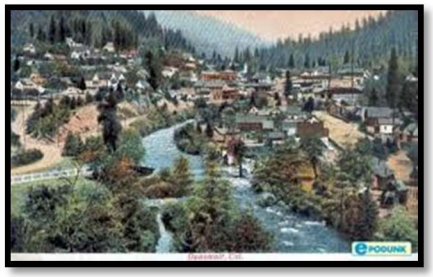
DUNSMUIR COMMUNITY WILDFIRE PROTECTION PLAN



May 31, 2016

Submitted by

Geo Elements, LLC
PO Box 461179
Leeds, UT 84746
www.geoelementsllc.com

COMMUNITY WILDFIRE PROTECTION PLAN

MUTUAL AGREEMENT PAGE

The Community Wildfire Protection Plan developed for the City of Dunsmuir:

- ✓ Was collaboratively developed. Interested parties, key stakeholders, local fire departments, and federal land management agencies managing land in the vicinity of Dunsmuir have been consulted.
- ✓ This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the community of Dunsmuir.
- ✓ This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Recommended by: _____

Joshua Spurlock
Mayor, City of Dunsmuir

Recommended by: _____

Daniel Padilla
Fire Chief, Dunsmuir Fire Department

Approved by: _____

Phillip R. Anzo
Fire Chief, Siskiyou County Unit – CAL FIRE

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SECTION 1. INTRODUCTION

1.1 Purpose of the Plan

The intent of this Community Wildfire Protection Plan (CWPP) is to enhance protection of human life and values within and adjacent to the City of Dunsmuir through pro-active wildland fire mitigation and preparedness action to reduce threat and severity of outcomes posed by wildfire. Protection focuses primarily on life safety followed by other community values such as structures, critical infrastructure, businesses, as well as natural and historic resources within and surrounding Dunsmuir. This plan provides guidance for current and future community wildfire protection activities by homeowners, property-owners, business-owners, fire protection entities and other interested groups/parties in their collaborative efforts to reduce the critical wildfire threat.

Wildfire protection implementation activities presented in the CWPP are subject to available funding, access to work on private lands, other City priorities, and environmental review under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), or other potential permitting processes, as required; pending site specific land ownership/administration stipulations.

1.2 Goals and Objectives

Community stakeholders (property-owners, agencies, interested parties) developed the following goals and objectives during the outreach period of the CWPP planning process (Table 1).

Table 1 CWPP Goals and Objectives

GOALS	OBJECTIVES
Reduce the wildfire threat to life safety within and adjacent to Dunsmuir community.	▪ Identify specific areas that are more susceptible to wildfire threat, within and adjacent to Dunsmuir ▪ Develop guidelines and mitigation strategies to mitigate the threat to life safety ▪ Reinforce guidelines and identify activities that enhance evacuation processes
Improve protection of values at risk from wildfire (includes homes, businesses, critical infrastructure, natural resources and historic resources)	▪ Assess potential damage and loss of structures from burning embers and a flaming fire front ▪ Evaluate Dunsmuir's wildfire preparedness, current and proposed fuel treatment activities, community education program, and existing wildfire hazard mitigation program ▪ Identify measures that reduce structure vulnerability ▪ Develop specific guidelines and strategies that minimize the wildfire threat to Dunsmuir's values;

	include prioritization process for hazard fuels mitigation activities. ▪ Recommend actions that enhance Dunsmuir's preparedness, firefighting capabilities, fuel reduction activities, community education program, and wildfire hazard mitigation program
Balance wildfire protection strategies with resource sustainability	▪ Identify strategies for implementation of mitigations that consider land, water and visual quality ▪ Ensure mitigation activities follow best management practices regarding natural and historic resources
Improve Dunsmuir's position to compete for grant funding related to the wildfire threat	▪ Ensure the CWPP meets or exceeds requirements of the Healthy Forests Restoration Act of 2003 ▪ Identify potential grant funding sources within CWPP affected area.
Engage the community, government partners, fire agency cooperators, and interested parties in development of the CWPP	▪ Encourage community-wide dialogue and participation throughout the planning process ▪ Identify opportunities for wildland urban interface pre-fire education and collaboration on hazard-risk mitigation activities with community members and adjacent agencies

1.3 Policy and Regulatory Framework

Knowledge of policies and regulations ensure a path of compliance for the wildfire mitigation recommendations presented in this CWPP. This CWPP is consistent with objectives and policies set forth in the following federal, state, county, and local policies and regulations:

1.3.1 Federal Level Policy

Disaster Mitigation Act (2000–present)

Section 104 of the Disaster Mitigation Act of 2000 (Public Law 106-390) enacted Section 322, Mitigation Planning of the Robert T. Stafford Disaster Relief and Emergency Assistance Act that created incentives for state and local entities to coordinate hazard mitigation planning and implementation efforts, and is an important source of funding for fuels mitigation efforts through federal hazard mitigation grants.

National Incident Management System (NIMS)

NIMS provides a systematic, proactive approach to guide government agencies, nongovernmental organizations, and the private sector to work together to prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. NIMS improves a community's ability to prepare for and respond to potential incidents and hazard scenarios.

National Fire Plan (NFP) 2000

The summer of 2000 marked a historic milestone in wildland fire records for the United States. Dry conditions (across the western United States), led to destructive wildfire events on an estimated 7.2 million acres, nearly double the 10-year average. Costs in damages including fire suppression activities were approximately 2.1 billion dollars. Congressional direction called for substantial new appropriations for wildland fire management. This resulted in action plans, interagency strategies, and the Western Governor's Association's "A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment - A 10-Year Comprehensive Strategy - Implementation Plan", which collectively became known as the National Fire Plan. This plan places a priority on collaborative work within communities to reduce their risk from large-scale wildfires.

Healthy Forest Initiative (HFI) 2002 ⇨ Healthy Forest Restoration Act (HFRA) 2003

In August 2002, the intent of the Healthy Forests Initiative (HFI) was to reduce the severe wildfires risks that threaten people, communities, and the environment. Congress then passed the Healthy Forests Restoration Act (HFRA) on December 3, 2003 to provide the additional administrative tools needed to implement the HFI. The HFRA strengthened efforts to restore healthy forest conditions near communities by authorizing measures such as expedited environmental assessments for hazardous fuels projects on federal land. This Act emphasized the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects and places priority on fuel treatments identified by communities themselves in their CWPPs.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) is a United States environmental law that promotes the enhancement of the environment and established the President's Council on Environmental Quality (CEQ). The law was enacted on January 1, 1970. As the bill was an early step towards the development of the United States' environmental policy, NEPA is referred to as the "environmental Magna Carta"

Quadrennial Fire Report (2009)

The Quadrennial Fire Review is a strategic assessment process conducted every four years to evaluate current mission strategies and capabilities against best estimates the future environment for wildland fire management. This integrated review is a joint effort of the five federal natural resource management agencies and their state, local, and tribal partners that constitute the wildland fire community. The objective is to create an integrated strategic vision document for fire management.

National Cohesive Wildland Fire Management Strategy (2009)

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

safe and effective wildfire response. Its vision is to safely and effectively extinguish wildfire when needed; use wildfire where allowable; manage our natural resources; and as a nation, to live with wildland fire.

National Fire Protection Association

The NFPA maintains numerous codes and standards that provide direction on development in the WUI including:

- NFPA 1, Fire Code, Chapter 17
- NFPA 1141, Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas
- NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting
- NFPA 1143, Standard for Wildland Fire Management
- NFPA 1144, Standard for Reducing Structure Ignition Hazards from Wildland Fire

1.3.2 State Level Policy

California Environmental Quality Act (CEQA)

The 1970 CEQA has evolved into one of the most prominent components of community planning in California. It requires state and local agencies to follow a protocol of analysis and public disclosure of environmental impacts in proposed projects and to include feasible measures to mitigate those impacts. Any proposed hazardous fuel treatment project recommended in this CWPP must comply with CEQA regulations.

California Strategic Fire Plan (updated 2012)

This statewide plan is a strategic document, which guides fire policy for much of California. The plan aims to reduce wildfire risk through pre-fire mitigation efforts tailored to local areas through assessments of fuels, hazards, and risks.

California State Multi-Hazard Mitigation Plan (updated 2013)

The purpose of the State Multi-Hazard Mitigation Plan (SHMP) is to significantly reduce deaths, injuries, and other losses attributed to natural- and human-caused hazards in California. The SHMP provides guidance for hazard mitigation activities emphasizing partnerships among local, state, and federal agencies as well as the private sector.

Public Resources Code Section 4290

This provision grants authority to State Board of Forestry and Fire Protection to develop and implement fire safety standards for defensible space on State Responsibility Area (SRA) lands.

Public Resources Code Section 4291

A state law, effective in January 2005, this section extends the required defensible space clearance around homes and structures from 30 feet to at least 100 feet for wildfire protection. The code applies to all lands that have flammable vegetation. The regulations include several requirements for how the vegetation surrounding buildings and structures should be managed to create defensible space.

Public Resources Code 4292-4296 and 14 CCR 1256: Fire Prevention for Electrical Utilities

These statutes and regulations address the vegetation clearance standards for electrical utilities. They include the standards for clearing around energy lines and conductors such as power-line hardware and power poles. These regulations are critical to wildland fire safety because of the substantial number of power lines in wildlands, the historic source of fire ignitions associated with power lines, and the extensive damage that results from power line caused wildfires in severe wind conditions.

Public Resources Code 4741

In accordance with policies established by the board, the department shall assist local governments in preventing future wildland fire and vegetation management problems by making its wildland fire prevention and vegetation management expertise available to local governments to the extent possible within the department's budgetary limitations. Department recommendations shall be advisory in nature and local governments shall not be required to follow such recommendations.

Title 14, 1270.04

This subchapter applies to the following: (a) local jurisdictions shall provide the Director with notice of applications for building permits, tentative parcel maps, tentative maps, and use permits for construction or development within SRA, (b) Director shall review and make fire protection recommendations on applicable construction or development permits or maps provided by the local jurisdiction, and (c) the local jurisdiction shall ensure that the applicable sections of this subchapter become a condition of approval of any applicable construction or development permit or map.

2013 California Fire Code

This code establishes regulations affecting or relating to structures, processes, premises and safeguards regarding residences and historic buildings. The Code includes: 1) hazards of fire and explosion arising from the storage, handling or use of structures, materials or devices; 2) conditions hazardous to life, property or public welfare in the occupancy of structures or premises; 3) fire hazards in the structure or on the premises from occupancy or operation; 4) matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems; and 5) conditions affecting the safety of firefighters and emergency responders during emergency operations.

Government Code 51175-51189: Very High Fire Hazard Severity Zones

This code defines Very High Fire Hazard Severity Zones and designates lands considered by the State to be a very high fire hazard. It also defines defensible space, fuel, fuel management, and wildfire.

Government Code 51189: Wildland Urban Interface Building Standards

This code directs the Office of the State Fire Marshal to create building standards for wildland fire resistance. The code includes measures that increase the likelihood of a structure withstanding intrusion by fire (such as building design and construction requirements that use fire-resistant building materials) and provides protection of structure projections (such as porches, decks, balconies and eaves), and structure openings (such as attics, eave vents, and windows).

California Building Code 2013 Edition Section 705A

Establishes minimum standards for the protection of life and property by increasing the ability of a building located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland Urban Interface Fire Area to resist the intrusion of flames or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses.

Government Code 65302.5: General Plan Fire Safety Element Review

This statute requires the State Board of Forestry and Fire Protection to provide recommendations to a local jurisdiction's General Plan fire safety element at the time that the General Plan is amended. While not a direct and binding fire prevention requirement for individuals, General Plans that adopt the Board's recommendations will include goals and policies that provide for contemporary fire prevention standards for the jurisdiction.

Section 17053.1 to the Revenue and Taxation Code (PENDING LEGISLATION)

Bill AB1329 for taxable years beginning on or after January 1, 2016, would allow a credit under that law in an amount equal to 25% of the amounts the qualified costs, as defined, paid or incurred by a qualified taxpayer, not to exceed a specified amount, during the taxable year for fuel management activities, as defined, performed on qualified real property owned by the qualified taxpayer.

1.3.3 Siskiyou County Level Policy

Unit Strategic Fire Plan – Siskiyou Unit, CAL FIRE (updated 2015)

The Siskiyou Unit Fire Plan is the framework established to help protect the people and resources of Siskiyou County. The reduction of loss and cost associated with unwanted fires is the primary focus of the plan.

Code of Ordinances

Chapter 3 – Fire Prevention

Chapter 3 consists of Sections 3-3.01 and 3-3.02, codified from Ordinance No. 115, Sections 3-3.03 through 3-3.05, codified from Ordinance No. 191, and Section 3-3.06, codified from Ordinance No. 205, repealed by Section II, Ordinance No. 460, and effective May 9, 1968. It includes firebreaks, maintenance of flammable materials, fire permitting, enforcement, and smoking.

Land Use Policy 30, (Siskiyou County GP, updated 1997)

Directs that all new development proposed within a wildfire hazard area shall be designed to provide safe ingress, egress and have an adequate water supply for fire suppression purposes in accordance with the degree of wildfire hazard.

1.3.4 City of Dunsmuir Policy

Chapter 15.24 – Fire Protection Ordinance

15.24.130 - Very high fire hazard severity zones.

Gives the fire chief authorization to designate very high fire hazard severity zones within one hundred twenty (120) days of receiving recommendations from the California Department of Forestry and Fire Protection.

1.4 CWPP Process

The development of a CWPP is a collaborative process by which community stakeholders assess the wildfire threat, define their wildland urban interface (WUI) boundaries, identify their community's values at risk from wildfire, and then develop solutions to mitigate the wildfire threat. The language in the 2003 HFRA provides maximum flexibility for communities to determine the substance and detail of their plans and the procedures they use to develop them. The CWPP planning process provides communities the autonomy to develop their own individual plans that influence where and how federal agencies implement fuel treatment activities on federal land and the distribution of federal funds for projects on non-federal lands.

The CWPP planning process brings together broad and diverse local interests to identify and discuss mutual objectives and concerns related to public safety, community protection, and natural resources sustainability and should provide a positive, solution-oriented environment in which to address the challenges of living in a community at risk from wildfire. A critical factor to the success of a CWPP is the provision of opportunities in which to solicit input, collect issues and concerns, and provide information related to the development of a CWPP.

As part of the 2003 HFRA, there are three minimum requirements for a CWPP, including:

1. Collaboration. A CWPP must be collaboratively developed. Local officials and state officials must meaningfully involve federal agencies that manage land in the vicinity of the community and other interested parties, particularly non-governmental stakeholders.
2. Prioritized Fuel Reduction. A CWPP must identify and prioritize areas for hazardous fuel reduction treatments on both federal and non-federal land and recommend the types and methods of treatment that, if completed, would reduce the risk to the community.
3. Treatment of Structural Ignitability. A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

1.4.1 Dunsmuir CWPP Collaboration

The process began by obtaining an appointment on the agenda of a Dunsmuir City Council meeting, August 20, 2015. Addressing the city council members as an initial course of action, gave council members a firsthand opportunity to comprehend the importance of their CWPP

and the necessary collaborative nature in the plan development process. A clear priority surfaced through this initial collaboration to engage all stakeholders and help them gain perspective, establish communications and join in developing their CWPP.

Two initial workshops provided opportunities to educate parties on the CWPP planning process, encourage participation, and solicit input from a broad range of stakeholders. Stakeholders were invited to the workshop via: postings to the Dunsmuir City Council website, Dunsmuir High School website and Facebook, local fire safe council meeting announcements and Facebook webpages (both county and city level), posters/flyers distributed in town, direct email messages, and newspaper announcements in local area newspapers.

Both scheduled workshops took place at Dunsmuir High School Campus on the evenings of October 22, 2015 and October 28, 2015. Stakeholders that participated include interested publics, homeowners, City Council staff, Dunsmuir High School staff, Dunsmuir Fire Safe Council (DFSC) representatives, Dunsmuir Fire Department staff, Fire Safe Council Siskiyou County (FSCSC) members, CALFIRE representatives, fire management staff from Shasta-McCloud Unit of Shasta-Trinity National Forest, a Roseburg Timber Products representative, a Union Pacific Railroad representative, local individual Registered Professional Foresters (RPFs), and local land stewards.

The Dunsmuir Fire Safe Council and Dunsmuir High School staff provided opening remarks followed by Geo Elements staff facilitating introductions and moving into a presentation. This visual presentation included description of the CWPP planning process, fire model outputs that identified hazard areas, reasons to draft a WUI map, and examples of potential goals and objectives for the CWPP. Following the formal presentation, an informal phase of the workshop provided the opportunity for interaction between community members, various agency representatives, interest groups/individuals and Geo Elements' staff on specific topics of interest or concern. Index cards were offered and provided stakeholders with an additional opportunity for comments, questions and input.

Additional public outreach occurred through emails, phone calls, and information posts on the FSCSC Facebook and website including the PowerPoint presentation, draft documents, and draft CWPP maps. The outreach period for input began October 29, 2015 through January 15, 2016. A summary of all workshop and meeting notes, index cards, and stakeholder comments are available in Appendix B.

SECTION 2. COMMUNITY OVERVIEW

The City of Dunsmuir is located in the southernmost portion of Siskiyou County. The northern project perimeter lies just north of the Dunsmuir Municipal-Mott Airport and the southern perimeter abuts Shasta County just north of the community of Castella (See Figure 1). The City is nestled along both sides of the upper Sacramento River Canyon in the Sacramento River Watershed along the narrowest and steepest portion of the canyon. At an elevation of approximately 2,350 feet above sea level, the project area has a unique setting in which class 3 whitewater rapids usually appear during summer run off through the middle of a city with about 2,000 residents.

Dunsmuir is an idyllic place to live and visit. With its close proximity to Mount Shasta, volcanic lava layers filter the drinking water and eliminate the need for filtration or treatment thus the town's marketing slogan, "Home Of The Best Water On Earth". The area is a hub for outdoor enthusiasts as visitors enjoy a range of activities including fishing, hiking, skiing, climbing, and sightseeing. Visitors are plentiful year-round as the community shares these riverbanks with the busy transportation routes of Interstate Highway 5 and Union Pacific Railroad. The area is abundant in rich natural resources including the river that serves as a critical water source for the citizens of the State of California and beautiful forested landscape.

While the beautiful landscape frames the City of Dunsmuir, it also exposes the City to potentially catastrophic wildfires. A combination of climate, steep terrain, thick vegetation, and human development creates significant potential for a large and destructive wildfire in the proximity of the community.

2.1 Values at Risk

A community's fundamental values include structures, critical infrastructure, businesses, and other directly tangible elements. Key values also include elements such as natural resources, sensitive species, cultural and historical resources, visuals resources, as well as each community member's individual viewpoint regarding their community and landscape around them.

The less tangible values are more difficult to address in mitigating wildfire hazard and risk. Actions can be taken to protect those values by developing strategies that reduce the wildfire threat overall. The challenge for Dunsmuir is to balance the level of hazard mitigation work required to protect one set of values without compromising others.

Dunsmuir community stakeholders emphasized the importance of the following values:

- Life Safety
- Homes/Structures/Neighborhoods/Businesses
- Critical Infrastructure
- Natural and Historic Resources
- Recreation Amenities/Facilities

2.1.1 Life Safety

DFSC and the fire department's highest priority is human life safety. Wildfires are extremely complex and often move extremely fast, can change direction unexpectedly, carry burning embers in wind that create new fires (spot fires) well ahead of the main fire, and often threaten communities with little to no warning.

Prevalent in the memories of most residents in Siskiyou County is the devastating 2014 Boles fire that caused evacuation of the residents of Weed CA located just 17 miles north of Dunsmuir. This fast-moving wind driven wildfire was a milestone event for all the surrounding communities triggering a renewed effort countywide to review wildfire protection and preparedness measures at an individual resident level as well as on a community-wide basis.

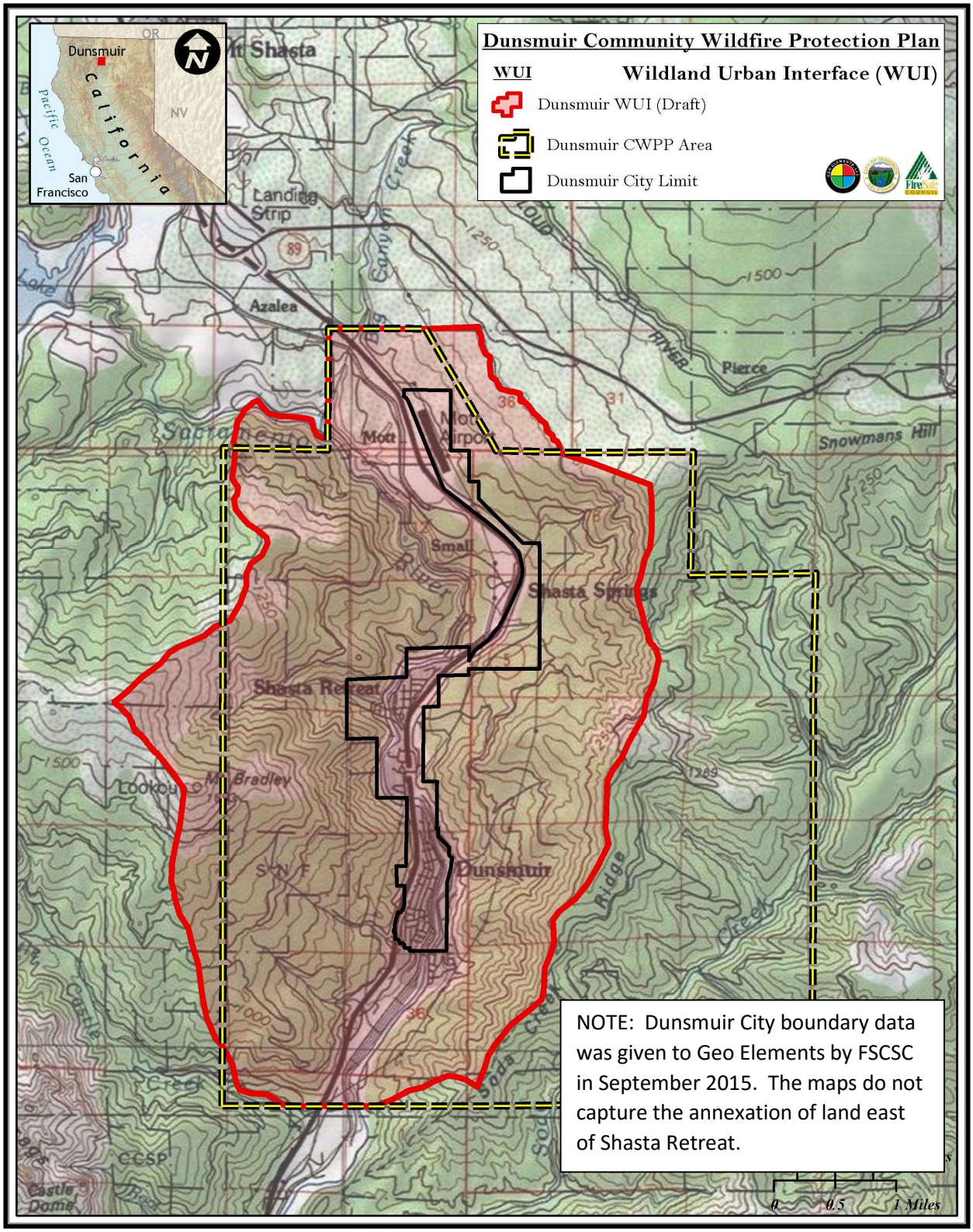
Current data shows that Dunsmuir's approximately 2,004 individuals live in an area of the county that is classified by CAL FIRE as "very high wildfire risk" (Siskiyou County Hazard Mitigation Plan, 2015). Dunsmuir's WUI area represents the proximity of humans and the wildland (See Figure 1, WUI Map). This depiction brings focus to the numerous life safety considerations during wildfire including access and egress issues, restricted and/or congested transportation systems, decisions whether to evacuate and/or shelter in place, how to evacuate and transport vulnerable or functional-needs populations, locations of temporary shelters, lack of defensible space, and structure vulnerability.

The Sacramento River is a central geographic feature dissecting the Dunsmuir community providing unique character and beauty; however, this design feature quickly adds an element of complexity for emergency responders in an evolving incident. There are limited access points into the community from the interstate and limited roads and bridges to residents for crossing the river. During a wildfire, reduced access to an area significantly impedes ingress and egress thereby reducing emergency resource response times and the evacuation. Other road system impediments include narrow winding roads, steep roads, vegetation encroached into roadways, gates, bridges, addresses not clearly visible from the roadways, unlit roads and intersections, unlit street signage, and limited turnaround capabilities.

The City of Dunsmuir's road system consists of numerous residential streets that funnel down into Dunsmuir Avenue, which acts as both the main city road and the only arterial frontage road along the Interstate 5. These roads can quickly become congested or worse cut-off by wildfire during an evacuation as responding emergency services personnel compete for space on primary travel routes. If Interstate 5 closes, the ingress/egress for an evacuation of Dunsmuir will become problematic and the imminent threat to life safety would elevate significantly.

Much like the Sacramento River, the Union Pacific railway line (UP) also geographically dissects the community. The current protocol in an emergency in Dunsmuir requires immediate notification to UP so they can halt all trains in both directions until further notified that the emergency is over. This notification process keeps the tracks uncongested and keeps the bridge crossings clear allowing residents evacuation access to facilitate life safety measures but can take some time to activate.

Figure 1 Dunsmuir Wildland Urban Interface Map



Often during wildfire events, law enforcement may issue evacuation orders to residents, visitors, and business-owners for protection of their life safety. Individuals may choose not to evacuate immediately and stay to defend their homes and/or businesses, or decide to shelter in place until the fire danger passes. Some residents believe a secondary evacuation order will be issued prior to conditions becoming truly life threatening. A decision to delay evacuation action puts lives of residents, firefighters and law enforcement personnel at risk, as well as hinder overall emergency operations. Community education programs can improve awareness of evacuation procedures.

Vulnerable or functional-needs populations have special needs and may be less likely to respond to, cope with, and recover from a wildfire. It is unknown how many people within the project area are vulnerable. Age, along with physical and mental limitations, can restrict mobility, making it more difficult for these individuals to evacuate in a disaster. Lack of financial resources may hinder the ability for low-income populations to invest in emergency preparedness or mitigation measures as well as recover from loss. Language issues can result in communication barriers to evacuation or support services. In addition, visitors to Dunsmuir are likely unfamiliar with the wildfire threat or the extent of their exposure or appropriate evacuation routes making them potentially vulnerable as well. Evacuation signs marking routes can help mitigate confusion. Planning for vulnerable or functional-needs populations is important to consider and gauge.

Pets, service animals, and large domestic animals are also vulnerable factions to consider in evacuation planning. Animals can become frightened and more difficult to manage during a wildfire and many emergency shelters and evacuation centers deny admission to pets for health and safety concerns, with the exception of service animals. Pets and large domestic animals can face death or suffering due to poor disaster planning by their human caretakers. During wildfire events, people have risked their lives and the lives of others to save their pets. Homeowners may be unwilling to evacuate or enter a shelter during an emergency without their animals, instead choosing to remain in harm's way rather than leave without their animals.

2.1.2 Structures

Dunsmuir has a history of catastrophic wildfires. In 1903, a wildfire destroyed many of the City's structures and in 1918 a wildfire again threatened the City. In the 1918 wildfire, individuals in the community began a backfiring operation that resulted in saving the City. Losses to vacant structures from the wildfire primarily occurred outside of the City boundary in the Mott area.

Most recently noted, is the 2014 Boles Fire that destroyed over 160 structures in the town of Weed, California located 17 miles north of Dunsmuir. Although still a distance away from Dunsmuir, this fast-moving wind driven fire was a milestone event for all of the surrounding communities, which served as a wakeup call of the potential wildfire threat to communities within Siskiyou County.

Dunsmuir has approximately 933 homes with an assessed value estimated at $136,220,359; located in an area that CAL FIRE classifies as very high wildfire risk (Siskiyou County Hazard Mitigation Plan, 2015). Most homes are single-family dwellings with the most densely packed area set between the central and south interstate exits, east of the highway and west of the Sacramento River (See Figure 1, WUI Map). Another densely packed residential area lies in the

north section of the City, between the central and north interstate exit, west of the highway, between the Sacramento River and interstate.

The business district runs along Dunsmuir Avenue and Sacramento Avenue. Businesses along Dunsmuir Avenue have a 1920s architectural design while businesses along Sacramento Avenue are more modern in design.

Access and egress to homes and businesses is a critical factor in many areas of Dunsmuir. Some primary factors contributing to potential access and egress issues during a wildfire include narrow and/or winding roads, steep slopes, rough terrain, gates, bridges and thickly encroaching wildland and/or landscaping vegetation. During a wildfire situation these factors can impede response times and safe actions of emergency personnel due to the lack of necessary safe access and defensible space.

Structure losses in a wildfire are often attributed to weakness in a structure's composition and defensible space. Current new construction building codes are an important preventative measure to reduce risk of structure loss; however, many structures in the planning area were constructed prior to these building codes and are at higher-risk, which can pose an elevated risk to nearby residents, visitors, firefighting forces, and nearby structures.

The enactment of stringent building codes has significantly reduced the potential loss of residential structures due to wildfire; however, they cannot eliminate all risk. Structure loss can still occur, even if structures and neighborhoods are built under modern fire resistant building codes. A study of the 2007 wildfires in San Diego County indicated that the fires destroyed 13% of the homes within the fire perimeters. Homes built under building codes enacted in 2001 had a loss rate of 4%, while homes built under fire codes modified in 2004 had a loss rate of only 2% (Rahn, 2009).

2.1.3 Critical Infrastructure

Although Dunsmuir is a relatively small northern California community, it is not small in terms of local and state level infrastructure components located within this narrow corridor. These infrastructure components are critical as they affect the livelihood of people throughout the state and the nation with respect to resources, transportation and power. Major infrastructure within and adjacent to Dunsmuir includes:

- Sacramento River - water for the state agriculture; food for the nation
- Interstate Highway 5 - key transportation corridor of the west
- Union Pacific Railroad railway - key supply and transportation corridor of the west
- Pacific Power Transmission Corridor - 69 kV line on the west side of the interstate
- California-Oregon Transmission Project - 110 kV on the east side of the corridor
- Pacific Power distribution power lines - homes/businesses
- Key communication site on Mount Bradley - utilized by local, state, and federal agencies

Wildfires can cause significant damage and loss to critical infrastructure, municipal facilities, and cause substantial economic losses that often go well beyond traditional impact indicators. Repairing and/or replacing critical infrastructure and restoring basic services after a disaster is a

top priority for public agencies and utility companies. These agencies and companies can incur significant repair, restoration, and rehabilitation costs after a wildfire including the cost of maintenance and damage assessment teams, field data collection, watershed rehabilitation and restoration efforts, preparation for future potential floods, replacement or repair of utility supply lines, pipelines, and replacement or repair of roads, guardrails, bridges, signage, culverts, and landscaping.

Post-fire destruction also includes the cost of repair or rebuild of municipal facilities such as fire stations, water pipelines, communication structures, city and country buildings, and others. Associated costs include lost work time, temporary rental of other buildings or offices, and moving expenses, all of which can largely impact the community. Wildfire losses also cause lost tax revenues in a number of categories such as sales and county taxes, as well as business revenue and property loss that accumulate over the long term. Additionally, private and commercial properties that escape damage in the fire may still experience dramatic drops in value as the area recovers.

Economic and financial losses can have long-term effects on a community's economic vitality due to destroyed businesses and the loss of tax revenue. It can take days, weeks, or months to repair critical infrastructure, restore services, and rebuild businesses following a wildfire.

2.1.4 Recreation Facilities

Mossbrae Falls/Fly Fishing
Photo by J.Titus

Outdoor recreation opportunities abound in and around the greater Dunsmuir area on a year-round basis. The upper Sacramento River is a blue ribbon trout stream that attracts anglers from all over the world. The area is a popular destination for tourists looking to visit, hike, and climb Mount Shasta or Castle Crags, also doubling as a winter sport enthusiast's spot for alpine skiing, snowboarding, snowshoeing and Nordic/cross-country or backcountry skiing treks. The local dirt roads and trail systems offer an array of beautiful vistas and challenging terrain for bicyclists, hikers, and runners. There are abundant picturesque waterfalls, streams, and lakes in the regioin including nearby Mossbrae Falls, Hedge Creek Falls, Lake Siskiyou, Castle Lake, McCloud Falls, McCloud Reservoir, and Shasta Lake.

There are multiple park sites within the City, some are officially recognized sites containing facilities including maintained buildings, storage structures, restrooms facilities, children's play structures, picnic area tables/equipment and river access areas. Dunsmuir City Park maintains several facilities and buildings as well as a community ballpark. This park site is home to a very well maintained and coveted botanical garden and hosts events by visiting artists including well-known orchestral groups from the San Francisco Bay area. Tahundali Park is another well-maintained park uniquely designed with network of paved public paths along the Sacramento River in the center of Dunsmuir. This City recently received grant funding and has restored and improved the park by upgrading restroom facilities, paths, river access, and removed area hazard fuels.

A destructive wildfire in any portion of this delicate canyon community setting would be devastating to the valuable recreational attributes. The short and long-term adverse outcomes from a wildfire of this severity would potentially cripple the inherent recreational opportunities and visitor use for an extended period of time.

Wildfire damages to Dunsmuir's recreational facilities and resultant area closures, compounded with loss of wildlife viewing experiences, degradation of water quality, debris flows, flooding, sightseeing, can result in a significant loss of spending by visitors in local businesses (e.g., hotels, groceries, restaurants, gas, etc.), which would be detrimental to a community that thrives on outdoor recreational use. A proactive planning effort by the community addressing the establishment and implementation of wildfire mitigation actions can assist in reducing potential for such a costly outcome.

2.1.5 Natural and Historic Resources

A wildfire event can cause a range of responses or effects on natural and cultural resources to wildfire. Responses from these events can vary from no effect to those that are temporarily altered to those that are damaged and/or destroyed. The following provides a general description of these resources.

Natural Resources

The upper Sacramento River Canyon is among the most resource rich area of California. Two prevalent and highly valuable natural resources, in terms of life sustenance locally and throughout the state, are water and timber. Dunsmuir's official city slogan is "Home of the best water on Earth" a fitting description for the pristine water generated from groundwater springs emitted from the lava tube systems that flow down beneath the slopes from the nearby massive Mount Shasta, a part of the Cascadian volcanic range and the Pacific Ring Of Fire. This water source is critical to the state's livelihood, specifically to the Central Valley's agriculture, which also feeds our nation.

Mixed conifer forest
Photo by J.Titus

The Sacramento River Canyon steep slopes above and adjacent to Dunsmuir contain a nearly continuous conifer forest stand with pockets of intermittent oak and hardwoods. Current property-owners and land managers include United States Forest Service (USFS), California Department of Forestry and Fire Protection (CAL FIRE), Sierra Pacific Industries, Roseburg Forest Products, and several private owners of prominent large forested parcels. There is active forest timber management in this vicinity, primarily by private industry; however, steep terrain, limited access, environmental constraints, and operational constraints limit vegetation management activity. Therefore, a majority of these forest stands are substantially overcrowded creating an unhealthy ecosystem and heightened wildfire hazard.

There is abundant wildlife within and surrounding the Dunsmuir community, as both riparian and forest wildlife habitats flank the city limits. Among the more commonly known mammals in this

area, include black-tailed deer and mule deer, coyote, river otter, mink, mountain lion, bobcat, black bear, fisher, marten, wolverine, Sierra Nevada red fox, and wolverine. Numerous bird species are noted in this area including eagles, hawks, owls, woodpeckers, falcons, osprey, quail, northern goshawk, blue grouse, and other species. Riparian aquatic wildlife species are also an essential component of the natural wildlife in the Dunsmuir vicinity.

Various local, state and federal resource protection policies establish clear protocol for management actions involving natural resources surrounding a community. Wildfire protection planning strategies for mitigation actions in Dunsmuir will adhere to resource policy and maintain ecosystem balance while reducing the risk of potential destruction to life, property and resources. Figure 2 depicts Sensitive Habitat Areas within the planning area. ***FOLLOW UP NOTE: As of April 2016, fisher is no longer listed as a Sensitive Species.***

Historical Resources

Dunsmuir has a long rich history. The hills and curves of the City's streets still reflect the footpaths of the native peoples who were here for thousands of years including the Siskiyou Trail that ran from California to Oregon. Alexander McLeod, a Hudson's Bay trapper from Vancouver, explored here as early as 1828 followed by many others such trappers, prospectors, surveyors, gold seekers, and early teamsters hauling freight wagons.

The Union Pacific Railyard, formerly the Southern Pacific Railyard, parallels Sacramento Avenue. The Central Pacific Railroad called this spot "Pusher" because this is where they added extra "pusher" locomotives to trains going north over the Siskiyou Range. A roundhouse, turntable, depot, machine shops, and railyard were here in the late 1880s. Publicized railroad excursions began in the 1880s, and in the 1920s special trains brought visitors from far and wide for the wonderful climate, superb fishing, scenic beauty, and the healing waters at well-known resorts such as Shasta Springs and Shasta Retreat. Among the tourists were some famous visitors that included presidents and actors and sports heroes. Clark Gable, Errol Flynn, and Claudette Colbert.

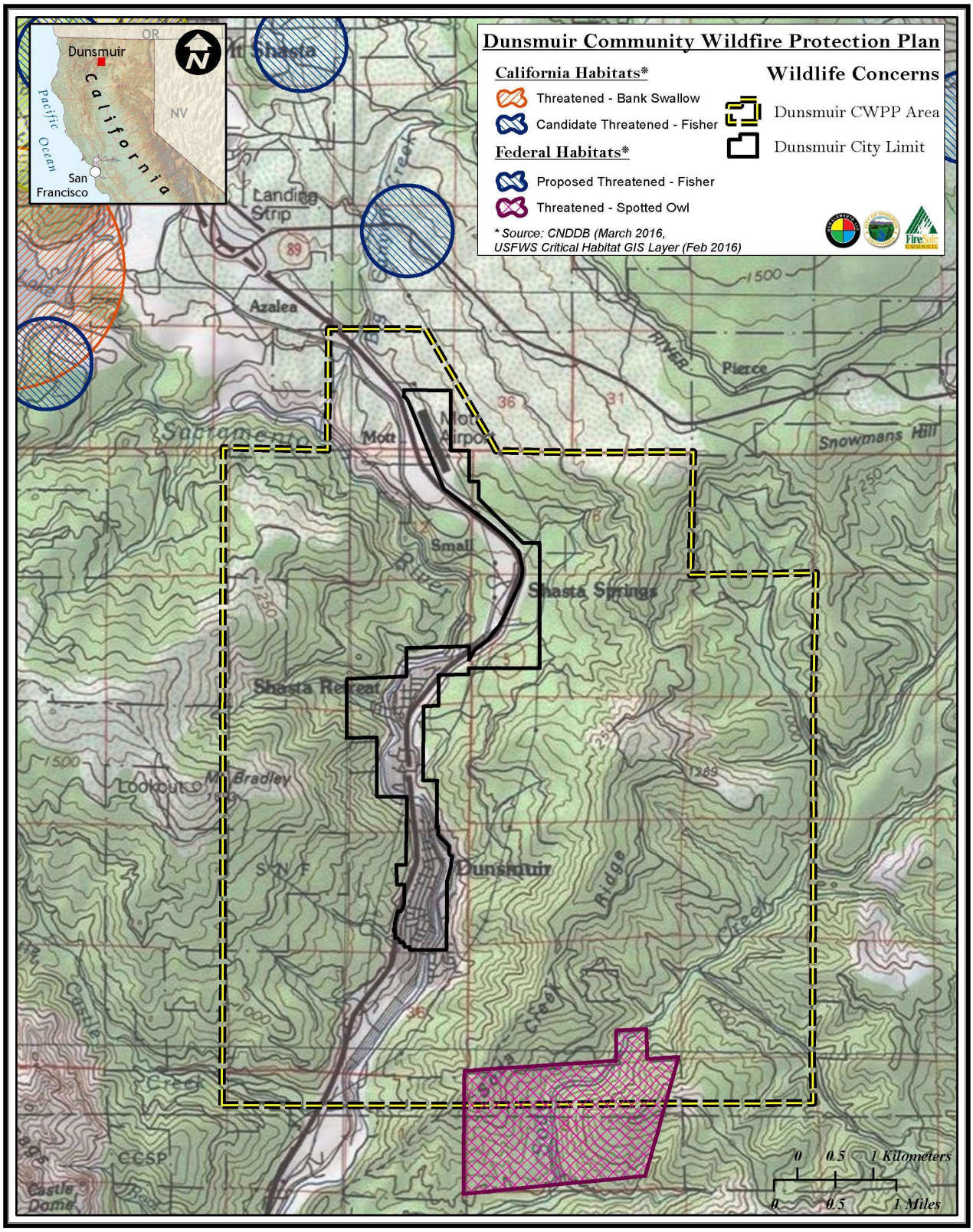
In 1924, Babe Ruth played an exhibition game at Dunsmuir's ballpark, which is still in operation in the north part of the City near the entrance to the riverfront park. Dunsmuir also maintains a historic fountain at the park's entrance, which was a gift from a British Columbia coal baron, Alexander Dunsmuir, back in 1888. He donated the fountain on condition that the town was named for him and his family.

Today, many historical buildings and artifacts remain intermittently throughout the vicinity, including an old historic portion of the cemetery and the City center has preserved much of the old-town architecture in many of the main street buildings maintaining the flavor and style of the 1920s – 1930s.

2.2 Fire Protection

Wildland fire protection in the State of California is the responsibility of the local, state, or federal governments. These fire protection responsibility areas represent areas of legal responsibility for fire protection, including Local Responsibility Areas (LRA), State Responsibility Areas (SRA), and Federal Responsibility Areas (FRA). The planning area includes the following areas:

Figure 2 Endangered Species Habitat Areas Map



- ***Local Responsibility Areas (LRA)***

These areas are private lands outside of watershed areas designated by the state or lands incorporated into cities. City fire departments, fire protection districts, counties, and CAL FIRE under contract to local governments typically provide fire protection for these areas. In the planning area the LRA is bordered by SRA and FRA.

Important Note: The Dunsmuir-Castella Fire Department is responsible for fire protection of LRA throughout the project area.

- ***State Responsibility Areas (SRA)***

SRA is the area of the state where the State of California is financially responsible for the prevention and suppression of wildfires. SRA does not include lands within incorporated city boundaries, fire protection districts, or in federal ownership.

Important Note: The California Department of Forestry and Fire Protection's (CAL FIRE) Siskiyou Unit covers over 6,347 square miles and has the primary wildland fire responsibility for 1,269,672 acres within Siskiyou County including SRA land within the CWPP planning area (See Section 1.3.2 for additional details on the Unit Strategic Fire Plan). SRA within the planning area is located outside of LRA on the eastern portion of the Sacramento River.

- ***Federal Responsibility Areas (FRA)***

The primary financial responsibility for wildfires suppression and prevention on federal lands is that of the federal government through the United States Forest Service (USFS), Department of the Interior - Bureau of Land Management, National Park Service, Fish and Wildlife Service, Bureau of Indian Affairs, and Defense Department for military lands.

Important Note: The Shasta Trinity National Forest is responsible for the prevention and suppression of wildfires on FRA within the planning area. FRA is located outside upslope of the designated LRA boundary on the west side of the Sacramento River.

Dunsmuir-Castella Fire Department

The Dunsmuir–Castella Fire Department is comprised of three governmental entities including the City of Dunsmuir, Dunsmuir Fire Protection District, and Castella Fire Protection District. The Dunsmuir Fire Department and Dunsmuir Fire Protection District operate together under a Joint Powers Authority (JPA) and has an automatic aid agreement with the Castella Fire District. A single fire chief oversees all three departments.

The Dunsmuir - Castella Fire Department has a response area of over 30 square miles and responds on average 400 to 500 calls per year. It operates apparatus out of four stations:

- Dunsmuir - Station 1
- Isgrigg - Station 3
- Castella - Station 2
- Crag View - Station 4

Additional Fire Protection/Collaborative Agreements

The Dunsmuir-Castella Fire Department has well established protocols for obtaining support from fire cooperators during an escalating wildfire through automatic and mutual aid agreements with adjoining jurisdictions including the Mount Shasta Fire Department, the CAL FIRE Siskiyou Unit and the Shasta Trinity National Forest.

The following is a brief summary of existing agreements and mechanisms through which the Dunsmuir-Castella Fire Department can request assistance for fire suppression operations.

Automatic Aid: As a member of California's Office of Emergency Services Region III, the Dunsmuir-Castella Fire Department has agreements in place with the Mount Shasta Fire Department and CAL FIRE Siskiyou Unit. In addition, a local agreement is in place for automatic aid from the USFS, who will respond to reported vegetation fires within the planning area. Aircraft consisting of fixed-wing air tankers and rotor-wings (helicopters) are dispatched from CAL FIRE Siskiyou Unit and the Shasta Trinity National Forest as part of the automatic aid response.

Master Mutual Aid: The California Disaster and Civil Defense Master Mutual Aid Agreement between the State of California and each of its counties and incorporated cities create a formal structure for the provision of mutual aid. Once a local emergency is declared, requests for additional firefighting resources can occur through the Operational Area Fire and Rescue Coordinator. If the emergency persists, additional resources are available from the regional or statewide system.

California Fire Assistance Agreement: This agreement is between the State of California, California Emergency Management Agency (CAL OES), California Department of Forestry and Fire Protection (CAL FIRE), and the five federal fire agencies (e.g., United States Forest Service, National Park Service, Bureau of Land Management, Fish and Wildlife Services, and Bureau of Indian Affairs). It provides the framework for coordinating the use of and reimbursement for local government fire and rescue resources used at wildfire incidents. Mobilization of firefighting resources occurs through the California Fire Assistance Agreement; however, reimbursement of expenses incurred in support of the Fire department may be required.

SECTION 3. DEFINING THE WILDFIRE PROBLEM

Wildfire is a natural process with an important ecological role on the landscape; however when these fires burn into human development they can become disastrous. The probability of a catastrophic wildfire occurring at any particular location within or adjacent to the planning area is dependent on a chain of events that includes fire ignition, fire weather, fire behavior, suppression actions taken, and the interaction of these factors.

Local firefighters are successful each year in containing most fires to less than one acre, which is a result of favorable weather and fuels conditions, early reporting, and a quick fire suppression response. However, when an ignition occurs during unfavorable weather and fuel conditions, and/or there is poor or limited access for fire suppression resources, and/or a lack or delay of aerial fire suppression resources these fires can become uncontrollable. Wildfires, once established, can grow very quickly and burn intensely threatening life safety and destroying structures, infrastructure, watersheds, cultural or historic sites, and natural habitats.

The devastating 2014 Boles fire that destroyed over 160 structures in the town of Weed has renewed efforts countywide to review wildfire protection and preparedness measures at an individual resident level as well as on a community-wide basis.

Although wildfire is inevitable within and adjacent to the planning area, the protection of human life and reduction of the threat of loss and/or damage to structures, businesses, critical infrastructure, and other values can be achieved through thoughtful planning and careful wildfire preparation.

3.1 Climate

Dunsmuir lies on the eastern border of the Klamath Mountain bioregion and the western border of the Southern Cascade bioregion, thereby acquiring a unique climate conglomerate with characteristics of the both prominent bioregions.

Utilizing the 'Klamath Mountains' geographic bioregion, Dunsmuir's climate is Mediterranean characterized by wet cool winters, and dry warm summers. However, the local expression of this climate regime is remarkably variable due to a strong west to east moisture and temperature gradient caused by proximity to the Pacific Ocean and steep elevation gradients that influence temperature and the spatial pattern of precipitation via orographic effects (Skinner et al, 2006).

Although most precipitation falls between October and April, there is considerable local and regional geographic variation for precipitation. Generally, less precipitation falls in valleys and canyons than in the surrounding uplands with strong gradients over short horizontal distances. Precipitation declines with distance from the coast in both the northern and southern Klamath Mountains. The driest areas occur along the eastern edge of the range adjacent to the Shasta and Sacramento Valleys; however, there is no west to east precipitation gradient in the eastern Klamath Mountains in the watersheds of the Sacramento, McCloud, and Pit Rivers. The high precipitation levels of the eastern-most Klamath Mountains is likely orographic uplifting of moist air masses. The eastern Klamath Mountains are the first major range encountered by

southwesterly flowing winds moving northeast across the Sacramento Valley. At higher elevations, most precipitation falls as snow.

Overall, critical fire weather is associated with any weather condition that creates sustained periods of high-velocity winds with low humidity.

3.2 Fire History

Overall, Siskiyou County as an extensive fire history due to the abundance of fuel sources combined with the climate and topography (See Figure 3 Fire History Map). Information from CAL FIRE lists over 500 fires within Siskiyou County that burned over 330,000 acres causing $3.6 million in damage 2005-2010. The fifth largest fire in CA since 1932 occurred in Siskiyou County in 2008.

Several fire history studies describe fire regimes in parts of the Klamath Mountains and Southern Cascades over the last few centuries. These studies indicate there are two periods with distinctly different fire regimes including the Native American (both pre historic and European settlement period) and the fire suppression period, beginning in the early 1900s (Sugihara et al, 2006)).

From local fire history study plots relative to Dunsmuir, revealed a fire return interval that ranged from 8 to 30 years. Currently, the notable departure from the historic average fire occurrence affects important fire environment characteristics that are described in subsequent sections of Chapter 3 in this CWPP. Table 2 lists historical large fire events that occurred within or adjacent to the planning and posed a threat to the City of Dunsmuir and vicinity (Sugihara et al, 2006).

The project area's fire history is a significant factor in determining the potential threat of a wildfire event that can impact Dunsmuir in future years. The most recent large fire occurred 65 years ago so a vast majority of the area is untouched by wildfire.

Table 2 Historical Large Wildfires

Year	Estimated Fire Size (acres)	Approximate Location in relation to Assessment Area
1950	111	Adjacent at southeast boundary of project area
1931	247	Southwest portion of project area
1924	152	Southwest portion of project area

Figure 4 provides statistical information on fire causes in Siskiyou County for one year by battalion. Dunsmuir is part of CAL FIRE's McCloud battalion that also includes the communities of McCloud and Mount Shasta.

Figure 3 Mount Shasta Area Fire History Map

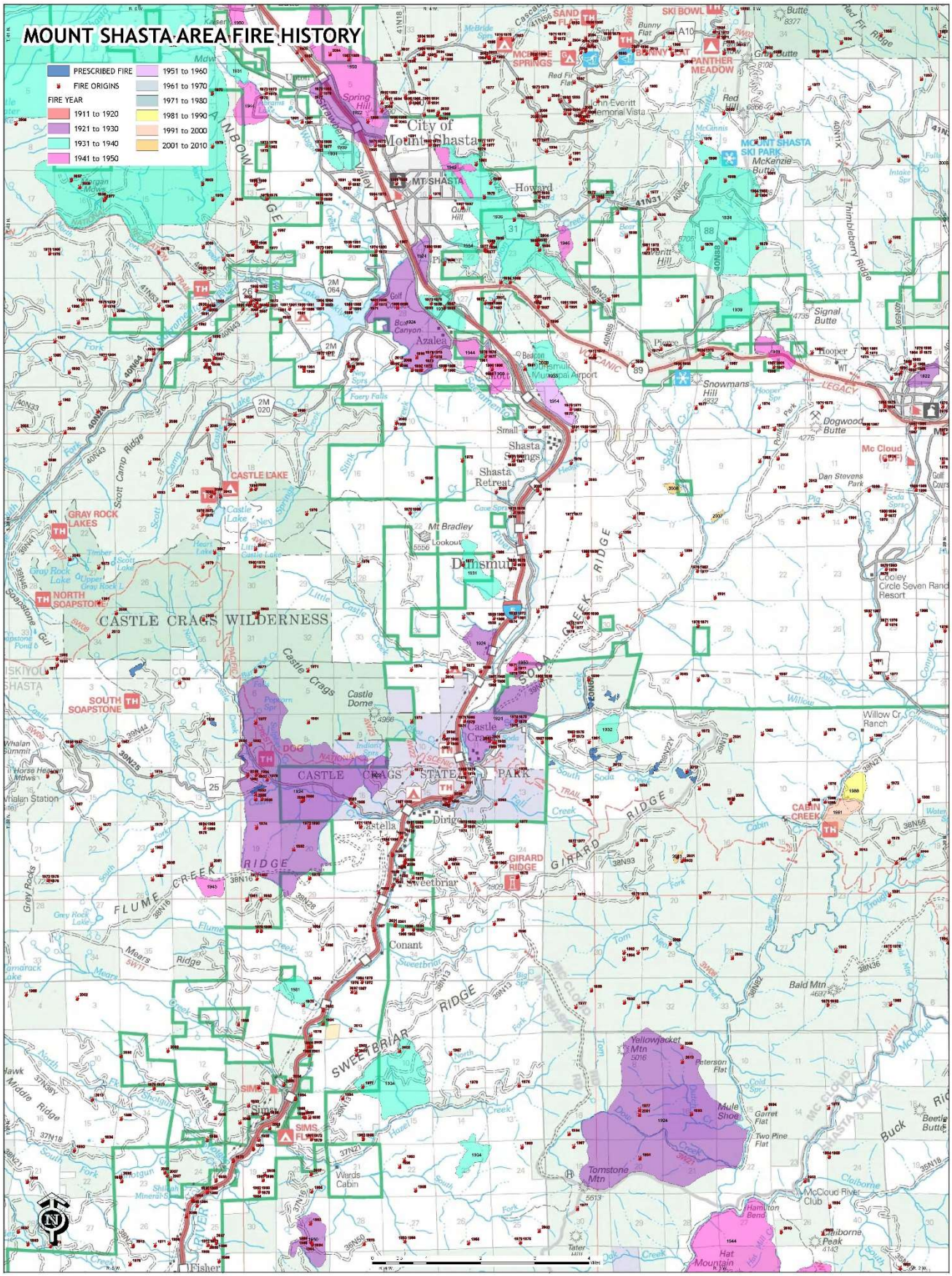
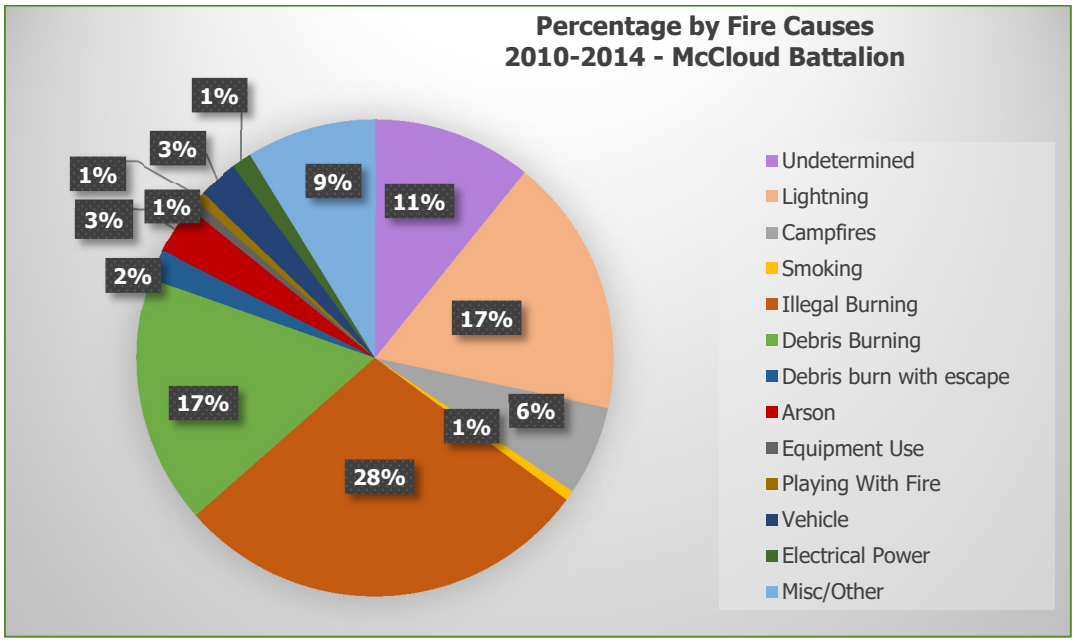

MOUNT SHASTA AREA FIRE HISTORY
PRESCRIBED FIRE
FIRE ORIGINS
FIRE YEAR
1911 to 1920
1921 to 1930
1931 to 1940
1941 to 1950
1951 to 1960
1961 to 1970
1971 to 1980
1981 to 1990
1991 to 2000
2001 to 2010
City of Mount Shasta
MT SHASTA
CASTLE CRAGS WILDERNESS
CASTLE CRAGS STATE PARK
CASTLE LAKE
GRAY ROCK LAKES
NORTH SOAPSTONE
SOUTH SOAPSTONE
DOG
SIMS
CABIN CREEK
GIRARD RIDGE
MOUNT SHASTA SKI PARK
SKI BOWL
PANTHER MEADOW
Dunsmuir
Castle Dome
Castle Crags
Castella
Dirigo
Sweetbriar
Conant
Shasta Retreat
Shasta Springs
Mt Bradley
Howard
Azalea
Pierce
Snowmans Hill
Signal Butte
Dogwood Butte
Mc Cloud
Dan Stevens Park
Willow Cr Ranch
Bald Mtn
Yellowjacket Mtn
Tomstone Mtn
Hat Mountain
Wards Cabin
McCloud River Club
Fisher
Scott Camp Ridge
Thimbleberry Ridge
Grey Rocks
Middle Ridge
Buck Mtn
Beetle Butte
Claiborne Peak
Tater
Mars Ridge
Spring Hill
Red Hill
Butte
Bunny Flat
Red Fir Flat
Jim Everitt Memorial Vista
McKenzie Butte
Outlet Hill
Pigeon
Golf
Bear Canyon
Small
Dogwood
Hooper
Snowmans Hill
Dan Stevens Park
Willow Cr Ranch
Circle Seven Ranch Resort
Paterson Flat
Mule Shoe
Garret Flat
Two Pine Flat
Hamilton Bend
Claiborne Peak
Beetle Butte
Buck Mtn
Bald Mtn
Mt Bradley Lookout
Castle Lake
Castle Dome
Indian Spr
Flume Creek
Sweetbriar Ridge
Girard Ridge
Cabin Creek
Soda Creek
Willow Creek
Mc Cloud River
Shasta Lake
Mt Shasta Airport
Dunsmuir Municipal Airport
Foery Falls
Mc Cloud (CDP)
Mc Cloud River Club
Circle Seven Ranch Resort
Horse Heaven Mdws
Whalan Station
Whalan Summit
Grey Rock Lake
Upper Gray Rock L
Scott Lake
Castle Lake
Hears Lake
Little Castle Lake
Gulf
Soapstone Gulf
Fisher
Tater
Hat Mountain
Yellowjacket Mtn
Tomstone Mtn
Paterson Flat
Mule Shoe
Garret Flat
Two Pine Flat
Hamilton Bend
Claiborne Peak
Beetle Butte
Buck Mtn
Bald Mtn
Mc Cloud River
Shasta Lake
Mt Shasta Airport
Dunsmuir Municipal Airport
Foery Falls
Mc Cloud (CDP)
Mc Cloud River Club
Circle Seven Ranch Resort
Horse Heaven Mdws
Whalan Station
Whalan Summit
Grey Rocks
Middle Ridge
Buck Mtn
Beetle Butte
Claiborne Peak

Figure 4 McCloud Battalion Fire Cause (Dunsmuir, Mount Shasta, and McCloud SRA



3.3 Dunsmuir's Wildland Fire Environment

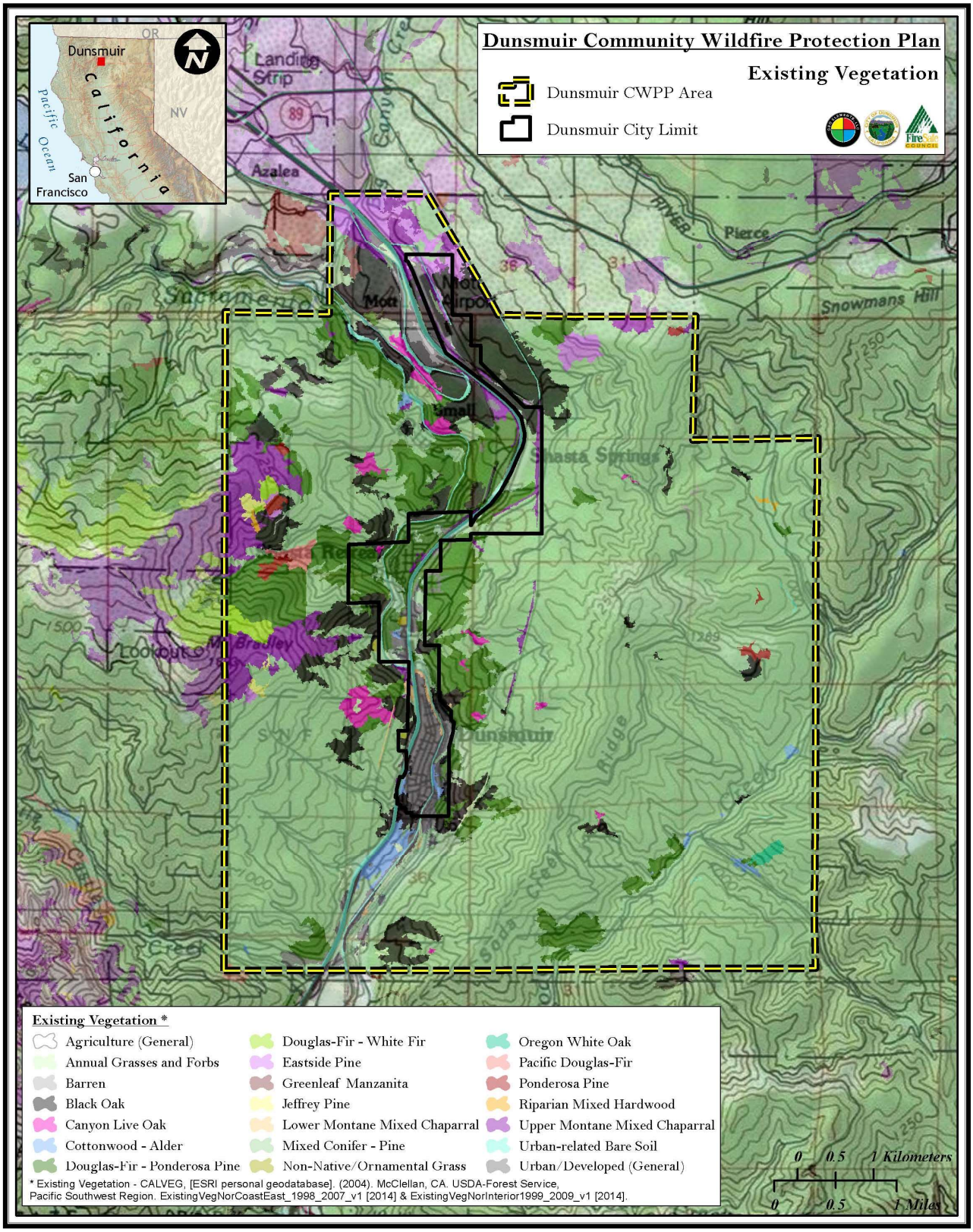
The interaction of fuels, topography, and weather affect the likelihood of a fire starting, the direction, speed and intensity that it will burn, and the firefighter's ability to control it. This section describes the wildland fire environment within and adjacent to the City of Dunsmuir.

3.3.1 Fuels

Wildland vegetation is the primary fuel source for wildfires, and is the most important factor in determining fire hazard in the wildlands. In the wildland urban interface, both wildland vegetation and many kinds of urban fuel present the hazard. Human-created sources of fuel or "urban fuels" such as structures (e.g., homes, commercial businesses, and outbuildings), ornamental vegetation used for landscaping, vehicles, fuel tanks, decks, fences, and anything combustible all contribute to the fire environment. These urban fuels affect fire behavior and can cause an increase in the hazard level of an area. Current fire models are not capable of modeling the hazards of urban fuels. This section only addresses wildland vegetation as the fuel source.

Existing vegetation or "fuels" in the planning area includes agriculture, black oak, white oak, canyon live oak, cottonwood, Douglas fir, Ponderosa pine, white fir, eastside pine, incense cedar, Greenleaf Manzanita, Jeffrey pine, lower Montane mixed chaparral, mixed conifer, riparian mixed hardwoods, upper Montane mixed chaparral, non-native ornamental grasses (See Figure 5, Existing Vegetation Map).

Figure 5 Existing Vegetation Map



Fuel types within and adjacent to the community include grasses, shrubs/brush, and timbered areas. Fuel types are broken in to specific fuel models that describe the physical properties of vegetation that support wildfire. Each fuel model has associated burning characteristics that can change significantly, as fire spreads through different fuel models across a landscape. It is possible to modify the fuels by reducing the amount of fuel/vegetation, thereby modifying fire behavior at a specific location on the greater landscape. Fuel treatment recommendations are addressed in Section 6.

3.3.2 Weather

Weather is the most variable element in the wildland fire environment and least predictable. The components of weather that are most critical include temperature, relative humidity, precipitation wind, and atmospheric stability. Each of these elements can either enhance or hinder wildfire spread and fire intensity.

Air temperature trends within the planning area include hot summers and more mild winters. The highest average maximum temperatures occur in July and the coldest average minimum temperatures occur in January. High temperatures in July and August average 90 degrees (Accessed 22February2016, www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2574).

On average Dunsmuir receives approximately 63-inces of rainfall with July having the lowest rainfall amount and December having the highest (Accessed 12 February 2016, www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2574). June through September typically receives the lowest amount of precipitation; however, thunderstorm activity normally begins in June with wet storms but turns dry with little or no precipitation reaching the ground as the season progresses into July and August. The Siskiyou Mountains experience as much as twice the number of lightning ignitions as occur in the Cascades or Olympic Mountains. The higher number of lightning ignitions is due to both increased lightning frequency and decreasing summer precipitation patterns characteristic of the Klamath-Siskiyou region. July and August have been reported as the months of greatest number of lightning strikes, but August and September have the highest proportion of actual lightning-caused fire ignitions (Siskiyou County Hazard Mitigation Plan, 2015).

Snowfall within the planning area on average is approximately 29-inches annually mostly from the months of December through March (Accessed 12February 2016, www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2574).

July and August are when local winds (slope winds and sea breezes) predominate, with the Pacific jet stream weak and well to the north. By mid or late September, north to northeast winds return to the north half of the planning area, bringing in moist ocean air (Draft Siskiyou County Hazard Mitigation Plan, 2012). North to northwest winds within the project area, occur about 31% of the time with south to southeast winds occurring approximately 31% of the time. The strongest average winds are northerly winds that can reach up to 25 miles per hour (Dunsmuir SIG). Winds generated during thunderstorm activity can reach in excess of 60 miles per hour coming from any direction.

3.3.3 Topography

Topography is the configuration of the earth's surface including its relief and the position of its natural and human-made features. It is the most stable of the elements in the fire environment and plays an important role in how a fire will burn. Topography modifies general weather by channeling wind, inducing slope and valley winds, creating thermal belts, and producing orographic thunderstorms thereby affecting the behavior of wildfire. Factors of topography that affect fire behavior include slope, aspect, terrain or land features, and elevation. Of all the topographic features, the steepness of slope is the most influential on fire behavior.

The planning area is located in the Sacramento River Canyon that primarily runs north to south and has a total area of 1.7 square miles. The north-south oriented streets in the City of Dunsmuir typically rise in elevation more gently with a gain of 400 feet from the south end of Dunsmuir to the City's north Interstate 5 interchange. Steep slopes rise dramatically within 1.5 miles to the west of the City from approximately 2,100 feet to 5,500 feet on Mount Bradley. On the east side of the City, steep slopes rise within 1-mile of the City up to 4,200 feet on Soda Creek Ridge. Much of the City's developed area lies in a narrow strip along the river ranging from 1,000 to 2,000 feet wide between these two prominent geographic ridge features.

The steep river canyon serves as a major flow path for the dominant north and south winds and can accelerate the winds.

3.3.4 Fire Behavior Characteristics

The variation of fuels, topography and weather found within and adjacent to the City leads to a fire environment that can support a full range of fire behavior including:

- Ground fires - burn in the organic material beneath the surface litter, such as the layer of duff, roots, and buried or partially buried dead and decaying woody material
- Surface fires - burn in material above the ground including low vegetation such as grasses, low shrubs, small trees, and woody debris on the soil surface
- Crown fires - burn in the tops of trees and tall shrubs or brush. The classification of crown fires include passive, active, and independent
- Spotting - occurs when wind, convection, and gravity outside the main perimeter of the fire transport firebrands. Whether or not a "spot fire" develops is dependent on if a firebrand lands on a receptive fuel

A combination of high temperatures, low relative humidity, and strong winds can create wildfire behavior that exceeds the capability of firefighting personnel to suppress wildfires. Wildfires that burn under severe weather conditions can result in the loss of life, structures, infrastructure, and important natural and cultural resources.

SECTION 4. DUNSMUIR: A COMMUNITY AT RISK

4.1 Designation as a Community at Risk

The 2000 National Fire Plan (NFP) directs funding for projects designed to reduce wildfire risk to communities and restore ecological health on Federal lands. The first step toward achieving this goal was to identify communities at high risk of damage and/or loss from wildfire. The Federal Register identified communities at risk from wildfire that were located near Federal lands. The City of Dunsmuir was designated as a Community at Risk (CAR) in January 2001 (Government Printing Office, Accessed 2016).

The NFP initially excluded communities that were not located near Federal lands from this funding opportunity, although they were still at significant risk from wildfire. In 2003, states had the opportunity to identify all CARs. The California Department of Forestry and Fire Protection (CAL FIRE) led the effort to identify all CARs in California. With California's extensive WUI situation the list of communities extends beyond those on Federal lands. CAL FIRE used three main factors to determine which communities were at risk and their level of fire threat, defining these factors as: 1) high fuel hazard, 2) probability of a fire, and 3) proximity of intermingled wildland fuels with urban environments. Currently, Dunsmuir is one of 1,327 communities in California identified as a CAR.

4.2 Dunsmuir's Wildland Urban Interface

The general definition of the WUI is "the zone where structures and other human development meet and intermingle with undeveloped wildland or vegetative fuels". This area poses a tremendous threat to life safety, property, and infrastructure. These interface zones are particularly vulnerable to the risks associated with large-scale wildfires because they represent the intersection between combustible homes and structures and accumulations of wildland fuels. The WUI is one of the most dangerous and complex situations that firefighters face.

Dunsmuir is surrounded by wildland fuel that consists of dense wildland forest and shrub vegetation on very steep terrain with limited access. There are also many areas within Dunsmuir city limits where wildland fuels, urban fuels and structures intermix on private lands, along riparian corridors, in open spaces and on vacant lots. Examples of this intermix scenario include the neighborhoods adjacent to Dunsmuir High School in the southwest portion of the planning area and the neighborhood and multiple vacant lots in the Mountain Estates area located in the central eastern area of the planning area.

The 2003 HFRA provided general limits as guides for WUI designation including those areas within 1/2 mile of a community's boundary or within 1-1/2 miles when mitigating circumstances exist, such as sustained steep slopes or geographic features that aid in creating a firebreak - unless the WUI is otherwise defined in a CWPP.

Steep canyon walls with continuous wildland fuels immediately adjacent to and upslope from Dunsmuir were primary factors in defining the community WUI boundary more broadly in scope than those in the HFRA guidelines. Agency and public stakeholders that attended the October

22nd and 28th, 2015 workshops collaboratively worked to define Dunsmuir's WUI. Figure 1 depicts the WUI boundary for this project.

Natural and Cultural Resources

An important component to recognize in a community at risk is the significance of the potential risk posed from the human population to the wildlands and natural resources. The inherent value of the abundant natural resources encompassing Dunsmuir is considered 'at risk' of loss and/or damage due to wildfire, along with the community itself. Wildfire ignitions from human activities within the community or the interstate can threaten the adjacent natural and cultural resources. These important values have been exposed to wildfire well before urban development; however, current unnaturally dense forest conditions on the steep slopes above the town pose an increased likelihood for increased fire intensities and amplify the potential for loss to these important assets.

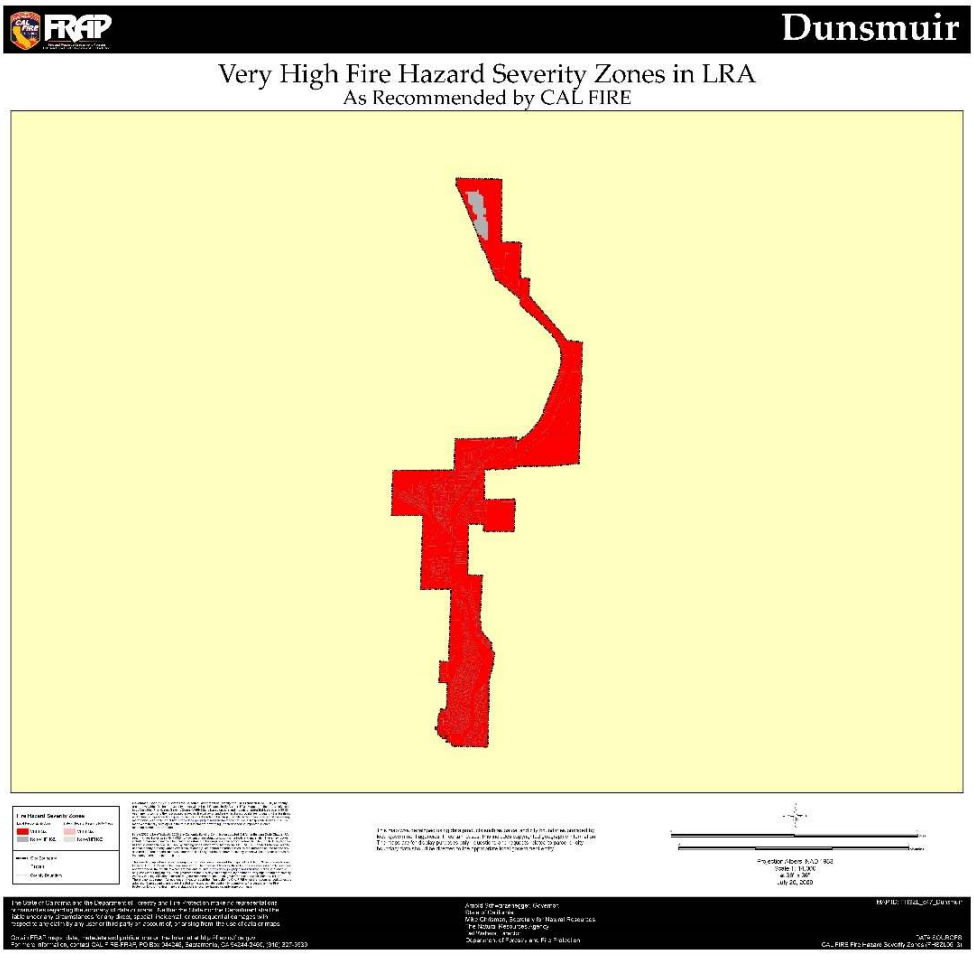
SECTION 5. WILDFIRE ASSESSMENT

An analysis of the wildfire potential utilized established assessment methods, scientifically accepted fire models, and validation of model outputs by fire professionals to identify the Dunsmuir's greatest wildfire hazard and wildfire risk. The purpose of this assessment is not to determine the wildfire hazard or risk for individual properties but to provide the framework for prioritizing potential wildfire mitigation strategies for the planning area.

5.1 California Fire Hazard Severity Zones

CAL FIRE is mandated to identify "fire hazard severity zones" throughout the State. These zones are defined as "areas that have similar burn probabilities and fire behavior characteristics. Dunsmuir has been identified as a "Very High Fire Hazard Severity Zone" (CAL FIRE, 2015).

Figure 6 Dunsmuir Very High Fire Hazard Severity Zone Map*



Taken from www.fire.ca.gov/fire_prevention/fhsz_maps/FHSZ/siskiyou/Dunsmuir.pdf.

5.2 Hazard Assessment

Established wildland fire models provided the basis to evaluate the wildfire hazard for the community including FlamMap (Version 5.0) and FireFamily Plus (Version 4.1). These fire models are the best available science for analyzing wildfire potential. The following identifies models used and associated data sources:

FlamMap

FlamMap is a spatial fire behavior mapping and analysis program that uses elevation, slope, aspect, surface fuel model, canopy cover, fuel moisture, and historic weather data to evaluate fire behavior (Finney, 2004). The outputs from FlamMap provide a reasonable representation of surface fire behavior and crown fire potential across the landscape. FlamMap allows evaluation of an entire analysis area under a defined set of environmental conditions, thereby providing insight into how fire behavior changes across the landscape.

FireFamily Plus

Fire Family Plus is a fire climatology and occurrence program that combines the functionality of various weather and climate programs into a single package (Bradshaw, McCormick, 2000). The model allows the user to summarize and analyze historic weather observations for use in FlamMap.

Data Sources for Models

A wildland fuel model is a mathematical representation of a vegetative fuel complex that specifies all fuel descriptors required for use in the fire models. The fire behavior modeling associated with this assessment utilized the Scott and Burgan's Standard Fire Behavior Fuel Model (FBFM) classification system that describes the composition and characteristics of both surface and canopy fuels (Scott, Burgan, 2005).

A challenge in wildfire assessments is accurate mapping of fuels in order to determine spatial fire hazard and to plan mitigation efforts. The Landscape Fire and Resource Management Planning Tools Project (LANDFIRE) fuels layer represents the best available data for Dunsmuir and was spot checked to validate fuel models as reported in the LANDFIRE data were representative of on-the-ground conditions. The 30-meter resolution of the fuels data available from LANDFIRE does not capture the level of detail needed for assessing small open spaces; however, for planning purposes the 30-meter resolution of the data is sufficient to assess overall wildfire hazard and to make recommendations for mitigating identified hazards.

Historic weather data was obtained from the Sims and Mount Shasta Remote Automated Weather Station (RAWS) and was analyzed in FireFamilyPlus to determine 90th percentile weather conditions for the assessment area. The Mount Shasta and Sims RAWS have continuous weather records dating back to 1997. The data for this analysis represents the summer and fall fire seasons from May 1st - October 31st and the results provided input into the fire models.

5.2.1 Hazard Assessment Results

Using 90th percentile weather conditions, the results from FlamMap show almost 55 percent of the planning area have flame lengths at 11 feet or greater (See Figure 7, Flame Length Map). Table 3 below details the breakout of flame lengths by percentage within the planning area.

Table 3 Flame Lengths

Flame Length (feet)	Acres	Percent
0-4	4,117.63	24.73%
04-8	970.19	5.83%
08-11	838.67	5.04%
11+	9,053.64	54.37%
Unburnable	1,671.72	10.04%
Grand Total	16,651.84	100%

Flame lengths correlate to surface fireline intensity and the ability of firefighters to control a wildfire. The Fire Suppression Interpretation Table (See Table 4) below is a guideline used by firefighters to measure the safety and potential effectiveness of various fireline resources based on a visual assessment of active flame length.

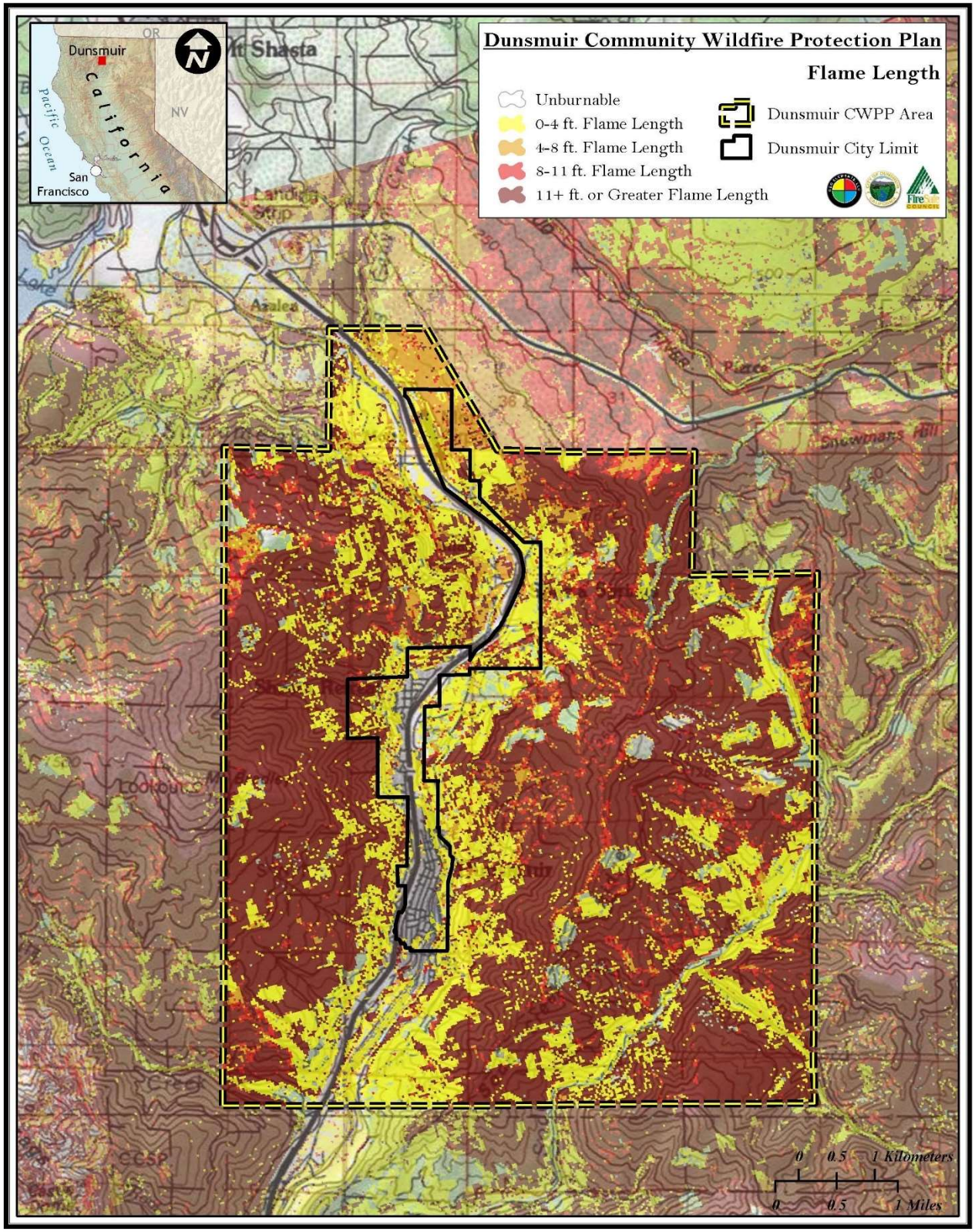
Flame lengths in excess of 11 feet are extremely hazardous with fireline intensities estimated in excess of 1,000 degrees Fahrenheit. Wildfires burning at these temperatures are difficult to control and can be extremely hazardous to the life safety of residents and firefighters. Values such as structures, infrastructure, and natural resources threatened by wildfires burning at these intensities are at significant risk of damage and loss.

Table 4 Fire Suppression Interpretation Table

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

Caution: *These are not guides to personal safety; fires can be dangerous at any level of intensity; Wilson (1977) has shown that most fatalities occur in light fuels on small fires or isolated sections of large fires.*
Source: NWCG Fireline Handbook, Appendix B Fire Behavior, April 2006.

Figure 7 Flame Length Map



Approximately 10 percent of the planning area (mostly within the City of Dunsmuir) shows no flame activity based on outputs from FlamMap. These areas therefore appear not to be at risk from a wildfire; however, this is not an appropriate interpretation of the model outputs.

The areas without flame activity have fuel models classified as "unburnable". The fuels data generalizes the surface fuel characteristics within a 30-meter-by-30-meter pixel so areas with urban development, lawns, roads, parking lots or other paved areas, and agricultural lands receive the "unburnable" classification so modeling results show that these areas will not support combustion. Additionally, the fire models do not account for the influence of ornamental vegetation and other "unburnable" fuels during a wildfire nor does the model consider the impact of firebrands landing on flammable debris and vulnerable structures causing ignition of structures, thereby structures themselves become a fuel.

Crown Fire

In FlamMap, crown fire potential is influenced by the amount of biomass in the canopy of the trees and/or tall brush, spacing of the canopy, and the height of the base of the canopy from the ground. Outputs from FlamMap provide an estimation of crown fire potential for passive crown fire and active crown fire but does not model the potential for independent crown fire. Estimated crown fire activity within the planning area is primarily passive crown fire. There are isolated small areas of active crown fire primarily in the west side of the planning area above Shasta Retreat area below Mount Bradley (See Crown Fire Potential Map, Figure 8).

The value of predicted fire behavior is important to the development of fire suppression strategies and tactics, particularly in terms of the difficulty of control and effectiveness of suppression resources, and the development of fuel treatment strategies. The intent of this assessment is to help determine locations within the planning area that are higher priority for mitigation work but can also provide potential targeted prevention efforts through outreach, education and enforcement to help minimize exposure to wildfires and potential threat to the community.

5.2.2 Wildfire Risk Assessment

The risk of an ignition is variable with the potential for fires to occur from many types of ignition sources including natural and anthropogenic/human activities (See Table 5 for details). The assessment of historical and potential fire occurrences are important to gain a better understanding of ignition potential, the prioritizing of fuel treatments, and the development of prevention strategies. The development of a wildfire risk assessment is essential to understanding the potential threats of wildfire within the community.

The Wildfire Risk Map, Figure 9 shows the heaviest concentrations of anthropogenic fire ignitions occur along Interstate 5, especially south and north of the City of Dunsmuir. Lightning fires are a minor component historically with greater numbers on the eastern portion of the planning area.

Figure 8 Crown Fire Map

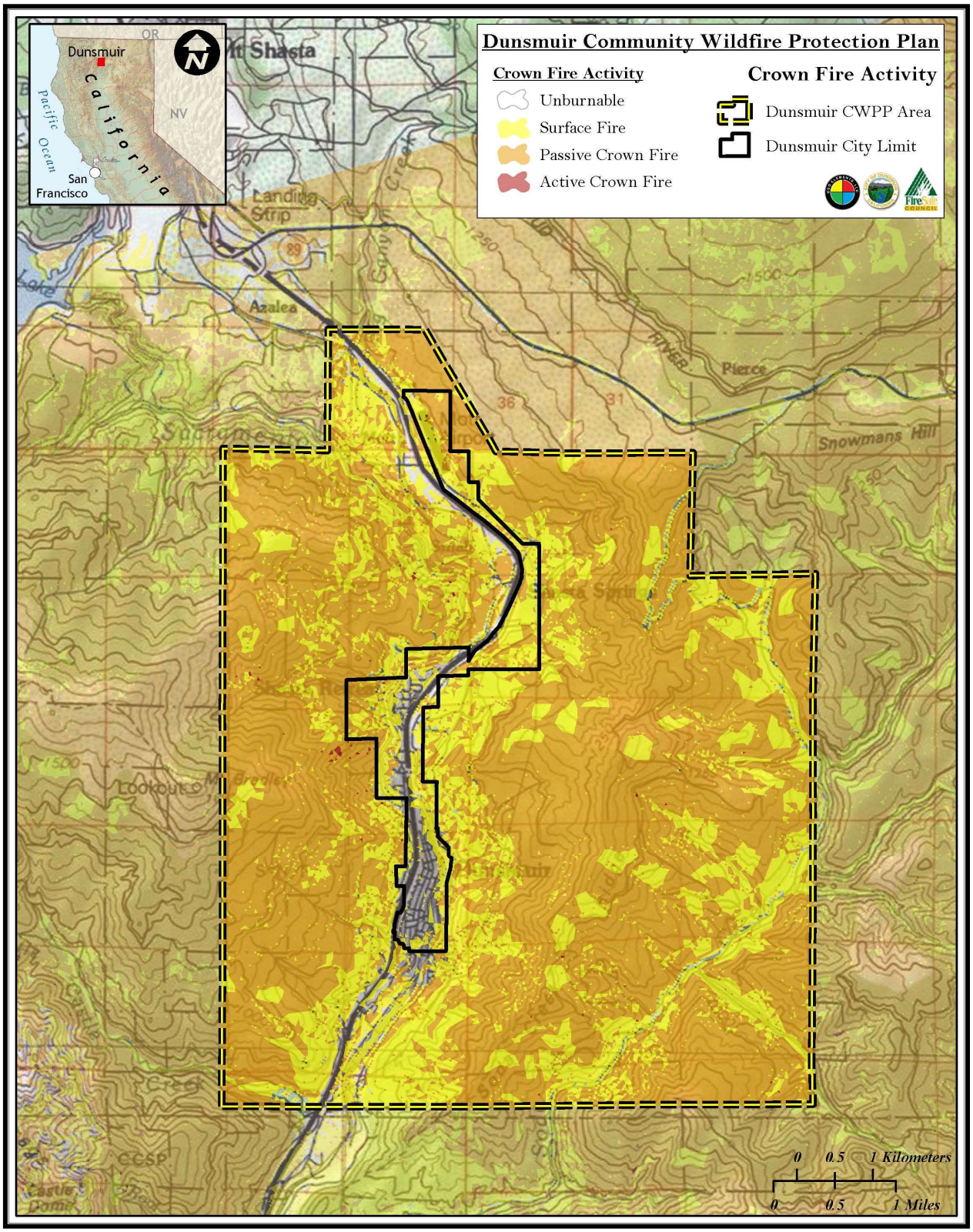


Figure 9 Wildland Fire Risk Occurrence Map

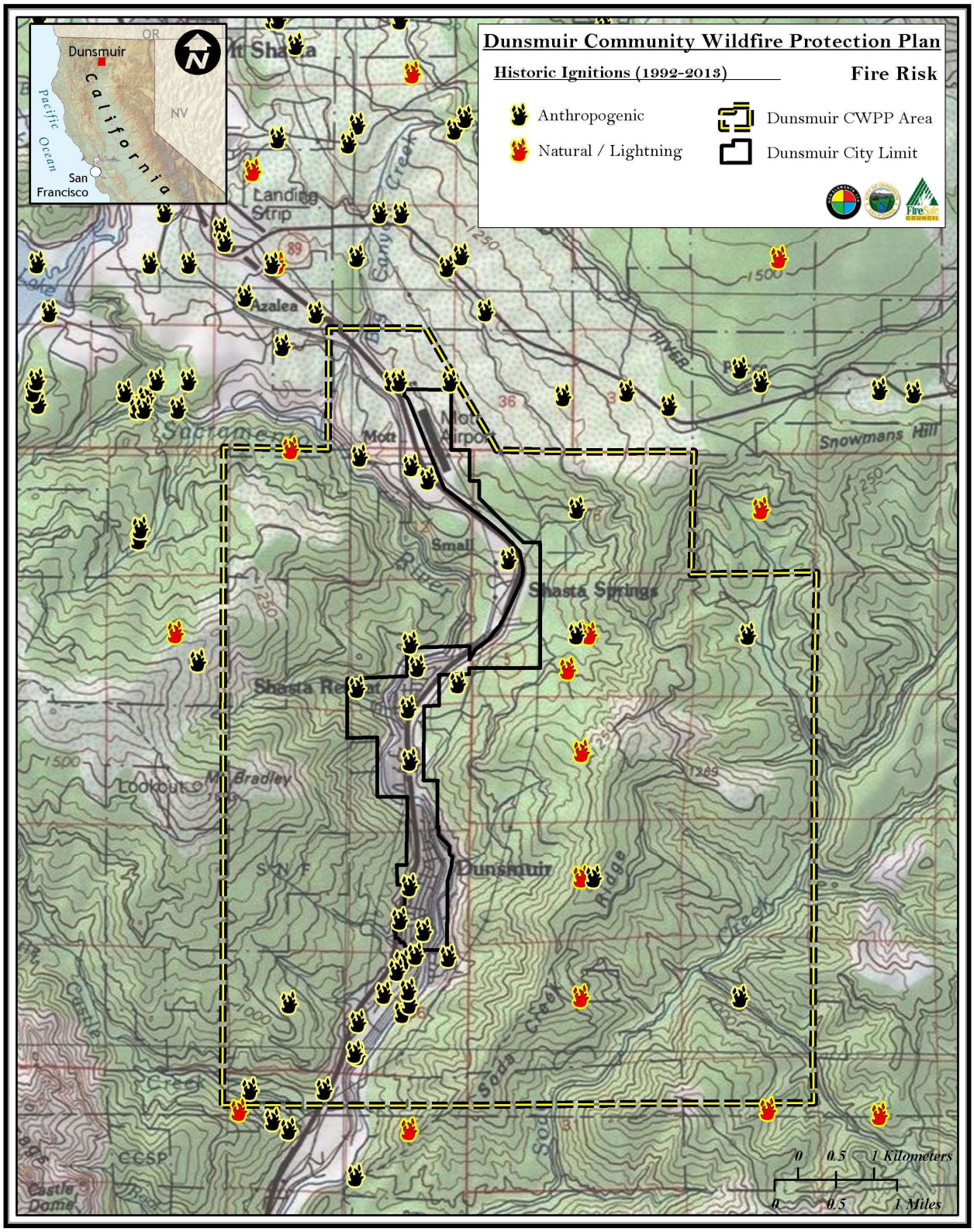


Table 5 Wildfire Ignitions by Cause (from 1992-2013)

Fire Cause	*Count*	*%*
Arson	1	1.9%
Campfire	8	14.8%
Children	2	3.7%
Debris Burning	11	20.4%
Equipment Use	6	11.1%
Lightning	7	13.0%
Miscellaneous	14	25.9%
Missing/Undefined	1	1.9%
Powerline	2	3.7%
Smoking	2	3.7%

5.2.3 Structure Vulnerability

The National Interagency Fire Center (NIFC) estimates that between 2004 - 2014, on average, approximately 2,600 structures per year are lost due to wildfires across the United States with more than half of these losses as primary residences (National Interagency Coordination Center, 14 January 2016). In 2015 alone, wildfires destroyed almost 3,000 structures in California.

There is potential for structure loss even outside of high hazard and high-risk areas. Burning embers from wildfires can be carried by the wind up to distances nearly a mile from the flaming front, creating a significant risk of ignition to poorly maintained structures and unattended flammable landscapes.

Research has shown repeatedly that the main reason for structure loss during a wildfire is due to the ignitability of the structure itself. Low intensity wildfires can destroy structures that are highly ignitable while structures with low ignitibility can survive high intensity fires (Cohen, 2000).

A wildfire can ignite structures in numerous pathways. These pathways depend on a variety of characteristics found in the WUI, examples include:

- adjacent wildland open space – fuels, terrain, weather, and fire's influence on itself
- community – housing density, zoning, separation distance, and physical barriers
- structure – exterior structure construction material, structure design, site location (e.g., midslope, hilltop), structure maintenance, and heat sources (e.g., landscaping, flammable exposures) within 100-200 feet (Cohen 2004; Cohen 2000; Cohen 1995; Cohen, J., Butler, B., 1998)

The risk of a structure's ignition is a direct result of exposure by wildfire from radiation, convection, and/or burning embers and the vulnerability or ignitability of the structure. Structures ignite in three ways:

1. Convection: The transfer of energy within fluids such as air. Convective heat rises vertically – visually observed as flames and smoke columns. Flames can overwhelm a structure by direct flame impingement, which is a result of no defensible space.

2. Radiation: Works much in the same way as a radiator heating a room in the wintertime. Flammable objects within a home's defensible space can get so hot that they provide sufficient heat for a structure to ignite. The potential for ignition is greatly reduced as space between wildland and urban fuels is increased.
3. Burning Embers: Burning material (i.e. wood shingles, tree bark, leaves, etc) that detach from the main fire front during strong convection drafts and/or winds in the burning zone. Hundreds to thousands of burning embers can be carried long distances by winds associated with the wildfire then landing on receptive fuels.

Three Forms of Structure Ignition (www.firewise.com):

The most vulnerable parts of a structure that can lead to loss or damage in a wildfire include:

Table 6 Structure Vulnerability

Structural Components	Vulnerability
Roofing	This has been the key factor in most fires. It's not just the type of roofing material, but also some of the construction details, the condition of the material, and whether the roof is clear of burnable material (such as pine needles and other debris).
Garages	Typically not well sealed so gaps at the top, bottom and edges of doors can allow burning embers to enter, often, garages contain flammable materials. Garages usually have vents at various locations, especially if they contain gas furnaces or hot water heaters. These vents are easy entry points for embers.
Siding	Flammable siding can provide a pathway for flames to reach vulnerable portions of a structure such as the eaves or windows. Siding needs a source of ignition, which in many cases includes vegetation in close proximity to a structure, wood decks and/or fences, or stacked firewood or other flammable material.

Vents	Soffit vents in the eaves are an easy entry point for wind-driven embers during a fire. These fires often start in an attic, which is not easy to detect from the outside. Structures have been lost when fire personnel have left the scene unaware that a fire is burning within the attic.
Windows	Unprotected and inadequate windows can be another major entry point for fire. Windows can be broken by airborne materials or cracked by thermal expansion during a wildfire and igniting materials in the structure through radiation, convection, and/or burning embers entering a structure.
Nooks and crannies	Little grooves, inside corners, and roof valleys all become areas where flammable debris (such as pine needles and bird's nests) have collected over time and burning embers can land igniting the debris.
Crawlspace Vents	These areas, not just under a structure, but under decks and other attachments, are difficult to protect if they are not adequately screened. Much like vents in the attic burning embers can be carried to flammable material underneath a structure.
Wood fences	Firefighters have observed that wood fences, when ignited; act as a fuel source that carries fire closer to a structure. Many fences either are attached to home or close enough to present a problem.
Wood decks	Act as a source of fuel that is attached or directly adjacent to structures. When ignited by wildfire the radiant and convective heat output can ignite structures. In addition, most decks are adjacent to large windows or glass sliders. The heat from the deck fire can cause the glass to fail allowing the wildfire to enter a structure.
Flammable landscape vegetation and/or items such as wood or flammable debris piles	Structures are exposed to significant radiant and convective heat and burning embers making structures more susceptible to ignition. Defensible space protects a structure from direct flame impingement, radiant heat, and some burning embers - and is essential for structure survivability during wildfires. It also provides a safer operational space for firefighters protecting structures.
Structure Location	Location on the terrain (e.g., steep terrain, heavily forested slopes, midslope).

SECTION 6. MITIGATION ACTION PLAN

Preparedness for the inevitable wildfire events includes activities such as community education, emergency planning, protection of values, reducing structure ignitibility, a comprehensive fuels mitigation strategy, and evacuation preparedness. A combination of hazardous fuel mitigation, structural hardening, and emergency preparedness activities can significantly affect firefighter's success in protecting life safety and reducing the threat to Dunsmuir's values.

As discussed earlier, wildfires have been an important component shaping the ecosystems of the Klamath Mountain region for centuries. Additionally, the influx of humans into the area has created a very complex wildland-urban interface fire problem with more people moving into the area each year.

We cannot eliminate wildfire from fire-adapted ecosystems nor can we ignore it. Steps can be taken well in advance of a fire to enhance the protection of life safety and minimize the wildfire threat to homes, infrastructure, and businesses while reducing impacts to natural and cultural resources.

The following describes actions that can enhance the protection of life safety and the community's values while balancing the impacts to biological and cultural resources.

6.1 Community Preparedness

The challenge for Dunsmuir and other communities in Siskiyou County is how to generate interest and maximize awareness of the wildfire threat and to encourage participation in activities that effect change at the individual and community level. The DFSC and FSCSC has been effectively leading the community to meet these challenges. The following describes the community's preparedness at the local, county, state and regional levels:

6.1.1 Emergency Preparedness Programs

City of Dunsmuir Programs

City of Dunsmuir Audible Emergency Warning System

The 'air horn' emergency warning system is tested daily at noontime test. The system pattern codes include:

Pattern Codes

- Single, four second blast – Daily Noon Test
- Five blasts, four seconds each with four second pauses between each blast – Fire Department Alert
- Continuous one second blasts with one second pauses – Evacuation imminent, tune to local radio for details (radio stations listed in table below)
- Continuous thirty second blasts – Alert, tune to local media for information
- Single two second blast – Used for testing and maintenance

Local radio stations with emergency information include:

Call Sign	Number (MHz)	Format	Broadcast area	Station Location	Bitcaster (internet broadcast)
KNSQ	FM 88.1	Public Radio	Mount Shasta	Ashland, Oregon	✓
KFPR or K222BR	FM 92.3	Public Radio	Dunsmuir, McCloud	Chico, CA	✓
KZRO	FM 100.1	Classic Hits	Dunsmuir	Mount Shasta	✓
KMJC	AM 620	News	Mounts Shasta	Ashland, Oregon	✓

Local television stations include:

Call Sign	Channel	Network	Broadcast area	Station Location
KRCR	7	ABC	Chico– Redding	Redding, CA
KTVL	10	CBS	Medford-Klamath Falls	Medford, OR
KHSL	12	CBS	Chico-Redding	Chico, CA
MCTV	15	Local/Public	Southern Siskiyou Co	Mount Shasta CA

Siskiyou County Programs

Code Red

Siskiyou County has instituted a rapid emergency notification service called CodeRED®. The new system distributes emergency messages via telephone to targeted areas or the entire county at a rate of 1,000 calls per minute. CodeRED® employs a one-of-a-kind Internet mapping capability for geographic targeting of calls, coupled with a high-speed telephone calling system capable of delivering customized pre-recorded emergency messages directly to homes and businesses, live individuals and answering machines. This service can be used in case of fires, chemical spills, evacuations, lock downs, downed power lines, lost individuals, natural disasters, abductions, water system problems, bomb threats, or other emergencies.

Office of Emergency Services

The Siskiyou County Office of Emergency Services (OES) is committed to the protection of lives, health, and property of Siskiyou County residents when disaster strikes. OES strives to accomplish this goal by maintaining a state of readiness utilizing the four phases of emergency management: Preparedness, Response, Recovery, and Mitigation.

6.1.2 Additional Programs and Tools for Consideration

Currently, many of the readily available community preparedness type programs are not actively utilized in Dunsmuir. The latest wildfire awareness and prevention programs provide for valuable public education for all age categories and include a realm of tools for guidance that range from hands-on coaching/training for the youth to important defensible space strategy for residences. The following are available programs in the greater Siskiyou County area that can augment the community's preparedness:

Ready! Set! Go! Preparedness Program

This program/plan includes information for defensible space, home hardening, preparing families, and checklists to help Dunsmuir's residences. The informational document covers wildfire prevention and preparedness tools throughout the state and is readily available at their website.

One Less Spark

"One Less Spark, One Less Wildfire," is a wildfire prevention campaign that focuses on the prevention of wildfires inadvertently caused by sparks from sources around the home and vehicle, as well as by industrial usage. This is a grass roots, community based effort to prevent unwanted wildfires everywhere: One Less Spark is One Less Wildfire.

Fire Adapted Communities (FAC) Toolkit

Fire Adapted Communities (FAC) is a concept that is used to convey the preparedness message from the USDA Forest Service and related federal and state land management agencies that encourages individuals to acknowledge and prepare for wildland fire threat at the community level. A fire adapted community requires minimal assistance from firefighters during the threat of a wildland fire as the community and its residents have accepted personal responsibility to seek out information and take action. This is important as the fire service is often not able to respond to every home affected by wildland fire.

California Fire Chiefs Association

An interagency group of California's Fire Chiefs that is established to strengthen and advocate for the California Fire Service through leadership, unity, and collaboration.

6.2 Protecting Values/Assets

This section describes actions to enhance protection of the project's values:

6.2.1 Life Safety

The fire department's first priority is life safety with the protection of property (e.g., homes, businesses, historic sites, infrastructure, etc.) as the second priority. Often in wildfire situations, it is extremely unsafe and/or impossible for property-owners to protect their property or firefighters to make a safe effective stand to protect structures; therefore, structures and other values must be able to survive on their own. Fighting wildfires and protecting structures is extremely complex and dangerous. In most cases, it is advisable that property-owners evacuate when directed to do so.

There are many factors that affect the ability of firefighters to protect structures and other improvements so firefighters arriving on scene quickly perform an assessment or "triage" to determine whether a structure or improvement is safely defendable. Prior to engaging in structure protection activities, firefighters look for access and egress issues. They assess factors such as whether a structure or improvement has characteristics of vulnerability, hazardous material issues, adequate water sources, adequate defensible space, and whether the defensible space provides them safe operational space. Often, the required 100-feet minimum defensible space may not be sufficient for firefighters to engage in structure defense safely.

Although not tested, guidelines established for wildfire safety zones can enhance safe operational space for firefighters and property-owners in the WUI; however, the additional element of burning structures and other "non-native" fuels will significantly increase fire intensities that can threaten the life safety of firefighters and property-owners.

Recently updated safety zones guidelines calculate the Safe Separation Distance (SSD) between a wildfire and firefighters based on the height of the vegetation. In order to determine the SSD, using the table below, firefighters can multiply the constant number eight (8) times a slope/wind factor times the height of the vegetation (See Table 8). An example is a 15 mph wind with a 24 percent slope, and 6-foot tall vegetation equals an SSD of 144 feet (8x3x6=144 feet), which is greater than the minimum defensible space standard of 100 feet (Butler, 2014).

Table 7 Preliminary Proposed Safety Zones Rule (July 2014)

New Preliminary Proposed Safety Zone Rule (July 2014)			
Calculating a Safe Separation Distance (SSD) SSD = 8 * Slope wind Factor * Height of the surrounding vegetation			
	SLOPE-WIND FACTOR		
Wind Speed	Flat 0% Slope	20% Slope	>30% Slope
Light 0-10 mph	1	2	3
Moderate 11-20 mph	2	3	5
Strong > 20 mph	3	5	6

***Disclaimer:** This proposed safety zone rule should be considered preliminary. It is based on limited data and analysis and is subject to increased or decreased spacing based on additional factors. It was presented in 2014 with the intent of increasing firefighter safety and reducing risk of injury. There have been no updates to these guidelines for 2015 and beyond.*

IMPORTANT NOTE: Although the assessment in Chapter 5 provides some guidance with flame lengths using 90th percentile weather conditions, an onsite consultation with Fire Department personnel is recommended to determine whether the clearance around a structure or other improvement is sufficient to provide a safer working environment.

6.2.2 Reducing Structure Ignitability

There simply are not enough fire engines or firefighters to protect every structure within the planning area. In some cases, it would not be safe for firefighters to engage in structure protection. Whether a structure survives a wildfire or not often depends on a structure's susceptibility to ignite even in the absence of firefighter protection. Structures must be able to stand on their own.

Most actions to reduce the ignition potential of a structure are associated with the structure itself and within 100-200 feet distance from the structure. Under some circumstances, reducing fire intensity for life safety will involve extending beyond 200 foot depending on the location of the structure on the terrain, high wind events, vegetation density, and fire behavior. The primary responsibility for protecting a structure lies with the property-owner and is the area within the Home Ignition Zone (HIZ).

The HIZ includes the structure itself and everything from the foundation out 100 – 200 feet depending on fire behavior conditions (NFPA, 2015). Within this 200-foot area, there are three zones:

Zone 1 encompasses the structure and all its attachments (e.g., wooden decks, fences, and patios) for at least 30 feet on all sides. In this area:

- Ornamental and wildland vegetation should be carefully spaced, low growing, well-watered, and free of resins, oils and waxes that burn easily.
- Mow regularly and prune trees up six to ten feet from the ground.
- Create space between tree crowns and trim back any trees that overhang the house.
- Create a 'fire-free' area within five feet of the home, using non-flammable landscaping materials and/or high-moisture-content annuals and perennials.
- Remove dead vegetation from under deck, flammable piles, and within 10 feet of house.
- Consider fire-resistant material for patio furniture, etc.
- Remove firewood and/or stacks or piles of flammable material; they should not be located in this zone.
- Water vegetation and mulch regularly.
- Consider xeric landscaping.

Zone 2 is 30 to 100 feet from the home, and vegetation in this zone should be low growing, well irrigated and less flammable. In this area:

- Leave 30 feet between clusters of two to three trees, or 20 feet between individual trees.
- Encourage a mixture of deciduous and coniferous trees.
- Create breaks in vegetation, such as driveways, gravel walkways and lawns.
- Prune trees up six to ten feet from the ground.

Zone 3 is 100 to 200 feet from the home. Thinning in this area should occur, although less thinning is required than in Zone 2. In this area:

- Thin vegetation and remove heavy accumulation of combustible growth, ground litter, and debris.
- Reduce the density of tall trees so canopies are not touching.

Mitigating risks within the HIZ is important, but requires a joint effort if a neighbor's residence is closer than the full 200' area. The figure below depicts neighboring homes with an overlapping HIZ. Whether these property-owners properly maintain their HIZ, their activities or lack of activity can influence the survivability of a neighbor's home. Tight subdivisions that have homes built within 100-200' of each can cause an overlap issue. Risk reduction efforts by all neighbors in these areas are beneficial to multiple properties.

HIZ concepts when applied to other improvements in the community can enhance their survivability as well. Actions in Table 8 will improve protection of life safety and enhance the survivability of structures in the community and Table 9 provides vegetation modification recommendations in the HIZ.

Table 8 Structure Mitigation Actions

Structural Components	Mitigation Actions
Defensible Space	The City of Dunsmuir requires 100 feet of defensible space from all sides of any structure but not beyond the property line except when adverse conditions exist. Follow prescriptive guidelines in Tables 9. Select fire resistant plants and non-combustible hardscape for the landscaping. Keep plants located within this area healthy, pruned, and maintained frequently.
Addressing	Address identification shall be Arabic numbers or alphabetical letters and be a minimum 6 inches contrasting with the background.
Roof	Replace wood-shake or shingle roofs with a Class-A – suitable for extreme fire exposure. Plug openings in roofing materials, such as the open ends of barrel tiles, to prevent ember entry and debris accumulation. Regardless of the type of roof, keep it free of bird's nests, fallen leaves, needles and branches.
Chimneys	Screen chimney and stovepipe openings with an approved spark arrestor cap with a 5/8-inch screen.
Eaves	Cover the underside of the eaves with a soffit, or box in the eaves, which will reduce the ember threat. Enclose eaves with fiber cement board or 5/8-inch thick, high-grade plywood. If enclosing the eaves is not possible, fill gaps under open eaves with caulk.
Exterior Siding	Noncombustible siding materials (e.g., stucco, brick, cement board and steel) are better choices. If using noncombustible siding materials is not feasible, keep siding in good condition and replace materials in poor condition.
Windows and Skylights	Single-pane windows and large windows are particularly vulnerable in older homes built prior to current fire codes. Recommend installing windows that are at least double-glazed and that utilize tempered glass for the exterior pane. The type of window frame (e.g., wood, aluminum or vinyl) is not as

	critical; however, vinyl frames can melt in extreme heat and should have metal reinforcements. Keep skylights free of leaves and other debris, and remove overhanging branches. If using skylights in the WUI, they must be flat skylights constructed of double-pane glass and must be kept free of vegetation.
Vents	All vent openings should be covered with 1/8-inch or smaller wire mesh. Another option is to install ember-resistant vents. Do not permanently cover vents, as they play a critical role in preventing wood rot. In the WUI, roof gutters shall be provided with the means to prevent accumulation of leaves, needles, and debris.
Rain Gutters	Always keep rain gutters free of bird's nests, leaves, needles and other debris. Roof gutters shall be provided with a means to prevent accumulation of leaves, needles, and debris. Check and clean them several times during the year.
Decks	Keep all deck materials in good condition. Consider using fire-resistant rated materials or heavy timber construction. Routinely remove combustible debris (pine needles, leaves, twigs and weeds) from the gaps between deck boards and under the deck. Enclosing the sides of the deck may reduce this type of maintenance. Do not store combustible materials under the deck.
Flammable Items	Keep the porch, deck and other areas of the home free of flammable materials (e.g., baskets, newspapers, pine needles and debris). Keep firewood, bales of hay or straw, and other flammable materials at least 30-feet away from a structure.

Table 9 HIZ Recommendations

Location →	Primary Defense Zone (A) (0 – 30′)*	Fuel Reduction Zone (B) (30′ – 100′)*	Fuel Reduction Zone (C) (100′ – 200′)*
Fuel Type ↓	***Based on Home Ignition Zone Recommendations***		***Based on Firefighter Safety***
Grass/ Forbs	Reduce fuel depth to 4 inches.	Same treatment as (A); longer grass in isolated open areas is acceptable.	In fuel ladder conditions; reduce to < 1 foot depth; or depth that breaks ladder
Surface Dead/Down Material	Clear the dead/down flammable material.	Reduce dead/down flammable material to < 3″ depth; and < 5 tons/acre in non-contiguous isolated logs acceptable.	Reduce heavier pockets of dead/down flammable material to < 5″ depth; < 5-7 tons/acre in isolated logs acceptable.
Chaparral/ Shrub	Remove all chaparral. Individual ornamental shrubs should be spaced generally 2x shrub height.	Remove up to 75 percent of chaparral vegetation. Allow for intermittent small pockets or clumps of chaparral/shrubs. Pockets and clumps of chaparral remaining should be healthy young-growth stage and limbed to 1/3 height of chaparral/shrub crown.	Less intensive brush removal with up to 30 foot for spacing of pockets and clumps of chaparral and shrubs. The remaining pockets and clumps of chaparral should be healthy and at the young-growth stage; and limbed to 1/3 height of chaparral/shrub crown.
Trees Overstory (without chaparral/shrub understory)	Thin smaller trees leaving larger trees (>than 6-inches DBH) at 15-20 foot crown spacing (based on slope, tree size and type); limb/prune lower branches 6-feet above grade level, or lower 1/3 of tree height on smaller trees.	Thin smaller trees leaving larger trees (> than 6-inches DBH) at approximately 10-20 foot crown spacing (based on slope, tree size and type); limb/prune lower branches 6-feet up, or lower 1/3 of tree height on smaller trees and removing all broken limbs and dead material.	Limb and prune lower branches of larger trees up to 6-feet above grade level and removing all broken limbs and dead material.
Trees Overstory (with chaparral/shrub understory)	Thinning specifications are the same as Trees Overstory without Chaparral/shrub understory in Zone A. Understory: remove chaparral; limb/prune ornamental shrubs to 1/3 of shrub height.	Thinning specifications are the same as Trees Overstory without Chaparral/shrub understory (Zone B). Understory: occasional small, less dense chaparral/ shrub and small tree clumps and pockets in openings without canopy and small trees in openings (non-canopy) are acceptable.	Thinning specifications are the same as Trees Overstory without chaparral/shrub understory in Zone C. Understory specifications are the same as Chaparral/shrub in Zone C except the pockets and clumps are limited to tree openings (non-canopy).
* Overstory Thinning Treatments should include oversight by local professional forester in support of forest product utilization.			

6.2.3 Other Values

The first priority for fire protection in the planning area is life safety. Fire suppression actions taken to protect life safety, structures, and infrastructure will take precedence over actions to protect natural or cultural resources.

The method to reduce the impacts of wildfire on natural and cultural resources is through implementation of fuel treatments. The integration of defensible space with other fuel treatments provide a holistic fuel mitigation strategy that affords the planning area's natural and cultural resources with an enhanced level of protection from a wildfire that may originate from a structure and spread into the wildland vegetation.

6.3 Fuels Mitigation Strategy

The most effective strategy for a community is to focus on mitigation actions that include structural hardening and modifying vegetation within the HIZ (see Section 6.2.2). However, additional steps can further enhance the protection of life safety and reduce the wildfire threat to critical values. These steps include fuels management activities that include buffering road systems and modifying vegetation/fuels in large areas.

Fuels management is the planned manipulation of the amount, composition, and structure of vegetation/fuels within wildland ecosystems to modify potential fire behavior and its effects (NPS, 2004). The primary goals of fuels management are to reduce a wildfire's intensity, slow fire spread, and minimize the severity of fire effects.

DFSC's fuel treatment strategy will enhance wildfire protection for life safety, structures, and other values identified by community stakeholders while also protecting the visual quality of the community, watershed, and its biological and cultural resources. This strategy is specific to the project area and incorporates agency priorities and relevant community documents. It provides fuel treatment guidelines that give DSFC maximum flexibility to carry out hazardous fuel reduction projects now and into the future. All fuel treatment activities will require site-specific planning with consideration of factors including, but not limited to, landownership, collaboration with property-owners, CEQA, NEPA, cultural sites, soil concerns, balance with other community priorities, and funding availability.

6.3.1 Existing Fuel Treatment Actions

Since 2008-2009, DFSC has made a significant investment of time and money to plan and implement fuel treatments. These treatments will only be effective in reducing the wildfire threat to the community when fuel treatment maintenance occurs. Maintenance of existing fuel treatments are a critical element in any fuel treatment program. Section 6.3.2.4 provides more details on fuel treatment prescriptive guidelines and Section 8 provides information on fuel treatment maintenance.

Figure 10, Existing Fuel Treatment Map that depicts the corresponding treatment areas and Table 10 lists the existing fuel treatments, unit numbers, fuel treatment type, status, and unit acres within the project area.

Figure 10 Existing Fuel Treatments

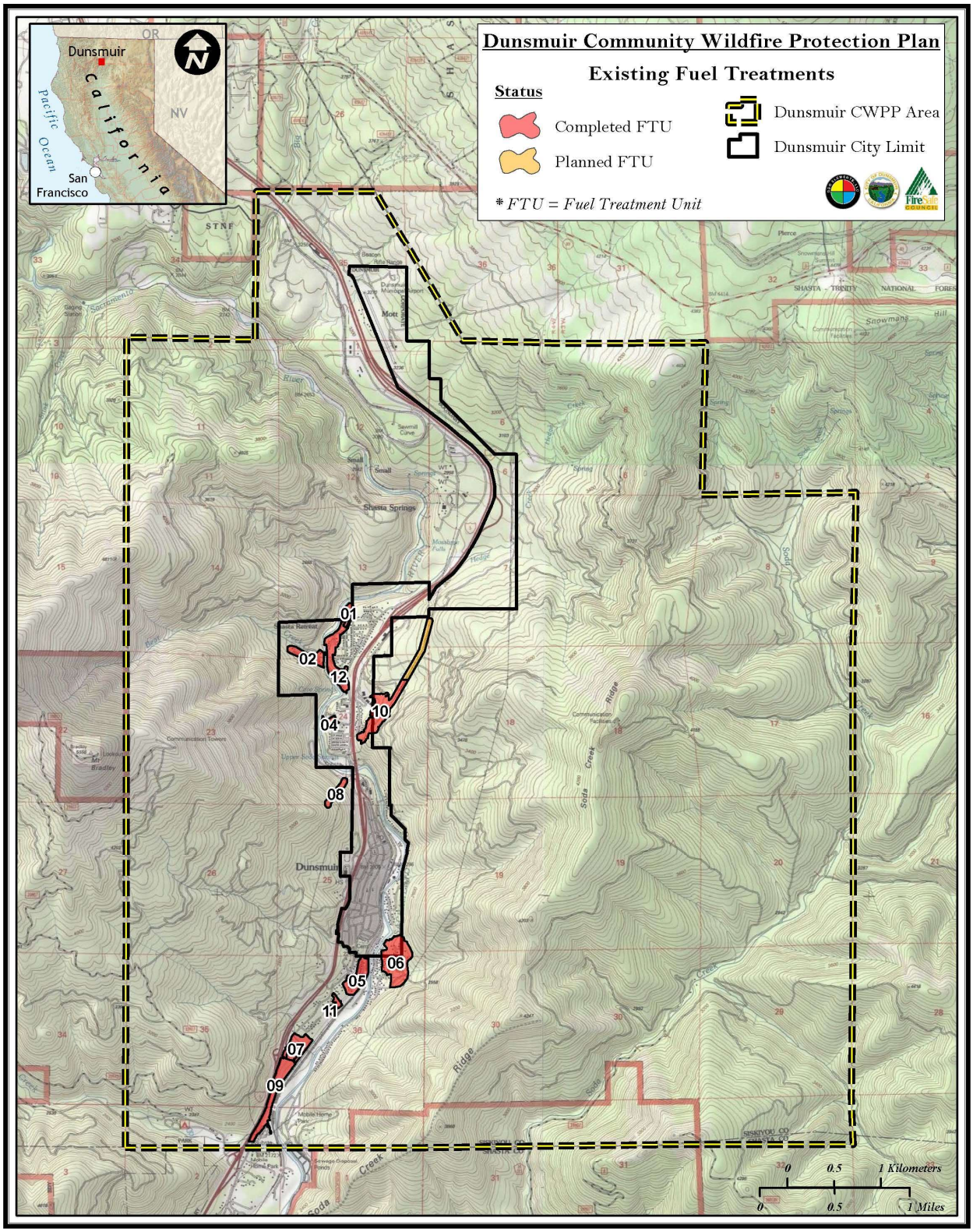


Table 10 Fuel Treatments - Existing and Potential

Unit Number	Type: FTU/FB	Status: E/P	Name	Acres
1	FTU	E	Prospect	4.1
2	FTU	E	Scarlett Way	9.5
3	FTU	E	City Park	4.4
4	FTU	E	Frances Way	14.0
5	FTU	E	Mican Way	31.6
6	FTU	E	Hobo Camp	13.5
7	FTU	E	Powerline West	5.5
8	FTU	E	South Hobo Camp	22.1
9	FTU/FB	E	North Powerline	36.0
10	FTU	E	Panorama	3.9
11	FTU	E	Shasta Retreat	21.4
12	FB	P	South First Street	13.3
13	FB	P	Dunsmuir Ave -South	11.3
14	FB	P	Gillis Street	2.5
15	FB	P	Butterfly Ave	5.4
16	FB	P	Mountain Ave	2.9
17	FB	P	River Ave	7.7
18	FB	P	Upper Soda Rd	3.4
19	FB	P	Siskiyou Ave	12.2
20	FB	P	Dunsmuir Ave -North	9.9
21	FB	P	Mott Road	23.0
22	FB	P	South Old Stage Extension	16.2
23	FB	P	I-5 Corridor-North	108.2
24	FB	P	I-5 Corridor-South	75.0
25	FTU	P	Riverwood Mobile Estates	71.8
26	FTU	P	Panorama North	42.8
27	FTU	P	Dunsmuir High School	143.8
28	FTU	P	Upper Soda Springs	35.8
29	FTU	P	North Powerline Phase 2	15.8
30	FTU	p	Mountain Estates	15.5
31	FTU	P	Shasta Springs	57.2
32	FTU	P	Sawmill Curve	38.8
33	FTU	P	Big Canyon	143.5
34	FTU	P	Airport North	86.8
35	FTU	P	Airport East	208.2

36	FTU	P	South Public Staging Area	3.4
37	FTU	P	Central Public Staging Area	5.5
38	FTU	P	DHS Evacuation Communication Center/Incident Command Post	7.2
E=Existing	P=Potential	FB = Fuelbreaks	FTU=Fuel Treatment Units	

6.3.2 Potential Fuel Treatment Activities

The public and stakeholder meetings provided the opportunity for the DFSC, FSCSC, local agencies, and interested publics to create a strategy for future fuel treatments. The results of their efforts include the recommendation of fourteen (14) new Fuel Treatment Units (FTUs) and thirteen (13) roadside Fuelbreaks (FB) in the project area. The FTUs contain a mixture of non-developed land, private property with wildland vegetation, and maintained landscapes. The FTUs will augment the HIZ and provide for protection of other values. Table 10 provides a list of the FTUs and Figure 11, potential Fuel Treatments Map).

6.3.2.1 Private Ownership Lands

There are many privately owned land parcels within and adjacent to the City of Dunsmuir. When structures are present, private property owners are required to follow current defensible space regulations - California PRC-4291 (See Section 1.3 for additional information). Undeveloped private lands can pose a significant wildfire threat to nearby values when left untreated. The fuel mitigation strategy and treatment guidelines presented in this CWPP are recommended for the entire land-base in the project area regardless of ownership or status.

6.3.2.2 Prioritization of Fuel Treatments

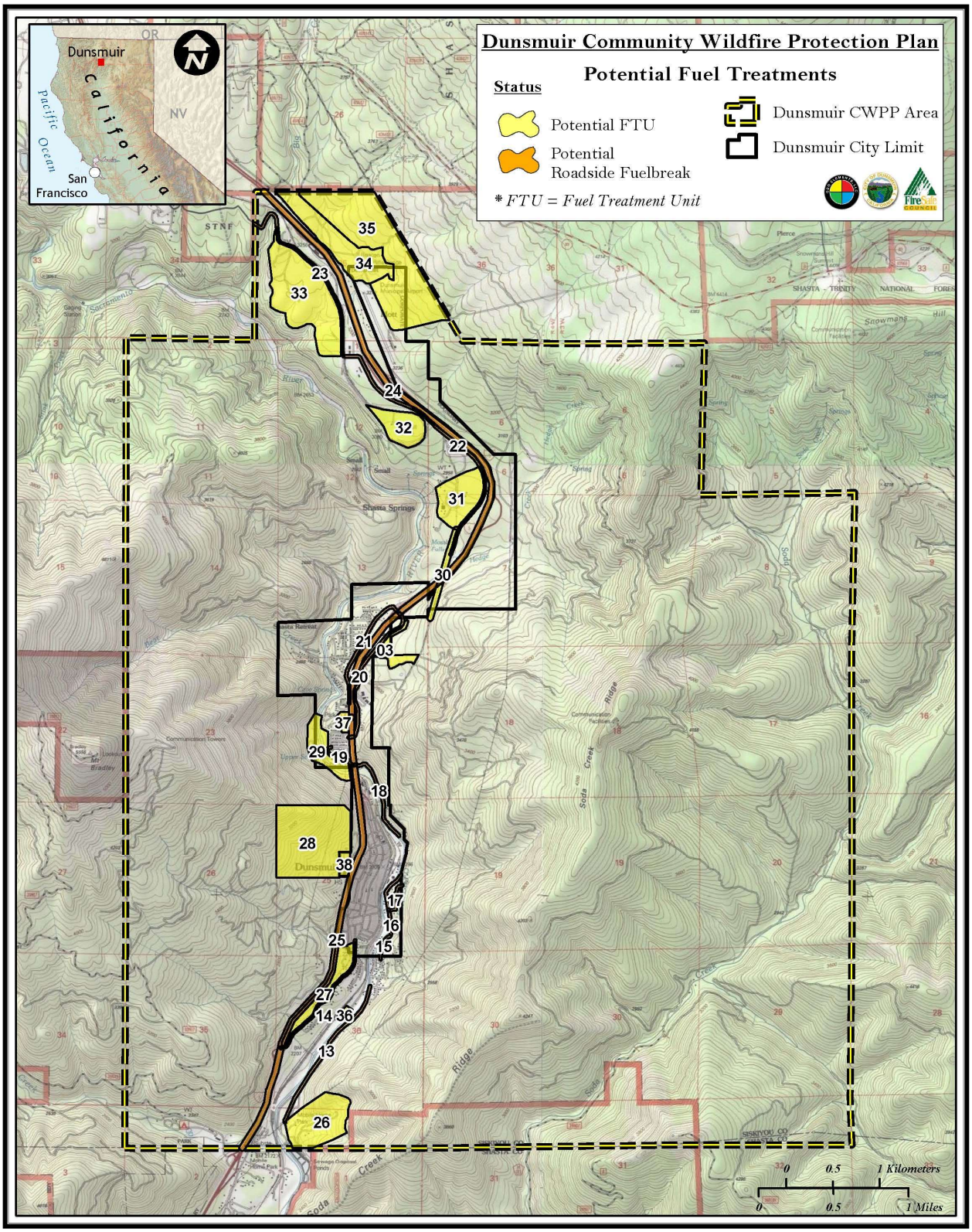
The fuel management strategy provides the groundwork for the treatment prioritization process. Prioritization of Dunsmuir's fuel reduction projects helps to guide the community in decisions about where and when for both the planning and implementation stages. The priorities promoted in this plan are:

1. Life Safety
2. Property – structures, infrastructure
3. Resources – natural, cultural, visual, recreation

The fuel treatments recommended for fuelbreaks and FTUs follows a basic premise: areas in need of treatment that are located in close proximity to dwellings or infrastructure are a higher priority for treatment than those areas that are further away from improvements. The outputs from fire modeling in Chapter 5 are factored into the prioritization process with VERY HIGH hazard areas (higher flame lengths) and areas closer to residences receiving a higher treatment priority.

The prioritization ranking associated with this plan consists of qualitative designators - High, Moderate, or Low. The primary attributes defining these designators involve fuel and fire behavior characteristics and proximity to values. These rankings are defined as follows:

Figure 11 Potential Fuel Treatments



- HIGH – Severe fire behavior characteristics are expected with significant threat to assets: assets are 300-feet or less from flame lengths of 4-feet or greater.
- MODERATE – Fire behavior is expected to pose a serious threat to assets; assets are more than 300-feet from flame lengths of 4-feet or greater. Ember cast from wildfire may still ignite flammable items/vegetation adjacent to assets.
- LOW – Fire behavior poses a minimal threat to assets. Flame lengths are less than 4-feet. Ember cast from wildfire can still ignite flammable items/vegetation adjacent to values.

Based on an analysis of fire behavior within each FB and FTU, each treatment location was ranked in priority for treatment (See Table 11). Potential fuel treatments that have life safety concerns are given the highest priority and the greatest proportion of "Very High" hazard areas in fuel treatments unit follow as the next highest treatment priority.

Table 11 Fuel Treatment Priorities

Priority	I.D.#	Treatment Title	Brief Priority Justification
1	15	Gillis Street	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
2	23	South Old Stage Extension	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
3	13	South First Street	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
4	16	Butterfly Ave	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
5	14	Dunsmuir Ave - South	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
6	24	Mott Road	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
7	22	I-5 Corridor (North)	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
8	17	Mountain Ave	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
9	18	River Ave	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
10	25	I-5 Corridor (South	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
11	20	Siskiyou Ave	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
12	19	Upper Soda Rd	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
13	21	Dunsmuir Ave - North	Roadside Fuelbreak; top priority due to life safety concerns related to emergency evacuation; Very High hazard
14	28	Dunsmuir High School	Highest Hazard; close proximity to Values
15	02	Scarlett Way	Maintenance
16	08	Powerline West	Very High Hazard; close proximity to Values
17	27	Panorama North	Proximity to community; Highway - evacuation route
18	07	Hobo Camp	Maintenance

19	09	South Hobo Camp	Maintenance
20	26	Riverwood Mobile Estates	High Hazard; high risk/ignition potential
21	11	Panorama	Maintenance
22	05	Frances Street	Maintenance
23	29	Upper Soda Springs	
24	06	Mican Way	Maintenance
25	37	Central "Public" Staging Area	
26	04	City Park	Maintenance
27	01	Prospect	Maintenance
28	12	Shasta Retreat	Maintenance
29	30	North Powerline	Maintenance
30	10	North Powerline Phase 2	
31	31	Shasta Springs	
32	03	Mountain Estates	
33	32	Sawmill Curve	
34	34	Airport North	
35	38	Dunsmuir HS; Evacuation Communication Center (ICP)	
36	33	Big Canyon	
37	35	Airport East	
38	36	South "Public" Staging Area	

Note: Over time, priorities can change and the DFSC may need to modify priorities. This table serves as a ***guide*** to DFSC, FSCSC, and the community. It provides maximum flexibility for planning and implementing these projects if or when unforeseen events may require modification.

6.3.2.3 Fuel Treatment Levels and Treatment Types

A fuel treatment prescription provides guidance on the amount of fuel removal (level of treatment) for effective hazard reduction. The intensity of the fuel treatment can vary due to a number of contributing factors in a given location. The more intense the treatment, the more fuel removed, making less fuel available to burn; thereby more effective in reducing or moderating fire behavior characteristics. The level of treatment is measured by the intensity of manipulation or the amount of vegetation removed; the higher intensity treatments generally remove a greater volume of fuel making less fuel available to burn, while lower intensity treatments remove less volume.

There are five categories of fuel treatment types including mechanical treatments, manual treatments, fire treatments, biological treatments, and herbicide treatments. The following are brief descriptions of these fuel treatment types:

Mechanical:

- ***Mowing*** of grasses, weeds and low-shrubs is likely a familiar treatment activity to those that care for lawns and yards. This option is of limited scope in Dunsmuir due to topography and fuel types. Mowing in a larger area is typically accomplished using:
    - a commercial size mower where the operator rides atop the equipment

- a mower is dragged behind a vehicle or piece of equipment
- the familiar push-type gasoline-powered mower

- ***Mastication*** is the mechanical grinding, crushing, shredding, chipping, and chopping of fuel. This treatment is used primarily in stands of chaparral shrub, mixed shrub, and trees or slash and vegetation in the understory of a timber stand. Several types of machinery have the capacity to do this mastication work. Examples include:
  - feller-bunchers or skidders modified with a masticating head
  - tractors pulling a mower/masticating head
  - excavators with a masticating head on their boom
  - dozers with masticator-type capability
  - innovative custom machines with masticating capabilities
- ***Commercial and Pre-Commercial Thinning*** of trees and shrubs is used as a treatment to modify the fuel structure in stands of trees and shrubs/brush that consist of a dense understory. Thinning a stand reduces ladder fuel and/or crown fuel continuity. A thinning treatment can provide economic returns, possibly producing some commercial products that should involve a Registered Professional Forester to develop thinning prescription guidelines. In most cases, thinning is only effective as a fuel management technique when the fine surface fuels are also reduced (Agee, J., Skinner, C., 2005).

  A thinning prescription generally uses spatial distance between crowns, diameter limit for trees removed, specified basal area (amount of tree-wood in a stand, and typically measured by square feet/acre). An adequate thin treatment prescription in WUI, should include specific guidance for treating the leftover thinned slash material, discussed subsequently.

  Equipment involved in various stages of thinning include:
  - feller-buncher,
  - rubber tired or tracked skidder,
  - cable yarder,
  - Chainsaws,
  - landing equipment such as forwarder, cutter, peeler, and chipper
- ***Slash treatment*** may include removal, chipping, mastication, or piling and burning. A less desirable option in steep and/or inaccessible ground in more remote areas is an intensive lop/scatter treatment. It is an important final step in a thin treatment but can also be a primary fuel reduction treatment in a timbered area that has not yet been thinned. Mechanical slash treatment equipment is similar to that used mastication option and may include:
  - feller-bunchers or skidders modified with a masticating head
  - small dozer or masticating type machine
  - excavators with a masticating head on their boom
  - innovative custom machines with masticating capabilities

- chipping equipment to chip debris/material and spread onsite or hauled offsite

Manual:

- ***Hand Thinning*** or removal of the smaller (typically non-merchantable sized) trees and shrubs is used as a treatment to modify the understory fuel structure in timbered stands with dense understory tree and shrub growth.
    - Hand saws or gas-powered chain saws
    - Small axe type tool
    - Shears or other cutting tools for very small diameter trees/shrubs
- ***Limbing or Pruning*** of larger trees
    - Pole saw (gas or hand powered)
    - Hand saws or gas-powered chain saws
    - Shears or other cutting tools
    - Long-handle lopper tools
    - Pruning shears
- ***Cutting, Hoeing or Raking*** of surface shrubs, slash and debris
    - Heavy duty hoe (e.g., McCleod type took
    - Rock rake or heavy duty rake
- ***Handpiling***
    - Surface slash, limb wood and debris are piled by personnel
- ***Hand-piling*** of surface slash, limb-wood and debris into piles
- ***Weed-whacking*** of grasses and low-growing shrubs
    - Cordless, electric or gas-powered weed whacker
    - Rake with scraping/cutting edge (e.g., McCloud type tool)

Prescribed Fire:

Within the WUI zone, fire treatment is usually limited to a piling and/or burning of slash operations. The slash/debris piling procedures follow specific guidance including pile size and location on a given site. An approved burn plan and smoke management plan must be on file with the administering agency before piles are burned. Landscape level prescribed fire operations within a WUI is also an option but will sustain an elevated level of complexity in the operations. Factors such as steep relatively inaccessible terrain adjacent to homes/property, smoke impacts, and ability to meet area burn prescriptions are a few associated complications. Complexity issues to consider in operations include factors include risk and the cost and feasibility to conduct operations in a safe and timely manner while achieving effective hazard reduction outcomes.

Biological:

This is a treatment involves the use of domestic livestock grazing or browsing to reduce surface fuel loads and can be very effective in treating hazard fuels in some locations. Grazing can reduce costs correlated with hand and mechanical treatments. Treatment location is restricted due to the necessity to focus on small areas, typically 'strips' of land along roads, fencing requirements, transportation costs, required access/transportation of water from sources to the site, and an

animal's indiscriminate and/or inability to leave certain plants (i.e., young 'leave' trees in a shaded fuelbreak treatment, etc.).

Herbicide:

A broad or hand-applied chemical application to kills live vegetation. This method is often challenging and/or controversial for various reasons. This subject matter is a separate topic of discussion apart from this plan. Siskiyou County's Agriculture Department Resource Protection website is a source for current information on this topic. Their direction states; 'bio-control is used whenever possible in the vegetation management programs.

6.3.2.4 Fuel Treatment Prescriptive Guidelines

Fuel treatment prescriptive guidelines vary based on project goals, vegetation/fuel characteristics (e.g., vegetation/fuel type, vegetation structure, vegetation volume, vegetation height, canopy characteristics), and topography, but can be limited in scope due to proximity to historical and cultural sites, watercourses, soil type, and sensitive habitats.

The fuel treatment guidelines in this plan follow local and state regulations as well as recommendations from fire researchers. Implementation of fuel treatments that follow these prescriptive guidelines can reduce the potential for wildfire to spread from undeveloped areas to structures or from human development into wildland areas.

The following tables describe recommended fuel treatment prescription for roadside and other corridor fuelbreak type treatments and Fuel Treatment Units.

Table 12 Roadside Fuelbreak Prescriptive Guidelines

Location → / Fuel Type ↓	Inner Fuelbreak (A) (up to 50′ from edge of roadway) (distance varies with terrain & accessibility)	Outer Fuelbreak (B) (50′ – 100′+ from edge of roadway) (distance varies with terrain & accessibility)
Grass/ Forbs	Reduce fuel depth to 3 inches.	Treatment may not be needed, unless fuel ladder condition exists
Surface dead/down material (primarily correlated with tree and chaparral overstory)	Remove/treat dead/down woody debris/slash material.	Remove 50-75 percent or more of >3″ diameter dead/down material.
Chaparral/Shrub	Remove all chaparral vegetation within this zone.	Remove 50- 75 percent of chaparral vegetation; open stand characteristic up to 40 feet spacing. Allow for intermittent small pockets or clumps of chaparral/shrubs. Small, less dense pockets/clumps of chaparral remaining should be healthy young-growth stage maintaining less volatile species composition and limbed to 1/3 height of chaparral/shrub crown. Chipped or masticated material may be "blown" back onto the slope where feasible to enhance soil coverage.
Trees Overstory* (without chaparral/shrub understory)	Thin/remove smaller trees leaving larger trees (>6-inch DBH) with crown spacing 15- to 20-feet. Limb trees to 6-feet above grade level or ½ of the live crown (smaller trees). Trim branches protruding over the roadway or driveway to a minimum height of 13-feet 6 inches.	Same treatment as Zone A; may decrease crown spacing to 10 feet in tree overstory.
Trees Overstory* (with chaparral/shrub understory)	Thinning specifications, same as Trees Overstory (without understory), but remove all understory chaparral/shrubs below trees in this zone.	Same treatment as Zone A leaving occasional small, less dense chaparral/ shrub clumps and pockets in openings without canopy is acceptable.

* Overstory thinning treatments should include oversight by local professional forester; in support of forest product utilization.

Table 13 Fuel Treatment Unit Prescriptive Guidelines

Fuel Type ↓	**General FTU Treatment Per Fuel Type**
Surface Fuels including Dead/Down Material	Reduce live fuel depth to < 1 ft depth, or depth that breaks ladder fuel structure. Reduce dead/down flammable material to < 12" depth in < 3" material; < 5-7 tons/acre in isolated logs.
Chaparral/ Shrub Stands	Remove brush/shrubs to +/- 30 ft spacing of pockets and clumps of chaparral. The remaining clumps of chaparral should be healthy, younger-growth stage; in some cases apply limbing to 1/3 height of chaparral/shrub crown.
Trees Overstory* (without chaparral/shrub understory)	Thin smaller trees leaving larger trees (>than 6-inches DBH) at +/- 20 foot crown spacing (based on slope, tree size and type); limb/prune lower branches 6-feet above grade level, or lower 1/3 of tree height on smaller trees.
Trees Overstory* (with chaparral/shrub understory)	Thinning specifications are the same as Trees Overstory without Chaparral/shrub understory (above) Understory: Same guidelines as in Chaparral/Shrub, except the pockets and clumps are limited to tree openings (non-canopy)
* Overstory thinning treatments should include oversight by local professional forester	

6.3.2.5 Considerations for Fuel Treatments

The following describes considerations to implement fuel treatments:

- CEQA and/or NEPA may be required prior to implementation of area treatment projects.
- Masticated material along roads, recreation trails, and recreation sites may be limited in depth.
- A smoke management plan may be required for burning.
- Fuel treatments may need to maintain free-form shapes and feathered edges that replicate natural patterns and profiles in surrounding landscape.
- Equipment operations may be required to minimize damage of residual trees.
- Signs may be needed to warn the public of potential hazards during fuel treatment activities.

Sensitive plant species and wildlife habitat

- Sensitive species surveys may be required.
- Flagging and/or avoidance where sensitive plant species exist may exclude treatment of certain areas.
- A limited operating period (LOP) may apply for treatments in identified suitable habitat for certain sensitive or listed species.
- The LOP's specified timeframe can vary with each individual species.

Noxious Weeds

- Vehicles and equipment may need to be washed to limit the spread and establishment of invasive plant species (e.g., noxious weeds) into project areas.
- Vegetation management treatments should comply with County Agricultural Commission guidelines.

Cultural Resources

- Cultural resource surveys may be required when a project includes ground-disturbing activities.
- Known cultural resources within the proposed project area limit the size and scope of fuel treatments in a project area.

Soil and Watershed

- If soils in project area have moderate to very high erosion potential, appropriate measures may be required to minimize damage to surface soil and reduce potential erosion.
- The use of mechanical equipment may be limited on steep slopes due to erosion, equipment limitations, and slope stability.
- Chipped or masticated material may be "blown" back onto the slope where feasible to enhance soil coverage.

6.4 Evacuation

Evacuation in the planning area presents unique challenges. As discussed in Section 5, wildfire is complex and extremely fluid. Compounding the problem are the human factors associated with evacuation, such as human behavior, population density, overloaded transportation routes, vulnerable populations, and evacuation of pets and large animals makes the task of evacuation even more complex. All of these factors can substantially increase the amount of time needed to evacuate.

The CWPP planning area presents a unique challenge for evacuation due to the location of structures and subdivisions and two access/egress points on Interstate 5. The amount of time it takes to evacuate an area can depend upon a variety of factors that include the size of the vulnerable population, road conditions, high hazard areas, and type of transportation routes. Evacuation is a difficult process for not only the evacuee, but also for those emergency resources who must devote their skills to ensuring residents are moving as quickly and safely as possible.

Experience shows that evacuation planning needs to take into account how long it will take to notify residents that an evacuation is necessary, how long it will take them to get ready and start driving out of the area, and then how long it takes to drive to a safe area. Evacuation planning guidelines help facilitate an orderly evacuation during an emergency wildfire situation. These systematic actions provide critical information and guidance for fire suppression and law enforcement personnel and the public during an emergency.

California law authorizes law enforcement officers to restrict access to any area where a menace to public health or safety exists due to a calamity such as flood, storm, fire, earthquake, explosion, accident or other disaster. Refusal to comply is a misdemeanor (Penal Code 409.5).

Evacuation in the planning area is the responsibility of the Siskiyou County Sheriff's Department. During an emergency, the County Sheriff will order residents, business-owners, and visitors to evacuate due to a threatening wildfire. The evacuation order will identify the preferred evacuation routes and safe sites; however, the need for evacuation can occur without notice when extreme conditions exist.

It's recommended that Dunsmuir in cooperation with DFSC and Siskiyou County Sheriff's Department develop a pre-preparedness evacuation plan. Each resident and business-owner should be strongly encouraged to develop a personal evacuation preparedness plan that identifies potential evacuation routes and actions to prepare.

Potential issues with evacuation planning includes:

- Residents may not choose to evacuate but stay and defend their homes or decide to shelter in place until the fire danger passes. Without fully understanding the effects of their decisions, resident's actions can put their life safety at risk as well as that of firefighters and law enforcement personnel.
- Individuals often delay their evacuation or are slow to leave their homes due to packing personal items jeopardize their lives and life safety of others by fleeing fires in a panic.

- Vulnerable populations have special needs that are critical to address during disasters. These populations may be less likely to respond to, cope with, recover from wildfire, and are less likely to get involved in wildfire mitigation activities. Age, physical and mental disabilities and/or limitations can restrict mobility making it more difficult to evacuate in a disaster. Lack of financial resources may hinder the ability for low-income populations to invest in emergency preparedness or mitigation measures as well as recover from loss. Language issues can result in communication barriers to evacuation or support services. In addition, visitors to the Planning Area are likely unfamiliar with the wildfire threat or the extent of their exposure or appropriate evacuation routes making them potentially vulnerable as well.
- Evacuating pets, service animals, and large animals pose significant problems since panicked animals behave unpredictably and may refuse to respond to normal handling approaches.
- Repopulation - The fire and sheriff's departments will determine when it is safe for residents, business-owners, pets and large animals to move back into the area. Repopulating an evacuated area requires as much forethought and planning as an evacuation order. The safety of residents and emergency responders is of the utmost concern and must drive the decision of when to repopulate.

SECTION 7. FISCAL RESOURCES AND CONSTRAINTS

Fiscal resources are limited and budgetary constraints can make it difficult to address all of the needs and implement all projects identified in this CWPP. A staggered approach to the implementation of the proposed fuel treatments will allow the fire safe council to continue enhancing wildfire protection while seeking additional funds through external sources (e.g., grants, stewardships).

It is anticipated that DFSC and SCFSC will seek external funding sources (i.e. grants, stewardships, etc.) to assist in implementation of required fire treatments when available.

7.1 POTENTIAL GRANT FUNDING SOURCES

There are numerous opportunities for federal, state, and local grants. The following identifies several grant sources:

- **Fire Service Grants and Funding (AFG)**
  Provides direct assistance on a competitive basis to fire departments of a State or tribal nation for protecting the health and safety of the public and firefighting personnel associated with fire and fire-related hazards.
- **Fire Service Grants and Funding (AFGP)**
  Federal Emergency Management Agency's Assistance to Firefighters Grant Program (AFGP), career and volunteer fire departments and other eligible organizations can receive funding through three different grants. The objective of the AFGP is to enhance a fire department's organization's ability to protect the health, safety of the public and protect the health of first responders, and increase or maintain the number of trained, "front-line" firefighters available in communities.
- **Staffing for Adequate Fire & Emergency Response Grant (SAFER)**
  The Staffing for Adequate Fire and Emergency Response Grant (SAFER) was created to provide funding directly to fire departments and volunteer firefighter interest organizations to help them increase or maintain the number of trained, "front line" firefighters available in their communities. The goal of SAFER is to enhance the local fire departments' abilities to comply with staffing, response and operational standards established by the NFPA (NFPA 1710 and/or NFPA 1720).
- **Fire Prevention & Safety Grants (FP&S)**
  The Fire Prevention and Safety (FP&S) Grants are part of the Assistance to Firefighters Grants (AFG) and support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal of this grant program is to reduce injury and prevent death among high-risk populations. In 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include Firefighter Safety Research and Development.

- **Pre-Disaster Mitigation Grant Program (PDM)**
  The PDM Program, authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, is designed to assist States, territories, federally recognized tribes, and local communities in implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis.

- **Pre-Disaster Mitigation Grant Program**
  The Department of Homeland Security, which includes the Federal Emergency Management Agency (FEMA) and the U.S. Fire Administration (USFA), administers Pre-Disaster Mitigation Planning and Project Grants. This competitive grant program, known as PDM, provides funds and technical assistance to state entities, tribes and local governments to help develop multi-hazard mitigation plans and to implement projects identified in those plans. Individual communities can apply for PDM grants, but they are advised to work with their state contacts in emergency management or mitigation as they are developing their plans and projects.

- **Hazard Mitigation Grant Program**
  The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

- **Secure Rural Schools and Community and Self-Determination Act - Title III-County Funds**
  The Self-Determination Act (SRS Act) has recently been reauthorized and now includes specific language regarding the Firewise Communities program. Counties seeking funding under Title III must use the funds to perform work under the Firewise Communities program.

SECTION 8. MAINTENANCE AND MONITORING

This section describes the monitoring of the CWPP as well as the activities described in the plan.

8.1 CWPP Review Recommendations

A CWPP's strength depends on collaboration, its relevance, and its ability to guide actions implemented on the ground. This CWPP provides a foundation to guide the community in wildfire protection activities based on input from stakeholders, current policy, a science-based wildfire assessment, and the development of mitigation strategies.

This CWPP should continue the progression of collaborative planning, implementation, monitoring, and adapting strategies based on lessons learned over time. Leadership from the local Fire Safe councils, Fire Department, and City Council will benefit from reviewing successes and challenges during the implementation of this CWPP to learn what does and does not work. Working with stakeholders, DFSC, FSCSC, and the community can identify new activities and evaluate the effectiveness of the resources necessary for successful CWPP implementation.

The DFSC and identified community representative(s) has the responsibility to conduct a review of this plan at recommended 5-year intervals to ensure its relevance. Significant changes in policy, budget, and/or environmental conditions may warrant a more frequent review.

8.2 Fuel Treatment Monitoring

Monitoring and evaluation of a fuel treatment establishes baseline data to draw on for decisions about maintenance treatment schedules as well as determining whether there is a need to modify fuel treatment prescriptive guidelines. The primary aspects to consider in a fuel treatment-monitoring program are the type of evaluation, equipment needed, and monitoring intervals.

Simple Visual Quantitative Monitoring Program

The following is an example of the equipment needed in a basic visual and qualitative data collection monitoring/evaluation process:

- Map of Dunsmuir's FTUs and FBs with Treatment Sites
- Prescription table & info on known treatment/site
- Clipboard with field notebook or writing pad
- Pen/pencil
- GPS location device
- Tape measure
- Digital Camera

Procedures to follow in this type monitoring/evaluation fuel treatment site visit include:

- Mark project location on a map
- Start an entry in a project specific notepad/book
    - Date of treatment
    - Site FTU or FB name and corresponding number

    - GPS coordinates
    - Fuel type
    - Treatment method used
- Take measurements of current growth heights (in grasses) or distances between sprouts in shrubs and seedling-trees.
- Take photos; GPS mark the photo site and mark the plot site with rebar stakes or aluminum tags on nearby tree.

This information should be saved in a project file and should be compiled in an electronic file system accessible to DFSC and appropriate personnel.

The recommended interval for site monitoring may fluctuate with site variables such as fuel types, rainfall amounts, or other needs. It is important to understand that a fuel treatment monitoring interval is not the same as that in treatment maintenance. For instance, the maintenance interval of grass/forbs may be 3 times in a year whereas a monitoring visit may only be once. In the early stages of an established fuel treatment, an annual visit to the site for the first 3 to 5 years is recommended. This annual interval may likely be reduced in the out years depending on vegetation growth rates etc.

Developing a simple yet comprehensive monitoring and evaluation process in the vegetation management strategy is a very important and useful step. The stored files are part of the project record, which is helpful for 1) validating fuel treatment management strategies, 2) historical perspective of fuel treatments in parks and open-spaces, 3) various educational forums, and 4) providing important validation data for continuing and future grant application processes.

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SECTION 10. APPENDICES

Appendix A Glossary

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

Active Crown Fire: A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other.

Aspect: Direction a slope faces.

Canopy Spacing: The distance from the edge of one tree canopy to another. Crown spacing varies from open (with 10 feet or more of space between tree canopies) to closed (where trees may be growing in very close proximity with little space between them).

Crown Fire: A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

DBH or Diameter at Breast Height: A standard method of expressing the diameter of the trunk or bole of a standing tree; measurement taken at 4.5 feet from ground level.

Dead Fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Direct Attack: A method of fire suppression where actions are taken directly along the fire's edge. In a direct attack, burning fuel is treated directly, by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Frequency: Temporal fire occurrence described as a number of fires occurring within a defined area within a given time period.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fire Potential: The likelihood of a wildland fire event measured in terms of anticipated occurrence of fire(s) and management's capability to respond. Fire potential is influenced by a sum of factors that includes fuel conditions (fuel dryness and/or other inputs), ignition triggers, significant weather triggers, and resource capability.

Fire Regime: The characterization of fire's role in a particular ecosystem, usually characteristic of particular vegetation and climatic regime, and typically a combination of fire return interval and fire intensity (i.e., high frequency, low intensity/low frequency, high intensity).

Fire Return Interval: The length of time between fires on a particular area of land

Fire Weather: Weather conditions that influence fire ignition, behavior, and suppression.

Flame Length: The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.

Flaming Front: The zone of a moving fire where combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.

Fuel: Any combustible material, which includes but is not limited to living or dead vegetation, human-built structures, and chemicals that will ignite and burn.

Fuelbed: An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model: Mathematical descriptions of fuel properties (e.g., fuel load and fuel depth) that are used as inputs to calculations of fire danger indices and fire behavior potential.

Fuel Moisture Content: The quantity of moisture in fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Goals: A goal is a broad statement of what you wish to accomplish, an indication of program intentions.

Ground Fire: Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.

Infrastructure: Basic physical and organizational structures and facilities (e.g., buildings, roads, and power supplies) needed for the operation of a society or enterprise.

Intensity: The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.

Ladder Fuels: Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and ensure the continuation of crowning.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

Mid-flame Windspeed: The speed of the wind measured at the midpoint of the flames, considered to be most representative of the speed of the wind that is affecting fire behavior.

Mitigation: To make less severe or intense; moderate or alleviate.

Objectives: They contribute to the fulfillment of specified goals and are measurable, defined, and specific.

Orographic Lift: When an air mass is forced from a low elevation to a higher elevation as it moves over rising terrain.

Passive Crown Fire: Also called torching or candling. A fire in the crowns of trees in which single trees or groups of trees torch, ignited by the passing front of the fire.

Safety Zone: A preplanned area of sufficient size and suitable location in the wildland expected to prevent injury to fire personnel without using fire shelters.

Red Flag Warning: Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Riparian: Situated or taking place along or near the bank of a watercourse.

Soffit vent: A screened vent in a house soft that allows air to flow into the attic or the space below the roof sheathing.

Spotting: Refers to the behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Strategy: The general plan or direction selected to accomplish incident objectives.

Surface Fire: Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.

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

Topography: Referred to as "terrain." The term also refers to parameters of the "lay of the land" that influence fire behavior and spread. Key elements are slope (in percent), aspect (the direction a slope faces), elevation, and specific terrain features such as canyons, saddles, "chimneys," and chutes.

Understory: Term for the area of a forest which grows at the lowest height level below the forest canopy. Plants in the understory consist of a mixture of seedlings and saplings of canopy trees together with understory shrubs and herbs.

Values at Risk: People, property, ecological elements, and other human and other intrinsic values within the City. Values at Risk are identified by stakeholders as important to the way of life in the City, and are particularly susceptible to damage from undesirable fire outcomes.

Wildland Fire Environment: The surrounding conditions, influences, and modifying forces of fuels, topography, and weather that determine wildfire behavior.

Appendix B Stakeholder Input

Stakeholder Input

Two stakeholder workshops occurred during the CWPP process. The first occurred on October 22, 2015 at Dunsmuir High School and the second occurred on October 28, 2015 at Dunsmuir High School Annex. Solicitation of stakeholder input began with the first public workshop through the release of the final draft Community Wildfire Protection Plan (CWPP) with the final meeting occurring on May 26, 2016. Invitations were sent to stakeholders through various methods including direct phone calls and advertisement on the fire safe council websites, Facebook pages, and the local media.

Details of the CWPP planning process and solicitation to gather input for the plan was available throughout the comment period on the firesafe council Facebook page and later on the FSCSC website.

The following tables identify stakeholder input:

October 22 & 28, 2015 – Public-Stakeholder Meeting/Workshops			
Method of Contact	**Stakeholder** (initials or unknown)	**Comment**	**Response**
Index card	AD	Can we work in to the plan, requirements or assurances for timber stand/forest owners to design their logging efforts in a way that enhances our planning efforts?	Yes, this is part of the collaboration process and would be incorporated at the project level planning stage.
"	DP	Please include in Dunsmuir CWPP; Berry Property also known as Castle Craig LTD; by Soda Creek Spring, south of Dunsmuir (Jeff Schuler is contact)	This CWPP assessment area did not include property in Shasta County, due to the complexity, scope and costs involved with multi-county plans. The FSC is looking into including that portion of Shasta Co in a plan in near future.
	DN	Is Dunsmuir H.S. forests timber management objectives, neighborhood timberland owners participating?	Yes, DHS hillside project timber management objectives are in sync with this CWPP and the forester involved is participating
"	DN	Viable suggestions for maintaining existing fuel reduction projects.	Maintenance needs to be in the planning up front in a project and as a set task in project implementation plans. This is an important topic and needs to be funded.
"	DN	Enforcement of PRC-4291, county code 3:3.1 (fuel reduction requirements) is NOT being effected sufficiently with the SRA "Fee"; Why not?	Not a question in the scope of this plan. Contact CAL FIRE
Flip Chart: Goals/Values Input		Develop strategies to keep homeowners engaged in fuel management and home safety.	This is specifically addressed in the plan objectives, the hazard mitigation guidance and action planning recommendations.
"		Ecological value related site-specific firewood gathering, hazard tree removal, clearing access roads, removing fuel	The plan acknowledges the importance of 'best management practices' in

		ladders and potential high volatile fuels and integrating assessments for natural values (nest sites, highly productive mushroom and decomposers, erosion controls, potential woody debris for riparian zones) in active treatments.	project implementation stages. It also states that all actions will need to follow necessary environmental policy standards, beginning in the planning stages of each site-specific project.
“		Identify landownerships around community	
May 26, 2016 – Final Public-Stakeholder Meeting, Draft Plan Review, Comments			
Comments, Questions (during presentation)		Questions regarding whether they will have the ability for treatment work of certain areas in higher priority than shown in table.	This plan is guidance, they can work collaboratively on changes as they feel appropriate; reminder that all the listed Roadside FBs are listed as of higher priority than FTUs.
		Comment on evacuation guidance: suggestions to have more (than the 3) ‘public staging’ locations identified.	This is doable, need to work with local FD Chief to identify additional areas as being viable, looking at accessibility, more than one entry-exit point and have enough fuels clearance for group safety.
		Wouldn’t it help to include ownership on (WUI) map for knowing who is involved in treatment planning?	This type information becomes a necessity for the actual project implementation stages. Whereas, this is a tool for viewing the entire area (landscape level view) for the vicinity hazard-risk assessment and treatment prioritization planning.
		What is the required interval of re-visitation and updating of the plan?	Re-emphasized, *minimum* of every 5 years but can definitely be sooner, and these re-visits should be done collaboratively.
Comments, Questions (post presentation)	MB	Expressed concern/urgency in the need to do treatments in steep terrain along Mountain Ave.	This is a roadside FB treatment and is relatively high in priority; it definitely needs hazard reduction work; this person should work collaboratively with local FD on assessment work and with local FSC to work on acquiring funding.
	DP	Need to remove the word ‘approximately’ in the glossary definition of ‘DBH’	Will do in final-final edit
	DP	In Section 3., in the listing of tree species, ‘incense cedar’ was left out	Good catch on an oversight of this species, will add
	DP	There is a problem with the city boundary delineation on the maps. Apparently a	Public domain database information was utilized in

		semi-recent annexation of properties on the middle and eastern portion of the city limits are not correctly showing as part of the city.	these CWPP maps. Follow-up will be taken to assess why this did not show correctly and the final plan version will note discrepancy information.

Note: For the introductory workshops, the listed comments do not include every question/comment posed; since many were explained in an educational, collaborative manner by presenter, Julie Titus, and/or various participating agency representatives, as part of the learning process.

Appendix C Fire Behavior Modeling Methodology

FIRE BEHAVIOR MODELING

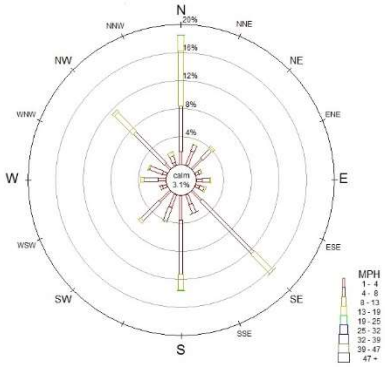
The Landscape File: The .lcp file from the LANDFIRE 2012 data (LF 2012 (LF 2012 - LF_1.3.0) is most recent data available for planning area. This .lcp file captures all recent significant wildland fire activity in the vicinity of the community. The data resolution provided by LANDFIRE is 30x30 meter, meaning that dominate .lcp file characteristics are generalized for each 30x30 meter pixel of the digital landscape. While finer scale of natural variation occurs on the ground, this level of detail is adequate for planning purposes.

Weather: Based on weather records obtained from the Mount Shasta and Sims RAWS to form a SIG, 90th percentile weather thresholds were developed for use in the fire behavior analysis. This RAWS has continuous weather records dating back to 1997. The dataset was evaluated in FireFamilyPlus based on the height of the fire season, using May 1st through October 31st to define the fire season

90th percentile weather is used to evaluate a typical high fire danger day in the project area From the analysis of 20 years of weather records from the SIG, Table 1 defines the 90th percentile weather conditions used in portions of the fire behavior analysis.

Table 1. 90th Percentile Weather Thresholds

Max Temp	Min Temp*	RH	Fuel Moistures dead / live	Wind speed
97ºF	59ºF	16%	4%/ 5%/ 7% 30% / 85%	10 mph



SIG Wind Rose indicating the dominate wind direction

FlamMap: FlamMap generated outputs for Flame Length and Crown Fire Activity for the planning area. The model was run using the 90th percentile fuel conditions developed in FireFamily Plus. This moisture scenario represents mid-summer conditions when live herbaceous fuels have fully cured and live woody fuels are approaching their minimums for the fire season. The California custom fuel model file was used in FlamMap to allow the use of recently developed Burgan-Scott 40 fuel models. Information on model limitations and assumptions is available at www.firelab.org/project/flammap.