). The HVRAs were broken into two categories and weighted as shown in Figure 3.10.

Relative Importance

- 30%
- 70%

- Structures (buildings, residences, businesses)
- HVRAs (communication sites and towers, power and transmission lines, pipelines, and substations)
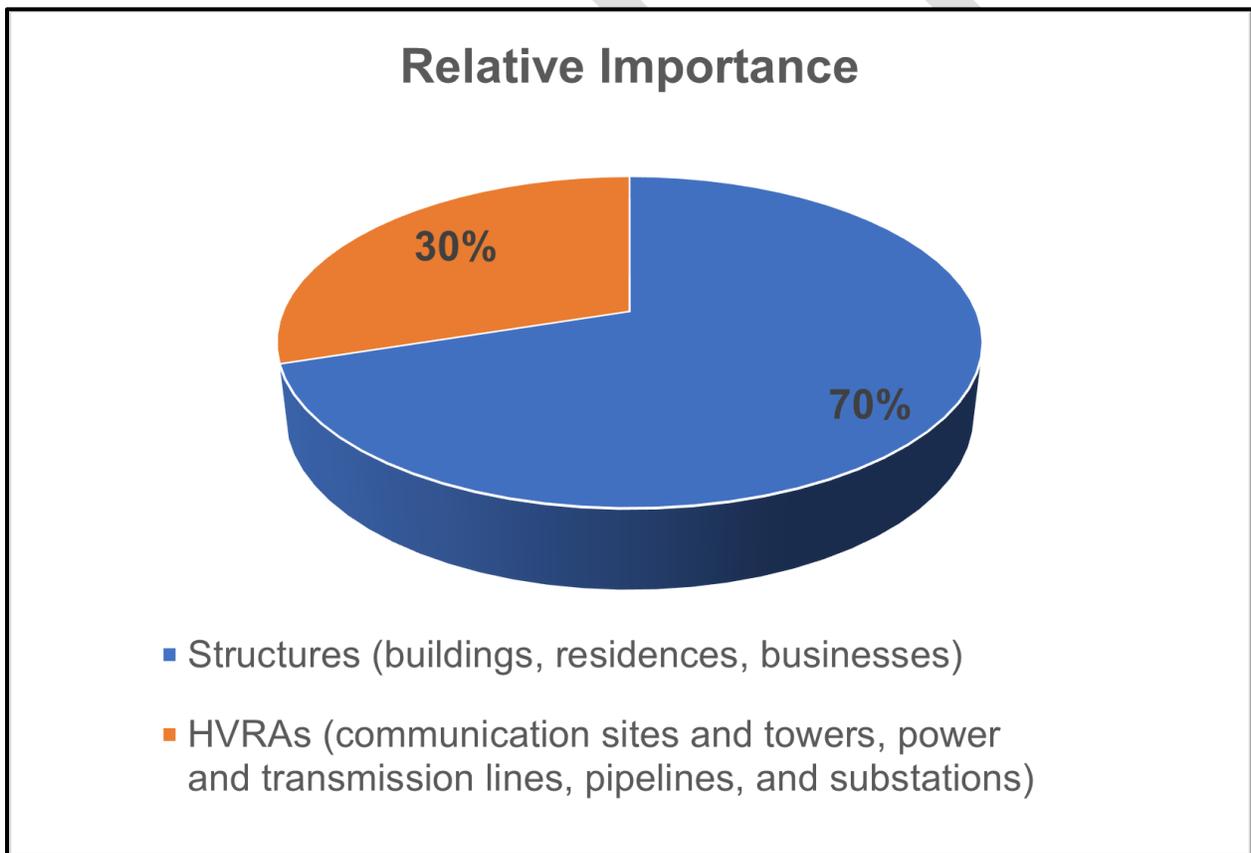
Figure 3.10. Relative importance of collaboratively selected HVRAs for the City of Escondido CWPP planning area.

3.4.6 Validation and Calibration

LANDFIRE is a national vegetation and fuels remote sensing project that provides land managers with a data source for all inputs needed for fire behavior models (fuels, topography, and canopy characteristics). The database is managed by the USFS and the U.S. Department of the Interior and is widely used throughout the United States for land management planning. More information available at: http://www.landfire.gov.

The fire modeling for the Wildfire Risk to Assets products utilized the LANDFIRE 2023 data layers. As a result, any wildfire activity occurring after the most recent LANDFIRE update (2023) is not reflected in this fire behavior modeling. For the purposes of this plan, this limitation is not considered significant as there have been no recent major wildfires since the last update that would be expected to significantly influence wildfire behavior across the surrounding landscape. However, future iterations of this risk analysis should carefully evaluate the accuracy and relevance of the current LANDFIRE dataset, or any alternative data sources, especially in the context of recent significant wildfire events. Integrating updated information that captures changes in vegetation and landscape conditions due to these wildfires will help ensure that analysis inputs more accurately reflect current and anticipated fire behavior. In turn, this will result in risk outputs that more reliably represent the true potential for wildfire impacts within the planning area.

3.4.7 QWRA Results

The QWRA map (Figure 3.11) highlights high and very high wildfire risk in the central portion of the city, where wildland fuels intersect infrastructure and buildings. Areas are color-coded to indicate varying levels of risk: green represents low risk, yellow indicates moderate risk, orange signifies high risk, and red highlights very high risk. The map shows that most of the developed urban core and central parts of Escondido are either unclassified (meaning nonburnable) or classified as low to moderate risk, while high and very high-risk areas are generally located along the city's eastern and northeastern boundaries, where WUI and undeveloped open spaces are more prevalent.

It is important to note that this analysis does not model how fire interacts with the built environment but rather focuses on how wildland fire behaves across burnable landscapes. As such, the assessment is primarily concerned with wildland fire and the risks faced by WUI communities and critical infrastructure. Additionally, this QWRA specifically evaluates wildfire risk to structures and HVRAs; therefore, areas of burnable landscape without these assets are depicted as having no data. This focused approach aligns with the CWPP's objective to prioritize the protection of communities and the critical infrastructure that supports them.
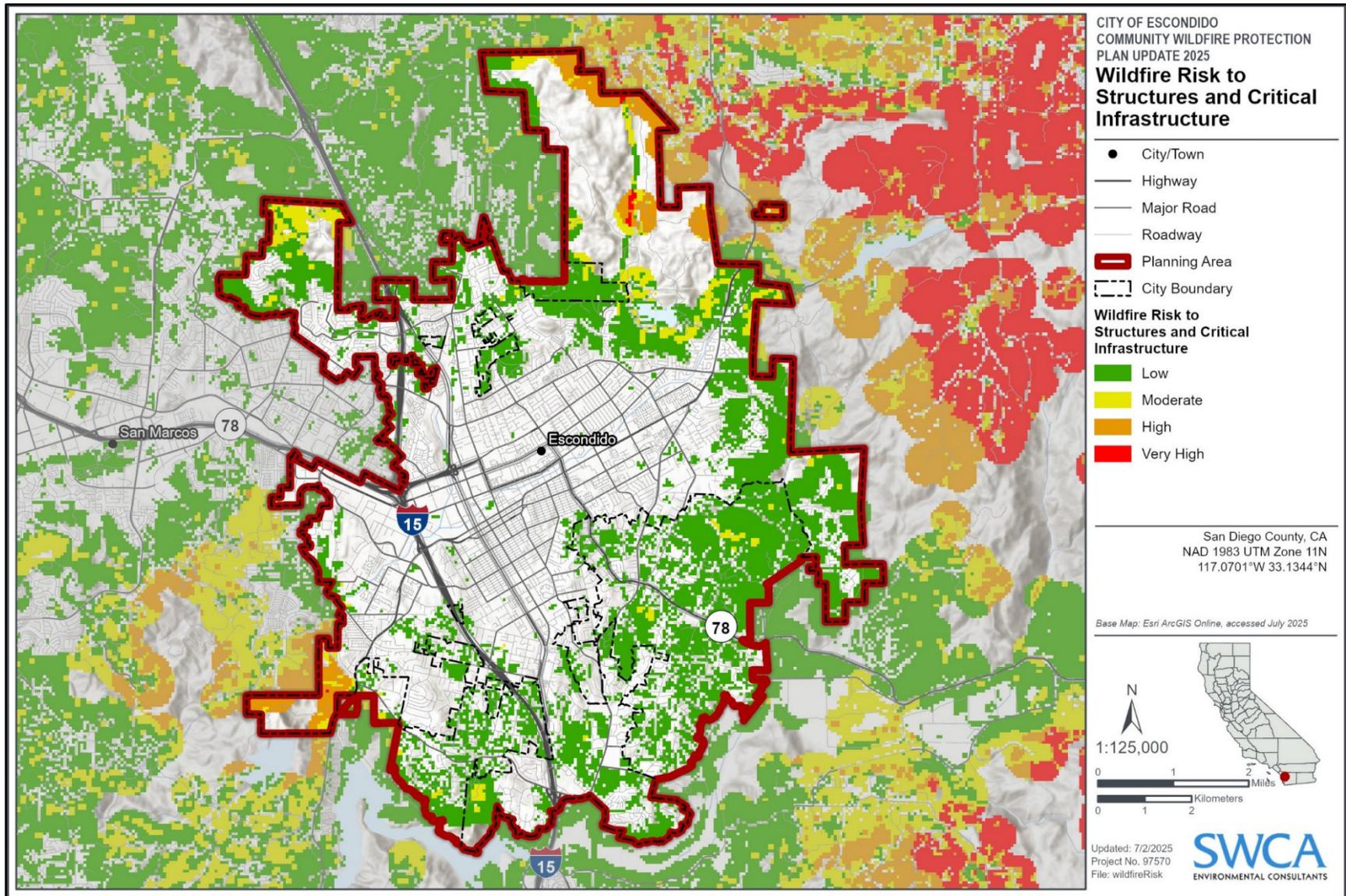
Figure 3.11. Wildfire risk to structures and critical infrastructure in the City of Escondido CWPP planning area.

CHAPTER 4   MITIGATION STRATEGIES

This chapter outlines project recommendations, implementation strategies, and conceptual fuel treatment approaches, all designed to support the three primary goals of the National Cohesive Wildland Fire Management Strategy: fostering resilient landscapes, building fire-adapted communities, and ensuring safe, effective, and risk-based wildfire response. As a non-regulatory document, the CWPP offers guidance and suggestions for actions that can help mitigate wildland fire risk; however, implementation of these recommendations is voluntary. The decision to adopt specific actions rests with City representatives, land managers, homeowners, and stakeholder groups, who should consider alignment with local planning documents when making these choices. Incorporating input from subject matter experts, lessons learned, and the best available science is encouraged throughout the processes of project planning, implementation, and maintenance.

Many recommendations can be put into action at the homeowner or community level, while larger-scale projects may require broader support and should be prioritized based on findings from the QWRA. Throughout this chapter, recommendation matrices provide actionable frameworks for implementation. Where applicable, recommendations have been aligned with the strategies and goals outlined in the Strategic Fire Plan for California (CAL FIRE 2018), the 2021 California Wildfire and Forest Resilience Action Plan, and California's Forests and Rangelands: 2017 Assessment.

4.1 COHESIVE STRATEGY GOAL 1: RESTORE AND MAINTAIN LANDSCAPES

RESILIENT LANDSCAPES

Landscapes are resilient to fire, insect, and disease disturbances, regardless of jurisdictional boundaries.

Recommendations to restore and maintain resilient landscapes are centered on vegetation management and hazardous fuel reduction.

Resilient landscapes are those that are healthy, diverse, and capable of withstanding and recovering from disturbances such as wildfires, climate change, invasive species, and insect infestations. Hazardous fuel reduction treatments are a vital tool for enhancing wildfire mitigation and promoting resilient landscapes, however, these approaches may not always be appropriate in all areas of Escondido due to the natural characteristics of the native vegetation. However, in certain situations, hazardous fuel reduction is necessary for a variety of mitigative actions, such as increasing safety and effectiveness of response efforts, controlling invasive plant species or managing unnaturally dense or overgrown vegetation. With proper implementation and maintenance, these actions ultimately support ecosystem health and resilience

General project recommendations for fostering landscape resilience within the planning area are provided in Table 4.2. All recommendations in this section were developed collaboratively with Core Team members, stakeholders, and the public.

4.1.1 Recommendations for Hazardous Fuel Reduction

Managing hazardous fuels on public and private lands within the Escondido WUI is essential for protecting homes, infrastructure, and sensitive natural resources during wildfire events and for meeting the objectives of Goal 1 of the Community Wildfire Strategy. Table 4.2 presents recommended types of fuel treatments and priority projects across the planning area. Recommended treatments include defensible space maintenance, shaded fuel breaks, mechanical thinning, and roadside vegetation clearance. Projects must comply with all applicable environmental regulations and permitting requirements. Depending on location and scope, coordination may be required with the California Department of Fish and Wildlife for California Endangered Species Act (CESA) compliance, the Regional Water Quality Control Board for water quality certifications, the U.S. Army Corps of Engineers for jurisdictional waters and wetlands, and other relevant agencies. California Environmental Quality Act (CEQA) review will determine the level of environmental documentation required and identify mitigation measures to avoid or minimize impacts (California Natural Resources Agency 2025). Site-specific considerations such as slope, aspect, vegetation type, and proximity to critical infrastructure or high-value resources must be incorporated into treatment design (USFS 2024).

4.1.1.1 California Vegetation Treatment Program (CalVTP) and Court-Mandated Updates

In May 2025, the California Courts of Appeal ruled that the California Board of Forestry and Fire Protection's Program Environmental Impact Report (PEIR) for the California Vegetation Treatment Program (CalVTP) did not fully comply with the CEQA requirements. (The court found that the

environmental analysis did not adequately evaluate the risk of type conversion, which is the long-term replacement of native shrubland habitats such as chaparral and coastal sage scrub with nonnative, highly flammable annual grasses and weeds (California Chaparral Institute v. California Board of Forestry and Fire Protection, Case No. D081636, May 30, 2025).

This legal decision requires that CAL FIRE revise the CalVTP PEIR to more thoroughly address the potential for type conversion, its role in increasing wildfire spread and intensity, and the associated impacts to biodiversity and ecosystem resilience. Scientific research has shown that when native shrublands are converted to invasive annual grasslands, fire frequency can increase significantly because of shorter fire-return intervals and higher flammability of fine fuels (Keeley et al. 2006; Syphard et al. 2019).

While CalVTP remains a critical tool for agencies seeking to implement vegetation treatment projects under streamlined CEQA review, project-specific analyses (PSAs) must now include explicit evaluation of whether proposed treatments could result in type conversion. Where risk is identified, mitigation measures such as targeted invasive species control, reseeding with native species, and maintenance of native canopy cover must be incorporated to preserve ecological integrity. (Figure 4.1)

Standard Project Requirements (SPRs) already included in the CalVTP, such as biological resource protections, must now also address the preservation of native shrubland structure, species composition, and continuity. For projects that extend beyond the scope of the original PEIR or introduce new potential impacts, PSA addenda must include provisions that specifically prevent or minimize type conversion and ensure wildfire hazard reduction goals are met without compromising long-term ecosystem health.

In summary, the May 2025 appellate ruling reinforces the need for CalVTP best management practices to balance wildfire hazard reduction and ecological stewardship. By integrating type conversion risk assessment and appropriate mitigation into vegetation treatment planning, agencies can ensure projects enhance community safety while maintaining the resilience and biodiversity of California's native landscapes. (CAL FIRE 2023b)
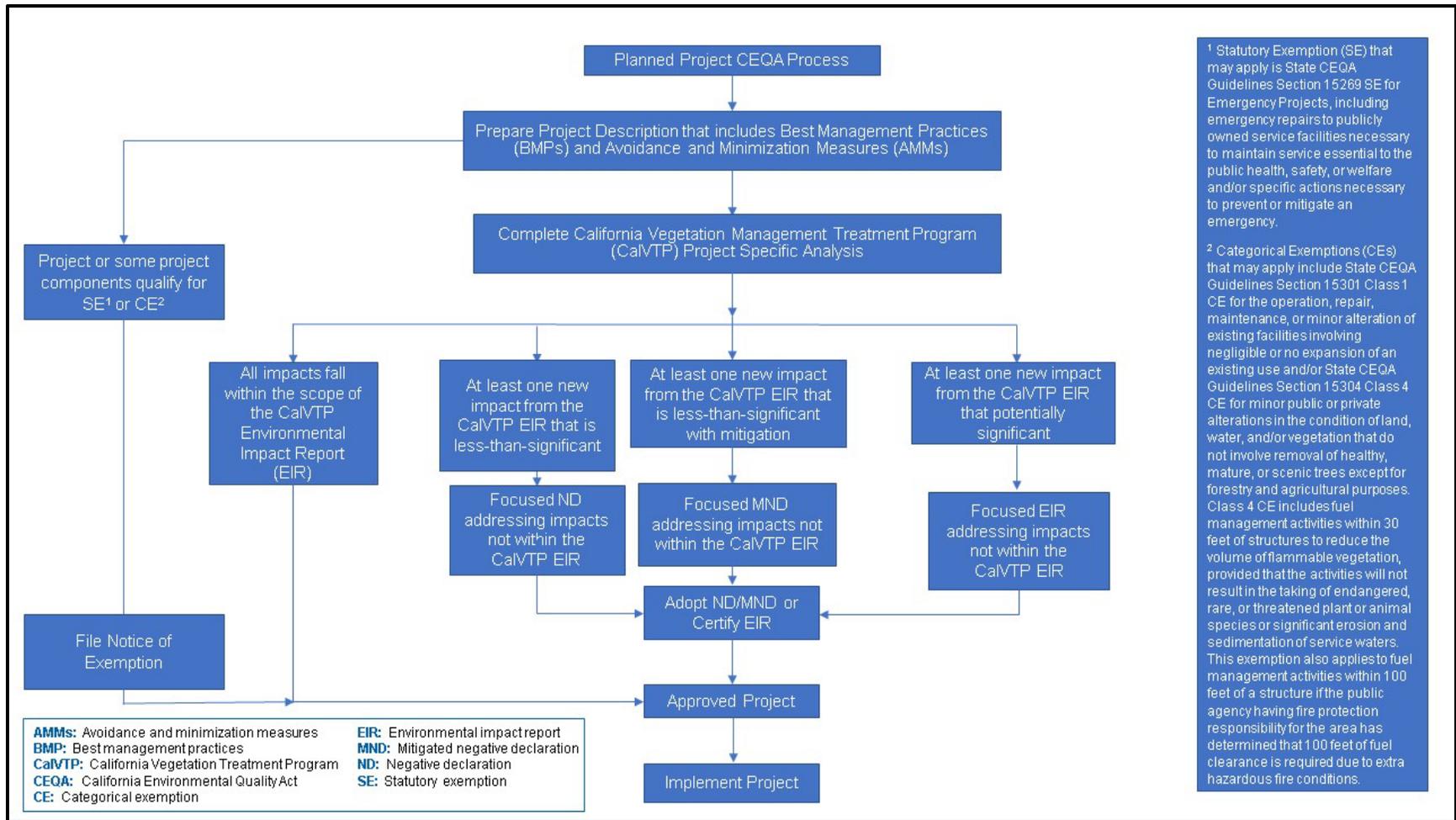
Figure 4.1. CEQA process for CalVTP implementation.

4.1.2 Areas of Concern and Priority

To support prioritization of resilient landscape recommendations, the CWPP Core Team and SWCA staff identified and mapped broad areas of concern (AOCs) within and adjacent to the city (Figures 4.2-4.6 and Table 4.1). These areas were delineated using a combination of spatial data, ground surveys, wildfire hazard mapping products, and local expertise. AOCs highlight locations where mitigation actions can most effectively reduce risk to community assets. By identifying these priority zones, the CWPP provides land managers and homeowners with a clearer understanding of where wildfire mitigation and preparedness efforts will have the greatest benefit. Fuel reduction efforts in these areas should be strategically located to connect with and reinforce other ongoing or planned mitigation projects. This integrated approach maximizes cumulative wildfire risk-reduction benefits and increases the overall effectiveness of suppression efforts during a wildfire (USFS 2025a).

While these areas are recommended for prioritized action, they do not represent all at-risk locations within the planning area and should not be considered an exhaustive list. As the CWPP is intended to be a living document, it is strongly encouraged that additional priority areas be identified and incorporated through ongoing updates and future implementation efforts, ensuring the plan remains responsive to evolving risks and community needs.

Figure 4.2. Areas of concern map.

Figure 4.3. Areas of Concern: North west Quadrant.

Figure 4.4. Areas of Concern: Northeast Quadrant
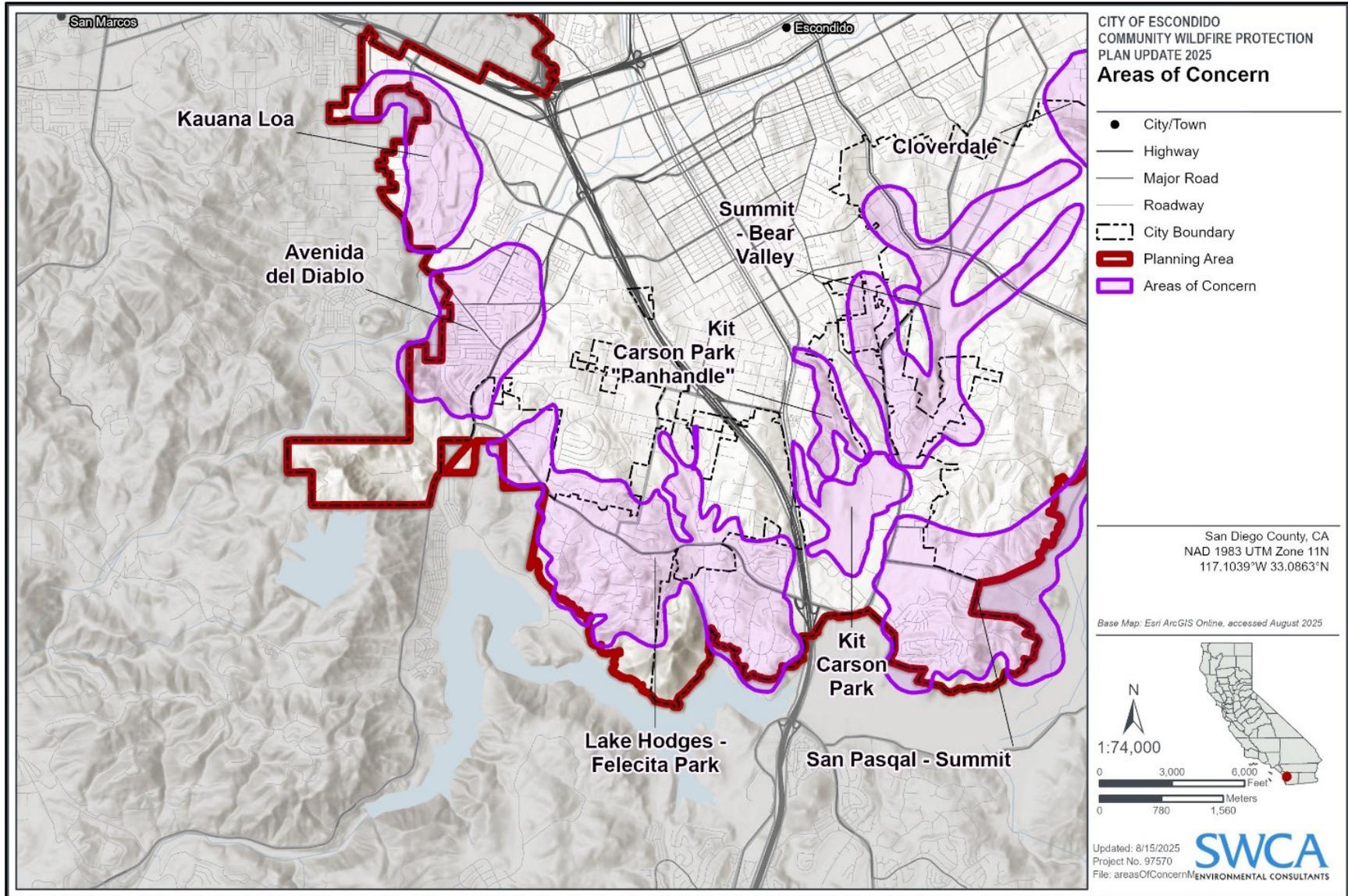
Figure 4.5. Areas of Concern: Southwest Quadrant
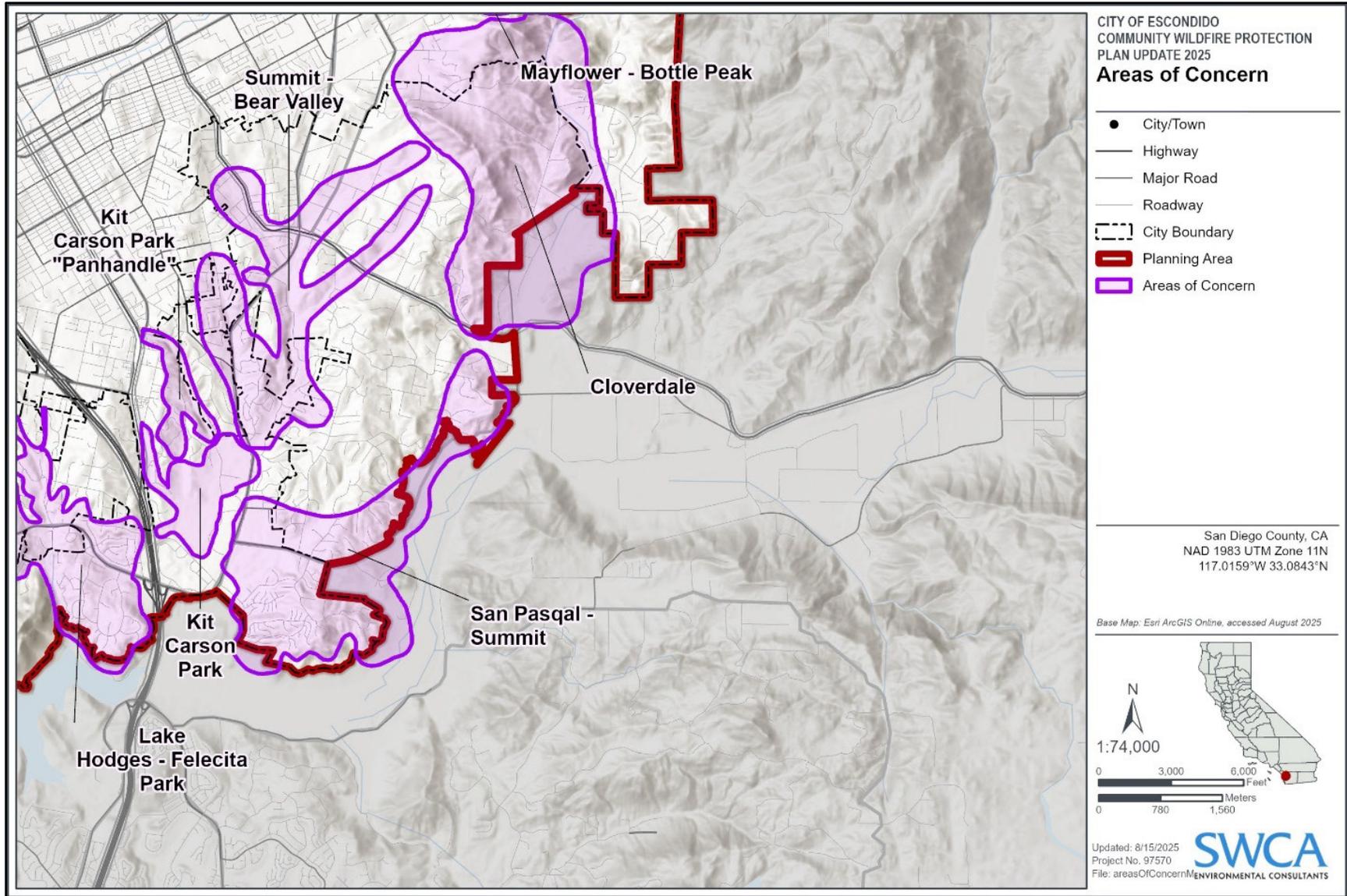
Figure 4.6. Areas of Concern: Southeast Quadrant

Table 4.1. Areas of Concern

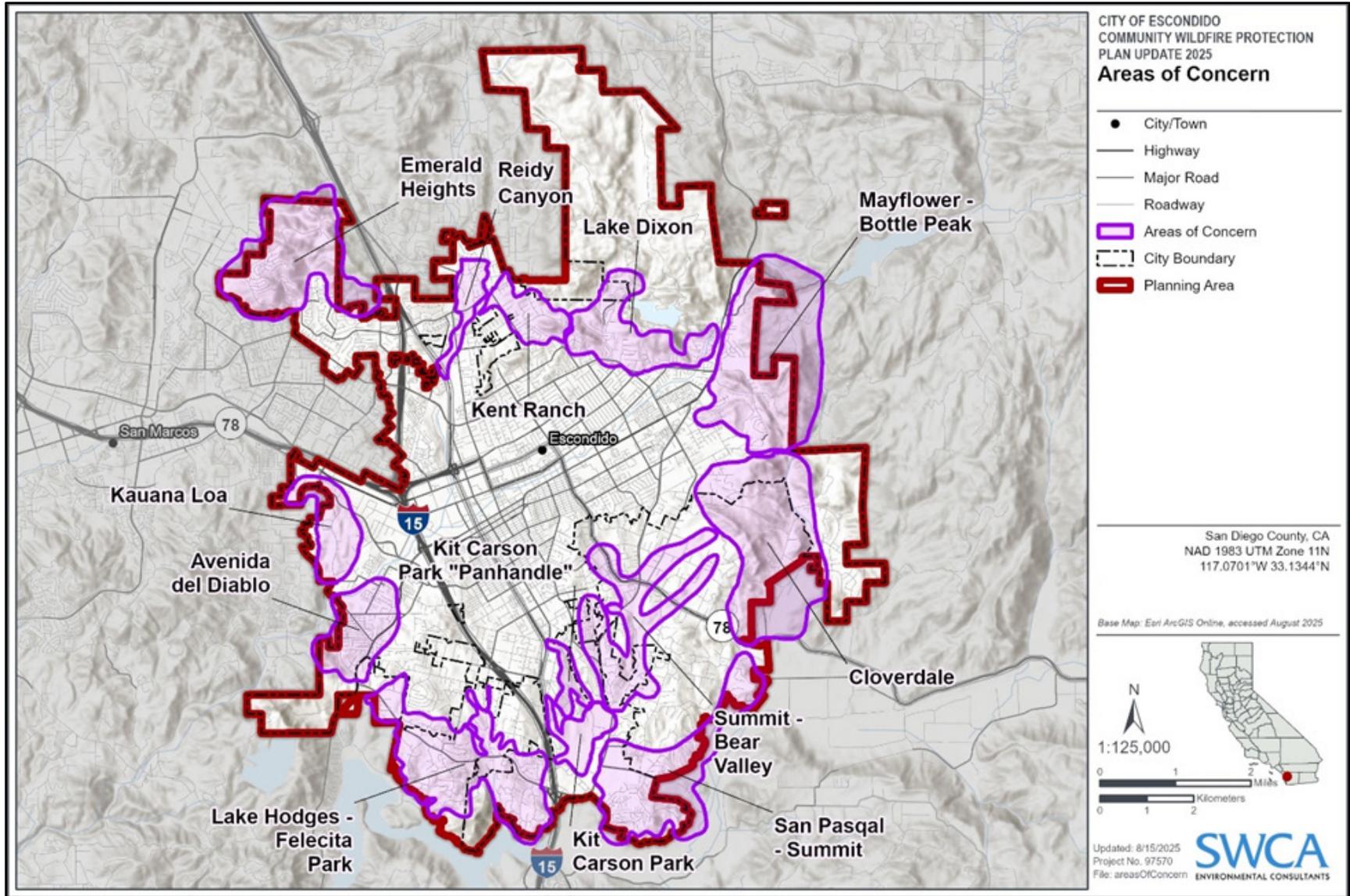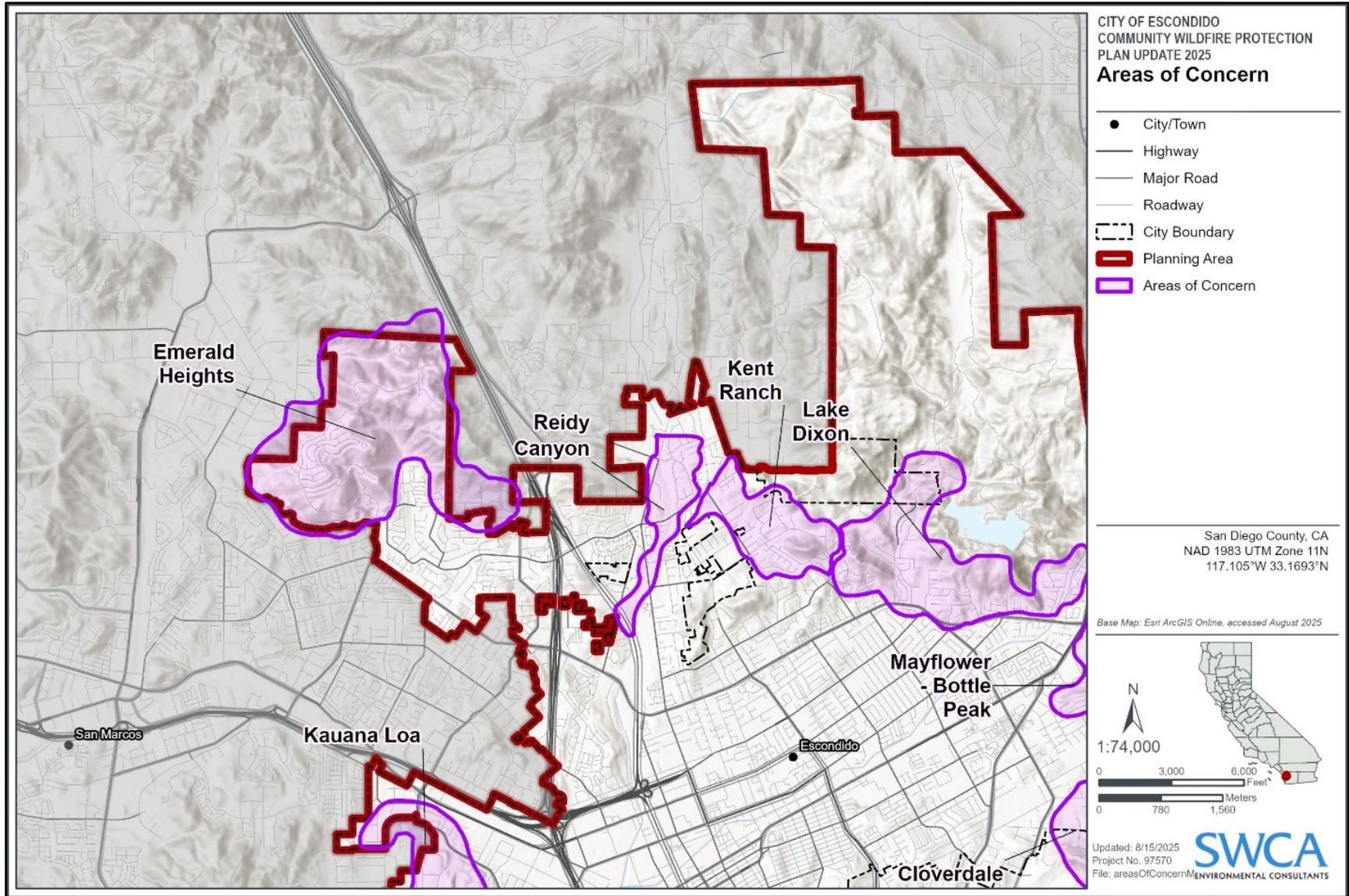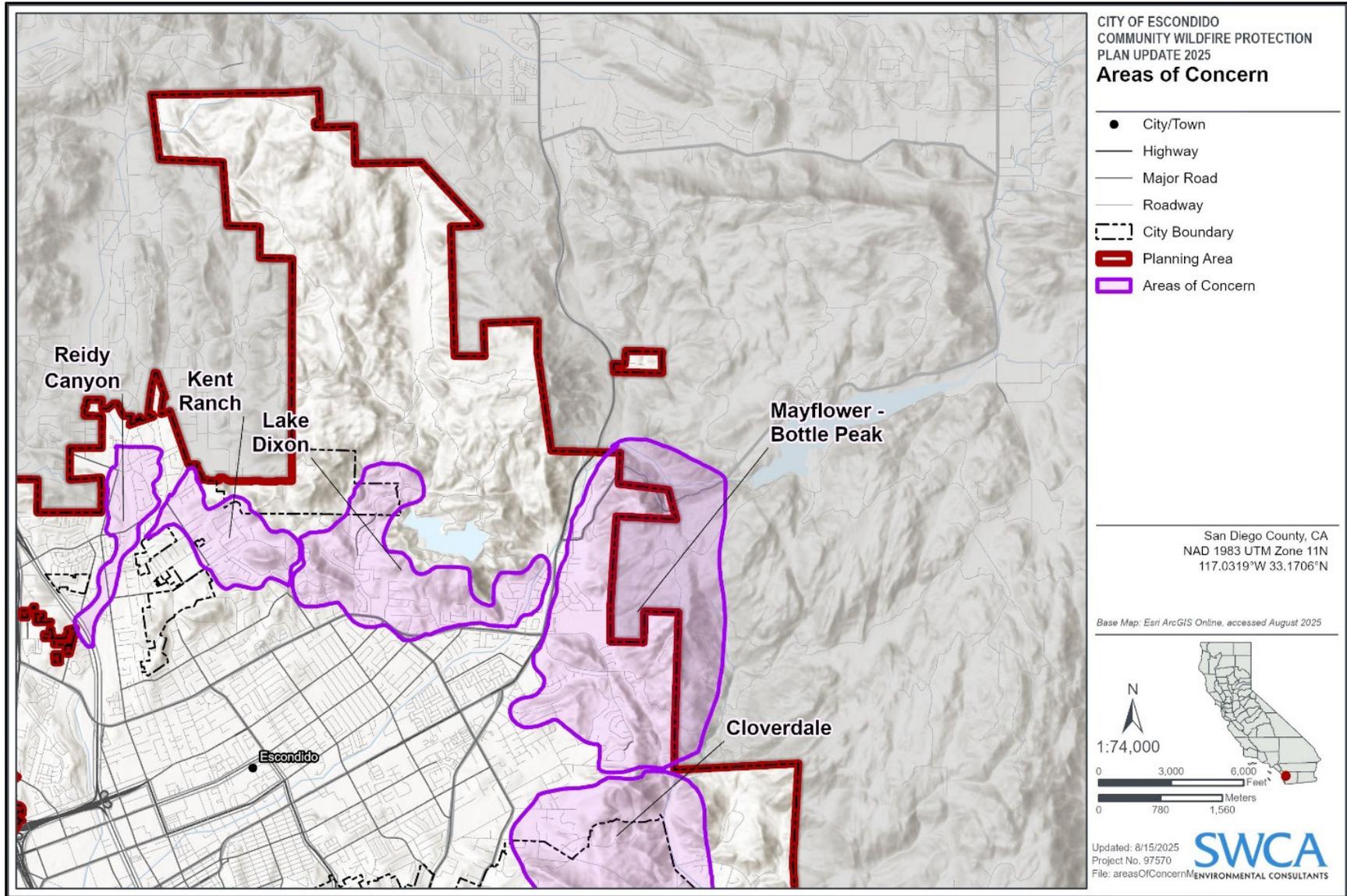| Area	Description
A1	Kauana Loa: Located on the city's western edge, this area borders continuous open-space fuels that extend south toward Lake Hodges and west through Harmony Grove and Elfin Forest. The 2014 Cocos Fire burned through San Marcos into Harmony Grove, destroying dozens of structures. That burn footprint borders the Kauana Loa area, illustrating potential spread pathways toward the community under similar conditions
A2	Avenida del Diablo: This area borders undeveloped canyons and chaparral-covered slopes south of Avenida del Diablo, creating continuous fuel load in close proximity to nearby neighborhoods and the water treatment facility. The facility is a critical piece of infrastructure, and damage or disruption could affect citywide water supply and fire suppression capability.
A3	Lake Hodges – Felicita Park: Neighborhoods around Lake Hodges and Felicita Park border the San Dieguito River Park corridor and preserved uplands containing continuous chaparral and coastal sage scrub. During Santa Ana events, historic fires, including the 2007 Witch Creek Fire, have burned through Lake Hodges and Del Dios, demonstrating the corridor's high exposure to wind-driven fire.
A4	Kit Carson Park: Popular community park contains oak woodland, riparian corridors, and grasslands surrounded by residential neighborhoods. High year-round visitation increases the likelihood of human-caused ignitions. A fire within the park could threaten homes on all sides, especially during wind-driven conditions.
A5	Kit Carson Park "Panhandle" The park's drainage network, including the 'Panhandle' can channel wind and fire spread toward surrounding neighborhoods during Santa Ana conditions. This area is an area with high homeless activity as well, and ignitions and small fires are very common in this area. Ember spread from the park to nearby structures is a major risk factor.
A6	Summit – Bear Valley: This area contains several small, steep-sided drainages branching south and west toward Kit Carson Park and Escondido Creek. These canyons support dense coastal sage scrub, chaparral, and oak-riparian woodland, creating continuous fuels between open space and homes. Fires can start in canyon bottoms and quickly run upslope toward structures
A7	San Pasqual – Summit: This area of concern along San Pasqual Road is adjacent to riparian corridors and open space preserves containing invasive plant species that are highly flammable, creating continuous fuel beds on both sides of the roadway. The surrounding hillsides to the north and south are dominated by chaparral, coastal sage scrub, and oak woodland, which provide abundant ladder fuels capable of carrying fire upslope into nearby commercial facilities and residential areas.
A8	Cloverdale: The area borders agricultural lands, preserves, and riparian corridors that create continuous fuel bed along and beyond Cloverdale Road. The Cloverdale Fire (2018) started off San Pasqual Valley Road near Escondido and burned 100 acres, demonstrating how quickly a wind-driven ignition can spread through the corridor. Limited evacuation routes along Cloverdale Road and connecting streets increase the urgency for early evacuation during wildfire events.
A9	Mayflower – Bottle Peak: The area surrounding Mayflower dog park borders the Bottle Peak County Preserve, with riparian corridors and native shrublands that form continuous fuel beds from the preserve into neighborhood edges. The headwaters of Escondido Creek form a riparian corridor which can channel fire toward residential areas. Limited evacuation routes via Mountain View Drive, Bear Valley Parkway, and local cul-de-sac streets could become congested during a fast-moving fire, making early evacuation essential.
A10	Lake Dixon: This area along the southern boundary of Daley Ranch and Lake Dixon Park contains abundant chaparral and contiguous open space. Public access at Dixon Lake Park increases ignition potential. Limited evacuation via East El Norte Parkway, La Honda Drive, and local streets can quickly become congested during wind-driven events, making early evacuation critical.
A11	Kent Ranch: The Kent Ranch Community Park area, at the base of Daley Ranch's foothills, borders undeveloped slopes and narrow canyons that connect directly to residential streets. Trail access behind Canyon Grove Drive increases ignition potential, and limited outlet roads to El Norte Parkway and Ash Street make early evacuation critical.
A12	Reidy Canyon: Reidy Canyon contains steep drainages with heavy canopy and understory that create continuous fuels adjacent to residential properties. The topography can accelerate fire spread toward structures. Limited roadway access presents evacuation challenges.

Area	Description
A13	Emerald Heights: This area is surrounded by the Daley Ranch open space that contains abundant old growth chaparral, coastal sage scrub, and oak woodland. Steep terrain can channel fire toward homes during wind-driven events, and evacuation is constrained to a few narrow roads. The private HOA has very limited access. The 24-hr staffed entry gate can further delay evacuation when not fully staffed, highlighting the need for early evacuation triggers, coordinated traffic control, and consistent vegetation management.

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Table 4.2. Recommendations for Creating Resilient Landscapes (hazardous fuels reduction)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
RL1		H	Fall 2026	**Fuel Reduction Hand Crew** Enlist the Fuel Reduction Hand Crew (Type 1 or 2) to perform manual vegetation management aimed at reducing hazardous fuels.	Planning area, with focus on WUI areas and high-risk zones	City of Escondido	• Procure funding and capacity for a Type 1 or Type 2 hand crew based on project needs and site conditions. • Manually thin, prune, and remove hazardous vegetation and ladder fuels. • Dispose of cut material through chipping, pile burning, or hauling as appropriate. • Coordinate activities with local agencies and stakeholders for alignment with mitigation goals. • Review the CAL FIRE Wild Animal Park Crew program to identify potential strategies and operational models that could inform local fire management efforts.	Reduce wildfire intensity and spread potential in high-risk areas and provide workforce development and training opportunities.	Conduct regular post-treatment inspections to assess fuel regrowth and treatment effectiveness Report monitoring results to inform adaptive management and future fuel reduction efforts.	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • San Diego County Fire Mitigation Fee Program • Regional Forest and Fire Capacity (RFFC) Program • USFS Community Wildfire Defense Grant (CWDG) • NRCS Conservation Innovation Grants (CIG) • FEMA Hazard Mitigation Grant Program (HMGP) • California Fire Safe Council Grant Programs
RL2		H	Spring 2027	**Hazardous Fuels Management along Ditches, Irrigation Channels, and Riparian Corridors** Reduce wildfire risk and enhance ecosystem health in and around watercourses.	Planning area public/private lands with ditches, irrigation channels, and riparian areas, (e.g., Kit Carson Park)	City of Escondido, Rincon del Diablo FPD, San Diego County, water districts, public agencies, private landowners, environmental groups	• Assess fuel buildup and prioritize high-risk ditches, channels, and riparian zones as delineated in the QWRA. • Coordinate with landowners, water managers, and public agencies for treatment planning and compliance. • Use a mix of mechanical, manual, biological, and chemical methods for vegetation management, based on site conditions and environmental and cultural compliance. • Establish and maintain shaded fuel breaks and reduce ladder fuels in sensitive areas. • Provide community education and outreach to encourage involvement. • Consider dedicated staff or coordination roles for ongoing maintenance and project oversight. • Seek funding and partnership opportunities for implementation.	Break up fuel continuity, support riparian health, and improve wildfire response safety.	Track and report acres treated and methods used. Conduct regular maintenance due to rapid vegetation regrowth in riparian zones.	• CAL FIRE Grant Programs • California Department of Conservation Regional Forest and Fire Capacity (RFFC) Grant Program • EPA Catalog of Federal Funding Sources; Water Resources • NRCS Environmental Quality Incentives Program (EQIP) • California State Coastal Conservancy Wildfire Resilience Program • California Fire Safe Council Grant Programs
RL3		H	Fall 2026	**Green Waste and Chipper Program** Increase Escondido's green waste and chipper program capacity. Explore biomass utilization options.	Planning area, with focus on WUI areas	City of Escondido (lead), CAL FIRE, San Diego County, private landowners	• Acquire more chipping equipment and offer no-cost chipping to residents in high-risk areas. • Study options for local biomass disposal, such as composting or mulching. • Engage the community and promote participation. • Seek funding and partnerships for program support. • Explore successful green waste programs in neighboring communities to identify best practices and innovative approaches for local implementation (e.g., Oceanside Green Waste) • Incorporate finding from Escondido Urban Forestry Plan	Reduce hazardous fuels, improve green waste management, and enhance community wildfire resilience.	Track participation, waste volumes, and program outcomes. Review annually and adjust strategies as needed.	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • San Diego County Fire Mitigation Fee Program • California Environmental Protection Agency Loans and Grants • California Fire Safe Council Grant Programs • California Fire Foundation Grant Programs
RL4		H	Spring 2027	**Hazard Tree and Dense Vegetation Survey and Mitigation** Identify and address hazardous trees and dense vegetation in high-risk areas to reduce wildfire risk and improve public safety.	Planning area, prioritizing WUI, roadways, and community infrastructure	City of Escondido (lead), CAL FIRE, private landowners, utilities	• Conduct a planning area survey and mapping of hazard trees and dense vegetation. • Create a shared database for tracking and prioritizing mitigation. • Focus removal and maintenance efforts on highest-risk locations as delineated on the CWPP QWRA • Coordinate roles among agencies and property owners.	Reduce wildfire hazards, protect residents and infrastructure, and enhance community safety.	Monitor progress and update the database regularly. Share results with stakeholders and the public.	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • NRCS Environmental Quality Incentives Program (EQIP) • FEMA Hazard Mitigation Grant Program (HMGP) • California Fire Safe Council Grant Programs • USFS Landscape Scale Restoration Competitive Grant Program

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
RL5		H	Fall 2026	**Hazardous Fuels Reduction Along Evacuation Routes** Reduce wildfire risk and improve safety by clearing hazardous vegetation along key evacuation routes.	Planning area, focusing on major evacuation corridors and high-risk areas	City of Escondido (lead), CAL FIRE, San Diego County, utilities (e.g., SDG&E)	• Assess and prioritize evacuation routes for fuels reduction. • Implement thinning, debris removal, and maintenance along selected routes. • Ensure compliance with environmental standards. • Adapt management practices based on monitoring and changing conditions.	Keep evacuation routes safe and accessible during wildfire emergencies, protecting residents and responders.	Regularly monitor and reassess route conditions. Maintain updated records and adjust strategies as needed.	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • FEMA Hazard Mitigation Grant Program (HMGP) • USFS Community Wildfire Defense Grant (CWDG) • California State Coastal Conservancy Wildfire Resilience Program • California Fire Safe
RL6		H	Spring 2027	**Fuel Management to Protect Water Resources** Reduce wildfire risk and protect Escondido's key water resources and watersheds from fire and post-fire impacts.	High-risk water resources and watersheds within Escondido and Rincon del Diablo FPD (e.g., lake hodges)	City of Escondido, Rincon del Diablo FPD, water districts, San Diego County, state/federal agencies, landowners	• Collaborate with hydrologists and land managers to identify and prioritize critical water resources and watersheds. • Implement targeted fuel reduction (mechanical, manual, biological, chemical, and, where appropriate, prescribed fire) around reservoirs, creeks, and recharge zones. • Integrate best practices to minimize erosion and sedimentation. • Restore burned areas through revegetation and tree planting to reduce debris flow, flooding, and water quality risks. • Coordinate with water agencies to ensure fuel management protects water quality and supply. • Engage the public in watershed protection education.	Safeguard water quality and infrastructure before and after fire events; reduce erosion, debris flow, and post-fire water impacts.	Monitor treated areas, track acres and methods, and assess watershed health post-fire. Adjust strategies as needed.	• CAL FIRE Grant Programs • California Department of Conservation RFFC Grant Program • EPA Catalog of Federal Funding Sources; Water Resources • NRCS Environmental Quality Incentives Program (EQIP) • FEMA Hazard Mitigation Grant Program (HMGP) • National Forest Foundation Matching Awards Program
RL7		M	Fall 2027	**Invasive Species Control Program** Reduce and manage invasive plant species to protect Escondido's native habitats and wildfire resilience.	Planning area, with focus on post-fire areas and natural open spaces	City of Escondido (lead), local conservancies, CAL FIRE, community volunteers	• Survey and map invasive species hotspots using ground assessment, public outreach, and GIS/remote sensing technologies. • Prioritize control in sensitive and high-risk areas. • Use integrated pest management: mechanical removal, targeted herbicides, and, where appropriate, biological control. • Restore native vegetation after removal. • Engage and educate the community, encouraging volunteer participation.	Protect native ecosystems, reduce wildfire risk, and improve habitat health.	Regularly monitor invasive species and restoration sites. Adapt strategies based on results and changing conditions.	• CAL FIRE Grant Programs • California Environmental Protection Agency Loans and Grants • NRCS Conservation Innovation Grants (CIG) • USFS Landscape Scale Restoration Competitive Grant Program • California Fire Safe Council Grant Programs
RL8		M	Fall 2026	**Enhance GIS Mapping with Updated Hazard Zones** Increase the accuracy and utility of hazard zone mapping by updating GIS data layers to reflect current conditions.	Planning area (City of Escondido, Rincon del Diablo FPD, and adjacent public/private lands)	City of Escondido	• Review and compile existing hazard zone data from relevant sources. • Acquire and integrate recent satellite imagery and field data to capture current conditions. • Update GIS layers to reflect newly identified or changing hazard zones. • Validate updated hazard zones through ground-truthing and stakeholder input. • Share revised GIS maps with agencies and partners for coordinated planning. • Maintain and periodically refresh hazard zone data to ensure ongoing accuracy.	Support resource prioritization and mitigation strategy development, and facilitate greater collaboration through shared, up-to-date information.	Track data usage and solicit user feedback to guide future improvements.	• CAL FIRE Grant Programs • State of California Grants Portal • Esri Environmental Systems Research Institute, Inc. Grants • California Fire Safe Council Grant Programs

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Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
RL9		M	Spring 2027	**Prescribed Grazing Pilot Program** Implement targeted goat or sheep grazing in high-fuel corridors.	Around critical infrastructure to maintain low-fuel conditions. This can reduce mechanical treatment needs and provide year-round maintenance.	City of Escondido, Rincon del Diablo FPD, San Diego County, water districts, public agencies, private landowners, environmental groups	• Inventory City-owned and accessible private properties suitable for grazing. • Conduct California Department of Fish and Wildlife (CDFW) environmental suitability reviews. • Install exclusionary fencing, and provide water access. • Contract with qualified grazing operators. • Schedule multiple grazing cycles per season in suitable areas.	Provide public outreach to highlight program benefits and risk reduction results. Reduce hazardous fuel loads, maintain defensible space around critical assets, increase public engagement, and demonstrate the City's commitment to wildfire risk reduction.	Evaluate prescribed grazing on annual basis.	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • San Diego County Fire Mitigation Fee Program • FEMA Hazard Mitigation Grant Program (HMGP) • California State Coastal Conservancy Wildfire Resilience Program • NRCS Environmental Quality Incentives Program (EQIP)
RL10		M	Fall 2027	**Workforce Development and Training for Fuels Reduction** Build local expertise to support wildfire resilience and ecological management.	Planning area	City of Escondido (lead), CAL FIRE, local agencies, community colleges, nonprofits	• Build curriculum based on best science and best management practices for native vegetation communities. • Provide hands-on and classroom training on fuels reduction, invasive species control, and restoration. • Offer mentorship and ongoing skills development. • Support agencies and organizations with resources and technical assistance.	Strengthen local workforce capacity to implement forest health and wildfire mitigation projects.	Evaluate training effectiveness, track skills application, and adapt programs based on feedback and emerging needs.	• CAL FIRE Grant Programs • California Fire Foundation Grant Programs • California Community Foundation Wildfire Recovery Fund
RL11		M	Spring 2028	**Cooperative Fuels Management** Coordinate fuels reduction efforts across Escondido, Rincon del Diablo FPD, and adjacent lands with diverse ownership (City, County, BLM, State, Caltrans, water and school districts, and private).	Planning area (City of Escondido, Rincon del Diablo FPD, and adjacent public/private lands)	City of Escondido, Rincon del Diablo FPD, County of San Diego, State agencies (Caltrans, CDFW), water and school districts, private landowners, nongovernmental organizations	• Jointly assess and prioritize high-risk areas for fuel treatments, focusing on WUI and boundaries between ownerships. • Identify parcels for targeted treatments to connect and enhance existing fuel breaks. • Pursue shared equipment, funding, and volunteer support. • Maintain fuel breaks near federal land, infrastructure, and critical facilities. • Develop collaborative maintenance and monitoring plans. • Hold annual multi-agency meetings to review progress and plan next steps.	Build resilient landscapes, reduce wildfire risk, and foster accountability among all land managers.	Conduct annual reviews, defensible space inspections, and invasive species monitoring. Track projects and share updates with stakeholders.	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • Regional Forest and Fire Capacity (RFFC) Program • USFS and NRCS Joint Chiefs' Landscape Restoration Partnership • FEMA Hazard Mitigation Grant Program (HMGP) • California Fire Safe Council Grant Programs
RL12		L	Fall 2028	**Fuel Break Installation and Maintenance** Implement planning and installation of fuel breaks. Build staffing to maintain and monitor existing and newly installed fuel breaks.	Planning area, with focus on WUI areas and high-risk zones	City of Escondido (lead), in coordination with private landowners, CAL FIRE, San Diego County, and local conservancies	• Implement and sustain fuel break projects in accordance with the CWPP and regional priorities. • Establish a regular maintenance and inspection schedule for fuel breaks on City-managed, public, and cooperative private lands to ensure continued effectiveness. • Maintain fuel breaks based on site-specific vegetation, with routine monitoring and adaptive maintenance criteria. • Collaborate with local fire departments, community groups, and regional land managers to coordinate efforts and share best practices. • Integrate hazard mitigation, such as removal of dead or diseased trees, into ongoing maintenance activities. • Assess the adequacy of fuel break width and continuity, especially along city boundaries and adjacent to open space preserves, and continuous fuels, expanding where necessary. • Explore and implement monitoring programs to improve accountability and enhance landscape resilience.	Enhance wildfire response capabilities and ensure the ongoing effectiveness of fuel breaks, reducing wildfire risk and protecting Escondido's neighborhoods, infrastructure, and natural resources.	Develop a robust monitoring plan with clear indicators, data collection protocols, and reporting timelines. Regularly publish updates on fuel break status and effectiveness to ensure transparency and facilitate adaptive	• CAL FIRE Grant Programs • San Diego Regional Fire Foundation • San Diego County Fire Mitigation Fee Program • Regional Forest and Fire Capacity (RFFC) Program • USFS Community Wildfire Defense Grant (CWDG) • FEMA Hazard Mitigation Grant Program (HMGP) • California State Coastal Conservancy Wildfire Resilience Program • NRCS Environmental Quality Incentives Program (EQIP) • California Fire Safe Council Grant Programs

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4.2 COHESIVE STRATEGY GOAL 2: FIRE-ADAPTED COMMUNITIES

Recommendations for fire-adapted communities include public education and outreach actions and actions to reduce structural ignitability.

4.2.1 Recommendations for Public Education and Outreach

Actions on the landscape are only a partial solution to reducing wildfire hazard; public education and action are critical for reducing human-caused ignitions, reducing the ignition potential of homes, and community wildfire resilience. Lack of knowledge, lack of positive actions (e.g., failing to create adequate defensible space within the home ignition zone), and negative actions (e.g., keeping leaf litter and exposed propane tanks close to structures) all contribute to increased risk of loss.

Table 4.3 lists public education recommendations to be implemented in the planning area.

4.2.2 Recommendations for Reducing Structural Ignitability

In addition to recommendations for public education and outreach, Table 4.3 also provides a list of community-based recommendations to reduce structural ignitability. 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). Maintaining defensible space and protecting the home from ignition from embers, including maintaining covers over vents and other openings, is strongly advised to protect a home from ignition. If property owners 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.

When selling a property in a High or Very High FHSZ in California, Assembly Bill 38 requires documentation of a compliant Defensible Space Inspection for real estate transactions.

Protecting structures from wildfire is a key aspect of California's 2018 Strategic Fire Plan, as buildings are among the most difficult and costly assets to protect. "Structural ignitability" refers to how likely a structure is to catch fire, often due to materials that can easily ignite from embers, direct flame, or radiant heat (Colorado State Forest Service 2025). Landowners should follow regional guidelines and state requirements like Chapter 7A of the California Building Code, which establishes wildfire-resistant construction and vegetation management standards for new buildings in FHSZs and WUI areas.

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Table 4.3. Recommendations for Creating Fire-Adapted Communities (public education and structural ignitability)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
FAC1	Fall 2026	H		**Wildfire Public Education and Community Engagement Program** Educate and empower Escondido residents to reduce wildfire risk and increase preparedness using an educational and outreach campaign	Planning area, including Rincon del Diablo FPD and high-risk neighborhoods	City of Escondido, Rincon del Diablo FPD, local fire agencies, schools, community groups, nonprofits, water districts, Tribal partners	• Develop and share wildfire safety materials (defensible space, fire-safe landscaping, home hardening, evacuation preparation). • Use diverse outreach methods: social media, websites, local media, mailers, community events, and workshops. • Offer in-person, hands-on demonstrations and training to ensure that public understands emergency preparedness principals. • Partner with schools, community organizations, and other groups for inclusive engagement. • Recruit and train community ambassadors to promote wildfire safety. • Provide resources for vulnerable and non-English-speaking populations. • Educate the public on evacuation procedures and host evacuation drills and preparedness workshops. • Maintain an online hub for wildfire education resources (e.g., City website, ArcGIS CWPP hub site, and story map). • Incorporate and promote water-wise landscaping practices as a key component of the education campaign to encourage sustainable water use in a drought -prone climates	Reduce human-caused wildfire risk, enhance preparedness, and build community resilience.	Review and update outreach regularly; track participation and engagement; adjust strategies to maximize impact.	• CAL FIRE Grant Programs • FEMA Fire Prevention and Safety Grants (FP&S) • Firewise Communities Program • California Fire Foundation Grant Programs
FAC2	Spring 2027	H		**ArcGIS Wildfire Resilience Hub Development** Develop an interactive public-facing ArcGIS hub site to centralize CWPP content, wildfire risk mapping, project tracking, and community engagement tools.	Planning area	City of Escondido (lead)	• Build a public hub with QWRA maps, treatment areas, and risk data. • Include a secure internal portal for project tracking, funding milestones, and interagency coordination. • Display measurable progress indicators for public transparency (e.g., acres treated, dollars invested).	Improve public access to wildfire information and enhance coordination between agencies.	Update hub content quarterly; maintain GIS layers and progress data.	• FEMA Community Wildfire Defense Grant (CWDG) • CAL FIRE Wildfire Prevention Grants
FAC3	Spring 2027	H		**Community Resilience Resource Network** Designate and equip community centers or public facilities as resilience hubs with backup power, cooling, emergency communications, and shelter-in-place capacity during wildfire events.	Planning area	City of Escondido, Rincon del Diablo FPD, community organizations	• Identify suitable facilities and assess infrastructure needs. • Install backup power, HVAC, communications equipment, and emergency supplies. • Develop operational protocols for shelter-in-place during wildfire and heat emergencies. • Train staff and volunteers on emergency hub operations.	Provide safe shelter and essential services during wildfire and heat emergencies, especially for vulnerable populations.	Conduct annual readiness inspections.	• Cal OES Resilience Grants
FAC4	Fall 2026	H		**Enhance Homeowner Address Visibility for Emergency Response** Implement a program to improve the visibility of homeowner address signage, particularly in areas with long driveways or obstructed views.	Planning area, especially WUI and high-risk areas with poor signage	City of Escondido, Rincon del Diablo FPD, planning and building departments, HOAs, real estate associations	• Assess current address visibility in high-risk or hard-to-access areas. • Develop and distribute guidelines for highly visible, reflective address signage that can be easily seen from the roadway. • Collaborate with homeowners to install or upgrade address signs, prioritizing properties with long driveways or blocked views. • Conduct outreach and education to raise awareness about the importance of address visibility for emergency response. • Review the Fallbrook program and other successful models to identify effective signage standards and materials.	Enhance the ability of emergency responders to quickly and accurately locate properties during critical incidents.	Schedule periodic reviews to ensure address signs remain visible and in good condition. Encourage homeowners to maintain signage and report damage or visibility issues.	• CAL FIRE Grant Programs • State Farm Good Neighbor Citizenship Grants • FEMA Fire Prevention and Safety Grants (FP&S)

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Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
FAC5	Spring 2027	H		**Defensible Space and Home Hardening Program** Promote, monitor, and enforce wildfire mitigation standards for Escondido residents, especially in WUI and high-risk areas.	WUI and high-risk neighborhoods in Escondido and Rincon del Diablo FPD	City of Escondido, Rincon del Diablo FPD, planning/building departments, HOAs, insurance partners, local contractors	• Enforce defensible space standards and encourage home hardening through education, inspections, and incentives. • Offer resources and programs for defensible space, fuels disposal, and structural improvements. • Partner with landscapers, architects, and contractors to promote Firewise practices. • Educate homeowners on mitigation strategies and available support. • Explore insurance incentives for compliant properties.	Reduce wildfire risk and property loss by increasing resident participation in defensible space and home hardening.	Annually evaluate program effectiveness, track participation, and update outreach as needed.	• CAL FIRE Wildfire Prevention Grants Program • FEMA Assistance to Firefighters Grants (AFG) • California Fire Safe Council Grant
FAC6	Fall 2027	M		**Annual Multi-Spectral Vegetation and Defensible Space Monitoring** Implement a citywide, high-resolution multi-spectral aerial monitoring program to map and analyze vegetation conditions, defensible space compliance, and wildfire risk across public property, open space, and private parcels.	Planning area	City of Escondido	• Classify vegetation and assess fuel loads in open space and WUI areas. • Overlay defensible space buffers on individual parcels for compliance tracking and resident education. • Maintain an annual imagery archive to measure changes, treatment effectiveness, and regrowth trends. • Map and integrate dip sites, staging locations, and other firefighting infrastructure into preplans. • Use vegetation and infrastructure data to support grant applications, hazard prioritization, and insurance outreach. • Share risk maps publicly to improve community awareness and transparency. • The program uses fixed-wing aircraft equipped with 4–6-inch resolution, 4-band multi-spectral cameras to capture annual orthomosaics of the city. • Use imagery to inventory critical infrastructure, identify and map water dip sites, locate drought-resilient staging areas, and integrate these resources into preplans for fire response. • This technology provides defensible, data-driven priorities that align with CWPP objectives and strengthens the City's position in grant applications.	Provide quantitative vegetation and defensible space data for enforcement, public education, and grant applications. Prioritize mitigation in high-risk locations based on vegetation load, slope, and structural vulnerability. Enhance pre-fire intelligence for first responders, improving safety and tactical decision-making.	Conduct annual flights and imagery processing. Update classification models and defensible space overlays annually. Archive all imagery and maintain change-detection capabilities for long-term trend analysis. Review and update mapped firefighting infrastructure annually.	• CAL FIRE Wildfire Prevention Grants (mapping and defensible space enforcement) • USFS Community Wildfire Defense Grants – Planning • Cal OES • Climate Investments – Priority Population and Resilience Projects
FAC7	Spring 2028	M		**Firewise USA Communities Program** Support Escondido neighborhoods in achieving Firewise USA recognition to boost wildfire safety and community resilience.	Escondido neighborhoods, especially in WUI and high-risk areas	City of Escondido, Rincon del Diablo FPD, CAL FIRE, community groups, homeowner associations (HOAs), Tribal partners	• Collaborate with local leaders and statewide Firewise coordinators to launch Firewise USA initiatives. • Conduct community fire risk assessments, and guide residents in developing and implementing safety plans. • Educate landowners on fire-safe practices and encourage participation through outreach and potential incentives. • Foster community champions to sustain engagement and action.	Increase neighborhood wildfire preparedness, safety, and resilience through education and community-driven action.	Regularly review and update safety plans; monitor implementation and reassess risks as needed.	• CAL FIRE Grant Programs • Firewise Communities Program • California Fire Safe Council Grant Programs • California Fire Foundation Grant Programs
FAC8	Fall 2027	M		**Funding Support for Underserved and Vulnerable Populations** Provide financial assistance to help Escondido's most at-risk residents reduce wildfire hazards and improve evacuation readiness.	Planning area, prioritizing high-risk and underserved neighborhoods	City of Escondido, Rincon del Diablo FPD, community leaders, HOAs, nonprofits	• Identify and prioritize vulnerable populations (elderly, disabled, low-income). • Work with local advocacy groups to compile a list of residents with functional needs (right term?) who are interested in receiving additional support for wildfire mitigation and evacuation. • Pursue grants and funding to support home hardening, defensible space, and evacuation assistance. • Collaborate with local organizations to reach and assist those in need.	Protect life and property for Escondido's most vulnerable residents during wildfire events.	Annually track and review assistance provided and outcomes for vulnerable households.	• FEMA Assistance to Firefighters Grants (AFG) and SAFER • California Fire Foundation Grant Programs • California Community Foundation Wildfire Recovery Fund • State Farm Good Neighbor Citizenship Grants

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
FAC9	Spring 2028	M		**Develop Evacuation Strategies for Remote Communities** Create tailored evacuation strategies for remote communities by identifying safe evacuation routes, addressing unique logistical challenges, and developing clear communication plans to ensure timely and effective evacuations during emergencies.	Rural communities within the planning area	City of Escondido, Rincon del Diablo FPD	• Conduct risk assessments to understand community-specific evacuation challenges and hazards. • Identify and map primary and secondary evacuation routes, considering road conditions and potential obstacles. • Collaborate with local agencies, first responders, and community members to validate routes and contingency plans. • Develop communication protocols for timely notification and guidance during evacuation events. • Provide education and outreach to residents on evacuation procedures and preparedness.	Enhance the safety and preparedness of remote community residents during emergencies.	Review and update evacuation strategies regularly, especially after drills or real events. Conduct periodic evacuation drills and incorporate community feedback.	• CAL FIRE Grant Programs • FEMA Hazard Mitigation Grant Program (HMGP) • USFS Community Wildfire Defense Grant (CWDG) • California Fire Safe Council Grant Programs
FAC12 Fall 2026 FAC13 Fall 2028 FAC10	Spring 2029	M		**Wildfire Awareness Signage and Information Dissemination** Enhance public awareness of wildfire risk and prevention in Escondido.	Planning area, including public open spaces, highways, and high-traffic areas	City of Escondido, Rincon del Diablo FPD, local agencies, community partners	• Install and maintain wildfire awareness signage at key locations. • Use electronic signs, flyers, and seasonal prevention messages in public areas. • Share wildfire warnings, safety tips, and fire danger ratings via social media, local news, and community platforms. • Regularly update outreach methods based on community engagement and feedback. • Explore feasibility of implementing a "homeless outreach team" to ensure that fire awareness reaches homeless populations, which are frequent ignition sources in Escondido.	Reduce wildfire risk and protect lives and property through effective public education.	Periodically assess signage placement and outreach effectiveness; track engagement and adapt strategies as needed.	• CAL FIRE Grant Programs • FEMA Fire Prevention and Safety Grants (FP&S) • State Farm Good Neighbor Citizenship Grants • California Fire Foundation Grant Programs
FAC11	Fall 2028	L		**Advanced Risk Assessments for Structural Ignitability and Defensible Space** Use field surveys and emerging technologies to assess wildfire risks at the parcel level in Escondido's high-risk communities.	High-risk WUI neighborhoods in Escondido and Rincon del Diablo FPD	City of Escondido, Rincon del Diablo FPD, planning/building departments, technology partners	• Integrate remote sensing, GIS mapping, and parcel-level data to identify areas with high structural ignitability and insufficient defensible space. • Conduct targeted, field-based assessments using NFPA 1144 or similar standards to ground-truth remote data. • Generate detailed maps and reports to pinpoint specific properties and neighborhoods needing improved outreach and mitigation. • Deliver personalized recommendations and educational materials to property owners based on assessment results. • Engage residents through digital platforms, workshops, and feedback opportunities. • Maintain photographic and digital records to track hazards and progress.	Increase community understanding of wildfire risk, prioritize outreach, and drive effective mitigation at the property level.	Regularly update risk models and assessments using new data; monitor outreach effectiveness and community response; adjust strategies based on results.	• CAL FIRE Wildfire Prevention Grants Program • FEMA Hazard Mitigation Grant Program (HMGP) • USFS Community Wildfire Defense Grant (CWDG) • Esri Environmental Systems Research Institute, Inc. Grants
FAC12	Fall 2026	L		**Framework for Updating HOA and Subdivision Covenants** Enable Escondido HOAs and subdivisions to adopt wildfire-resilient policies and practices.	Planning area HOAs and subdivisions, especially near wildland areas	City of Escondido, Rincon del Diablo FPD, HOAs, urban planners, fire safety experts	• Develop a process for revising HOA covenants to support defensible space, vegetation management, and evacuation planning. • Identify wildfire planning vulnerabilities within communities. • Engage residents through surveys, workshops, and meetings. • Collaborate with fire and planning professionals to guide updates. • Provide resources and education to help residents prioritize fire prevention.	Reduce wildfire risk and promote cohesive, fire-adapted community development.	Review effectiveness annually; maintain ongoing communication and outreach with HOAs and residents.	• CAL FIRE Grant Programs • California Fire Safe Council Grant Programs

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Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
FAC13	Spring 2027	L		**Wildfire Risk Communication for Real Estate and Development** Ensure real estate professionals and buyers are informed about wildfire risks and mitigation in Escondido.	Planning area, especially WUI and high-risk areas	City of Escondido, Rincon del Diablo FPD, planning and building departments, real estate associations, insurance agents	• Provide real estate agents, developers, architects, and insurance agents with property-specific wildfire risk data, defensible space needs, and other mitigative action. • Link to local wildfire plans and resources on real estate platforms. • Educate buyers and sellers about wildfire hazards and mitigation opportunities.	Increase awareness of wildfire risks in property transactions, and encourage proactive mitigation by property owners.	Periodically review and improve communication strategies with real estate and development sectors.	• CAL FIRE Grant Programs • FEMA Fire Prevention and Safety Grants (FP&S) • State Farm Good Neighbor Citizenship Grants • California Fire Foundation Grant Programs

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4.3 COHESIVE STRATEGY GOAL 3: WILDFIRE RESPONSE

Recommendations for safe, effective, efficient risk-based wildfire management decisions and actions that jurisdictions could undertake to improve wildfire response.

4.3.1 Recommendations for Improving Fire Response Capabilities

Enhancing wildfire preparedness and response in Escondido requires a holistic strategy that emphasizes prevention, readiness, capacity, and community safety. This includes maintaining high standards for risk reduction across the city, ensuring the community and responders are well-prepared and fostering ongoing coordination among the community to effectively address wildfire challenges and prevent loss.

Recent wildfires in the region have demonstrated the complexity of responding across diverse landscapes and the importance of cooperation among government entities, response agencies, and the community. During multiple wildfire incidents, resources are often stretched thin. This makes it essential that residents are well-informed about relevant safety protocols and prepared to respond appropriately.

Table 4.4 provides recommendations for improving firefighting capabilities. Many of these recommendations are general in nature to be tailored for response agencies across the city.

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Table 4.4. Recommendations for Safe and Effective Wildfire Response

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
WR1		H	Fall 2026	**Regular Inspection and Maintenance of Fire Hydrants** Implement a comprehensive program to routinely inspect, test, and maintain fire hydrants to ensure reliable operation and accessibility for emergency response.	Planning Area (with focus on Areas with reported hydrant issues) e.g., Candlelight Gl.	City of Escondido, Rincon del Diablo FPD,	• Conduct scheduled inspections of all fire hydrants to assess condition and operability. • Perform flow and pressure testing to verify performance standards. • Identify and promptly repair or replace damaged, obstructed, or non-functional hydrants. • Coordinate with local fire departments and water utilities to address issues and streamline repairs.	Ensure hydrants are operational and accessible for fire suppression and emergency response.	Schedule regular inspections (e.g., semi-annual or annual) and after significant incidents. Maintain detailed records of inspections, maintenance, and repairs.	• CAL FIRE Grant Programs • FEMA Fire Prevention and Safety Grants (FP&S) • State Farm Good Neighbor Citizenship Grants • California Fire Foundation Grant Programs
WR2		H	Spring 2027	**Aerial Water Source Assessment and Mapping** Identify, assess, and map water sources suitable for aircraft drafting to support wildfire suppression operations across Escondido. This project will improve aerial response capacity by locating reliable, accessible water sources and identifying gaps in coverage.	Planning Area	Escondido Fire Department, Rincon del Diablo FPD, CAL FIRE (San Diego Unit), City Public Works/Utilities Department, SDG&E (for access or safety around infrastructure), USFS or nearby agencies (if mutual aid involved)	• Identify, assess, and map local water sources available for drafting during wildland incidents • Coordinate with CAL FIRE and other partners to confirm the location and condition of aerial refill sites • Identify areas to Pre-stage portable water tanks in strategic locations to support helicopter operations • Pursue funding opportunities for water system upgrades and drought-resilient infrastructure • Integrate aerial resource planning into local fire response protocols	Improve water accessibility, availability, and fire suppression capacity	Convene Working Group: Coordinate with agencies listed under Land Ownership/Lead Mapping & Prioritization Develop geospatial maps showing: Current aerial refill sites, Strategic locations for portable tank staging, Gaps in water source coverage. Prioritize sites based on risk and operational need Field Verification Coordinate aerial resource planning with CAL FIRE and local partners	• Hazard Mitigation Grant Program (HMGP) FEMA / Cal OES • USFS Community Wildfire Defense Grant (CWDG) • CAL FIRE Fire Prevention Grants Program • Regional Planning Assistance Grants SANDAG or local COGs
WR3		H	Fall 2026	**Code Enforcement and Defensible Space Inspection Program** Strengthen enforcement of vegetation management and defensible space standards to reduce wildfire risk in Escondido.	Planning area, with focus on high-risk neighborhoods and WUI	City of Escondido, Rincon del Diablo FPD, code enforcement, fire departments, planning/building departments	• Increase staffing for dedicated defensible space and code enforcement positions. • Provide specialized training on wildfire risk reduction, hazardous vegetation, and abatement practices. • Use technology (GIS mapping, mobile inspection apps) to track violations, inspections, and compliance. • Conduct routine property inspections and enforce local and state vegetation management codes. • Educate residents on requirements and best practices; offer workshops and outreach. • Ensure clear enforcement processes and follow-up for non-compliance.	Protect life, property, and resources by ensuring consistent vegetation management and defensible space compliance.	Regularly monitor and evaluate enforcement and inspection activities; update training and outreach; track community compliance and program effectiveness.	• FEMA Assistance to Firefighters Grants (AFG) • CAL FIRE Wildfire Prevention Grants Program • California Fire Safe Council Grant Programs
WR4		H	Fall 2026	**Full-Time Fire Department Staffing and Retention Program** Assess, expand, and retain full-time fire personnel to meet Escondido's emergency response needs.	City of Escondido and Rincon del Diablo FPD	City of Escondido Fire Department, Rincon del Diablo FPD, Human Resources departments	• Conduct a comprehensive assessment of current and future full-time staffing needs for both agencies. • Implement targeted recruitment strategies to attract qualified candidates. • Develop retention initiatives—including professional development, recognition, and career advancement opportunities—based on regular staff feedback. • Establish formal mechanisms (e.g., surveys, focus groups, feedback sessions) to gather and act on employee input regarding job satisfaction and workplace improvements. • Foster a positive work environment that supports staff well-being and growth.	Ensure sufficient and stable full-time fire staffing to provide timely and effective emergency response for the community.	Regularly review staffing levels, retention rates, and staff feedback; adapt recruitment and retention strategies as needed.	• FEMA Staffing for Adequate Fire and Emergency Response (SAFER) • FEMA Assistance to Firefighters Grants (AFG) • California Fire Foundation Grant Programs

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
WR5		H	Spring 2027	**Wildfire Response Coordination and Pre-Planning Program** Enhance wildfire response speed and coordination, especially in rural and WUI areas of Escondido.	Rural Escondido, WUI neighborhoods, Rincon del Diablo FPD	City of Escondido Fire Department, Rincon del Diablo FPD, CAL FIRE, state/federal agencies, utilities	• Conduct regular joint training and pre-season drills with all response partners. • Maintain up-to-date communications, equipment lists, and contact information among local, state, and federal responders. • Incorporate solution for limited access issues within the General Plan Safety Element • Regularly update and review mutual aid and cooperative agreements. • Map and secure access points, gates, and water sources in rural and WUI areas; ensure agreements for emergency access. • Strategically place equipment caches to reduce response times. • Host annual coordination meetings and train new staff on roles and procedures.	Improve wildfire response times and effectiveness, reduce risk to life and property, and clarify agency responsibilities.	Annually review and update agreements, water resources, and access plans; evaluate training and coordination efforts for continuous improvement.	• FEMA Hazard Mitigation Grant Program (HMGP) • USFS Community Wildfire Defense Grant (CWDG) • Homeland Security Grant Program (HSGP) • CAL FIRE Grant Programs
WR6		H	Spring 2027	**Disaster Debris Removal Plan** Establish a clear, actionable plan for managing wildfire and disaster debris, ensuring coordinated response and rapid recovery for the City of Escondido and Rincon del Diablo FPD.	City of Escondido and Rincon del Diablo FPD	City of Escondido, Rincon del Diablo FPD, Code Enforcement, fire departments, planning/building departments, emergency management	• Assemble a cross-agency planning team. • Identify and assess potential debris staging and disposal sites. • Develop step-by-step procedures for debris collection, sorting, transport, and disposal. • Provide training and public communication protocols. • Integrate FEMA and Cal OES standards to ensure eligibility for federal aid.	Achieve compliance with state and federal debris management requirements. Maximize FEMA and state reimbursement opportunities. Accelerate safe debris removal and community recovery. Strengthen coordination among agencies and departments.	Review and update the plan at least every 5 years or after major incidents. Conduct annual training exercises for staff and partners. Monitor and document debris operations and reimbursement outcomes to guide improvements.	• State Homeland Security Grant Program • General Fund
WR7		H	Fall 2027	**Extreme Wind Wildfire Response Enhancement** Mitigate the effects of extreme wind on wildfire response and containment in Escondido, especially in rural and WUI areas.	Planning area, with focus on wind-prone and high-risk areas	City of Escondido Fire Department, Rincon del Diablo FPD, emergency management, weather services	• Integrate weather data and wind forecasts into wildfire response planning. • Use wind modeling tools (e.g., WindNinja), satellite imaging, drones, and remote sensors for planning, early detection, and monitoring. • Implement targeted fuel treatments and fuel breaks to slow fire spread during wind events. • Train and equip fire personnel for rapid response to wind-driven wildfires. • Maintain efficient communication channels among all response agencies.	Enhance wildfire response and containment during extreme wind events, reducing risk to life and property.	Provide regular staff training; annually assess and update protocols based on incident reviews and new technology.	• FEMA Hazard Mitigation Grant Program (HMGP) • CAL FIRE Grant Programs • USFS Community Wildfire Defense Grant (CWDG)
WR8		H	Fall 2026	**Wildfire Personnel Training Program** Enhance the skills and readiness of Escondido's emergency responders for wildfire management.	City of Escondido and Rincon del Diablo FPD	City of Escondido Fire Department, Rincon del Diablo FPD, training providers	• Assess training needs based on current skills and emerging wildfire challenges. • Utilize established National Wildfire Coordinating Group training regimen, tailoring to local conditions as needed. • Conduct regular classroom and hands-on training in wildfire behavior, suppression, safety, and equipment. • Offer certification and continuing education to ensure responders are up to date on best practices and new technologies. • Track performance metrics to measure training effectiveness and guide improvements.	Strengthen emergency response capabilities for wildfire incidents.	Monitor participation, certification rates, and responder performance; adjust training as needed based on results and feedback.	• FEMA Assistance to Firefighters Grants (AFG) • CAL FIRE Grant Programs • California Fire Foundation Grant Programs

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements	Funding Sources
WR9		H	Spring 2027	**Wildfire Equipment and Apparatus Upgrade Program** Ensure Escondido's emergency responders have modern, reliable equipment for effective wildfire response.	City of Escondido and Rincon del Diablo FPD	City of Escondido Fire Department, Rincon del Diablo FPD, equipment vendors	• Assess current equipment and apparatus needs; procure upgrades to address gaps. • Implement a regular maintenance schedule to keep all equipment in optimal condition. • Provide training for responders on equipment use and care. • Gather responder feedback on equipment performance and make adjustments as needed. • Maintain detailed maintenance and equipment status logs.	Maintain a ready, well-equipped fleet for wildfire suppression and emergency response.	Track equipment status, maintenance records, and responder feedback; review and update procurement and maintenance plans regularly.	• FEMA Assistance to Firefighters Grants (AFG) • CAL FIRE Grant Programs • California Fire Foundation Grant Programs
WR10		H	Fall 2027	**Firefighting Fleet Modernization Forecasting Program** Improve forecasting system for upgrade Escondido's firefighting fleet to ensure reliable, effective wildfire response.	City of Escondido and Rincon del Diablo FPD	City of Escondido Fire Department, Rincon del Diablo FPD, fleet management	• Increase capacity and capabilities for assessing the current fleet to identify aging or high-maintenance vehicles. • Develop a strategic plan for forecasting the need to replace and acquire vehicles based on operational needs and service demands. • Reassign or decommission underutilized vehicles to maximize efficiency. • Maintain an ongoing schedule for fleet maintenance and upgrades.	Improve wildfire response capability, reduce downtime, and enhance community resilience with a modern, reliable fleet.	Regularly evaluate fleet performance, track upgrades, and adjust plans to meet operational goals and community needs.	• FEMA Hazard Mitigation Grant Program (HMGP) • FEMA Pre-Disaster Mitigation (PDM)
WR11		H	Spring 2028	**Fire Facility Modernization Program** Upgrade and modernize Escondido's fire stations to meet current standards and support future staffing and operational needs.	City of Escondido and Rincon del Diablo FPD	City of Escondido Fire Department, Rincon del Diablo FPD, facilities management	• Assess and upgrade existing fire stations to provide modern facilities, equipment, and technology. • Ensure stations accommodate current and future staffing models, training, and administrative needs. • Expand or enhance office, storage, training, and parking space as needed. • Support fire suppression, prevention, community engagement, and wildfire mitigation programs with improved facilities.	Enhance emergency response capability, staff readiness, and community safety through modern, well-equipped fire facilities.	Regularly evaluate facility conditions, maintenance needs, and operational effectiveness; monitor funding sources and project progress.	• FEMA Hazard Mitigation Grant Program (HMGP) • FEMA Pre-Disaster Mitigation (PDM) • CAL FIRE Grant Programs • California Fire Foundation Grant Programs
WR12		H	Fall 2026	**Post-Fire Coordination Group** Establish a coordination group to support effective recovery from future fire events.	City of Escondido Planning Area	City of Escondido, San Diego County officials, utility providers, local Fire Safe Councils, and neighborhood leaders	• Form a standing group with representatives from city departments, county emergency services, utilities, and community organizations. • Develop protocols and communication strategies for post-fire coordination, including damage assessment, debris removal, utility restoration, and community assistance. • Conduct tabletop exercises and maintain a current contact roster and communication platform (e.g., SharePoint or Everbridge). • Integrate group functions into existing emergency operations plans	Coordinates post-fire response efforts across city departments, county agencies, utilities, and community partners. Facilitates clear and consistent communication with the public during the recovery phase. Streamlines recovery actions such as damage assessments, debris removal, utility restoration, and resource distribution.	Form A working group and designate a lead agency. Formalize partnerships through MOUs, holding regular meetings and trainings, developing recovery protocols and communication templates, and maintaining a secure, centralized platform for data sharing.	• Hazard Mitigation Grant Program (HMGP) FEMA / Cal OES • Pre-Disaster Mitigation (PDM) FEMA / Cal OES • Homeland Security Grant Program (HSGP) DHS / Cal OES • Community Wildfire Defense Grant (CWDG) USDA Forest Service • Fire Prevention Grants Program CAL FIRE • Regional Planning Assistance Grants SANDAG or local COGs
WR13		H	Spring 2027	**Emergency Transportation for Vulnerable Populations** Facilitate evacuation and transportation for Escondido's vulnerable residents during disasters.	Planning area, with focus on high-risk and underserved neighborhoods	City of Escondido, Rincon del Diablo FPD, emergency management, transportation providers, community organizations	• Identify and map vulnerable populations (elderly, disabled, children, etc.). • Develop a comprehensive emergency transportation plan outlining resources, protocols, and responsible agencies. • Assess and coordinate available transportation options (buses, vans, ambulances, etc.). • Provide clear, accessible information to the public and targeted outreach to vulnerable groups.	Facilitate evacuation and support Escondido's most at-risk residents during emergencies and disasters.	Annually review and update transportation plans; assess effectiveness after evacuation events; gather feedback from participants.	• FEMA Hazard Mitigation Grant Program (HMGP) • FEMA Assistance to Firefighters Grants (AFG) • State Farm Good Neighbor Citizenship Grants • California Fire Foundation Grant Programs

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CHAPTER 5   MONITORING AND EVALUATION

Developing an action plan and assessment strategy that clearly identifies roles, responsibilities, funding needs, and realistic timelines for implementing high-priority projects is a key step in advancing the Escondido CWPP. The previous chapter outlines recommended project timelines and monitoring protocols, which are further detailed below.

All stakeholders and signatories to this CWPP share the goal of producing meaningful, measurable outcomes. However, on-the-ground wildfire risk reduction efforts typically take years to complete and often require ongoing maintenance, such as annual or seasonal treatments. Given the investment of time, resources, and funding, it is important to establish a way to evaluate whether the plan's goals and objectives are being achieved as intended.

Monitoring and reporting efforts contribute to a long-term understanding of how ecological conditions change over time and how fire mitigation activities affect both the environment and surrounding communities. As the CWPP is updated in the future, it will also be necessary to track policy changes, shifts in stakeholder roles, and evolving levels of community preparedness. These elements are critical to future revisions and addendums to the plan. (CA WFRTF 2023; Brown 1974; Ottmar et al. 2000).

It is recommended that project monitoring be implemented as a collaborative effort. There are many available tools and resources for designing a community-based, multi-party monitoring program that would support and enhance the effectiveness of this CWPP. Multi-party monitoring typically involves a mix of residents, community-based organizations, regional interest groups, and public agencies. This approach builds trust among partners and improves public understanding of how fire mitigation and ecological restoration projects affect the landscape.

While collaborative monitoring may take more time due to the coordination it requires, the benefits often outweigh the costs. To be successful, a clear and well-defined monitoring plan should be developed early in the implementation process.

Table 5.1 outlines monitoring strategies that correspond to different CWPP recommendations, including both measurable and qualitative indicators. These strategies are intended to track the progress and long-term sustainability of projects. However, it is important to note that:

- These strategies are not comprehensive.
- Their implementation will depend on available funding, staffing, and partner capacity.

Ongoing collaboration, transparency, and adaptability will be essential to keeping the CWPP relevant and effective as conditions and priorities change in Escondido over time.

Table 5.1. Recommended Monitoring Strategies

Monitoring Approach	Method / Tool	Responsible Party	Purpose
Hazardous Fuels Projects	Use GIS-based tracking tool with project boundaries and attributes. Integrate wildfire hazard layers to show risk reduction progress.	City, Core Team	Visualize progress, identify treatment gaps, support strategic planning.
Photographic Monitoring	Establish permanent photo points with GPS coordinates. Document pre- and post-treatment landscapes, evacuation routes, and events. Store securely in an online archive.	Core Team	Track visual change, support public communication, validate results.
Multispectral Imaging (Citywide)	Use aerial or satellite-based multispectral imaging to monitor vegetation condition, treatment effectiveness, and regrowth over time. Aligns with GIS and fuels tracking layers.	City, Core Team, GIS specialists	Detect vegetation stress, track landscape recovery, support multiple monitoring metrics.
Acres Treated (by fuel type and method)	Use spatial database using GPS and GIS. Include treatment type (e.g., thinning, grazing, prescribed fire). Link to modeling tools.	Core Team	Quantify implementation, support performance-based funding, assess behavior change.
Home Ignition Zones / Defensible Space	Use web-based mapping and self-reporting tool for documenting defensible space work. Include treatment date and type.	Homeowners with Core Team support	Reduce structural vulnerability, track community participation.
Public Participation	Maintain attendance records for workshops, tours, classes, and hearings.	Core Team	Evaluate engagement and cultural shift toward fire preparedness.
Homeowner Outreach	Maintain outreach database logging door-to-door visits, phone calls, and event contacts.	Fire Safe Council, Core Team	Evaluate effectiveness and saturation of educational campaigns.
Local Job Creation	Track contract and grant-supported jobs through project reporting.	Core Team	Measure local economic impact of CWPP implementation.
Education and Outreach Activities	Online database of events, materials distributed, participant numbers, and feedback.	Core Team	Track delivery of education objectives and community reach.
Emergency Response Capacity	Maintain inventory of fire response staffing, equipment, and interagency coordination agreements.	Core Team	Evaluate operational readiness and mutual aid capabilities.
Policy and Code Changes	Document local planning and regulatory changes related to wildfire safety and land use.	Core Team	Monitor institutional support for risk reduction.
Stakeholder Involvement	Maintain an updated list of engaged partners and track turnover or new additions.	Fire Safe Council, Core Team	Assess community collaboration and planning resilience.
Wildfire Impacts Over Time	Maintain records of wildfire acreage, injuries, fatalities, structural damage, suppression costs, and recovery efforts. Compare annually with historic averages.	Core Team	Evaluate long-term effectiveness of CWPP strategies.

5.1   FUELS TREATMENT MONITORING

It is important to evaluate whether fuel treatments have accomplished their defined objectives and whether any unexpected outcomes have occurred. Monitoring ensures that treatment effectiveness, ecological impacts, and maintenance needs are clearly understood and can guide 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 help answer this by providing both qualitative and quantitative feedback.

- **Can there be ecological consequences associated with fuels work?** Items to consider include post-treatment soil disturbance, erosion, or invasive species encroachment. Even relatively low-cost monitoring may help reduce long-term management costs and ecological consequences.

- **Vegetation will grow back.** As a result, fuel break maintenance and fuels modification in both the home ignition zone and at the landscape scale require periodic assessment. Monitoring these changes helps decision-makers determine the most effective treatment intervals and identify where reentry is needed.

Monitoring is recommended for all types of fuels treatment. For example, in addition to assessing mechanical treatments, comprehensive post-fire monitoring can help evaluate whether pre-fire fuels reduction treatments altered fire behavior and intensity. Monitoring may also capture broader ecological effects, such as wildlife responses, vegetation regeneration, and changes to soil chemistry or hydrology. Monitoring outcomes inform adaptive management, which involves refining future actions based on observed results. Monitoring can also address legal and economic questions and offer valuable educational opportunities for students, interns, and volunteers.

Monitoring activities should be tailored to each project's goals, location, and available resources. The timeline and method used will depend on the size, sensitivity, and scope of the treatment. The following methods range in complexity and cost, offering scalable approaches appropriate for different project teams and participants.

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, wood posts, or GPS-recorded locations, and photographs are 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. This method is appropriate for foresters or other personnel monitoring fuel treatments on forested lands.

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, like multi-spectral remote sensing, or fire monitoring (Fire Effects Monitoring and Inventory System [FIREMON]) plots. This method is ideal for foresters or university researchers tracking vegetation changes in forested land.

5.1.1 Remote Sensing Monitoring

In addition, new technology is helping make many monitoring practices easier and more efficient. It also allows for greater scalability, especially in larger or more remote treatment areas. Multispectral remote sensing offers a high-efficiency, repeatable method for monitoring fuel treatments using drone, fixed-wing, or satellite-based imagery (CA WFRTF 2023; USFS 2022). Vegetation changes can be assessed through spectral indices such as Near Infrared, NDVI (Normalized Difference Vegetation Index) and/or NBR (Normalized Burn Ratio), which allow for detection of treatment impacts, regrowth trends, and invasive species spread.

This technology can also be used to analyze defensible space around structures by measuring vegetation cover, canopy density, and proximity of fuels within defined buffer zones. Automated classification or manual interpretation of high-resolution imagery can help verify compliance with defensible space guidelines and identify areas needing maintenance or follow-up treatment.

Multispectral monitoring is increasingly used for:

- Pre-treatment vegetation analysis
- Post-treatment vegetation recovery assessments
- Burn severity mapping
- Detection of type conversion or invasive encroachment
- Tracking effectiveness of large-scale treatments over time
- Evaluating defensible space conditions around homes and critical infrastructure

This method is best suited for agencies or research partners with GIS and imagery analysis capacity, but it can also be contracted out for one-time or periodic evaluations. When paired with ground-truthing, remote sensing provides a powerful tool for long-term wildfire resilience planning.

5.2 IMPLEMENTATION

This CWPP provides recommendations for prioritized fuels reduction projects, strategies to reduce structural ignitability, and methods to improve public education and outreach. Implementation of these recommendations must be tailored to each specific project and adapted to the unique conditions, resources, and regulatory context within the City of Escondido and the Rincon del Diablo FPD.

On-the-ground implementation will rely on the project recommendation matrices provided in Chapter 4. These matrices offer a framework for translating planning priorities into action. Prior to implementation, each project will require development of an assessment strategy to determine next steps and ensure alignment with CWPP objectives.

This phase includes identifying:

- Responsible parties and their roles, including local agencies, fire departments, community groups, and landowners

- Funding sources and needs

- Timelines for project initiation and completion

- Permitting or environmental compliance requirements, if applicable

The CWPP recommends establishing an implementation working group or continuing Core Team to oversee progress, track milestones, and coordinate outreach and engagement. Information related to funding opportunities and grant programs is provided in Appendix E, which includes federal, state, and regional funding sources that may be applicable to Escondido's priority projects. Successful implementation will depend on collaboration, clear communication, and a sustained commitment from local leadership, residents, and agency partners. Integrating this plan into broader emergency preparedness, land use, and capital improvement efforts will strengthen wildfire resilience across the planning area.

5.3   CWPP EVALUATION

CWPPs are designed to reduce wildfire risk to communities and the surrounding environment. However, wildfire risk is not static. Over time, communities grow, infrastructure expands, vegetation regenerates, and environmental conditions evolve. As a result, the strategies and actions outlined in a CWPP must be dynamic and adaptable to remain effective.

Regular evaluation ensures the CWPP continues to meet its goals and provides opportunities to adjust strategies based on current conditions, emerging challenges, and new information. It is recommended that the CWPP be reviewed annually, with input from the Core Team and relevant stakeholders. These evaluations should inform annual updates to the CWPP document and its planning goals and objectives.

A structured, four-step approach is recommended for evaluating the CWPP:

Identify Objectives

Evaluate whether the CWPP is performing as intended by reviewing the original goals and how well they are being achieved across key areas:

- Structural ignitability reduction

- Fuel treatment implementation

- Public education and outreach

- Multi-agency collaboration

- Emergency response capacity

Assess the Changing Environment

Analyze how conditions in and around the community have changed since the CWPP was developed:

Population Trends

- Changes in population size and demographics

- Expansion into WUI areas

- Shifts in settlement patterns and housing distribution

Vegetation and Fuels

- Changes in fuel type, density, and continuity

- Drought impacts and vegetation stress

- Invasive species, pests, or disease-related die-off

Review Action Items

Compare actions completed to the plan's objectives to determine progress and identify remaining needs:

- Review the status of each action item (e.g., completed, in progress, not started).

- Document accomplishments and completed projects.

- Identify barriers to implementation and lessons learned.

- Establish next steps and prioritize upcoming efforts.

Assess Results and Outcomes

Evaluate the impact of CWPP implementation activities across focus areas:

Multi-Agency Collaboration

- Are original CWPP partners still engaged in implementation?

- Has the collaborative planning process supported long-term partnerships?

- Are agencies leveraging the CWPP to secure funding or align with other plans?

Risk Assessment

- Is the risk assessment being used to guide treatment priorities?

- Have any new wildfire-related policies, ordinances, or mandates been adopted?

- Are at-risk communities actively engaged in mitigation efforts?

Hazardous Fuels

- How many acres have been treated? What types of treatment were used?

- Are treatments cross-boundary or landscape-scale?

- Are residents participating in defensible space activities?

Structural Ignitability

- Have local fire codes or building ordinances been updated?

- Has structural loss occurred since CWPP development?

- Is public awareness of home hardening and fire-safe design improving?

Public Education and Outreach

- Are residents more aware of wildfire risk and mitigation strategies?

- Has outreach been inclusive of vulnerable populations?

- What types of community involvement have taken place?

Emergency Response

- Is the CWPP integrated into hazard mitigation plans or emergency operations plans?

- Has local fire response capacity changed (staffing, equipment, coverage)?

- Is the CWPP consistent with other regional or state planning efforts?

Annual evaluation is a critical component of maintaining a relevant and effective CWPP. It ensures the plan remains a living document, responsive to environmental change, community needs, and the evolving wildfire landscape. Regular input from the Core Team and community stakeholders will support shared accountability, encourage adaptive management, and strengthen Escondido's long-term wildfire resilience.

5.4   TIMELINE FOR UPDATING THE CWPP

The Health Forests Restoration Act (HFRA) provides flexibility in the CWPP planning process, allowing the Core Team to determine the most appropriate schedule for updates. Core Team members are encouraged to convene annually to review the project list, assess recent accomplishments, identify implementation challenges, and coordinate on funding opportunities for priority actions. (HFRA 2003; HFRAA 2009).

It is recommended that the evaluation framework described above be applied annually to guide updates and ensure the CWPP remains relevant and effective. A more formal revision of the plan should occur every 5 years. This 2025 CWPP serves as an update to the City of Escondido's original 2011 CWPP. The first formal update of this revised CWPP is scheduled for October 1, 2030, followed by the next update on October 1, 2035, and every 5 years thereafter.

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CHAPTER 6 HOMEOWNER ACTIONS AND RESOURCES

With adequate resources, homeowners may have the ability to significantly reduce wildfire risk through practical measures such as home hardening, which aims to reduce a home's ignitability, and by creating defensible space throughout the property and within the home ignition zone, preventing the likelihood of flames and embers reaching and igniting structures. The following includes comprehensive guidance on building resilient communities by creating defensible space; hardening the home and surrounding property to wildfire impacts; utilizing local, state, and national resources; and preparing the household for potential evacuation. Financial constraints and the complexity of mitigation can often pose significant obstacles for homeowners, so included are several resources and recommendations at varying levels of effort designed to support these actions.

6.1 DEFENSIBLE SPACE

Defensible space is a critical component of wildfire mitigation, requiring both consistent maintenance by property owners and enforcement by local fire agencies. As part of CAL FIRE, the California Board of Forestry and Fire Protection has established defensible space regulations that include an ember-resistant zone within 5 feet of structures, full vegetation clearance from 0 to 30 feet, and vegetation thinning from 30 to 100 feet in State Responsibility Areas (SRAs) and in Local Responsibility Areas (LRAs) designated as High or Very High Fire Hazard Severity Zones. These designations are common throughout Escondido (CAL FIRE 2022; City of Escondido 2025c).

6.1.1 City of Escondido Standards

While the Escondido Fire Department's Defensible Space Property Review Checklist differs in approach from the CAL FIRE standards, it shares the overarching goals of fuel reduction and minimizing structural ignitability. Property owners should be familiar with both sets of guidelines to ensure compliance. The Escondido Fire Department checklist requires property owners to remove non-fire-resistant vegetation within a 50-foot radius of the home, thin 50% of natural vegetation, and remove dead plants and woody debris within a 50- to 100-foot perimeter (City of Escondido 2025d). It's important to note that, at the time this plan was drafted, Escondido's defensible space guidelines are under review and are expected to be updated after the publication of this plan. Homeowners are encouraged to stay informed and watch for updates from the City and Fire Department regarding any changes to these guidelines.

More details regarding Escondido's current defensible space standards can be found here: https://www.escondido.gov/DocumentCenter/View/2748/Property-Review-Checklist-PDF

6.1.2 CAL FIRE Standards

According to CAL FIRE effective defensible space consists of three zones (Figure 6.1): a fire-free area next to the home (Zone 0), a thinned and cleared secondary zone (Zone 1), and, for larger parcels, a managed transitional area (Zone 2). Together, these zones reduce fire intensity and help prevent flames from reaching the home. Defensible space also provides greater opportunities for firefighters to protect structures more safely and effectively. While it increases a home's chances of surviving a wildfire, it does not guarantee survival. Consistent application of these principles across neighborhoods benefits everyone. The three defensible space zones are described below (CAL FIRE 2022):
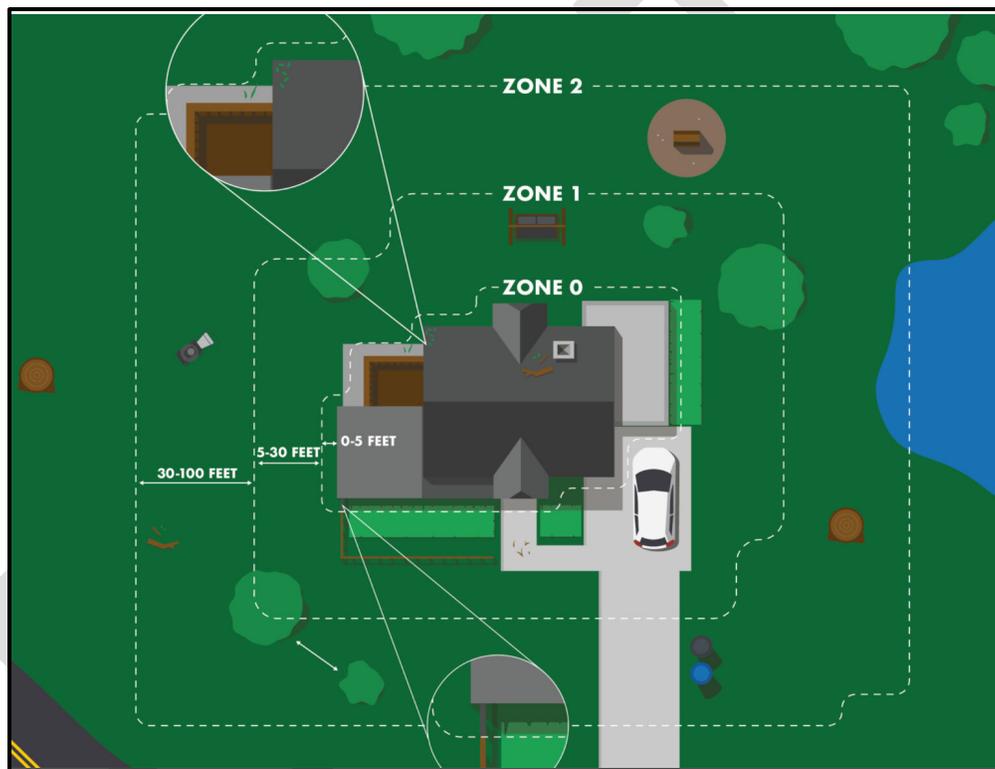
Figure 6.1. Defensible space zones as designated by CAL FIRE.
Source: https://readyforwildfire.org/prepare-for-wildfire/defensible-space/

Zone 0 – Immediate Zone: The area within 0 to 5 feet of a structure (including under decks and attachments), is the most critical for wildfire protection. This zone should be kept free of combustible materials such as plants, mulch, firewood, and debris. Only noncombustible landscaping, like gravel, is recommended. Regularly clear dead leaves, needles, and branches, especially from gutters and roofs. Trees and woody plants should be avoided, and combustible items like outdoor furniture, gates, and fences should be replaced with noncombustible alternatives or kept outside Zone 0 whenever possible (CAL FIRE 2022).

Zone 1 – Intermediate Zone: Zone 1 encompasses the first 30 feet surrounding structures and serves as a critical buffer between Zone 0 and Zone 2. The primary focus in this area is on fuel reduction and maintaining a clean, green landscape. Key recommendations include removing all dead or dying

vegetation and debris, regularly checking and clearing roofs and gutters, and maintaining at least a 10-foot clearance between chimneys and any vegetation. Trees should be pruned to keep a 10-foot distance between canopies, and any flammable items or vegetation near windows, under decks, or stairs should be removed or relocated to Zone 2. Additionally, items that could ignite, such as patio furniture or swing sets, should be separated from vegetation and other combustibles.

Zone 2 – Extended Zone: Zone 2, which spans from 30 to 100 feet from a structure (including any parts that extend onto neighboring properties), is dedicated to reducing wildfire fuel and slowing fire spread. In this zone, grasses should be maintained at a maximum height of 4 inches and shrubs should be spaced apart. To prevent fire from climbing into treetops, lower tree branches should be pruned to create at least 6 feet of clearance from the ground, or three times the height of nearby shrubs. While up to 3 inches of vegetation debris may be allowed, it is recommended to remove as much as possible. Additionally, firewood must be surrounded by a 10-foot buffer of bare mineral soil with no vegetation.

In addition to the recommendations listed above, CAL FIRE requires 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.

6.2   HOME HARDENING

To safeguard your home from embers during wildfires, it is crucial to recognize that exterior vegetation is not the sole source of fuel for these embers. Wildfires can spread between structures and wildland vegetation or from structure to structure. Houses that are close together may find that hardening their home is the most effective option if there aren't options to manage exterior vegetation due to overlapping property lines. Fortifying or retrofitting your home serves as a strong defense against ember intrusion. To effectively mitigate a home from wildfire, use fire-resistant building materials, perform regular maintenance, and address potential ignition points caused by embers Figure 6.2 illustrates the relative cost of upgrading various home features, including siding, eaves, windows, decks, roofs, doors, fences, gutters, and vents, to ember-resistant materials and designs. Understanding these costs helps homeowners prioritize improvements that most effectively enhance wildfire resilience.

Further information and instructions for enhancing resilience for each component of your home are outlined below.

For more information and additional components surrounding home hardening activities for increasing wildfire resilience, reducing structural ignitability, and preparing for wildfires, please visit: https://wildfireprepared.org/.

Figure 6.2. Sustainable defensible space: relative cost of upgrading the listed features.

Source: https://defensiblespace.org/house/house-upgrade/

6.2.1 Upgrading Components to Reduce Structural Ignitability

6.2.1.1 Roof

The roof is the most vulnerable component of your home during wildfires and must be able to resist wind-blown embers and other wildfire exposures. Complex roofs, where the roof meets vertical walls or includes dormers, present additional vulnerabilities, making roof evaluation a top priority when building or remodeling. Upgrading to a Class A fire-resistant material (such as metal, composition, clay, or tile) offers significant benefits, while regular maintenance, like removing debris, trimming overhanging limbs, inspecting roof-to-wall intersections for gaps, and covering chimneys with spark arrestors, reduces ignition risk. Additional measures, such as blocking gaps between roof decking and boxing in eaves with noncombustible materials, further enhance protection. Maintaining and upgrading your roof is a high-priority, cost-effective step for wildfire resilience.

Roof vents are vital for attic air circulation and moisture control but are highly susceptible to flame and ember intrusion during wildfires. To reduce vulnerability, replace non-metal vents with metal ones, install corrosion-resistant metal mesh screens with openings no larger than 1/8 inch, and add shutters where possible. Additional protection can be achieved by installing fire dampers in HVAC ducts, which close automatically under high heat. Regular maintenance, such as removing debris and vegetation near vents and turning off HVAC systems during wildfire threats, further minimizes risk. Upgrading vents is a cost-effective, high-priority home hardening measure for fire resistance, though each home's needs may vary.

6.2.1.2 Gutters

Dry debris in gutters can ignite from embers, allowing flames to reach the roof and siding. If gutter upgrades aren't possible, annual cleaning is still effective at reducing wildfire risk. For greater protection, install noncombustible leaf guards; use gutters and downspouts made from materials like galvanized

steel, copper, or aluminum; and add a drip edge. A drip edge both protects the roof edge from flames and helps block embers from entering gaps under the roof.

6.2.1.3 Fences and Decks

Landscape fencing and walls attached to or near buildings in wildfire zones pose a high ignition risk, as they can carry flames or radiant heat directly to structures. Wooden fences, especially old or weathered post-and-board styles, easily become fuel for wildfires and can act as horizontal ladder fuels, allowing fire to travel along their length and collect embers in gaps. To reduce risk, avoid attaching combustible fences and walls to buildings; if attachment is unavoidable, end the fence with a noncombustible material such as masonry or metal, or use a metal gate or plate at the connection point, though be mindful that metal flashing may cause moisture issues over time. Fences and decks within 10 feet of a home should be constructed from fire-resistant materials, and any gaps or slats that could trap embers should be avoided.

For decks, clear combustible debris from beneath, use gravel or other non-ignitable surfaces below, and cover openings with metal mesh. Remember, both plastic and wood-plastic composite decking are combustible, so consider upgrading to fire-retardant materials, especially close to the house. Regular maintenance and strategic upgrades to fencing and decking are high-priority, cost-effective steps for improving wildfire resilience.

6.2.1.4 Walls, Sidings, Coatings

Exterior walls are susceptible to ignition from direct flames, radiant heat, and windborne embers, especially if made from solid wood or wood composites. To reduce wildfire risk, ensure continuous siding coverage from foundation to roof and use fire-resistant materials such as concrete, fiber-cement, fire-retardant-treated wood, stucco, masonry, or metal. Avoid non-treated wood and vinyl siding. For upgrades, replace flammable coverings with noncombustible options and regularly clear combustible debris near exterior walls.

6.2.1.5 Windows

Windows, sliding glass doors, and skylights are critical for preventing wildfire ignition inside a home by blocking windborne embers, hot gases, and radiant heat. For new construction, use tempered glass with low-e or reflective coatings, insulated glazing units, and solid metal frames, and screen operable windows for added protection. California code requires multipaned windows with at least one tempered pane that meet NFPA 257 or SFM 12-7A-2 standards. When upgrading existing homes, replace vulnerable windows, door vision panels, sliding glass doors, and skylights with fire-resistant materials that meet these recommendations.

6.2.1.6 Doors and Garages

Protecting exterior doors, including garage doors, from ember intrusion and radiant heat is essential in wildfire-prone areas. Enhance protection by installing adjustable weatherstripping and automatic door bottoms, and using insulated metal garage doors with tested weatherstripping and noncombustible trim. For existing homes, reinforce doors, upgrade sliding glass doors, and replace wooden garage doors to improve resilience and reduce heat transmission.

6.3   RESOURCES AND PROGRAMS

6.3.1 Local Resources

6.3.1.1 Escondido Fire Department: Wildfire Safety

The City of Escondido offers a comprehensive suite of wildfire safety and evacuation resources to help residents prepare for and respond to wildfire threats. Their guidance is based on the "Ready, Set, Go!" model, encouraging residents to harden their homes, create defensible space, and develop a family evacuation plan. Tools like the CAL FIRE mobile app provide real-time wildfire updates and location-based alerts. Residents are urged to prepare in advance by making packing lists, safeguarding important documents, and planning for pets and livestock. Key recommendations include:

- Store important documents in a safe deposit box or fire-resistant container.

- Prepare a list of essential items to pack during evacuation.

- Have emergency supplies ready, including water, food, clothing, first aid kit, tools, and medications.

- Make arrangements for pets and livestock, including carriers, food, and water.

- Tune in to local news for fire updates instead of calling 911.

During wildfire events and Red Flag Warning days, the City emphasizes the importance of early evacuation, safe driving, and staying informed. Residents are advised to avoid activities that could spark fires, such as outdoor burning or mowing dry grass, and to register for emergency notifications. Additional tips for Red Flag conditions include:

- Keep your vehicle's gas tank at least half full.

- Register for reverse 911 and emergency alerts at ReadySanDiego.com.

- Prepare for possible Public Safety Power Shutoffs (PSPS) by SDG&E.

- Have a family meeting point or contact plan.

- Download the SD Emergency mobile app for up-to-date information.

These resources and recommendations are designed to ensure that all Escondido residents are prepared, informed, and ready to act quickly in the event of a wildfire.

For more information visit the Escondido Fire Department website here: https://www.escondido.gov/714/Wildfire

Escondido Fire Safe Council

The Escondido Fire Safe Council is a nonprofit, community-led organization focused on wildfire safety, hazard reduction, and preparedness across Escondido. Working with local agencies and partners, the Council provides education on home hardening and defensible space, offers property risk assessments, organizes preparedness events, distributes free and low-cost resources, and helps residents access grants for brush clearing. The Council also promotes community engagement and advocates for fire

resilience and insurance reform. Membership is open to volunteers, all working toward the goal of a fire-safe, resilient Escondido

For more information, resources, or to get involved, visit their webpage here: https://www.fscswesco.com/home

6.3.1.2 Rincon Del Diablo Fire Protection District

The Rincon Del Diablo FPD provides fire and paramedic services in partnership with the City of Escondido. The district offers resources and support for fire hazard complaints, including an online Weed Abatement Complaint form and direct contact with the Vegetation Abatement Officer. The district also places focus on educating property owners about vegetation management and defensible space requirements to reduce wildfire risk, providing guidance and information on maintaining safe properties in high fire hazard areas. (RDFFPD 2024; 2025)

For further information about the FPD and to see whether your residence is within their service area, visit the following webpage: https://rinconwater.org/fire-district/

6.3.1.3 San Diego County Fire Safe Councils

San Diego County Fire Safe Councils provide regional support through home assessments, community chipping events, defensible space workshops, fuel reduction services, and post-fire recovery assistance. Interested parties can contact the Resource Conservation District of Greater San Diego County at (619) 562-0096 or email info@rcdsandiego.org for participation.

Visit www.firesafesdcounty.org for more information.

6.3.2 State Resources and Programs

6.3.2.1 Wildfire Home Retrofit Guide

The Wildfire Home Retrofit Guide provides homeowners and building professionals with recommendations on retrofitting homes to withstand wildfires. It focuses on hardening vulnerable home components like roofs, vents, decks, and siding while emphasizing defensible space in three key zones around the home. To view the guide, visit the following link: https://readyforwildfire.org/wp-content/uploads/2024/03/wildfire-home-retrfito-guide-1.26.21.pdf.

6.3.2.2 CAL FIRE Ready, Set, Go!

The CAL FIRE Ready, Set, Go! Program, not to be mistaken for the National Ready, Set, Go! initiative described below, is a three-step plan designed to help California residents prepare for wildfires. To learn more about this three-step wildfire preparation plan, visit the following website: https://readyforwildfire.org/prepare-for-wildfire/.

6.3.2.3 Housing Assistance

Cal OES provides housing assistance to individuals affected by wildfires, offering temporary housing solutions, financial aid for housing repairs, and rental assistance to those displaced by wildfire damage. For more information on available housing assistance programs, visit the Cal OES Wildfire Recovery page here: https://wildfirerecovery.caloes.ca.gov/general-info/housing-assistance/.

6.3.2.4 California Wildfire Mitigation Discount Program

The California Wildfire Mitigation Discount Program offers eligible homeowners and condo policyholders discounts on their insurance if they take specific wildfire mitigation actions. For more information and to access informational resource such as frequently asked questions, access the following website: https://www.horacemann.com/insurance/homeowners-insurance/wildfire-discounts.

6.3.2.5 California Wildfire Mitigation Program

The California Wildfire Mitigation Program was established to enhance community resilience against wildfires through home hardening and defensible space creation, focusing on areas at high wildfire risk. Developed through a partnership between Cal OES and CAL FIRE, the program was initiated under Assembly Bill 38 in 2019. For more information on the program and to explore additional resources, access the following California Wildfire Mitigation Program webpage here: https://www.caloes.ca.gov/office-of-the-director/operations/recovery-directorate/hazard-mitigation/california-wildfire-mitigation-program/.

6.3.2.6 California Department of Insurance Safer from Wildfires Program

The California Department of Insurance's Safer from Wildfires Program provides homeowners with information on home hardening measures that qualify for discounted insurance rates and references 10 steps that homeowners can take, each providing insurance discounts so that homeowners can save more as they complete each step. For more information on the program and to explore resources, access the following website: https://www.insurance.ca.gov/01-consumers/200-wrr/Safer-from-Wildfires.cfm.

6.3.3 National Programs

6.3.3.1 Ready, Set, Go!

The National 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.

The tenets of Ready, Set, Go! as included on the website (http://www.wildlandfirersg.org) are:

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. 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.

6.3.3.2 National Fire Protection Association

The National Fire Protection Association (NFPA) is a global nonprofit 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 property owners, 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 reports and special studies that cover a broad spectrum of fire safety–related topics.

6.3.3.3 U.S. Fire Administration's Wildland-Urban Interface Toolkit

The U.S. Fire Administration is an entity of 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 assessments, public outreach, and community training. Find the toolkit here: https://www.usfa.fema.gov/wui/.

6.3.3.4 Wildfire Research Center (WiRē)

Wildfire Research Center (WiRē) is a nonprofit organization that works with local wildfire services to achieve community-tailored pathways that reduce risk to wildfire while simultaneously promoting pathways to fire adaptation.

To achieve its goals and serve communities, WiRē will typically conduct a "rapid wildfire risk assessment," which assesses what contributes to wildfire risk, such as building materials, vegetation near homes, background fuels, local topography, and access to emergency fire services. Additionally, WiRē also conducts social surveys, assessing residents' perceptions about wildfire, wildfire risk, risk mitigation behavior, and their willingness to take action to reduce wildfire risk.

For more information, please visit https://wildfireresearchcenter.org/.

6.3.3.5 National Interagency Fire Center

The National Interagency Fire Center (NIFC) provides a wide array of fire resources and services. The NIFC offers communication assistance to many firefighters and major events at one given time. In addition, NIFC's Predictive Services Group creates wildfire forecasts and predictions from fuel and weather data. The NIFC has a network of weather stations that help inform the Predictive Services Group.

The National Wildfire Coordinating Group (NWCG), which is nested under the NIFC, provides operational coordination to federal, state, local, tribal, and territorial partner. 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 with the environment, and other environmental science topics. The NIFC also provides public education resources: (NIFC 2024)

- Wildfire Readiness – Home (https://disastersafety.org/wildfire/wildfire-ready/)

- Wildfire Readiness – Business (https://disastersafety.org/wildfire/wildfire-ready-business/)

- Wildfire Readiness – Farm and Ranch (https://disastersafety.org/wildfire/farm-and-ranch-wildfire-guidance/)

- Weekend Wildfire Preparedness (https://disastersafety.org/wildfire/weekend-wildfire-preparedness-projects/)

- What to Do if a Wildfire is Approaching (https://disastersafety.org/wildfire/what-to-do-if-a-wildfire-is-approaching/)

- Wildfire Risk – Community (https://wildfirerisk.org/reduce-risk/)

- Prepare and Protect Your Home (https://www.nifc.gov/fire-information/fire-prevention-education-mitigation/wildfire-mitigation/home)

- Prepare Your Community (https://www.nifc.gov/fire-information/fire-prevention-education-mitigation/wildfire-mitigation/community)

- One Less Spark, One Less Wildfire (https://www.readyforwildfire.org/prevent-wildfire/one-less-spark-campaign/)

6.3.3.6 U.S. Small Business Association

The U.S. Small Business Administration provides low-interest disaster loans to help businesses, homeowners, renters, and nonprofits recover from declared disasters like wildfires. These loans cover losses not fully compensated by insurance or FEMA and help with business operating expenses impacted by the disaster. The Small Business Association offers different loan types, including physical damage loans, mitigation assistance for future damage prevention, and economic injury loans for small businesses. Eligible applicants must be located in declared disaster areas and can apply online for assistance to aid in their recovery.

For more information, please visit the following webpage: https://www.sba.gov/funding-programs/disaster-assistance.

6.3.3.7 Insurance Institute for Business & Home Safety

The Insurance Institute for Business & Home Safety (IBHS) is a nonprofit organization dedicated to advancing building safety and resilience through scientific research. Supported by property insurers and affiliated companies, IBHS translates research into practical solutions to reduce losses from severe weather and other hazards. Their work includes testing building materials, developing building codes, and providing guidance on construction and retrofitting best practices.

Protect your home

- Critical Home Preparation: https://ibhs.org/wildfireready/

- Exterior Home Upgrades: https://ibhs.org/wildfirereadyhomeupgrades/

- Create a Wildfire-Resistant Yard: https://ibhs.org/wildfirereadyhomedefensiblespace/

- Home Preparation Checklist: https://wildfireprepared.org/wp-content/uploads/WPH-How-To-Prepare-My-Home-Checklist.pdf

- Wildfire Prepared Home (free online assessment): https://wildfireprepared.org/wildfire-prepared-home-base-assessment/

- Homeowner Articles and Testimonies: https://wildfireprepared.org/homeowner-articles/

- Applications for Wildfire Prepared Certifications: https://wildfireprepared.org/get-started/

Prepare for evacuation

- Prepare Your Home for Evacuation: https://ibhs.org/ibhs-in-the-news/prepare-your-home-for-evacuation-from-wildfire/

- Home Evacuation Steps: https://ibhs.org/wildfirereadyhomeevacuation/

6.3.4 Insurance Resources

The Safer from Wildfires initiative, a partnership between the California Insurance Commissioner, Cal OES, CPUC, CAL FIRE, and California Governor's Office of Planning and Research (Cal OPR 2022), has led to the development of regulatory action that creates insurance incentives for implementing actions that build up home and community resilience to wildfire. This new wildfire safety regulation aims to make insurance more affordable while increasing public involvement in risk mitigation and awareness regarding local hazards (California Department of Insurance 2023). Wildfire risk reduction actions identified in this plan (such as home hardening, creating defensible space, and community collaboration) are in alignment with the mitigation actions specified in the Safer from Wildfires initiative. More information can be accessed through the following link: https://www.insurance.ca.gov/01-consumers/200-wrr/Safer-from-Wildfires.cfm. (CDI 2021; 2023; 2025)

The California FAIR Plan Association, established in 1968, provides insurance coverage to homeowners unable to find traditional insurance, particularly in high-risk areas like fire zones or earthquake fault lines. It is a syndicated fire insurance pool comprising all licensed property/casualty insurers in California, who share the risks and profits based on their market share. The FAIR Plan is not a state agency and receives no public funding. It serves as a temporary safety net for homeowners until they can obtain coverage from

traditional insurers. As of June 2024, the FAIR Plan covers over $392 billion in dwelling exposure (Bankrate 2024).

An additional resource to homeowners is nonprofit 501(c)(3) United Policyholders. Their mission is to serve as a reliable and valuable information source and advocate for consumers across all 50 states in matters related to insurance. United Policyholders is committed to providing unbiased guidance on purchasing insurance, assisting with claims, and advocating for the rights of consumers. The nonprofit operates independently, without financial support from insurance companies, ensuring transparency and unwavering support for the interests of policyholders.

United Policyholders offers free assistance to homeowners who experience significant losses from wildfires. They also assist homeowners who are having issues getting insured or obtaining risk assessment documents from their insurer and help with facilitating conversation with insurers about risk scores. To learn more about United Policyholders, please visit: https://uphelp.org/.

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