

AUGUST 2024

BOULDER COUNTY



COMMUNITY WILDFIRE PROTECTION PLAN

Working together to build
fire adapted communities,
resilient to wildfire



SWCA[®]
ENVIRONMENTAL CONSULTANTS

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

For additional information, questions, or concerns regarding this project, please contact Project Manager Arianna Porter at arianna.porter@swca.com or Boulder County Community Planning and Permitting, Wildfire Partners Team Project Coordinator Meg Halford at mhalford@bouldercounty.gov.

DISCLAIMER

The purpose of the risk assessment contained in this Plan is solely to provide a broad county-level overview of general wildfire risks within the assessment area as of the date hereof, and to provide a potential resource for county pre-fire planning. This risk assessment is premised on various assumptions and models which include and are based upon data, software tools, and other information provided by third parties (collectively, "Third-Party Information and Tools"). SWCA, Incorporated, doing business as SWCA Environmental Consultants ("SWCA") relied upon various Third-Party Information and Tools in the preparation of this risk assessment and SWCA shall have no liability to any party in connection with this risk assessment including, without limitation, as a result of incomplete or inaccurate Third-Party Information and Tools used in the preparation hereof. This risk assessment may not be relied upon by any party without the express written consent of SWCA. SWCA hereby expressly disclaims any responsibility for the accuracy or reliability of the Third-Party Information and Tools relied upon by SWCA in preparing this risk assessment. SWCA shall have no liability for any damage, loss (including loss of life), injury, property damage, or other damages whatsoever arising from or in connection with this risk assessment, including any person's use or reliance on the information contained in this risk assessment. Any reproduction or dissemination of this risk assessment or any portion hereof shall include the entirety of this plan disclaimer.

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EXECUTIVE SUMMARY

This document is Boulder County's Community Wildfire Protection Plan (CWPP). The CWPP provides a means for Boulder County to evaluate current conditions with regard to wildfire risks and hazards. It is not intended to be a review of scientific literature, however the best available resources were used during the creation of the plan. Members of Boulder County, in cooperation with local, county, state, and federal agencies and other interested stakeholders, have collaboratively developed the Boulder County CWPP. The CWPP was developed according to the Healthy Forests Restoration Act (HFRA) of 2003 and the Colorado State Forest Service (CSFS) *Minimum Standards for Developing Community Wildfire Protection Plans* (CSFS 2022b).

A CWPP can be developed for any scale of community, from a homeowners association to a county or metropolitan city. A county-level plan is a broad-level planning document used to assess risk and plan across the landscape. The plan can be used to guide priorities in smaller communities or county subareas but typically does not provide the level of detail needed for reducing risk at a site-specific scale. Information contained in the plan is at a level of specificity appropriate for Boulder County.

Additionally, CWPPs are not policy documents and are not legally binding. They are intended to facilitate efforts where stakeholders within communities, including residents, homeowners associations (HOAs), fire protection districts, and government and business entities, work together to help make their communities safer from wildfire.

The Marshall Fire and other recent catastrophic fires are a stark example of how wildfires have increased dramatically in intensity and frequency in Boulder County. They now burn at unprecedented scales and frequency often accompanied by record-setting destruction. Additionally, the threats and impacts from these more intense wildfires have expanded beyond the foothills and mountains, and now also threaten our communities in the eastern plains of Boulder County. Wildfire planning, response, and mitigation must be addressed on a much larger scale at a much faster pace to match current fire activity, climate change, and population growth in the wildland-urban interface (WUI). It is also crucial to keep the needs of socially vulnerable communities in mind, ensuring they are supported and protected through equitable access to resources and targeted mitigation efforts.

This CWPP provides a science-based assessment of wildfire risk in the WUI of Boulder County, Colorado. The previous Boulder County plan was completed in 2011 and was referenced in the completion of this CWPP. Technical assistance was provided by Boulder County Geographic Information Systems (GIS) Department, Colorado Forest Restoration Institute (CFRI), and the Colorado All-Lands (COAL) Quantitative Wildfire Risk Assessment.

WHAT ARE THE GOALS OF A CWPP?

The goals of this CWPP are to protect lives and reduce risk to property and critical infrastructure. It empowers local communities to improve their wildfire mitigation and response capabilities by working with fire protection districts and local government and non-governmental agencies to identify high-risk areas and prioritize actions for minimizing the impacts of wildfire to homes, people, and infrastructure across the county landscape. The CWPP does not aim to provide prescriptive-level management guidance and local experts should be consulted when crafting project-level action plans and treatment prescriptions.

The CWPP must also meet the minimum standards of the HFRA and Colorado State Forest Service (CSFS) by being developed collaboratively between local, state, and federal agencies, as well as other

interested parties; including priority areas for hazardous fuel reduction treatments; and recommending measures that homeowners and communities can take to reduce structural ignitability (CSFS 2022b; Society of American Foresters [SAF] 2004). More information regarding CWPP minimum standards is available at https://csfs.colostate.edu/wp-content/uploads/2022/03/2022-CSFS_CWPP_Min_Standards.pdf. Recommendations in the CWPP were developed using the quantitative wildfire risk assessment, which considers fuel hazards, fire history, structure vulnerability, and protective community values. Additionally, both Core Team and public input were used to inform recommendations and identify priority areas of concern.

The CWPP will be treated as a living document intended to be updated every 5 years. Boulder County's Wildfire Partners team plans to review and revise the plan annually to reflect changes, modifications, or new information such as projects completed or added, and lessons learned from public education and project implementation. Chapter 5 provides an evaluation framework that can help guide the CWPP update process.

WHAT ARE THE STRATEGIES TO ADDRESS WILDFIRE HAZARDS?

The Wildland Fire Leadership Council created a National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) that aims “to safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire” (Forests and Rangelands 2021). In 2013, the Western Regional Action Plan, which outlines a regional approach to achieving the goals of the Cohesive Strategy, was adopted (Western Regional Strategy Committee [WRSC] 2013). This CWPP is aligned with the Cohesive Strategy and uses the framework from the Western Regional Action Plan.

Goal 1 of the Cohesive Strategy/Western Regional Action Plan is to **Restore and Maintain Resilient Landscapes**: Landscapes, regardless of jurisdictional boundaries are resilient to fire, insect, disease, invasive species, and climate change disturbances in accordance with management objectives.

Recommendations for hazardous fuels treatments include the following:

- Implement large landscape, community-wide and/or cross-boundary fuel treatments.
- Protect critical infrastructure (water, power, communications, businesses, schools, etc.) by strategically reducing fuels.
- Conduct targeted fuel management in forests and grassland/shrub vegetation types.
- Conduct vegetation management along key evacuation routes.
- Safeguard critical drinking water and wastewater infrastructure.
- Use controlled, prescribed fire strategically across the landscape.

Goal 2 of the Cohesive Strategy/Western Regional Action Plan is **Fire-Adapted Communities**: Human populations and infrastructure are as prepared as possible to receive, respond to, and recover from wildland fire. Existing public outreach programs in Boulder County are identified and described in Table 1.3 and the Public Education and Preparedness Resources section of Appendix A.

Recommendations for public engagement and decreasing structural ignitability include the following:

- Continue to provide resources and guidance on home hardening and defensible space practices.

- Gather input and raise awareness on projects to mitigate wildfire risk including the needs of socially vulnerable communities.
- Continue to enhance emergency notification and evacuation systems.
- Continue to conduct comprehensive home assessments.
- Continue to adopt and improve wildfire-mitigation related building code requirements.
- Continue to host educational events and implement the public awareness campaign.

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

Recommendations for improving fire response capabilities include the following:

- Develop and implement a comprehensive structure protection plan.
- Establish and advertise temporary refuge areas for community members.
- Secure annual funding for the Boulder Wildland Fire Incident Management Type 3 Team.
- Address the effects of extreme wind on wildfire response capabilities.
- Establish control features and structure protection protocols in the WUI.

WHAT IS A QUANTITATIVE WILDFIRE RISK ASSESSMENT?

The Colorado All Lands (COAL) Quantitative Wildfire Risk Assessment serves as a tool to model, visualize, and assess the risk of wildland fires within the planning area. The Quantitative Risk Assessment is the result of a collaborative effort that used a spatial computer model of wildfire hazard based on calibrated fuel models, severe weather conditions, and topography to map burn probability and other factors (for more information, see Chapter 3). These modeling outputs are utilized alongside data pertaining to highly valued resources and assets (HVRAs) and the WUI, which are established by wildfire professionals across Colorado in conjunction with the Core Team, to create comprehensive wildfire risk products to inform all stakeholders as well as this CWPP's risk reduction recommendations (see Chapter 4).

WHERE IS THE PLANNING AREA?

The planning area includes all lands contained within the borders of Boulder County (Figure ES.1). Boulder County encompasses several different topographic and vegetative zones. Moving east or west, elevation, precipitation, vegetation, and most importantly, fire regimes change dramatically over a short distance due to the rapid change from mountainous to grassland ecosystems. Fire regimes refer to the characteristic frequency, intensity, and severity of wildfires within a specific area, influenced by factors such as climate, vegetation type, and human activities. Wildfire risk also changes with these factors, and it is important to understand where your home and your community are situated in relation to wildfire risk on this diverse landscape.

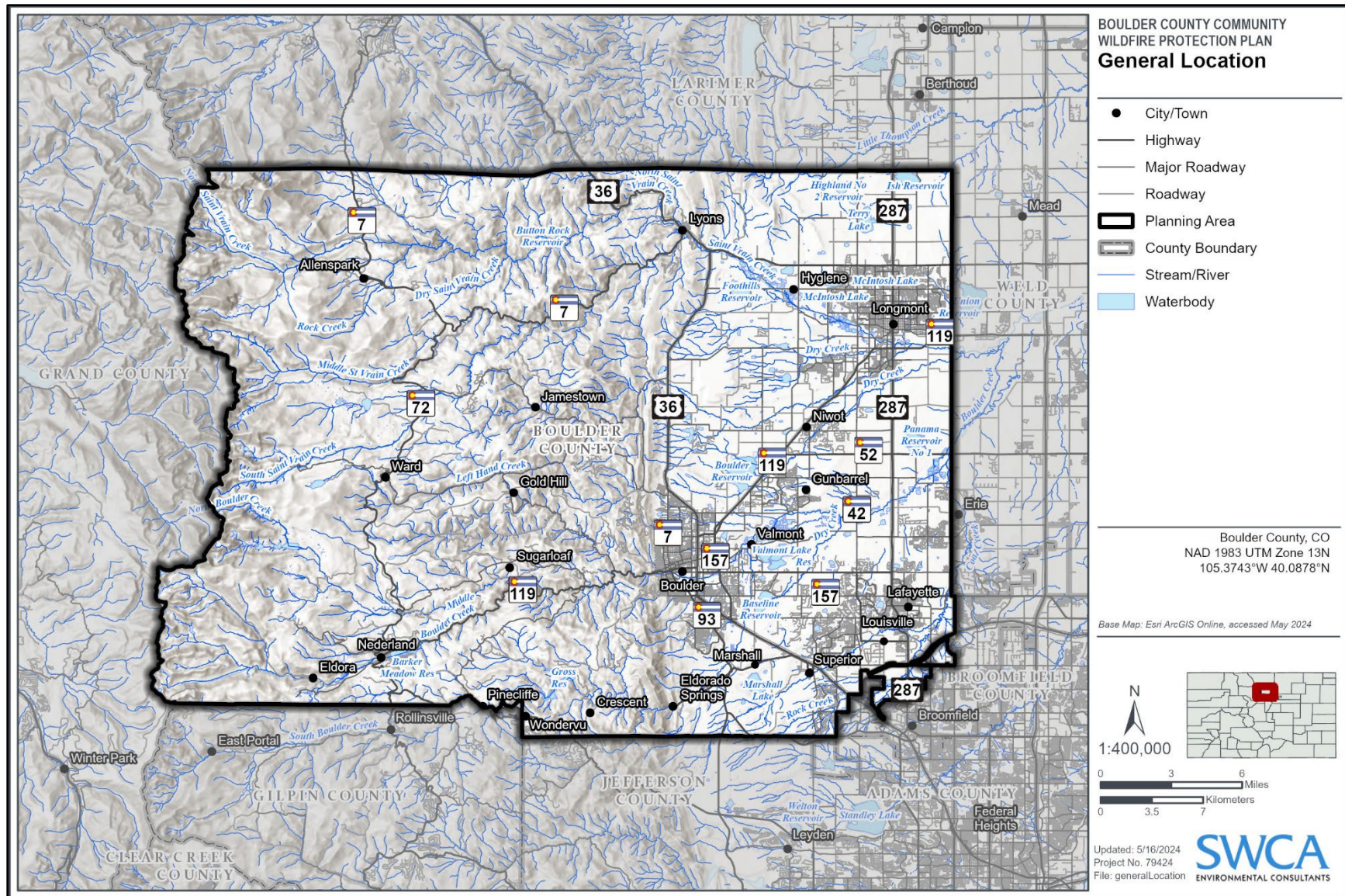


Figure ES.1. Boulder County CWPP planning area.

Residents located in the forested foothills to the west, within the grasslands to the east, or those situated at an intersection between the two, face distinct wildfire hazards and risks. These risks are heightened during extreme fire weather events like red flag conditions (drought, low relative humidity, and high winds). It is important to recognize that mitigation strategies may vary throughout the region depending on the hazards specific to a certain area. For instance, mitigation strategies for forested communities may include fuels reduction and forest thinning in combination with home hardening and increased defensible space, whereas in a more urban, built environment, emphasis may be on grassland, shrub, and tree mitigation around communities, businesses, and critical infrastructure coupled with home hardening and increased defensible space.

In Boulder County, the wildfire season is year-round. It is important to recognize and understand weather forecasts and fuel conditions as they relate to wildfire danger. Being prepared, informed, and ready for the wildfire behavior forecasted in your area is the best way to protect yourself, your property, and your community.

HOW WAS THE 2024 BOULDER COUNTY CWPP DEVELOPED?

The CWPP planning process was multifaceted and collaborative. It included identifying and convening a Core Team of local, state, and federal representatives, and non-governmental groups. Monthly Core Team meetings were used to gather expertise and allow oversight to guide the development of the plan. Public engagement also played a crucial role in the 2024 CWPP update, with community members actively providing input through various community engagement events and online surveys. Through this process, the Core Team identified and prioritized management recommendations aligned with the goals of resilient landscapes, fire-adapted communities, and safe, effective wildfire response to address risk across the county. See the CWPP Public Involvement section of Chapter 1 to learn more about the CWPP development process.

The CWPP is broken into chapters and appendices as shown below. In-depth background information is housed in the appendices.

Chapter 1 provides a general overview of CWPPs, the Core Team, the planning area, land ownership, and public involvement.

Chapter 2 presents an overview of the WUI, fire environment, and specific information about vegetation and fire history, as well as fire management and response.

Chapter 3 describes the Quantitative Risk Assessment, results of the assessment, and community values at risk.

Chapter 4 provides mitigation strategies in accordance with the National Cohesive Wildfire Strategy, as well as post-fire protocols and rehabilitation strategies.

Chapter 5 presents monitoring strategies to assist in tracking project progress and in evaluating work accomplished.

Appendix A contains additional background on the planning area's geography, environmental challenges, and socially vulnerable communities, as well as available programs and additional public education and preparedness resources for community members and homeowners, covering a variety of wildfire-related topics.

Appendix B contains information on local, state, and federal fire response capabilities and evacuation resources.

Appendix C contains background information on the planning area including fire policy, past planning efforts, and federal and state land management practices.

Appendix D outlines modeling and geographic information system (GIS) processes and methodologies.

Appendix E details potential fuel treatment types and methods for application.

Appendix F contains information on recovery and restoration following a wildfire.

Appendix G presents information on public outreach and engagement with regard to this CWPP.

Appendix H provides additional mapping.

Appendix I details funding opportunities.

Appendix J provides the Core Team's recommendations.

WHAT PUBLIC ENGAGEMENT OCCURRED DURING THE CWPP PROCESS?

Boulder County implemented extensive public outreach throughout the development of this CWPP. Starting in the summer of 2023, the Core Team began various initiatives, including updates on the County website, press releases, flyers, and open house community engagement events that included eight areas. The County also used an interactive Boulder County CWPP (<https://boulder-county-cwpp-bouldercounty.hub.arcgis.com/>) and online story map to engage the public throughout the project, providing information on the purpose, project history, scheduled events, community survey, and key resources. The story map includes tabs on fire environment, risk assessment, mitigation strategies, and monitoring and evaluation strategies.

From June 2023 to June 2024, Boulder County residents provided valuable feedback through a public survey (available in both Spanish and English languages), with 1,095 responses collected thus far, which resulted in adaptations and additions to the CWPP content. Additionally, written public feedback was solicited during open house events, and the responses were used to inform community concerns and priorities. See the CWPP Public Involvement section in Chapter 1 and Appendix G to learn more about how the public contributed to the development of the CWPP.

HOW DOES THIS CWPP ALIGN WITH OTHERS IN THE REGION?

Wherever possible, CWPP Core Teams work collaboratively to align planning efforts with others in surrounding regions. In a region such as the Colorado Front Range, there may be many overlapping CWPPs encompassing a variety of geographic scales. CWPPs serve different operational purposes based on their planning scales. The purpose of this County plan is to reduce wildfire risk across the landscape by coordinating with local and fire protection district plans to enhance resources, support, and implement measures to address risk. It aims to foster valuable relationships and coordination among federal, state, county, and local fire and emergency management offices. Differing planning scales will

cause maps and data throughout this plan to vary from those in other CWPPs covering the same region. The Boulder County CWPP utilizes the COAL Quantitative Risk Assessment, which differs from the CSFS Colorado Wildfire Risk Assessment. Both assessments are used throughout Colorado, and community members should reach out to local experts with questions and, if presented with conflicting information, err on the side of caution with the goal of preparedness in all possible outcomes. The Boulder County CWPP serves as a broad overview risk at the landscape scale, whereas local-level (e.g., city, town, fire protection district) plans pinpoint specific areas where risks and hazards will be assessed in more detail. It is important to note that the countywide risk assessment outputs for this plan may differ from plans at a more specified planning scale, especially under differing modeling approaches and methodologies.

WHO PARTICIPATED IN DEVELOPING THE PLAN?

Land managers, government representatives, and local representatives from eastern and western communities across Boulder County participated in this CWPP planning process. Organizations, municipalities, and agencies such as Boulder County, CSFS, local Boulder County fire protection districts, U.S. Forest Service (USFS), local townships, and the Boulder Office of Disaster Management (ODM) served as the Core Team for this CWPP and drove the decision-making processes. Please refer to Table ES.1 for the Project Core Team list, which outlines the individuals involved in the development of the plan. In addition to those listed in Table ES.1, a larger stakeholder team of over 100 representatives across Boulder County played a large role in the creation of this plan.

Members of the public also participated by providing input and feedback through public meetings, online webinars, surveys, and public review of the draft plan. The results were used to shape and develop the draft and final versions of the CWPP update.

Table ES.1. 2024 Boulder County CWPP Core Team

Name	Organization	Title	Project Role
Meg Halford	Boulder County	Wildfire Partners Forest and Grasslands Project Coordinator	Executive Core Team Member
Mike Chard	Boulder Office of Disaster Management	Director	Executive Core Team Member
Michael Agena	Boulder County Parks & Open Space	Forestry Program Supervisor	Executive Core Team Member
Seth McKinney	Boulder County Sheriff's Office	Fire Management Officer	Executive Core Team Member
Kevin McLaughlin	USFS	Boulder District Ranger	Executive Core Team Member
Ben Pfohl	CSFS	Supervisory Forester	Executive Core Team member
Brian Oliver	Boulder Fire-Rescue	Wildland Fire Division Chief	Executive Core Team Member
Kerry Webster	Boulder Fire-Rescue	Wildland Fire Operations Specialist	Executive Core Team Member
Greg Schwab	Boulder Rural FPD	Fire Chief	Executive Core Team Member
Paul Ostroy	Mountain View FPD	Fire Management Officer	Executive Core Team Member
Mike Palamara	Boulder Mountain FPD	Wildland Division Chief Firefighter	Executive Core Team Member
Chris O'Brien	Lefthand FPD	Fire Chief	Executive Core Team Member

Name	Organization	Title	Project Role
Allison James	Town of Superior	Disaster Preparedness and Recovery Manager	Executive Core Team Member
Kiana Freeman	City of Louisville	Recovery and Resilience Manager	Executive Core Team Member
Natalea Cohen	City of Louisville	Mitigation Coordinator	Executive Core Team Member
John Willson	Louisville FPD	Fire Chief	Executive Core Team Member
John Weaver	Longmont FPD	Longmont Assistant Fire Chief	Executive Core Team Member
Jim Krick	City of Longmont	Ecosystem Manager	Executive Core Team Member
Scott Ritter	Colorado Forest Restoration Institute	Wildland Fire Scientist	Executive Core Team Member
Maya MacHamer	Boulder Watershed Collective	Director	Executive Core Team Member
Jim Webster	Boulder County Community Planning & Permitting	Wildfire Mitigation Program Manager	Executive Core Team Member
Victoria Amato	SWCA	Principal Fire Planner	Plan Preparer
Arianna Porter	SWCA	Project Manager	Plan Preparer
Liz Hitzfelder	SWCA	Lead Geospatial Scientist	Plan Preparer
Sam Lashley	SWCA	Assistant Project Manager	Plan Preparer
Mitch Burgard	SWCA	Subject Matter Expert	Plan Preparer
Ryan Saggese	SWCA	Fire Planner	Plan Preparer
Eleanor Fuchs	SWCA	Fire Planner	Plan Preparer
Mallory Phillips	SWCA	Fire Planner	Plan Preparer

WHO WILL LEAD THE IMPLEMENTATION AND MONITORING OF THIS CWPP?

Implementation of projects identified in this CWPP will benefit from the collaboration and cooperation of multiple individuals and entities such as community residents, private organizations, Boulder County, local townships, and state and federal agencies. The CWPP **does not require** implementation of any of the recommendations; however, the most effective fire mitigation is achieved through the joint actions of individual homeowners and land and resource agencies. However, to ensure that projects move forward, the plan will be managed by Boulder County as a collaborative effort through the Boulder County Fireshed and their partners. The plan will be kept relevant through the incorporation and consideration of new conditions, projects, and local CWPPs. See Chapter 4 for proposed agencies to lead implementation of recommended projects.

INTERACTIVE TOOL DEVELOPMENT

Boulder County opted to develop a story map (online web content) that presents the CWPP in a web layout with accompanying web maps. The purpose of the story map is to disseminate information to the public and allow for public input. In addition to facilitating information sharing, the story map also provides

the County with a platform that can be readily revised to keep the CWPP document current. The Story Map is available at: <https://boulder-county-cwpp-bouldercounty.hub.arcgis.com/>.

For additional information on this project, please contact Project Manager Arianna Porter at arianna.porter@swca.com or Boulder County Community Planning and Permitting, Wildfire Partners Team Project Coordinator Meg Halford at mhalford@bouldercounty.gov.

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CHAPTER 1 – INTRODUCTION

The number of annual wildfires throughout the United States has been increasing in recent years (58,100 in 2018 and 50,000 in 2019 vs. 59,000 in 2021 and 69,000 in 2022). Similarly, the number of acres burned has been on the rise (Congressional Research Service [CRS] 2023). An average of 7 million acres is burned every year due to wildfire, more than doubling the annual average of acres burned in the 1990s (CRS 2023). The Marshall Fire serves as a local example of how wildfires have increased dramatically in intensity and frequency in Boulder County.

Communities are seeing the most destructive wildfire seasons in history. The 2015 fire season had the most acreage impacted in a single year since 1960 at 10.13 million acres. Following closely, 2020 was the second most extensive year for wildfire with 10.12 million acres burned (CRS 2023). In 2021, the year of the Marshall Fire, the U.S. Forest Service (USFS) and U.S. Department of the Interior (DOI) spent almost twice as much on fire suppression resources in 2021 than in 2020 (approximately \$2.3 billion spent in 2020 and approximately \$4.4 billion spent in 2021) (National Interagency Fire Center [NIFC] 2022). These statistics demonstrate that wildfires are becoming more severe, increasingly destructive, and harder to control.

Colorado's 2020 Forest Action Plan states that forests and grasslands in Colorado, like other western states, face serious issues concerning longer fire seasons and uncharacteristic fire behavior that threaten the sustainability and ecological function of the state's ecosystems. Figure 1.1 illustrates how wildfires around the state are burning larger, with the largest wildfires in 2020 burning more combined acreage than the largest fires combined from 2002 to 2016 and half of the state's 20 largest wildfires having occurred since 2018. These issues require an analysis of the current gap between existing and necessary wildland fire management strategies. A top priority in Colorado is coupling current and future wildland fire management strategies with wildland fire and fuels mitigation priority areas to guide federal, state, and private program funds toward projects that restore natural forest conditions, help communities live with wildfire, protect watersheds, conserve wildlife, and enhance the public benefits from trees and forests (CSFS 2020).

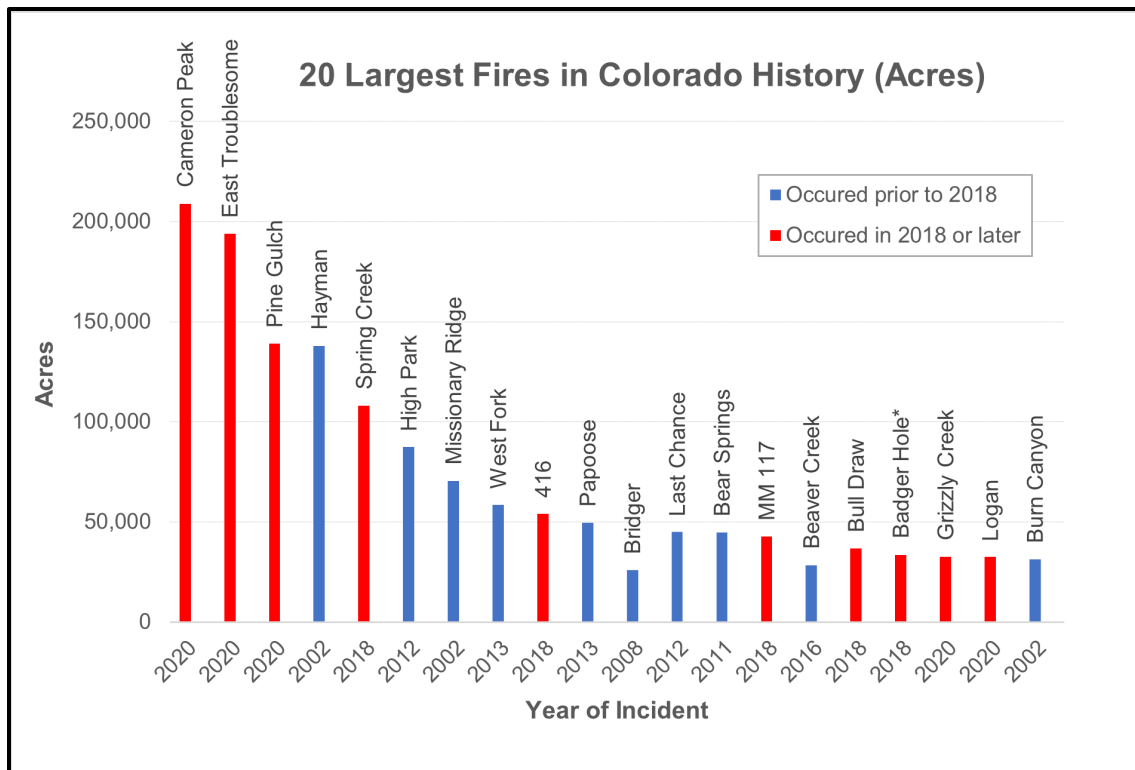


Figure 1.1. Chart of the acreage burned by Colorado's largest* wildfires from 2002 to 2021.

Source: Colorado Division of Fire Prevention and Control (DFPC) (n.d.)

*Note: Fires that burned in multiple states.

Comprehensive wildland fire and vegetation management strategies (forest and grasslands) are necessary for adapting to a changing climate and its effects on natural fire regimes. Frequent drought, tree mortality, climate change, and an increase in population and housing density have all worked together to increase wildfire likelihood and community vulnerability to wildfire (CSFS 2020). These factors have interacted to increase the risk of uncharacteristically large and high-severity fires (CSFS 2020). In the past few years, fires have grown to record sizes in Colorado and are burning longer, hotter, and more intensely than they have in the past (CSFS 2021a).

As wildfire severity and extent increases, communities need a plan to help prepare for, reduce the risk of, and adapt to wildland fire events. While the expansion of wildfires poses a significant threat, it is crucial to recognize the accompanying rise in severity, which compounds the dangers faced by communities. This heightened severity not only strains emergency response resources but also elevates the potential for substantial property damage, and most critically, for injury and/or loss of life (Western Fire Chiefs Association [WFCA] 2024). See Chapter 2, Fire Environment, and the Environmental Challenges section in Appendix A to learn more about the effects of climate change and urban development on wildfire. Community wildfire protection plans (CWPPs) help accomplish these goals. A CWPP provides recommendations that are intended to help reduce, **but not eliminate**, the extreme severity or risk of wildland fire.

The planning process involves looking at past fires and treatment accomplishments using the knowledge and expertise of the professional fire managers who work for the various Boulder County agencies and governing entities. From there, the CWPP ultimately identifies the current local wildfire risks and needs that occur in the county, which is further supported with relevant science and literature from the western region of the United States.

In addition, this 2024 update to the 2011 Boulder County CWPP reviews and verifies prior recommendations and completed projects, while also identifying potential additional priority areas, outreach strategies, and mitigation measures to protect from wildfire the irreplaceable life, property, and critical infrastructure in the planning area. However, this CWPP does not attempt to mandate the type and priority of treatment projects that will be carried out by the land management agencies and private landowners. The responsibility for implementing wildfire mitigation treatments lies at the discretion of the landowner, resource owner, and land managers; the 2024 Boulder County Community CWPP will only identify potential treatments and strategies and provide a suggested priority for these projects. CWPPs across all planning scales can be found on the website of their associated jurisdiction or fire management agency. To ensure inclusivity and accessibility, this CWPP follows Colorado's Americans with Disabilities Act (ADA) compliance standards to ensure it is accessible for all residents, and provides bilingual access to information, helping to reach and inform a broader audience within the community.

GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and disaster preparedness. Another goal of the CWPP is to enhance public awareness by helping residents better understand the natural and human-caused risk of wildland fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the Healthy Forests Restoration Act of 2003 (HFRA), are the following:

Collaboration: Town, county, and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (SAF 2004).

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

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

It is the intent of this 2024 CWPP to provide a countywide scale of wildfire risk and protection needs and bring together all wildfire management entities and jurisdictions in the Boulder County area to address the identified needs, and to support these entities in planning and implementing the necessary mitigation measures for both the eastern and western portions of the county. Additional information on the planning and policy process is available in Appendix C.

ALIGNMENT WITH COHESIVE STRATEGY

The 2024 CWPP is aligned with the Cohesive Strategy and its Phase III Western Regional Action Plan by adhering to the nationwide goal “to safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and collectively, live with wildland fire.”

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

- **Resilient Landscapes** – Landscapes, regardless of jurisdictional boundaries are resilient to fire, insect, disease, invasive species, and climate change disturbances, in accordance with management objectives.
- **Fire Adapted Communities** – Human populations and infrastructure are as prepared as possible to receive, respond to, and recover from wildland fire.
- **Safe, Effective, Risk-based Wildfire Response** – All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

For more information on the Cohesive Strategy, please visit:

<https://www.forestsandrangelands.gov/documents/strategy/natl-cohesive-wildland-fire-mgmt-strategy-addendum-update-2023.pdf>

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

In addition to aligning with the Cohesive Strategy, the CWPP also incorporates information on post-fire recovery, the significant hazards of a post-fire environment, and the risk that post-fire effects pose to communities (Figure 1.2).

ALIGNMENT WITH PLANS AND AGREEMENTS

For all wildfire hazards that are, or may become, declared emergencies or major disasters under the Stafford Act, the State of Colorado (specifically the CSFS and the Colorado Division of Fire Prevention and Control [DFPC]) has entered into a cooperative wildland fire management agreement with multiple federal agencies (e.g., Bureau of Land Management [BLM], USFS, National Park Service [NPS], U.S. Fish and Wildlife Service (USFWS), and Bureau of Indian Affairs). The purpose of these agreements is to improve wildfire response and management efficiency by facilitating the coordination and exchange of equipment, personnel, supplies, services, and funds among the parties in the agreement. The details of this agreement are described in the *Colorado Cooperative Wildland Fire Management and Stafford Act Response Agreement* (available at <https://gacc.nifc.gov/rmcc/administrative/docs/COAgreement.pdf>).

Additionally, this CWPP is aligned with multiple local, state, and federal planning documents (Table 1.1). These documents and agreements are summarized in Appendix C. More information on fire policy and legislative direction can also be found in Appendix C.



Figure 1.2. The CWPP incorporates the three primary goals of the Cohesive Strategy with post-fire recovery to serve as a holistic plan for fire prevention and resilience.

Table 1.1. Relevant Plans for Alignment with the Boulder County CWPP

Plan/Agreement Title	Alignment with 2024 Boulder County CWPP
The Boulder County Comprehensive Plan and Boulder County Land Use Code	<ul style="list-style-type: none"> Protects and promotes the health, safety, and general welfare of current and future inhabitants of Boulder County. Guides future growth, development, and distribution of land uses within Boulder County. Guides physical development of unincorporated Boulder County.
The Boulder County Comprehensive Plan Natural Hazards Element	<ul style="list-style-type: none"> Aims to limit inappropriate development in hazard areas and mitigate existing risk (i.e., elevated risk in the wildland-urban interface, the fire-dependence of local ecosystems, opportunities for interjurisdictional and interagency cooperation, and forest management).

Plan/Agreement Title	Alignment with 2024 Boulder County CWPP
2023 Boulder County Office of Climate Change and Sustainability (OSCAR) Sustainability, Climate Action, and Resilience Plan https://bouldercounty.gov/climate/sustainability-plan	<ul style="list-style-type: none"> Creates a more environmentally sustainable and just community. Addresses various aspects such as air quality, energy, transportation, water, ecological health, local food and agriculture, circular economy, etc. Prioritizes collective climate action and equitability in public health and safety planning by providing accessible information and serving as a guide for mitigating the threat of wildfire to both the people and natural environment of Boulder County. Considers socioeconomic disparities in access to resources and incorporates measures that account for varying abilities throughout the county.
2023 Boulder County Office of Disaster Management (ODM) Hazard Mitigation Plan	<ul style="list-style-type: none"> Represents basic desires of the community. Encompasses all aspects of community, public and private. Are nonspecific, in that they refer to the quality (not the quantity) of the outcome. Are future-oriented, in that they are achievable in the future. Are time-independent, in that they are not scheduled events.
2010 Boulder County Parks and Open Space (BCPOS) Forest Management Policy	<ul style="list-style-type: none"> Works cooperatively in fire management with the BCSO and the Fire Management Officer (FMO). Uses prescribed fire for public safety, natural fuels reduction, and ecological benefits. Monitors and manages wildland fire impacts to decide mitigation efforts such as erosion and noxious weeds control, temporary closures for public safety, and recreational impacts to roads and trails. Evaluates and incorporates best available science and techniques into BCPOS's forestry practices.
2011 Boulder County Sheriff's Office Fire Management Plan	<ul style="list-style-type: none"> Coordinates wildland fire response. Provides expertise in wildfire suppression, prescribed burning, fire restriction implementation, and education. Responsible for suppression of forest and prairie fires on all unincorporated lands in Boulder County.
2020 Boulder County Fireshed Memorandum of Understanding (MOU)	<ul style="list-style-type: none"> Collaboration and coordination to improve forest health and reduce wildfire risk in Boulder County Meaningful and ongoing engagement with stakeholders to establish mutual goals and priorities
Northern Colorado Fireshed Collaborative (NCFC) https://nocofireshed.org/	<ul style="list-style-type: none"> Collaborative efforts to work strategically across land ownerships to increase the pace and scale of forest restoration. Integrating using prescribed burning into forest and watershed management. Increase understanding of wildland fire risk management activities at landscape scale.
Saint Vrain Forest Health Partnership https://nocofireshed.org/fires/st-vrain-forest-health-partnership/	<ul style="list-style-type: none"> Collaborative efforts to plan and implement landscape scale forest restoration in the St. Vrain Watershed Working to increase the fire resilience of our forests to benefit communities, forest ecosystems, and water quality.
Colorado Strategic Wildfire Action Program	<ul style="list-style-type: none"> Reducing wildfire risk through collaborative efforts Opening opportunities for grant funding Advocating for development of strategic mitigation projects

Plan/Agreement Title	Alignment with 2024 Boulder County CWPP
Colorado Forest Action Plan	<ul style="list-style-type: none"> Promoting the effective and sustainable management of natural resources Building an adaptive planning process and learning to live with wildfire Advocating for ecologically sound forest treatments
2022 U.S. Department of Agriculture (USDA) and USFS Wildfire Crisis Strategy Implementation Plan	<ul style="list-style-type: none"> Identifying the right locations and tools for fuels and forest health treatments that are science-based and equitable. Developing needed workforce capacity and investing in the enabling conditions required for success. Working with partners across jurisdictions to develop and implement projects that are landscape scale, outcome-driven, and community ready. Supporting planning and investments in fire-adapted communities and on partnerships to restore and reforest areas already impacted by fire and mitigate risks associated with postfire events.
2006 Boulder Mountain Fire Protection District CWPP (Updating in 2024/2025)	<ul style="list-style-type: none"> Promoting community awareness to community's risk and hazards Improve wildfire prevention through education. Facilitate appropriate hazardous fuels reduction. Promote improved levels of response and coordination
2007 Boulder Rural Fire Protection District CWPP	<ul style="list-style-type: none"> Collaborating with stakeholders and enhancing public awareness and education Identifying and prioritizing fuels reduction opportunities across the landscape Addressing structural ignitability and reducing the impact of fire to property and infrastructure
2009 Allenspark CWPP (Updating plan in 2024/2025)	<ul style="list-style-type: none"> Building community awareness and education on wildfire safety Building community stakeholder engagement Prioritizing wildfire risks and fuel reduction opportunities
2011 Boulder County CWPP	<ul style="list-style-type: none"> Promoting community awareness and engagement on wildfire risks and hazards Addressing structural ignitability and associated impacts to infrastructure and property Enhancing the resiliency of Colorado forests
2024 Nederland/Timberline Fire Protection District CWPP	<ul style="list-style-type: none"> Enhancing community awareness and collaboration with stakeholders Addressing community fire-response and/or suppression capabilities Providing a comprehensive, scientifically based analysis of wildfire-related hazards and risks in the WUI
2011 Lyons Fire Protection District CWPP (Updating in 2024)	<ul style="list-style-type: none"> Meeting Colorado minimum requirements for a CWPP Improving wildfire protection through community awareness and education Prioritizing hazardous fuel reduction projects for the district as well as USFS and Boulder County. Addressing local fire department response capabilities

Plan/Agreement Title	Alignment with 2024 Boulder County CWPP
2015 Lefthand Fire Protection District CWPP (Updating in 2024)	<ul style="list-style-type: none"> Increasing collaboration between local and state government representatives in consultation with federal agencies and community stakeholders Prioritizing fuel reduction treatments in identified areas Addressing structural ignitability
2023 Boulder West Wildfire Authority CWPP (Four Mile FPD, Gold Hill FPD, Sugarloaf FPD and Sunshine FPD)	<ul style="list-style-type: none"> Promoting community awareness and engagement to address wildfire risks and hazards Enhancing safety for residents and first responders Reducing wildfire risk to the landscape and mitigating undesirable fire outcomes to property, infrastructure, and quality of life
2023 Mountain View Fire Protection District	<ul style="list-style-type: none"> Promoting community awareness on wildfire risks and hazards Enhancing wildfire prevention through improved wildfire education Identifying and prioritizing appropriate hazardous fuel reduction opportunities Improving the level of response in identified areas of concern
2024 City of Boulder CWPP	<ul style="list-style-type: none"> Addressing structural ignitability and the impact of fire to people, property, infrastructure, and natural resources Identifying and prioritizing fuel reduction treatments Promoting community awareness to wildfire risks/hazards and building on existing community wildfire education Making recommendations for the improvement of wildfire and disaster response
2024 Coal Creek Canyon Fire Protection District	<ul style="list-style-type: none"> Promote enhancing home survival from wildfire impacts through effective mitigation in the Home Ignition Zone. Guide resident in hardening home and creating defensible space. Assess and provide specific risk mitigation recommendation for communities (Plan Units) within the planning area.
2021 Colorado Statewide Post-Wildfire Susceptibility Analysis	<ul style="list-style-type: none"> Mapped assessment of post-fire watershed impacts including risk to transport systems, life and property, aquatic ecosystems, and water infrastructure. Assessment of post-fire impacts including debris flow, flooding, erosions and sedimentation, water quality, and hillslope erosion. Identifies priority watersheds and locations within watersheds most susceptible to post-fire hazards.

In 2018 the USFS released its national Shared Stewardship strategy that contains the following main goals: determine management needs on a state level, do the right work in the right places at the right scale, and use all available tools for active management. The strategy is based on the USFS seeking out state, tribal, and local input to best determine land management needs. The Shared Stewardship agreement was formalized in Colorado in 2019, establishing a Shared Stewardship framework between CSFS, Department of Natural Resources, Colorado DFPC, and other state agencies (Colorado Department of Natural Resources [CDNR] 2022b).

Additionally, in 2022 the U.S. Department of Agriculture (USDA) and USFS introduced a comprehensive 10-year strategy targeting the escalating wildfire crisis in the west, aiming to enhance community and ecosystem resilience through coordinated, science-based wildfire risk reduction across various jurisdictions (USDA and USFS 2022). This plan focuses on expanding and optimizing the scale of fuel and forest health treatments, building workforce capacity, and strengthening partnerships among federal

agencies, states, tribes, and private landowners to collaboratively manage wildfire threats (USDA and USFS 2022). The implementation plan is designed as a living document, adaptable to new insights and changing conditions related to wildfire risks and the public.

Improving community resilience against wildfire necessitates strategic coordination and implementation of planning goals across regional plans. Collaborative endeavors are crucial for crafting wildfire mitigation strategy that suits the unique geographical feature, in conjunction with local planning frameworks.

For access to additional Community Wildfire Protection Plans (CWPPs) in the Boulder County region, visit the following webpage: <https://csfs.colostate.edu/wildfire-mitigation/community-wildfire-protection-plans/>

POTENTIAL OPERATIONAL DELINEATIONS

The Rocky Mountain Research Station Wildfire Risk Management Science (WRMS) Team co-developed Potential Operational Delineations (PODs) to pre-plan for fire using a risk management approach, and to give land managers a formal process for developing landscape-scale wildfire response options before fires start. PODs are spatial units or containers defined by potential control features, such as roads and ridge tops, within which relevant information on forest conditions, ecology, and fire potential can be summarized. PODs combine local fire knowledge with advanced spatial analytics to help managers develop a common understanding of risks, management opportunities, and desired outcomes to determine fire management objectives. The PODs pre-planning framework has been applied to over 40 national forests and counting, often including adjacent landowners and jurisdictions for cross-boundary planning. See Figure 4.3 in Chapter 4 to view a map of PODs defined by the USFS in the planning area.

For additional information on the WRMS Team's use of PODs for wildfire response and mitigation, please visit: <https://www.fs.usda.gov/research/rmrs/projects/pods>.

PLANNING AREA

The planning area includes the entirety of Boulder County as delineated by its geographic and political boundaries (Figure 1.3).

Boulder County encompasses 726 square miles in land area and has a population of approximately 330,758 people (U.S. Census Bureau 2020). Situated at the base of the Rocky Mountains, Boulder County encompasses both urban and rural settings, along with foothills, valleys, and mountain peaks. The county is host to a multitude of landscapes offering access to seasonal activities, including national forests, open spaces, lakes, and other amenities. Boulder County has roughly 144,409 housing units (U.S. Census Bureau 2020). Additional Information on the planning area's location and geography is provided in Appendix A, Community Background and Resources.

The county's landscape is split in the east and west into two distinct geographic, topographic, and vegetative sectors, presenting a unique set of challenges regarding wildfire management. The eastern sector is characterized by flattened terrain with widespread development, rangelands, and sprawling grassland ecosystems, necessitating a management approach tailored toward mitigating the rapid spread of wildfire. In contrast, the western sector consists of mountainous terrain with dense forest, posing challenges related to slopes, heavy fuel loads, and fire infiltrating the WUI. It is essential to recognize these differences to implement targeted and effective wildfire mitigation and build wildfire resilience across Boulder County.

The planning area has been further subdivided into regional polygons, delineated using Fire Protection District (FPD) boundaries with Potential Operational Delineations (PODs) in the west and Genesys evacuation zones in the east. Regional polygons allow local managers and stakeholders to utilize this CWPP at a smaller scale. Details on the regional polygons within the planning area are shown in Chapter 3 (Figure 3.11). Information on the PODs can be found in Chapter 4 with a corresponding map (Figure 4.1), and further information on the FPDs, including a map of FPD boundaries available in Appendix B (Figure B.2).

LAND OWNERSHIP

Boulder County exhibits a diverse distribution of land ownership, encompassing various entities (Figure 1.4). Private ownership dominates the landscape, constituting approximately 36.90% of the total land area. Federal ownership, which includes agencies such as the USFS, accounts for 35.02%. Boulder County itself manages a significant portion, covering 19.97%, while the City of Boulder holds 7.68%. Other stakeholders include local municipalities with 0.30% and the State of Colorado with 0.13%.

Additional details regarding land in Boulder County, such as topography and land management direction, are summarized in Appendix A.

EXISTING WILDFIRE MITIGATION MEASURES

PAST MITIGATION AND ONGOING FUELS MITIGATION

Boulder County's previous CWPP was completed in 2011. In the last 13 years, Boulder County has taken great strides toward addressing wildfire risk. Boulder County's existing mitigation measures will not include those specific to the City of Boulder, as these are comprehensively detailed in the City of Boulder CWPP. Examples of wildfire resilience and community mitigation accomplishments within the planning area are shown below in Table 1.2. Estimates of treated acres between 2011 and 2023 are also graphed in the figures below the table (Figure 1.5 to 1.11).

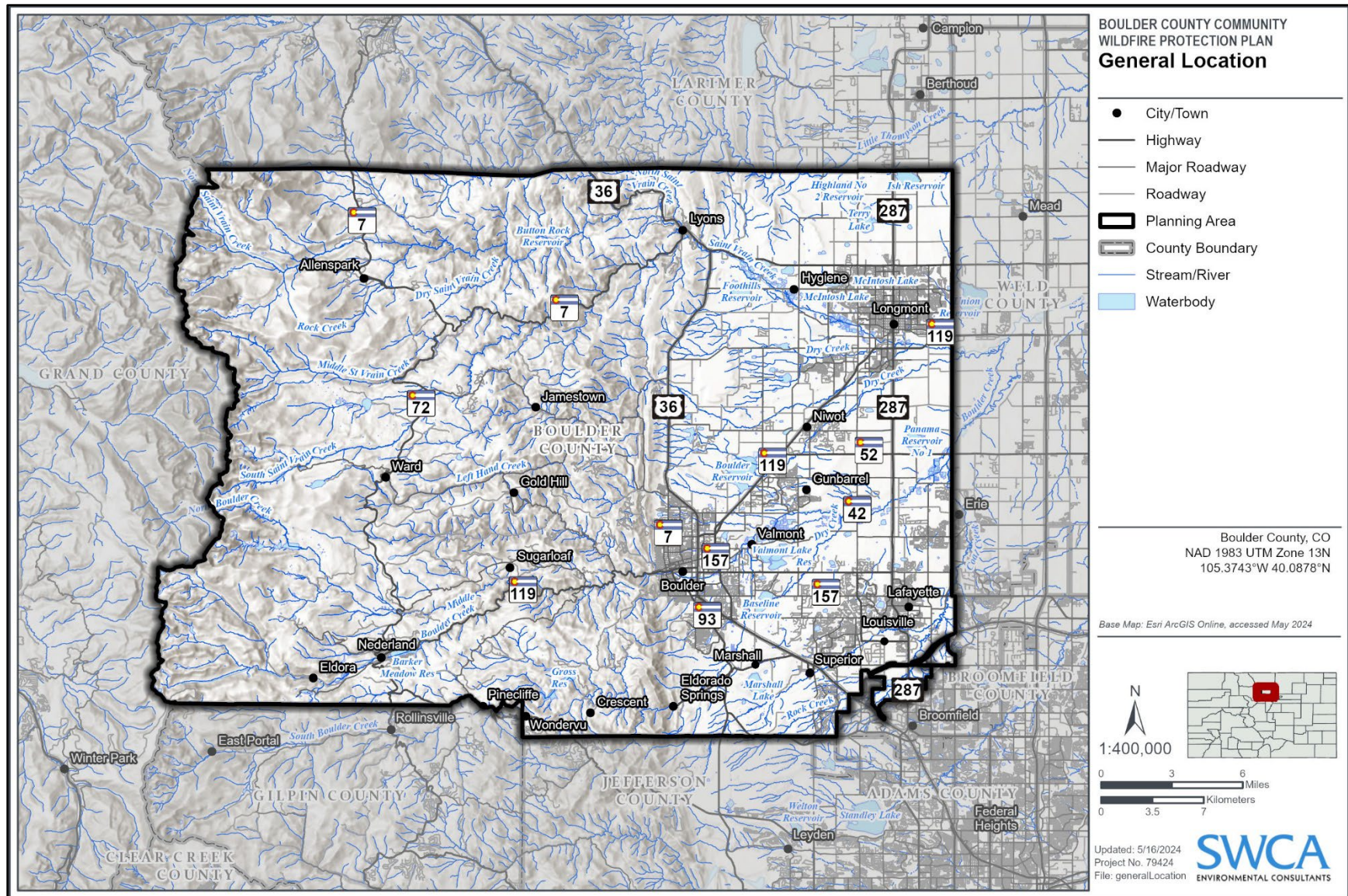


Figure 1.3. Boulder County general location.

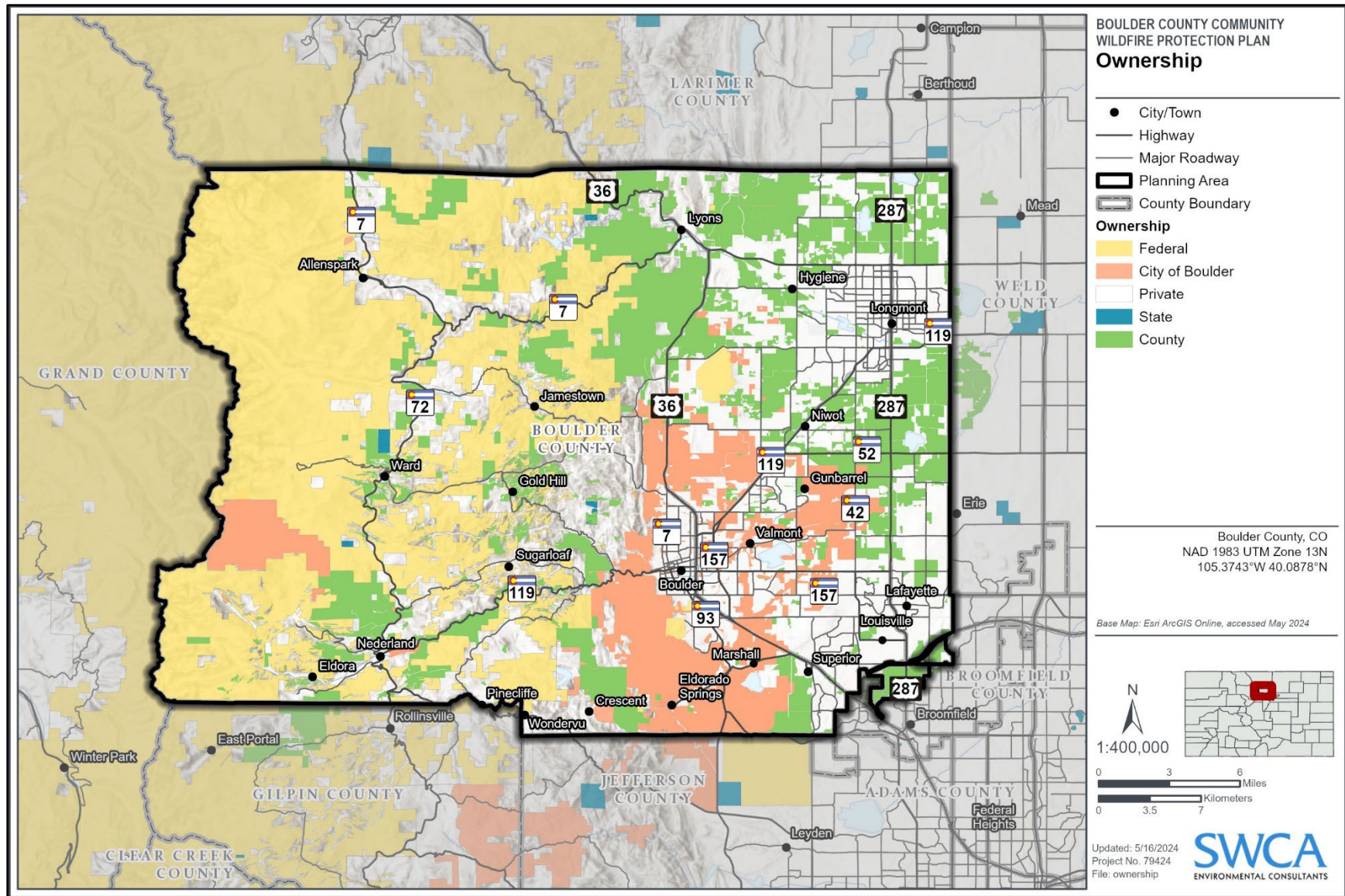


Figure 1.4. Boulder County land ownership.

Table 1.2. Examples of Wildfire Resilience and Community Mitigation Accomplishments

**past treatment metrics (acres/ft/miles) are approximate totals using the best available data.

Year Completed	Entity	Project Name	Project Details	Treatment Area*
2011–2023	Boulder County Parks & Open Space	Hall Ranch, Heil Valley Ranch, Reynolds Ranch, Meeker Park, Betasso Preserve, Williams/Merlin, Caribou/Sherwood	Fuels Reduction Forest Restoration	1,481 acres
2011–2023	Boulder County Parks & Open Space and Boulder County Sheriff's office	Hall Ranch, Heil Valley Ranch, Reynolds Ranch, Mud Lake, Walker Ranch	Rx Fire Piles	2,746 piles
2011–2023	Boulder County Parks & Open Space	BCPOS Properties east of Hwy. 36	Rx Fire Agriculture/Ditches	146,344 feet
2024	Boulder County Parks & Open Space and Boulder County Sheriff's office	Caribou Ranch BCPOS Properties east of Hwy. 36	Rx Fire Piles Rx Fire Agriculture/Ditches	982 piles 30,750 feet
2011–2023	Boulder County Community Planning and Permitting Wildfire Partners	West Boulder County	Defensible Space/HIZ assessments	3,767 (total # assessments) 1,687 (total # certified) 1,493 (total # re-certified)
2023	The Watershed Center	Jamestown Fire Mitigation Project	Community-wide fuels mitigation	28 acres (43 properties)
2011–2023	Boulder County FPDs with Mitigation Crews: Lefthand FPD Four Mile FPD Boulder Mountain FPD	Poorman Road, Arroyo Chico West, Gold Hill Ashram Forest Ag Mitigation projects Private Property HIZ Pinebrook Hills, Boulder Heights, Carriage Hills, Buckingham Hills, Wagonwheel Gap	Fuels Reduction Pile Burning Burn Piles Defensible Space Treatments Pile Burns Defensible Space/HIZ	730 acres 1,150 piles 30 acres 5,200 piles 455 structures
2011–2023	Colorado State Forest Service	Private lands Forest Agriculture program Western Boulder County (multiple project names)	Forest Ag. Tax Treatments Fuels Reduction	1,544 acres (63 landowners) 1,785 acres
2023	Boulder Valley Longmont Conservation District	Camp St. Malo Eagle Ridge	Forest Restoration Fuels Reduction (part of larger DNR COSWAP project with private landowners)	82 acres 130 acres

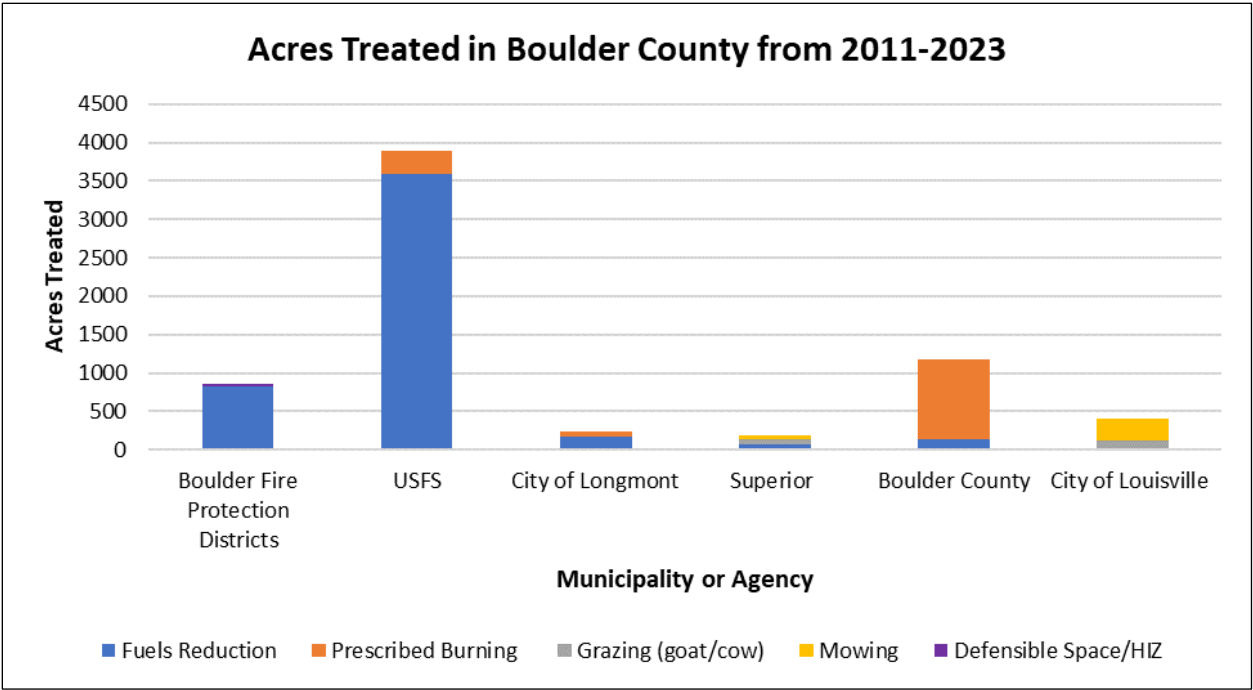


Figure 1.5. Fire mitigation estimates in Boulder County from 2011 through 2023.

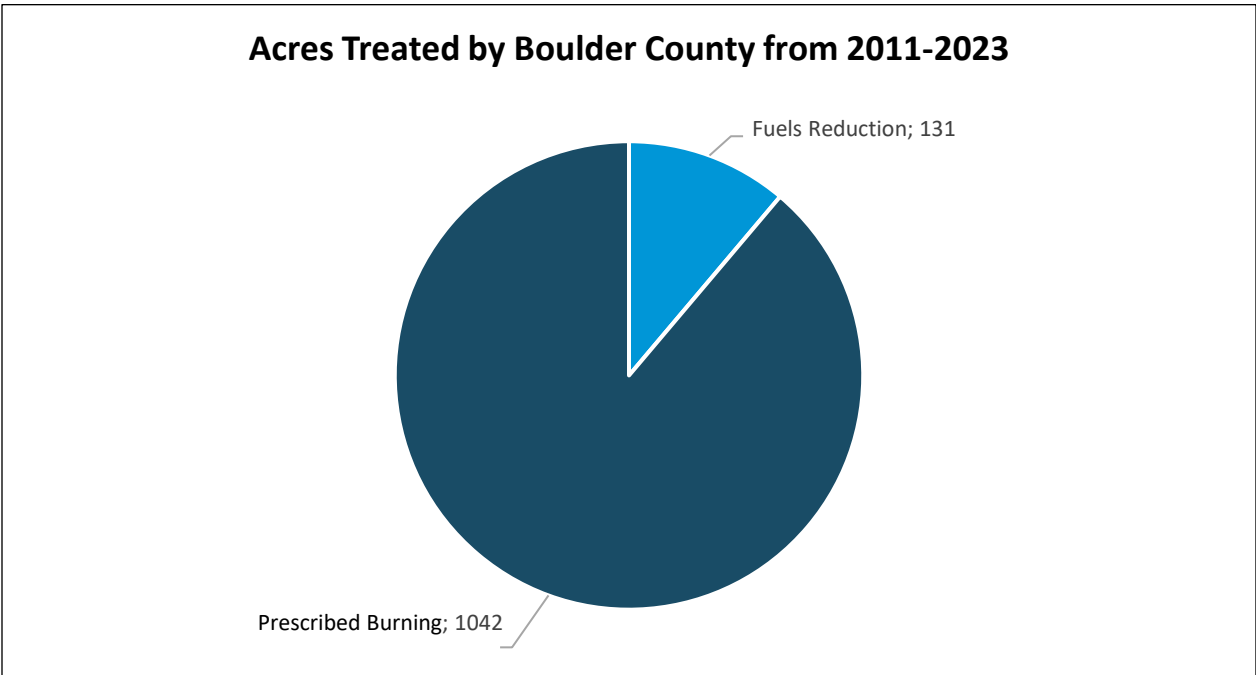


Figure 1.6. Estimates of fire mitigation efforts by Boulder County from 2011 through 2023.

Fuels Reduction

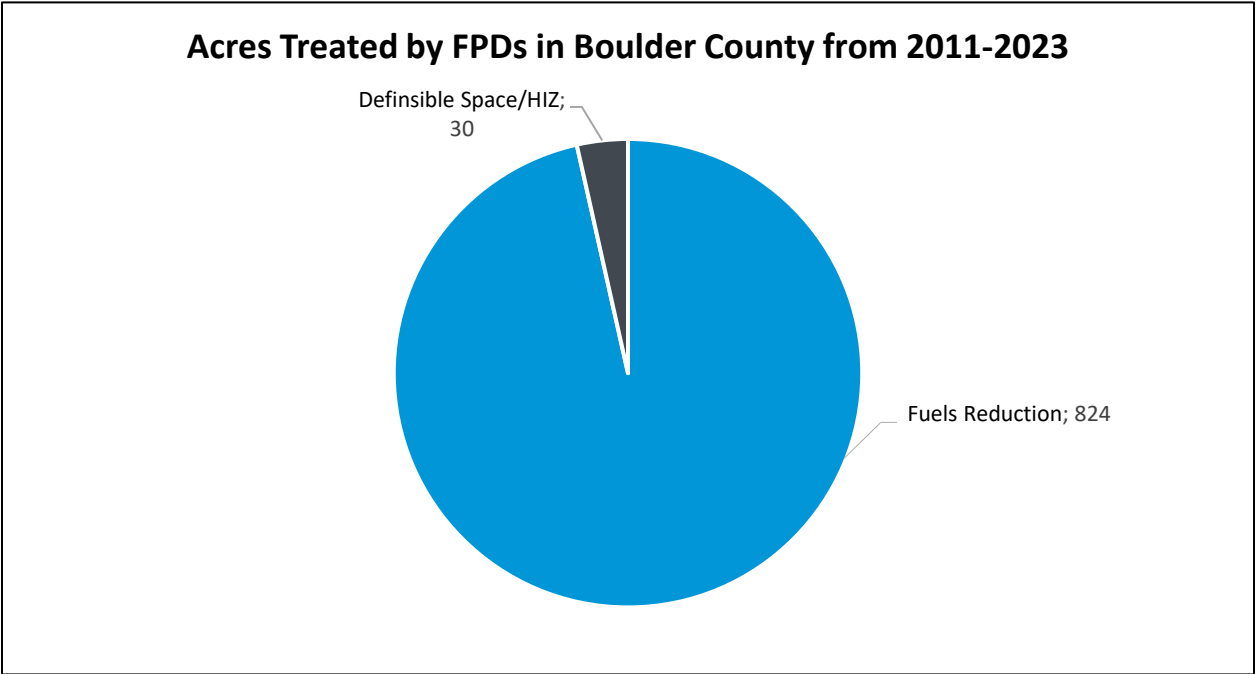


Figure 1.7. Estimates of fire mitigation efforts by FPDs within Boulder County from 2011 through 2023.

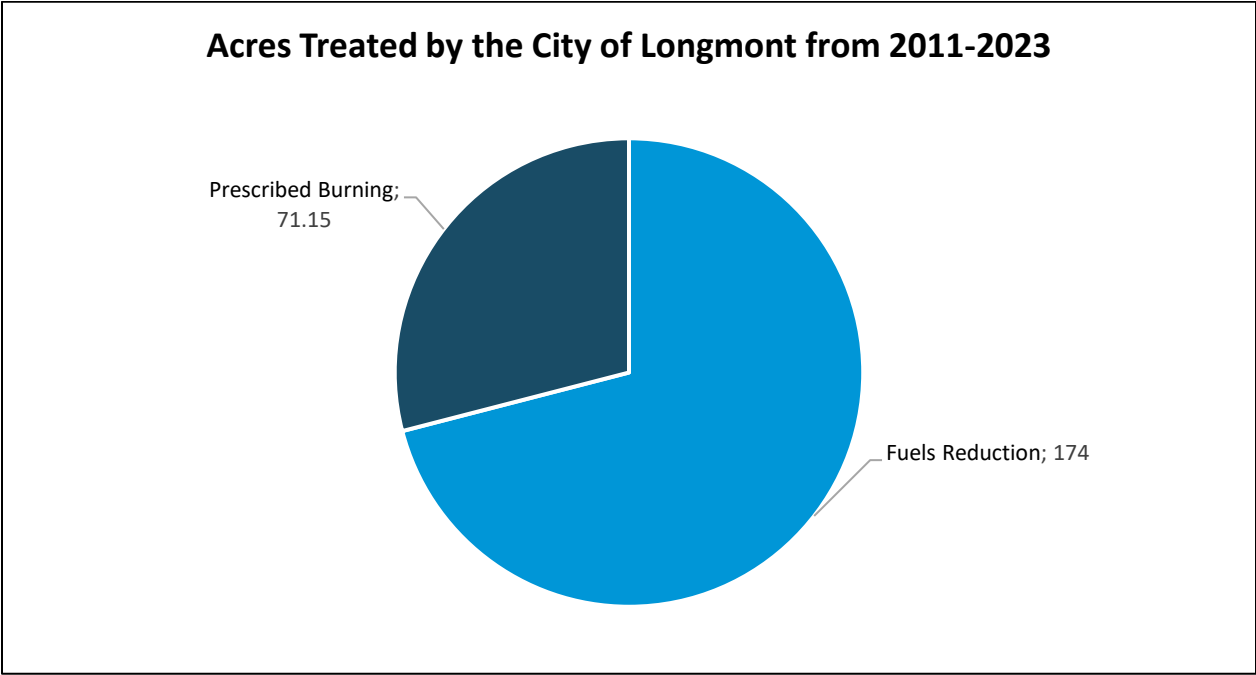


Figure 1.8. Estimates of fire mitigation efforts by the City of Longmont from 2011 through 2023.

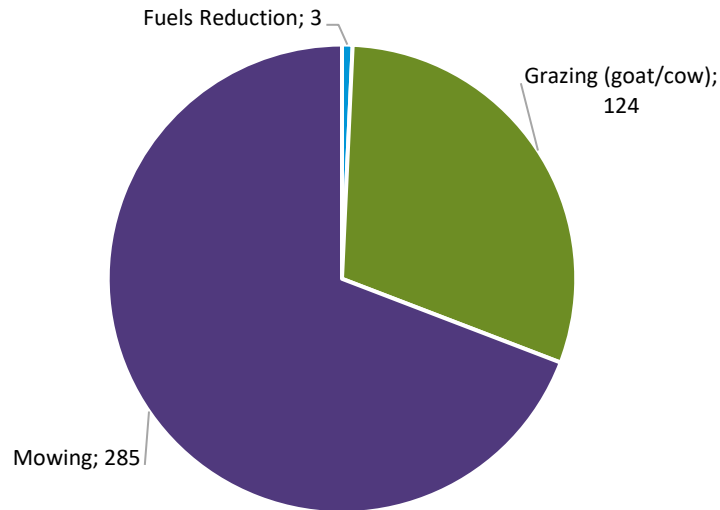
Acres Treated by the City of Louisville from 2011-2023

Figure 1.9. Estimates of fire mitigation efforts by the City of Louisville from 2011 through 2023.

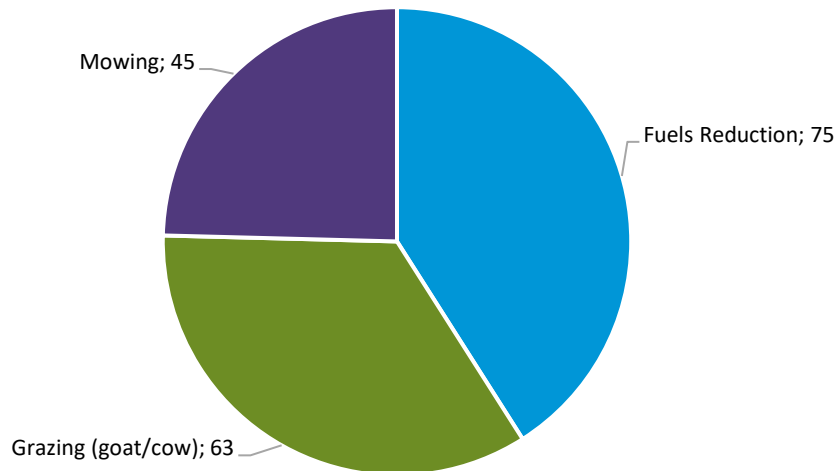
Acres Treated by the Town of Superior from 2011-2023

Figure 1.10. Estimates of fire mitigation efforts by the Town of Superior from 2011 through 2023.

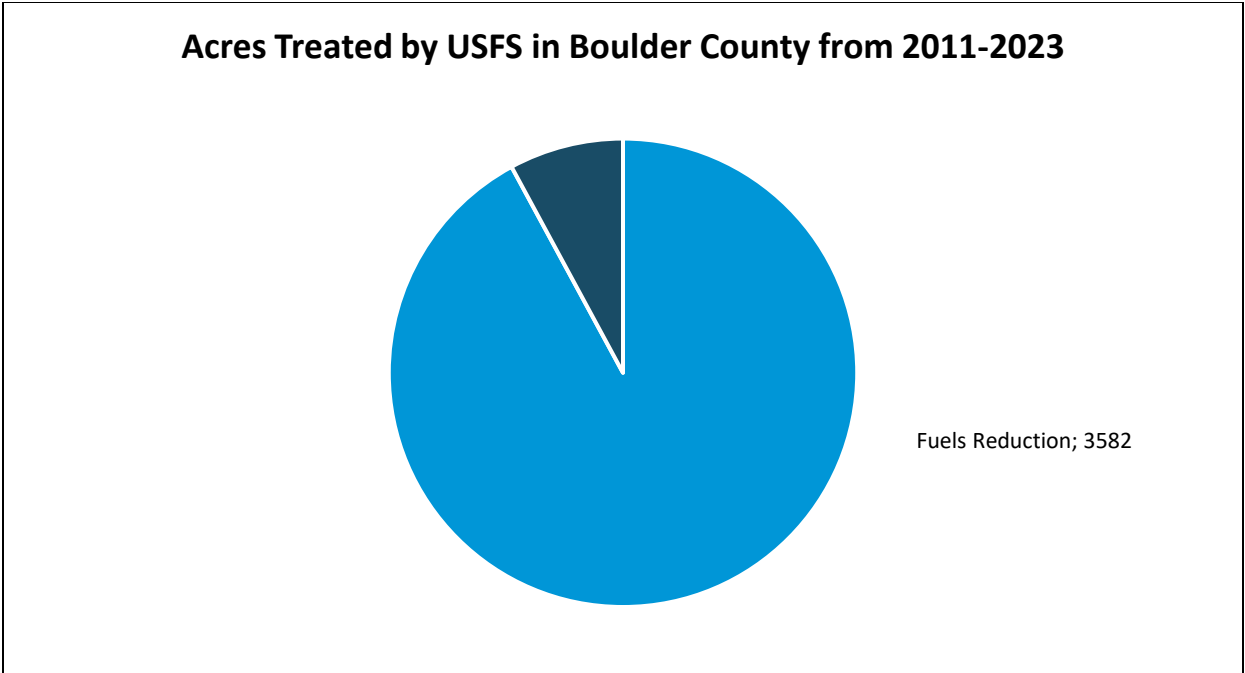


Figure 1.11. Estimates of fire mitigation efforts by the USFS from 2011 through 2023 in Boulder County.

WILDFIRE PROGRAMS

Boulder County also has a multitude of wildfire programs available to the public. Table 1.3 lists local programs currently being implemented within the planning area. Boulder County's existing wildfire programs will not include those specific to the City of Boulder, as these are comprehensively detailed in the City of Boulder CWPP. **Please see Appendix A for more details on existing local, state, and federal wildfire outreach programs and homeowner resources.**

Table 1.3. Boulder County Programs Regarding Wildfire

Agency/ Organization	Program/ Outreach Tool	Description
Boulder County Wildfire Partners (WP)	Wildfire Mitigation Sales Tax Programs	In 2022, Boulder County voters approved a 0.1% countywide sales and use tax to fund wildfire mitigation efforts. This tax, initiated by ballot measure 1A, aims to address the increasing risk of climate-driven wildfires. The tax revenue supports two main programmatic areas: Strategic Forest and Grassland Management Projects, which aim to reduce catastrophic wildfire risk, protect drinking water supplies, and create resilient ecosystems; and Creating Community Resiliency, which include expanding the Wildfire Partners program to serve residents in eastern Boulder County and continuing wildfire preparedness efforts in western Boulder County. This initiative ensures proactive and comprehensive wildfire mitigation across the county as listed below.

Agency/ Organization	Program/ Outreach Tool	Description
	Individual Home Assessments program/Defensible Space	Boulder County and the Wildfire Partners program supports residents in eastern (plains/grasslands) and western (mountains/forest) Boulder County to perform wildfire mitigation. They have been offering individual home assessments to residents of western Boulder County since 2014. In 2022, they launched their first pilot of a home assessment program for eastern Boulder County. https://bouldercounty.gov/disasters/wildfires/mitigation/wildfire-mitigation-programs/
	Community Planning Assessments	In collaboration with Wildfire Partners, Boulder County is offering a Community Planning Assessment program where communities can self-identify and organize to assess and reduce wildfire risk. https://wildfirepartners.org/community-mitigation/
	Community Chipping Program	Wildfire Partners now offers free chipping services to all county residents (incorporated and unincorporated areas). To be eligible, one person or household assumes the role of “Chipping Event Host” for at least five properties. https://wildfirepartners.org/chipping-program/
	Strategic Fuels Mitigation Grant Program (SFMG)	Wildfire Partners established the Strategic Fuels Mitigation Grant (SFMG) program in 2023, after voters approved the county’s new wildfire mitigation and use tax in November 2022. The purposes of these funds are to support large landscape and community-wide forest and grassland management projects to reduce the risk of catastrophic wildfire, protect water supplies, and promote resilient ecosystems. The SFMG program provides funding through competitive grants to leverage other federal, state, and local funding sources. https://bouldercounty.gov/disasters/wildfires/mitigation/strategic-fuels-mitigation-grant-program/
	Wildfire Partners Rebate Program	Wildfire Partners offers residents wildfire mitigation rebates (up to \$500 per household) to participate in the public awareness campaign—Wildfire Happens Here. Everyone who resides in Boulder County is eligible to receive a rebate for answering four “Calls to Action.” The budget for the rebate program is \$2.5 million in 2024.
	Wildfire Partners Public Awareness Campaign	Wildfire Happens Here is a campaign to increase public awareness about wildfires and wildfire mitigation. The campaign includes four Calls to Action: Junk your Junipers, Fences are Fuses, the First Five Feet, and Screen your Vents.
	Youth Helping Vulnerable Individuals and Communities	Wildfire Partners works with TEENS Inc. and Mile High Youth Corps to provide free mitigation services to residents who have been historically underrepresented, underserved, or who are socially vulnerable. Wildfire Partners received a \$75,000 grant from the Fire Adapted Communities Learning Network to hire a coordinator for this program and offer 20 weeks for free mitigation services in 2024.
Boulder County Parks and Open Space	Community Forestry Sort Yards	Boulder County residents can drop off tree branches, logs, and timber free of charge in Nederland and Allenspark. For more information on this seasonal service, visit the https://bouldercounty.gov/property-and-land/forest-health/community-forestry-sort-yards/ page.
	Boulder County Youth Corps Forestry and Fire	This program provides Boulder County teens an opportunity to get involved in the community by learning strong work habits, new skills, and the value of environmental and civic stewardship. County departments, municipalities, and towns benefit from the maintenance projects and tangible products, such as new trails built by Corps members, each summer.

Agency/ Organization	Program/ Outreach Tool	Description
	Community Grinding Program	BCPOS staff continue to implement free community grinding projects.
City of Boulder OSMP	Firewood Program	Wood generated by the City of Boulder's Forest management operations is made available to contract-holding members of the public. The firewood program incentivizes the reduction of hazardous wildland fuels on OSMP lands while providing firewood to local contract holders.
Boulder Office of Disaster Management (ODM)	Webpage	Boulder ODM hosts a webpage offering extensive educational resources on disaster preparedness, covering topics such as emergency alerts, hazard awareness, disaster planning, and emergency guidance on evacuation.
	Disaster Strong Preparedness Series	Boulder ODM has created the Disaster Strong Preparedness Series, which consists of workshops and resources to increase the public's disaster preparedness. New topics are continually added to meet the needs of the community.
Boulder County Office of Sustainability, Climate Action, and Resilience (OSCAR)	Climate Risk Mapping	OSCAR is developing or has developed the following: <ul style="list-style-type: none"> • A detailed map that visualizes the risks related to climate impacts including high heat, poor air quality, wildfire, flooding, and drought alongside demographics like household income, language, race, age, and reliance on public transportation. • Biomass Management and Utilization Plan • Boulder County Climate Innovation Fund • Urban Tree Canopy Assessment • Urban Landscape for Climate Action Toolkit • Climate Resilience and Desertification Risk Assessment • Wildfire Ready Watershed projects
Boulder County Sheriff's Office	Prescribed Burning	Boulder County Parks and Open Space (POS) is responsible for managing over 100,000 acres of land in Boulder County. Fire Management works closely with POS to implement agricultural burns, prescribed burns on prairies and forested properties, cutting projects, and pile burning. Project locations include public-use properties, public easements, and various closed and protected lands.
	Burn Permits and Public Outreach	Fire Management helps residents obtain permits for burn piles on private property within unincorporated Boulder County. More information can be found through the https://bouldercounty.gov/safety/fire/burn-permits/ . Fire Management also participates in outreach events throughout the year. Staff attend fire department open house events and are involved with the Sheriff's Office https://bouldercounty.gov/safety/sheriff/join-our-team/community-academy/ , the Left Hand Outdoor Challenge https://bouldercounty.gov/open-space/get-involved/left-hand-outdoor-challenge/ , and https://bouldercounty.gov/jobs/youth-corps/ .

Agency/ Organization	Program/ Outreach Tool	Description
Boulder County's Community Planning and Permitting	Wildfire Mitigation Code	The Wildfire Mitigation Code requires property owners in designated wildfire zones to implement specific measures to mitigate fire risks. These measures include using ignition-resistant and noncombustible building materials, creating defensible space around structures, and managing vegetation to minimize fuel loads. Initially adopted in 1993 for Wildfire Zone 1 (western Boulder County), the code mandates mitigation practices for new constructions, significant additions, and specific exterior projects. Following the Marshall Fire in December 2021, the county extended these requirements to Wildfire Zone 2 (eastern Boulder County) in order to address the unique fire hazards of each zone.
Superior Disaster Preparedness and Recovery Office	Webpage and Preparedness Programming	This web page and associated programming provides essential resources and information for disaster preparedness and recovery in the Superior, Colorado, community. The page covers general preparedness, specific disaster information, and efforts to enhance community resilience, offering educational resources, upcoming events, and contact details for the Disaster Preparedness and Recovery Office. https://www.superiorcolorado.gov/departments/disaster-and-hazard-preparedness
City of Louisville	Wildfire Risk Assessment	This risk assessment was developed in 2023, with both a written plan and story map component. The report contains general mitigation best practices to inform short- and long-term management decisions in the City of Louisville. Mitigation best practices include fuels reduction, structure hardening, and others. Find more information here: https://www.louisvilleco.gov/local-government/government/departments/parks-recreation-and-open-space/open-space-division/wildfire-risk-assessment

CWPP PUBLIC INVOLVEMENT

A key element in the CWPP process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (SAF 2004). Boulder County implemented extensive public outreach with the support of local municipalities throughout the development of the CWPP, all of which directly contributed to the content of this plan. Starting in the summer of 2023, the Core Team began various initiatives, including updates to the Boulder County website, virtual and in-person meetings, flyers, press releases, public surveys, an interactive story map, and open house events to gather diverse perspectives on wildfire risks and mitigation strategies (Table 1.4). To support inclusivity and accessibility, this CWPP follows Colorado's ADA compliance and provides bilingual access to information where possible, helping to reach and inform a broader audience within the community. The County will also provide a copy of the 2024 Boulder County CWPP in Spanish on Boulder County's Community Planning and Permitting Wildfire Mitigation webpage once the plan is finalized in the fall of 2024.

Table 1.4. Public Outreach Resources

Outreach Type	Date(s)	Description
Webpage	Ongoing	A webpage hosted by Boulder County describing the CWPP planning process, funding sources, and CWPP goals.

Outreach Type	Date(s)	Description
Hub site	Ongoing	A dedicated hub site by Boulder County serves as a central platform for stakeholders to access project updates, timelines, and homeowner resources.
Community Survey	June 2023–June 2024	A public survey to collect community input for the draft CWPP.
Flyers	June 2023–August 2023	Informational flyers including details about events and encouraging participation in the community survey.
Press Releases	June 2023–March 2024	Various press releases disseminated through local websites and newspapers to announce events and encourage community involvement.
Public Engagement Events	June 2023–April 2024	Multiple (8) open house events held at different locations to provide updates on the CWPP and solicit public input from various zones and communities.
Articles	August 2023–March 2024	News articles published online and in local newspapers informing residents about the CWPP and encouraging participation in events and the review process.
Public Review Period	June 2024	An online period in early June 2024 allowed the public to review and comment on the draft CWPP.

The goal of public engagement for the CWPP was to collect feedback and input regarding wildfire risk and integrate public input into the plan. Information about the 2024 Boulder County CWPP update was distributed through online resources and public open house events. Feedback was collected through a community survey, public engagement event survey (written and virtual), and through direct dialogue with Core Team members and SWCA staff at public open houses (in-person and virtual). Using an interactive web page: <https://boulder-county-cwpp-bouldercounty.hub.arcgis.com/> and online story map, Boulder County presented information on the CWPP's purpose, project history, scheduled events, and key resources. This interactive platform showcases the plans content through a highly accessible webpage with tabs on the county's fire environment, the wildfire risk assessment, mitigation strategies, and monitoring and evaluation strategies. Synthesized results of feedback received can be found in Appendix G.

From June 2023 through May 2024, the community provided valuable feedback through a public survey, with 1,095 responses collected thus far, influencing adaptations and additions to the CWPP content. Additionally, written public feedback was gathered during open house events; comments were used to guide plan content and recommendations in conjunction with Core Team input. Additionally, a zoned approach was used to distribute information about the 2024 CWPP update across the entire planning area and ensure the feedback received was representative of Boulder County as a whole.

The draft CWPP was available for public review from June 7 to June 21, 2024. Comments and concerns regarding the draft CWPP were gathered and used to make changes to the document's language and content. Table 1.4 summarizes the public outreach completed as part of the CWPP development.

For more information on public involvement and outreach methods and results, please see Appendix G.

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CHAPTER 2 – FIRE ENVIRONMENT

WILDLAND-URBAN INTERFACE

The WUI is defined as the area where structures and other human developments meet or intermingle with wildland vegetation (CSFS 2023a). In intermix areas, wildland vegetation is not just near structures but interspersed among them (National Institutes of Standards and Technologies [NIST] 2023a). These areas create an environment in which fire can move quickly between structural and vegetative fuels and have become increasingly prevalent as human development has progressed into the region's wildland areas. Vegetative fuels include grasses, trees, shrubs, and any other plant material that contributes to the spread of wildfire.

According to the HFRA, a CWPP offers the opportunity for collaboration of land managers to establish a definition and a boundary for the local WUI; to better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area; and to prioritize and plan fuels treatments to mitigate for fire risks.

It is essential to note that this CWPP's WUI boundary was developed for this county-scale CWPP, offering information at regional and subregional levels as opposed to the neighborhood or parcel level. Distinct agencies, such as FPDs or cities, may interpret WUI differently based on their unique environmental factors, topography, weather conditions, and fuel types. Consequently, WUI definitions may differ slightly, reflecting the diverse perspectives and considerations of the protection agency responsible for the plan and the overall planning area's size and environmental characteristics. However, most agencies use WUI delineations for a similar purpose, to prioritize treatments and recommendations on the landscape.

The Boulder County CWPP WUI is provided in Figure 2.1. The Boulder County WUI was developed collaboratively by the Core Team to provide a broad delineation of the WUI with the purpose of capturing all of the potential WUI areas in the county, while also pointing to local CWPP efforts for more detailed WUI delineations. The Boulder County WUI delineation may be updated in the future as modeling results become available and the WUI in the eastern vs. the western portions of the county is better understood.

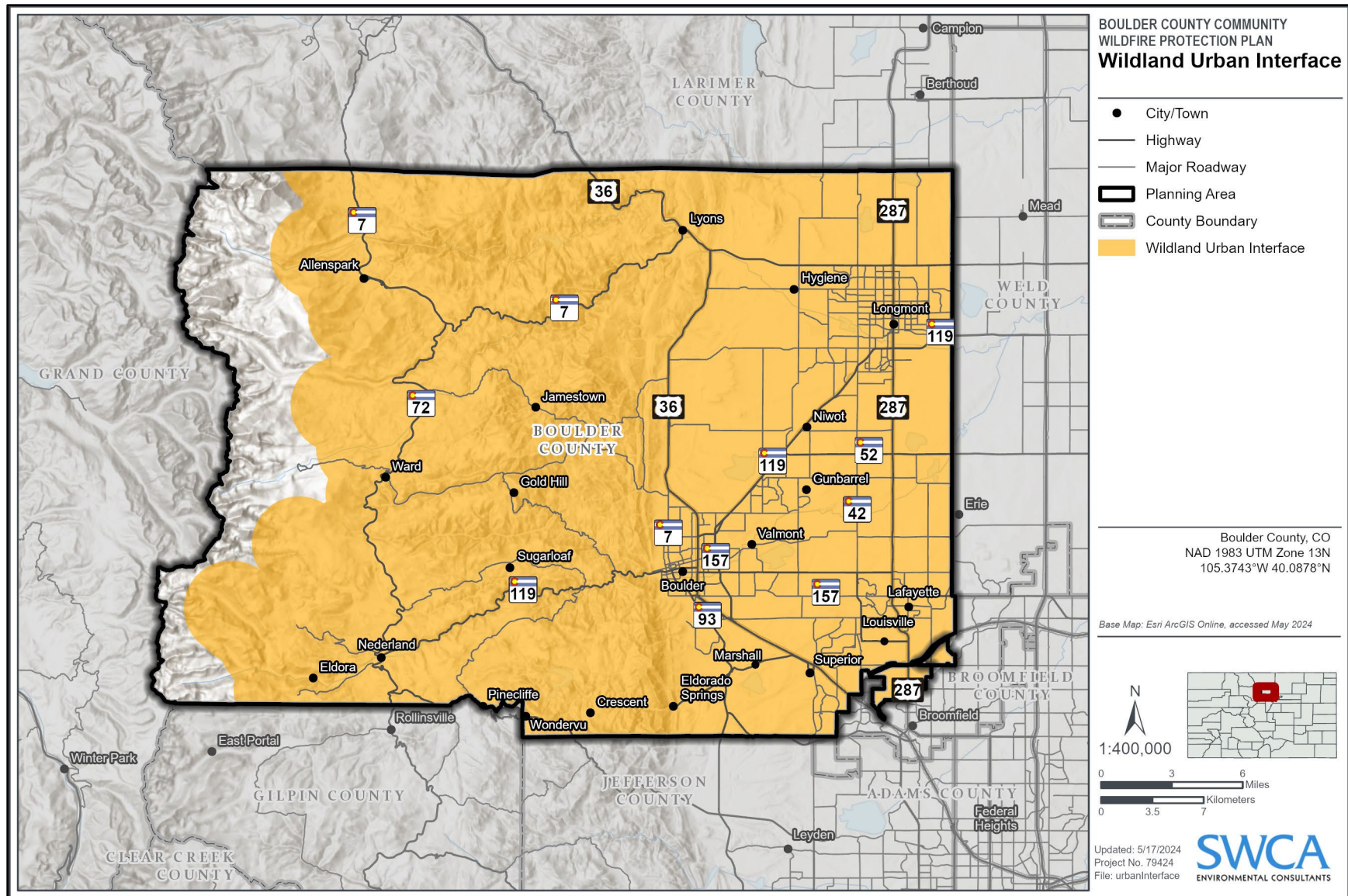


Figure 2.1. Boulder County CWPP planning area WUI map.

WILDLAND-URBAN INTERFACE LAND USE

Cities and counties are continuously challenged to accommodate both current and future residents in need of safe and affordable housing. Between 2010 and 2020, Boulder County's population increased by more than 36,000 people, while the development of new housing has not increased at the rate needed to meet this demand (U.S. Census Bureau 2020). As of 2022, just under half of Colorado's 2.5 million residents live in the WUI (CSFS 2023b). Over 1 million of those residents live in areas the CSFS has assessed as moderate to very high risk of wildfire (CSFS 2023b).

While wildfires are a natural component of Colorado's ecosystems and aid in maintaining healthy forests and grasslands, the development in these interface areas has expanded to meet public demand for proximity to open space. Consequently, structures and communities are now situated in areas historically prone to regular fires, which are essential for forest and grassland health. To restore ecosystems to a more natural state and mitigate wildfire risks, collaboration between land managers and property owners is crucial. Buildings and surrounding properties should be designed to facilitate safe firefighting while allowing wildfires to progress naturally in the ecosystem, promote healthier forests and reduce the threat of large and uncontrollable fires (CSFS 2024a).

Human development into all unincorporated areas beyond cities or towns is guided by the Boulder County Land Use Code. With the primary objective of safeguarding and enhancing the well-being of future resident, the Code dictates the parameters for new construction and development in unincorporated areas. The Code serves to reflect the objectives set forth in the Boulder County Comprehensive Plan and is continuously updated and amended to reflect changing needs and circumstances (Boulder County 2023b).

URBAN CONFLAGRATION

In addition to understanding and delineating the WUI, it is crucial to address the potential risk of urban conflagration within these interface zones. When a wildfire event ignites structures in urban environments, it can become an urban conflagration. Urban conflagration refers to the rapid and widespread ignition and combustion of structures and vegetation within urban environments, often exacerbated by the proximity of structures and the presence of flammable fuels (Calkin et al. 2023).

An urban conflagration refers to a large-scale and uncontrollable fire that rapidly spreads through populated urban areas, causing destruction to buildings, infrastructure, and human lives. These fires often overwhelm local firefighting resources and can result in catastrophic losses (Insurance Institute for Business & Home Safety [IBHS] 2023).

Urban conflagrations continue to pose significant threats to communities across the United States as shown by the Camp Fire, Marshall Fire, and Lahaina Fire. Factors such as drought, high winds, dense urbanization, expansion of development into the WUI, aging infrastructure, and climate change contribute to the frequency and severity of urban conflagrations (Bowman et al. 2017).

Communities can address potential devastating impacts of urban conflagrations by implementing mitigation in the WUI as well as community preparedness and response measures. To enact these measures, communities must use proactive and collaborative planning, effective policy, and ensure robust operational capability (United Nations Office for Disaster Risk Reduction 2019).

Boulder County employs a multifaceted approach to managing conflagration risk, including wildfire mitigation efforts, land-use planning, community outreach, fire department response, and collaboration with regional stakeholders. These proactive measures aim to reduce ignition sources, enhance defensible space around properties, and improve emergency preparedness among residents.

CAUSES OF URBAN CONFLAGRATION

There are several factors that contribute to the occurrence and escalation of urban conflagrations. The four factors listed below are the primary causes identified within the planning area.

1. **Wildland fuels:** wildland fuels in close proximity and near continuous fuels adjacent to the urban built environment create ember showers that impact structures.
2. **Urban built environment:** structures that are less than 50 feet apart, combustible materials creating sustained heat exposure, flammable vegetation covering the property, connective fuels to structures, variable home age and maintenance, openings in the structure where embers can travel to the interior, and fire spread from radiant and convective heat all contribute to urban conflagration.
3. **Weather:** drought conditions, high winds sustained above 30 mph, and low humidity dry out vegetation, as well as building materials and fencing, within the urban built environment.
4. **Firefighting:** firefighting suppression operations capabilities, limited water supply, access challenges, and inability to establish congruent operational command across multiple agencies are common with urban conflagration.

IMPACTS OF URBAN CONFLAGRATION

1. **Loss of life:** conflagrations can result in fatalities and injuries among firefighters, residents, and wildlife.
2. **Property damage:** homes, businesses, infrastructure, and natural resources are often destroyed or severely damaged by conflagrations, leading to substantial economic losses.
3. **Environmental degradation:** conflagrations disrupt ecosystems, damage habitats, and release harmful pollutants into the air and water.
4. **Social disruption:** displacement of communities, evacuation orders, and psychological trauma are common consequences of conflagrations, straining emergency response systems and social cohesion.

Mitigation Strategies

Prevention: public education campaigns, fire safety regulations, and land-use planning can reduce the likelihood of conflagrations by minimizing ignition sources and promoting responsible behavior.

Mitigation: actions taken by residents to reduce the ignitability of the structures on their property, through vegetation management and modification to structures.

Preparedness: investing in early warning systems, firefighting equipment, and emergency response training enhances the capacity to detect and contain conflagrations effectively.

Suppression: tactically deploying firefighting crews and aerial resources and using strategies such as prescribed burns and firebreaks can limit the spread and intensity of conflagrations, safeguarding lives and property.

Resilience: building resilient communities through disaster preparedness initiatives, insurance coverage, and post-fire recovery efforts strengthens the ability to recover from conflagrations and adapt to future threats.

Specific mitigation actions to consider:

- Develop projects in the WUI to manage vegetative and human-made fuels to reduce the rate of fire spread, fire intensity, and the likelihood of wildfire transitioning into the built environment.
- Build with at least 50 feet of building space between structures.
- Increase tree canopy spacing within the home ignition zone.
- Conduct vegetation management within the home ignition zone.
- Adopt building codes requiring non-combustible construction materials.

CURRENT TRENDS AND CLIMATE CHANGE

With the ongoing effects of climate change, the risk of urban conflagrations is expected to escalate in the future. Rising temperatures, prolonged droughts, and extreme weather events increase the likelihood of fire incidents and intensify their impacts to urban environments. Addressing this growing threat requires proactive measures in preparedness, mitigation, and response to safeguard communities and infrastructure.

Effective planning plays a crucial role in mitigating conflagration risks by identifying vulnerable areas, implementing land-use policies that prioritize fire resilience, and integrating fire mitigation strategies into community development plans (European Commission 2021). Incorporating risk assessments and emergency preparedness measures into urban planning processes enables cities to better anticipate and respond to conflagration threats (Pyne 1997). Addressing the conflagration problem and enhancing community resilience, requires a holistic approach encompassing proactive planning, effective policies, and robust operational capabilities.

Key mapping, methodology and recommendations pertaining to supporting socially vulnerable populations can be found in Appendix A.

BOULDER COUNTY WILDFIRE BUILDING CODES

Wildfires are unavoidable in Boulder County and the western United States. In 1989, the Black Tiger Fire swept through the foothills of Boulder County, Colorado, destroying 44 homes and other structures and causing an estimated \$10 million in damage. The fire was the first of many in Boulder County that highlighted the need for wildfire-mitigating land use and building codes.

The conditions that principally determine whether a home survives wildfire occur within 100 feet or the home ignition zone (HIZ) of the structure. These include the home's exterior materials, the surrounding landscaping and vegetation, and the urban and wildland fuels in this area. Boulder County's Land Use and Building Code addresses these elements to reduce the risk of loss of life and property in unincorporated Boulder County.

Since the early 1990s, Boulder County has been regulating the forested areas of the county by requiring ignition-resistant materials and fuel management surrounding new construction. As new information has been brought to light through organizations such as the USFS Missoula Fire Science Laboratory, National Institute of Standards and Technology (NIST), Insurance Institute for Business & Home Safety (IBHS), and the National Fire Protection Association (NFPA), Boulder County has been periodically revising and strengthening the County's codes to align the policy with evolving fire science. As a result of the Marshall Fire, the vulnerability of the urban and suburban areas of Boulder County that are adjacent to grasslands became painfully clear. Boulder County now requires some level of ignition-resistant construction countywide and is committed to refining these regulations to ensure a balance between property owners' architectural freedom, community safety, costs, and the best available fire science. Updates to the Boulder County Building Code are anticipated to address construction details and ember intrusion vulnerabilities. Regulations regarding fuel management will continue to evolve countywide.

Until the Marshall Fire in 2021, the eastern part of the county had experienced few notable fire events in recent history, largely reflecting the contemporary fire regimes established through current land management and land use practices in the county. That fire destroyed almost 1,100 homes, including over 150 in unincorporated Boulder County and over 900 in Superior and Louisville. This prompted the County to update its building code to include ignition-resistant requirements for eastern unincorporated Boulder County—Wildfire Zone 2—effective June 2022. Residents of Boulder County who lost their homes in the Marshall Fire were granted exceptions to adhere to the 2018 requirements due to being underinsured. As of 2024, Boulder County is revising the building codes. Meanwhile, the Land Use Planning Departments of various municipalities develop and enforce their own building codes within their jurisdictions. The codes are a vital part of the County's wildfire mitigation efforts, and they will continue to play an essential role in reducing the risk of loss of life and property from wildfires.

VEGETATION AND LAND COVER

Vegetation zones within the planning area are primarily a function of elevation, slope, aspect, substrate, associated climatic regimes, and land use. Since a broad range in elevation and topography exists across the planning area, characteristics in vegetative communities are highly variable (Figure 2.2).

Dominant vegetation types within the county are described based on a large spatial scale and represent the overall vegetation community structure, which plays a general role in fire occurrence and behavior. Although the vegetation types are outlined for the planning area, site-specific evaluations of the vegetative composition and structure should be taken into consideration when planning fuels treatments.

Vegetation and fuel data (Figures 2.2 and 2.3) is sourced from United States Government LANDFIRE program which provides 25+ national geospatial layers, databases, and ecological models that are available to the public (LANDFIRE 2022). According to LANDFIRE's 2022 vegetation and landcover data, the dominant vegetation types in the planning area are Southern Rocky Mountain Ponderosa Pine Woodland, Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland, Rocky Mountain Lodgepole Pine Forest, Western Cool Temperate Pasture and Hayland, Western Great Plains Foothill and Piedmont Grassland, and Developed-Roads.

FUELS AND TOPOGRAPHY

Many communities in the planning area are surrounded by fire-adapted grasslands and montane forests that have historically experienced natural wildfire. Additionally, the varied and complex topography of

Boulder County influences wildfire spread and intensity differently, which is exemplified by wildfire behavior in eastern Boulder County versus western Boulder County. Variation in terrain can influence the rate of wildfire spread depending on factors such as slope steepness, aspect, and time of day. Steep slopes combined with high fuel loads can significantly increase wildfire risk to western communities. Alternatively, continuous grasslands paired with high winds increase wildfire risk for communities in the east.

Fuels in the planning area were estimated using the updated Scott and Burgan (2005) 40 fuels model (Table 2.1). Most of the planning area is predominantly composed of grass (GR) and grass-shrub (GS) (Pyrologix 2022b), with moderate components of timber litter (TL), burnable developed areas (BU), and timber understory (TU).

Fuel models refer to groups of vegetation with similar physical burning characteristics that affect the spread, intensity, and severity of wildland fires. These characteristics include the loading, size, and bulk density of the vegetation. In contrast, **vegetation type** is a broader term that describes the different categories of plant communities, such as grasslands, shrubs, or forests, without specifically accounting for their fire behavior characteristics.

The COAL Quantitative Wildfire Risk Assessment uses and expands on the 40 fire behavior fuels models established by Scott and Burgan (2005), a nationally recognized standard for fuels modeling.

WESTERN BOULDER COUNTY

Western Boulder County exhibits a highly variable topography, characterized by the Rocky Mountain foothills and extending into mid-elevation conifer forests. This region is predominately occupied by grass-shrub (GS) fuels, timber-understory (TU) fuels, and timber-litter (TL) fuels. The conifer timber litter (TL) fuels are associated with mid-elevation conifer forests, which contribute to a higher risk of fire spread due to dense vegetation and significant fuel loads. Additionally, the western region includes non-burnable areas largely composed of inflammable, rocky surfaces on hill faces and peaks. These variations in terrain, including slope steepness and aspect, significantly influence the rate of wildfire spread and behavior. The diverse topography in this part of the county results in significant variations in climate, weather, and vegetation, impacting local communities by promoting hazardous fire conditions.

EASTERN BOULDER COUNTY

Eastern Boulder County is characterized by topographically flatter areas with predominantly non-irrigated (native) grasslands and more developed urban regions. This region includes densely populated cities such as Boulder, Longmont, and Louisville. Additionally, the area features the transition zone where the foothills meet the plains, resulting in a mixture of grass (GR) and grass-shrub (GS) fuels. The interface between the montane life zone and the plains impacts fire spread by creating varying fuel types and topography. Grass fuels in the flat, open areas can lead to rapid fire spread, especially under windy conditions, while the grass-shrub fuels in the transition zone can facilitate the movement of fires between the plains and foothills. This mix of fuels can result in more complex fire behavior, with fires spreading quickly across grasslands and potentially gaining intensity as they move into areas with denser vegetation.

Figure 2.3 illustrates the Scott and Burgan 40 fire behavior fuel models throughout the planning area. It should be noted that Figure 2.3 includes data through 2022 and captures disturbances caused by the Marshall Fire.

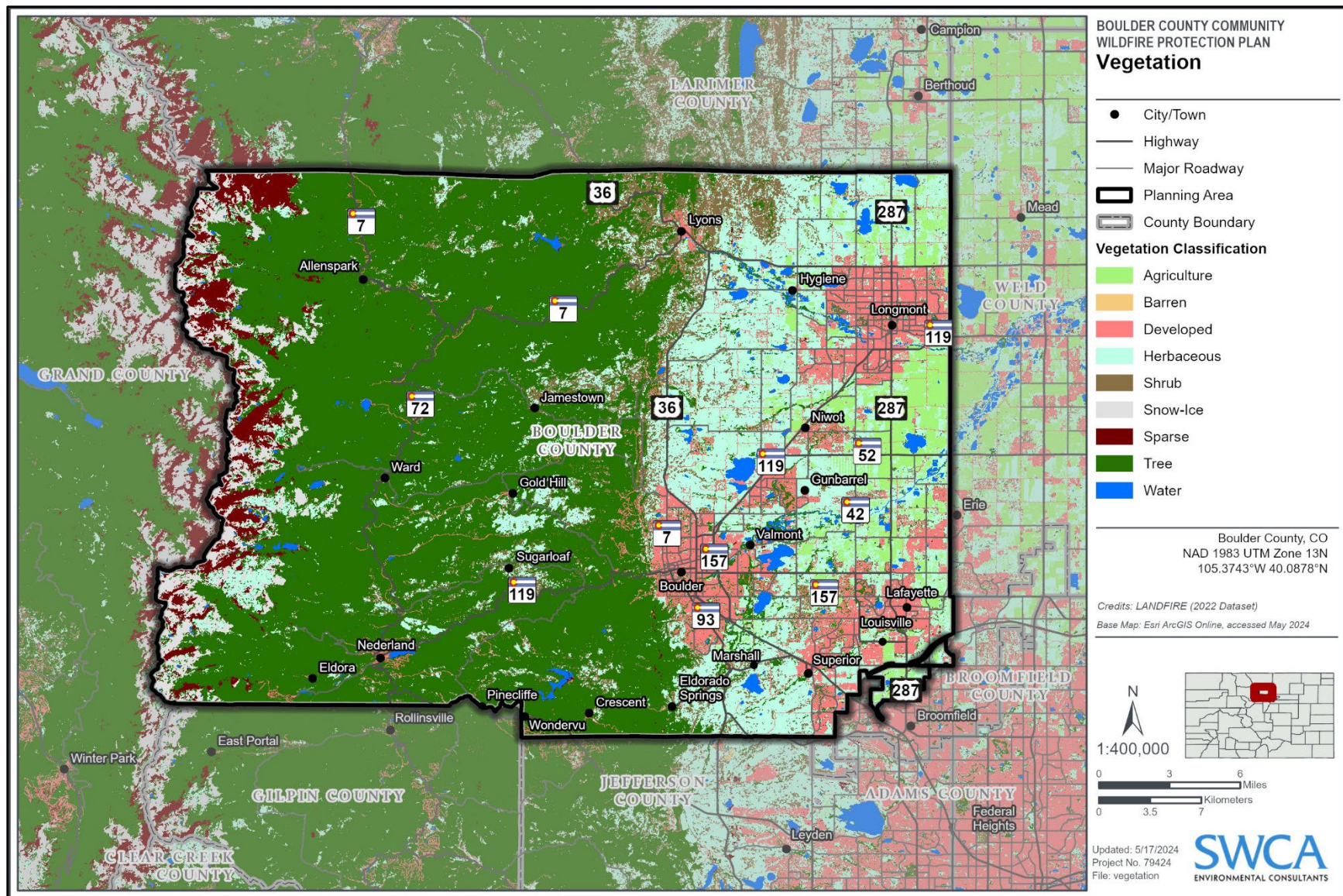


Figure 2.2. Estimated vegetation types (recent to May 2022) in the Boulder County CWPP planning area.

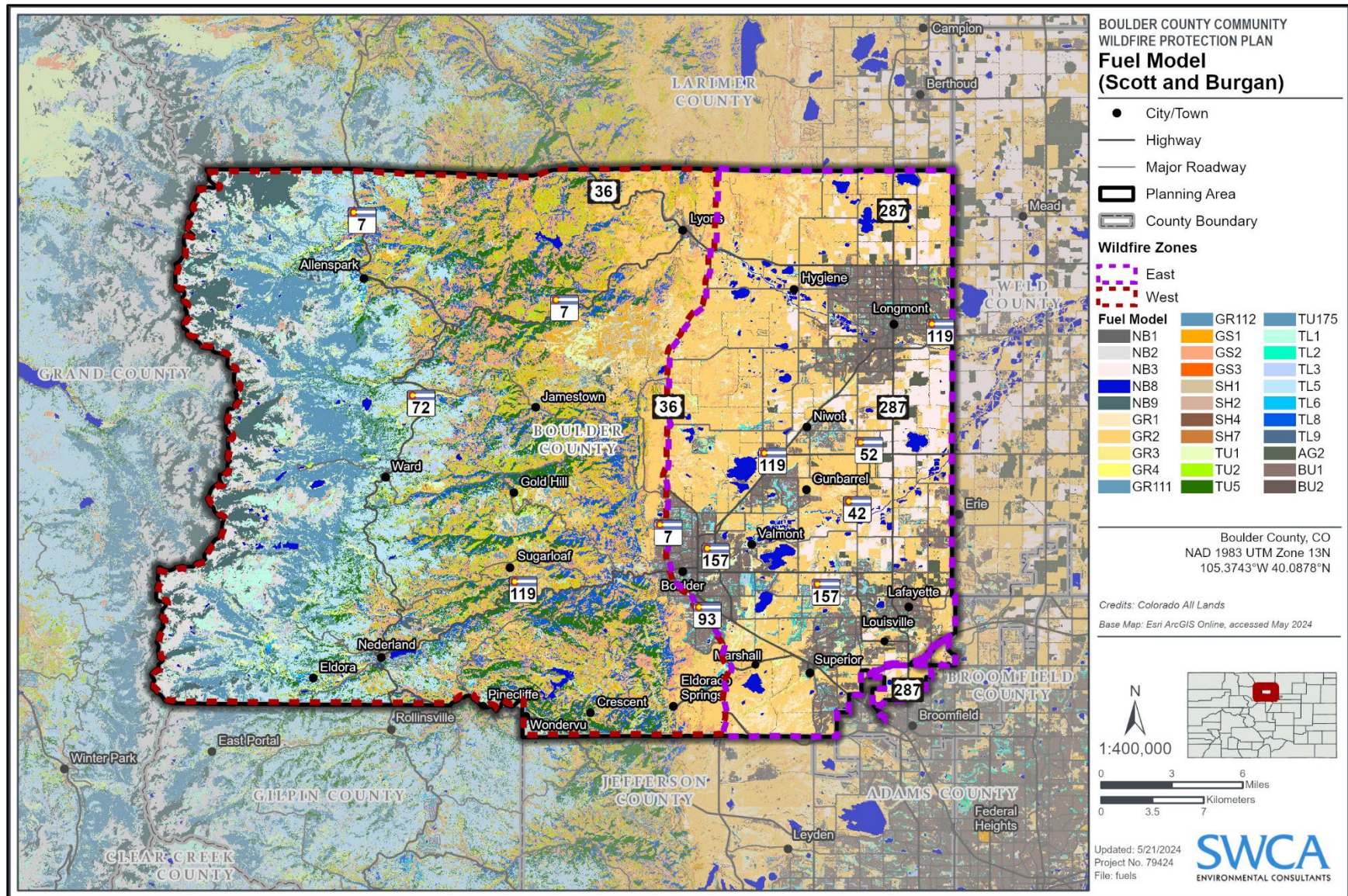


Figure 2.3. Scott and Burgan 40 fire behavior fuel models within the planning area.

Table 2.1. Most Common Fuel Types in the Planning Area

Western Boulder Common Fuel Types	Acres of Planning Area	Percent of Planning Area
GS2 – Grass-shrub, shrubs are 1 to 3 feet high, moderate grass load. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (2.1 tons/acre).	54,779	17.5%
TL5 – Timber Litter, high load conifer litter; light slash or mortality fuel. Spread rate low; flame length low.	35,199	11.3%
TU175 – Timber Understory	29,950	9.6%
TU5 – Timber Understory, fuel bed high load conifer with shrub understory. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).	28,061	9.0%
TL8 – Timber Litter, long needle litter; long needle fuel. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).	22,390	7.0%
GR2 – Grass, moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (1.10 tons/acre).	21,182	6.8%
TU2 – Timber Understory, moderate litter load with shrub component. High extinction moisture. Spread rate is moderate; flame length is low.	18,624	6.0%
TU1 – Low load dry climate timber grass shrub, low load of grass and/or shrub with litter, spread rate and flame low	17,019	5.4%
NB9 – Non-Burnable, bare ground.	16,014	5.1%
GS1 – Grass-shrub, shrubs are about 1-foot high, low grass load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (1.35 tons/acre).	15,911	5.1%
NB2 – Non-Burnable, snow/ice.	14,504	4.6%
Other* – Various Fuel Types.	38,980	12.6%
Eastern Boulder Common Fuel Types	Acres of Planning Area	Percent of Planning Area
GR2 – Grass, moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (1.10 tons/acre).	67,322	41.7%
BU1 – Burnable developed areas.	30,209	18.7%
NB3 – Non-Burnable, agricultural field, maintained in non-burnable condition.	17,804	11.0%
GR1 – Short, sparse dry climate grass is short, naturally or heavy grazing, predicted rate of fire spread and flame length low.	10,727	6.6%
NB8 – Non-Burnable, open water.	6,525	4.0%
GS2 – Grass-shrub, shrubs are 1 to 3 feet high, moderate grass load. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (2.1 tons/acre).	5,105	3.2%
TU1 – Low load dry climate timber grass shrub, low load of grass and/or shrub with litter, spread rate and flame low.	4,633	2.9%
Other* – Various Fuel Types.	19,013	11.9%

* Sum of various fuel types each comprising less than 1% of the planning area's total acreage

To learn more about the how the wildfire hazard was measured, please visit:

http://pyrologix.com/reports/COAL_HazardReport.pdf

Additional information on fuels within the planning area is in Appendix D, Fire Behavior Modeling/GIS Background and Methodology.

FIRE ECOLOGY

Fires are characterized by their severity, the frequency with which they occur, the season in which they occur, their spatial pattern or extent, and their type (surface, passive crown, active crown). Combined, these attributes describe the fire regime.

In more recent times, fire suppression and changes to land use strategies have increased fire return intervals and reduced the size of wildfires when compared to historic conditions (NatureServe 2023). These suppressive actions coupled with other human activities have altered the historic fire regimes found in the eastern and western portions of the county. Due to these past practices the current vegetation landscape is now more homogenous and overstocked with fuels enabling wildfire to spread over large areas with high intensity. Understanding historic fire regimes across fuel types in the planning area (see Figure 2.3) can help practitioners classify, prioritize, and plan for fuels treatments that return the natural ecological role of fire on the landscape.

Boulder County is home to a diverse array of landscapes. The dramatic rise in elevation, as well as changes in slope aspect, results in a variety of ecosystems, each with its own unique characteristics. These ecosystems, or life zones, have a specific relationship with fire, or what is called a fire regime. Understanding the fire regimes across the different life zones of Boulder County can help residents become more adept at living in this unique region of the world.

The major life zones that most Boulder County residents live in are the Plains, Lower Foothills Ecotone, or Montane. Each of these life zones has its own fire regime, which encompasses fire occurrence, behavior, and fire effects within a specified area. Additionally, slope aspect heavily influences precipitation and sun exposure, in turn dictating fire regimes. Northern aspects, for example, are typically cooler and wetter with dense forests experiencing longer fire return intervals. Conversely, southern aspects are generally hotter and drier with less vegetation and shorter fire return intervals. Fire regimes represent the fire return interval, intensity, and severity for a certain vegetation types or life zones.

WESTERN BOULDER COUNTY LIFE ZONES

The western portion of the county is characterized by diverse forest types that vary with elevation. This includes Rocky Mountain ponderosa pine woodlands (a fire-adapted forest community), dry mixed-conifer forests, and higher-elevation subalpine forests dominated by spruce and fir (LANDFIRE 2022). The fire regimes of these ecosystems are influenced significantly by elevation, aspect, and proximity to other ecological zones. Hotter and drier sites, generally found in lower elevations or southern aspects, typically experience shorter fire return intervals. Alternatively, higher elevations and northern aspects are cooler and wetter, contributing to higher fuel loading and longer fire return intervals.

Lower Montane Life Zone

Starting at lower elevations, fire regimes in Rocky Mountain ponderosa pine woodlands in Boulder County have historically been quite variable, with only a small portion, about 20%, of the ponderosa pine stands in Boulder County experiencing low-severity fires (Veblen et al. 2005). These areas are typically found on the gentler terrains of the foothills and the adjoining plains grasslands, which are part of the lower montane zone (Veblen and Donnegan 2006).

The vast majority of these forests, however, have recorded moderate- to high-severity fires (Veblen and Donnegan 2006). This variability is largely attributed to the complex terrain and the differing climatic conditions across the landscape, resulting in a patchy mosaic of fire histories (Veblen and Donnegan 2006). The Rocky Mountain ponderosa pine woodlands (Figure 2.4) typically experience fire return to the landscape in 30 years or more (McKinney 2019). Low-severity fire events occurring in ponderosa pine woodlands at lower elevations bordering more fire-prone grasslands are more frequent and typically return to the landscape in less than 30 years (McKinney 2019).



Figure 2.4. Lower montane ponderosa pine and Douglas-fir stands on northern aspects, with open grass-shrub fuels on the southern aspects in the central portion of the planning area.

Upper Montane Life Zone

Moving higher, the Upper Montane life zone is situated at elevations between approximately 6,000 and 9,000 feet. This zone features mid-elevation, dry mixed-conifer forests, typically composed of species such as ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and lodgepole pine (*Pinus contorta*) (USFS 2012). The fire regimes in these forests vary by site but are generally characterized by low-frequency and mixed-severity fires, with an average historical return interval of 10 to 55 years (USFS 2012). Recent fire suppression policies paired with greater prevalence of drought and insects/diseases due to climate change has resulted in denser forests with higher fuel loads. This greatly increases the chances for high-intensity, stand-replacing wildfire that differs from historical conditions.

Subalpine Life Zone

Elevations in the planning area between 9,000 and 11,000 feet are typically occupied by subalpine ecosystem consisting of subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*), as well as varying densities (intermingled to pure stands) of lodgepole pine (*Pinus contorta*), most notably in previously burned areas (NPS 2022).

Unlike many Colorado forest types, spruce-fir forests (occurring at higher elevations in the planning area) are less fire resistant due to thin bark and persistence of dead lower limbs, increasing susceptibility to fire and crown fire potential. In stand-replacing fires, spruce-fir can take as long as 300 to 400 years to regenerate (CSFS 2022b). Even so, these forests have adapted to wildfire and require wildfire for initiating natural ecological succession in mature stands.

The historical fire regime of lodgepole pine is characterized by moderate- to high-severity, stand-replacing fires. These fires typically occur with a frequency or return interval ranging from several decades to multiple centuries (LANDFIRE 2012). Stand-replacing fires in lodgepole pine forests are essential for the natural regeneration of the ecosystem (Zimmerman and Omi 1998). Lodgepole pinecones remain closed and serotinous until exposed to the high temperatures of a wildfire, at which point they open and release their seeds, promoting the establishment of a new generation of trees (CSFS 2022c). In the absence of fire, shade-tolerant spruce and fir species may become more dominant, leading to more dense vegetation (Figure 2.5) (NPS 2022).

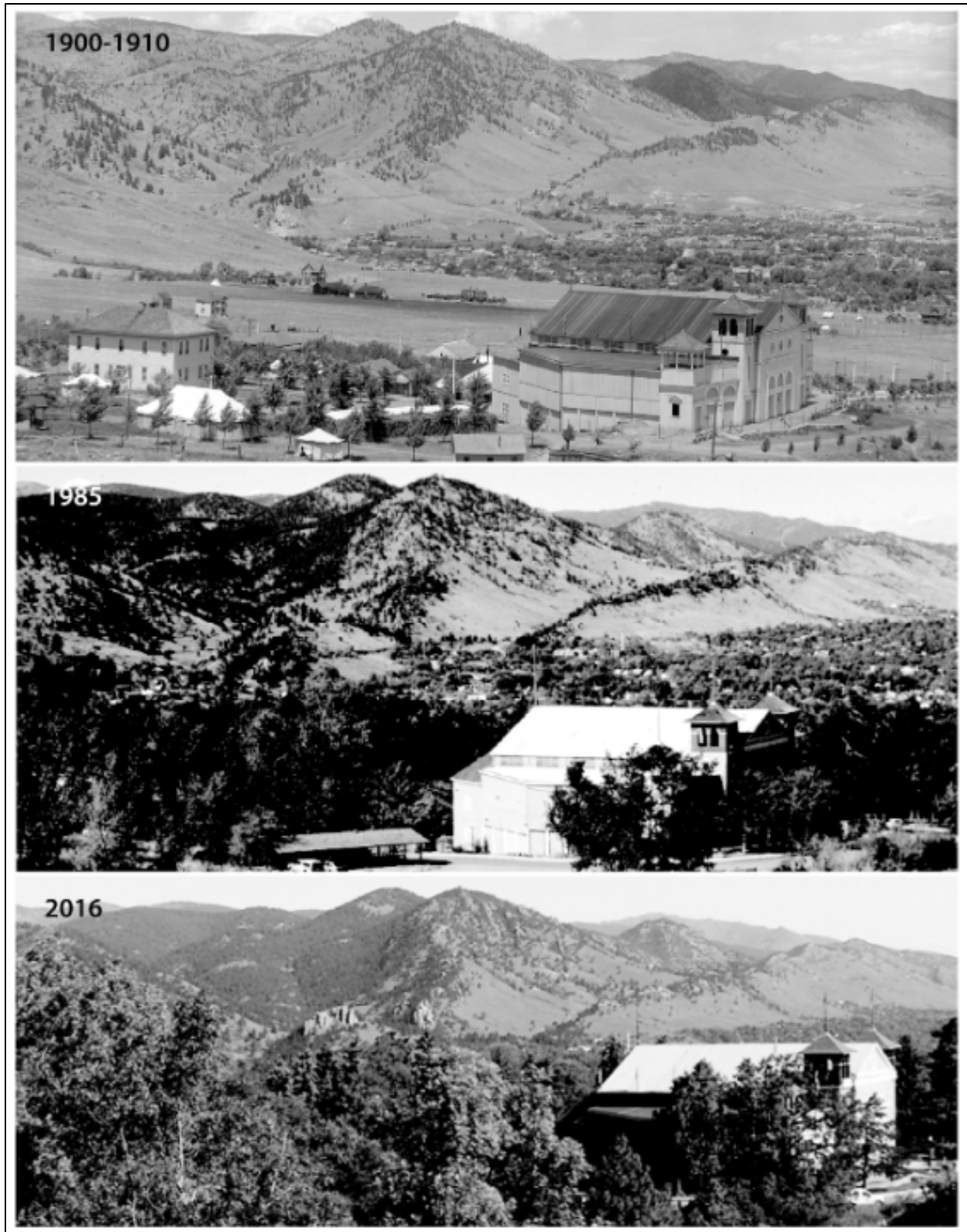


Figure 2.5. Photograph showing evidence of fuel composition changes due to low fire disturbance on and around Boulder County’s Mount Sanitas between the early 1900s and 2016.

Source: Hagmann et al. (2021)

EASTERN BOULDER LIFE ZONES

Fires can and do occur on farmlands, especially during hot and dry conditions (Western Farm Press 2017).

Historically, much of the eastern portion of the planning area reflected high plains mixed-grass prairie vegetation types. The historical fire regimes in these grasslands were frequent occurrences of fire, strongly associated with cycles of moisture and drought (USDA 2005). In more recent times, fire suppression and changes to land use have altered the fire return interval and likely limited the size of wildfires when compared to historic conditions (NatureServe 2023).

The Plains Life Zone

In the Plains life zone, located in the eastern portion of the county below 5,300 feet in elevation (Figure 2.6), fires occur at intervals of 1 to 5 years. They typically burn at a low severity, which is characterized by some consumption of woody material and the renewed growth of grasses from their root system. They are often caused by lightning strikes or spread from the forest to the west, though Indigenous people occasionally started grassland fires to attract game with new growth. Today, the fire regime of the Plains is mostly absent, as the presence of urban development and agriculture has severely altered it. It is not completely gone, however, as evidenced by the disastrous Marshall Fire of 2021 (Boulder County Parks and Open Space 2022).



Figure 2.6. Representative photograph of the grasslands present in the Plains life zone of eastern Boulder County.

Source: Boulder County Parks and Open Space

The current agricultural landscape within the planning area is vast and diverse, with much of the land dedicated to irrigated and native (non-irrigated) grasslands. It is noteworthy that the irrigated grasslands typically deviate from natural fire regimes. However, although a substantial portion of these grasslands are employed for agricultural practices, the majority remains unirrigated and characterized by native grasses. Wildfire risk in grasses depends on land use, timing of management methods, the growing and curing cycle of species, and other interrelated factors. In fact, practices such as grazing and irrigation can mitigate fire risk across the landscape.

Western Great Plains shortgrass prairies (Figure 2.7) extend into the eastern region of the county. This biophysical setting occurs on flat and rolling uplands with elevations ranging from 3,000 to 6,500 feet (USDA 2014). Vegetation is historically characterized by dominant short grasses, including species such as blue grama (*Bouteloua gracilis*), buffalo grass (*Buchloe dactyloides*), western wheatgrass (*Agropyron smithii*), and needlegrasses (*Nassella* spp.), alongside shrubs like prairie sagewort (*Artemisia frigida*) and broom snakeweed (*Gutierrezia sarothrae*) (USDA 2014). The fire regime in these prairies is characterized by a fire return interval of approximately 22 years with high fire severity levels (USDA 2014). Ongoing discussions among researchers continue regarding the historical fire return interval, estimated to be between 5 and 50 years, influenced by factors such as precipitation gradients and fuel characteristics such as fuel load, grazing patterns, and fuel moisture content (USDA 2014).

Another common vegetation type in the planning area is Invasive Perennial Grassland (Figure 2.8). Here, species such as smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*) are the

dominant species (LANDFIRE 2022). Extensive grass cover from a rhizomatous species (species that regenerate from underground stems), such as smooth brome, can result in excessive fine dead fuel loading once newer growth continues to cure, which may result in faster rates of fire spread than that of traditional shortgrass prairies (DFPC 2022a).



Figure 2.7. Non-irrigated grasslands in eastern Boulder County characterized by ankle-high grasses dominated by blue grama and buffalo grasses.

Source: Boulder County.



Figure 2.8. Invasive perennial grassland at Hall Ranch before treatments to reduce invasive species densities, such as cheatgrass.

Source: Boulder County Parks and Open Space (2021).

Lower Foothills Ecotone

In the Lower Foothills Ecotone, located at elevations between 5,300 and 6,400 feet (Figure 2.9), the character of fire changes as the vegetation transitions from grasses to shrubs and scattered trees. The fire regime is highly variable depending on slope, aspect, and fuel conditions. Fires carried by the grasses occur as frequently as every few years, while the shrubs and trees burn more infrequently when conditions are favorable. Severity and intensity are also highly variable, from low-intensity grass fire to higher severity where shrubs dominate. This varied severity allows for a diverse mixture of plant and animal species in this life zone. Because of fire suppression in the twentieth century, this life zone has become less dominated by grass and shrubs as higher-density ponderosa pine forests have been allowed to take over. This change has led to higher-severity fires occurring in a life zone that is located just west of the County's major population centers. An example of a Lower Foothills Ecotone fire is the eastern portion of the Cal-Wood Fire of 2020 (Boulder County Parks and Open Space 2022).



Figure 2.9. Representative picture of the Lower Foothills Ecotone in Eastern Boulder County.

Source: Boulder County Parks and Open Space

FIRE HISTORY

Fire is a natural part of Colorado's diverse landscapes and is essential to many ecosystems across the state. Almost all of Colorado's diverse ecosystems are fire-dependent or fire-adapted. For centuries, many Colorado Native American tribes recognized this interdependence between fire and the ecosystem and used prescribed fire and other traditional cultural practices to maintain and restore ecosystem health. However, in the 1800s, a shift in management actions—settlers began enforcing strict fire suppression regimes and widespread livestock grazing—led to challenges such as dense stand conditions, unhealthy rangelands, and increased ecosystem and community vulnerability to fire.

While evidence suggests that the fire regimes for some forests and grasslands within the planning area may still fall within their historic range of variation, indications also point to the detrimental effects of wildland fire suppression. This suppression appears to be impacting the health of forest and grassland ecosystems, agricultural water infrastructure, and causing a departure from historic conditions (USFS 2015). Furthermore, other actions such as human expansion into wildlands, climate change, and forest health degradation have likely resulted in an imbalance between wildfire and ecosystem interactions (Higuera et al. 2021).

Changes in management actions have also influenced the causes and frequency of forest fires. As human activities have expanded into wildlands, the risk of fire ignition has increased. Figure 2.10 illustrates national-level statistics for wildfire causation (Arshad et al. 2022).

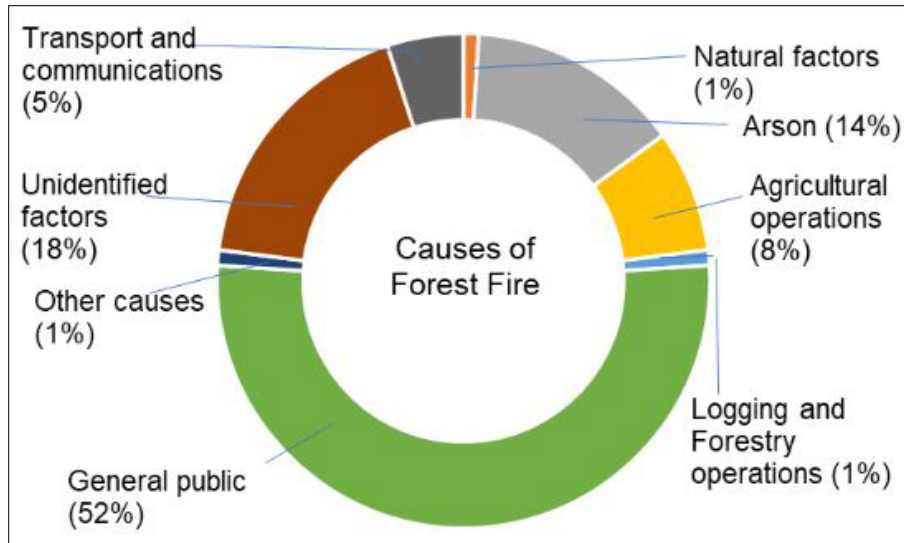


Figure 2.10. Causes of forest fires.

Source: Arshad et al. (2022)

Overall, human activity, whether it be intentional or unintentional, is the primary cause for the majority of wildland fires. Unattended campfires, chains dragging from a trailer, tossing a cigarette, and spontaneous combustion of debris piles are examples of unintentional fires, which get combined under the category of 'general public'. If a more specific cause can be determined, such as agricultural operations, logging and forestry operations, then it is recorded as such. As these are national statistics, it should be noted that different areas and agencies have various reporting categories and criteria. The graph is an attempt to capture and categorize data from a variety of reporting systems.

In Boulder County, each fire department and district have the responsibility for determining causes of wildland fires and reporting findings to a national database. However, it is often difficult to make a conclusive determination about what started a fire. Wildfires are often listed as 'general human activity', 'unidentified', or 'other'. Additionally, investigations can have legal consequences; without clear evidence that points to a single irrefutable cause, investigators may generalize the cause of the fire to 'general public' because the evidence is not sufficient for legal prosecution.

There are more people than ever enjoying the trails and open space areas in Boulder County and throughout the United States. Through extensive public education, outreach, and instigating periodic burn bans, land management agencies are continuously working to increase public awareness about how individual actions can limit the number of wildland fires in Boulder County.

PAST WILDFIRE IMPACTS

The following statistics on past wildfires in Boulder County are sourced from Chapter 4 of the 2022–2027 Boulder County Hazard Mitigation Plan and updated with Boulder County Sheriff's office investigations.

December 30, 2021: The Marshall Fire

Cause of the fire: Hot particles discharged from Xcel Energy power lines.

Total acreage burned: 6,026 acres.

Number of homes and/or residents evacuated: Tens of thousands of residents in the Town of Superior and the cities of Louisville, Broomfield, and unincorporated Boulder County.

Number of homes and/or structures lost: 1,084 buildings destroyed.

Number of casualties: Two confirmed dead. Numerous animals and pets perished as well.

Total cost to suppress the fire: \$513 million.

Fire characteristics: Dry conditions and very high winds gusting up to 115 mph drove the fire east toward suburban communities.

October 17, 2020: The Cal-Wood Fire

Cause of the fire: Unknown.

Total acreage burned: 10,113 acres.

Number of homes and/or structures lost: 26 structures lost or damaged.

Fire characteristics: The fire rapidly grew in size due to dry conditions and high westerly winds.

March 19, 2017: The Sunshine Fire

Cause of the fire: Unattended campfire.

Total acreage burned: 62 acres.

Number of homes and/or residents evacuated: 426 homes, 20,000 residents on standby.

Total cost to suppress the fire: \$800,000.

Fire characteristics: No structures damaged or lives lost.

July 9, 2016: The Cold Springs Fire

Cause of the fire: Campfire on private property that had not been properly extinguished.

Total acreage burned: More than 500 acres.

Number of homes and/or residents evacuated: More than 1,900 residents.

Number of homes and/or structures lost: 8 homes.

Fire characteristics: All homes within the fire's perimeter that were part of the Wildfire Partners Program survived.

September 6, 2010: The Fourmile Canyon Fire

Cause of the fire: Fire in a fire pit not fully extinguished.

Total acreage burned: 6,200 acres.

Number of homes and/or structures lost: 169 structures.

Fire characteristics: High winds fanned the embers, and the fire grew rapidly.

February 14, 2006: The Elk Mountain Fire

Cause of the fire: Fireplace ashes dumped outside a mobile home.

Total acreage burned: 600 acres.

Fire characteristics: Gusting winds spread the hot ash, igniting nearby grasses that were tinder-dry.

October 29, 2003: The Overland Fire

Cause of the fire: High winds sheared off the top half of a tree, which fell onto a power line.

Total acreage burned: 3,500 acres.

Number of homes and/or residents evacuated: Jamestown was evacuated, and roads and schools were closed for 24 hours.

Number of homes and/or structures lost: 12 residences and several outbuildings.

Total cost to suppress the fire: \$400,000.

Fire characteristics: High winds and dry weather conditions contributed to the fire's spread.

November 24, 1990: The Olde Stage Road Fire

Cause of the fire: A man threw a burning mattress out his front door.

Total acreage burned: Approximately 3,000 acres.

Number of homes and/or structures lost: 10 homes and five outbuildings.

Fire characteristics: Wind gusts up to 80 mph fanned the fire out of control.

July 9, 1989: The Black Tiger Fire

Cause of the fire: Human-caused.

Total acreage burned: Over 2,100 acres.

Number of homes and/or structures lost: 44 homes.

Total cost to suppress the fire: \$10 million.

Fire characteristics: Hot temperatures, low humidity, and gusty winds contributed to the fire's spread.

CLIMATE AND WEATHER PATTERNS

Substantial variations in topography throughout the planning area contribute to the varied climate and weather patterns observed in western and eastern Boulder County. Below, there is information about both the high elevations in western Boulder and the lower elevations in eastern Boulder. Low elevation rangelands and plains are comparatively warm and dry compared with the higher-elevation areas, which are generally cooler and receive more precipitation. The combination of slope and aspect, paired with weather and climate has a significant impact to the spread of wildfires in western Boulder County (Butler et al. 2007). Figure 2.11 illustrates how weather and topography can cause flames to race up hills creating a wildfire hazard to structures located on slopes above wildland fuels. Conversely, Figure 2.12 demonstrates how wind conditions can drive fire behavior downhill, as they did during the Marshall Fire. Eastern Boulder County is characterized by less varied topography and is primarily influenced by fuels rather than topography.

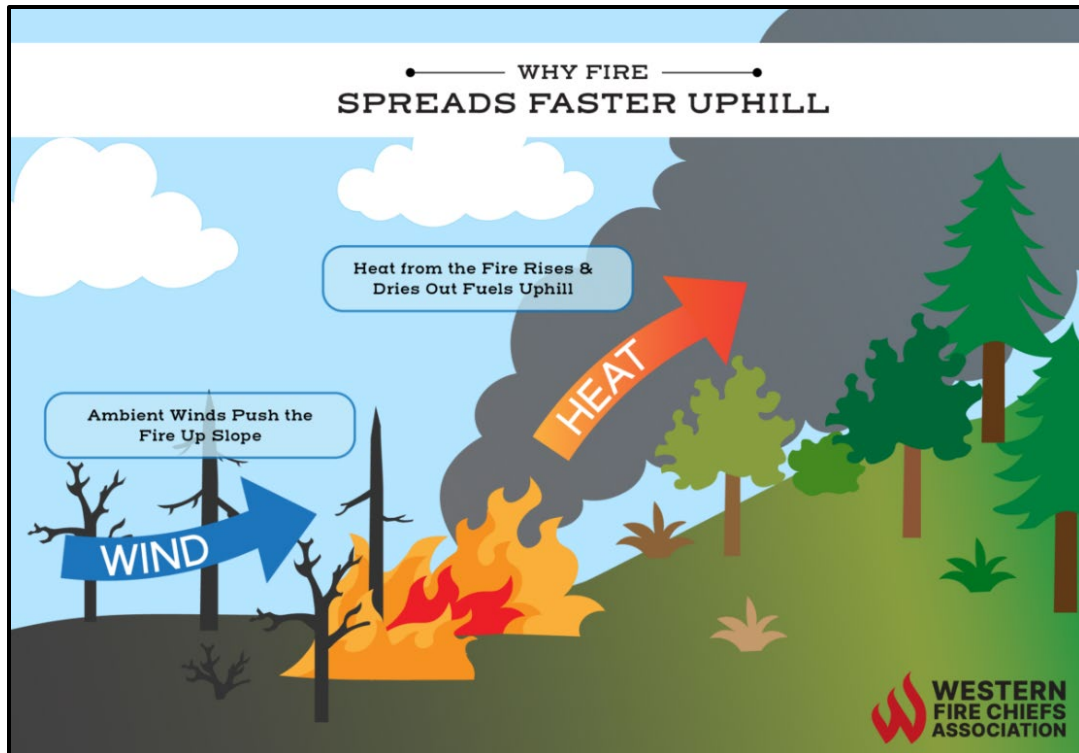


Figure 2.11. Standard fire behavior on topographic features, such as slopes and hillsides.

Source: Western Fire Chief Association (WFCA) 2024.

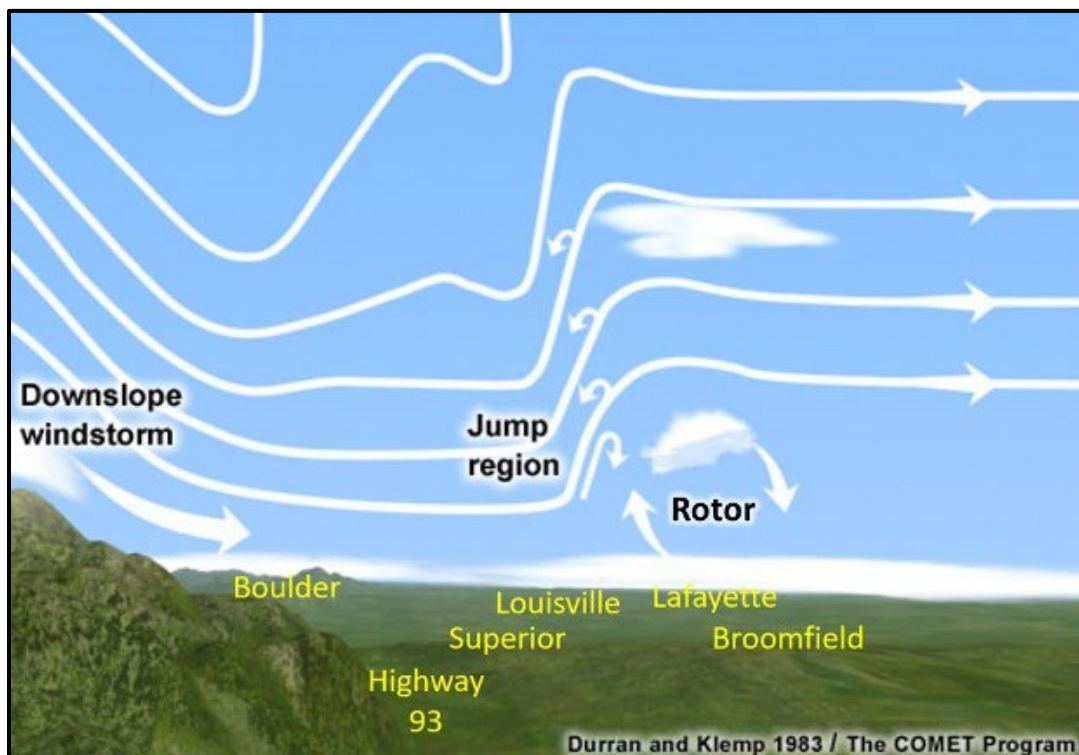


Figure 2.12. Diagram of wind events that will drive fire behavior downhill.

Source: National Oceanic and Atmospheric Administration [NOAA] 2021.

Table 2.2 presents mean annual precipitation and temperature data offering a comparison between the western and eastern regions of the county. The data are sourced from two stations (east and west) in the county. The eastern station is located in the center of the City of Boulder, positioned at the mountain-grassland interface at the base of the foothills (Table 2.2). The western station called the Boulder 14 W station is located just north of Nederland, capturing weather data in the western regions of the county with diverse topography and elevated terrains. Areas near Nederland experience on average almost 40% more precipitation than regions in the eastern plains. The eastern portions of the county generally experience higher temperatures compared to the areas at high elevations in the western portions of the county, which from 1991 to 2020 had mean annual temperatures approximately 30% lower than the mean annual temperatures in east (NOAA 2022a).

Table 2.2. Mean Annual Temperature and Precipitation by Station in the Planning Area

Station	Period of Record	Mean Annual Precipitation (Inches)	Mean Annual Temperature (°F)		
			Max	Min	Mean Annual
Boulder	1991–2020	21.2	65.7	37.4	51.5
Boulder 14 W	1992–2020	33.9	45.5	25.0	35.2

Source: NOAA (2022a).

July is typically the hottest month of the year in the eastern portions of the county, with average July maximum temperatures reaching 88°F. December is usually the coldest month, with average December minimum temperatures reaching 21.1°F, while the month with the highest average snow fall is March (NOAA 2022a).

Annual precipitation in the eastern portions of the county peaks in May with an average of 3.21 inches. The winter and spring months are usually the wettest months of the year in the high-elevation montane areas near Nederland. June is typically the driest month of the year in the region. Precipitation totals in June average 1.95 inches in the eastern areas. Particularly dry summer months can exacerbate fire risk, especially in years with a weak monsoon effect in July and August.

The western areas of the county, with elevated terrains and diverse topography, are more prone to receiving higher levels of precipitation due to orographic lifting and the presence of mountain ranges, which enhance moisture retention and promote cloud formation (Napoli et al. 2019). In contrast, the eastern plains, characterized by flatter terrain and greater distance from moisture sources, experience drier conditions and higher temperatures (Roth et al. 2021). These disparities in climate patterns have significant implications for wildfire behavior and risk. The arid conditions and elevated temperatures in the east create a conducive environment for wildfires, increasing the likelihood of ignition and facilitating rapid fire spread. In contrast, the regions in western Boulder County face different challenges influenced by topography and weather patterns.

Monthly climate normal (30-year averages) for the eastern plains (Figure 2.13) and the western portion of the planning area near Nederland (Figure 2.14) are depicted below.

It should be noted that, with climate change, Colorado is expected to experience significant changes in weather, which will likely exacerbate the behavior of future fires. Specific to wildfires, under all climate change scenarios, Colorado is expected to have increased summer temperatures and is already experiencing year-round fire seasons. Precipitation totals are less likely to change, but the timing and duration of precipitation events will be more variable (Colorado Water Conservation Board 2023). Overall, the warmer temperatures will bring about drier weather in Boulder, which will exacerbate the fire risk.

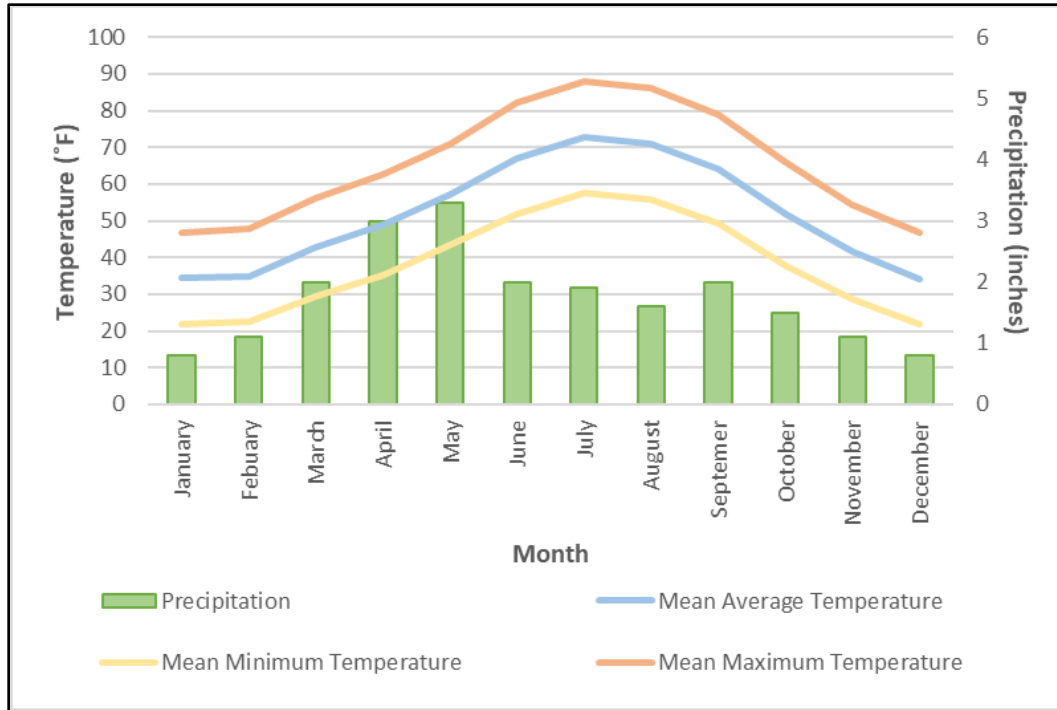


Figure 2.13. Monthly climate averages for the Boulder station, 1991–2020.

Source: NOAA (2022a).

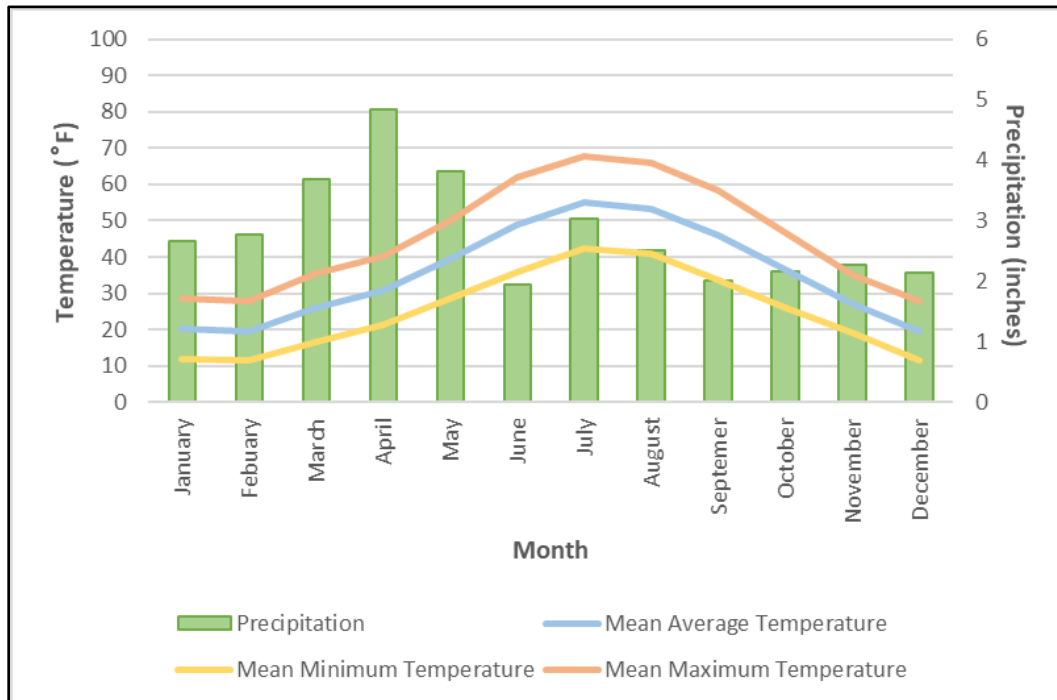


Figure 2.14. Monthly climate averages for the Boulder 14 W station, 1991–2020.

Source: NOAA (2022a).

WIND

Wind is an important and unpredictable factor in determining fire behavior. Wind can be influenced by pressure systems, topography, time of day, and even wildfires themselves. High winds are often responsible for fast rates of spread, long flame lengths, and high fireline intensity, which greatly reduce the ability of emergency resources to suppress these fast-moving, wind-driven fires. Under extremely windy conditions wildfires are often difficult or nearly impossible to suppress. Even moderate winds can create dangerous conditions that prevent aerial resources (helicopters and planes) from taking off and providing support.

A recent example of this occurring within Boulder County is the Marshall Fire in 2021. The winds during the Marshall Fire were from the prevailing direction (Figure 2.15) but were much greater than the average wind speed (Figure 2.16). The prevailing wind direction (west) is where the highest wind speeds originate (Figure 2.17). While most severe windstorms in Boulder County's recent history were observed to have significant lulls in wind intensity, the measurements during the Marshall Fire reflected little fluctuation, with southwest winds gusting at 60 to 100 mph for 10 to 11 hours (NOAA 2024). High winds will increase rates of spread and flame lengths in all fuel types, as was seen in grass fuels during this event (Figure 2.18).

Every notable fire in the Boulder area since 1989 has been driven by high winds. These include the Cal-Wood and Lefthand Canyon Fires (Boulder County 2023c), Cold Spring Fire, Fourmile Canyon Fire, Overland Fire, Olde Stage Road Fire, and Black Tiger Fire. In multiple cases, high winds were responsible for knocking down power lines, ultimately igniting wildfires (5280fire 2009; Boulder County 2023c; Wildfire Today 2016).

The occurrence of many fires listed above, such as the Marshall Fire in late December, the Olde Stage Road Fire in early January, and the Overland Fire in late October, highlight the fact that wildfires can happen beyond the boundaries of traditional fire seasons. During these atypical months, when vegetation may not be as dry as during the peak summer season, the influence of wind becomes even more significant in fueling fire behavior. The timing of these events emphasizes the critical recognition of wind-driven occurrences as a year-round risk factor for wildfire occurrence and spread.

Average local wind speeds and prevailing directions, as shown in Figures 2.15, 2.16, and 2.17, provide evidence to suggest that the most dangerous and destructive fires in the planning area are fast-moving, wind-driven fires that travel from forested regions in the west to grasslands in the east (Figure 2.18) (5280fire 2009; Wildfire Today 2016). The National Weather Service will announce red flag warnings when a combination of weather factors such as low relative humidity and high winds and temperatures can support rapid fire growth. The wind frequency roses shown below visualize wind characteristics on a cardinal plane defined by degrees: north (0°), east (90°), south (180°), and west (270°).

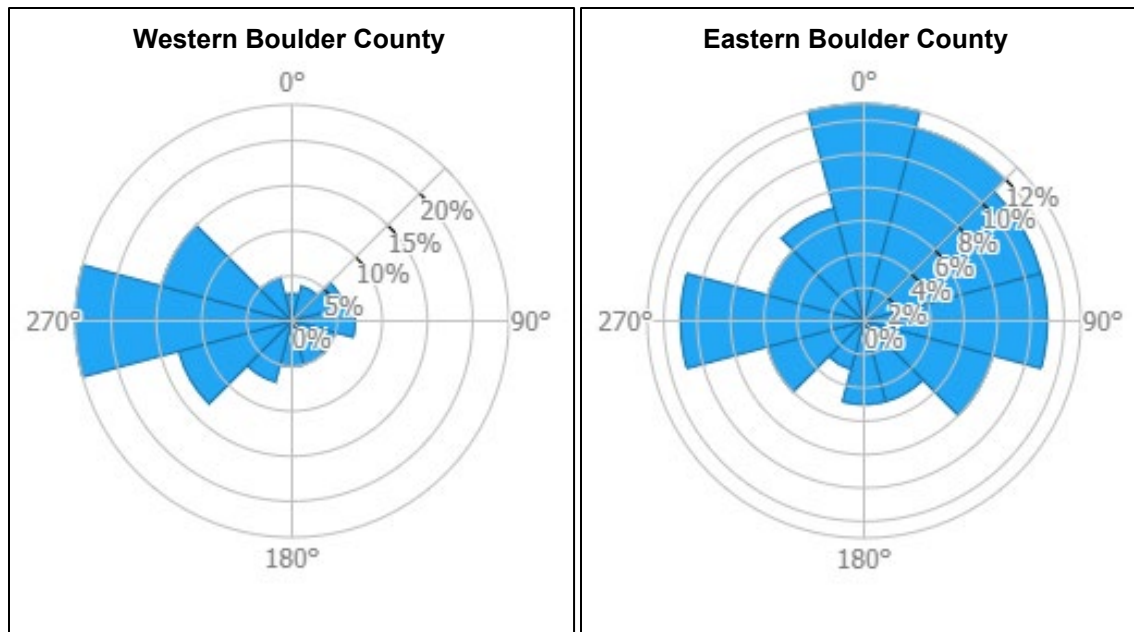


Figure 2.15. Wind frequency roses from western (left) and eastern (right) Boulder County recording data at 10-meter heights, showing the prevailing wind direction as an average percentage of daily wind direction.

In total, 25% of the wind blowing in the western area of Boulder County comes from the west, and 12% of the wind blowing in eastern Boulder County comes from the northeast.

Source: Global Wind Atlas (2023).

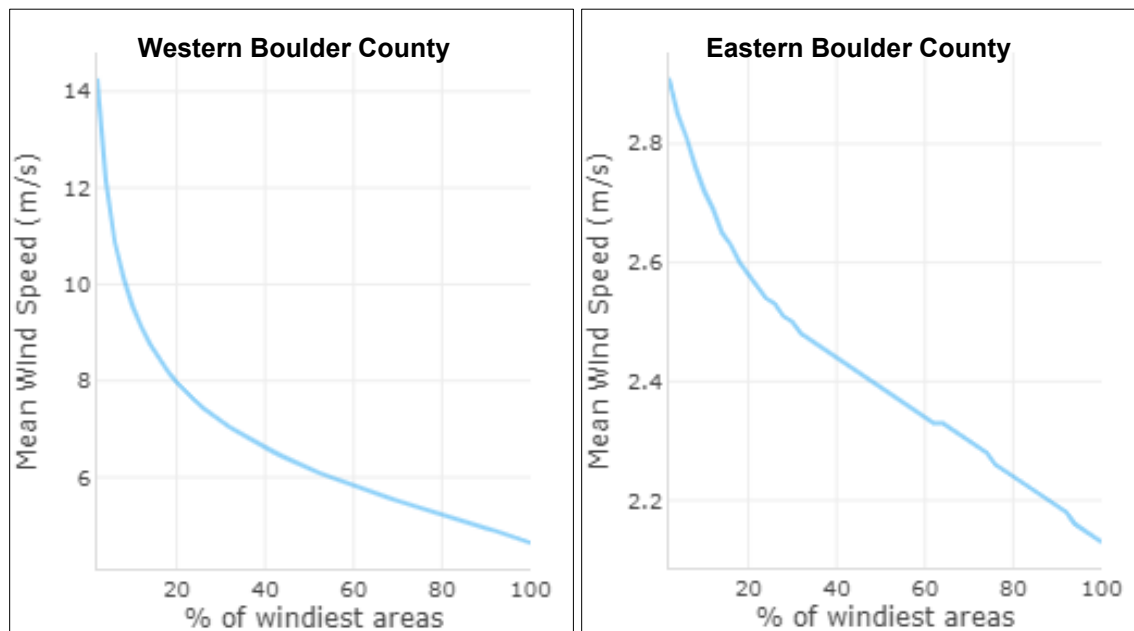


Figure 2.16. Mean wind speed (in meters per second [m/s]) for different percentiles of windy areas within western Boulder County (left) and eastern Boulder County (right).

In western Boulder County, the average windspeed in the top 20% windiest areas is about 8 m/s (approximately 18 miles per hour), with an average windspeed for most of western Boulder of about 3 to 4 m/s (approximately 7 to 8 miles per hour). In eastern Boulder County, the average wind speed in the top 20% of windiest areas is about 2.8 m/s (approximately 6 miles per hour), with the average windspeed for most of the area at 2.2 m/s (approximately 5 miles per hour).

Source: Global Wind Atlas (2023).

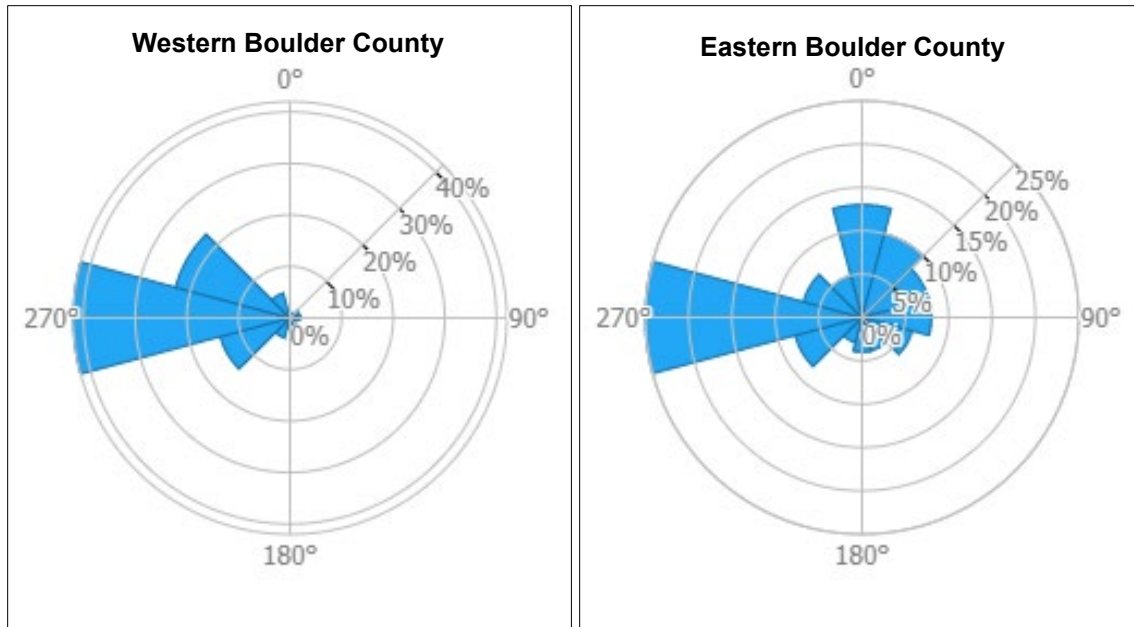


Figure 2.17. Wind speed roses recording data at 10 meters, showing the direction from which the most windspeed prevails from in western Boulder County (left) and eastern Boulder County (right).

Note that 40% of the wind speed experienced by western Boulder County (left) prevails from 270° west. In eastern Boulder County (right), 25% of the wind speed experienced in the area prevails from 270° west.

Source: Global Wind Atlas (2023).



Figure 2.18. High winds creating a tall and fast-moving flaming front during the Marshall Fire.

Source: Mountain View FPD (2021).

PAST FIRE MANAGEMENT POLICIES AND LAND MANAGEMENT ACTIONS

Fire management in Colorado and the western United States has adapted over time in response to changing knowledge of forest ecosystems. In the 1970s, modern forest management research aligned with long founded Indigenous knowledge confirming that wildfire plays a natural and pivotal role in these ecosystems, and by the turn of the century, complete fire suppression tactics on publicly managed land were mostly replaced with a combination of suppression, containment, and mitigation measures such as fuel treatments and prescribed fire (Forests and Rangelands 2021).

Although these practices now protect and restore lands through methods grounded in science, some areas in Boulder and the foothills have excessive fuel buildups, dense and continuous vegetative cover, and tree and shrub encroachment into previously open rangelands as a result of historic suppression strategies (USFS 1997). This has become an issue that community members throughout Boulder County have become more aware of, particularly after the mass destruction following the Marshall Fire (Boulder County 2022b). Drake Research & Strategy, Inc. presented the results of Boulder County's 2022 annual public opinion survey, revealing a notable shift in priorities among Boulder County residents, with wildfire mitigation now ranking as the second most important issue (Boulder County 2022b). This underscores the heightened concern among residents regarding the need for proactive measures to address fuel buildups and other wildfire hazards (Boulder County 2022b).

RECENT FIRE OCCURRENCE

Colorado's fire season has been estimated to occur between mid-May and mid-October (Wei et al. 2016). However, as the Marshall Fire shows, fires can occur at any time of the year when dry conditions, extreme wind, and burnable fuel are present. It is important to note that the largest fires that have occurred in the planning area have not occurred during the typical fire season months. Outlined below are several destructive fires experienced by the county in the past decade:

NCAR Fire: On March 26, 2022, a human-caused ignition started the NCAR Fire inside the city limits of Boulder by less than 100 feet (Boulder County Sheriff's Office 2022). The origin of the fire was determined to be just a few feet off Bear Canyon Trail on the Boulder Open Space and Mountain Parks (OSMP) property south of the NCAR facility. Before it was contained, the NCAR Fire burned almost 200 acres, impacting 1,629 people, 699 housing units, and 836 buildings (Garrison 2022).

Marshall Fire: On December 30, 2021, the Marshall Fire ignited near the intersection of Colorado State Highway 93 and Eldorado Springs Drive and comprised two separate fires that later merged (Boulder County 2023c, 2023e). Now known to be largest and most destructive wildfire to occur in the Boulder area, the Marshall Fire resulted in 6,026 acres burned, over 1,000 homes and commercial structures destroyed or damaged, and two fatalities (Boulder County 2023f). Extremely high winds and cured dry winter grass fuels contributed to rapid spread and long flame lengths. The National Renewable Energy laboratory recorded 111 separate wind gusts exceeding 75 mph on December 30, 2021 (Boulder County 2023g). Under these conditions, wildfire suppression was extremely difficult, and evacuations became a priority.

Cal-Wood Fire: The Cal-Wood Fire began October 17, 2020, outside of Jamestown near the Cal-Wood Education Center property off County Road 87. The fire burned 35 acres per minute for over 3 hours after the initial ignition, pushed by low- humidity, heavy west winds, and dry conditions (Colorado Public Radio 2020). On Sunday, October 18 the BCSO Communications Center received a report of a second wildfire near Ward, in the Lefthand Canyon and Spring Gulch area. This blaze, known as the Lefthand Canyon Fire, scorched 460 acres. There were no fatalities, but 26 structures were lost or damaged and the cost of suppression resources for the Cal-wood Fire is estimated at \$6.6 million (Boulder County Sheriff's Office 2021; Boulder County 2021b; Boulder County 2023c).

Cold Spring Fire: The Cold Springs Fire started on July 9, 2016, near Nederland, Colorado, sparked by an illegal, and inadequately extinguished, campfire on private property. Fueled by heavy vegetation and windy conditions, the fire exhibited intense crown fire behavior, scorching 528 acres primarily on private land. Evacuation orders affected nearly 2,000 individuals and their large animals, while eight homes, valued at approximately \$2.43 million, were lost. Despite the property damage, there were no fatalities (Boulder County 2023c)

Figure 2.19 displays historical wildfire data and statistics in the planning area.

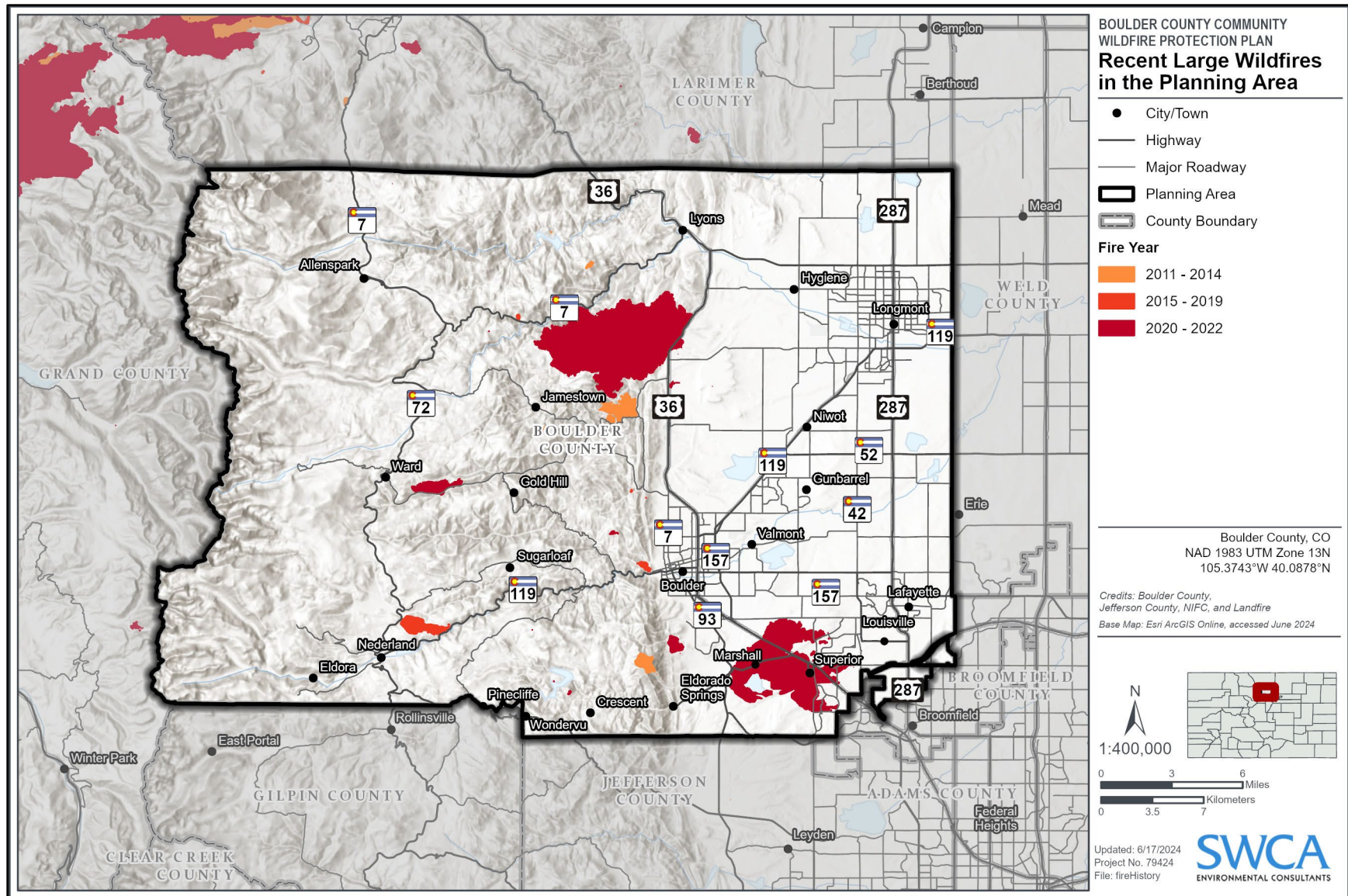


Figure 2.19. Recent wildfire history in the Boulder County CWPP planning area (not all small fires are depicted on this map).

FIRE RESPONSE CAPABILITIES

PLANNING DECISION AND SUPPORT

A primary emergency management tool utilized by all levels of government, nongovernmental organizations, and private sectors, is the National Incident Management System (NIMS). NIMS, established by the Federal Emergency Management Agency (FEMA), is a standard that works to prevent, respond, mitigate, and recover from incidents (FEMA 2008). In the context of incident response, the NIMS Incident Command System (ICS) plays a pivotal role in ensuring a coordinated effort. It enables effective collaboration between businesses and public agencies involved in activities such as firefighting and property conservation (Ready 2023).

Wildfires have continued to grow in size and severity over the last decade, requiring fire managers to institute more robust pre-fire planning as well as adaptive and improved decision-making tools in order to reduce risk to fire responders and the public.

In the event of an incident, activities such as firefighting and property conservation may be ongoing at the scene, while others involved in incident stabilization, business continuity, or crisis communications report to an Emergency Operations Center (EOC). The EOC serves as a critical component triggered in response to major incidents that cause significant property damage or disruption to local businesses or that pose potential impacts to the community (Ready 2023). It provides a space for decision makers to gather, receive up-to-date information, and make informed decisions. The EOC, whether physical or virtual, serves as the central hub for coordinating and supporting incident management activities.

Along with the efficiency of NIMS and ICS, Boulder County benefits from a local Incident Management Team (IMT), a vital component in the region's emergency management structure. Established in 2010, the Boulder IMT has responded to significant emergencies over the years, including the Fourmile Canyon and Dome Fires in 2010, the September 2013 floods, the Cold Springs Fire in 2016, the Sunshine Fire in 2017, and various other smaller incidents (Boulder IMT 2024). For more information on the local IMT, see below.

FIRE RESOURCES

Fire management in Colorado is accomplished through a cooperative interagency partnership among federal, state, and local entities. Regional wildland fire response is directed and managed by regional interagency fire centers in Colorado. These dispatch centers are part of the larger Rocky Mountain Area Coordination Center. The dispatch centers in Colorado include Fort Collins, Craig, Grand Junction, Montrose, Durango, and Pueblo Interagency Dispatch Centers. Wildfire response in Boulder County is largely an interagency cooperative effort (Geographic Area Coordination Centers [GACC] 2024). Dispatch services for Boulder County wildfires are currently provided by the Fort Collins Dispatch Center, although due to consolidation efforts among the Colorado Interagency Dispatch Centers, this information is subject to change. See Figure 2.20 for a map of fire response areas for Boulder County.

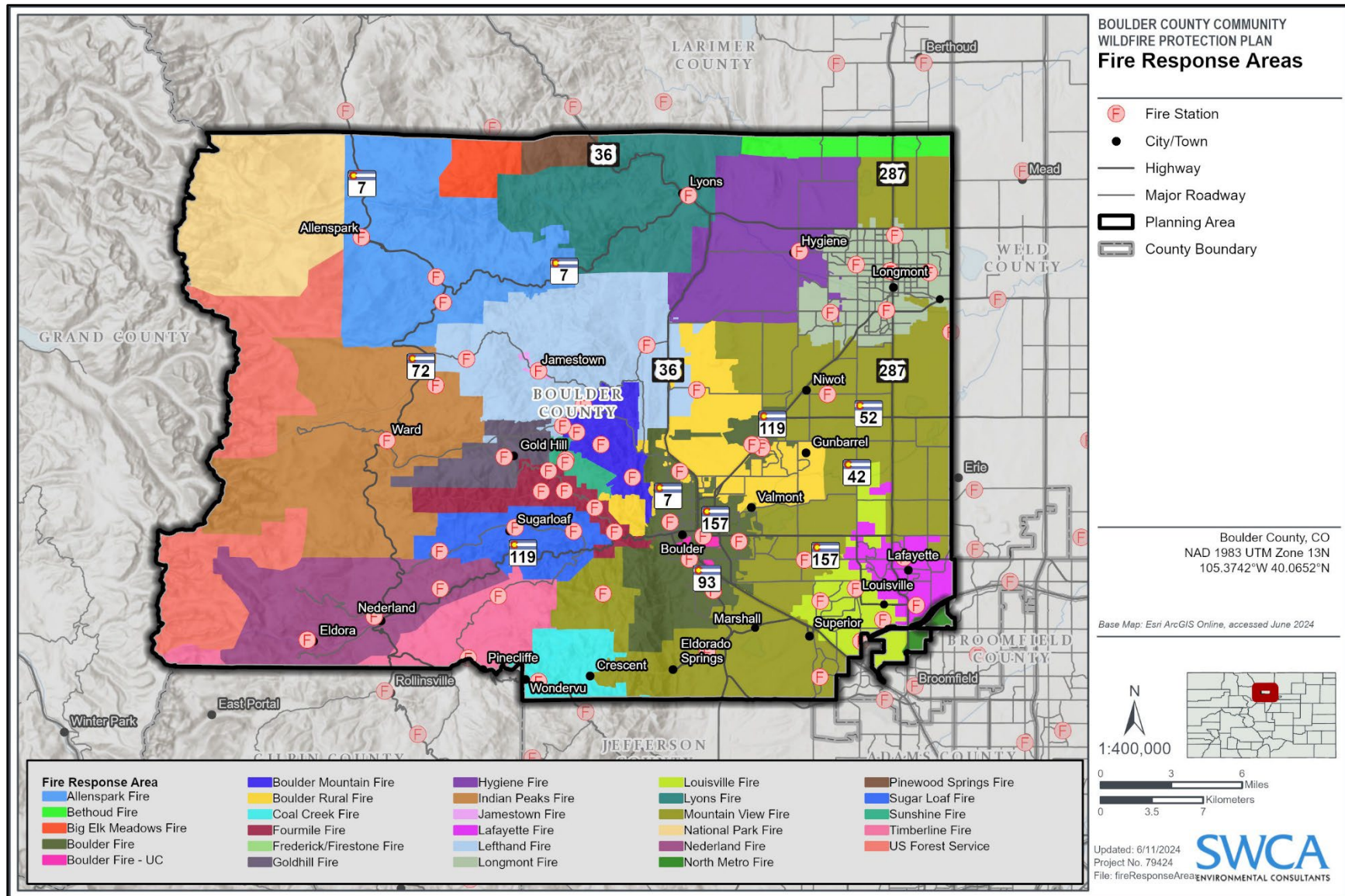


Figure 2.20. Fire response areas and fire stations for FPDs within Boulder County.

Boulder County faces unique wildfire response challenges stemming from its diverse landscape. The eastern plains feature vast expanses of grasslands and agriculture that are at risk of rapid fire spread, while the western mountainous regions present hazardous fire behavior and heavy fuel loads that create heightened wildfire risks within the WUI. In an effort to address these challenges, the Fire Management Program was established and today it comprises eight full-time employees, including a Fire Management Officer (FMO), an Assistant FMO, two Fire Operation Specialists, and four Senior Firefighters. Eight Term firefighters are also hired to bolster wildfire response, conduct prescribed fire activities, and carry out forestry projects as the wildland fire season approaches (Boulder County 2024c)

Additional details regarding fire response resources can be found in Appendix B.

Individuals seeking fire resources can explore the Boulder County's Wildfire Resources and Information page (<https://bouldercounty.gov/disasters/wildfires/mitigation/wildfire-resources-and-information>), which serves as an excellent local resource for collaborative education and action on wildfire prevention, mitigation, home hardening and community preparedness. The page also includes insurance guides, a list of Wildfire Partner qualified forestry contractors, and defensible space in forested and urban/suburban environments. In addition, community members who are interested in joining wildland fire crews or volunteering at a fire department can take National Wildfire Coordinating Group (NWCG) classes (<https://www.nwcg.gov/publications/training-courses>) to obtain the necessary certifications.

Boulder County Sheriff's Office

Outlined below are the current efforts of the Boulder County Sheriff's Office Fire Management Program for addressing wildfire prevention and response.

The Boulder County Sheriff's Office (BCSO) acknowledges it is important to look at ways which can dictate how efficiently wildfire prevention and response efforts are conducted, and programs which empower Boulder County citizens and partner agencies to confidently operate in ever-changing conditions.

These programs should be designed and operate within all current applicable legislation, and utilize the best available technologies and practices, while also being cost-effective and meeting inter-operable standards to maximize applicability and use.

Wildfire Detection Cameras

- BCSO has piloted systems with Pano AI and AlertWest, deploying cameras on high points for panoramic views. Boulder County is considering options for wildfire detection moving forward.
- Artificial intelligence enables rapid fire detection and distinguishes smoke from other environmental factors.
- Detected data undergoes verification before dissemination to agencies or individuals for response coordination.
- Live images aid in real-time situational awareness, often helping to de-escalate responses and monitor active fires for operational and administrative purposes.

Archive of Legal Burning

- The Open Burn Permit System has been improved to include increased notifications and extended lifetime of actions for legal burns, aiding in fire mitigation efforts. More information on burn planning and permitting can be found at <https://bouldercounty.gov/safety/fire/burn-permits/>.

- Agricultural burns, protected by Colorado statute, and Open Burning offer cost-effective solutions for managing slash material around homes and properties, as well as clearing ditches for water conveyance.
- Maintaining a real-time database of legal burning is essential to minimize unnecessary responses from first responder agencies and align with wildfire detection camera initiatives for efficient fire management.

Data Collection

- Complete and effective data must be sourced to support escalating wildfire events as Boulder County experiences a wide range of weather conditions.
- BCSO's investment in three high-end Remote Automated Weather Stations (RAWS), integrated into the National Fire Danger Rating System (NFDRS), addresses a historical data gap in lower elevations and eastern Boulder County.
- These stations complement existing RAWS on federal lands, enhancing data accuracy and enabling fine-tuning of business practices and agreements.
- The data from these RAWS supports initiatives like 'indices-based-dispatching', allowing response levels and resource allocation to match fire danger conditions, aiding in effective wildfire response and prevention strategies, as well as guiding decisions regarding fire restrictions and prescribed burn applications.

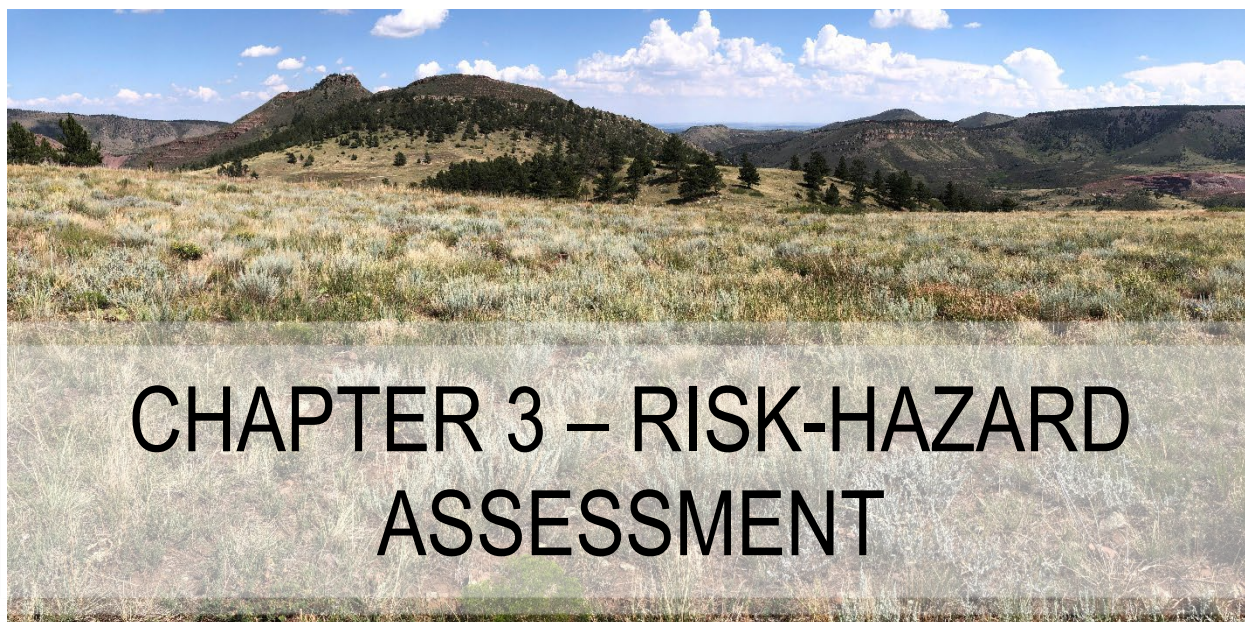
Incident Management Team

In addition to numerous response agencies and first responders, Boulder County and the City of Boulder jointly support a Type 3 IMT. The Boulder Wildland IMT (BWIMT) is a multi-agency organization with members that have the necessary qualifications, training, and experience to respond to, manage, and support escalating wildfire incidents.

The mission of the BWIMT is to provide enhanced management capacity and incident support during wildfires in Boulder County and potentially beyond. As an incident escalates, the BWIMT is an additional resource that can be activated at the request of the Sheriff's Office or local Incident Commander. The BWIMT provides enhanced incident safety, operational coordination, management support, and fiscal accountability. While the intent is to be activated before transitioning to a higher-complexity (regional/national) IMT, BWIMT has shown to be of particular benefit during incidents that require response and management for multiple operational periods, when higher complexity support is not necessary. The team is a critical link between the ongoing wildfire incident and Boulder Office of Disaster Management (ODM).

To build depth and expertise, the BWIMT continuously recruits new members and provides internal and external training opportunities, whether through out-of-area assignments or courses through FEMA or NWCG. Beyond training, there is a significant variety of technical equipment required to support an incident, which is included when the BWIMT is activated. Financial support is imperative to ensure the team can continue to provide the high-level services that are expected from the team.

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Disclaimer

The purpose of this risk assessment is solely to provide a community and landscape-level overview of general wildfire risks within the assessment area as of the date hereof, and to provide a potential resource for community pre-fire planning. This risk assessment is premised on various assumptions and models that include and are based on data, software tools, and other information provided by third parties (collectively, "Third-Party Information and Tools"). SWCA, Incorporated, doing business as SWCA Environmental Consultants ("SWCA"), relied on various Third-Party Information and Tools in the preparation of this risk assessment, and SWCA shall have no liability to any party in connection with this risk assessment including, without limitation, as a result of incomplete or inaccurate Third-Party Information and Tools used in the preparation hereof. This risk assessment may not be relied on by any party without the express written consent of SWCA. SWCA hereby expressly disclaims any responsibility for the accuracy or reliability of the Third-Party Information and Tools relied on by SWCA in preparing this risk assessment. SWCA shall have no liability for any damage, loss (including loss of life), injury, property damage, or other damages whatsoever arising from or in connection with this risk assessment, including any person's use or reliance on the information contained in this risk assessment. Any reproduction or dissemination of this risk assessment or any portion hereof shall include the entirety of this plan disclaimer.

PURPOSE

Upon completion of a Quantitative Wildfire Risk Assessment for the planning area, land use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire, as well as work with community members through outreach and education regarding methods for reducing the damaging consequences of fire. A Quantitative Wildfire Risk Assessment can also aid in the identification and prioritization of fuel treatments based on where wildfire risk is greatest. The fuels reduction treatments can be implemented on both private and public land, so community members can actively apply the treatments on their properties, as well as support treatments on public land that they care about. For more information about fuels treatments, see Chapter 4, Mitigation Strategies.

For this CWPP update, areas of high wildfire hazard and risk are identified using the COAL Quantitative Wildfire Risk Assessment through the modeling and mapping of fire behavior, analysis of highly valued resources and assets (HVRAs), and incorporation of stakeholder and expert input.

Detailed information on the modeling process is provided in Appendix D.

EMBER IGNITION HAZARDS

Ember exposure from wildland fires can pose a significant threat to homes and other structures in the WUI (Maranghides and Mell 2013). Spotting occurs when embers travel in advance of the flaming front; long-range spotting can be miles ahead of the main fire (Figure 3.1). Many factors determine whether an ember will result in an ignition (firebrand source and size, wind, receiving materials, exposure duration, etc.). Burning structures and other materials (vehicles and ornamental vegetation) have been identified as another source of embers that can ignite additional combustible materials in the WUI, particularly when there is a low structure separation distance (Maranghides et al. 2022; Suzuki and Manzello 2021).

Canopy characteristics of tree stands, including species, height, and tree trunk size affect the quantity and size of embers produced during a wildfire. Embers from thick-barked species like ponderosa pine and Douglas fir travel shorter distances compared to those from species with lighter bark like subalpine fir and spruce. Additionally local topography influences where embers may land. Ridges can catch embers, and steep valleys tend to collect embers. A combination of wind, slope angle, and the positioning of structures can all impact ember production and potential ignitions.

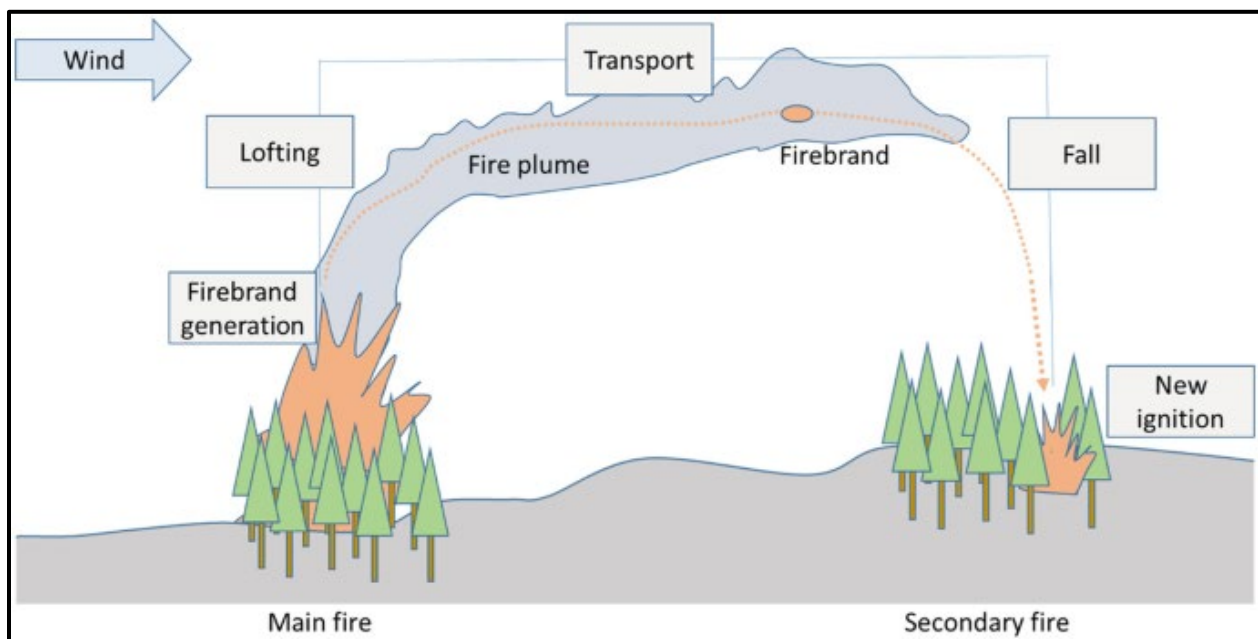


Figure 3.1. Factors associated with embers (firebrands) on the landscape. Vegetation type, wind, and topography all influence ember production and travel distances.

Source: Martin and Hillen (2016).

Grass and shrub embers can play a significant role in wildfire spread, especially under conditions with high dead fuel accumulations. Known for burning at high temperatures and intensities, grasses and shrub fuels can promote spot fires and affect ember production. These embers are capable of igniting

surrounding grass or shrub fuels and spreading fires kilometers ahead of the fire front (Pausas et al. 2017; NWCG n.d.)

Land managers and homeowners should take note of vegetation, landscape, and atmospheric conditions that are conducive to ember production and travel distance as these directly influence spot fire behavior. Strategic landscape fuel reduction activities such as fuel breaks and thinning can help reduce the likelihood of ember production and spotting. Homeowners should note surrounding vegetation (trees, grasses, shrubs, and vegetation litter or debris) and implement home hardening practices, such as installing ember-resistant vent covers, and removing leaf litter from decks, gutters, roofs, and the base of combustible materials such as wood siding and fences to reduce structural ignitions from falling ember showers. Programs to aid landowners in preventative efforts and cases of wildfire are provided in Appendix A, Community Background and Resources.

MODELING THE FIRE ENVIRONMENT

The wildland fire environment consists of three factors that influence the spread of wildfire: fuels, topography, and weather (see Chapter 2). Understanding how these factors interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the WUI. In the wildland environment, vegetation (alive or dead) is synonymous with fuels. When sufficient fuels for continued combustion are present, the level of risk for those residing in the WUI is heightened.

To understand wildfire modeling it is important to be aware of how wildfire spreads. Wildfire spreads via surface fire (Figure 3.2), crown fire (Figure 3.3), and spotting (Figure 3.4) with all three commonly occurring during red flag conditions. Active crown fire is when surface fire “ladders” up into the upper levels of the forest canopy and spreads through the tops (or crowns) independent of, or along with, the surface fire, and is often beyond the capabilities of suppression resources. There are two types of crown fire: active and passive. Active crown fire (see Figure 3.3) is when fire spreads actively from tree to tree. Passive crown fire is when ground fuels establish in ladder fuels and torch or burn individual tree crowns.

Surface fires are when the flaming front remains on the ground surface (in grasses, shrubs, small trees, etc.) and control is significantly more manageable than active crown fires.

Active crown fires are extremely difficult to control. Removing ladder fuels and reducing fuel loading near communities before a fire ignites is the best way to limit crown fire and reduce wildfire risk.



Figure 3.2. A low-intensity surface fire.

Source: photograph by Brandon Oberhardt, USFS (2016).



Figure 3.3. Active crown fire.

Source: photograph by Mike McMillan, USFS (2013).



Figure 3.4. Spotting, in which embers are lifted and carried with the wind ahead of the main fire and ignite receptive fuels, including homes.

Photo credit: Boulder Fire-Rescue.

If embers are plentiful and/or long range (>0.5 mile), rates of spread and resistance to control can be very high. Ember load index throughout the planning area is quantified and illustrated in Figure 3.5. An ember load index is a value describing the relative load of embers a pixel on the landscape experiences given landscape burn probability, weather, topography, and fuels. See Appendix D for a more detailed description of modeling methodology.

Crown fire and spotting activity have been a concern for fire managers, particularly under extreme weather conditions. In areas where homes are situated close to timber fuels and/or denser shrubs and trees, potential spotting from intensely burning fuels to adjacent unburned fuels should always be acknowledged (see Figure 3.4). See the Ember Ignition Hazard subsection and Figure 3.1 for a diagram and explanations describing the factors that affect ember production and travel.

Embers cause up to 90% of home and business ignitions during wildfire events (IBHS 2019). Is your home located in a steep drainage? Near conifer trees or downwind of conifer trees? Structures located in areas predicted to experience high ember load should implement defensible space and home hardening upgrades.

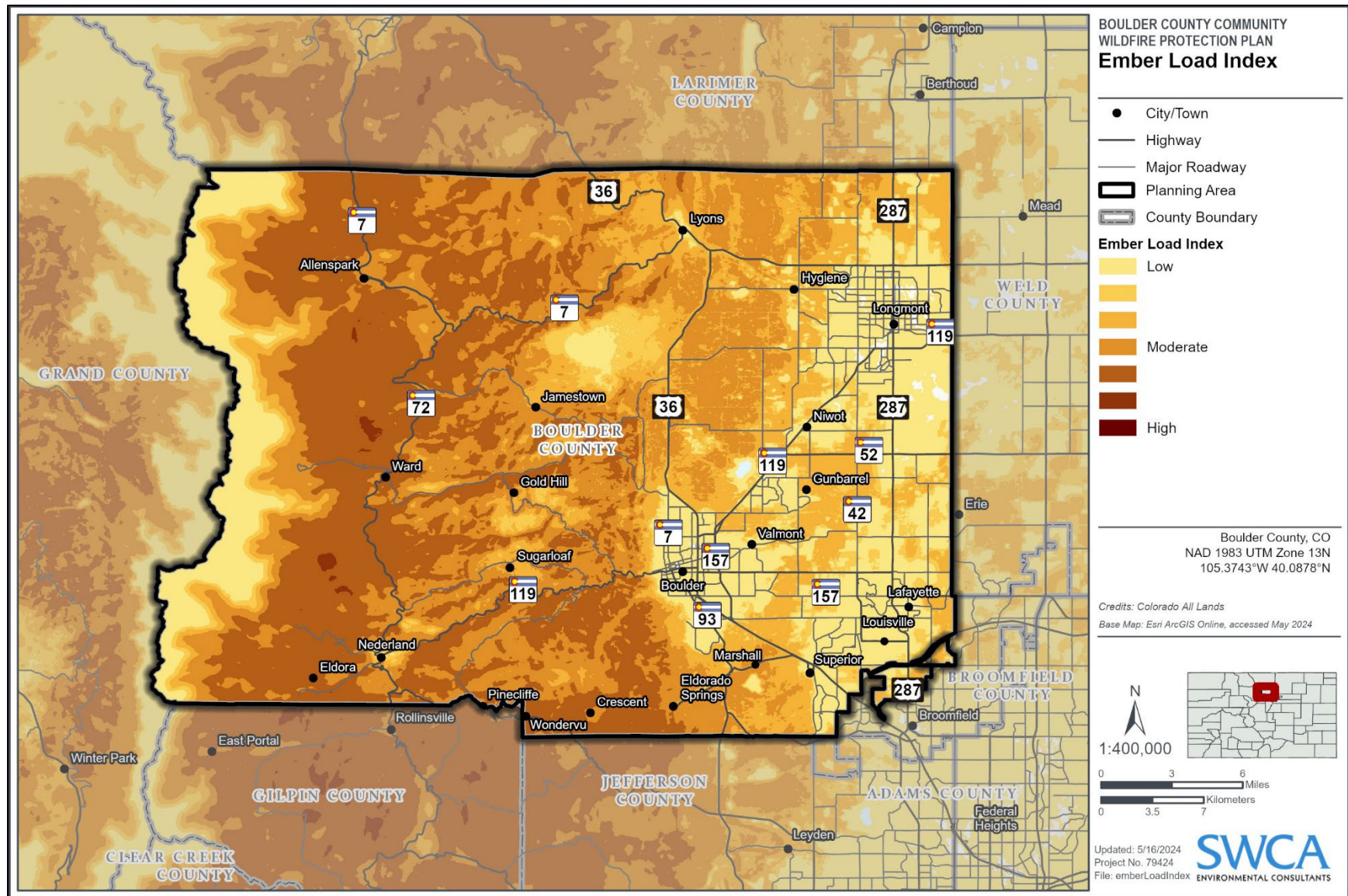


Figure 3.5. Ember load index values for the planning area.

COLORADO ALL LANDS QUANTITATIVE RISK ASSESSMENT

The COAL Quantitative Wildfire Risk Assessment developed by Pyrologix was created collaboratively with CSFS and USFS experts. The purpose for developing this risk assessment was to provide the communities of Colorado with a standardized assessment of hazard, vulnerability, and risk across the landscape using state-of-the-art modeling methods and up-to-date source data on existing conditions. This allows officials and land managers to compare risk across jurisdictional boundaries and apply successful strategies in reducing wildfire risk in multiple communities throughout Colorado. Many of the shortcomings of previous wildfire risk assessments have been addressed and accounted for in the COAL Risk Assessment. Important examples include:

- Recalibrating the Colorado fuelscape to account for past disturbances (wildfires)
- Recalibrating the burnability of urban and agricultural fuels in fire behavior modeling
- Removing data seam lines
- Utilizing a set of collaboratively approved HVRAs standardized across Colorado.

The COAL Quantitative Wildfire Risk Assessment is a unique tool for evaluating the risk of wildland fires to communities within the WUI areas of the county. In the context of wildfire risk modeling, risk is a combination of hazard and vulnerability. Although many definitions for risk exist, for the purpose of this document, risk is a product of four factors defined by the Quantitative Wildfire Risk Framework (Figure 3.6):

Burn probability is the likelihood of 30-square-meter pixel burning.

Intensity is an expression of the rate of energy release (kW/m) and is used to describe heat of combustion, fuel consumed, and linear rate of spread.

Exposure is the proximity of HVRAs to hazards on a landscape (e.g., homes in the WUI or a source watershed in an alpine environment).

Susceptibility is a measure of how easily an HVRA is damaged by wildfire. Resiliency is a common term used to describe the susceptibility of a HVRA.

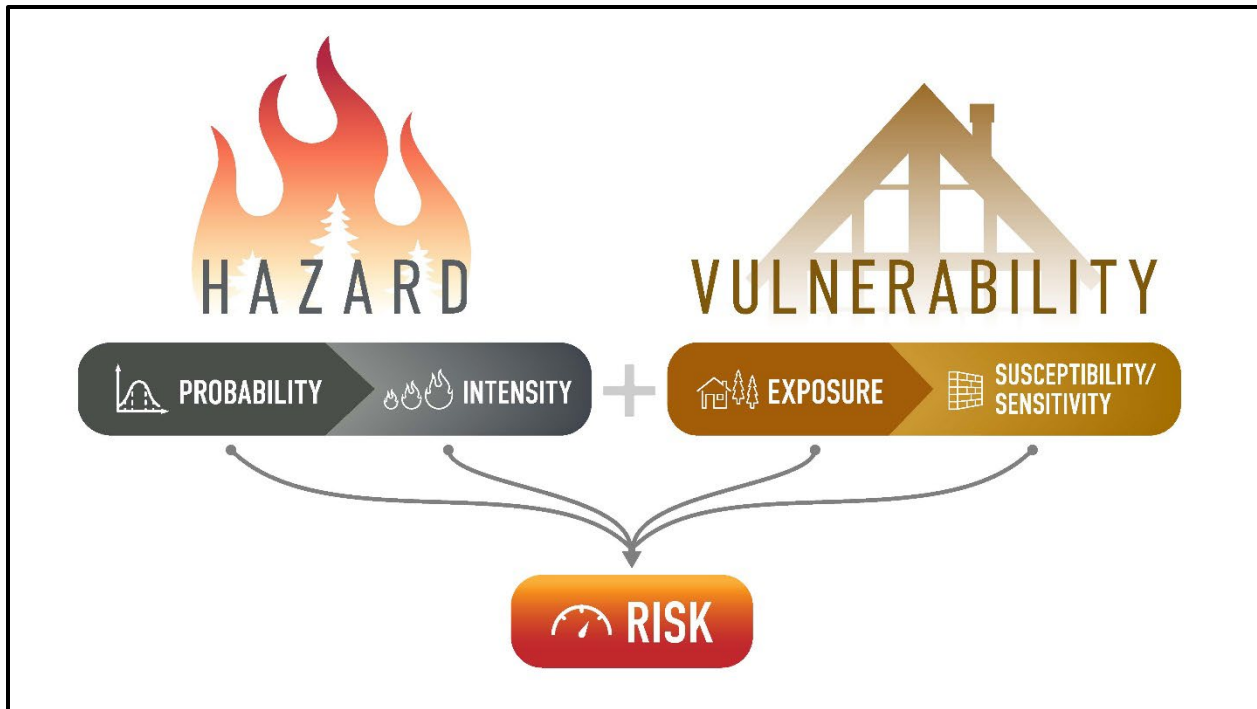


Figure 3.6. Pyrologix's Quantitative Wildfire Risk Framework for the COAL Quantitative Wildfire Risk Assessment, derived from Scott et al. (2013).

A detailed methodology of the COAL Quantitative Wildfire Risk Assessment can be found in Appendix D, Fire Behavior Modeling/GIS Background and Methodology.

An overview of wildfire **hazards** (frequency and severity) can be found in Figure 3.7. Factors used to determine wildfire hazard include the predicted fire behavior if a wildfire were to occur represented by outputs such as flame length, rate of spread, and fire line intensity. These fire behavior outputs are directly influenced by fuel type, fuel density, and crown height, as well as other landscape characteristics such as slope and aspect. Notice that wildfire hazard is greatest in areas with steep topography and high fuel loading such as the steep forested slopes of the Front Range.

Land Management efforts to reduce wildfire risk should primarily focus on forests and grasslands located within or adjacent to the WUI areas that show potential for high wildfire hazard.

Looking at **vulnerability**, the above equation is a function of the exposure and susceptibility of values on the landscape, based on their position and the intensity of expected fire.

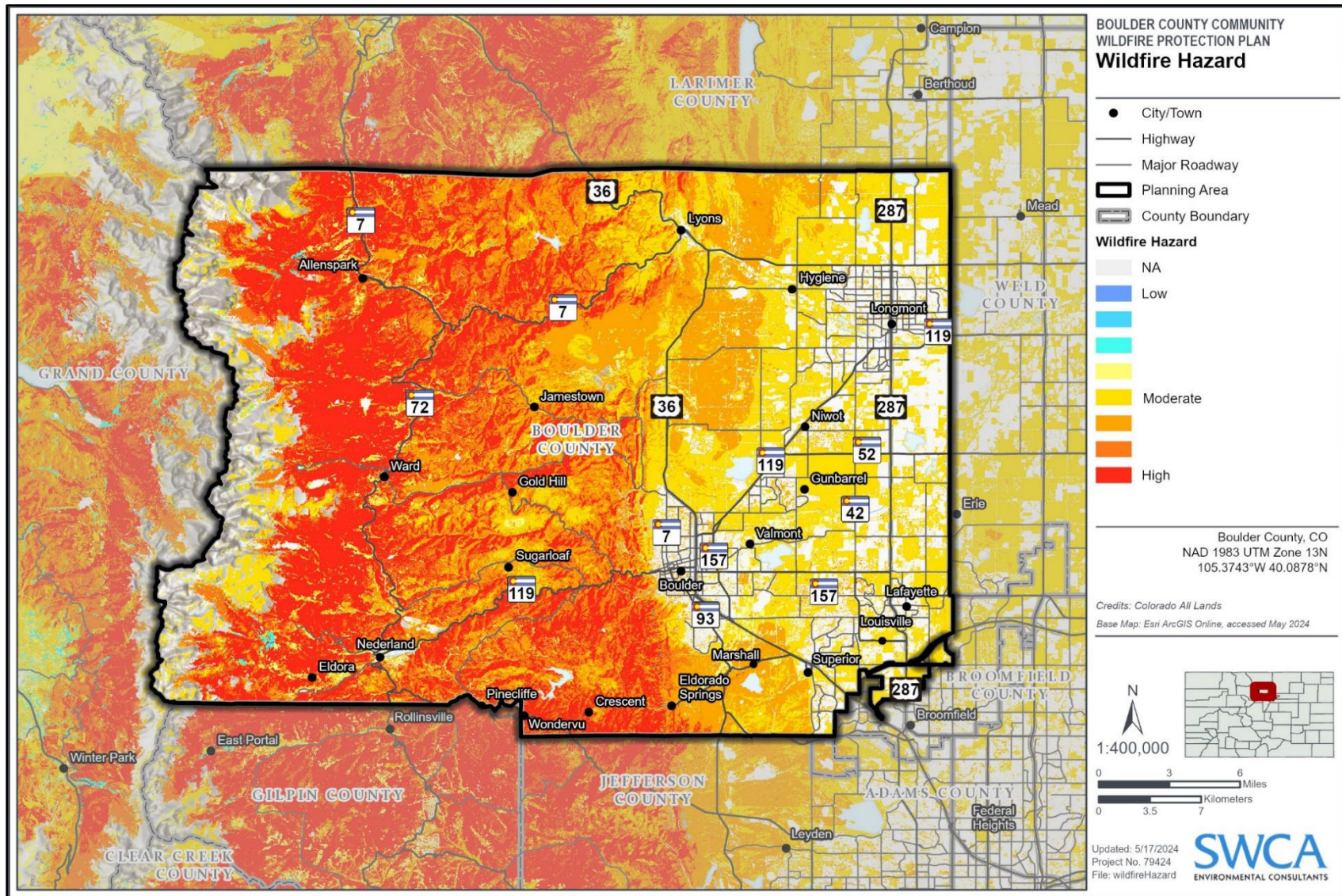


Figure 3.7. Wildfire hazard across the Boulder County CWPP planning area. Wildfire hazard is modeled from the probability of the landscape burning and the predicted fire behavior when it does. See Appendix D for a detailed modeling methodology.

Source: COAL Quantitative Wildfire Risk Assessment (Pyrologix 2022a).

WILDFIRE RISK IN BOULDER COUNTY

Quantitative assessments of wildfire **risk** depend heavily on three factors: 1) the probability of fire occurring, 2) the range of expected fire intensity, and 3) the location of assets and their proximity to vegetative fuels. HVRAs are included in wildfire risk assessments to determine how wildfire hazards influence wildfire risk to different assets across a landscape. The HVRAs included in the COAL Quantitative Wildfire Risk Assessment were determined for the state of Colorado by an interagency group of statewide representatives and wildfire experts during a two-part fire effects workshop held in July 2021.

HVRAs were identified based on readily available national spatial datasets that were evaluated for response to wildfire. The resources and assets included in the risk analysis for the COAL Quantitative Wildfire Risk Assessment are people and property, infrastructure, water, and vegetation. See below for a brief explanation of each HVRA.

People and Property (PP) – This data represents housing data calculated from building footprints and U.S. Census Bureau 2018 county population estimates and census block level datasets.

Infrastructure (INFRA) – This data represents high- and low-voltage electric transmission lines, communication sites, and power infrastructure (power plants and substations) all sourced from the Homeland Infrastructure Foundation-Level Data (HIFLD) program.

Water – This data represents surface drinking water protection areas sourced from the U.S. Environmental Protection Agency (EPA) Source Water Protection Area program. Potential watershed impacts were evaluated based on intake location and population served.

Vegetation (VEG) – This data represents ecosystem function sourced from LANDFIRE's 2016 biophysical setting layer.

Additionally, line officers, area fire management officers, and interagency leadership placed relative importance (RI) values on each HVRA for the purpose of weighting and ranking HVRAs (Figure 3.8). RI allows all of the HVRAs to increase or decrease the combined wildfire risk depending on the RI of that value or asset. HVRAs and their RI fulfill the vulnerability side of the risk equation.

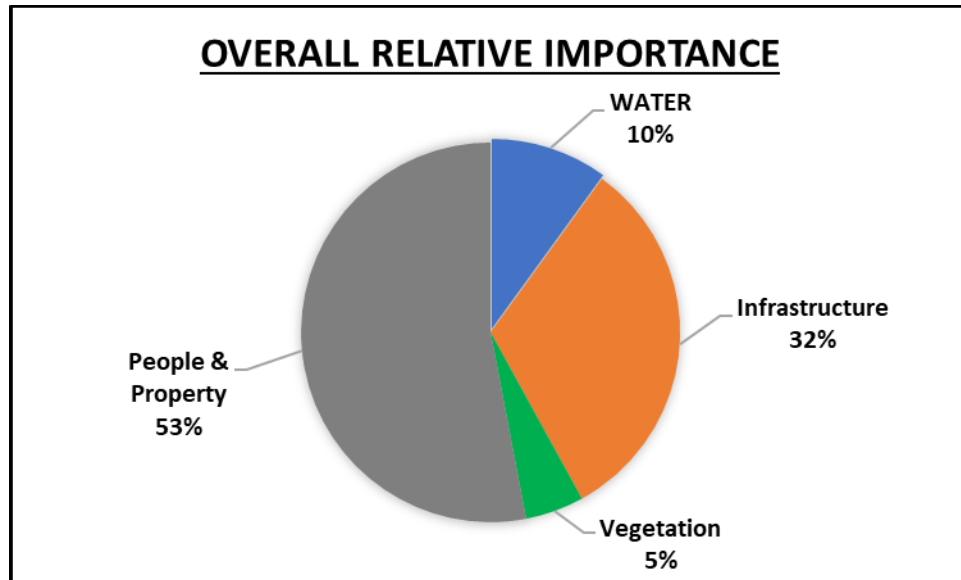


Figure 3.8. Overall RI weighting (ranking) of collaboratively determined HVRAs for the state of Colorado.

Source: Pyrologix (2022a).

In Figure 3.9, “Wildfire Risk to Assets”, the areas where the HVRAs in Boulder County overlap areas of high wildfire hazard (see Figure 3.7) are shown as high risk. See Appendix D for mapping and information pertaining to the HVRAs used to model wildfire risk to assets in Boulder County. Figure 3.9 identifies areas on the landscape that could be prioritized for wildfire risk mitigation activities and informs areas of concern (Figure 4.4 in Chapter 4) and other recommended projects. See Chapter 4 for project recommendations.

As depicted in Figure 3.9, fuels, community, development, and fire behavior directly influence wildfire risk to assets. Examples of assets include residential structures, commercial structures, and energy and water infrastructure. Woodlands and grasslands situated along the front range foothills, areas characterized by steep topography, and extensive continuous grasslands all pose a significant risk to assets located within their vicinity within the planning area. This is due to extreme wildfire behavior being likely to occur in these areas near assets. Grass and shrub fuels can promote rapid fire spread, usually with shorter flame lengths. However, under windy conditions, grass-fueled fires can spread extremely quickly with intense flames. Extreme fire weather, also known as red flag conditions, can cause extreme fire behavior, leading much higher in areas adjacent to wildland spaces. Thus, it is crucial to establish proper defensible spaces around properties, implement effective alert systems, and have well-defined evacuation protocols.

Recently burned areas, rangelands, and agricultural lands generally have a low to moderate level of wildfire risk. Areas with the lowest wildfire risk are typically situated far from the WUI. These regions may encompass areas that are considered non-burnable, such as bodies of water or high-elevation rocky peaks.

Wildfire risk is highest where highly valued resources and assets such as homes are closest to high wildfire hazards like dense and tall trees, continuous grass, areas downwind of open spaces and steep slopes.

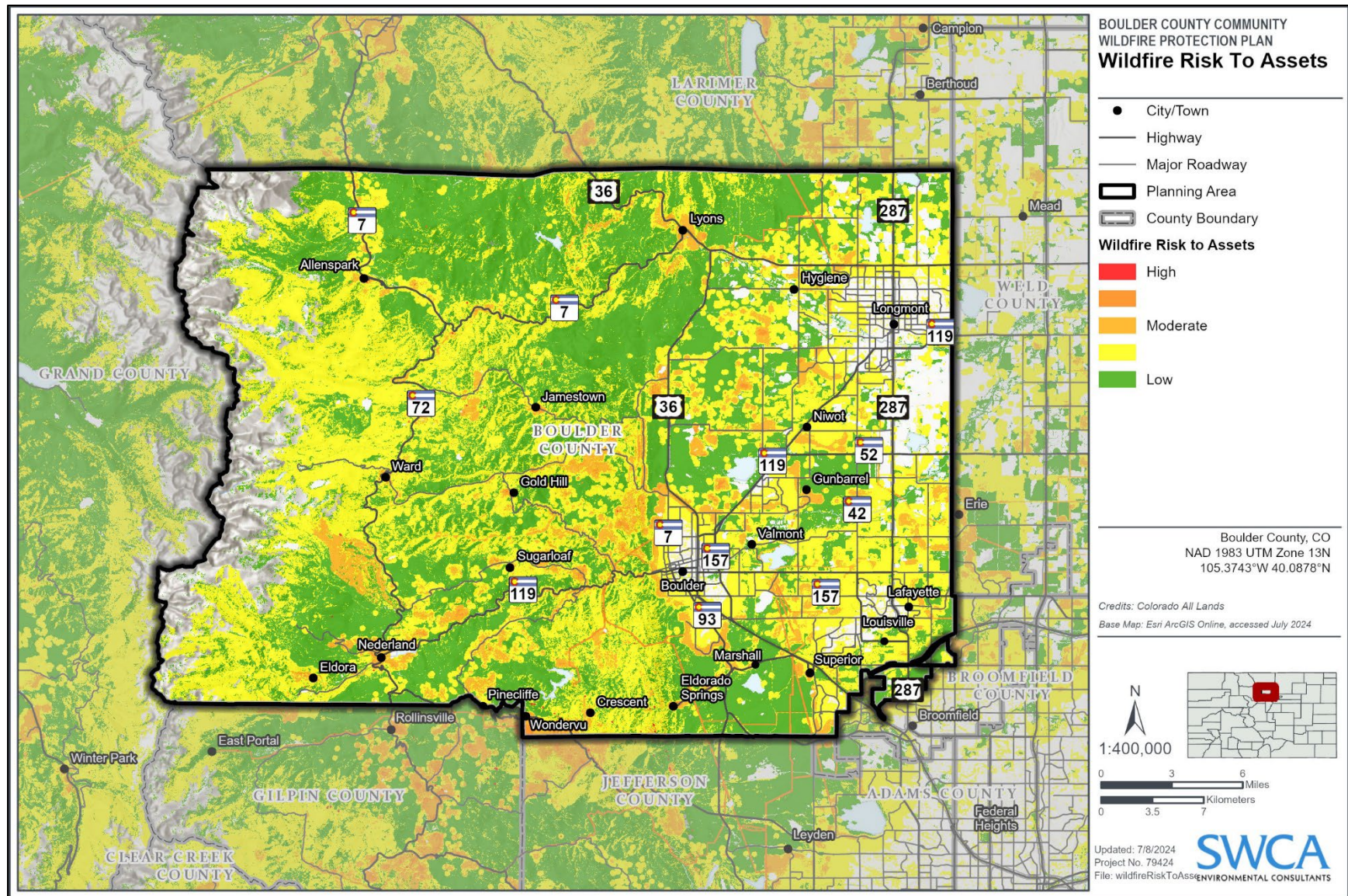


Figure 3.9. Wildfire risk to assets in the Boulder County CWPP planning area.

Source: Pyrologix (2022a).

The risk to assets map is useful when trying to understand wildfire risk to existing HVRAs, such as existing homes across the landscape. However, it is also important to look at wildfire risk comprehensively across the landscape in open space areas as well as developed zones. The Expected Risk to Potential Structures dataset allows this analysis (Figure 3.10).

Figure 3.10 allows land managers to compare areas on the landscape that are currently developed to those that are not. The expected risk to potential structures map is created by multiplying flame lengths and probability to determine for every pixel on the landscape if structure loss is expected if a structure were to be there. No HVRA data are incorporated into this map except for implied building locations, showing as unburnable, as a result of urban development fuel models. Keep in mind that, even in densely urban areas, wildfire risk can be low but is never zero.

Low to moderate risk dominates the planning area due to wildfire models basing results on weather conditions. Under more extremes such as reduced fuel moisture content and high winds, high to extreme risk can be likely.

Low to moderate risk to potential structures dominates the planning area due to wildfire behavior models basing results on given weather conditions. Under more extreme model parameters such as lower fuel moisture content and high winds, high to extreme risk can be likely. To further understand how different weather condition scenarios impact fire behavior, please see Figures D.16 through D.19 in Appendix D.

RISK IN EASTERN BOULDER COUNTY

The eastern portion of Boulder County, characterized by grasslands and more developed areas, presents distinctive risk factors. The grasslands historically experienced frequent fire occurrences, with fire regimes strongly influenced by cycles of moisture and drought. Factors that contribute to wildfire risk in the east are the prevalence of grassy fuels that can exhibit rapid fire spread, and with the region's greater population density and presence of key infrastructure.

As previously mentioned in Chapter 2 of this CWPP, extreme wind events are possible and further exacerbate the risk of catastrophic fires in Boulder County, posing threats to people and property. Additionally, the eastern region generally experiences higher temperatures and drier conditions compared to the western portion of the county (see Chapter 2), enhancing the likelihood of ignition and extreme fire behavior, especially during dry summer months with weak monsoon effects.

Figure 3.9 demonstrates the high number of assets in the eastern portion of the county, especially bordering communities and near vital infrastructure. Figure 3.10 shows the low to moderate expected risk to potential structures throughout the eastern region, with the lowest expected risk in deep urban centers and the highest expected risk in open spaces with grassland fuels given the outputs of the probability and fire behavior modeling. In both figures, a buffer into urban areas was modeled that represents some level of risk for the low probability, but very high consequence outcomes, during the most extreme fire scenarios and weather events. For more information on fire in urban settings, see the Urban Conflagration section in Table 2.

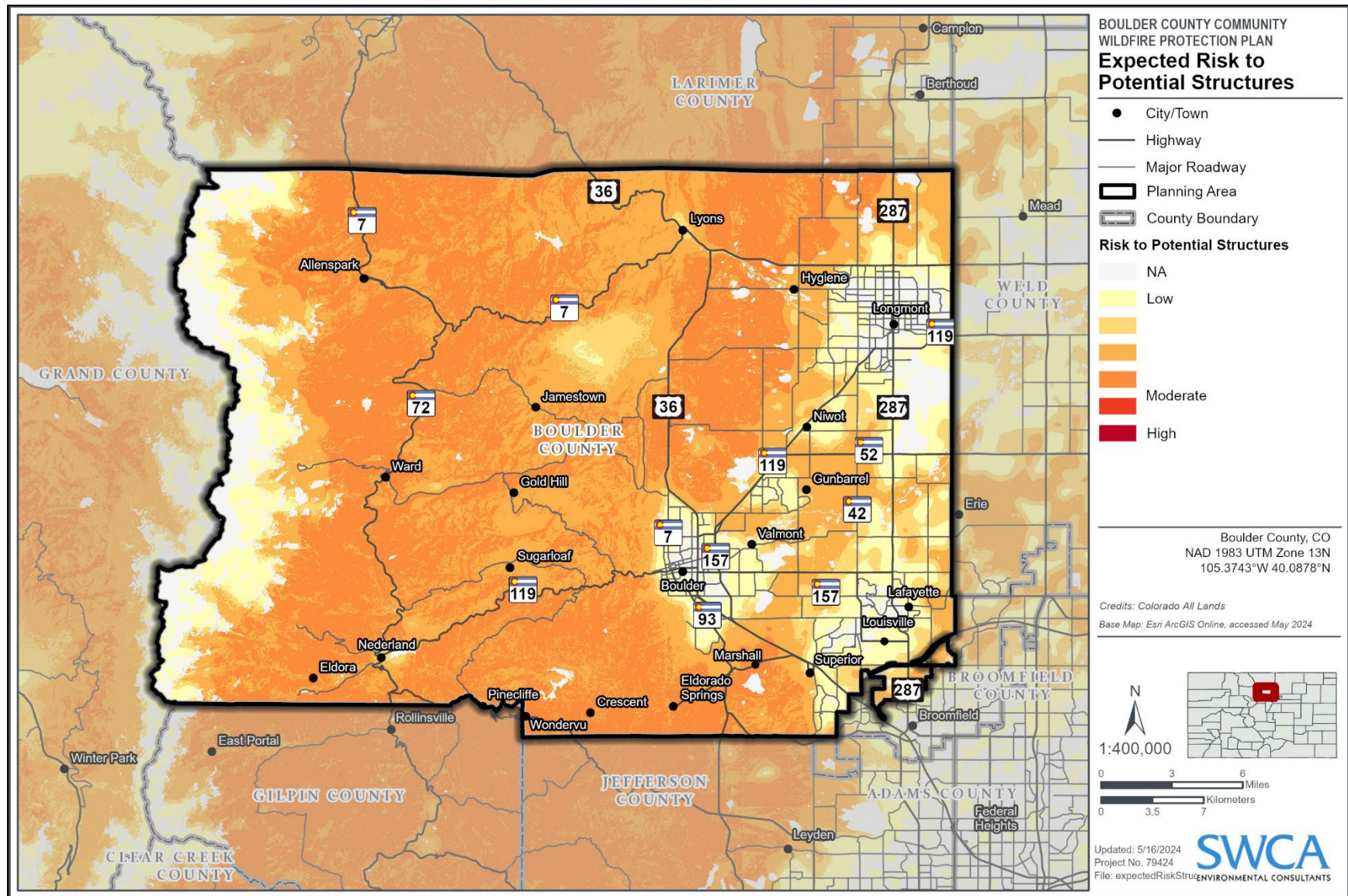


Figure 3.10. Expected risk to potential structures.

RISK IN WESTERN BOULDER COUNTY

In western Boulder County, varied forest types and complex topography pose unique challenges for wildfire mitigation. The diverse vegetative communities experience a range of fire severities. Additionally, historic wildfire suppression tactics has contributed to heavy fuel overstocking among upper montane, lower montane and subalpine lodgepole pines, leading to elevated wildfire risk in these zones (Veblen et. al 2005). Furthermore, elevated fire behavior and heavy timber fuels present in the area pose unique challenges when it comes to ember loading.

Figure 3.9 demonstrates the risk to existing HVRAs on the landscape in the western portion of the county. With the highest risk being near communities and areas where drinking water is sourced, as well as infrastructure. Figure 3.10 shows low to moderate expected risk to potential structures throughout the western region, with the lowest expected risk in alpine environments and the highest expected risk occurring with steep, south-facing topography and high fuel loads.

REGIONAL POLYGON SUMMARIES

Regional polygons were collaboratively delineated by the CWPP Core Team in 2023. Regional polygons are used to break down the larger county into smaller areas of focus for the CWPP. See Figure 3.11 for a map of the Boulder County CWPP regional polygons. Regional polygon boundaries were delineated using PODs for the western portion of the planning area and FPD boundaries paired with Genasys evacuation zones for the eastern portion of the planning area. Region boundaries were also informed by response resources, infrastructure, travel routes, and wildfire zones as discussed and mapped below.

This section provides an overview of expected risk to potential structures for each polygon based on the COAL Quantitative Wildfire Risk Assessment. Expected risk to potential structures was used as it provides a view of wildfire risk at a resolution acceptable for the regional/community level and is not influenced by specific HVRA datasets, allowing for a general comparison of wildfire risk between regions. Information is also provided on the major fuel types for each polygon and an overview of the values and infrastructure present. Risk ratings are based on a desktop analysis, and no on-the-ground assessments were completed as part of the assessment. While this resource aims to bring more localized information to smaller portions of the planning area, additional neighborhood/subdivision- and parcel-level assessments should be completed to develop localized action plan.

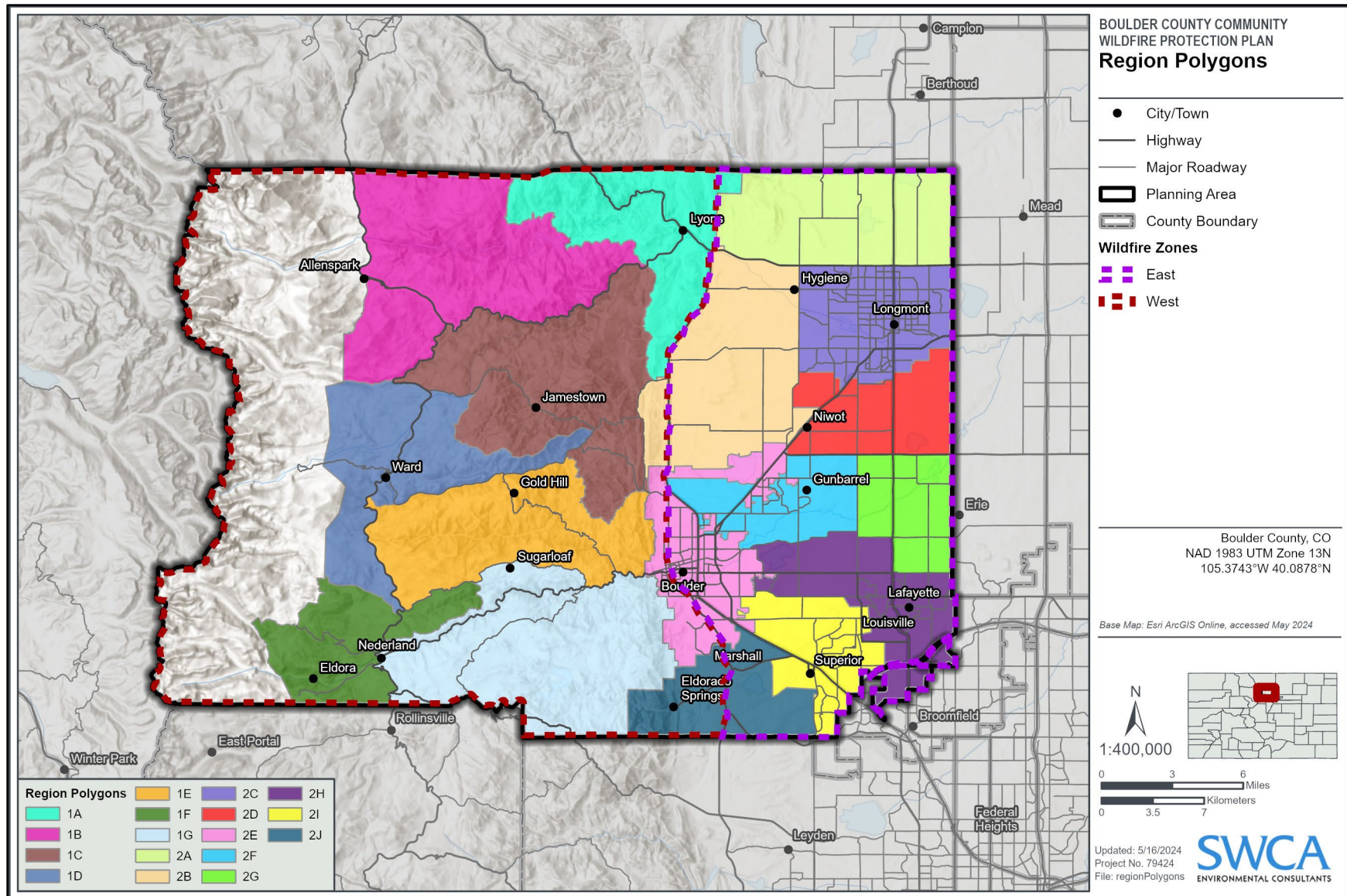


Figure 3.11. Boulder County CWPP regional polygons.

DELINEATION OF BOULDER COUNTY REGIONAL POLYGONS

Boulder County has been divided into two distinct wildfire zones to better manage and mitigate wildfire risks across the region. This division helps in understanding and addressing the unique characteristics and fire hazards present in varying landscapes in the county.

To view Boulder County’s Wildfire Zone Map, please visit: <https://assets.bouldercounty.gov/wp-content/uploads/2017/03/wildfire-zone-map.pdf>.

Western Boulder Regional Polygons

Western Boulder County falls into the Wildfire Zone 1, which consists of seven regional polygons, which encompass the communities of Lyons, Allenspark, Jamestown, Ward, Gold Hill, Sugarloaf, Nederland, Eldora, Eldorado Springs, and others. This region is characterized by rugged terrain, thick coniferous forests, and significant fuel loads. These features make western Boulder County more susceptible to high-intensity wildfires. The delineation into specific polygons helps in implementing targeted fire management strategies that consider the unique environmental conditions and wildfire behavior patterns prevalent in this part of the county.

1A

The 1A regional polygon is located along the north-central border of the planning area and extends south. It contains the Lyons community and has an area of 23,809 acres. Land in the polygon is primarily privately owned, with USFS- and local government–managed lands intermixed. The polygon contains multiple mine sites, a substation and transmission line, a key travel highway, and a variety of high-use trails. The assessed risk to structures is illustrated in Figure 3.12, and additional information on risk category percentages is listed in Table 3.1. The primary fuels in the polygon are grasses and shrubs with 34.73% of land categorized as low-load grasses, 25.21% as moderate-load grass-shrub, and 9.94% as low-load grass shrub.

Table 3.1. 1A Region Attributes

Regional Polygon Background				
Regional Polygon Name: 1A				
Area (square miles): 37.20				
Building Count: 1,881				
Building Density (building units per square mile): 50.56				
Fire Agencies: Lyons FPD (Wildland Program),				
Lefthand FPD (Mitigation Program), and				
Pinewood Springs FPD				
Fire Station Count: 1				
Percent of Community by Level of Expected Risk to Potential Structures				
Moderate:	Low-Moderate:	Low:	Very Low:	Not Available:
31.13%	66.36%	2.20%	0.03%	0.26%
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
GR2 (34.73%)	GS1 (9.94%)			
	GS2 (25.21%)			

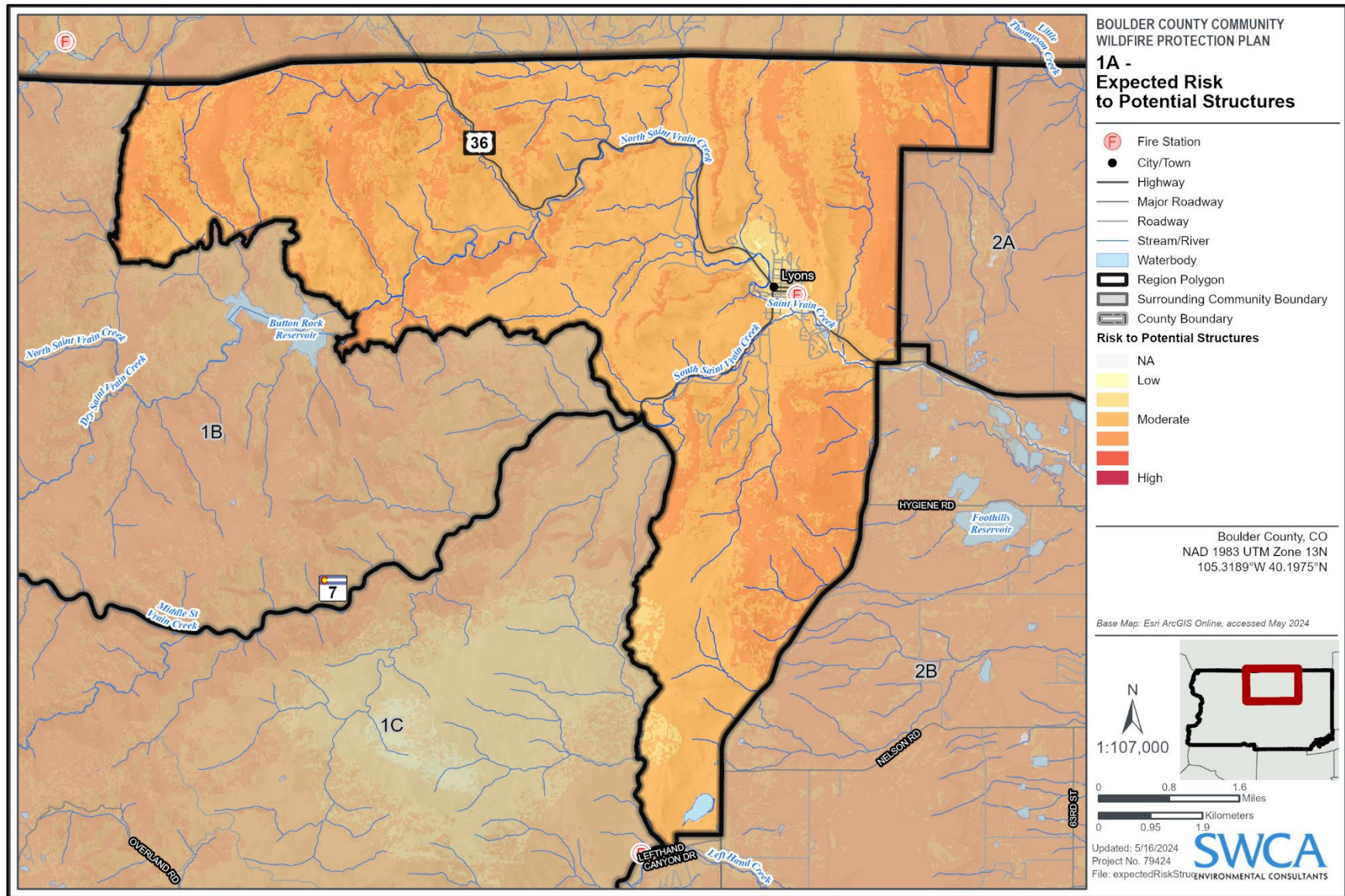


Figure 3.12. 1A region (Lyons) expected risk to potential structures.

1B

The 1B regional polygon covers a large area of 40,646 acres at the northwest corner of the planning area. The polygon is bordered to the west by Rocky Mountain National Park, and most of the land in the polygon is managed by the USFS as part of Roosevelt National Forest. The area is sparsely populated, containing the communities of Pine Valley and Allenspark. HVRAs and critical infrastructure include a fire station, St. Vrain reservoir and dam, hiking trails, and multiple communications towers and bridges. Figure 3.13 shows the potential risk to structures assessment with associated risk category percentages included in Table 3.2. Fuels in the area are primarily grass-shrub and timber. The breakdown of the top three fuels is 30.90% moderate-load grass-shrub, 13.39% very high-load timber-shrub, and 13.96% high-load conifer litter.

Table 3.2. 1B Attributes

Regional Polygon Background				
Regional Polygon Name: 1B				
Area (square miles): 63.51				
Building Count: 652				
Building Density (building units per square mile): 10.27				
Fire Agencies: Allenspark FPD, Lefthand FPD (Mitigation Crew), and Indian Peaks FPD				
Fire Station Count: 1				
Percent of Community by Level of Expected Risk to Potential Structures				
Moderate:	Low-Moderate:	Low:	Not Available:	
67.30%	32.23%	0.003%	0.47%	
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
	GS2 (30.90%)		TU5 (13.39%)	TL5 (13.96%)

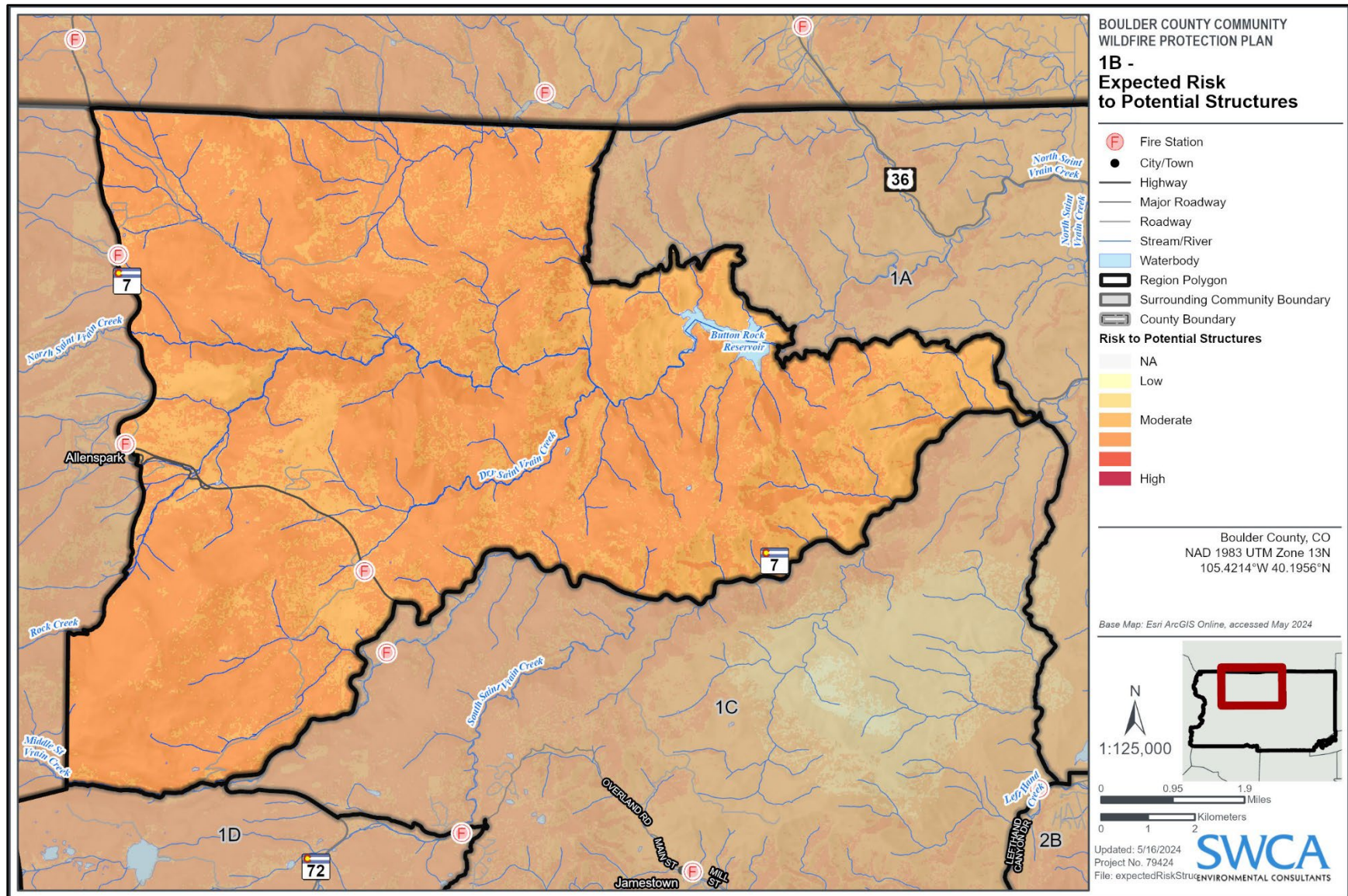


Figure 3.13. 1B region expected risk to potential structures.

1C

The 1C regional polygon is centrally located to the west of the 2B polygon and includes the communities of Jamestown, Springdale, and Lazy Acres. Land in the polygon is mostly managed by the USFS with some local government-, state-, and privately owned land intermixed. Critical infrastructure and HVRAs are spread across the area and include four fire stations, many communications towers, USFS facilities and infrastructure, a variety of trails, and valuable creeks and streams. The expected risk to potential structures is illustrated in Figure 3.14, and a breakdown of the risk category percentages is included in Table 3.3. The primary fuels in the area are grasses, shrubs, and timber, with 24.57% moderate-load grass-shrub, 12.47% low-load grass-shrub, and 12.52% very high-load timber-shrub.

Table 3.3. 1C Region Attributes

Regional Polygon Background				
Regional Polygon Name: 1C				
Area (square miles): 58.82				
Building Count: 1,311				
Building Density (building units per square mile): 22.29				
Fire Agencies: Lyons FPD (Wildland Program), Lefthand FPD (Mitigation Program), Jamestown FPD, Allenspark FPD, Boulder Mountain FPD (Mitigation Program), and Indian Peaks FPD				
Fire Station Count: 4				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u> 40.78%	<u>Low-Moderate:</u> 46.28%	<u>Low:</u> 12.06%	<u>Very Low:</u> 0.83%	<u>Not Available:</u> 0.03%
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
	GS1 (12.47%) GS2 (24.57%)		TU5 (12.52%)	

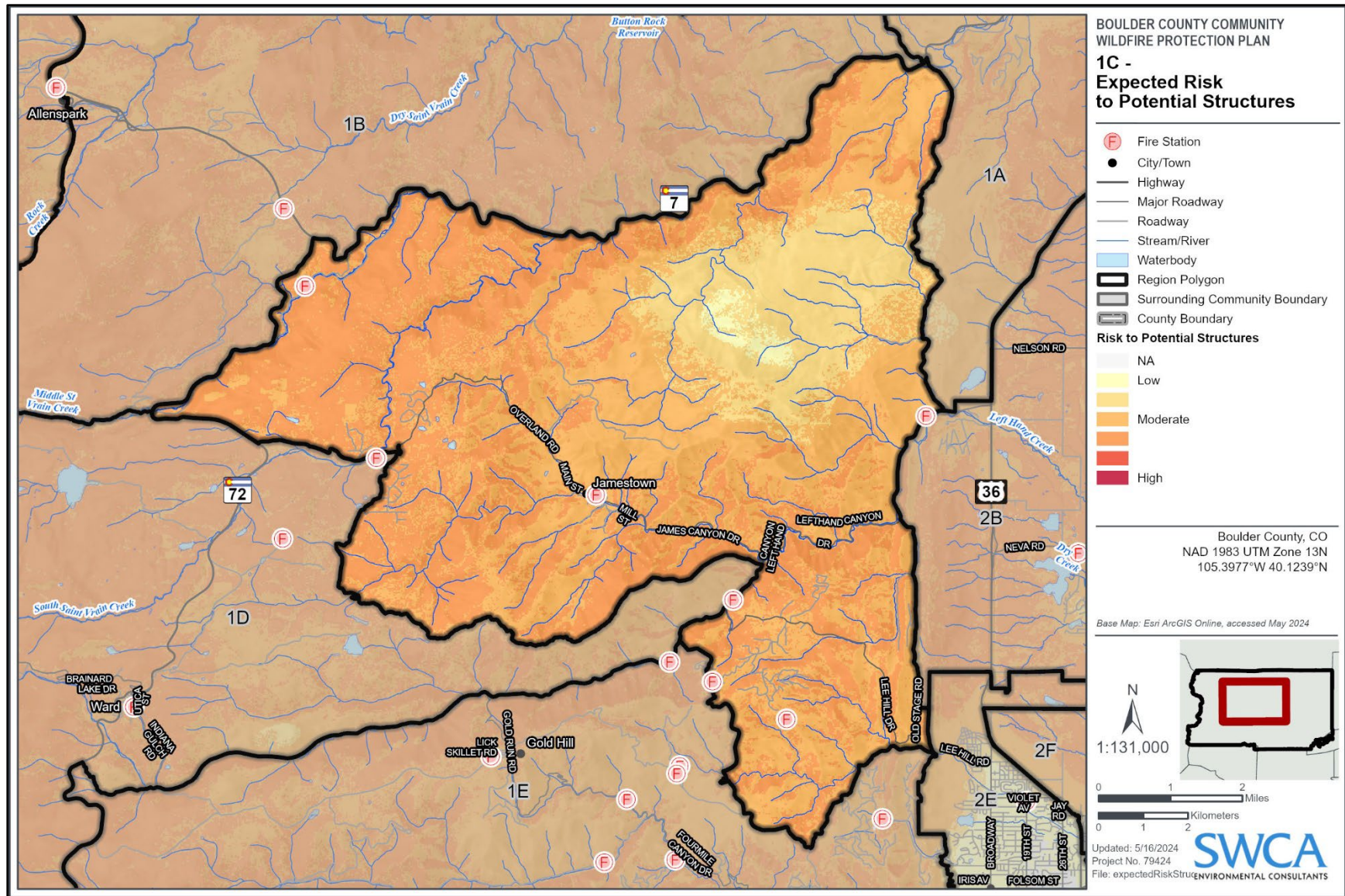


Figure 3.14. 1C region expected risk to potential structures.

1D

The 1D regional polygon is located along the west-central border of the planning area and covers an area of 25,239 acres. The area is mostly USFS-managed with some private ownership intermixed.

The polygon is sparsely populated and contains the communities of Ward and Hidden Lake. HVRAs and critical infrastructure include five fire stations, Beaver Reservoir and its dam, multiple communications towers, trails, and USFS facilities. Figure 3.15 shows the expected risk to structures. The percentages of the polygon within each risk category are listed in Table 3.4. Fuels in the polygon are primarily timber driven, and the top three fuels include high-load conifer litter (32.46%), low-load conifer litter (19.08%), and very high-load timber-shrub (10.61%).

Table 3.4. 1D Region Attributes

Regional Polygon Background				
<u>Regional Polygon Name: 1D</u>				
Area (square miles): 39.44				
Building Count: 413				
Building Density (building units per square mile): 10.47				
Fire Agencies: Lefthand FPD (Mitigation Program),				
Indian Peaks FPD, and				
Gold Hill FPD				
Fire Station Count: 5				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Not Available:</u>	
71.27%	27.64%	0.33%	0.75%	
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
			TU1 (19.08%)	TL5 (32.46%)
			TU5 (10.61%)	

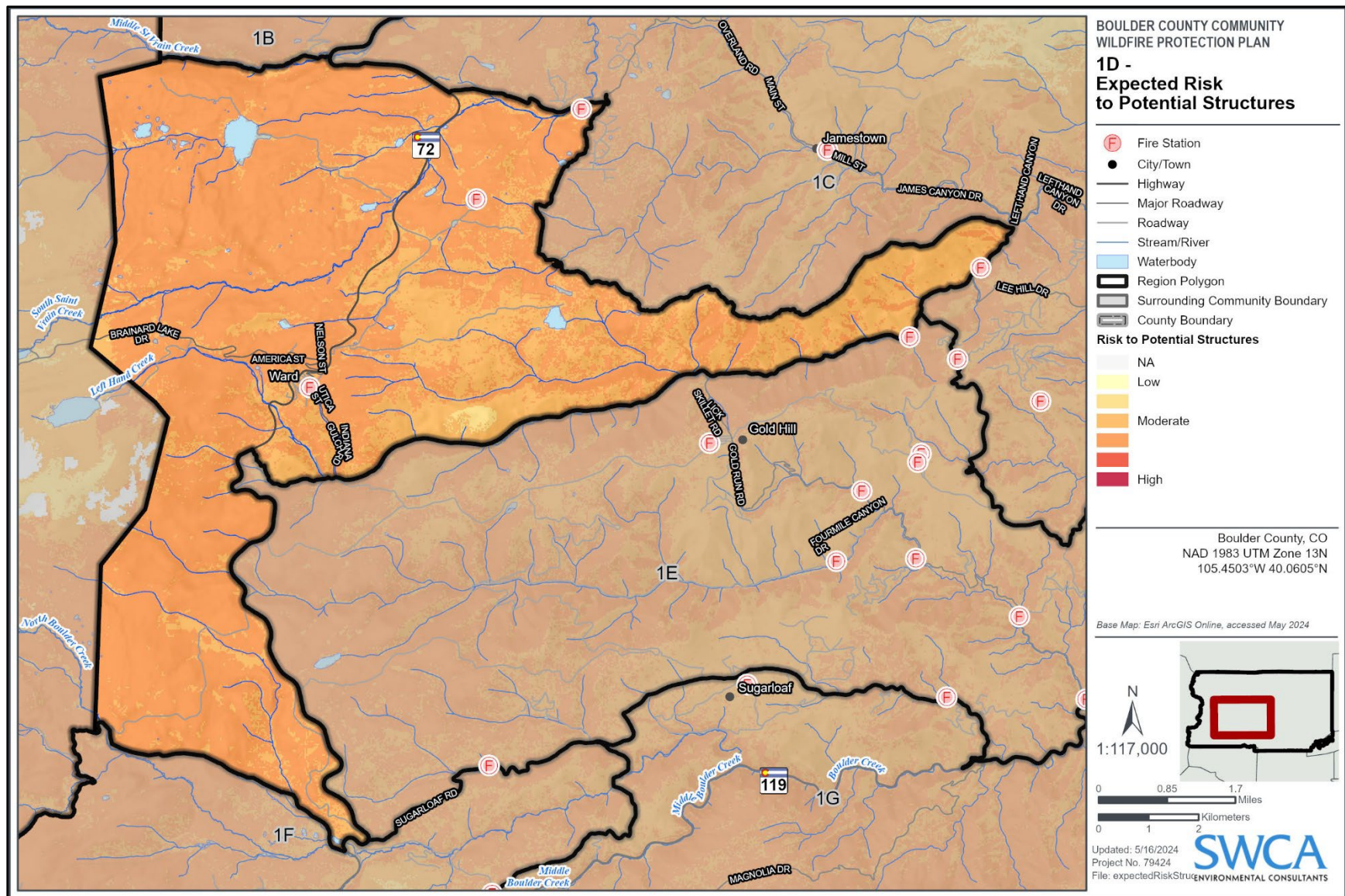


Figure 3.15. 1D region expected risk to potential structures.

1E

The 1E regional polygon encompasses 28,554 acres of mostly forested area in the county owned or managed by the USFS, BLM, City of Boulder, State of Colorado, and private landowners. The region is mostly rural with a small population and includes the communities of Gold Hill, Sunset, Silver Springs, and Seven Hills. There are 12 fire stations throughout the region. Critical infrastructure and values at risk in the region include mines; communication sites and towers; a power plant and substation; many hiking, biking, and off-roading trails; cemeteries; bridges; and multiple valuable watersheds such as Fourmile Creek. Figure 3.16 provides an illustration of risk to structures in the polygon ranging from NA to moderate, and a breakdown of the percentage in each category is listed in Table 3.5. The top three dominant fuel types are grass and shrubs (23.07%), high-load timber litter (13.79%), and heavy forest litter with a shrub or small tree understory (11.55%).

Table 3.5. 1E Region Attributes

Regional Polygon Background				
<u>Regional Polygon Name: 1E</u>				
Area (square miles): 44.62				
Building Count: 1,853				
Building Density (building units per square mile): 41.53				
Fire Agencies: Lefthand FPD (Mitigation Crew), Indian Peaks FPD				
Boulder Mountain FPD (Mitigation Crew), Sunshine FPD,				
Gold Hill FPD, Fourmile FPD (Mitigation Crew), and				
Sugarloaf FPD				
Nederland Fire Station Count: 12				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	
47.95%	51.71%	0.27%	0%	
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
	GS2 (23.07%)		TU5 (11.55%)	TL5 (13.79%)

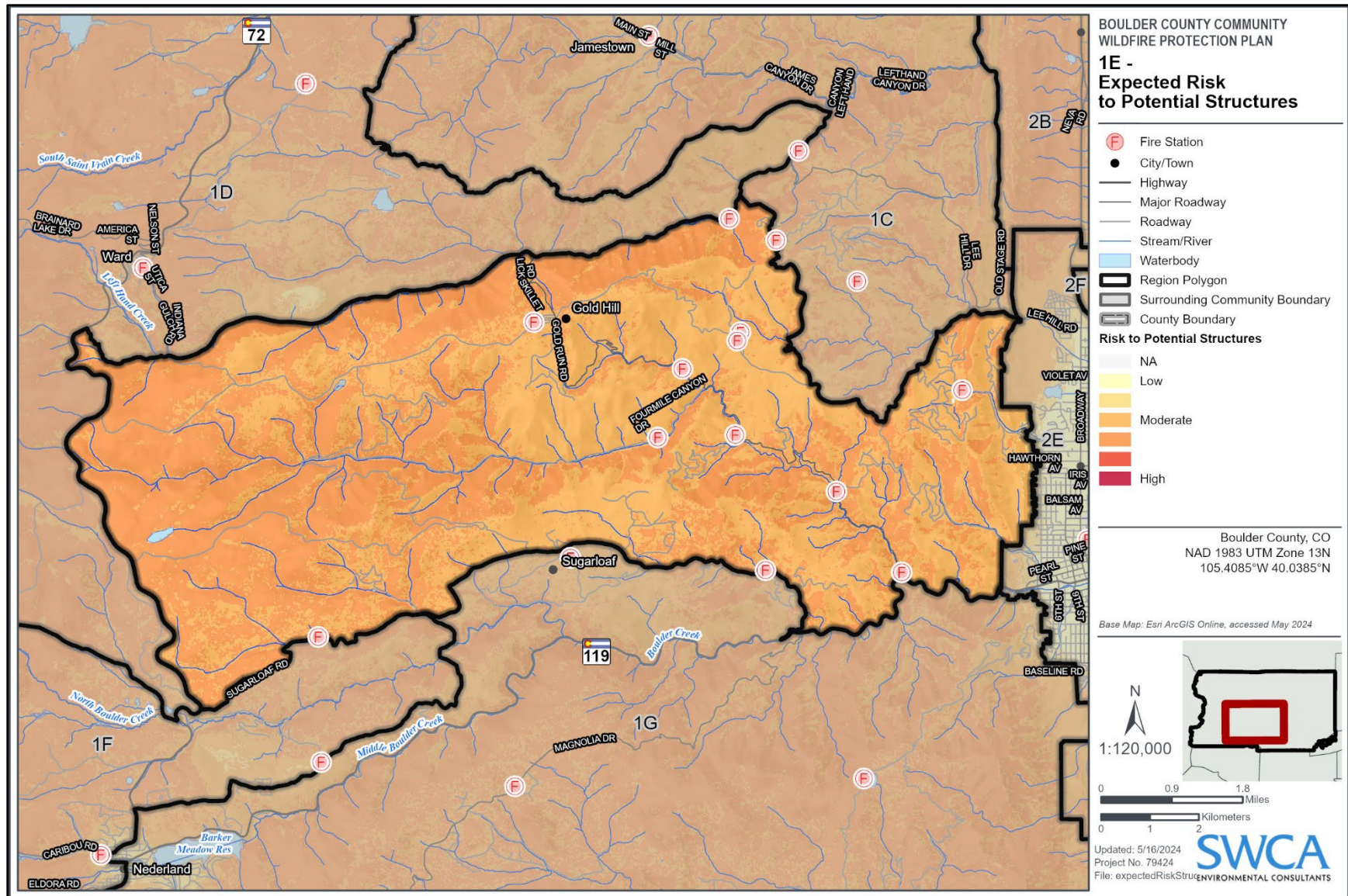


Figure 3.16. 1E region expected risk to potential structures.

1F

The 1F regional polygon is located at the southwest corner of the planning area and covers 17,254 acres. Land in the polygon is primarily owned by Boulder County and the USFS, with privately owned land intermixed. The area encompasses important headwater lakes and streams and a variety of high-use hiking trails. Other critical infrastructure includes communication towers, three fire stations, and USFS infrastructure. Figure 3.17 illustrates the expected risk to potential structures, with specific risk category percentages listed in Table 3.6. The primary fuels in the polygon are timber-related and include 33.80% high-load conifer litter, 14.89% very high-load timber-shrub, and 9.97% light-load timber-grass-shrub.

Table 3.6. 1F Region Attributes

Regional Polygon Background				
Regional Polygon Name: 1F				
Area (square miles): 26.96				
Building Count: 829				
Building Density (building units per square mile): 30.75				
Fire Agencies: Nederland FPD (Wildland Program),				
Sugarloaf FPD (Wildland Program), and				
Indian Peaks FPD				
Fire Station Count: 3				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>
69.62%	29.35%	0.65%	0.001%	0.37%
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
			TU1 (9.97%)	TL5 (33.80%)
			TU5 (14.89%)	

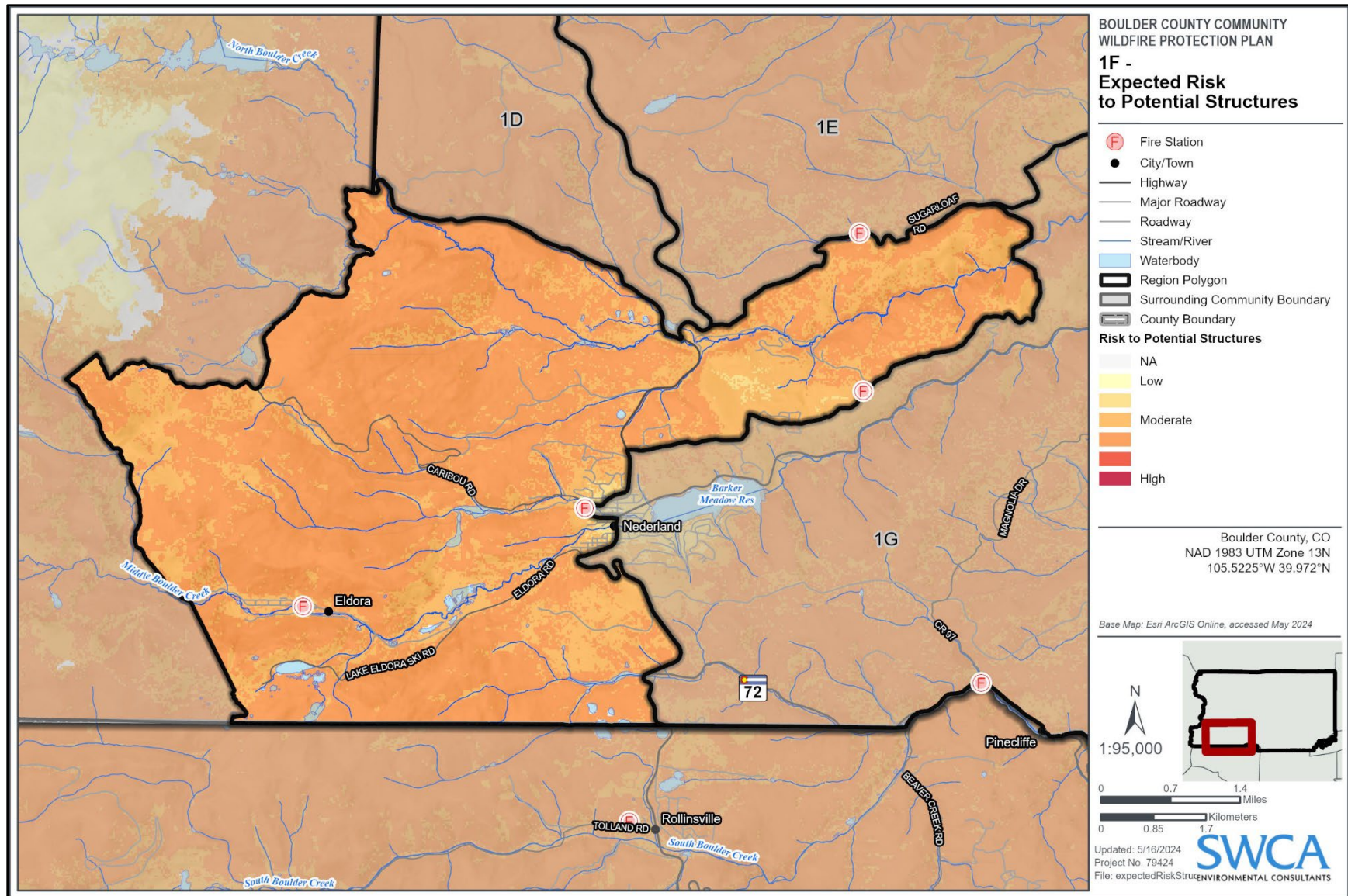


Figure 3.17. 1F region expected risk to potential structures.

1G

The 1G regional polygon is located along the south-central border of the planning area and has an area of 40,101 acres. Ownership in the area is primarily local government and USFS with smaller portions of private, City of Boulder, and Boulder County–owned land intermixed. The polygon includes two key water resource features: Gross Reservoir and Barker Reservoir. Other critical infrastructure and HVRAs include a number of hiking trails, a power facility, two dams, four fire stations, multiple communications towers, and historic properties. The risk rating for 1G is illustrated in Figure 3.18, and percentages for each risk category are listed in Table 3.7. The top three fuels in the area are moderate-load grass and shrub (28.41%), very high-load timber and shrub (17.55%), and long-needle litter (15.44%).

Table 3.7. 1G Region Attributes

Regional Polygon Background				
<u>Regional Polygon Name: 1G</u>				
Area (square miles): 62.66				
Building Count: 2,396				
Building Density (building units per square mile): 38.24				
Fire Agencies: Fourmile FPD (Mitigation Crew), Sugarloaf FPD, Nederland FPD,				
Mountain View FPD (Mitigation Program), Timberline FPD, and				
Coal Creek FPD				
Fire Station Count: 4				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u> 65.40%	<u>Low-Moderate:</u> 32.39%	<u>Low:</u> 0.88%	<u>Very Low:</u> 0.03%	<u>Not Available:</u> 1.30%
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
	GS2 (28.41%)		TU5 (17.55%)	TL8 (15.44%)



Eastern Boulder Regional Polygons

Eastern Boulder County falls into Wildfire Zone 2, which consists of 10 regional polygons: the communities of Longmont, Hygiene, Niwot, Gunbarrel, the City of Boulder, Lafayette, Louisville, Superior, Marshall, and Eldorado Springs. This region is characterized by lower elevations, more open landscapes, and a mixture of irrigated and non-irrigated grasslands and urban environments. The varied topography and land use in eastern Boulder County require distinct wildfire management approaches. By dividing the region into specific polygons, fire management strategies can be tailored to address the specific conditions, hazards, and wildfire behavior patterns found in these diverse landscapes.

2A

The 2A regional polygon is in the northeastern corner of the planning area and is mostly privately owned land, aside from a local government–owned section of land in the northwestern portion. The polygon covers a mostly rural area of 24,366 acres. Multiple ponds and reservoirs serve as critical water resources for the area. Additional HVRAs include a transmission line, multiple communication towers, a nature preserve, a railroad, and multiple dams. Expected risk to potential structures can be viewed in detail in Figure 3.19. Table 3.8 includes the percentages of the polygon that fall within each risk category. Over 60% of the fuels in the polygon are low-load grassland, 11.79% are agricultural fields, and 6.61% are sparse, short grasslands.

Table 3.8. 2A Region Attributes

Regional Polygon Background					
<u>Regional Polygon Name: 2A</u>					
Area (square miles): 38.07					
Building Count: 1,794					
Building Density (building units per square mile): 47.12					
Fire Agency: Mountain View FPD (Mitigation Program) and					
Hygiene FPD (Wildland Program)					
Fire Station Count: 0					
Percent of Community by Level of Expected Risk to Potential Structures					
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>	
43.25%	38.89%	8.26%	5.4%	4.18%	
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Burnable Urban	Non-Burnable
GR1 (6.61%)				NB3 (11.79%)	
GR2 (60.79%)					

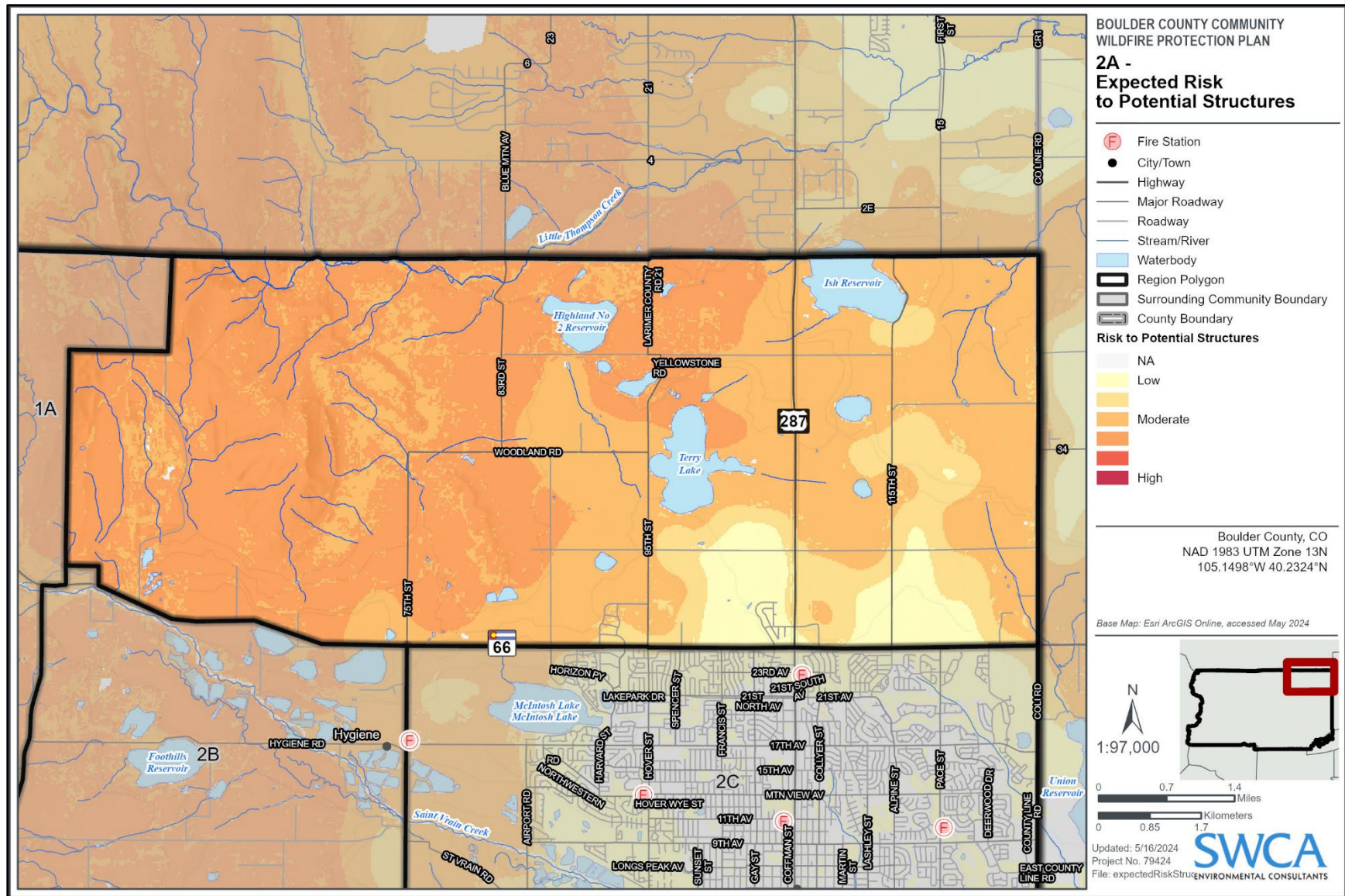


Figure 3.19. 2A region expected risk to potential structures.

2B

The 2B regional polygon covers an area of 29,472 acres in the central plains portion of the planning area. Land in the polygon is primarily privately owned with smaller portions owned by the City of Boulder, Boulder County, and NOAA. Homes are spread across the area, and the small community of Hygiene is located at the northeastern edge. The polygon contains many valuable natural resources, including multiple lakes, ponds, streams, four dams, and multiple trails. Critical infrastructure in the area includes communication towers, bridges, a railroad, and a fire station. The expected risk to potential structures for 2B is shown in Figure 3.20, and Table 3.9 lists the percentages for each risk category. Fuels in the polygon are primarily grasses with 65.35% being low-load dry climate grass, 7.38% being short, sparse grasses, and 5.34% categorized as moderate load grass-shrub.

Table 3.9. 2B Region Attributes

Regional Polygon Background				
Regional Polygon Name: 2B				
Area (square miles): 46.05				
Building Count: 2,983				
Building Density (building units per square mile): 64.78				
Fire Agencies: Hygiene FPD (Wildland Program),				
Lefthand FPD (Mitigation Program), and				
Lyons FPD (Wildland Program)				
Fire Station Count: 1				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>
65.29%	28.86%	1.73%	0.08%	4.10%
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
GR2 (65.35%)	GS2 (5.34%)			
GR1 (7.38%)				

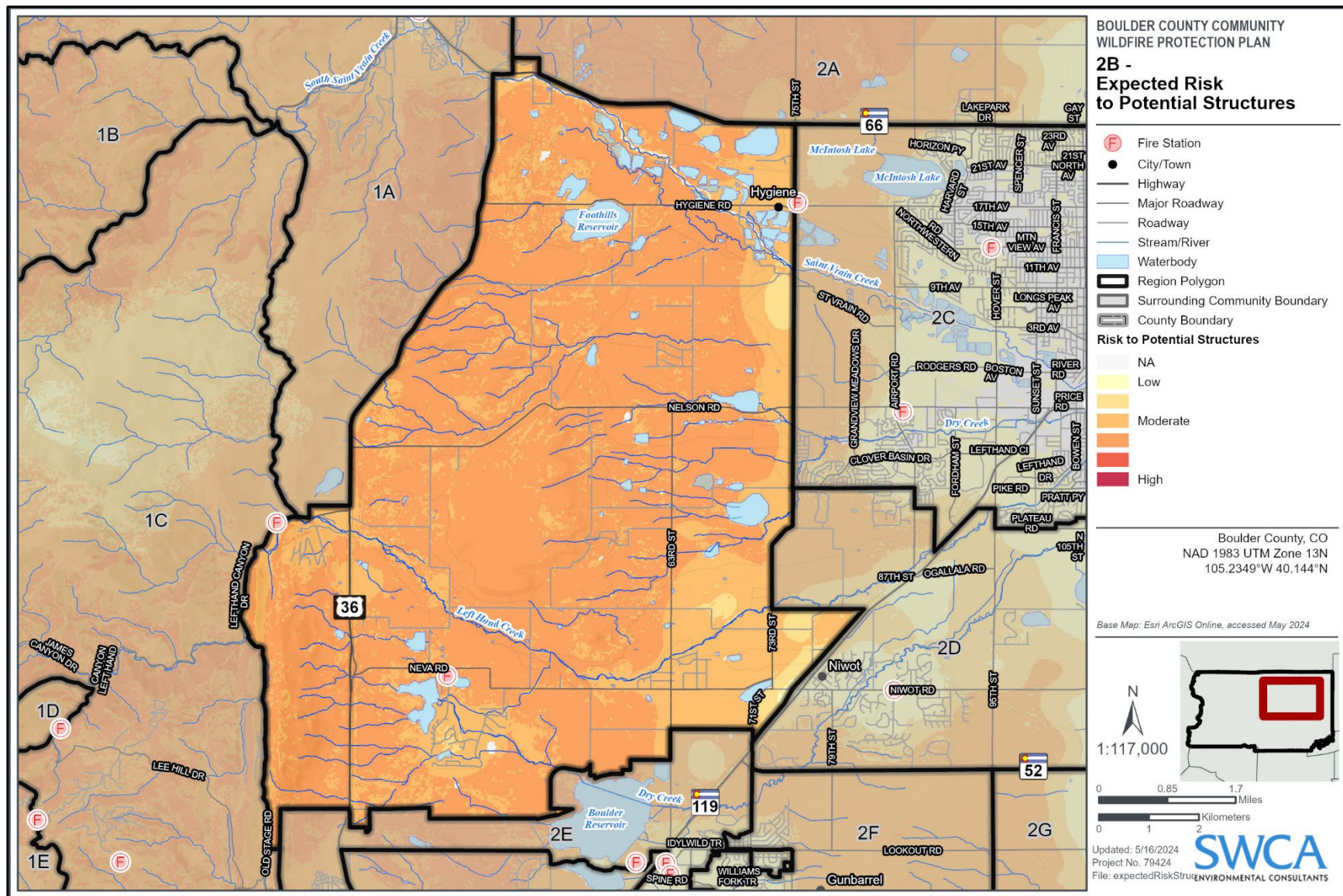


Figure 3.20. 2B region expected risk to potential structures.

2C

The 2C regional polygon includes the city of Longmont and covers an area of 18,553 acres in the northeastern portion of the planning area. The polygon is primarily urban development with a high building density. An abundance of critical infrastructure is contained in the area, including seven fire stations, an airport, many nursing homes, communication towers, and transmission lines. The polygon also contains one dammed reservoir and a variety of trails intermixed with communities. The potential risk to structures is illustrated in Figure 3.21, and a breakdown of the risk category percentages is displayed in Table 3.10. Fuels composition in the area is mostly burnable urban (53.70%); 15.06% is low-load grassland, and 5.75% is agricultural fields.

Table 3.10. 2C Region Attributes

Regional Polygon Background					
<u>Regional Polygon Name: 2C</u>					
Area (square miles): 28.99					
Building Count: 29,872					
Building Density (building units per square mile): 1,030.41					
Fire Agency: Longmont FPD (Wildland Program)					
Fire Station Count: 7					
Percent of Community by Level of Expected Risk to Potential Structures					
<u>Moderate:</u>	<u>Low-moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>	
0.01%	14.14%	6.36%	38.51%	40.97%	
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Burnable Urban	Non-Burnable
GR2 (15.06%)				BU1 (53.70%)	NB3 (5.75%)

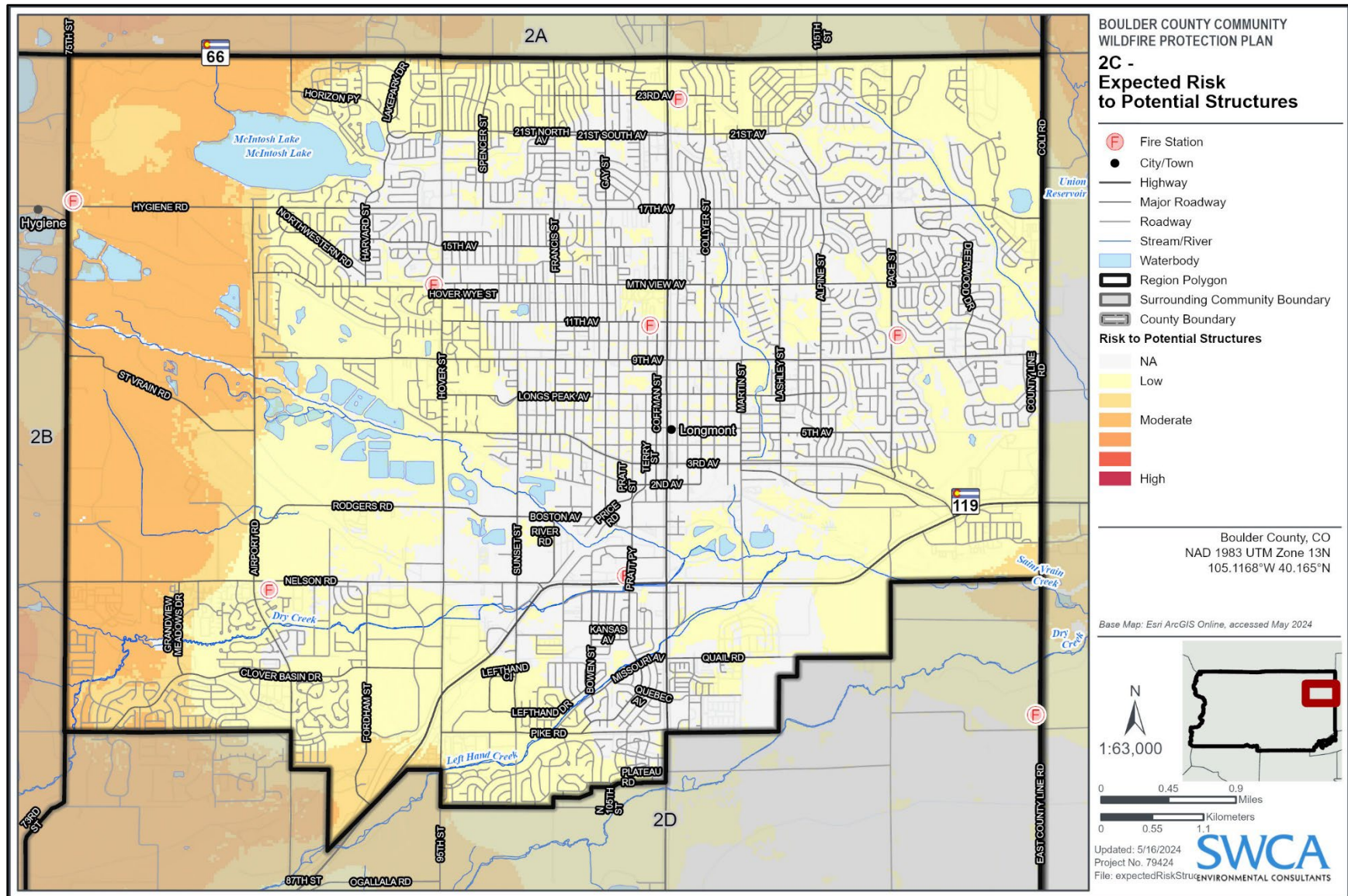


Figure 3.21. 2C region expected risk to potential structures.

2D

The 2D regional polygon is located along the east-central border of the planning area between the 2C and 2G polygons. The area covers 14,836 acres of land that is almost entirely privately owned. HVRAs and critical infrastructure in the polygon include a train track, wastewater treatment facility, two fire stations, a transmission line, and multiple water resources, including Panama Reservoir and associated dams. The risk to potential structures for 2D is shown in Figure 3.22. Table 3.11 provides percentages of the polygon within each risk category. The top three fuels in the area are agricultural fields (41.35%), low-load grasses (28.78%), and burnable urban development (8.04%).

Table 3.11. 2D Region Attributes

Regional Polygon Background					
Regional Polygon Name: 2D					
Area (square miles): 23.18					
Building Count: 2,794					
Building Density (building units per square mile): 120.52					
Fire Agency: Mountain View FPD (Wildland Program)					
Fire Station Count: 2					
Percent of Community by Level of Expected Risk to Potential Structures					
Moderate:	Low:	Very Low:	Not Available:		
17.00%	24.55%	33.74%	24.70%		
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Burnable Urban	Non-Burnable
GR2 (28.78%)				BU1 (8.04%)	NB3 (41.35%)

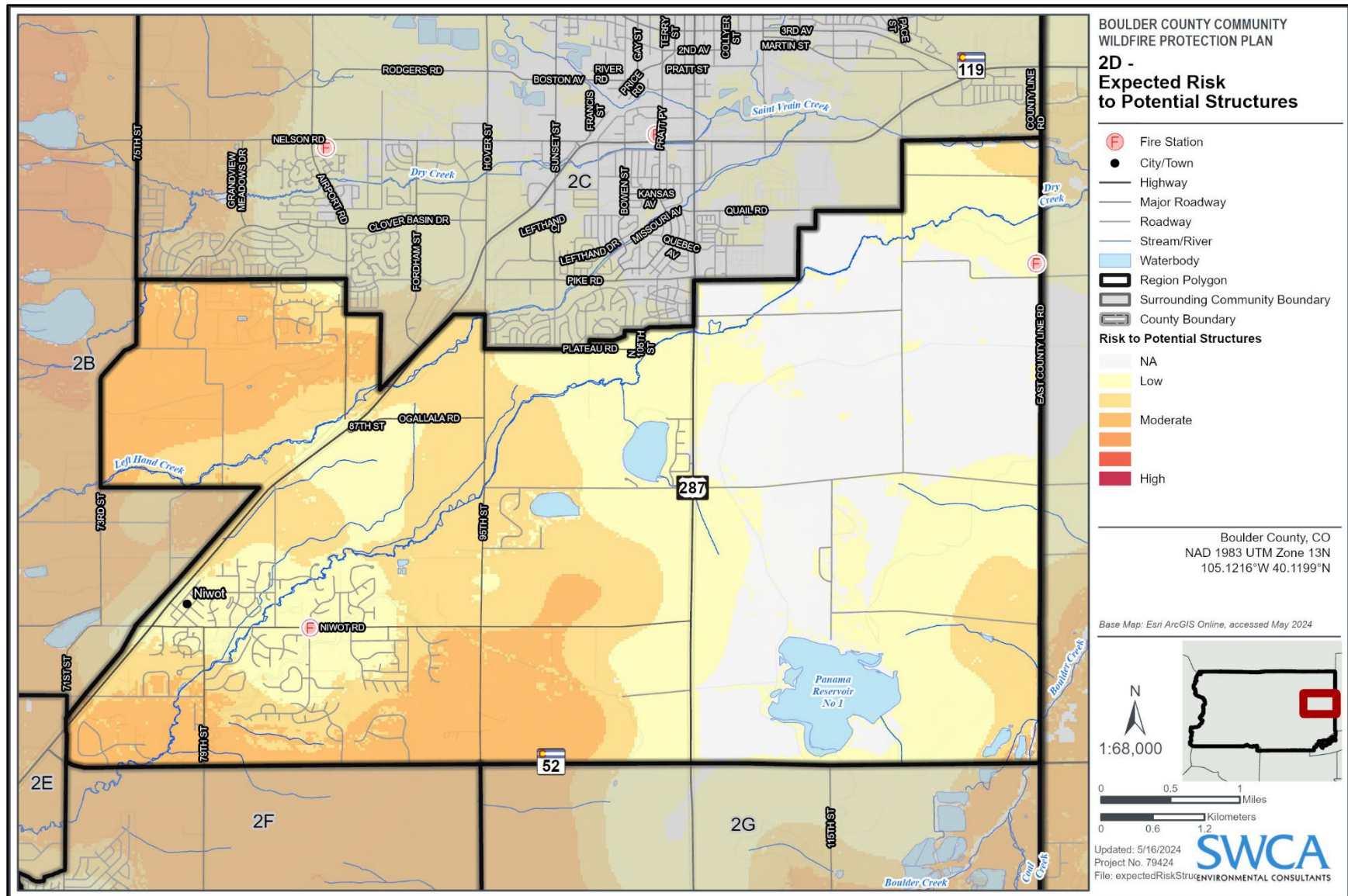


Figure 3.22. 2D region expected risk to potential structures.

2E

The 2E regional polygon covers 18,428.27 acres in the south-central portion of the planning area. Land ownership in the area is primarily the City of Boulder and private ownership. A small portion of the area is owned by NOAA, as well as other local governments. The 2E polygon has an abundance of HVRAs and critical infrastructure including communication towers, a power plant, fire stations and an Emergency Management System (EMS) facility, many trails and trailheads, and historic properties. Figure 3.23 maps the risk to structures for 2E with the percentages of the area falling within each risk category listed in Table 3.12. Approximately 50% of the area is burnable urban fuels, 15% is low-load grasslands, and 5.6% is high-load timber litter.

Table 3.12. 2E Region Attributes

Regional Polygon Background					
<u>Regional Polygon Name: 2E</u>					
Area (square miles): 28.79					
Building Count: 25,913					
Building Density (building units per square mile): 899.94					
Fire Agency: City of Boulder (Mitigation Program)					
Fire Station Count: 9					
Percent of Community by Level of Expected Risk to Potential Structures					
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>	
4.68%	20.24%	11.7%%	42.77	20.59%	
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter	Burnable Urban
GR2 (15.59%)				TL3 (5.59%)	BU1 (49.77%)

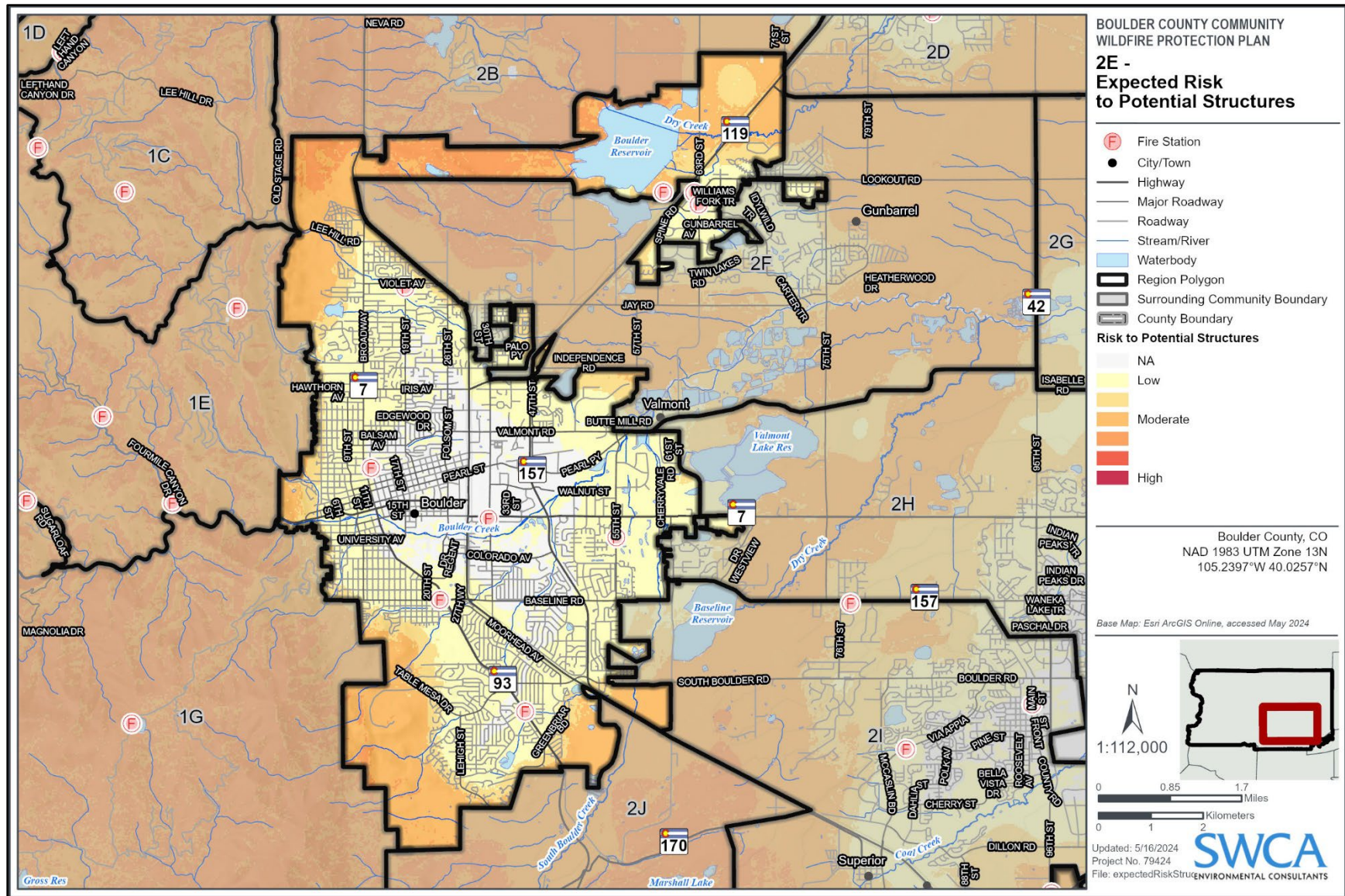


Figure 3.23. 2E region expected risk to potential structures.

2F

The 2F regional polygon is located west of the 2G polygon and covers an area of 12,676 acres. Ownership is primarily split between Boulder County and private owners, with small portions of City of Boulder–owned land intermixed. The polygon contains a large number of structures, as well as water resources throughout. Other HVRAs and critical infrastructure includes a wastewater treatment plant, two power plants, multiple trail systems, and multiple bridges and communication towers. Details on the risk to structures, including percentages for each risk category, can be found in Figure 3.24 and Table 3.13. Over 50% of the area is low-load grasslands, 12% is burnable urban structures, and 8% is short, sparse grasses.

Table 3.13. 2F Region Attributes

Regional Polygon Background					
<u>Regional Polygon Name: 2F</u>					
Area (square miles): 19.81					
Building Count: 4,535					
Building Density (building units per square mile): 228.96					
Fire Agency: Boulder Rural FPD (Wildland Program)					
Fire Station Count: 0					
Percent of Community by Level of Expected Risk to Potential Structures					
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>	
6.70%	64.34%	13.98%	9.64%	5.32%	
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter	Burnable Urban
GR1 (8.11%)					BU1 (12.44%)
GR2 (51.28%)					

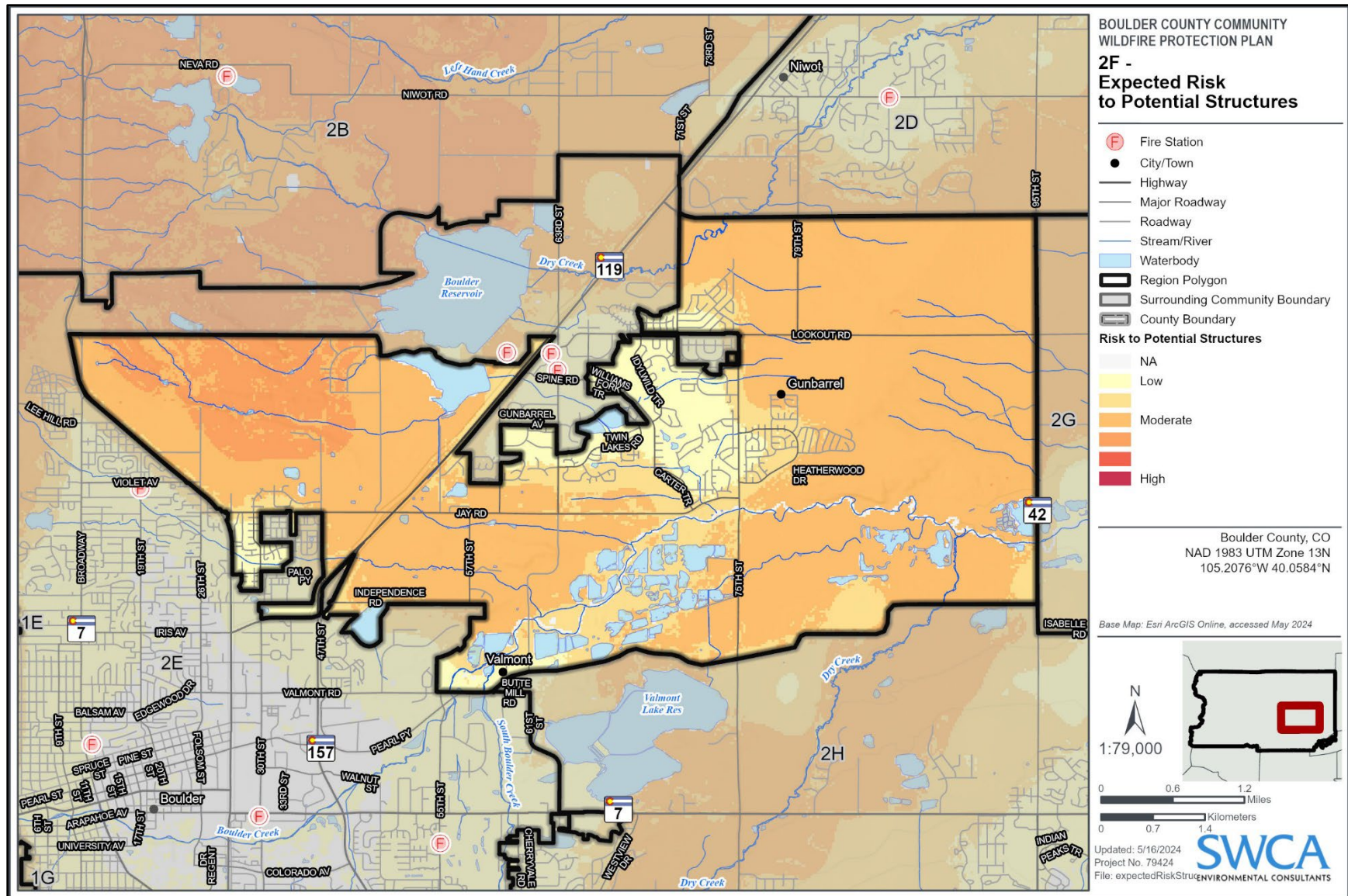


Figure 3.24. 2F region expected risk to potential structures.

2G

The 2G regional polygon is located on the southeastern border of the planning area, and the land is primarily owned by the City of Boulder and Boulder County; the remaining land is privately owned. The polygon covers an area of 11,420 acres and contains no fire stations. HVRAs include transmission lines, an EMS facility, multiple bridges and communication towers, and a variety of trails. Figure 3.25 illustrates risk to structures in the polygon with the percentage of the polygon within each risk category listed in Table 3.14. Fuels in the polygon are primarily low load grassland at 36.45%, agricultural fields (29.62%), and burnable urban structures (11.16%).

Table 3.14. 2G Region Attributes

Regional Polygon Background					
Regional Polygon Name: 2G					
Area (square miles): 17.84					
Building Count: 4,310					
Building Density (building units per square mile): 241.53					
Fire Agency: Mountain View FPD (Mitigation Program)					
Fire Station Count: 0					
Percent of Community by Level of Expected Risk to Potential Structures					
Low-Moderate:		Low:		Very Low:	
28.59%		33.45%		33.08%	
				Not Available:	
				4.86%	
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Burnable Urban	Non-Burnable
GR2 (36.45%)				BU1 (11.16%)	NB3 (29.62%)

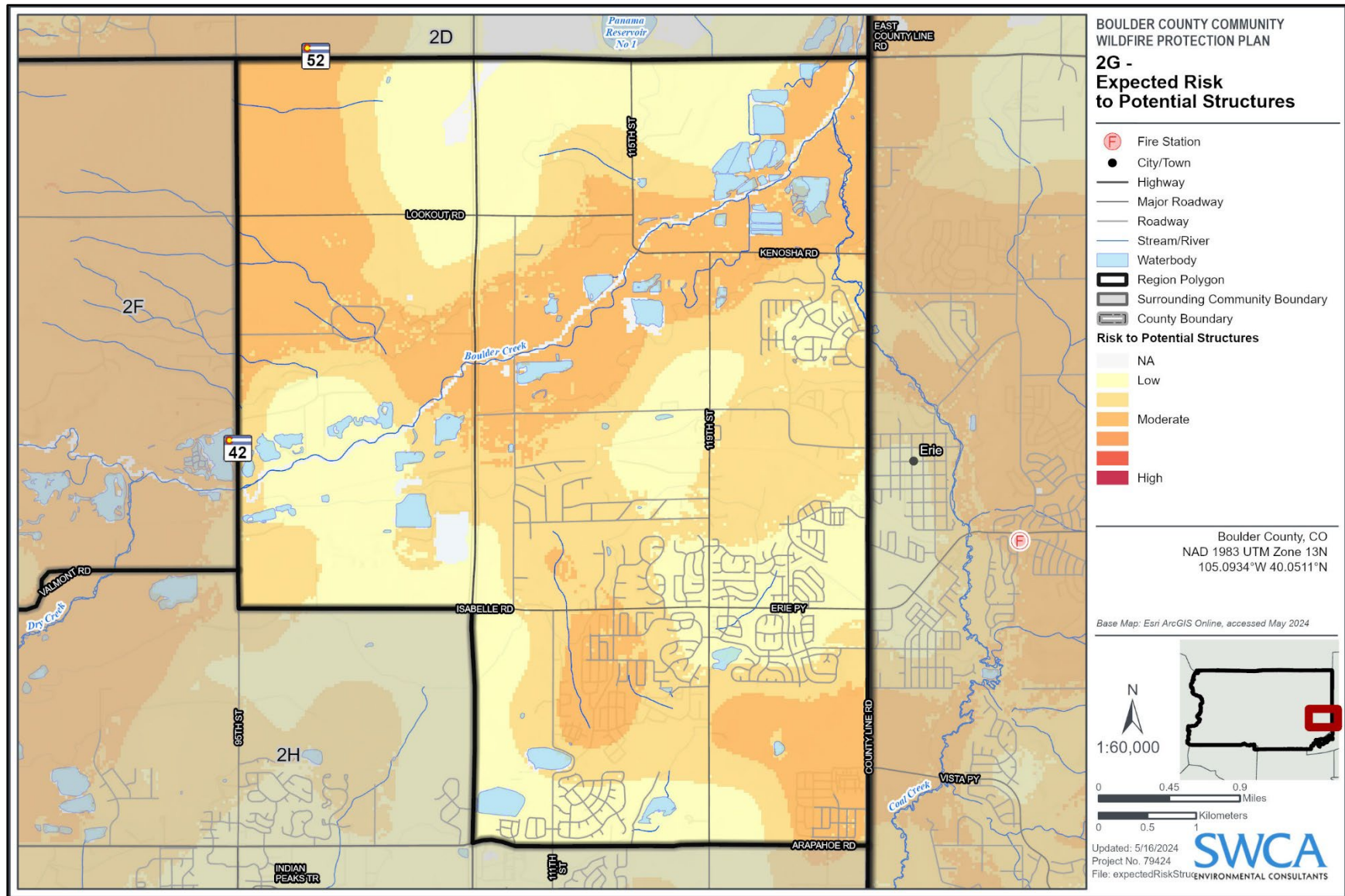


Figure 3.25. 2G region expected risk to potential structures.

2H

The 2H polygon covers an area of 18,801 acres in the southeastern portion of the planning area. Land in the polygon is largely privately owned with small portions owned by the City of Boulder which are primarily agricultural or open space. The area contains a number of critical infrastructure and valued resources such as reservoirs and associated dams, two fire stations, a wastewater treatment facility, agricultural resources, and a number of trails, communication towers, and nursing homes. The polygon contains a high number of homes and urban development as well. Risk to structures is shown in Figure 3.26 and the percentages for each category are provided in Table 3.15. Fuels in the area are primarily composed of low-load grasses (35.46%), burnable urban structures (21.57%), and agricultural fields (12.40%).

Table 3.15. 2H Attributes

Regional Polygon Background					
<u>Regional Polygon Name: 2H</u>					
Area (square miles): 29.38					
Building Count: 11,555					
Building Density (building units per square mile): 393.32					
Fire Agencies: Louisville FPD (Wildland Program), Lafayette FPD (Wildland Program), and Mountain View FPD (Wildland Program)					
Fire Station Count: 2					
Percent of Community by Level of Expected Risk to Potential Structures					
<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>		
28.28%	28.51%	31.75%	11.43%		
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Burnable Urban	Non-Burnable
GR2 (35.46%)				BU1 (21.57%)	NB3 (12.40%)

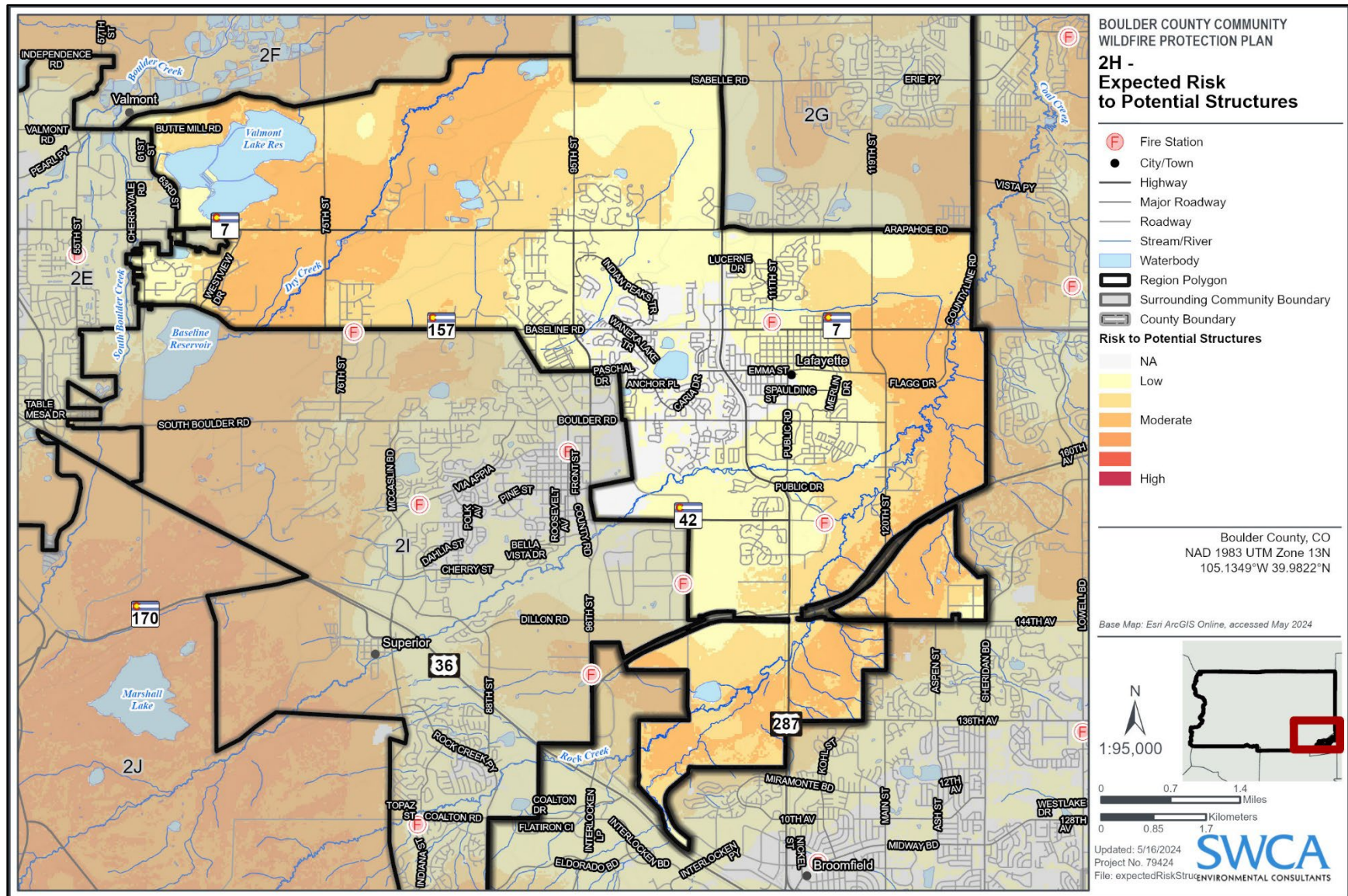


Figure 3.26. 2H region expected risk to potential structures.

2I

The 2I regional polygon covers an area of 13,127 acres in the southeast corner of the planning area. Land in the polygon is almost entirely privately owned with a small portion of City of Boulder–owned land at the east edge. The polygon contains six fire stations, a portion of U.S. Highway 36, communications towers and transmission lines, and multiple trail systems. Figure 3.27 illustrates the risk to structure in the area with additional risk category detail shown in Table 3.16. Fuels are mainly composed on grasses and urban construction: burnable urban (33.38%), low-load grasses (31.23%), and sparse, short grasses (7.25%).

Table 3.16. 2I Region Attributes

Regional Polygon Background					
<u>Regional Polygon Name: 2I</u>					
Area (square miles): 20.51					
Building Count: 11,425					
Building Density (building units per square mile): 557.01					
Fire Agencies: Louisville FPD (Wildland Program) and Mountain View FPD (Wildland Program)					
Fire Station Count: 6					
Percent of Community by Level of Expected Risk to Potential Structures					
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>	
3.40%	26.99%	22.23%	36.57%	10.78%	
Percent of Community Top Three Fuel Types					
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter	Burnable Urban
GR1 (7.25%)					BU1 (33.38%)
GR2 (31.23%)					

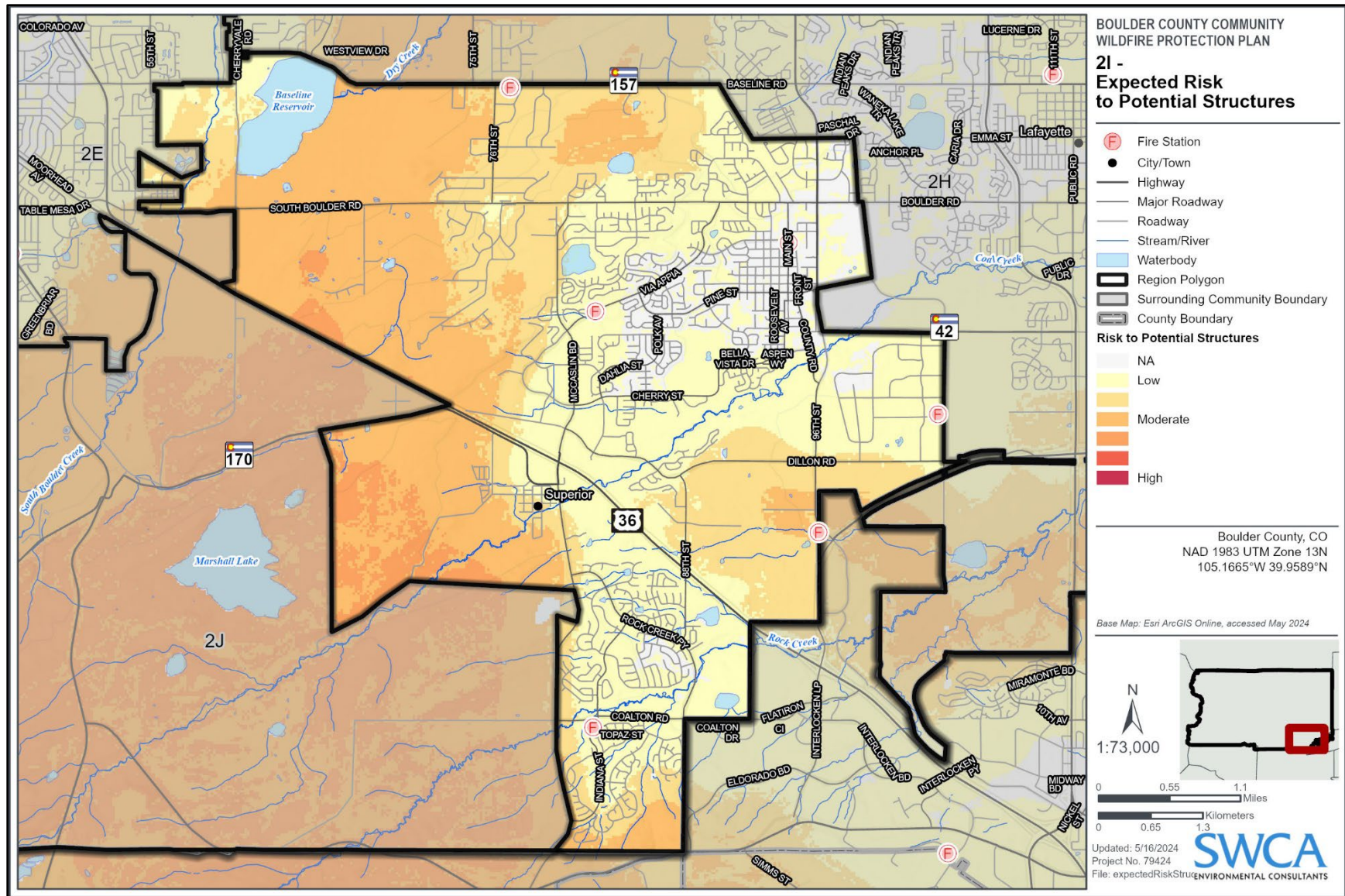


Figure 3.27. 2I region expected risk to potential structures.

2J

The 2J regional polygon covers an area of 15,139 acres in the southeastern portion of the planning area. The land in the polygon is mostly owned by the City of Boulder and local governments with small portions of privately owned land and a conservation easement included. A large portion of the Preble's jumping mouse critical habitat is located in the area along its border with the 2E polygon. Other HVRAs and critical infrastructure include Marshall Lake and its associated dam; multiple communications towers, bridges, and trails; a fire station and EMS facility, and historic properties. Figure 3.28 shows the expected risk to potential structures in 2J, and the percentages of land in each risk category are included in Table 3.17. Grass and shrubs dominate the fuel loads in the polygon with 49.63% low-load grasses, 13.80% short, sparse grass, and 10.83% moderate-load grass-shrub.

Table 3.17. 2J Region Attributes

Regional Polygon Background				
<u>Regional Polygon Name: 2J</u>				
Area (square miles): 23.65				
Building Count: 644				
Building Density (building units per square mile): 27.23				
Fire Agency: Mountain View FPD (Wildland Program)				
Fire Station Count: 1				
Percent of Community by Level of Expected Risk to Potential Structures				
<u>Moderate:</u>	<u>Low-Moderate:</u>	<u>Low:</u>	<u>Very Low:</u>	<u>Not Available:</u>
61.94%	35.47%	0.35%	0.009 %	2.22%
Percent of Community Top Three Fuel Types				
Grass	Grass/Shrub	Shrub	Timber Understory	Timber Litter
GR1 (13.80%)	GS2 (10.83%)			
GR2 (49.63%)				

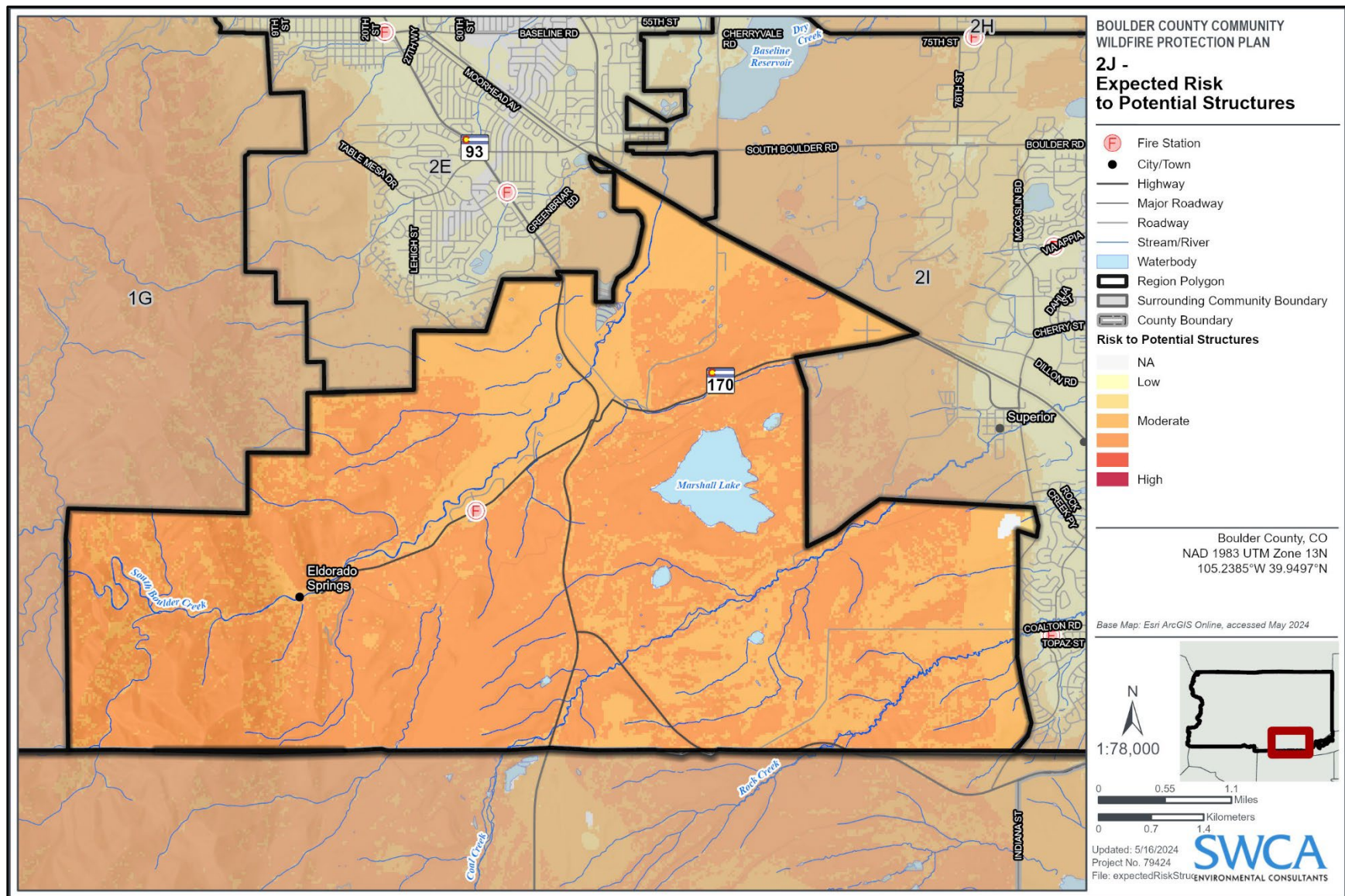


Figure 3.28. 2J region expected risk to potential structures.



CHAPTER 4 – MITIGATION STRATEGIES

This chapter provides project recommendations, implementation guidance, and conceptual fuel treatment recommendations. A comprehensive mitigation strategy not only includes recommendations to mitigate wildfire hazards but also actions to improve preparedness and resiliency. This well-rounded approach involves being prepared both pre- and post-fire. Past and current planning efforts can be found in Appendix C, and post-fire response and rehabilitation information can be found at the end of this chapter and in Appendix F.

CWPP recommendations have been structured around the three main goals of the Cohesive Strategy: resilient landscapes; fire-adapted communities; and safe, effective, risk-based wildfire response. Many of the recommendations listed can be implemented by a homeowner or at a community level (preparedness resources can be found in Appendix A). Projects requiring large-scale support can be prioritized based on the COAL Quantitative Wildfire Risk Assessment (detailed in Appendix D). Funding resources are summarized in Appendix I.

This chapter includes recommendation matrices that serve as an action plan for implementation. Recommendations adhere to the minimum requirements for CWPPs established by the CSFS (2022b) and are aligned with the strategies in the 2020 Colorado Forest Action Plan (CSFS 2020), wherever possible. Recommendations should be enacted collaboratively whenever possible. Many of these projects overlap priority projects identified in other local CWPP plans.

As a non-regulatory document, project and action recommendations in the CWPP are not required to be implemented. Recommendations are put forward to provide guidance and suggestions on actions that will mitigate wildland fire risk. It is at the discretion of Boulder County representatives, land managers, homeowners, and stakeholder groups to determine when or if a recommendation will be implemented. Alignment with local planning documents should be considered. Appropriate subject matter experts, lessons learned documentation, and the best available science should be included in decision making regarding project planning, implementation, and maintenance. Including a variety of stakeholders, the public, and subject matter experts in the project planning and development phase will ensure that ecological impacts are considered along with risk reduction objectives. A suite of co-benefits are available when developing projects, and proper discussion should be had to ensure projects can positively impact the community and local ecosystem to the furthest extent possible.

In addition, enhancing community wildfire resilience requires strategic alignment and implementation across regional plans. Coordinated efforts are essential for a geographically tailored wildfire mitigation approach, working jointly with local planning frameworks. A list of proposed local projects is found in Appendix J, most of which are already identified in local FPD CWPPs or other government planning documents. Including them in Appendix J underscores this Boulder County CWPP effort's commitment to local collaboration and coordination as countywide partners. This approach also enables us to pursue funding for projects that may not currently be recognized in local CWPPs. To view other CWPPs in the Boulder County region and more detailed recommendations in the planning area, please visit: <https://csfs.colostate.edu/wildfire-mitigation/community-wildfire-protection-plans/>.

For further planning, land managers, stakeholders, and decision-makers in Colorado have access to valuable information and decision support tools through the Colorado Forest Atlas. The Forest Atlas serves as a one-stop shop for developing projects, writing forestry plans, and assessing wildfire risk to communities. The applications available through this tool allow users to generate detailed reports to understand risk and tailor wildfire risk reduction actions both to their specific needs and to the objectives outlined in the Colorado Forest Action Plan. To learn more about the Colorado Forest Atlas, please visit the following website: <https://csfs.colostate.edu/wildfire-mitigation/colorado-forest-atlas/>.



Cohesive Strategy Goal 1: Resilient Landscapes

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

Resilient landscapes refer to ecosystems that are healthy, diverse, and capable of withstanding and recovering from various disturbances, such as wildfires, climate change, invasive species, and insect infestations. Project recommendations aimed at creating more resilient landscapes in the planning area can be found in Table 4.1. **The following information and guidance is provided at a broad scale since this is a county CWPP. More detailed recommendations have been developed for local CWPPs throughout the county and these efforts can be viewed in Appendix J.**

All recommendations in this chapter were created through extensive collaboration with Core Team members and the public. These efforts consisted of the compilation of information on past and planned fuel treatments and prioritizing areas for future treatment projects. All recommendations were delineated using the Boulder County's areas of concern (see Figure 4.4), regional polygons (see Chapter 3), the COAL Quantitative Wildfire Risk Assessment (see Chapter 3), as well as stakeholder and public input. The Core Team prioritized projects and set timelines based on wildfire hazards in the planning area, effective mechanisms to mitigate hazards and increase preparedness, and how realistic potential actions were to implement. Other factors that influenced the time frame include availability or need for additional funding, leadership needs, and capacity. After prioritizing the protection of life and property, whenever possible, the recommendations included in Table 4.1 should follow CSFS and USFS best management practices for water, vegetation, and wildlife (CSFS 2020, 2023c; USFS 1997).

The CWPP Core Team also used their expertise, public input, and the COAL Quantitative Wildfire Risk Assessment to identify general, landscape-scale treatment recommendations (Figures 4.2 and 4.3, Table 4.2) and broad areas of concern (Figure 4.4). Areas of concern are regions of the planning area in which more specific mitigation efforts should be prioritized given a variety of attributes (see the Areas of Concern section below for more detail).

Finally, completed fuel treatment projects and planned fuel treatments are shown in the Past Fuel Treatment Accomplishments section and future recommended projects are outlined in the Fuel Treatment Recommendations section.

PRESCRIBED FIRE PROGRAM

Many agencies and municipalities within Boulder County conduct prescribed burns when conditions allow (Boulder County n.d.). Prescribed burning is conducted to reduce fire danger for the community by modifying hazardous fuels, improving the health of open space ecosystems, and maintaining agricultural water infrastructure (Davis et al. 2024).

Boulder County conducts agricultural prescribed fire to help maintain open space agricultural properties, including ditches that provide water for open space farming and ranching operations. Prescribed fire in agricultural ditches removes vegetation from important irrigation infrastructure and helps control plant growth and invasive weed species. The Arapaho and Roosevelt National Forest also conducts slash pile burning and broadcast burning to remove residual fuels left on the landscape after fuel thinning projects

to improve forest health and reduce wildfire hazards (Northern Colorado Fireshed Collaborative [NCFC] 2024).

Boulder County and partner agencies schedule prescribed burns with consideration of multiple key measures. Public notifications are sent out at least 24 hours prior to ignition via local media and social media outlets to promptly inform stakeholders. Boulder County Parks and Open Space, in collaboration with local and federal fire departments, oversees the burns, containing them using trails and roads while maintaining firefighting resources on-site until the fire is contained. Site conditions are monitored during and after the burn to consider wildfire spread risk, ecological concerns, and potential human health issues (Boulder County n.d.).

Considerations for Private Landowners

Any private landowners or agricultural landowners currently assume responsibility, risk, and liability should they engage in any prescribed burning activities on their lands. Sometimes, landowners will partner with their local FPDs for conducting pile burning operations in the winter. Please see Table 1.3 to learn more about obtaining a burn permit through the Boulder County Sheriff's office. There are barriers in place for local, state, and federal agencies to perform prescribed burning on private lands.

This CWPP acknowledges the barriers to private landowners for conducting prescribed burning operations (Gass 2018). These barriers include smoke management, availability of professional expertise, liability, cross-boundary challenges, information and advocacy, and expense.

RECOMMENDATIONS FOR RESILIENT LANDSCAPES

Table 4.1. Recommendations to Create Resilient Landscapes (Vegetation Management)

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
RL1	Fuels Reduction	H	1–5 years	Landscape-scale/Countywide Fuels Mitigation Projects Prioritize and implement local fuel reduction projects within Boulder County, focusing particularly on high-risk areas with varied ownership, including public and private lands.	Boulder County (grasslands/urban and forest lands)	Boulder County Community Planning and Permitting; Wildfire Partners; Boulder County Parks and Open Space (BCPOS); local, county, municipal, and city governments (City of Boulder OSMP, FPDs); USFS, CSFS, Boulder County Fireshed; Conservation District; and nonprofit groups	Enhance and coordinate fuel reduction efforts through strategic planning, collaboration, adaptive management, and leveraging existing knowledge and resources to manage healthy forest ecosystems effectively. <ul style="list-style-type: none">Through the Strategic Fuels Mitigation grant program, increase pace and scale of landscape scale and or community-wide fuels mitigation projects.Collaborate with local partners, local landowners, private stakeholders, and community members to identify and prioritize fuel reduction projects.Employ the potential operational delineations (PODs) as a risk management tool where applicable.Tailor treatment strategies to the specific characteristics of each area, ensuring an adaptive and effective response to diverse fuel conditions.Leverage the lessons learned from previous successful fuel reduction projects within Boulder County.Align with past planning of proven strategies, optimizing resource allocation, and building on the successes of prior efforts.Manage for healthy forest ecosystems.Evaluate and incorporate best available science and techniques into BCPOS practices.Assess current information from forested open space properties to determine the best management actions.Recognize best management practices and low-impact forestry techniques and apply them during forest management operations.Meet prescribed fire objectives (broadcast burning, pile burning, ditch burning, etc.)Leverage existing treatments and look for connections between agency projects.	Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. Create a fuel arrangement unlikely to support crown fire or fast rates of spread. Reduce the risk of home and structure ignitions. Collectively work toward creating safer environments and minimizing the potential.	Establish a post-treatment monitoring plan to evaluate the long-term impact of fuel reduction projects. Collect and assess data and other information on forested open space. Document current conditions and assess change over time due to natural processes or management activities. Evaluate lessons learned and best practices from existing treatment projects throughout Boulder County that have undergone success with regard to fuel mitigation, i.e., Superior's vegetation management practices (e.g., mowing, grazing, fuel removal) are multifaceted and collaborative. Based on evaluations and monitoring of past treatments, consider second entry treatments to maintain efficacy of original project. Long-term maintenance must consider forest types and associated return interval (for example, lodgepole pine forest types revegetate more quickly than ponderosa pine forest types).
RL2	Fuels Reduction	H	1–5 years	Fuel Reduction Projects (West) Develop, prioritize, and implement landscape-scale fuels reduction project on BCPOS properties to mitigate fuels and promote forest health in a variety of forest types in western Boulder County: ponderosa pine, mixed conifer, and lodgepole pine.	CSFS, City of Boulder, Boulder County Sheriff's Office (BCSO), USFS, City of Longmont, The Watershed Center, Boulder Watershed Collective Boulder Valley and Longmont Conservation Districts	BCPOS, CSFS, City of Boulder, BCSO, USFS, City of Longmont, The Watershed Center, Boulder Watershed Collective Boulder Valley and Longmont Conservation Districts	Collaboratively manage vegetation and fuels on western Boulder County lands to reduce wildfire risk and promote healthy forest ecosystems. <ul style="list-style-type: none">Collaborate with other agencies, partners, and landowners.Collaboratively identify vegetation and fuels management needs based on the COAL Quantitative Wildfire Risk Assessment and input from local officials and land managers.Utilize PODs and Boulder County Priority Focus areas as a pre-planning framework in developing wildfire projects where applicable on BCPOS properties.Implement shaded fuel breaks, reduce ladder fuels, and promote cross-boundary actions.Manage for healthy forest ecosystems.Monitor and maintain fuel reduction areas regularly to prevent fuel accumulation and promote long-term effectiveness.Prioritize the establishment and maintenance of shaded fuel breaks and reduction of ladder fuels in ecologically sensitive areas, referencing the COAL Quantitative Wildfire Risk Assessment.Evaluate and incorporate best available science and techniques into BCPOS practices.Assess current information from forested open space properties to determine the best management actions.Recognize best management practices and low-impact forestry techniques and apply them during forest management operations.	Protect life and property by mitigating fuels and reducing wildfire risk and hazards on BCPOS lands. Reduce fuel loading of fine fuels that could increase wildfire spread to WUI areas. Reduce fuel loading and continuity within and around communities. Enhance regional landscape resiliency.	Establish a post-treatment monitoring plan to evaluate the long-term impact of fuels reduction projects. Collect and assess data and other information on forested open space. Document current conditions and assess change over time due to natural processes or management activities. Based on evaluations and monitoring of past treatments, consider second entry treatments to maintain efficacy of original project. Long-term maintenance must consider forest types and associated return interval (for example, lodgepole pine forest types revegetate more quickly than ponderosa pine forest types).

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
RL3	Fuels Reduction	H	1–5 years	Fuel Reduction Projects (East) Develop, prioritize, and create grassland/shrubland buffers on BCPOS properties in the eastern plains.	BCPOS properties in eastern Boulder County	BCPOS); local, county, municipal, and city governments	<p>Collaboratively manage vegetation and fuels on eastern Boulder County lands to reduce wildfire risk to urbanized areas while promoting healthy grassland and shrubland ecosystems.</p> <ul style="list-style-type: none">• Collaborate with other agencies, partners, and landowners.• Collaboratively identify vegetation and fuels management needs based on the Quantitative Wildfire Risk Assessment and input from local officials and land managers.• Consider mechanical and chemical treatment as appropriate (e.g., mowing and herbicide).• Consider the use of prescribed fire.• Consider the use of biological treatments as a solution for treating areas of high concern where topography would be unsafe for hand treatment (e.g., grazing).• Develop equipment needs to accomplish work (including maintenance) and seek funding for purchase.• Assess open space risk areas and develop a coordinated approach for delineating project areas and conducting fuel reduction projects in these areas. Employ appropriate treatment methods, targeting and preventing the spread of invasive/noxious species.• Use both mechanical and manual methods to target grass and shrub fuels, ensuring effective removal and reduction.• Implement prescribed burning techniques where appropriate.• Monitor and maintain fuel reduction areas regularly to prevent fuel accumulation and promote long-term effectiveness.• Establish main roads and highways as potential fuel breaks through regular mowing of shoulders and medians.	<p>Protect life and property by mitigating fuels and reducing wildfire risk and hazards.</p> <p>Reduce fuel loading of fine fuels that could increase wildfire spread to WUI areas.</p> <p>Reduce fuel loading and continuity within and around communities.</p> <p>Enhance regional landscape resiliency.</p>	<p>Establish a post-treatment monitoring plan to evaluate the long-term impact of fuel reduction projects.</p> <p>Collect and assess data and other information on forested open space. Document current conditions and assess change over time due to natural processes or management activities.</p> <p>Evaluate lessons learned and best practices from existing treatment projects throughout Boulder County that have undergone success with regard to fuel mitigation. For example, Superior's vegetation management practices (e.g., mowing, grazing, fuel removal) are multifaceted and collaborative.</p> <p>Based on evaluations and monitoring of past treatments, consider second entry treatments to maintain efficacy of original project.</p> <p>Long-term maintenance must consider forest types and associated return interval (for example, grass regrowth occurs quickly when compared to shrub and tree growth).</p>
RL4	Fuels Reduction	H	1–2 years	Fuel Breaks Fuel Break Maintenance Establish and implement a comprehensive plan for the regular maintenance of fuel breaks throughout the county.	Countywide	BCPOS, ditch companies, Municipal Open Space departments, City of Boulder OSMP, associated owner of treated land	<p>Maximize the effectiveness of fuel breaks as barriers to wildfire spread by implementing systematic maintenance approach.</p> <ul style="list-style-type: none">• Assess the condition and effectiveness of existing fuel breaks, identifying areas to focus more resources.• Prioritize fuel breaks near subdivisions.• Schedule regular maintenance intervals based on the specific needs.• Collaborate with local fire departments, land management agencies, and community members.• Encourage residents to report any concerns or observations related to the condition of fuel breaks. <p>Integrate fuel breaks into emergency access routes to enhance their dual purpose in both fire mitigation and evacuation planning.</p> <p>Collaborate with the Northern Colorado Fireshed Collaborative to identify opportunities for funding and hiring.</p>	<p>Enhance the effectiveness of fuel breaks in preventing the spread of wildfires.</p> <p>Reduce the risk of catastrophic fire events.</p>	<p>Regularly monitor fuel break conditions through routine inspections.</p> <p>Evaluate effectiveness from initial maintenance practices.</p>

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
RL5	Fuels Reduction	H	1–2 years	Prescribed Fire Use prescribed burning techniques strategically across the landscape to reduce accumulated flammable vegetation.	Countywide Open space, state, and federally managed lands	BCSO, BCPOS, local fire protection districts, City of Boulder OSMP, Department of Fire Prevention and Control (DFPC), Colorado Department of Public Health and Environment (CDPHE)	<p>Implement carefully executed prescribed fires under prescribed conditions to reduce excessive fuel loads.</p> <ul style="list-style-type: none">Use prescribed fire for ecosystem and fuels management. Reduce forest residues by burning slash piles and broadcast burning of slash.Use the air curtain burner as a community resource to reduce the biomass generated during public and private landowners' mitigation projects.Work cooperatively with BCPOS agriculture and water resources staff and with the Fire Management Officer toward agricultural management goals, such as irrigation ditch burning and cropland burning.Allow for flexibility in prescribed fire prescriptions on site-specific application in order to accommodate new information and changing conditions.Work with BCSO and the Fire Management Officer to manage and suppress wildland fire. <p>Continuously monitor weather conditions and air quality to identify suitable windows for prescribed burns, prioritizing days with favorable conditions to minimize smoke impacts.</p>	<p>Remove or reduce dense vegetation that is fuel for wildfires.</p> <p>Reduce surface fuel loading in combination with forest thinning activities or grassland mowing/grazing activities.</p> <p>Reduce hazardous fuels, protecting human communities from extreme fires.</p> <p>Minimize the spread of pest insects and disease.</p> <p>Remove unwanted species that threaten species native to an ecosystem.</p> <p>Provide forage for game.</p> <p>Improve habitat for threatened and endangered species.</p> <p>Recycle nutrients back to the soil.</p> <p>Promote the growth of trees, wildflowers, grasslands, and other plants.</p>	<p>Conduct post-burn monitoring to assess the effectiveness of fuel reduction efforts, evaluate ecological impacts, and make necessary adjustments for future prescribed burns.</p> <p>Impacts to local riparian zones, wildlife habitat, and soil health should be evaluated and monitored for all fuel treatment activities.</p> <p>Long-term maintenance must consider forest types and associated return interval (for example, grass regrowth occurs quickly when compared to shrub and tree growth).</p>
RL6	Fuels Reduction	M	1–3 years	Ingress and Egress Improve ingress and egress routes through enhanced clearance of rights-of-way along high-risk roads, per public feedback.	Countywide	Fire protection districts, local government emergency offices, Boulder County ODM, USFS, private landowners	<p>Creating effective management of vegetative fuels along key ingress and egress routes is vital to ensure safe evacuations and unimpeded access for emergency response teams during a wildfire incident.</p> <ul style="list-style-type: none">Collaborate with local fire departments, emergency management agencies, and relevant stakeholders to identify and prioritize key ingress and egress routes.Develop and implement a comprehensive vegetation management plan for identified routes. Incorporate a combination of methods to clear and maintain vegetation along the roadsides (e.g., mechanical, chemical, biological, and manual methods).Collaborate with adjacent landowners, homeowners' associations, and local communities. <p>Establish compliance mechanisms and work with local jurisdictions to enforce regulations related to vegetation management along these routes.</p>	<p>Enhance public and firefighter safety and mitigate wildfire risk within Boulder County.</p> <p>Protect life by reducing high-risk fire behavior along important roads.</p> <p>Improve community safety and time to egress.</p>	<p>Conduct regular maintenance to prevent fuel accumulation and allocate resources for ongoing upkeep.</p> <p>Implement a monitoring and evaluation system to assess the effectiveness of fuel treatments along these routes.</p> <p>Align with ongoing evacuation planning and modeling efforts.</p>
RL7	Fuels Reduction	M	1–5 years	Ditch Fuels Mitigation Address hazardous fuels along ditches, irrigation channels, and riparian corridors in coordination with ditch companies and BCPOS	BCPOS properties, eastern Boulder County	Ditch companies and their contractors, Boulder County landowners, public landowners	<p>BCPOS to collaborate with ditch companies, landowners, corporations, and jurisdictions to delineate areas along ditches, irrigation channels, and riparian corridors for potential treatment based on compliance requirements and suitability.</p> <ul style="list-style-type: none">Conduct a thorough assessment of hazardous fuel conditions and vegetation condition class.Develop an understanding of resource needs and build capacity to carry out projects as necessary, considering modeling of potential fire characteristics.Implement a combination of mechanical, chemical, biological, and manual methods to clear and maintain vegetation along ditches, irrigation channels, and riparian corridors.Remove vegetation that may be left along the banks of ditches as a result of fuel mitigation actions.Provide education and outreach programs to promote awareness and involvement of local communities in fuel reduction efforts along ditches, irrigation channels, and riparian corridors, addressing human ignitions from trail users and unhoused encampments.	<p>Reduce fuel continuity within communities and create resilient landscapes.</p> <p>Restore and maintain riparian ecosystem health.</p> <p>Increase safe and effective wildfire response capabilities.</p> <p>Reduce the probability of ignitions and wildfire spread on ditch company lands.</p>	<p>Conduct post-treatment data collection and assessment to evaluate the effectiveness of treatment toward meeting treatment goals.</p> <p>Maintain vegetation as needed (frequent maintenance may be required as vegetation in riparian areas grows quickly).</p> <p>Record number of acres treated (by fuel type, treatment method).</p>

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
RL8	Collaboration and Planning	M	1–3 years	Data Reporting Portal Establish a central data reporting portal to streamline the collection, analysis, and dissemination of WUI treatment polygons.	Countywide	CSFS, Boulder County Fireshed, Northern Colorado Fireshed Collaborative	Create a comprehensive and user-friendly reporting system. <ul style="list-style-type: none">Collaborate with CSFS and other entities who have established reporting methods to align and partner on integrating into their reporting systems in place.Develop a localized County reporting portal that feeds into the CSFS reporting cycles to ensure reporting is accurate and up to date.Design a portal with user-friendly interfaces accessible to all intended users.Collaborate with IT and GIS professionals to ensure seamless data acquisition and explore security measures.Develop standardized reporting templates for consistent data entry, ensuring that key information is included.Provide training sessions and ongoing support to ensure accurate reporting.	Facilitate informed decision-making. Enhance interagency communication and collaboration. Contribute to a more effective wildfire mitigation strategy.	Regularly assess the portal's functionality and address any technical issues promptly. Gather feedback from users to identify areas for improvement and enhanced usability.
RL9	Collaboration and Planning	L	1–5 years	Boulder County Fireshed Build capacity and support for Boulder County Fireshed.	Countywide	Boulder County, community groups	Contribute to Boulder County's outreach and education program to enhance community awareness about wildfire risks and the importance of neighborhood-level preparedness. <ul style="list-style-type: none">Foster collaboration among members and across disciplines to share best practices and develop effective strategies.Continue to utilize the Grasslands Work Group to focus on the unique challenges associated with grassland fire management.	Fortify Boulder County Fireshed's ability to effectively address wildfire challenges in our community.	Establish a regular reporting mechanism to track progress of initiatives. Conduct regular surveys and community feedback sessions to gather insights. Track the progress of community-led small fuel reduction projects through a centralized database.
RL10	Collaboration and Planning	L	1–5 years	Agency Collaboration Foster collaboration among federal, state, local governments, and nonprofit entities, to streamline fuel reduction initiatives.	Countywide	Boulder County, CSFS, USFS, state agencies, federal agencies, nonprofit organization, community organizations	Form a workgroup/task force comprising representatives from collaborating parties, encouraging clear discussion on optimizing strategic fuel treatment implementation. <ul style="list-style-type: none">Define roles and facilitate regular meetings to discuss future and ongoing projects.Document individual agency objectives, strategies, and priorities for fuel treatment. Utilize POD boundaries to guide planning and resource allocation.	Create a synergistic approach to fuel treatment priorities by enhancing coordination between agencies.	Periodically assess the frequency and quality of communication.
RL11	Community Programs and Support	M	1–5 years	Biomass Utilization (i.e., sort yards, BCPOS grinding services, biochar pilot with Boulder County Office of Sustainability, Climate Action, and Resilience (OSCAR), wood burner at county office, etc.)	Boulder County Community Forestry Sort and Storage Yards	OSCAR	Maximize the sustainable use of biomass products from open space properties for energy production, local applications, and habitat enhancement, while supporting Boulder County's sustainability initiatives. <ul style="list-style-type: none">Continue using biomass products from open space properties to their highest potential. This may include energy production, roundwood products, habitat enhancement, firewood, and lumber for BCPOS historic restoration projects and amenity construction.Promote sustainable management activities such as the use of locally produced forest products for local applications.Continue to commit to sustainable energy use, such as using a biomass facility to heat the BCPOS, Department and Transportation buildings, and guiding development of other County facilities.Participate in the Boulder County Sustainability Initiative.	Further wildfire mitigation efforts, climate resilience goals, and the ability of our natural systems to store carbon. Promote local initiatives that bolster landscape resilience and restoration in the face of climate change. Recognize regional leadership role in promoting the use of woody biomass technology for forest management activities.	Generate annual reports detailing the volume of biomass processed. Provide transparent and accessible updates to the public. Conduct annual program assessments.

DOMINANT FUEL TYPES AND RECOMMENDED TREATMENTS

The top six fuel types in Boulder County with associated acreages are displayed in Figure 4.1 and Figure 4.2. Broad recommendations for these dominant fuel types, which can be implemented in various communities and spatial contexts depending on available funding and capacity, are presented in Table 4.2. For more detailed information on fuel treatment types and methods, including defensible space, fuel breaks, prescribed burning, grazing, and larger-scale treatments, please refer to Appendix E, which provides comprehensive guidance and visual aids to help you understand and implement effective wildfire mitigation treatments and strategies.

These treatments were created by assessing wildfire fuels and vegetation coverage at a large scale over the entire planning area. As a result, some nuances in vegetation are not illustrated. This includes spatial and temporal variance between grassland and agricultural land, irrigated vs. non-irrigated fields, and native vs. nonnative vegetation. When planning specific projects, fuel and land cover intricacies should be discussed and mapped with appropriate land managers and other subject matter experts to ensure projects align with local land management and ecosystem function objectives.

When applying fuel treatments, every effort should be made to align treatments with the Colorado State Forest Action Plan (CSFS 2020) with consideration of all appropriate best management practices and sound science. Treatments should be strategically located to maximize effectiveness of other existing and ongoing projects. Additionally, treatment should occur where these fuels overlap areas of high wildfire risk (see Figure 3.9 in Chapter 3), countywide priority treatment areas for action (see Figure 4.4), and fireshed priority areas (see Figure 4.5).

Proper consideration should also be given to any ecological impacts resulting from these projects. All projects should adhere to the National Environmental Policy Act (NEPA), Endangered Species Act, National Historic Preservation Act, Clean Water Act, and other regulatory compliance mechanisms when conducted on lands requiring compliance considerations.

More specifically, broader ecosystem function and health should be considered to ensure projects do not negatively impact habitat. Opportunities for multi-benefit projects should be identified; many mitigation actions overlap actions that restore or improve wildlife habitat, ecosystem function, and overall landscape resilience. Actions that meet or contribute to a variety of goals and objectives and align with multiple planning documents can be a more effective use of limited funding or lead to funding applications that are more competitive.

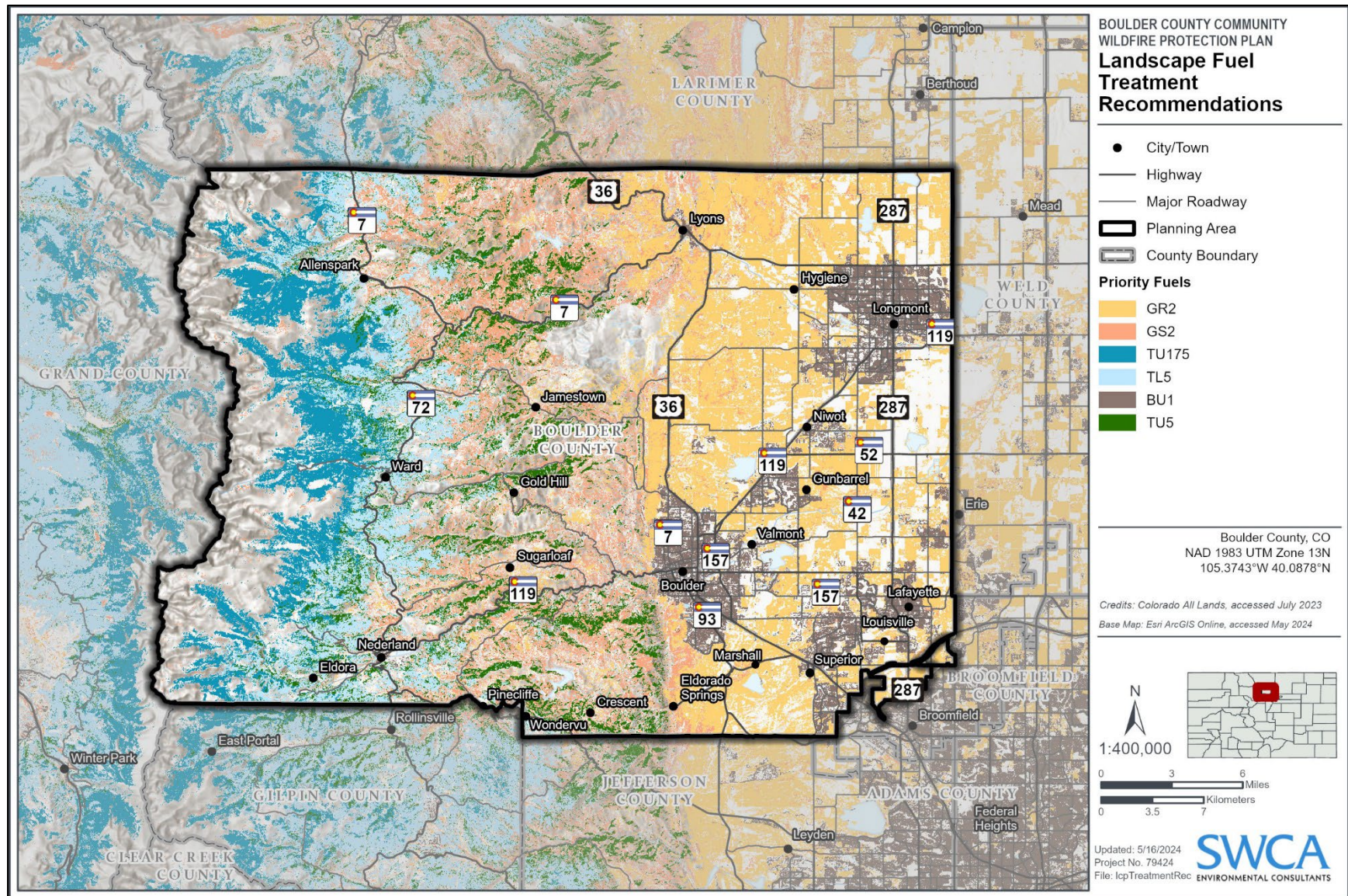


Figure 4.1. Top six fuel types in Boulder County by acreage.

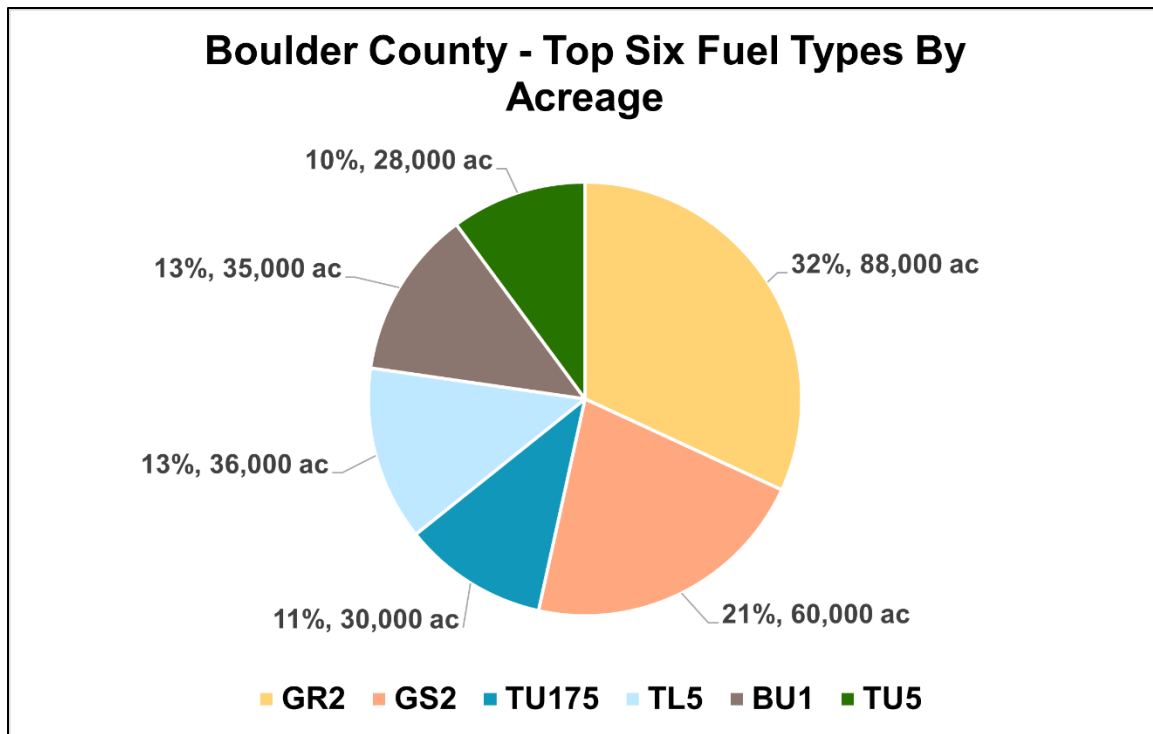


Figure 4.2. Top six fuel types in the planning area by acreage.

Table 4.2. Dominant Fuel Types of Eastern and Western Boulder County and Recommended Treatment Types

Dominant Fuel Types in Western Boulder County	Recommended Treatment
TL5: Timber litter, high load conifer litter; light slash or mortality fuel. Spread rate low (0–334 feet per hour); flame length low (0–4 feet).	Forest thinning activities to reduce ladder fuels and create tree crown spacing. TL5 areas near structures should be prioritized.
TU175: Timber understory, Rocky Mountain subalpine dry-mesic spruce-fir forest and woodland. Flame length and rate of spread are not available as this is a custom COAL fuel model. Metrics will be similar to other TU models.	This high alpine forest type has a generally low risk of wildfire occurring. Timber litter and shrubs are the primary carriers of fire in this fuel type. Managing understory fuel loads can greatly limit fire spread and flame length. However this is only recommended if there are community values present.
TU5: Timber understory, very high load, dry climate timber-shrub; heavy forest litter with a small tree understory. Spread rate moderate (334–1,320 feet per hour); flame length moderate (4–8 feet);	To manage the TU5 fuel type effectively, it is advisable to focus on reducing forest litter and managing the understory vegetation. Thinning shrubs and small trees can help decrease density and limit fire spread. Mastication may also be beneficial in breaking down smaller fuels, making them less likely to contribute to high-intensity fires. Additionally, removing ladder fuels by thinning lower branches can prevent fire from climbing into the canopy in this type.

Dominant Fuel Types in Eastern Boulder County	Recommended Treatment
GR2: Grass, moderately coarse continuous grass, average depth about 1 foot. Spread rate high (1,320–3,326 feet per hour); flame length moderate (4–8 feet); fine fuel load (1.10 tons/acre).	The GR2 fuel type is an excellent candidate for prescribed herbivory techniques for controlling fuel loading in the late summer and fall provided all local restrictions are met. Mowing along existing control features such as roads and trails can be effective in limiting wildfire spread in this fuel type. Continuity of grass fuels should be broken up using fuel breaks adjacent to structures and other control features to limit the momentum of fast-moving grass fires.
GS2: Grass-shrub, shrubs are 1 to 3 feet high, moderate grass load. Spread rate high (1,320–3,326 feet per hour); flame length moderate (4–8 feet); fine fuel load (2.1 tons/acre).	The GS2 fuel type can support extreme wildfire behavior, especially during red flag and high-wind conditions. Shrubs such as junipers planted near structures pose a wildfire hazard and should be thinned or removed to decrease fuel loading and continuity. It is recommended to avoid planting shrubs like juniper in close proximity or adjacent to structures and infrastructure, as they are highly flammable and can significantly increase the risk of fire spreading to buildings. Mowing along existing control features such as roads and trails can be effective in reducing wildfire spread. Areas with dense shrubs near homes and infrastructure should be prioritized for thinning and shrub removal within prescribed fuel breaks and defensible space around structures.
BU1: Burnable developed areas.	Burnable developed areas encompass structures, outbuildings, and HIZs within 100 feet of buildings. Defensible space treatments are effective in reducing wildfire intensity near structures. Home hardening upgrades should be paired with defensible space measures, such as surface fuel removal, limbing, and thinning, to reduce the risk of structural ignition. Treatment of BU1 fuels should be prioritized in the WUI and where wildland fuels meet the built environment.

POTENTIAL OPERATIONAL DELINEATIONS (PODS)

The USFS in partnership with the Rocky Mountain Research Station Wildfire Risk Management Science Team developed PODs for the purposes of creating wildfire preplanning management strategies for land managers and landscape-scale wildfire response teams. PODs use existing potential control features such as ridges, rivers, roads, and fuel type transitions. PODs combine local fire knowledge with advanced spatial analytics to help managers develop a common understanding of risks and management opportunities (USFS 2024). Recommended fuel treatment projects in this CWPP may partially follow POD boundaries in areas where fuel management objectives coincide with landscape characteristics and potential control features.

To best use the following information, land managers should prioritize employing mitigation measures to protect life, property, and other values within identified countywide priority treatment areas for action and foster wildfire resilience across the local landscape. Table 4.3 presents actionable recommendations depending on desired outcomes. Treatment types will be site-specific and should address a need to slow fire spread or mitigate potential extreme fire behavior parameters, such as high flame lengths or potential crown fire activity. POD boundaries should be considered when planning and executing fuel treatment projects.

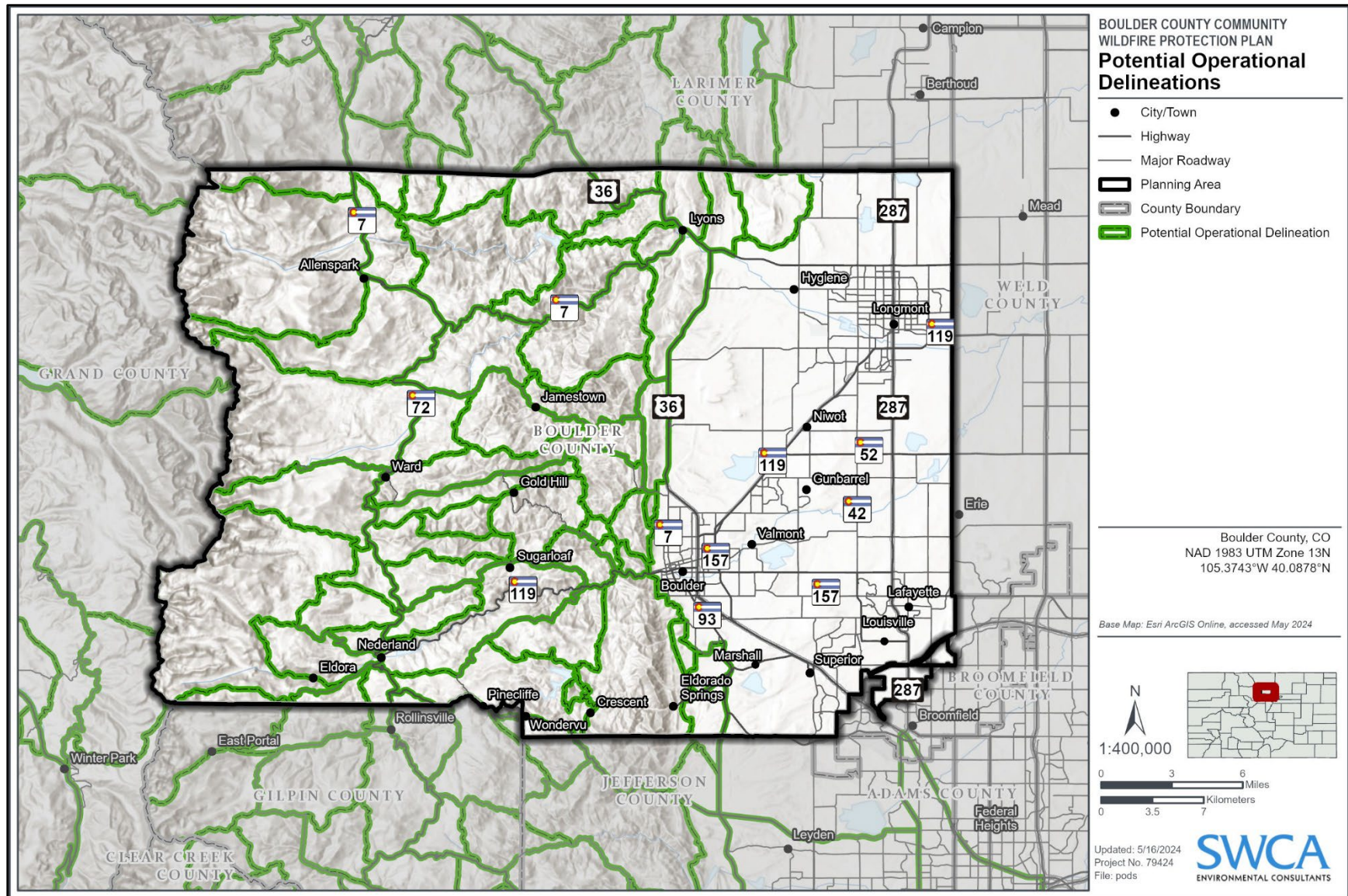


Figure 4.3. PODs defined by the USFS.

COUNTYWIDE PRIORITY TREATMENT AREAS FOR ACTION

To better prioritize resilient landscape recommendations (see Tables 4.1 and 4.2), the CWPP Core Team delineated broad countywide priority treatment areas for action (priority treatment areas) (Figure 4.4) using a variety of mapping products including **risk to assets, expected risk to structures, WUI, wildfire hazards, fuel models, probability of control, PODs, topographical maps, and aerial imagery**. In addition to modeling tools, the Core Team leveraged local expert knowledge and public input gathered during in-person and virtual events, as well as a public survey, to guide the delineation of these areas.

Priority treatment areas are used to show areas of high wildfire risk that are prioritized for mitigation actions to reduce risk to assets. This allows land managers and homeowners to better understand locations on the landscape that would benefit the most from wildfire mitigation and preparedness. The public was invited to comment on priority treatment areas during public engagement events and the public review process.

FIRESHED FOCUS AREAS

In August 2020, federal, state, and local governments joined with non-profit entities in Boulder County to establish the Boulder County Fireshed as a shared vision for reducing the risk of wildfire to its people, communities, recreation areas, and natural resources through closely coordinated forest management across all lands (Boulder County 2024I). Focus areas were informed by local CWPPs, Boulder County's 2011 CWPP, the CSFS's Forest Action Plan, USFS PODs, and the ongoing Colorado Forest Restoration Institute's risk assessment process on behalf of USFS.

Fireshed focus areas were identified to support the Fireshed agreement by providing a framework for supporting outreach, priority setting, and decision making (see Figure 4.5). The Boulder Watershed Collective, Boulder County Forest Collaborative, Watershed Center, and St. Vrain Forest Health Partnership will be the primary conduits to the public for explaining fireshed focus areas and seeking input to improve them. See Table 4.3 for goals and objectives associated with each fireshed focus area. The Memorandum of Understanding for collaboration and coordination to improve forest health and reduce wildfire risk in Boulder County states that the above parties will "support and work with existing and future forest- focused collaborative organizations to outreach and engage stakeholders to increase understanding and together refine the vision and outcomes detailed herein" (The Watershed Center 2021).

Fireshed focus areas should be considered when planning outreach efforts and wildfire mitigation actions. A combination of PODs, priority treatment areas, and fireshed focus areas can inform possible preexisting control features, project prioritization, and opportunities for focused outreach. Consider incorporating local stakeholders and County partners when determining goals and objectives for proposed project areas within fireshed focus areas.

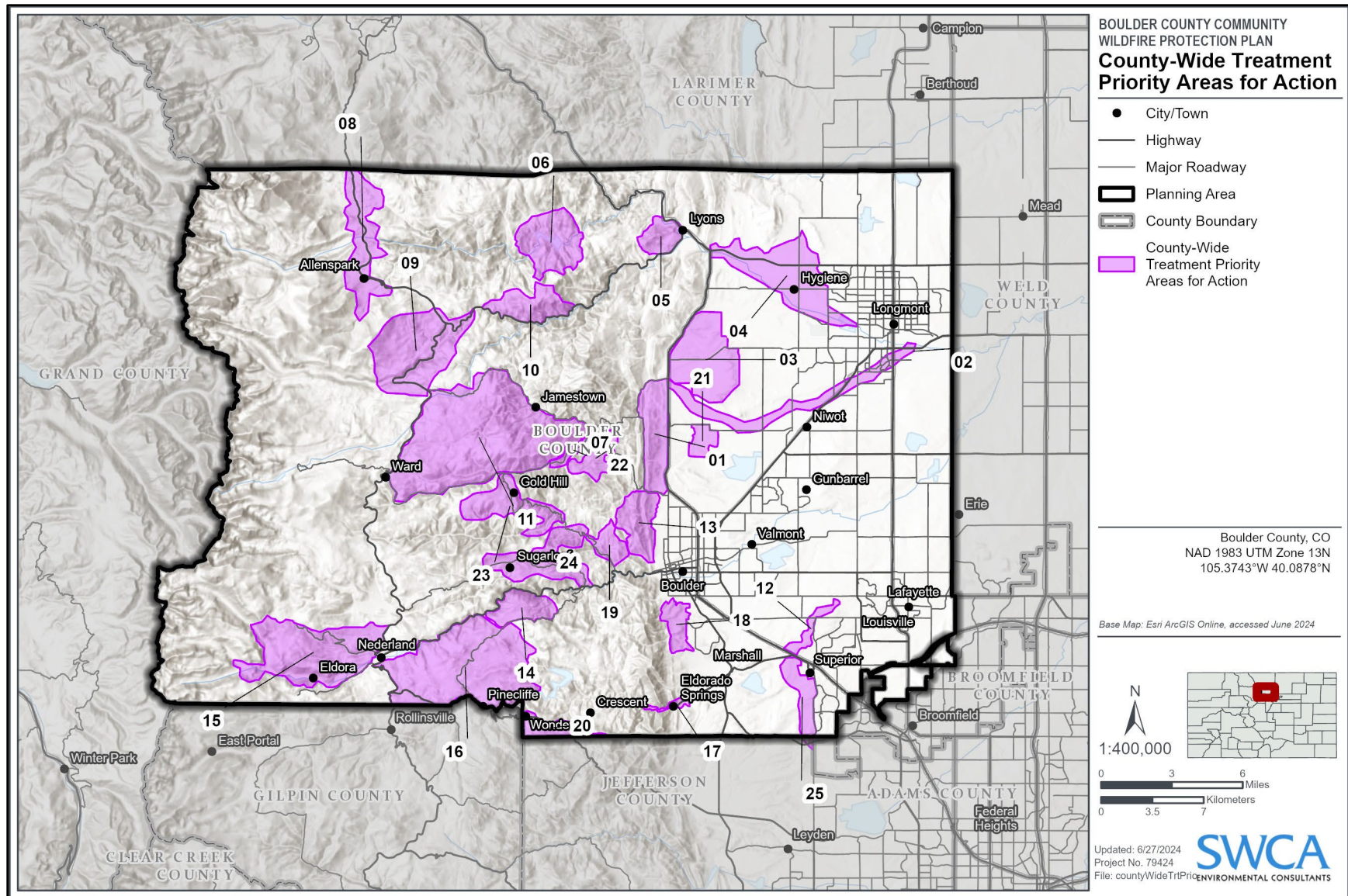


Figure 4.4. Core Team–delineated priority treatment areas for action. Numbers represent polygon IDs, referenced in Table 4.3.

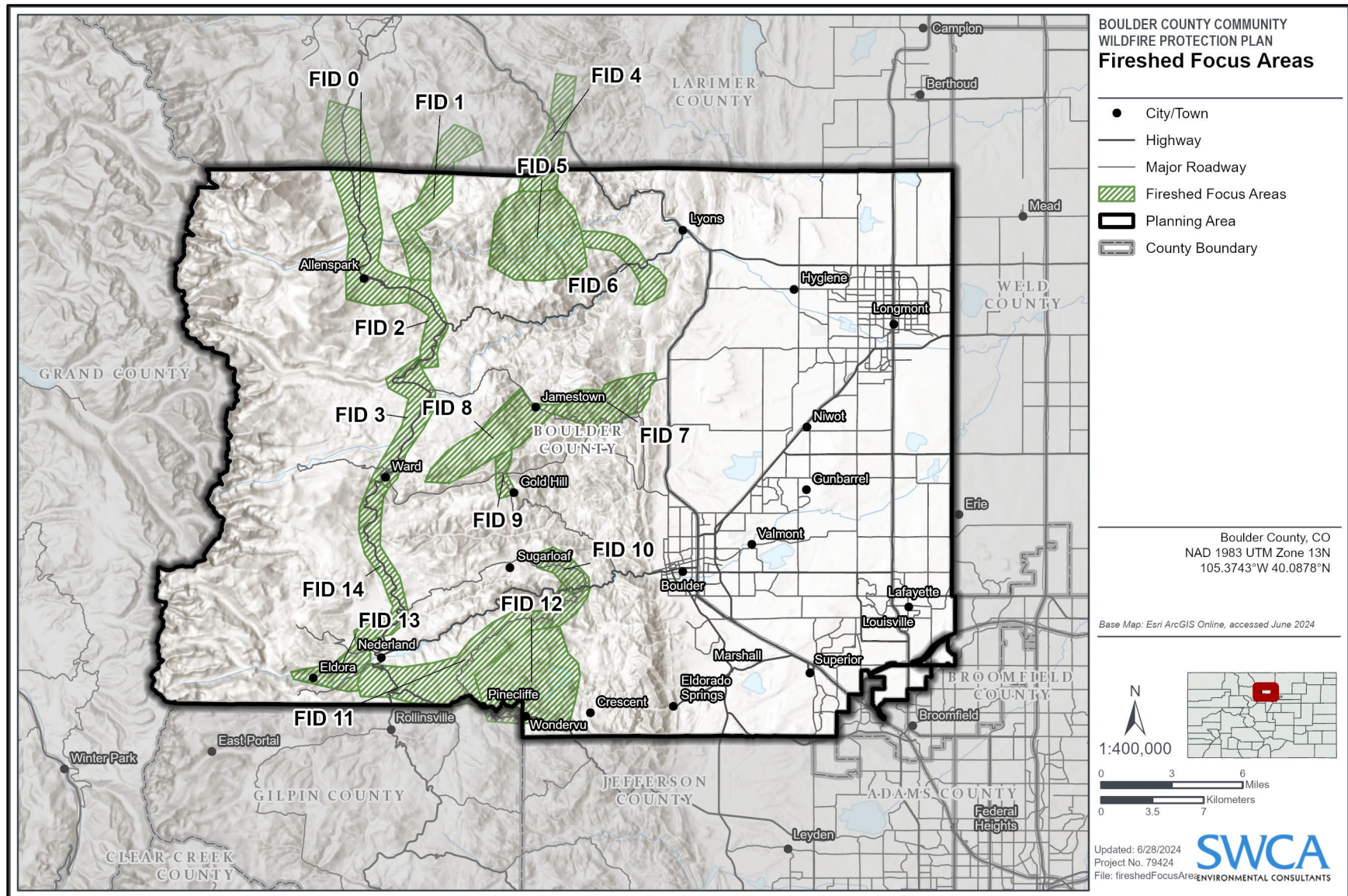


Figure 4.5. Fireshed priority areas collaboratively delineated by stakeholders in the region.

Table 4.3. Boulder County Fireshed Focus Areas Goals and Objectives

Fireshed Focus Area ID	Goals and/or Objectives
FID 0	<ul style="list-style-type: none"> • Connect Allenspark and Rocky Mountain National Park fuel treatments. • Lower the suppression difficult index throughout the peak-to-peak corridor. • Consider Colorado Department of Transportation right-of-way treatments.
FID 1	<ul style="list-style-type: none"> • Connect existing treatments and anchor them into the Big Elk Fire burn scar. • Strengthen the POD boundary upwind of the Button Rock Reservoir area. • Connect treatments in the Johnny Park area with nearby efforts.
FID 2	<ul style="list-style-type: none"> • Improve protection capabilities for the Raymond community. • Strengthen the peak-to-peak corridor and POD boundary.
FID 3	<ul style="list-style-type: none"> • Reduce wildfire risk along the peak-to-peak corridor. • Conduct outreach to private landowners west of the highway. • Improve protection capabilities for the Ward and Jamestown communities.
FID 4	<ul style="list-style-type: none"> • Improve protection capabilities for the Pinewood Springs community. • Connect Johnny Park treatments and anchor into the Big Elk Fire burn scar.
FID 5	<ul style="list-style-type: none"> • Reduce the potential impacts of fire to the Button Rock reservoir.
FID 6	<ul style="list-style-type: none"> • Improve protection capabilities for the Lyons community. • Connect treatments completed on Hall and Heil ranches. • Support connecting fire scars with fuel treatments from north to south.
FID 7	<ul style="list-style-type: none"> • Reduce the potential impact of fire to the Lefthand Water District intake at the eastern edge of the focus area.
FID 8	<ul style="list-style-type: none"> • Connect the Overland Fire and Lefthand Fire burn scars with fuel treatments. • Increase protection of Gold Hill and limit potential fire spread into Lefthand Canyon.
FID 9	<ul style="list-style-type: none"> • Improve protection capabilities for the Gold Hill community. • Connect fuel treatments within FID 8 to the Fourmile Fire burn scar.
FID 10	<ul style="list-style-type: none"> • Connect existing burn scars with fuel treatments along Magnolia Road.
FID 11	<ul style="list-style-type: none"> • Improve protection capabilities for Gross Reservoir and the POD boundary there. • Connect fuel treatments around the community of Nederland. • Implement fuel treatments along Magnolia Road.
FID 12	<ul style="list-style-type: none"> • Connect existing fuel treatments and prescribed fire units around Forsythe Canyon.
FID 13	<ul style="list-style-type: none"> • Improve protection capabilities for the Nederland community. • Connect fuel treatments south of Nederland to potential treatments along the peak-to-peak corridor.
FID 14	<ul style="list-style-type: none"> • Strengthen POD boundaries along the peak-to-peak corridor. • Consider Colorado Department of Transportation right-of-way treatments. • Lower the suppression difficulty index throughout the peak-to-peak corridor.

WILDFIRE MITIGATION RECOMMENDATIONS

Treating hazardous fuels and implementing wildfire mitigation actions are critical strategies for reducing the risk of structure ignition and other wildfire impacts across Boulder County (Davis et al. 2024). These strategies vary between the eastern and western parts of the county due to differences in fuel types, fire regimes, and the density of the built environment.

In **western Boulder County**, which often has denser vegetation and steeper terrain, mitigation actions focus on but are not limited to:

1. **Fuel Treatments:** Techniques such as thinning, pruning, and prescribed burns to reduce the amount of hazardous fuels.
2. **Defensible Space:** Maintaining a clear area around homes to prevent fire from spreading to structures. This includes removing flammable plants, debris, and other fuels within the HIZ.
3. **Home hardening:** See more information in Cohesive Strategy Goal 2.

In **eastern Boulder County**, characterized by grasslands and more urban development, mitigation actions focus on but are not limited to:

1. **Home Hardening:** See more information in Cohesive Strategy Goal 2.
2. **Community Collaboration:** Working with neighbors to reduce the risk of urban conflagration. This involves coordinated efforts to manage grass fires and implementing neighborhood-wide risk reduction practices.
3. **Strategic Open Space Management:** Techniques such as grazing, mowing, and prescribed burns to reduce the amount of hazardous fuels as applicable.

General Mitigation Recommendations for Boulder County

- **Understanding Mitigation Priorities:** Homeowners, communities, and jurisdictions must understand their specific risks and prioritize mitigation actions accordingly.
- **Utilizing Homeowner Resources:** Appendix A provides resources tailored for homeowners, offering guidance on best practices for wildfire mitigation.
- **Understanding Fuel Treatment Types and Methods:** Appendix D offers detailed information on various fuel treatment techniques and their implementation.
- **Monitoring Progress:** Chapter 5 discusses how to track and evaluate the effectiveness of mitigation efforts.
- **Utilizing Funding Sources:** Appendix I lists potential funding sources that can help support mitigation activities.

Key Actions for Homeowners

- **Creating Defensible Space:** Remove flammable materials and vegetation near structures.
- **Home Hardening:** Invest in fire-resistant materials and construction techniques.
- **Community Engagement:** Participate in local wildfire mitigation efforts and collaborate with neighbors to create a safer environment.

Implementing these strategies can significantly reduce the risk of wildfire damage and enhance the resilience of communities in Boulder County. See Table 4.4 below to learn more about the recommended wildfire mitigation actions and the areas of concern they can be applied to throughout the county.

Table 4.4. Boulder County Recommended Wildfire Mitigation Actions

Mechanical Treatments		
Type	Description	Priority Treatment Areas
Aspen enhancement	<ul style="list-style-type: none"> A treatment whereby conifers within and occasionally surrounding an aspen stand are cut to maintain aspen stand health and growth. 	06, 08, 09, 10, 11, 15, 16
Chipping	<ul style="list-style-type: none"> The process of reducing larger woody slash into smaller material that is generally 3 inches or smaller. Material is typically brought to a chipping machine. Chips are then randomly scattered so as not to exceed a predetermined depth. 	05, 06, 08, 09, 10, 11, 12, 13, 15, 16, 22, 23
Fuel breaks	<ul style="list-style-type: none"> Accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced, aims to improve fire control opportunities. <ul style="list-style-type: none"> Reduces fuel density, enhancing fire control. Involves thinning the stand and pruning remaining trees to remove ladder fuels. Disposes of brush, heavy ground fuels, snags, and dead trees. 	06, 08, 09, 10, 11, 13, 15, 16, 22, 23
Mastication	<ul style="list-style-type: none"> Transform larger woody slash or understory ladder fuels into smaller material to minimize vertical fuel continuity, crown fire potential, and fireline intensity. Utilized to decrease the volume of forest vegetation and downed material when other fuel removal methods such as pile burning, chipping, and broadcast burning are not viable. Methods include grinding, shredding, chunking, or chopping material using a mastication attachment on a tracked or wheeled machine. 	06, 08, 09, 10, 11, 13, 15, 16, 22, 23
Patch cut	<ul style="list-style-type: none"> A small patch cut that ranges in size from 2 acres to a maximum of 20 acres. This is commonly utilized in homogenous even-aged stands such as lodgepole pine. Long-term maintenance of patch cuts, particularly in lodgepole forest types, is critical to maintain the efficacy of the opening. Patch cuts should be strategically prioritized along POD boundaries and near communities that can be utilized for wildfire response and community protection. 	06, 08, 09, 10, 11, 13, 15, 22, 23
Understory thinning	<ul style="list-style-type: none"> Smaller understory trees commonly referred to as regeneration are removed to increase the gap between ground vegetation and the lower branches of taller trees. This also reduces competition for resources and results in a healthier tree stand. Understory shrubs, small trees, and lower limbs of trees are removed to create vertical separation between surface fuels and the tree canopy, reducing the likelihood of crown fire. 	06, 08, 09, 10, 11, 13, 15, 16, 22, 23
Manual Treatments		
Type	Description	Priority Treatment Area
Hand felling and piling	<ul style="list-style-type: none"> Manually cutting down trees and stacking them in piles, primarily used for removing smaller-diameter trees or ladder fuels. This technique is useful on steep slopes, near ecologically sensitive areas, and near homes. 	05, 06, 08, 09, 10, 11, 12, 13, 15, 16, 22, 23
Hand felling and lop and scatter	<ul style="list-style-type: none"> Cut trees and limbs are masticated by hand and scattered evenly throughout an area to reduce fuel volume and height. This is used when piling, mastication, and burning are not viable or when the soil may benefit from increased organic matter. 	05, 06, 08, 09, 10, 11, 12, 13, 15, 16, 22, 23

Mosaic thinning	<ul style="list-style-type: none"> Mature trees, regeneration, branches, and shrubs are selectively thinned following the guidance of subject matter experts for reducing wildfire risk and maintaining stand health and aesthetics. Prescriptions will vary from site to site and species type. 	05, 06, 08, 09, 10, 11, 13, 15, 16, 22, 23
Pruning and limbing	<ul style="list-style-type: none"> Branches are removed from trees to reduce ladder fuels and wildfire intensity. This is an effective treatment for maintain defensible space in the HIZ. 	06 08, 09, 10, 11, 12, 13, 15, 16, 22, 23
Prescribed Fire		
Type	Description	Priority Treatment Area
Slash pile burning	<ul style="list-style-type: none"> Piling and burning forest debris to reduce fuel load and continuity. <ul style="list-style-type: none"> Debris is accumulated from fuel reduction projects like tree thinning. Burning occurs under specific conditions to ensure safety and effectiveness, guided by a state-issued smoke permit and county-issued burn permit when applicable. 	01, 05, 06, 07, 08, 09, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24
Broadcast burning (prescribed burn)	<p>Criteria for broadcast burning include smoke dispersal conditions, weather, staffing, and fuel moisture.</p> <p>Detailed burn plans are reviewed thoroughly before implementation to ensure safety and effectiveness.</p> <p>Understory Prescribed Burning</p> <ul style="list-style-type: none"> Prescribed fire under the forest canopy, targeting surface fuels such as dead and down debris, shrubs, and regeneration. The objective is to minimize mature tree mortality while reducing fuel loads and providing the stand with the ability to undergo natural succession conducive to the historical fire regime of the area. Typically occurs after treatments like overstory and understory thinning. Aims to reduce hazardous fuels and improve wildlife habitat and forest health. <p>Grassland Prescribed Burning</p> <ul style="list-style-type: none"> Prescribed fire in grasslands, agriculture fields, and mixed grass-shrub fuels. The objective is to remove hazardous fuel during optimal times of year to promote soil health and reduce wildfire risk. Typically occurs in the spring or fall to remove cured thatch and promote new growth. 	01, 03, 04, 11, 13, 16, 18, 21, 25
Grassland Treatments		
Type	Description	Priority Treatment Area
Mowing	<ul style="list-style-type: none"> Reduces fuel height, decreasing flame length and intensity of grass fires. <ul style="list-style-type: none"> Can be combined with other techniques like prescribed burning to ensure containment or disking to improve soil health. Mowing at the appropriate time of year to approximately 4 inches in height minimizes weed and brush encroachment. Timing impacts <ul style="list-style-type: none"> Grass species prioritization; late mowing after nonnative annual grasses have cured can promote the growth of perennial native grasses. Avoid mowing during bird ground nesting seasons to preserve habitats. Typically required annually and even biannually to effectively reduce wildfire risk. 	01, 02, 03, 04, 12, 18, 21, 25

Grazing	<ul style="list-style-type: none"> • Cattle Grazing: <ul style="list-style-type: none"> ○ Decreases heavy buildup of dead grass and thatch, particularly caused by invasive tall oatgrass weeds. ○ Helps preserve resilient native grass species by reducing competition. • Goat Grazing: <ul style="list-style-type: none"> ○ Browses on woody vegetation up to 6 feet above the ground. ○ Creates vertical separation between canopy and ground cover. ○ Indiscriminately damages most plants, so best used in resilient areas and in accordance with a recovery schedule. 	01, 02, 03, 04, 12, 18, 21, 25
Other Treatment Options		
Type	Description	Priority Treatment Area
Beaver Restoration	<ul style="list-style-type: none"> • Reduces wildfire intensity and post-fire wildfire hazards, increases wildfire resilience, and improves overall ecosystem function. <ul style="list-style-type: none"> ○ Helps maintain higher soil moisture levels and offer refuge for wildlife during wildfires. ○ Provides natural filters, capturing sediment and debris flow. ○ Creates diverse habitat features and improves water quality. • Consider appropriate habitat and gauge community support. • Utilize adaptive management and community engagement. 	Appropriate beaver habitat in Boulder County
Home Treatments		
Type	Description	Priority Treatment Area
Home hardening	<ul style="list-style-type: none"> • Construction: <ul style="list-style-type: none"> ○ Install fire-resistant soffits, ember-resistant screened vents, and tempered glass. ○ Install non-combustible roofing, siding, and skirting. • Perimeter Fences: <ul style="list-style-type: none"> ○ Keep wood fences clear of combustible materials. ○ Replace wood fences with metal or other non-combustible materials. ○ Link house and fence with non-combustible material or do not link at all if possible. ○ Construct non-combustible barriers between property and wildland fuels. • Storage: <ul style="list-style-type: none"> ○ Store combustible materials away from the house. ○ Clear flammable material from around propane tanks or relocate propane tanks underground. ○ Store deck furniture and ornaments inside during fire weather and red flag conditions. • Clearance and Maintenance: <ul style="list-style-type: none"> ○ Remove materials from under decks; enclose spaces. ○ Stack firewood at least 30 feet from homes. ○ Keep gutters free of combustible material. ○ Maintain roofs by installing flashing, fixing holes, and replacing shingles. ○ Mitigate hazards on adjoining structures to prevent ignition points. 	08, 09, 10, 11, 13, 15, 16, 22, 23

Home ignition zone/ defensible space	<ul style="list-style-type: none"> • 0 to 5 feet around the home: <ul style="list-style-type: none"> ○ Remove flammable vegetation such as juniper and other ornamental conifers within the 0- to 5-foot zone. ○ Limit the number of attachments (porches, decks, covered driveways) and outbuildings within the HIZ. ○ Use materials like rock mulch, gravel, or pavement to create fuel breaks. ○ Regularly remove vegetation litter and woody debris on and near the structure. • 5 to 30 feet around the home: <ul style="list-style-type: none"> ○ Limit the intensity and spread of fire by reducing fuel loads and implementing fuel breaks. ○ Maintain short grass, remove surface fuels, space trees apart, remove ladder fuels, and prune tree branches. ○ Remove stressed or diseased trees and shrubs. • 30 to 100 feet around the home: <ul style="list-style-type: none"> ○ Focus on keeping fire on the ground and limit the momentum of fire spread. ○ Maintain tree crown spacing, prune branches, and treat slash material. • Beyond 100 feet: <ul style="list-style-type: none"> ○ Collaborate with neighbors to maintain defensible space. ○ Consider treatments aligned with landscape projects. • Management of Hazardous Trees and Vegetation <ul style="list-style-type: none"> ○ Treat or remove hazardous trees, vegetation near power lines, and ornamental conifers (e.g., juniper removal) ○ Dispose of slash and debris within the HIZ before wildfire season. • Fire Response <ul style="list-style-type: none"> ○ Ensure reflective address markers and label the entrance of driveways. ○ Maintain turnarounds for large vehicles. ○ Maintain water sources (wells, ponds, spigots). 	08, 09, 10, 11, 13, 15, 16, 22, 23
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PAST FUEL TREATMENT ACCOMPLISHMENTS

Boulder County has actively planned and executed fuel treatment projects in coordination with land managers and neighboring jurisdictions for many years. This includes various fuel treatment projects on tall shrub and forested fuels and the implementation of prescribed herbivory (grazing) in grassland open spaces. Figure 4.6 shows completed fuel treatments by Boulder County, CSFS, and other partners. Refer to agency websites and the <https://www.federalregister.gov/> for the latest information regarding planned or ongoing actions on adjacent public land.

Fuels management of both public and private land in the WUI and beyond is essential to reducing risk to homes during a wildfire event, as well as meeting the criteria of the National Cohesive Strategy Goal 1. Research has shown how fuel treatments in the WUI can change fire behavior to support suppression activities and protect homes (Evans et al. 2015).

Examples of fuel treatment accomplishments within the planning area are shown in Table 1.2 and Figures 1.5 through 1.11. Past treatment metrics (acres/feet/miles) are approximate totals using the best available data.

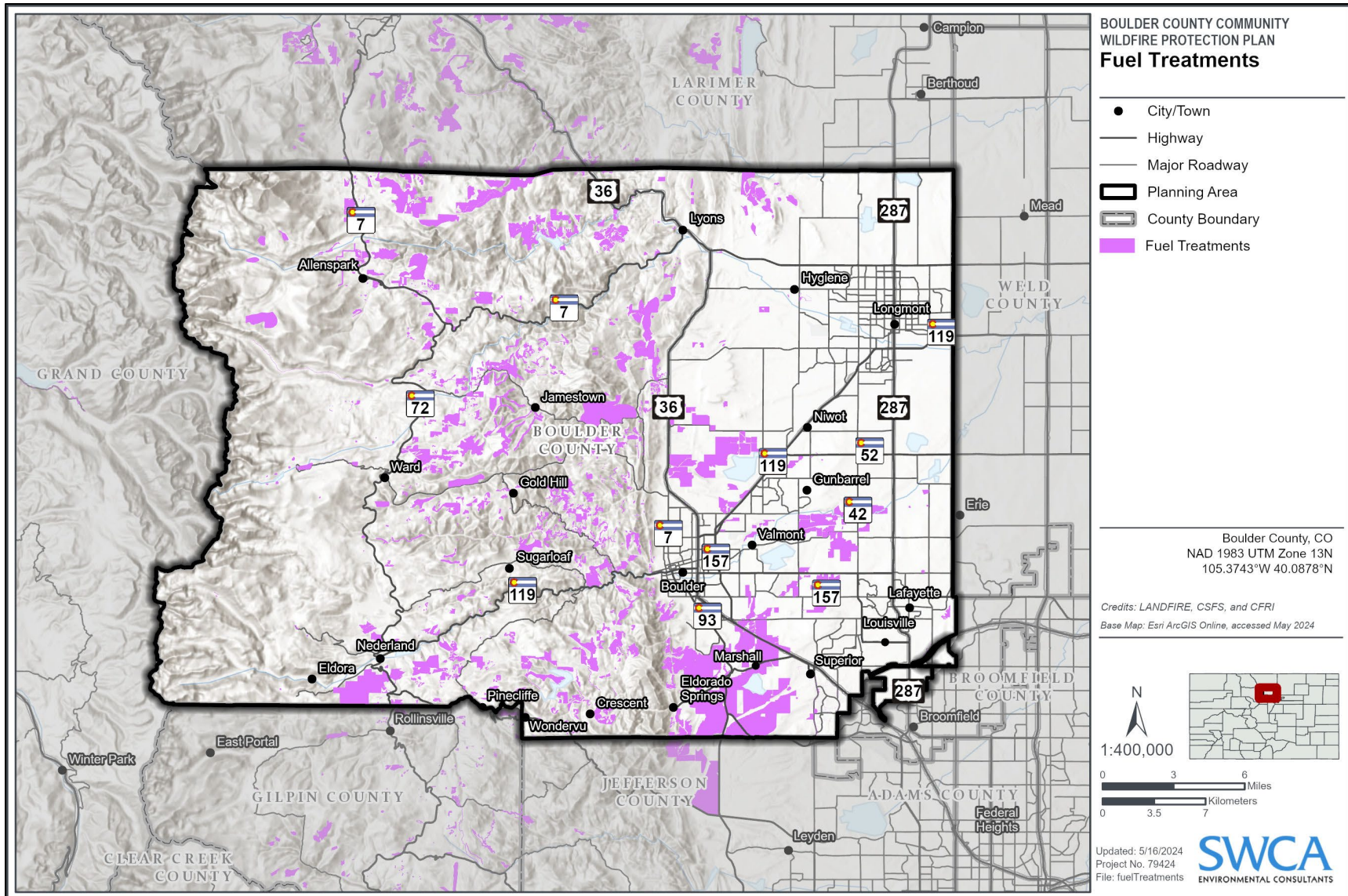


Figure 4.6. Fuel treatments that have been completed or are currently planned by Boulder County and partners.



COHESIVE STRATEGY GOAL 2: FIRE ADAPTED COMMUNITIES

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

RECOMMENDATIONS FOR PUBLIC EDUCATION AND ACTION

Actions on the landscape are only a partial solution to reducing wildfire hazard; public education and action are critical for reducing human-caused ignitions, reducing the ignition potential of homes, and community wildfire resilience. Lack of knowledge, lack of positive actions (e.g., failing to create adequate defensible space within the HIZ), and negative actions (e.g., keeping leaf litter and exposed propane tanks close to structures) all contribute to increased risk of loss. See Chapter 1 to view past wildfire resilience and community mitigation accomplishments (Table 1.2) and ongoing initiatives and wildfire programs (Table 1.3) throughout the county.

There are a variety of strategies to effectively engage community members and move them to action. These include conducting wildfire home assessments, obtaining Wildfire Partners certification, coordinating workshops and training to teach home hardening methods, implementing beneficial building and landscaping techniques, and hosting community cleanups. Individual and family preparedness is also a crucial aspect of planning. Public engagement events at various locations can support widespread awareness of wildfire mitigation and participation in the resilience-building process. Potential and past locations of events in Boulder County include farmers markets, fairs, festivals, recreational centers, social media platforms, city newsletters, home improvement stores, and community groups. This diverse approach aims to reach people where they naturally gather and connect, ensuring broad and inclusive participation. Properly educating the community on preparing for an event can reduce strain on response resources and help families efficiently and safely evacuate and respond during a wildfire.

Boulder County recognizes the need for well-informed fire-adapted communities and has therefore prioritized public engagement during the CWPP development process through public events, advertisements, and an online survey. See Table 1.4 and Appendix G for examples of public outreach efforts during the CWPP planning process. Boulder County has also hosted vital information found in this CWPP in an interactive online story map, which can be found here: <https://boulder-county-cwpp-bouldercounty.hub.arcgis.com/>.

RECOMMENDATIONS FOR FIRE-ADAPTED COMMUNITIES

Table 4.5 provides a list of homeowner actions to reduce structural ignitability that should be implemented throughout Boulder County. Reduction of structural ignitability includes public education that provides homeowners the information they need to take responsibility for protecting their own properties. Recommendations for public education and outreach programs are included in Table 4.6.

Carrying out fuels reduction treatments on public land will not effectively reduce fire risk in isolation. If owners have not carried out mitigation on their properties, the risk of home ignition and home-to-home

spread remains high. A lack of attention in the HIZ places firefighters' lives at risk when carrying out structural defense.

Embers that travel independently of the flaming front can ignite homes even if they were not impacted by direct flame impingement see, the Ember Ignition Hazards section in Chapter 3. Hardening the home to ignition from embers, including maintaining vent coverings and other openings, is also strongly advised. Additionally, measures proven to protect against ember ignition include removing weeds and debris within a 30-foot radius of the structure and maintaining clean roofs, decks, and gutters.

Table 4.5. Homeowner Actions for Reducing Structural Ignitability

Limited Investment
Regularly check fire extinguishers and have a 100-foot hose available to wet perimeter of home.
Maintain defensible space around home. Collaborate with neighbors to provide adequate fuels mitigation in the event of overlapping property boundaries.
Ensure that house numbers are easily readable from the street.
Keep wood perimeter fences free of combustible materials. If possible, non-combustible material should link the house and fence.
Store combustible materials (propane, grills, firewood) away from the house.
Remove flammable material from around propane tanks.
Maintain a 5-foot perimeter around the home clear of any combustible materials.
Clear out materials from under decks and near structures. Enclose the area underneath the deck when feasible.
Stack firewood at least 30 feet from homes.
Prioritize your workload by considering local weather conditions. First, consider mitigating hazards on the side of your property that faces the prevailing wind direction, then work around to cover the entire property.
Keep gutters free of combustible material. Gutters can act as collection points for embers.
Maintain roofs by installing flashing, fixing holes, replacing shingles, and closing gaps.
Purchase or use a NOAA weather alert radio to hear fire weather announcements.
Moderate Investment
When landscaping in the HIZ (approximately 5 to 30 feet around the property), select non-combustible plants, lawn furniture, and landscaping material. Combustible plant material like junipers and ornamental conifers should be pruned and kept away from siding with regular maintenance. If possible, trees should be planted in groups and no closer than 10 feet to the house. Tree crowns should have a spacing of at least 18 feet when within the HIZ. Vegetation at the greatest distance from the structure and closest to wildland fuels should be carefully trimmed and pruned to reduce ladder fuels, and density should be reduced with approximately 6-foot spacing between trees and crowns. See Appendix E for additional defensible space and landscaping guidance.
Work on mitigating hazards on adjoining structures like sheds, garages, barns, etc. These can act as ignition points to your home.
Clear and thin vegetation along driveways and access roads so they can act as a safe evacuation route and allow emergency responders access to the home.
Construct a gravel turnaround in your driveway to improve access and mobilization of fire responders.
Install a roof irrigation system.

High Investment

Install an environmentally friendly and fire-resistant xeriscape yard.

Install screen vents with non-combustible meshing. Mesh openings should not exceed a nominal 1/8 to 1/16-inch size.

Enclose open space underneath permanently located manufactured homes using non-combustible skirting.

Construct a non-combustible wall or barrier between your property and wildland fuels. This could be particularly effective at mitigating the effect of radiant heat and fire spread where 30 feet of defensible space is not available around the structure.

Install fire-resistant soffits and under-eave vents to protect your home from heat and embers that can be trapped beneath roof overhangs.

Replace exterior windows and skylights with tempered glass or multilayered glazed panels.

Update your roof to a non-combustible construction. Look for materials that have been treated and given a fire-resistant roof classification of Class A.

Upgrade exterior walls with fire-resistant materials.

Relocate propane tanks underground.

Note that the level of investment and average costs will vary by action item based on a multitude of factors including location, structure complexity, quality of materials, local building codes and regulations, as well as preferences and scope of work.

Home Insurance and Wildfire Partners

The availability and cost of insurance—specifically related to wildfire risk—is a major concern for Boulder County residents. Residents have expressed their concern over home insurance and wildfire risk during numerous public meetings convened during the CWPP planning process. Residents are also passionate and willing to implement home hardening upgrades such as those listed above in Table 4.5 for not only reducing wildfire risk but for maintaining home insurance policies. See Appendix G for statistics on public survey responses.

Because the availability and cost of insurance is a complicated subject—often addressed at the state level—many counties and county-level CWPPs do not directly address the challenges related to insurance. Boulder County, however, is unique. In 2013, after the Wildfire Insurance and Forest Health Task Force completed its report for the State of Colorado, Boulder County created Wildfire Partners—a public-private partnership that includes insurance companies and insurance industry representatives—to help address the problem of insurability. Boulder County staff worked with leading researchers from across the nation—including representatives from the insurance industry—to develop an assessment tool and certification standards based on the best available science and best management practices. Since 2014, hundreds of homeowners in western Boulder County have used Wildfire Partners program participation and certification to help obtain or retain insurance. Wildfire Partners—certified homes, however, do not receive an insurance discount as the program focuses on insurability rather than affordability.

Homeowners must apply for and be accepted into the Wildfire Partners certification program to participate. If accepted, homeowners actively participated in a comprehensive, individual, on-site home assessment with a professional wildfire mitigation specialist. During the assessment, the homeowner and specialist examine all vulnerabilities and risks to the home and mark vegetation for removal within defensible space zones. The assessment covers 50 questions and takes approximately 2 hours to complete. After the assessment, homeowners receive their customized report with a mitigation checklist, photographs documenting action items, and additional information on wildfire mitigation and

preparedness. Financial awards are available to share the cost of hiring a Wildfire Partners forestry contractor. Participants with limited incomes can apply for a need-based award that covers additional costs. After completing their individual checklists and passing on-site inspections, homeowners receive their Wildfire Partners certificate and Wildfire Partners yard sign. Given the importance of maintaining mitigation efforts over time, Wildfire Partners encourages participants to re-certify their properties every 2 to 3 years.

The Wildfire Partners certification program is a national model that has helped advance and improve insurance industry mitigation programs and has been adopted by other counties and fire districts. By recognizing and rewarding homeowners who take action to reduce the ignition potential of their homes through its certification program, Wildfire Partners has seen a dramatic increase in the quality and quantity of mitigation efforts. While certification programs are not easy to implement, some homeowners prefer them to systems that use fixed scores generated from computer models to determine the insurability of their homes because these scores do not change—no matter how many mitigation measures homeowners implement and maintain to effectively reduce their wildfire risk. Certification programs recognized by insurance companies provide homeowners an incentive to take action; fixed scoring systems lead to frustrated homeowners with less incentive to take responsibility for mitigation. As a result, recommendations to expand and improve the Wildfire Partners certification efforts that are recognized by insurance companies are an important element of this plan.

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Table 4.6. Recommendations for Creating Fire-Adapted Communities (Public Education and Reducing Structural Ignitability)

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FAC1	Policy and Regulation	H	0–1 years	HOA and Subdivision covenants Create a framework for changing covenants within HOAs and subdivisions	Eastern Boulder County	HOAs	Develop a structure for altering covenants in HOAs and residential subdivisions to best suit a cohesive planning approach within the county. <ul style="list-style-type: none">Identify potential planning vulnerabilities within HOAs and subdivisions (e.g., proximity to wildland areas, vegetation management planning, and evacuation capabilities).Engage with community members (e.g., surveys, town hall meetings, and workshops).Collaborate with fire safety experts, urban planners, and other land managers to build a framework for changing covenants within HOAs and addressing conflicts hindering cohesive planning.Ensure changes to covenants comply with local jurisdictional ordinances. Provide residents with knowledge and resources to prioritize fire prevention and response in their communities.	Reduce wildfire risk and loss of structures through effective regulation. Facilitate sustainable and cohesive urban development.	Assess and improve communication between HOAs and wildfire managers. Complete an annual review for effectiveness. Perform frequent public outreach.
FAC2	Policy and Regulation	H	0–2 years	Human Ignitions Reduction Reduce potential for human-caused wildfire ignitions in urban environments and along recreational trails.	Countywide (especially eastern Boulder County)	Boulder County, Boulder County Sheriff's office, ODM USFS, BLM, Colorado Parks and Wildlife (for State lands), municipalities, NGOs	Increase public awareness of the human causes of ignitions in the surrounding environment: <ul style="list-style-type: none">Communicate heightened wildfire ignition risk when motorized vehicles travel near dry fuels during warmer periods of the year (e.g., use flyers).Highlight hazardous conditions surrounding homes/structures (e.g., exposed propane tanks, electrical hazards, hazard trees, limited defensible place).Use temporary and/or permanent trail closures in high-to-extreme fire risk areas. Inform and educate the public about methods to reduce human-caused wildfire ignitions. <ul style="list-style-type: none">Educate the public about sources of human-caused wildfire ignitions (e.g., target practice, cigarette butts, fireworks).Provide materials with resources for the public to understand how and with what funding they can take action to reduce risks.Conduct community training courses and workshops. Collaboratively explore outreach and education on public lands specific to camping and illegal campfires.	Reduce human-caused wildfire ignitions. Improve public knowledge about wildfire risk for their surrounding environment.	Regular monitoring of recreational trail conditions. Regular public outreach.
FAC3	Policy and Regulation	M	2–5 years	Defensible Space and Building Codes Encourage the adoption and enforcement of defensible space and building codes.	Countywide	Municipalities within Boulder County	Collaborate with local building departments and fire agencies to review and strengthen building codes to incorporate effective wildfire-resistant construction standards and best defensible space practices. <ul style="list-style-type: none">Integrate clear and enforceable defensible space requirements.Adopt updated and best available WUI codes.Encourage the adoption of the International WUI code.Conduct public outreach campaigns and provide educational materials on code requirements.Strengthen code enforcement mechanisms to ensure adherence. Offer technical assistance and support to builders, architects, and property owners. Improve communication and coordination with transmission companies to work toward implementing proactive measures for reducing wildfire risk around power infrastructure. <ul style="list-style-type: none">Develop a shared protocol for vegetation management around power lines and other structures at risk.Collaborate on public education campaigns.Create open lines of communication between transmission companies, Boulder County, and other land management agencies in the region.	Increase community resilience to wildfires, reduce structure ignitability, and enhance overall safety in the WUI. Reduce suppression costs and risk to residents and first responders. Reduce the risk of urban conflagration and damage or destruction of infrastructure and other values at risk.	Establish a process for regular reviews and updates of local building codes to reflect advancements in fire science, construction technology, and best practices. Involve relevant stakeholders, including fire professionals, in the code revision process to ensure comprehensive and up-to-date standards.

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FAC4	Awareness and Outreach	M	1–3 years	Smoke-Ready Communities Create smoke-ready communities through facilitating smoke education and providing educational resources.	Countywide	Boulder County, Boulder ODM, local emergency and health management departments	Develop and implement smoke education programs to increase awareness and understanding of the health risks associated with smoke exposure during wildfires. <ul style="list-style-type: none">Target smoke-prone regions and socioeconomically disadvantaged communities that are most vulnerable to the impacts of smoke.Distribute information on best practices for creating indoor clean air spaces and using air filtration devices to reduce smoke infiltration.Collaborate with local health departments, air quality agencies, and community organizations.Integrate wildfire smoke education into the school curriculum. Provide resources (e.g., air cleaners, filtration systems) to vulnerable and at-risk communities. Disseminate educational information through various channels, including: <ul style="list-style-type: none">Social mediaPublic eventsIn-person training and workshops	Enhance community resilience to smoke events by equipping residents with the knowledge and resources needed to mitigate health risks. Provide the community with knowledge and strategies to reduce health impacts associated with smoke from wildfires.	Conduct annual program evaluation and updates as necessary. Conduct an annual lessons-learned review.
FAC5	Awareness and Outreach	M	2–5 years	Structural Ignitability Demonstration Site Establish a demonstration site for structural ignitability improvements aimed at showcasing best practices and educating residents on effective wildfire mitigation measures.	Countywide	Local FPDs	Collaborate with local fire departments, building professionals, and community stakeholders to design, construct, and use the demonstration site. <ul style="list-style-type: none">Identify a suitable location for the demonstration site, considering accessibility, visibility, and proximity to risk areas.Incorporate recommended mitigation measures and structural ignitability improvements.Organize guided tours and workshops to engage residents and community members.Install signage and informational displays.	Educate residents and property owners on effective wildfire mitigation measures. Showcase best practices for reducing the vulnerability of homes and buildings.	Survey visitors to assess their knowledge and awareness of wildfire mitigation techniques before and after visiting the site. Track the number of community members visiting and participating in events and workshops.
FAC6	Awareness and Outreach	M	0–10 years	Prescribed Burning Education Increase public understanding and support for cultural and prescribed burning through outreach coordination with local FPDs and tribal organizations.	Countywide	Boulder County, local tribes, local fire departments.	Develop educational materials and outreach events related to culturally prescribed burning in coordination with local tribes. <ul style="list-style-type: none">Identify tribal governments and organizations (e.g., The Nature Conservancy) with an understanding and practical approach to implementing prescribed fire.Coordinate the development of educational resources detailing the cultural, ecological, and hazard mitigation significance of prescribed fire.Conduct outreach events with the inclusion of tribal organizations to further educate on the approach and importance of cultural burns. Where possible, conduct field visits to prescribed fire locations to illustrate before and after conditions.	Foster support and broader public understanding of the benefits and implications of prescribed fire. Connect the public to local tribes and their approach and cultural significance of prescribed burning.	Track educational materials developed and distributed to the public. Track outreach events and attendees.
FAC7	Awareness and Outreach	M	0–10+ years	Realtor Training and Communications Train realtors on the science of home ignition and wildfire mitigation and provide realtors with a certification for completion of the training	Countywide	Boulder County Wildfire Partners	Implement a formal, monthly training program for realtors. Encourage sellers to upload their Wildfire Partners certificate to the Master Listing Service—the master listing of sale used by the real estate industry.	Increase pre-purchase knowledge of fire environment and post-purchase action by new homeowners. Educate property owners. Reduce threats to life and property.	Monitor demand for the training program and continue to offer training opportunities every year

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FAC8	Awareness and Outreach	L	0–10 years	Promote Wildfire Partners Practices Boost the adoption of Wildfire Partners practices and mitigation strategies within Boulder County communities.	Countywide	Boulder County Wildfire Partners, CSFS, local fire departments	Enhance education and expand understanding of Wildfire Partners practices to more communities throughout the County and sustain ongoing initiatives. <ul style="list-style-type: none">• Prioritize Home Ignition Zone (HIZ) preparation, ensuring the home and its surroundings can withstand wildfire impacts.• Educate the public on the effect of home hardening and defensible space practices.• Organize events to raise wildfire mitigation awareness and educate the community.• Encourage participation in community chipping services.• Raise awareness of available grants and subsidies to cover the cost of mitigation efforts.• Encourage community members to collaborate with neighbors to enhance community resilience and effectiveness of individual efforts.• Expand availability and participation in comprehensive home assessments.• Seek state, federal, and local grant opportunities to support Wildfire Partners programs.	Reduce wildfire risk through community engagement and actions.	Conduct routine maintenance checks to ensure continued effectiveness. Provide ongoing support and resources for community members to sustain their wildfire mitigation efforts. Implement feedback mechanisms to address any challenges and optimize the adoption process.
FAC9	Awareness and Outreach	L	1–5 years	Signage Improvements Use and improve existing wildfire risk signage. Explore additional means of disseminating wildfire warnings and information (social media, local news outlets, etc.).	Countywide (especially western Boulder County)	Boulder County Sheriff's Office, Boulder ODM	Communicate wildfire risk using various social media and local news outlets, tracking community engagement, and encouraging dialogue between the County and members of the community. Communicate wildfire risk using strategically placed signage and other materials. <ul style="list-style-type: none">• Spread seasonally adjusted flyers and prevention messages along highways and in public open space areas to reduce human ignitions and promote defensible space.• Continue the use of existing electronic signs at firehouses and other locales to display fire prevention information, safety messages, and fire danger ratings linked to safety actions.• Engage with diverse communities to identify specific needs and preferences for wildfire signage and communication.• Develop materials specifically addressing the unique vulnerabilities and needs of mobile home park residents.	Reduce wildfire risk through public education and outreach. Reduce threats to life and property.	Assess the current situation and determine where signage can be improved (e.g., increasingly popular recreation areas). Provide information on pertinent County webpages and webpages of local businesses. Assess and use current popular information sources (Nextdoor, social media, X [formerly Twitter], etc.)
FAC10	Community Programs and Support	H	0–2 years	Homeowner Funding and Incentives Establish funding pathway for underserved homeowners and vulnerable populations.	Countywide	Boulder County	Offer financial assistance to underserved homeowners who may require additional support to mitigate home hazards and evacuate during a wildfire. <ul style="list-style-type: none">• Identify vulnerable populations (e.g., elderly, disabled individuals, low-income households).• Pursue grant opportunities to secure funding for assistance programs. Offer incentives, such as financial rewards or discounts on mitigation materials, to homeowners who attend public education events and workshops on wildfire preparedness and evacuation. <ul style="list-style-type: none">• Organize a structured rewards program that provides financial assistance or other incentives. Collaborate with local organizations and stakeholders to identify opportunities and secure funding for the incentives.	Encourage greater participation in public education events and workshops on wildfire preparedness and evacuation among homeowners. Protect life and property of the underserved and at-risk populations.	Complete an annual review of the number of actions taken to address vulnerable populations and underserved homeowners. Track attendance and participation rates at public education events and workshops to assess the effectiveness of the incentives program. Gather feedback from homeowners to evaluate the impact of incentives on their engagement.

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FAC11	Community Programs and Support	H	0–2 years	Support Socially Vulnerable Populations Build trust and sustainable relationships with socially vulnerable communities in the county.	Countywide	Boulder County (collaborate with nongovernmental organizations, local watershed groups, and municipalities).	Enhance wildfire preparedness and response through targeted outreach, education, and collaboration with identified communities that are vulnerable to wildfire impacts. <ul style="list-style-type: none">Conduct events in locations preferred by vulnerable groups (e.g., older adults, people with disabilities, bilingual populations, and economically disadvantaged communities).Gather feedback from residents regarding their wildfire safety needs, concerns, and preferred mitigation programs.Work with outreach and education staff to create messages tailored to certain populations.Ensure alignment with existing and programs. Leverage relationships with entities focused on community safety, involving local partners such as FPDs, Wildfire Partners, long-term recovery committees, and BCPOS.	Ensure that the voices and concerns of socially vulnerable communities are included and prioritized. Influence wildfire mitigation project prioritization and funding decisions.	Host feedback sessions with community representatives, using feedback to adapt strategies. Track engagement levels, feedback received, and the implementation of suggested programs and initiatives.
FAC12	Community Programs and Support	H	0–2 years	Community Assessments and Mitigation Encourage communities to apply to the Wildfire Partners community mitigation program.	Countywide	Boulder County, Wildfire Partners	Identify and mitigate vulnerabilities in homes and surrounding landscapes across properties throughout Boulder County. Continue and bolster mitigative actions carried out for existing home assessment program: <ul style="list-style-type: none">Engage local officials, community leaders, and residents and partner with local FPDs, HOAs and other community organizations.Conduct home assessments where specialists and homeowners collaboratively identify vulnerabilities to wildfire.Provide a detailed, customized report to each homeowner (including mitigation checklist, photos, and risk reduction recommendations).Offer financial awards to subsidize the cost of mitigation work. Extend the Wildfire Partners home assessment program to more areas within eastern Boulder County. <ul style="list-style-type: none">Develop and distribute updated educational materials tailored to the unique wildfire risks in eastern Boulder County.Tailor approach to accommodate high-risk and high-density communities.	Enhance the Community Home Assessment Program to encourage home mitigation, thereby increasing community resilience against wildfire.	Regularly review and update assessment protocols and procedures to incorporate new information and best practices. Track the number of participants in the Wildfire Partners community mitigation program and Firewise USA. Solicit feedback from property owners and stakeholders.
FAC13	Community Programs and Support	H	0-2 years	CWPP Implementation Sub-Committee Form a subcommittee composed of stakeholders from the Boulder County Fireshed, including local, state, and federal partners, to create a collaborative body that will ensure the effective implementation of CWPP goals.	Countywide	Boulder County, Boulder County Fireshed, Boulder County Wildfire Partners, Local non-profits, CSFS, USFS	Foster collaboration and communication across various levels of government and organizations through the formation of the subcommittee. <ul style="list-style-type: none">Identify and invite representatives from local municipalities, Boulder County, state and federal agencies, and other relevant organizations.Outline the mission, objectives, roles, and responsibilities of the subcommittee/task force members.Schedule regular meetings (e.g., quarterly) to review progress, address challenges, and plan future actions. Contribute to a unified approach to CWPP implementation and wildfire management in the county. <ul style="list-style-type: none">Create a platform for sharing information, best practices, and resources among stakeholders.Identify, implement, and support projects and initiatives that align with the CWPP goals. Engage local communities in the CWPP implementation process through public meetings, workshops, and outreach at public events (fairs, farmers markets, HOA community events, etc.).	Facilitate coordinated efforts among diverse stakeholders to enhance wildfire preparedness.	Prepare quarterly and annual progress reports summarizing activities, achievements, and challenges. Measure the success of joint projects and initiatives based on predefined objectives and performance indicators. Collect feedback from the community on the effectiveness of wildfire mitigation efforts and public outreach initiatives.

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FAC14	Community Programs and Support	M	2–5 years	Community Leadership Programs Strengthen and expand Wildfire Partners community liaison and community host initiatives.	Countywide	Boulder County, Boulder County Wildfire Partners, City of Boulder, Boulder Watershed Collective, ODM	Strengthen and expand community-based leader programs, utilizing programs such as the Fire Adapted Colorado Neighborhood Ambassador Program. <ul style="list-style-type: none">Encourage active participation of residents, homeowners, agencies, and other stakeholders.Provide neighborhood leaders with training and resources for mobilizing their communities.Increase staff capacity to manage a community leadership program. Collaborate with Boulder County Wildfire Partners, Boulder ODM, and nonprofit partners such as Boulder Watershed Collective on leadership and implementation. Build on or use ODM Train-the-Trainer program as a springboard for continued community-based programs.	Reduce risk at the neighborhood- or community-scale by empowering residents to organize and collaborate. Build relationships between community members, the County, and agency partners. Reduce structural ignitability.	Conduct regular assessments to evaluate effectiveness. Establish metrics for measuring the program's impact (e.g., number of neighborhoods involved, level of community engagement, documented reductions in wildfire risk). Participate in statewide ambassador community of practice to stay aligned with best practices.
FAC15	Community Programs and Support	M	2–5 years	Rebate Programs for Wildfire Mitigation Continue to grow and strengthen the Wildfire Partners' implementation of a rebate program	Countywide	Boulder County	Collaborate with Wildfire Partners and county authorities to identify needs and areas of improvement for home mitigation efforts. <ul style="list-style-type: none">Develop clear guidelines and eligibility criteria for residents to qualify for the rebates.Use existing infrastructure and platforms for communication and outreach to educate the community. Explore the extension of rebates to renters and rental companies to ensure comprehensive coverage across the community.	Enhance community resilience against wildfires by incentivizing and facilitating wildfire mitigation efforts.	Monitor the effectiveness of the rebate program through regular evaluation of participation rates, feedback from residents, and impact assessments. Conduct periodic review and revision of requirements.
FAC16	Community Programs and Support	L	1–4 years	Wildfire Partners Community Chipping Program Continue to grow and strengthen free community chipping services offered to all residents by Wildfire Partners to help maintain their defensible space.	Unincorporated Boulder County, City of Boulder, Erie (Boulder County portions), Jamestown, Lafayette, Longmont, Louisville, Lyons, Nederland, Superior, and Ward	Boulder County	Collaborate with local fire departments, community organizations, and volunteers to ensure continued support and participation of the program. <ul style="list-style-type: none">Promote the program through community meetings, newsletters, social media, and local media outlets.Develop and distribute educational materials, such as brochures, videos, and online resources, to increase awareness and participation.Increase the frequency and coverage of chipping events. Ensure adequate funding for the purchase and maintenance of chipping equipment and hire or train staff to operate the machinery.	Reduce wildfire risk by removing vegetative debris that can serve as fuel. Promote community collaboration and engagement in wildfire mitigation efforts. Enhance overall community resilience to wildfire events.	Collect feedback from participants to assess program effectiveness and identify areas for improvement.
FAC17	Community Programs and Support	M	1–5 years	A Path for Insurability Wildfire Partners will work to provide technical assistance to homeowners who are accepted into the program.	Western Boulder County	Boulder County Wildfire Partners	Implement Wildfire Partners individual home assessment program and Wildfire Partners community mitigation program to reduce wildfire risk and promote insurability of homes in Boulder County. <ul style="list-style-type: none">Homeowners participate in an on-site assessment and receive a customized report with a checklist of required mitigation measures.Wildfire Partners provides financial assistance to homeowners accepted into the program based on their ability to pay for mitigation.Qualifying homeowners receive rebates, or other financial assistance, if they achieve a Wildfire Partners Certificate.Wildfire Partners encourages insurance companies to recognize the Wildfire Partners Certificate as proof of effective wildfire mitigation and significant risk reduction.For homeowners who are not able to obtain and retain insurance, Wildfire partners works with interested parties to create a path to insurability based on the Wildfire Partners certificate.	Help homeowners obtain insurance coverage who have been denied insurance because of lack of wildfire mitigation.	Track participation in the program by homeowners, insurance companies, and the State of Colorado. Track homeowners who are able to obtain or retain insurance as a result of this program.

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Cohesive Strategy Goal 3: Safe, Effective, Risk-Based, Wildfire Response

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

A balanced wildfire response requires integrated pre-fire planning with effective, efficient, and coordinated emergency response. Pre-fire planning helps tailor responses to wildfires across jurisdictions and landscape units that have different uses and management objectives. Improved prediction and understanding of weather, burning conditions, and various contingencies during wildfire events can improve firefighting effectiveness, thereby reducing losses and minimizing risks to firefighter and public health and safety.

This section provides recommended actions that various agencies as well as the public could implement to support safe, effective wildfire response (Table 4.7). Recent wildfires in and around the county, such as the Marshall Fire, underscore the importance of safe and effective wildfire response, and highlight the multifaceted challenges in responding to wildfire in WUI and urban areas. This intricate issue requires cooperation and collaborative efforts between various levels of government, response agencies, and the public.

Often during wildfire incidents, resources are stretched thin due to fire personnel committed to other ongoing fires. Increased community preparedness through education is a key factor in supporting local fire departments, in particular education regarding emergency notifications and evacuation protocols.

Please visit the County's wildfire preparedness webpage and Boulder ODMs Natural Hazard Mitigation Plan for more information on fire response:

- Wildfire preparedness guide: <https://bouldercounty.gov/disasters/wildfires/preparing-for-a-wildfire/>
- Boulder ODMs Natural Hazard Mitigation Plan: <https://boulderodm.gov/recovery/mitigation/mitigation-plan/>

You can sign up for emergency alerts at: <https://member.everbridge.net/453003085612231/login>.

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RECOMMENDATIONS FOR SAFE AND EFFECTIVE FIRE RESPONSE

Table 4.7. Recommendations for Safe and Effective Wildfire Response

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FR1	Evacuation and Planning	H	0–2 years	Evacuation Services for Vulnerable Populations Enhance evacuation services for elderly, disabled individuals, and those with specific needs during wildfire events.	Countywide	Boulder County ODM, local law enforcement, FPDs, local emergency managers	Improve evacuation assistance for seniors, people with disabilities, and individuals requiring specialized support during wildfire incidents. <ul style="list-style-type: none">Analyze existing evacuation routes and identify areas where improvements are needed.Conduct a comprehensive assessment to identify vulnerable populations within the county.Gather insights into the specific needs and challenges faced by vulnerable populations during evacuations. Identify evacuation support processes for vulnerable individuals (e.g., elderly, disabled people, unhoused people). <ul style="list-style-type: none">Develop a process for the evacuation and support of vulnerable persons, including transportation and medical assistance.Establish a neighborhood support plan to identify residents who may require extra assistance during evacuations and emergencies, ensuring their safety and well-being. Enhance signage with more information to improve evacuation awareness and preparedness among the unhoused population.	Improve the safety and well-being of vulnerable individuals during wildfire evacuations by addressing their unique needs and challenges.	Establish channels for feedback from residents, emergency responders, and community organizations to continuously refine and adapt evacuation services.
FR2	Evacuation and Planning	H	1–3 years	Evacuation Planning Improve evacuation planning and preplanning procedures, considering the needs of vulnerable populations.	Countywide	Boulder County	Assess current evacuation plans to identify strengths and weaknesses. <ul style="list-style-type: none">Gather input from stakeholders and community members on potential areas for improvement.Evaluate the need for a comprehensive plan, including a road risk analysis, traffic control measures, re-routing options, and risk mitigation strategies. Identify evacuation routes and ensure travel for emergency response vehicles. <ul style="list-style-type: none">Map out primary evacuation routes used by residents and emergency vehicles.Conduct fuel treatments along roads. Develop a livestock and pet evacuation plan. <ul style="list-style-type: none">Use resources such as USDA's disaster planning for animal facilities and CSU Extension's livestock resources webpage to construct a comprehensive livestock and pet evacuation and sheltering plan. Provide training for code responders and other relevant personnel on fire safety protocols and evacuation procedures for the unhoused population.	Protect life by reducing high-risk fire behavior along important roads. Protect public and first responder life and safety.	Conduct regular evaluations of evacuation planning effectiveness. Gather feedback from emergency responders and other stakeholders to assess the impact of planning enhancements.
FR3	Evacuation and Planning	H	0–2 years	Temporary Refuge Areas Establish Temporary Refuge Areas (TRAs) throughout the county.	Countywide	Boulder County, ODM, BCSO, Boulder Fire-Rescue, Boulder Police Department	Create a working group to identify and evaluate potential TRAs. Establish TRA criteria, using resources such as NIST “A Case Study of the Camp Fire.” Once identified, create a naming or numbering convention. Decide how to map, advertise, communicate these TRAs and educate the public on how to use them (see next project below).	Provide safe locations for residents to seek refuge during wildfire events, reducing the risk of injury or loss of life.	Regularly monitor TRA locations to ensure they are strategically placed throughout the community and are easily accessible to residents. Gather feedback from residents regarding the effectiveness and usability of TRAs through surveys, public meetings, or focus groups to identify areas for improvement and address any concerns.

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FR4	Response and Prevention	H	0–2 years	Response/Suppression Plan Create a tactical and operational fire response and suppression plan, with a focus on preventing wildland fire escalations into urban conflagration.	Countywide (especially eastern Boulder County)	Boulder County ODM and BCSO, local FPDs	<p>Establish a formalized interagency coordination framework involving local fire departments, emergency services, and relevant governmental bodies.</p> <ul style="list-style-type: none">Develop comprehensive tactical and operational interagency standard operating procedures.Facilitate regular joint training exercises to ensure seamless integration of resources and personnel.Identify weaknesses and strengthen mutual aid agreements with neighboring jurisdictions and FPDs to ensure a rapid and coordinated response.Evaluate and establish shared response goals and responsibilities between entities (e.g., BCSO, ODM, and City of Boulder Wildland Division). <p>Design a suppression and control protocol that uses predetermined control features (e.g., fuel breaks) to strategically manage and contain wildfires.</p> <p>Create multiple contingency plans to address various fire behavior conditions.</p> <p>Provide land managers with a formal process for developing landscape-scale wildfire response options in wildland areas before fires start (similar to PODs).</p> <ul style="list-style-type: none">Define spatial units and summarize relevant information and local knowledge on fuel conditions, ecology, and fire behavior potential.Facilitate collaborative pre-planning and address potential cross-boundary issues. <p>Pre-identify values at risk to help inform decision making during a wildland fire.</p> <p>Integrate planning and data into the Wildland Fire Decision Support System (WFDSS).</p>	Improve preparedness and capacity for local FPDs to respond to and slow the spread of WUI fires.	Conduct a routine evaluation process to assess the effectiveness of the response and suppression integration measures. Use feedback from wildfire incidents to continuously improve coordination.
FR5	Response and Prevention	H	1–5 years	Water Resources Improve water resource planning for wildland fire suppression through enhancing identification capabilities and increased funding.	Western Boulder County	Boulder County	<p>Collaborate and establish partnerships with regional land management agencies and organizations to enhance water availability throughout the district.</p> <ul style="list-style-type: none">Apply for and obtain funding through grants or local, state, and federal programs.Consider increasing water resources through the implementation of tanks and cisterns.Recognize the limitations of municipal water systems. <p>Establish more detailed, countywide fire-designated water supplies, officially designated as fire ponds or fire use, registered by the state.</p> <ul style="list-style-type: none">Map personal reservoirs as fire ponds to comply with national water regulators' requirements. <p>Encourage individuals to register their ponds as fire ponds.</p> <p>Integrate planning and data into the Wildland Fire Decision Support System (WFDSS).</p>	Improve the local ability and self-reliance of local FPDs to address wildfire concerns.	Conduct an annual assessment/review of water resources to ensure functionality and adequacy for firefighting purposes. Regularly assess the capacity and functionality of water tankers to supplement municipal water systems.
FR6	Response and Prevention	H	0–2 years	Wildland Fire Team Secure annual funding for the Boulder Wildland Fire Incident Management Type 3 Team.	Countywide	BCSO, City of Boulder	<p>Prepare a grant proposal and establish a dedicated annual funding allocation for the Boulder Wildland Fire Incident Management Type 3 Team.</p> <ul style="list-style-type: none">Ensure that this funding encompasses all operational needs.Clearly articulate how the team's activities contribute to climate resilience, community safety, and overall wildfire risk reduction. <p>Align the budget for the Type 3 Team with the specific criteria and objectives outlined by the Climate Tax and 1B funding initiatives.</p>	Ensure sustained financial support for the Boulder Wildland Fire Incident Management. Contribute to the overall wildfire resilience of the community.	Establish a mechanism for regular review and adjustment of the Type 3 Team's budget based on evolving needs, technological advancements, and changes in training requirements.

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FR7	Response and Prevention	M	1–5 years	Wind Impacts on Response Addressing the impacts of extreme wind on wildfire response.	Eastern Boulder County	Boulder County ODM	Implement a multi-pronged approach to mitigate the effect of extreme wind on wildfire response and improve containment efforts during wind driven event. <ul style="list-style-type: none">Integrate weather data and wind forecast into response plan.Use wind modeling programs (i.e., Wind Ninja).Use satellite imaging, drones, and remote sensors for early detection and monitoring.Implement fuel treatments and fuel breaks aimed at reducing spread under high wind conditions.Train and equip firefighting force to respond to wind-driven wildfire incidents rapidly (during safe periods when winds have receded). Establish efficient communication channels between fire response entities.	Enhance wildfire response capabilities and reduce extreme wind impacts.	Provide comprehensive training sessions for all staff members. Conduct annual evaluations to assess effectiveness.
FR8	Response and Prevention	M	2–5 years	Structural Defense Emphasis Prioritize the protection of home, business, and other key structures from the impacts of wildfire. Develop and implement a comprehensive structure protection plan.	Countywide	Boulder County ODM, BCSO, FPDs, City of Boulder Fire-Rescue	Enhance efforts to safeguard homes and businesses against wildfire threats by prioritizing structural defense measures. <ul style="list-style-type: none">Assess current wildfire response plans and identify opportunities to integrate structural defense strategies.Collaborate with fire departments, building professionals, and stakeholders to develop protection measures.Prioritize resources and funding towards initiatives aimed at mitigating wildfire risks to structures. Conduct a thorough assessment to identify areas with higher wildfire risk (e.g., wildland areas, complex topography, historical fire behavior) and prioritize structures within those zones for targeted protection efforts. <ul style="list-style-type: none">Define a strategic plan and equip residents, architects, and planners with the essential resources needed to bolster response efforts. Carry out community-wide initiatives to ensure consistent application of protection efforts.Foster collaboration with local experts to coordinate best practices and protocols to inform the plan.Consider use of “Expected Risk to Structures” dataset that was employed in the development of this CWPP. Ensure local mutual aid resources have access to the structure protection plan.	Increase the resilience of homes and businesses to wildfire threats, reducing the potential for property damage and loss. Prioritize public safety by emphasizing proactive measures to protect structures during wildfire events.	Track the implementation of structural defense measures. Monitor wildfire incidents to assess the effectiveness of measures. Solicit feedback from residents and stakeholders.
FR9	Staffing and Training	H	1–3 years	Increase Staffing Address staffing limitations within Boulder County's wildfire division.	Countywide	Boulder County ODM and BCSO, local FPDs	Conduct a comprehensive assessment of the current staffing levels and allocate resources strategically, ensuring that staffing levels are a proper reflection of the scale of wildfire risk and current wildfire season. <ul style="list-style-type: none">Explore and establish collaborative partnerships with neighboring jurisdictions, firefighting agencies, and relevant private entities.Invest in ongoing training programs for wildfire division staff, focusing on building specialized skills in regional risk factors. Increase the number of firefighting jobs and volunteer firefighting opportunities. <ul style="list-style-type: none">Improve collaboration/cooperation capabilities between firefighting agencies.Train physically capable workers from other departments to fight fire on fire lines (e.g., roads, train workers from vegetation, wildlife, and weed crews). Achieve funding through fundraising/grant applications (e.g., federal, state, local, and independent grants and private donations).	Improve local ability and self-reliance of Boulder County fire managers to address its wildfire concerns, effectively leaning on partnerships where necessary. Reduce risk of loss of life and property from wildfire. Provide career growth opportunities for personnel and support succession planning.	Establish a regular review process to assess the effectiveness of staffing solutions and wildfire management strategies. Adapt staffing levels and approaches based on evolving wildfire risk. Provide annual online and in-person wildfire training classes/refresher courses.

Project ID	Project Type	Priority (H,M,L)	Timeline for Action	Project Description	Location	Lead Agency/Partnering Agencies	Methodology/Approach	Serves To:	Monitoring/Maintenance Requirements
FR10	Staffing and Training	H	2–5 years	Wildland Fire Response Training Refining the budget allocation for wildland fire preparedness and threat mitigation, ensuring uniformity across local districts, and integrating CWPP and emergency operation plan guidelines into spending decisions.	Countywide	Boulder County ODM and BCSO, local FPDs	Enhance local district responses to wildfires by standardizing training protocols, addressing gaps in response strategies, and ensuring appropriate funding allocation for response and water supply specifics. <ul style="list-style-type: none">Conduct a comprehensive assessment of wildland training requirements for local districts, considering factors such as terrain, vegetation, and historical wildfire incidents.Develop a standardized training curriculum tailored to address the identified needs, incorporating best practices and lessons learned from past incidents. Analyze the budget allocation for wildland training to ensure adequacy and effectiveness in meeting training goals.	Ensure proper usage of the emergency management budget and effective spending of taxpayer dollars.	Ensure specificity in funding allocation for response training water supply specifics, and other key efforts, aligning expenditure with CWPP and emergency operation plan priorities.
FR11	Staffing and Training	H	1–3 years	Communication system Establish a common communication channel for the County.	Countywide	Boulder County ODM, BCSO, FPDs	Establish a system through which the department will communicate using common practices and pre-built frequencies. <ul style="list-style-type: none">Identify specific communication needs within the County.Develop a centralized system of standardized communication. Implement training programs to educate County emergency response members on appropriate and effective use of the communication system.	Enhance emergency response communications and capabilities within the County.	Assess the annual effectiveness of the communication system. Establish a feedback mechanism to gather input from County members regarding the communication system.



All stakeholders and signatories to this CWPP desire worthwhile outcomes. It is also known that risk reduction work on the ground, for the most part, is often not attainable in a few months—or even years. The amount of money and effort invested in implementing a plan such as this requires that there be a means to describe, quantitatively and/or qualitatively, if the goals and objectives in this plan are being accomplished according to expectations.

Monitoring and reporting contribute to the long-term evaluation of ecosystem change, and the knowledge concerning how natural resource management decisions affect both the environment and the people who live in it. It is important that monitoring protocols are developed with specific regions and project types in mind to maintain the accuracy and effectiveness of monitoring data. Although the HFRA does not include specified requirements for CWPP project tracking, it is important that project outcomes are monitored and evaluated regularly. Furthermore, as the CWPP evolves over time, there may be a need to track changes in policy, requirements, stakeholder changes, and levels of preparedness. These can be significant for any future revisions and/or addendums to the CWPP.

Included below is the description of the 2024 Boulder County CWPP Project Tracking Application, housed on the [CWPP hub site](#). The system is designed to be used by local land managers as a collaborative effort to track project progress for both planned and implemented projects. In addition, the tracking system will be able to provide quick stats such as acres treated, or dollars spent for community members to follow.

MONITORING STRATEGIES

It is recommended that project monitoring be a collaborative effort. There are many resources for designing and implementing community-based, multiparty monitoring that could support and further inform a basic monitoring program for the CWPP (Egan 2013). Multiparty monitoring involves a diverse group consisting of community members, community-based groups, regional and national interest groups, and public agencies. Using this multiparty approach increases community understanding of the effects of restoration efforts and trust among restoration partners.

Table 5.1 identifies monitoring strategies for various aspects of all categories of CWPP recommendations and the effects of their implementation, both quantifiable and non-quantifiable, for assessing the progress of the CWPP and increasing the sustainability of projects. It must be emphasized that these strategies are 1) not exhaustive and 2) dependent on available funds and personnel to implement them. When possible, other relevant plans should be used as guidance for monitoring, especially when projects overlap with planning objectives.

Local and regional partner agencies and organizations should be teamed with and relied on to support monitoring efforts. Due to the nature of a county-level CWPP, there will be other CWPPs within Boulder County that are specific to municipalities for fire protection districts. It is recommended that the implementation leaders of other, more specific CWPPs coordinate annually with the CWPP implementation leader for Boulder County to ensure alignment and efficiency when enacting risk reduction projects.

PROJECT TRACKER

Within the project's home page, <https://boulder-county-cwpp-bouldercounty.hub.arcgis.com/>, an interactive web-based tool has been designed to communicate CWPP projects within a project tracking application ([click here to view application](#)). The application is designed to provide real-time updates to the public and facilitate multiagency coordination and collaboration. The tracking system is available for internal use with a public-facing dashboard and the following features:

- Project database
- Project entries and sub-entries into the database
- Funding tracking
- Milestone and goal tracking
- Project constraint/opportunity tracking
- Project progress tracking
- Agency delegation
- Ability to attach images or other files to project records
- Spatially delineated project locations/working areas

Externally, the project tracker will display relevant information to the public in an easy-to-navigate dashboard. The dashboard will contain project information such as acres treated, dollars spent, homes assessed, and public outreach events conducted. The monitoring strategies outlined in Table 5.1 can be applied to complete and proposed mitigation projects in conjunction with the project tracking application.

Table 5.1. Recommended Monitoring Strategies

Strategy	Task/Tool	Remarks
Project Tracking System	<i>Online tracking tool (click here for tool) to track risk reduction projects spatially.</i>	Interactive tool is easily updated and identifies areas that require additional efforts, update monthly if possible
Photographic record (documents pre- and post-fuels reduction work, evacuation routes, workshops, classes, field trips, changes in open space, treatment type, etc.)	<i>Establish field GPS location; photo points of cardinal directions; keep photos protected in archival location.</i>	Moderate cost, repeatable over time; used for programs and tracking objectives
Number of acres treated (by fuel type, treatment method)	GPS/GIS/fire behavior prediction system – this can be monitored within the Project Tracking System	Evaluating costs, potential fire behavior
Number and acres of home ignition zones/defensible space treated to reduce fuels Number and cost of home treatments to reduce ignitability	GPS – This can be monitored within the Project Tracking System	Fuels reduction Structure protection
Number of residents/citizens participating in any CWPP projects and events	Meetings, media interviews, articles	Evaluate culture change objective Annual lessons learned review encouraged among stakeholders
Number of homeowner contacts (brochures, flyers, posters, etc.)	Visits, phone	Evaluate objective Annual lessons learned review encouraged among stakeholders
Number of jobs created, contracts, grants	Project Tracking System	Evaluate local job growth
Education outreach: number, kinds of involvement	Workshops, classes, field trips, signage; Project Tracking System	Evaluate objectives Annual lessons learned review encouraged among stakeholders
Fire Response: changes in agency response capacity	<i>Collaboration, grants to fund fire department needs such as new personnel and equipment</i>	Evaluate mutual aid Annual review
Codes and policy changes affecting CWPP	Qualitative	CWPP changes
Wildfire acres burned, human injuries/fatalities, infrastructure loss, environmental damage, suppression, and rehabilitation costs	Wildfire records	Compare with 5- or 10-year average
Number of home assessments completed and completing a comprehensive summary of risk to homes.	Web-based mapping, field surveys	Evaluate existing home risk assessment data
Number of curbside risk assessments completed and completing a comprehensive summary of risk.	Web-based mapping, field surveys	Align risk assessment data with Wildfire Partners
Number of medical incidents attached to wildfire suppression incidents.	After action reviews, meetings, record of medical incident reports	Determine causes and possible mitigation actions
Number of structures lost per wildfire incident accompanied by weather and fire behavior data.	National Weather Service, field surveys, public input	Establish trends and correlations before, during, and after wildfire disasters.

FUEL TREATMENT MONITORING

Monitoring fuel treatment projects is necessary for assessing the efficacy of proposed actions and evaluating how projects support environmental sustainability and wildfire resiliency. Establishing monitoring protocols can help project managers better understand how well the proposed treatment methods and prioritized actions fulfill planned goals and objectives. Recording and sharing monitoring results is crucial for establishing benchmarks and determining long-term fuel treatment strategies.

Additionally, cataloging fuel treatment projects in conjunction with monitoring results in a web-based mapping system is a good strategy for organizing geospatially referenced data that can be easily shared. The monitoring of projects with differing treatment methodologies and/or vegetation, topography, and human communities can skew results and prevent the selection of appropriate treatment methods. Therefore, it is important to standardize monitoring protocols and sampling intervals across similar treatment types and for projects within similar regional areas such as west and east Boulder County. See below to learn more about the different fuel treatment monitoring strategies for eastern and western Boulder County.

Resources and strategies regarding post-fire recovery and restoration can be found in Appendix F. Fuel treatment methodologies can be found in Appendix E.

WESTERN BOULDER COUNTY

Monitoring fuel treatments in western Boulder County encompasses comprehensive forest stewardship and management of wildfire hazards in proximity to rural communities. Evaluating fuel treatments specific to western Boulder's mountainous landscape and coniferous vegetation is important for determining the achievement of defined objectives and whether any unexpected outcomes or issues occurred.

The following monitoring strategies should be considered for fuel treatment projects in western Boulder.

Measure the short- and long-term ecological consequences associated with treatments. Items to consider include soil movement and invasive species encroachment post treatment. Relatively cost-effective monitoring may help reduce long-term costs and consequences to the environment.

- Vegetation will grow back. Thus, treating fuels in both the HIZ and broader landscape requires periodic assessment. Monitoring these changes can help decision makers identify appropriate treatment intervals.
 - Forest succession of landscape treatments should be monitored to ensure projects align with local forest management plans and sustainable forest stewardship goals.
 - Vegetation growth in the HIZ should be regularly monitored by homeowners and evaluated periodically by wildfire risk assessors. It is important to align defensible space treatments with broader wildland fuel treatments and to assess the health of trees near structures.

Monitoring methods for prescribed burning treatments should consider ecological succession and establishment of desired pioneer and intermediate species for supporting a healthy climax community.

EASTERN BOULDER COUNTY

Monitoring fuel treatments in eastern Boulder County encompasses comprehensive grassland stewardship and management of wildfire hazards. Evaluating fuel treatments specific to eastern Boulder's

flat developed landscape and grass-shrub vegetation is important for determining the achievement of defined objectives and whether any unexpected outcomes or issues occurred. The following monitoring strategies should be considered for fuel treatment projects in eastern Boulder.

- Measure the short- and long-term ecological consequences associated with treatments. Items to consider include soil depletion and invasive species encroachment post-treatment. Relatively cost-effective monitoring may help reduce long-term costs and consequences to the environment.
- Grass will grow back every year. Therefore, it is critical that monitoring is conducted on an annual basis to determine the efficacy of treatments and adjust strategies accordingly. Grass treatments should align with certain growth stages depending on the type of treatment used (i.e., grazing, prescribed burning, mowing).
 - Grass fuel loads should be monitored for potential wildfire hazard during fire season as well as during the winter months when cured grass is most likely to support extreme fire behavior.
 - Vegetation growth in the HIZ should be regularly monitored by homeowners and evaluated periodically by wildfire risk assessors. It is critical to reduce the risk of structure ignitability by maintaining a 5-foot zone around structures devoid of vegetation.
- Monitoring methods for prescribed burning treatments should consider ecological succession and establishment of desired pioneer and intermediate species for supporting a healthy climax community.
 - Many native grass and shrub vegetation communities benefit from regular fire return intervals, and project managers can establish monitoring protocols for determining ideal burning strategies for specific species.
 - Determine the ecological impact, safety, and effectiveness of prescribed burning versus mowing and prescribed grazing practices. To accomplish this, evaluate invasive weed establishment, fuel loading trends, cost, human health impacts, and fire behavior effects.

IMPLEMENTATION

Fuel treatment monitoring protocols can be implemented at various levels of effort depending on the type of project, region, and involved communities. Several levels of monitoring activities meet different objectives, establish different monitoring interval intensities, and are appropriate for different management groups and communities. They include the following:

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

Appropriate for many individual homeowners who conduct fuel reduction projects on their properties. Good for a visual record of data.

Moderate – Level 2: Multiple Permanent Photo Points

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

High – Level 3: Basic Vegetation Plots

A series of plots can allow monitors to evaluate vegetation characteristics such as species composition, percentage of cover, and frequency. Monitors then can record site characteristics such

as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols based on the types of vegetation present and the level of detail needed to analyze the management objectives. This method is appropriate for wildfire specialists, City and Town planners, foresters, and other personnel monitoring fuel treatments on forested land and grasslands.

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

The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974), an appropriate photo series (Ottmar et al. 2000), or fire monitoring (Fire Effects Monitoring and Inventory System [FIREMON]) plots. This method is ideal for foresters or university researchers tracking vegetation changes in forested lands. For grasslands this would involve a gap intercept to interpret the size and distribution of exposed ground, soil stability tests to define the soil's susceptibility to water erosion, as well as a species inventory to measure the overall biodiversity (USDA 2016).

EVALUATION OF ACTIONS SUPPORTING THE NATIONAL COHESIVE STRATEGY

The 2024 Boulder County CWPP makes recommendations for prioritized fuels reduction projects, measures to reduce structural ignitability, methods with which to carry out public education and outreach, and recommendations to increase safe, effective wildfire response. Monitoring for fuels reduction is discussed above, and monitoring for projects aimed at creating fire-adapted communities and safe and effective wildfire response is discussed below. Implementation should be carefully tailored to the unique characteristics of each region within Boulder County.

WEST BOULDER COUNTY

Western Boulder County communities are small and rural, with each facing unique challenges regarding wildfire resiliency and response. The success of actions supporting fire adapted communities and fire response should be based on local CWPP and emergency action plan documents. Assessing the effectiveness of public engagement through digital platforms can be effective for large populations. However, the smaller and more rural communities in western Boulder may be more suited to providing feedback and recommendations via in-person meetings or live webinars/panels.

Facilitating coordination between federal, state, and local fire response resources in western Boulder County, where many jurisdictions overlap, can be effective in providing decision makers with comprehensive feedback on actions to improve fire response capabilities. In addition, conducting after action reviews can be effective in determining the value of proposed and completed wildfire mitigation actions. Therefore, it is valuable to forward the key outcomes of after-action reviews to the appropriate decision makers to maintain fire fighter safety and effectiveness during suppression operations.

EAST BOULDER COUNTY

Eastern Boulder County encompasses the City of Boulder and several moderately sized towns connected by subdivisions and infrastructure developments. Higher housing and population density of eastern Boulder County necessitates the need for evaluating the effectiveness of proposed and completed actions within community mitigation zones (CMZs). Assessment and evaluation of actions regarding fire adapted communities can be accomplished through collaboration between Boulder County, the City of Boulder, other municipalities, and local FPDs.

Fire response resources in eastern Boulder can monitor staffing, equipment, and evacuation needs using parcel-level risk assessment data. Home risk assessments and curbside risk assessments can be efficiently completed in eastern Boulder County and will provide decision makers with a comprehensive assessment of wildfire risk. Additionally, due to the expansive grassland ecosystem in eastern Boulder County, it is essential that local fire response resources communicate challenges and successes to Boulder County officials related to the suppression and control of grass fires. Boulder County should coordinate with local fire response resources in eastern Boulder County regarding equipment and staffing needs during times of forecasted high winds and ensure communication protocols and technology are operational prior to the fire season or periods of extreme fire weather.

CWPP EVALUATION

CWPPs are intended to provide information, guidance, and recommendations to reduce the risk of wildfire damaging a community and the environment. However, as communities change through development and vegetation communities evolve, so does the risk of wildfire. The recommendations and methods to reduce risk must be dynamic to keep pace with changes in the WUI and the fire environment; therefore, consistent evaluations of the CWPP are imperative. Additionally, recently published research and case studies regarding wildfire risk should be considered when evaluating the CWPP.

STEPS TO EVALUATE A CWPP

1

IDENTIFY OBJECTIVES:

What are the goals identified in the plan?
How are they reached? Is the plan performing as intended?



- Structural ignitability
- Fuel treatments (landscape and home ignition zone)
- Public education and outreach
- Multi-agency collaboration
- Emergency notifications/response

2

ASSESS THE CHANGING ENVIRONMENT:

How have population characteristics and the wildfire environment changed?

**Population change**

- Increase or decrease
- Visitor levels
- Demographics

Population settlement patterns

- Distribution
- Expansion into the WUI

Vegetation

- Fuel quantity and type
- Drought and disease impacts

3

REVIEW ACTION ITEMS:

Are actions consistent with the plan's objectives?



- Check for status, i.e., completed/started/not started
- Identify completed work and accomplishments
- Identify lessons learned, challenges, and best practices
- Identify next steps congruent with other hazard mitigation planning efforts

4

ASSESS RESULTS:

What are the outcomes of the action items?

**Multi-agency collaboration**

- Who was involved in the development of the CWPP?
- Have partners involved in the development process remained involved in the implementation?
- How has the planning process promoted implementation of the CWPP?
- Have CWPP partnerships and collaboration had a beneficial impact to the community?

Risk-hazard assessment

- How is the risk-hazard assessment utilized to make decisions about fuel treatment priorities?
- Have there been new wildfire-related regulations?
- Are at-risk communities involved in mitigating wildfire risk?

Hazardous fuels

- How many acres have been treated?
- How many projects are cross-boundary?
- How many residents have participated in creating defensible space?

Structural ignitability

- Have there been updates to fire codes and ordinances?
- How many structures have been lost to wildfire?
- Has the CWPP increased public implementation of structural ignitability and hazard reduction strategies?

Public education and outreach

- Has public awareness of wildfire and mitigation strategies increased?
- Have residents, visitors, and second homeowners been involved in wildfire mitigation activities?
- Has there been public involvement?
- Have vulnerable populations been involved?

Emergency response

- Has the CWPP been integrated into relevant plans (e.g., hazard mitigation or emergency operations)?
- Is the CWPP congruent with other hazard mitigation planning efforts?
- Has availability and capacity of local fire departments changed since the CWPP was developed?
- Have egress routes been publicized and mitigated?

TIMELINE FOR UPDATING THE CWPP

The HFRA allows for maximum flexibility in the CWPP planning process, permitting the Core Team to determine the time frame for updating the CWPP. However, it is suggested that a formal revision be made on the fifth anniversary of signing and every 5 years following. Furthermore, due to the dynamic nature of wildfire litigation and the natural landscape, several triggers may warrant a CWPP update before the 5-year mark. Among these triggers are extensive wildfire or another disaster event, changes to the local planning outlook (e.g., significant update to the hazard mitigation plan), and local adoption of new wildfire-related codes and ordinances. The Core Team members are encouraged to meet annually to review the project list, discuss project successes, strategize regarding project implementation funding, and determine whether a plan revision is needed.

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ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
ACCC	Adams-Cowger/Cabin Creek
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
BAER	Burned Area Emergency Rehabilitation
BC	Boulder County
BCC	Boulder County Communications Center
BCPOS	Boulder County Parks and Open Space
BCSO	Boulder County Sheriff's Office
BFR	Boulder Fire-Rescue
BFRD	Boulder Fire-Rescue Department
BLM	Bureau of Land Management
BMP	best management practice
BOCO	Boulder County
BPD	Boulder Police Department
BRIC	Building Resilient Infrastructure and Communities
BVLCD	Boulder Valley & Longmont Conservation District
BWC	Boulder Watershed Collective
CA GOPR	California Governor's Office of Planning and Research
CAR	Community at Risk
CCC	Coal Creek Canyon
CDC	Centers for Disease Control and Prevention
CDHSEM	Colorado Division of Homeland Security and Emergency Management
CDNR	Colorado Department of Natural Resources
CERT	Community Emergency Response Team
CFBC	Community Foundation of Boulder County
CFSY	Community Forestry Sort Yards
CIG	Conservation Innovation Grants
CMZ	community mitigation zone
CNP	Community Navigators Program
COAL	Colorado All Lands
Cohesive Strategy	National Cohesive Wildland Fire Management Strategy
CRS	Congressional Research Service
CSFS	Colorado State Forest Service

CUSP	Coalition for the Upper South Platte
CWA	Clean Water Act
CWPP	community wildfire protection plan
DEM	digital elevation model
DFPC	Colorado Division of Fire Prevention and Control
DHS	Department of Homeland Security
DOE	Department of Energy
DOI	U.S. Department of the Interior
DOLA	Department of Local Affairs
DW	Denver Water
EAS	Emergency Alert System
ECP	Emergency Conservation Program
EFRP	Emergency Forest Restoration Program
EMPG	Emergency Management Performance Grant
EMS	Emergency Management System
EOC	Emergency Operations Center
EOP	Emergency Operation Plan
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ERC	Energy Release Component
ESRI	Environmental Systems Research Institute
EWP	Emergency Watershed Protection
FACNM	Fire Adapted Communities New Mexico
FCIDC	Fort Collins Interagency Dispatch Center
FDO	Fire Duty Officer
FEMA	Federal Emergency Management Agency
FP&S	Fire Prevention and Safety
FPD	Fire Protection District
FRI	fire return interval
GACC	Geographic Area Coordination Centers
GIS	geographic information system
GPS	global positioning system
GR	grass
GS	grass-shrub
HFRA	Healthy Forests Restoration Act of 2003
HIZ	home ignition zone

HMP	hazard mitigation plan
HMPG	Hazard Mitigation Grant Program
HOA	homeowner association
HVRA	highly valued resource or asset
IBHS	Insurance Institute for Business & Home Safety
ICC	International Code Council
ICS	Incident Command System
IFTDSS	Interagency Fuel Treatment Decision Support System
IMT	Incident Management Team
INFRA	infrastructure
IPAWS	Integrated Public Alert Warnings
JCD	Jefferson Conservation District
MVFPD	Mountain View Fire Protection District
NCA	National Climate Assessment
NCAR	National Center for Atmospheric Research
NCFC	Northern Colorado Fireshed Collaborative
NCFWRA	Northern Colorado Fireshed Wildfire Risk Assessment
NEPA	National Environmental Policy Act
NFF	National Forest Foundation
NFP	National Fire Plan
NFPA	National Fire Protection Association
NFSC	National Fire Science Consortium
NIFC	National Interagency Fire Center
NIMS	National Incident Management System
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
ODM	Office of Disaster Management
OSMP	City of Boulder Open Space and Mountain Parks
PFCG	Post-fire coordination group
POD	Potential Operational Delineation
PP	People and property
PPE	personal protective equipment
PRISM	PRISM Climate Group

PSU	Penn State University
RAWS	remote automated weather station
RI	Relative importance
SAF	Society of American Foresters
SAFER	Staffing for Adequate Fire and Emergency Response
SBA	Small business administration
SCRCP	Species Conservation and Recovery Plan
SRA	State Responsibility Area
SVI	Social Vulnerability Index
SWCA	SWCA Environmental Consultants
SWIFT	state wildland inmate fire teams
TEPCS	threatened, endangered, proposed, candidate, and sensitive plant species
TL	Timber litter
TRA	temporary refuge area
TU	Timber understory
UCANR	University of California, Agriculture and Natural Resources
ULI	Urban Land Institute
UNODRR	United Nations Office for Disaster Risk Reduction
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USFA	U.S. Fire Administration
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VEG	vegetation
VFS	Various Funding Sources
WEA	Wireless Emergency Alerts
WESTT	Wildfire Erosion and Sediment Transportation Tool
WFCA	Western Fire Chiefs Association
WFP	Wildfire Partners
WRSC	Western Regional Strategy Committee
WUI	wildland-urban interface

GLOSSARY

Aspect: Cardinal direction toward which a slope faces in relation to the sun (NWCG 2024).

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

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

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

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

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

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

Chain: Unit of measure in land survey, equal to 66 feet (20 m) (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances. Popular in fire management because of its convenience in calculating acreage (example: 10 square chains equal one acre) (New Mexico Future Farmers of America 2010).

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

Communities at Risk (CAR): Defined by the HFRA as "Wildland-Urban Interface Communities within the vicinity of federal lands that are at high risk from wildfire."

Community Emergency Response Team (CERT): The CERT program educates volunteers about disaster preparedness for the hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT offers a consistent, nationwide approach to volunteer training and organization that professional responders can rely on during disaster situations, allowing them to focus on more complex tasks (Ready 2021).

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

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

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

Crown Fire: A fire that advances at great speed from crown to crown in tree canopies, often well in advance of the fire on the ground (NWCG 1998).

Defensible Space: The area around a home (or structure) that has been modified to reduce fire hazard by creating space between potential fuel sources (CSFS HIZ guide). Defensible space is divided into three zones based on the following distances from the home (or structure): 0 to 5 feet, 5 to 30 feet, and 30 to 100 feet. The size of the third zone may be extended to 200 feet or more for structures on steep slopes.

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

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

Energy Release Component: A value related to the available energy within the flaming front at the head of a fire. Daily variations in the Energy Release Component are due to changes in the moisture content of the fuels present, both live and dead (NIFC n.d.).

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

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

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

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

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

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

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

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

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

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

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

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

Fire Prevention: Efforts to stop human-caused wildfires. The goal of wildfire prevention is to limit the number of human-caused wildfires through programs targeting causes of wildfires such as campfire safety, equipment and vehicle use, firework safety, smoker education, burn permits, and target shooting safety. Preemptively powering down parts of the electricity grid during high wind events is an example of fire prevention.

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

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

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

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

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

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

Fuel Break: A natural or human-made change in fuel characteristics that affects fire behavior so that fires burning into them can be more readily controlled (NWCG 2024).

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

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

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

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

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

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

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

Fuel Treatment: The manipulation or removal of fuels to minimize the probability of ignition and/or to reduce potential damage and resistance to fire suppression activities (NWCG 2024). Synonymous with fuel modification.

Grazing: There are two types of grazing: traditional grazing and targeted grazing. Traditional grazing refers to cattle that are managed in extensive pastures to produce meat. Targeted grazing involves having livestock graze at a specific density for a given period of time for the purpose of managing vegetation. Even though both kinds of grazing manage fuel loading in range- and forested lands, targeted grazing is different in that its sole purpose is to manage fuels. Targeted grazing is done by a variety of livestock species such as sheep, goats, or cows (University of California, Agriculture and Natural Resources [UCANR] 2019).

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

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

Hazardous Fuels: A fuel complex defined by type, arrangement, volume, condition, and location that poses a threat of ignition and resistance to fire suppression (NWCG 2024).

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

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

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

Home Ignition Zone (HIZ): The home or structure plus surrounding area. HIZ extent depends on structural ignitability and defensible space (SWCA).

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

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

Influence Zone: An area that, with respect to wildland and urban fire, has a set of conditions that facilitate the opportunity for fire to burn from wildland fuels to the home and or structure ignition zone (NWCG 2024).

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

Invasive Species: An introduced, nonnative organism (disease, parasite, plant, or animal) that begins to spread or expand its range from the site of its original introduction and that has the potential to cause harm to the environment, the economy, or to human health (USGS 2021).

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

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

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

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

Mitigation: Action taken before a wildfire ignites to reduce its severity and negative impacts such as the destruction of homes. Forest management, prescribed fire, home hardening, and defensible space are common wildfire mitigation strategies. Action taken after a wildfire ignites— emergency notification, fire suppression, and recovery programs—are not included in the definition of wildfire mitigation (Boulder County 2024k).

Mutual Aid: Assistance in firefighting or investigation by fire agencies, regardless of jurisdictional boundaries (NWCG 2024).

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

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

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

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

Vision: To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire (Forests and Rangelands 2021).

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

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

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

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually, it is expressed in chains or acres per hour for a specific period in the fire's history (NWCG 2024).

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

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

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

Slope Percent: The ratio between the amount of vertical rise of a slope and horizontal distance as expressed in a percent. One hundred feet of rise to 100 feet of horizontal distance equals 100 percent (NWCG 2024).

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

Surface Fire: fire that typically burns only surface litter and undergrowth (National Geographic 2023).

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

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

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

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

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

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

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

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

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

Wildfire Exposure: During fire suppression activities, an exposure is any area/property that is threatened by the initial fire, but in National Fire Incident Reporting System (NFIRS) a reportable exposure is any fire that is caused by another fire, i.e., a fire resulting from another fire outside that building, structure, or vehicle, or a fire that extends to an outside property from a building, structure, or vehicle (USFA 2020).

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

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

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

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

- Grass
- Shrub

- Grass-Shrub
- Timber Litter
- Timber-Understory
- Slash-Blowdown

Wildland Urban Interface (WUI): The zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (USFA 2021a). In the absence of a CWPP, Section 101 (16) of the Healthy Foresters Restoration Act defines the wildland urban interface as “ (I) an area extending ½ mile from the boundary of an at-risk community; (II) an area within 1 ½ miles of the boundary of an at-risk community, including any land that (1) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; (2) has a geographic feature that aids in creating an effective fuel break, such as a road or ridge top; or (3) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; (III) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuels reduction to provide safer evacuation from the at-risk community.” A CWPP offers the opportunity to establish a localized definition and boundary for the wildland urban interface (USFA 2020).



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APPENDIX A:

Community Background and Resources

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LOCATION AND GEOGRAPHY

Boulder County is 741 square miles, located northwest of the Denver metropolitan area at elevations ranging from 5,000 to over 14,000 feet above sea level (Boulder County 2023a). Boulder County's westernmost border follows the Continental Divide, while its largest city, Boulder, sits in the eastern portion of the county along the foothills of the Rocky Mountains (Boulder County 2023a). The County encompasses three unique geographic zones with alpine mountains in the west, plains in the east, and transitional zone between (Colorado Encyclopedia Staff 2015) (Figure A.1 and Figure A.2). Characterized largely by mountains, ridges, and canyons, the western portion of the county exhibits a diverse topography with wildland fuels that often interface with communities found along main roadways (Colorado Encyclopedia Staff 2015). The eastern portion of the County is generally less geographically varied however it contains considerable open space with wildland fuel and is home to most of the County's population and developed area.

Land ownership in the planning area is split between private landowners and several local, state, and federal agencies. Predominantly, the land is privately owned, with significant portions owned and managed by the federal government, Boulder County, and the City of Boulder. The remaining land within the planning area is primarily managed by local and state government. The USFS manages the Arapaho and Roosevelt National Forest in the western portion of the planning area, and the NPS maintains the Rocky Mountain National Park in the northwest corner of the planning area. The planning area encompasses campgrounds, trailheads, as well as open spaces and parks managed by the BLM, state, and local governments throughout the county. A summarized breakdown of land ownership in the planning area is provided in Table A.1.

Table A.1. Breakdown of Land Ownership in the Planning Area

Land Ownership	Acres	Percentage of County
Private	174,711.83	36.90
Federal	165,811.61	35.02
Boulder County	94,568.46	19.97
City of Boulder	36,375.62	7.68
Local	1,409.34	0.30
State	600.85	0.13
Total	473,477.71	100.00



Figure A.1. Typical landscape in the eastern portion of the planning area.



Figure A.2. Typical landscape in the western portion of the planning area.

TOPOGRAPHY

Boulder County, located in northern Colorado, spans 740 square miles of Rocky Mountains and eastern plains (BC OpenGov n.d.). Lower elevations consist of grasslands, while middle and higher elevations feature coniferous forests, and the highest peaks are characterized by alpine tundra. The High Plains begin in the east at less than 5,000 feet above sea level (BC OpenGov n.d.). Moving westward, the terrain transitions to foothills and valleys near Lyons, Boulder, and Eldorado Springs, eventually reaching the Rocky Mountain National Park and Longs Peak, standing at 14,255 feet (NFSC 2017).

The varied topography in western Boulder County could intensify wildfire behavior by altering wind patterns and fire spread rates (NFSC 2017). Strong westerly winds, influenced by the orographic and diurnal effects of mountainous topography, pose a particular risk, potentially driving wildfires eastward into the grasslands (Penn State University [PSU] n.d.). Canyons further enhance the danger by funneling and intensifying westerly winds, creating hazardous fire conditions (PSU n.d.). Conversely, the flatter grasslands to the east support wildfires primarily influenced by weather and fuel characteristics rather than topography (Leys et al. 2018).

Certain topographic elements like ridges, rock outcrops, streams, rivers, lakes, or roads can serve as effective fire barriers. These features can be strategically utilized to establish boundaries around fires for firefighting purposes or to create fuel breaks for future incidents (NFSC 2017). The USFS has delineated potential operational delineations (PODs) that factor in existing potential control features like those listed above. PODs provide a framework for identifying and planning treatment projects such as fuel breaks and forest thinning. See Chapter 1 for more information on PODs.

POPULATION

In 2020, the population estimate of Boulder County was 330,758 persons, an increase of more than 36,000 people compared with the 2010 census numbers of 294,567 (U.S. Census Bureau 2020). In 2020, there were 140,848 housing units and 137,786 households in Boulder County. Boulder County has a population density of 455.3 people per square mile (U.S. Census Bureau 2020).

Boulder County encompasses numerous cities and towns, with the City of Boulder, located in southern Boulder County, being the most densely populated, followed by Longmont to northeast, and Lafayette and Louisville in southeastern Boulder County. The least populated towns and municipalities include Ward, Jamestown, and Nederland, all of which are located in the central and the most southwestern regions.

This substantial population and diverse landscape can bring challenges particularly in the context of natural disasters like wildfires. The high population densities located in or adjacent mountainous areas underscore the importance of proactive measures to address wildfire risk to communities and resources. As these communities continue to grow and develop, it will remain crucial to implement effective wildfire prevention and response strategies to safeguard both lives and property in Boulder County.

RECREATION

Outdoor recreation is extremely popular in Boulder County, with numerous attractions drawing millions of visitors each year. The county is home to wide selection of outdoor areas offering recreational opportunities, including the Flatirons, Green Mountain, Flagstaff Mountain, Royal Arch, Mount Sanitas, Eldorado Canyon, Boulder Reservoir, wilderness areas, scenic trails, and cultural attractions. In and adjacent to Boulder County are the Arapaho and Roosevelt National Forests, Rocky Mountain National Park, and Golden Gate Canyon State Park. Hiking, biking, camping, hunting, fishing, skiing, snowmobiling, boating, and other activities are all popular throughout the county with over 120 miles of trails and over 60 parks and countless recreation programs (Boulder County 2024f) (Figure A.3).

In 2022 approximately 1.8 million people visited parks in Boulder County (Boulder County Parks and Open Space 2022). July is typically the busiest month for Boulder County Parks and Open Space, which received 125,996 visitors in July 2022 (Boulder County Parks and Open Space 2022).

The high volume of visitors to Boulder County's natural areas poses a heightened risk of wildfire ignition. Mishandling of open flames, heat from vehicles, and the use of firearms are just a few possible sources for human-caused ignitions observed in Colorado (Paul 2017). During times of peak visitation, large crowds tend to gather in relatively limited spaces, exacerbating the potential harm to human life during emergencies where an evacuation becomes necessary, such as wildfires.



Figure A.3. Recreational trailhead for Hall Ranch in Boulder County (Boulder OSMP).

SOCIAL VULNERABILITY CONSIDERATIONS

To create an equitable Community Wildfire Protection Plan (CWPP) for Boulder County, it is essential to recognize and incorporate the unique needs of socially vulnerable communities. Social vulnerability refers to the increased susceptibility of some groups to the adverse effects of emergencies or disasters. Populations identified as more vulnerable include older adults, children, underrepresented racial or ethnic groups, individuals with limited English proficiency, low-income or no-income individuals, people with disabilities, and those with medical conditions. This vulnerability stems from historical and structural discrimination, often perpetuated by government policies. Wildfire can disproportionately affect socially vulnerable populations due to factors such as inadequate housing, social exclusion, lack of property, and inability to evacuate effectively (Fothergill and Peek 2004).

Another key implication of the substantial health and health-associated economic impacts from wildfires is the importance of cultivating community resilience and protecting vulnerable populations who have less access to wildfire mitigation resources and reduced adaptive capacity. While many wildfire-prone regions are home to communities with lower social vulnerability, the intersection of wildfire health effects and equity will continue to grow in importance in the coming years as wildfires increase in severity and populations become more vulnerable to subsequent impacts (Davies et al. 2018).

Boulder County is dedicated to addressing these inequities through a deliberate and inclusive planning process. In alignment with Boulder County's vision, this CWPP prioritizes collective climate action and equity in public health and safety planning. It serves as a guide for mitigating wildfire threats to people, structures, and the natural environment; recognizes the inequity in access to resources; and incorporates measures to address these disparities throughout the county.

This CWPP uses Social Vulnerability Index (SVI) data acquired from the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR). This data is derived from the U.S. Census Bureau's 2020 American Community Survey 5-year estimates (CDC 2023). Such populations can be assessed using an SVI, which approximates the social vulnerability of a location based on multiple indicators. More information on mapping and methodology pertaining to social vulnerability can be found in Chapter 3.

It is important to consider all indicators of social vulnerability, which can be understood using the CDC/ATSDR overall SVI shown in Figure A.4. Figure A.5 shows the American Community Survey datasets that were used to calculate total social vulnerability values across the United States. However, certain indicators of social vulnerability have more implications for residents in the context of wildfire disasters.

Quantifying complex constructs such as social vulnerability or community resilience is challenging. There are several widely recognized limitations of social indices including (Reilley 2022):

- **Data availability and reliability:** regularly collected, high-quality social and economic data available to inform indices are difficult to obtain. The U.S. Census Bureau's American Community Survey is one of the few national surveys of socioeconomic and demographic data, and because of sampling error inherent to the process, data can be especially unreliable in rural or small population areas.
- **Spatial Scale:** existing indices have focused on using administrative boundaries utilized by the U.S. Census Bureau, most notably counties and census tracts. However, census geographies are limited in their ability to represent communities for many reasons. Counties are legal divisions of most states and can be rather large, encompassing multiple communities. Census tracts and block groups, both subdivisions of counties, are designed to have roughly the same number of people, resulting in units that vary widely in size depending on population density. Therefore, results of assessments may vary depending on the scale at which data are aggregated and displayed.
- **Selection of Indicators:** one commonly cited critique of nearly all social indices is that the individual indicators included have not necessarily been empirically tested for their positive or negative contribution to vulnerability or resilience but are instead grounded in theory and expert knowledge. This makes it difficult to have confidence that indices truly reflect the social vulnerability or resilience of a given place. A 2016 review of vulnerability and resilience indices found that less than 20% employed any validation or sensitivity analysis (Beccari 2016).

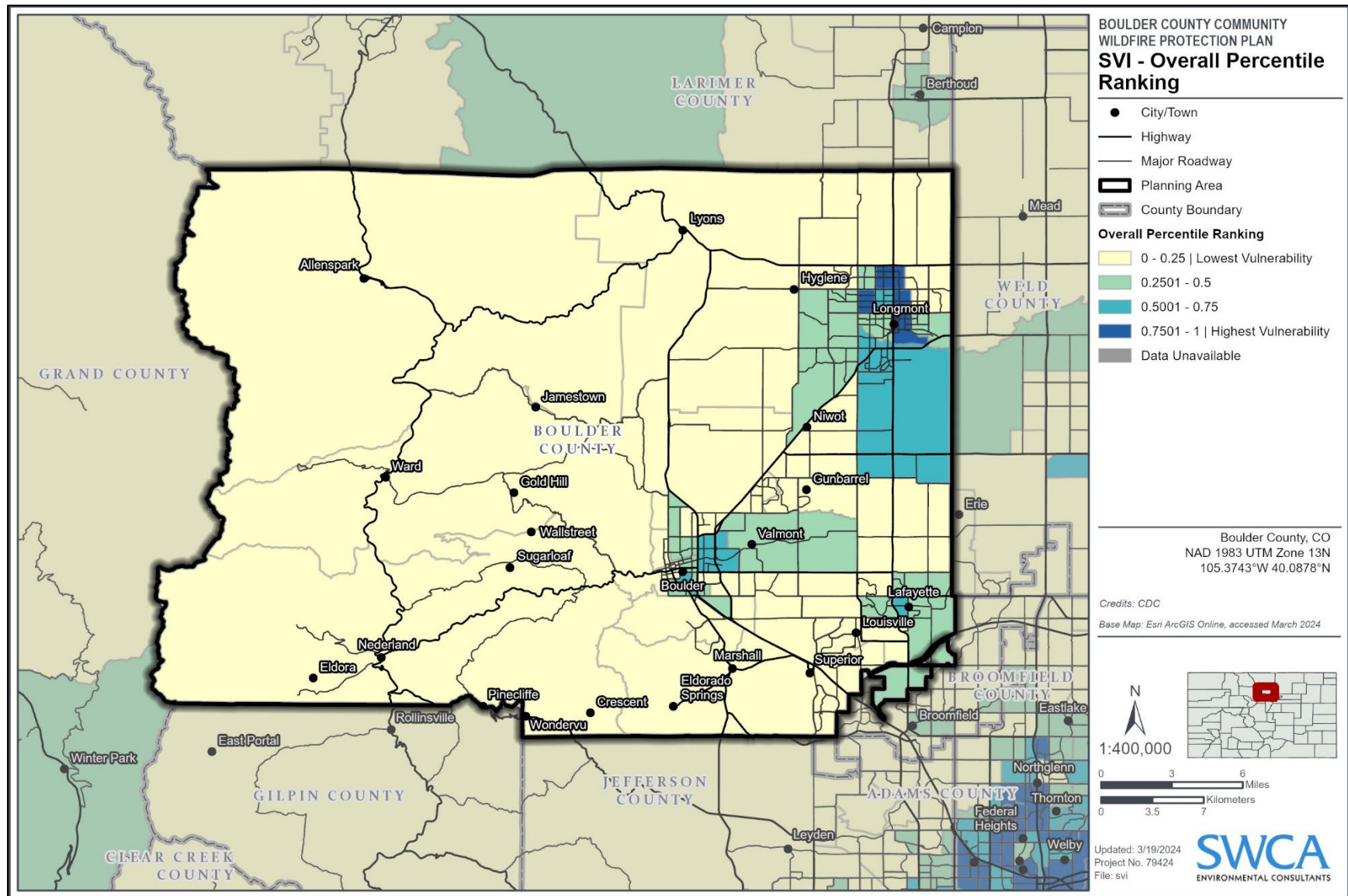


Figure A.4. Overall SVI percentile ranking for the planning area.

Source: CDC (2023).

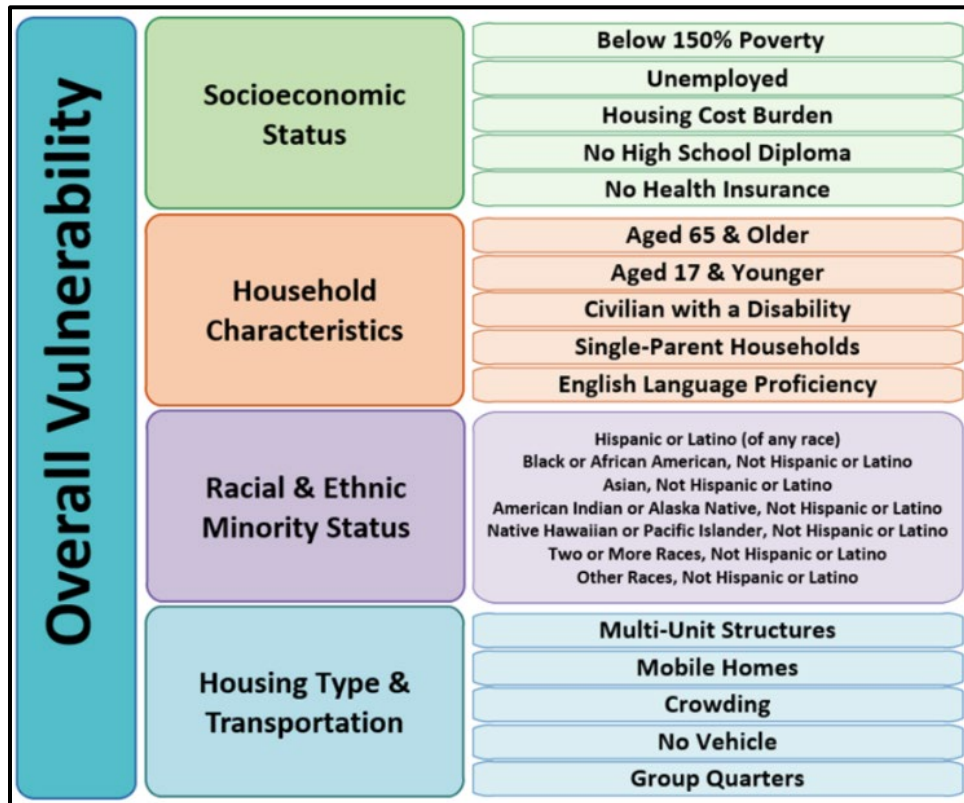


Figure A.5. Flowchart describing CDC/ATSDR indicators of social vulnerability.

Source: CDC (2023).

Socially vulnerable populations were considered while drafting this plan through public engagement and outreach; however, this CWPP does not attempt to identify all socially vulnerable populations in the planning area. Figures A.6 through A.8 shows a range of demographic data collected through the CWPP survey. For more results and background information on the Boulder County CWPP Survey, please see Appendix G. Additional information on how wildfire may affect socially vulnerable populations can be found at Wildfire Risk to Communities here: <https://wildfirerisk.org/>.

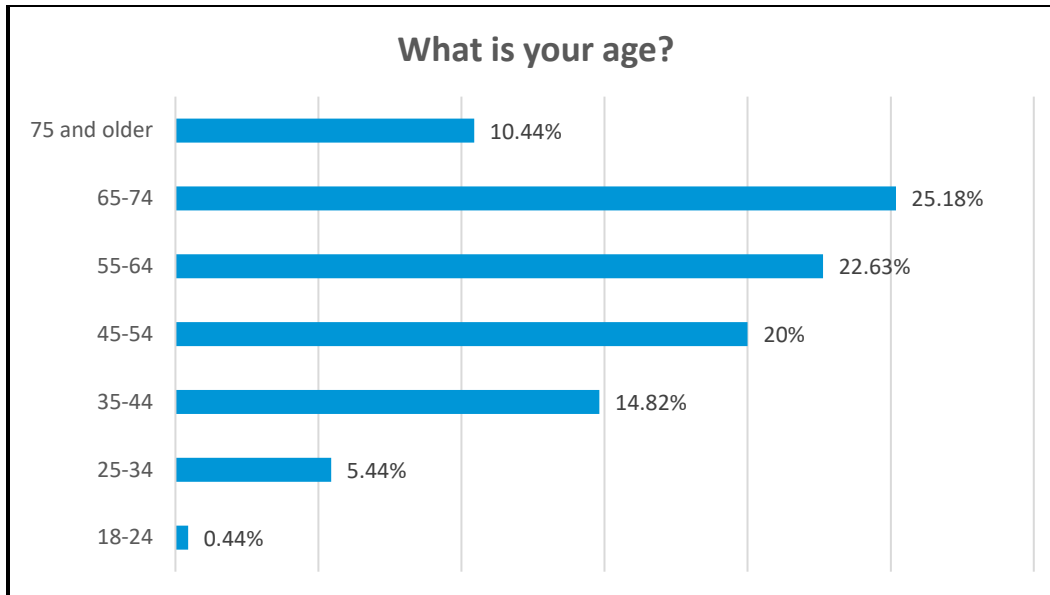


Figure A.6. Community survey response summary to the question “What is your age?”.

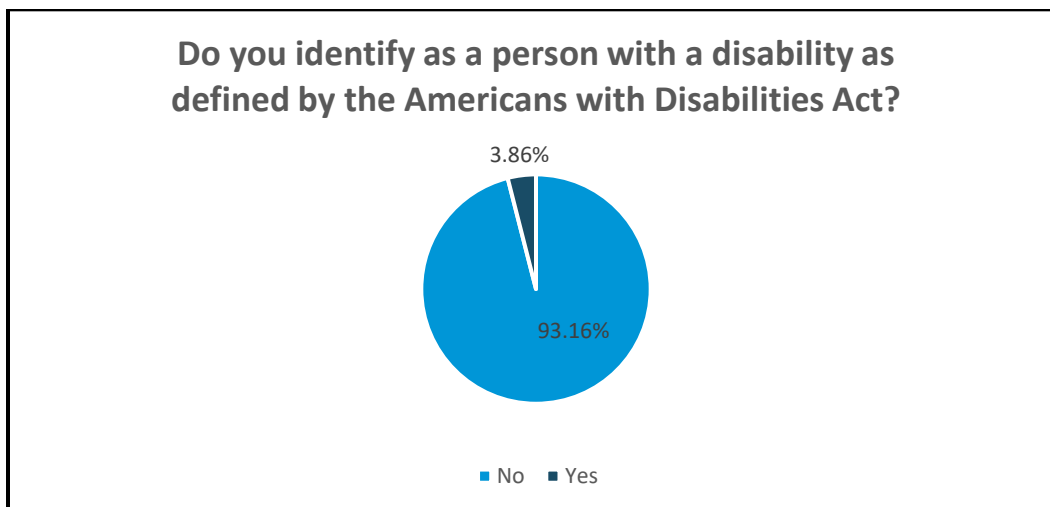


Figure A.7. Community survey response summary to the question “Do you identify as a person with a disability as defined by the Americans with Disabilities Act?”.

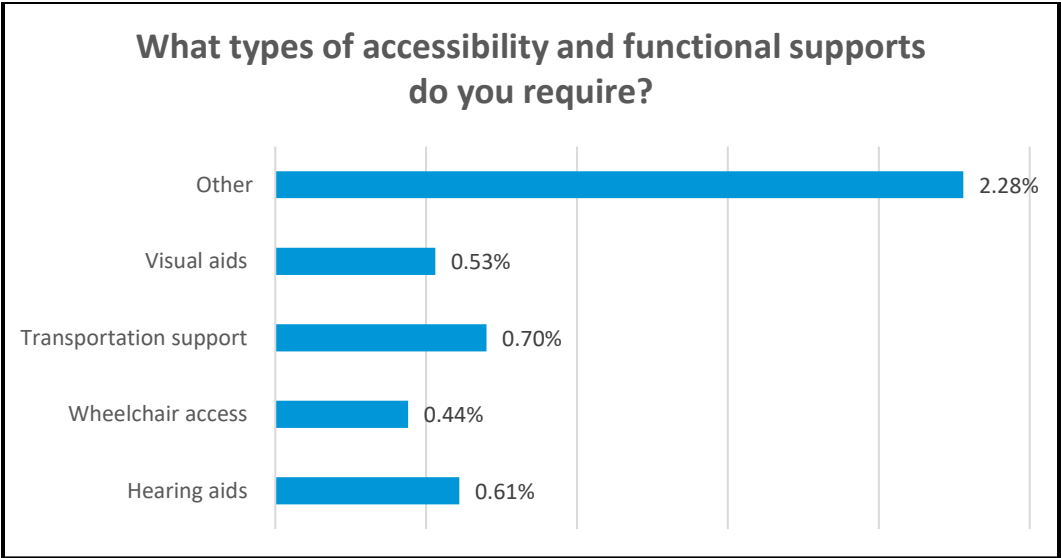


Figure A.8. Community survey response summary to the question “What types of accessibility and functional supports do you require?”. Percentages represent the percentage of all survey respondents under each functional supports category.

Poverty percentages are derived from the 2020 federal 150% poverty level determinations for the contiguous United States. Table A.2 shows the 150% federal poverty levels per household size.

Table A.2. 2020 Poverty Guidelines for CDC/ATSDR Social Vulnerability Indicators

Household Size	2020 150% Federal Poverty Line (dollars)
1	19,140
2	25,860
3	32,580
4	39,300
5	46,020
6	52,740
7	59,460
8	66,180
9	72,900
10	79,620

Supporting Socially Vulnerable Populations

Boulder County and other regional leaders must reach out to socially vulnerable populations to increase trust and build sustainable relationships with community stakeholders and cultural brokers. Cultural brokers are individuals who are considered bridges, connectors, or mediators between groups or people with different cultural contexts for the purpose of reducing conflict or producing change (Jezewski 1990).

Once introduced to members of a socially vulnerable community by cultural brokers, county efforts to gain trust and momentum would include:

- Hosting outreach and education events in locations preferred or identified by groups such as older adults and seniors, people with disabilities, Latino and other bilingual populations, and communities with fewer economic resources.
- Partnering with nongovernmental groups such as the local watershed groups (The Watershed Center and Boulder Watershed Collective), the Boulder County Fireshed, and local municipalities to form local focus groups and co-lead discussions with resident and community leaders.
- Soliciting input and feedback from the residents within the community regarding their wildland fire needs, concerns, and challenges (what types of programs related to wildfire safety, mitigation, response, etc., would the residents find helpful).
- Partner with the outreach and education staff of our respective agencies to craft messages more likely to reach populations who are impacted by catastrophic wildfire, but less directly (e.g., air and water quality, critical infrastructure).
- Align with other programs that focus on community safety. The county will draw upon existing relationships that our colleagues in the county (e.g., fire protection districts, Wildfire Partners, long-term recovery committees, Boulder County Parks and Open Space, local watershed groups, and other local partners) have already established.

The Core Team understands that input into the CWPP affects wildfire mitigation project prioritization and grant funding decisions across the county. Therefore, it is crucial to ensure the voices and concerns of socially vulnerable communities are included and prioritized.

ENVIRONMENTAL CHALLENGES

DROUGHT AND CLIMATE

Frequent drought, tree mortality, and climate change have all coincided to increase the likelihood of wildfire and community vulnerability in Colorado (CSFS 2020). These factors have also led to an increase in the risk of uncharacteristically large and high-severity fires occurring (CSFS 2020). In recent years, fires have grown to record sizes in Colorado and are burning longer, hotter, and more intensely than they have in the past (CSFS 2021a). According to the National Interagency Fire Center (NIFC), the occurrence of catastrophic wildfires in the western United States has greatly increased over the last 20 years. Westerling (2016) found that the frequency of large wildfires (greater than 1,000 acres) has been increasing with each decade since 1970.

Elevated seasonal temperatures, as shown in Figure A.9, contribute to drier conditions, reducing soil moisture and increasing the likelihood of vegetation drying out. This prolonged dryness, combined with hot temperatures, creates an environment conducive for the ignition and rapid spread of wildfires.

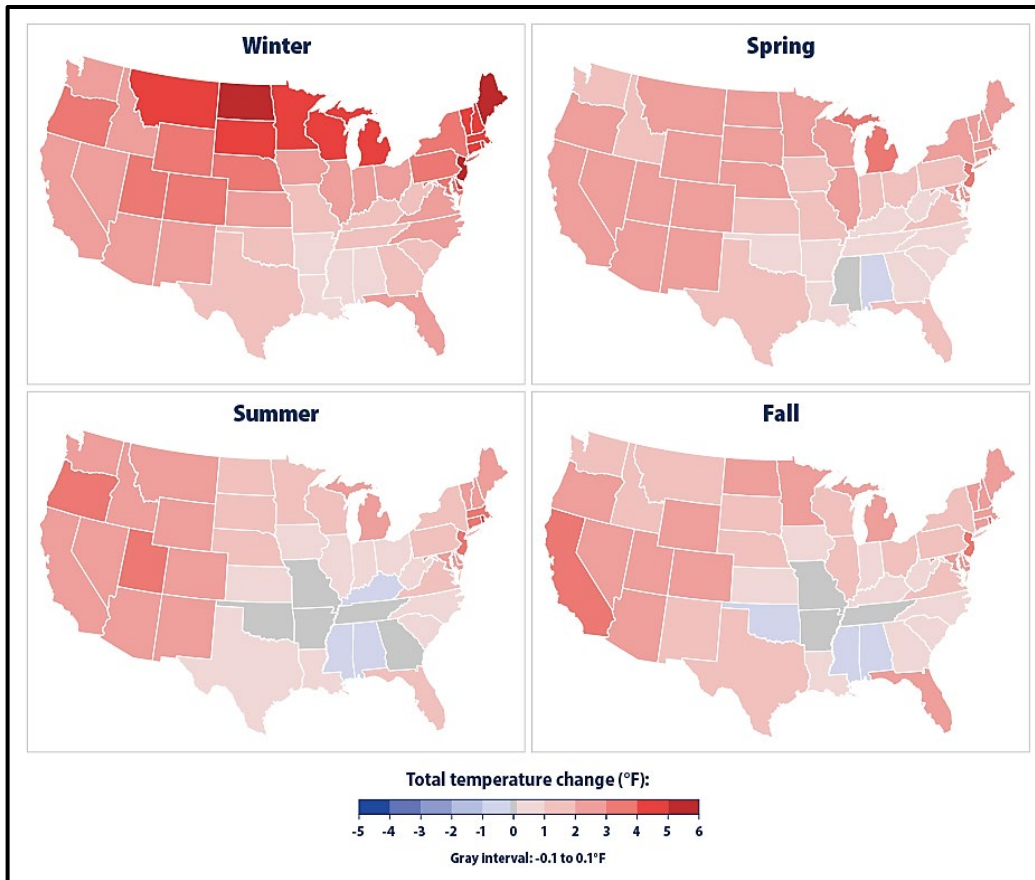


Figure A.9. Graphs showing the change in seasonal temperatures by state from 1896 to 2021.

Source: NOAA (2022b)

The shifting climate, particularly rising temperatures, changing wind patterns, and increasing temporal and spatial variability of water availability, is causing a notable escalation in wildfire risk across the state. Since 1990, mean annual temperatures in Colorado have increased by 2°F. Climate change projections predict that these trends will continue and possibly accelerate, depending on CO₂ emission outcomes. By the mid-twenty-first century, Colorado is expected to have 40 fewer days when the temperature in the high-elevation areas drops below 32°F (CSFS 2020). As the frequency and length of intense heatwaves (Figure A.10) rises, the likelihood of droughts occurring and/or worsening increases, in turn, reducing water availability, influencing vegetation patterns, and creating a conducive environment for wildfire (Center for Climate and Energy Solutions 2023).

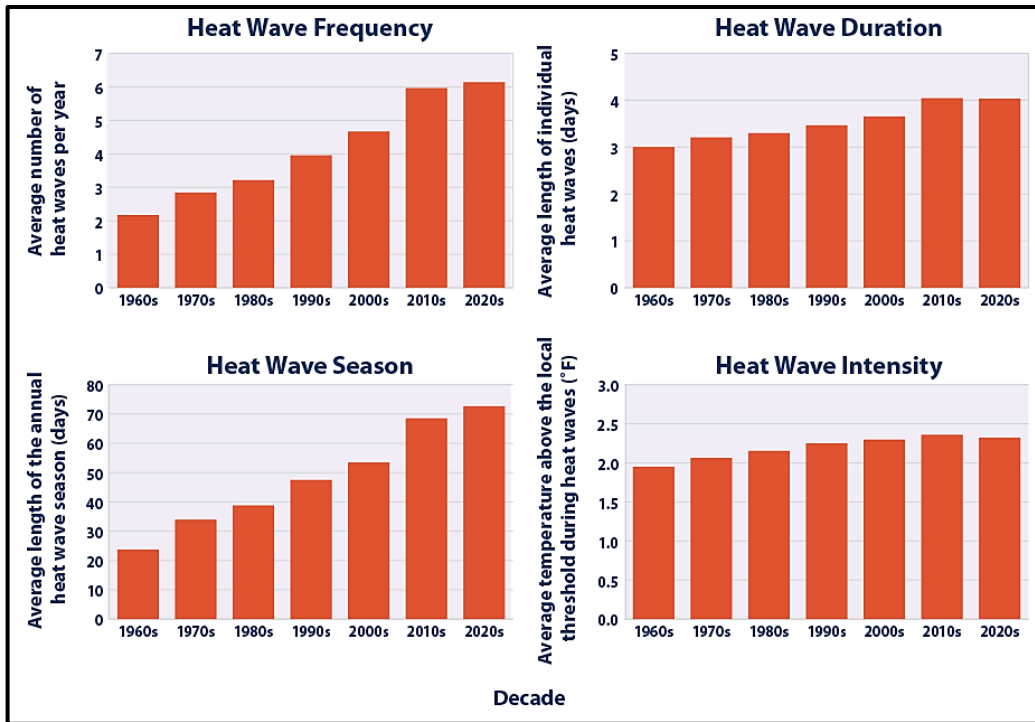


Figure A.10. Graphs showing the change in heat wave characteristics by decade from 1960 to 2020.

Source: NOAA (2022b)

Based on NOAA data from 1984 to 2020, wildfires in Colorado burned an additional 2 acres per square mile in 2020 compared to the acreage burned in 1984 (Figure A.11). The National Climate Assessment estimates that by mid-twenty-first century, most areas will have 20 to 30 more days with above 90°F temperatures (National Climate Assessment [NCA] 2023). Taken together, these impacts mean smaller and more ephemeral winter and spring snowpacks, longer and warmer growing seasons (i.e., longer and more hazardous fire seasons), increased drought stress on forests and rangelands.

It is important to note that fire is a natural part of Colorado's diverse landscapes and is essential to many ecosystems across the state. Almost all of Colorado's diverse ecosystems are fire-dependent or fire-adapted (CSFS 2020). Wildfire, when not directly or indirectly intensified by human actions, works to balance ecosystems, and restore their natural functions. Rises in unnatural and unintentional ignitions coupled with disruptions to the regions established vegetative and ecological relationship with fire can lead to frequent, uncharacteristically large, high-severity wildfires (CSFS 2020).

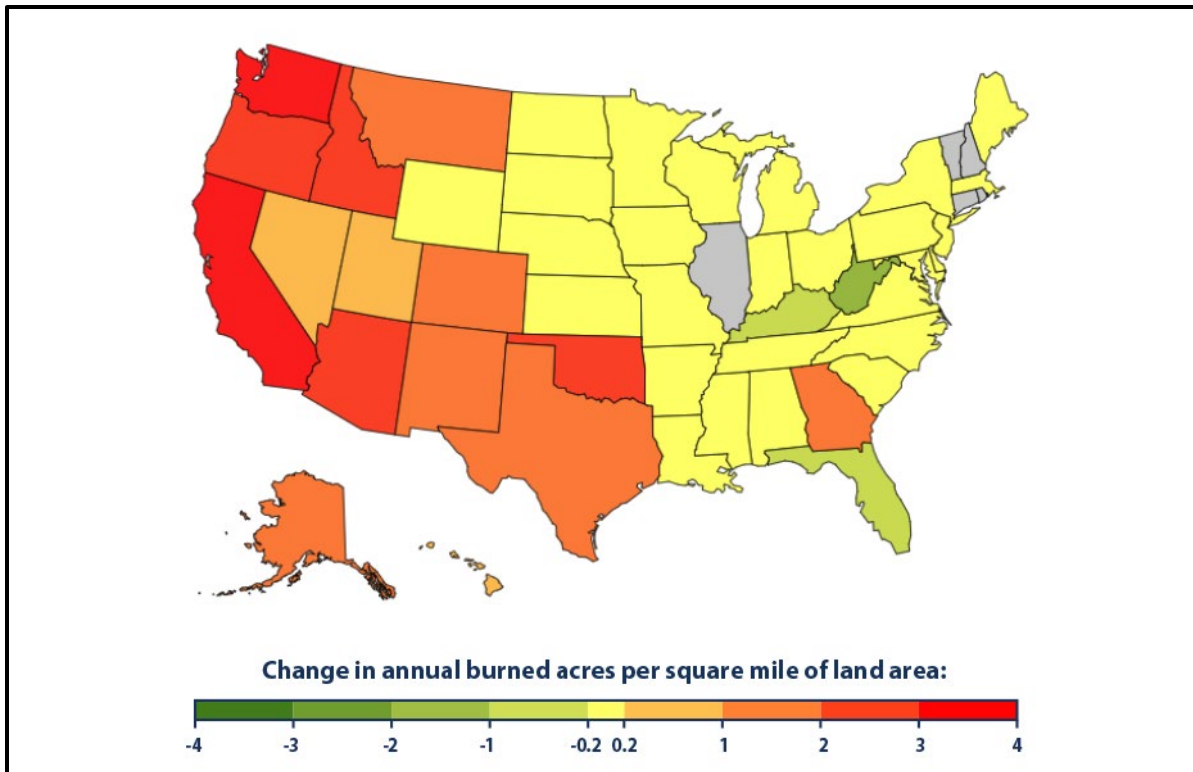


Figure A.11. A map showing the change in annual acres burned per square mile due to wildfire from 1984 to 2020.

Source: NOAA (2022b)

WIND

The extended wildfire season, influenced by warmer temperatures associated with climate change, also contributes to the heightened risk posed by wind. Altered atmospheric circulation patterns, driven by climate change, affect wind directions and speeds resulting in shifts in the distribution and behavior of wildfires (Abell et al. 2021). Prolonged periods of conditions favorable for wildfires, including dry vegetation and strong winds, increase the window of vulnerability.

Strong winds, carrying embers over long distances, can ignite new fires ahead of the primary fire front, making containment efforts more challenging (NWCG n.d.). Boulder County experiences a complex interplay of meteorological factors impacting the severity of wildfires. The western side of Boulder bears the brunt of wildfire's rapid spread, primarily influenced by the occurrence of strong downslope winds, also called foehn winds, descending from the eastern slope of the Front Range (U.S. Department of Commerce n.d.).

Foehn winds, a warm and dry wind along the downslope of a mountain range, play a crucial role in the fire's behavior and have contributed to several high-intensity wildfires in the Boulder area (Dougherty and Johnson 2023). As foehn winds descend from the eastern slope of the Front Range, they gain momentum as they reach the grassland-mountain transition zone and become increasingly dry, creating conditions conducive to the rapid spread of wildfires (Fovell et al. 2022). The warming effect of foehn winds further dry vegetation, increasing their susceptibility to ignition.

The wind dynamics, characterized by cross-barrier flow, with winds hitting the Continental Divide directly from the west, can set the stage for a mountain wave (Stein 2021). Mountain waves occur when air encounters a barrier, such as a mountain range. The Front Range can act as a barrier, causing air to be forced upward. However, the presence of a stable layer of air near the mountaintops, known as an inversion, can impede the upward movement of the air, resulting in a wave-like motion (Durrán 1990). This phenomenon, illustrated in Figure A.12, contributed to the formation and intensification of the mountain wave, leading to unprecedented wind speeds exceeding 100 mph during the Marshall Fire in 2021 (Stein 2021).

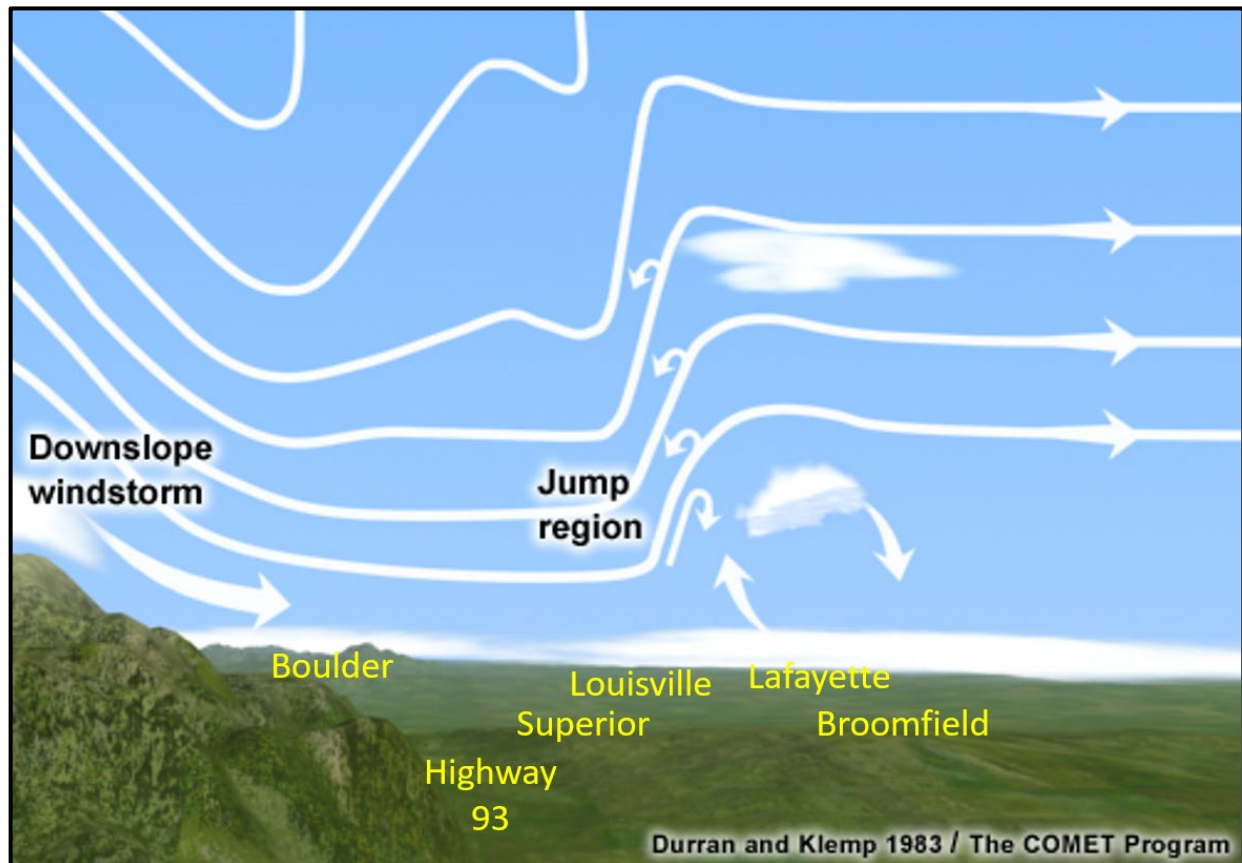


Figure A.12. Illustration of the extreme wind caused by mountain waves that develop as very strong westerly winds accelerate down the Front Range and foothills to the flatter low county. Wind disperses east into the Superior and Louisville area before quickly weakening (jump region) in the east.

Source: U.S. Department of Commerce (n.d.).

FOREST HEALTH

Boulder County is home to many species of deciduous and coniferous trees spread throughout an urban and wildland environment. Both native and non-native species can be found throughout the planning area. This presents unique challenges for land managers and urban foresters who must contend with a multitude of native and introduced insects and diseases (Table A.3).

Table A.3. Major Forest Pests and Diseases

Major Native Forest Pest Common Name	Scientific Name	Notes
Mountain pine beetle	<i>Dendroctonus ponderosae</i>	The mountain pine beetle infests all native pine species found in Colorado, with the exception of piñon (or pinyon) pines (<i>Pinus edulis</i>). This native bark beetle infested around 80% of Colorado's pine forests between 1996 and 2014. While not every tree within each acre of pine forest was affected, many of the largest and most susceptible ponderosa and lodgepole pines were depleted during this outbreak. The mountain pine beetle continues to thrive in weakened trees, particularly those stressed by recent droughts (CSFS 2024b).
Western balsam bark beetle	<i>Dryocoetes confusus</i>	In high-elevation forests, there is a growing trend of subalpine fir (<i>Abies lasiocarpa</i>) experiencing a decline, marked by small clusters of trees turning red due to infestations by the western balsam bark beetle. In Colorado, subalpine fir often grows alongside Engelmann spruce (<i>Picea engelmannii</i>) and becomes more vulnerable to bark beetle infestation and decline, particularly during extended periods of drought (CSFS 2021a).
Western spruce budworm	<i>Choristoneura freemani</i>	The western spruce budworm primarily affects Douglas-fir, true fir, and Engelmann spruce trees. This defoliator is prevalent across low-elevation mixed-conifer forests and spruce-fir forests in Colorado. In 2021, a cooler, wet spring followed by an active monsoon in 2022 subdued its activity towards the end of the 2022 season. However, defoliation has seen a significant increase in 2023 despite a cooler start to the summer. Continuous years of budworm defoliation leave drought-stressed trees vulnerable to attack by Douglas-fir and other bark beetles. (CSFS 2024b).
Douglas-fir tussock moth	<i>Orgyia pseudotsugata</i>	The Douglas-fir tussock moth (DFTM) is a significant defoliator of spruce, Douglas-fir, and true firs. Outbreaks can cause extensive defoliation and may weaken trees, making them susceptible to bark beetles and fungi. Effective management includes surveying for egg masses, using insecticides, and relying on natural predators and a virus (e.g., "wilt disease") in the caterpillars (CSU 2020).
Spruce beetle	<i>Dendroctonus rufipennis</i>	The spruce beetle primarily targets Engelmann spruce but can infest other spruce species. Epidemic conditions arise when beetle populations, typically feeding on downed trees, shift to live trees after disturbances. Effective management strategies include forest health maintenance, preventive insecticide sprays, solar treatments, and trap trees. Proactive forest management is essential in mitigating the ecological and economic impacts of spruce beetle outbreaks (CSFS 2014).

Major Non-Native Forest Pest Common Name	Scientific Name	Notes
Emerald ash borer (EAB)	<i>Agilus planipennis</i>	EAB is an insect native to Asia, believed to have been introduced into North America during the 1990s, likely via ash wood pallets or packing material. Since its initial discovery in southeastern Michigan in 2002, this invasive insect has caused widespread devastation, resulting in the death of millions of ash trees (<i>Fraxinus</i> spp.) across central and northeastern United States and Canada. In Colorado, the first infestation of EAB was detected in the City of Boulder in September 2013 and fully infested by 2015 (CSFS 2021a).
Cottonwood canker	<i>Cytospora chrysosperma</i>	Cottonwood canker is caused by various species of <i>Cytospora</i> fungi. Cottonwood canker primarily affects woody shrubs and trees, particularly those under stress (CSFS 2019a).
Major Forest Diseases Common Name	Scientific Name	Notes
Dwarf mistletoes	<i>Arceuthobium</i> spp.	Dwarf mistletoe, a parasitic plant prevalent in Colorado's forests, comprises forty-two known species worldwide, with five species specifically found within the state. Primarily native to western North America, including Alaska, the western United States, Mexico, and Central America, dwarf mistletoes pose a significant threat to coniferous trees, particularly ponderosa (<i>Pinus ponderosa</i>) and lodgepole pines (<i>Pinus contorta</i>). Although they primarily target these species, dwarf mistletoes can also infect Douglas-fir (<i>Pseudotsuga menziesii</i>), piñon, limber (<i>Pinus flexilis</i>), and bristlecone pines (<i>Pinus</i> subsect. <i>Balfourianae</i>). These parasitic plants cause substantial damage by inhibiting growth, reducing seed production, and compromising wood quality, with severe, prolonged infections capable of tree mortality (CSFS 2024c).
Root disease fungi	<i>Armillaria</i> spp.	Armillaria species, also known as root disease fungi, impact roots primarily through a process called root rot. These fungi infect the roots of various host plants, causing decay and deterioration. Once established, Armillaria fungi can weaken and eventually kill the roots, compromising the plant's ability to absorb water and nutrients from the soil. This root damage can lead to symptoms such as reduced vigor, stunted growth, yellowing or browning of foliage, and eventual death of the affected plant. Additionally, Armillaria fungi can form rhizomorphs, specialized structures that spread the infection to nearby healthy roots and plants, further exacerbating the damage (Forest Pathology 2024).
Comandra blister rust	<i>Cronartium comandrae</i>	Comandra blister rust, caused by <i>Cronartium comandrae</i> , is a significant canker disease affecting lodgepole pine within the Central Rocky Mountains. This rust disease often leads to stem deformities and growth reduction, with frequent occurrences of stem girdling and top-kill (USFS 2011).
White pine blister rust	<i>Cronartium ribicola</i>	White pine blister rust is caused by an invasive fungus that significantly affect North American white pines at high elevation. This pathogen impacts the regeneration process, reduces cone and seed production, and alters ecosystem dynamics, potentially leading to more homogeneous forests and changes in fire regimes (USFS n.d.).

Aquatic Nuisance Species (ANS) such as zebra mussels (*Dreissena polymorpha*), Quagga mussel (*Dreissena bugensis*), Eurasian watermilfoil (*Myriophyllum spicatum* L.), Asian carp (*Cyprinidae* spp.), New Zealand mudsnail (*Potamopyrgus antipodarum*), and the rusty crayfish (*Faxonius rusticus*), are also

prevalent throughout Colorado's waterways (Colorado Parks and Wildlife 2020). To prevent their spread, it is recommended that response personnel clean fire response apparatus and take several precautions when utilizing water delivery systems.

THREATENED AND ENDANGERED SPECIES

Table A.4 lists the threatened and endangered species within Boulder County. Additional information on Boulder County species of special concern and environmental resources can be found in the Boulder County Comprehensive Plan Environmental Resources Element. Goals, policies, and maps in this plan can be found here: <https://bouldercounty.gov/property-and-land/land-use/planning/boulder-county-comprehensive-plan/update/environmental-resources-element/>.

Table A.4. Federally and State-Listed Threatened and Endangered Species within Boulder County

Common Name	Scientific Name	Status
Mammals		
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	Threatened
Tricolor bat	<i>Perimyotis subflavus</i>	Proposed Endangered
Birds		
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened
Piping plover	<i>Charadrius melodus</i>	Threatened
Whooping crane	<i>Grus americana</i>	Endangered
Eastern black rail	<i>Laterallus jamaicensis</i> ssp. <i>jamaicensis</i>	Threatened
Fish		
Greenback cutthroat trout	<i>Oncorhynchus clarkii stomias</i>	Threatened
Pallid sturgeon	<i>Scaphirhynchus albus</i>	Endangered
Bonytail	<i>Gila elegans</i>	Endangered
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Humpback chub	<i>Gila cypha</i>	Threatened
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered
Insects		
Monarch butterfly	<i>Danaus plexippus</i>	Candidate for official listing
Flowering Plants		
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened
Western prairie fringed orchid	<i>Platanthera praeclara</i>	Threatened

Source: USFWS (2023).

Recommendations for fuel treatments should be developed following all wildlife and bird best management practices to ensure protection of critical wildlife habitat (i.e., elk and deer calving areas, wetlands and streambanks, nesting, and migratory bird seasons, etc.). Treatment approaches should be aligned with actions that provide for habitat enhancement for threatened and endangered species. Refer

to guidance from local, regional, or state natural resource agencies before conducting fuel treatments, during active fire response, and during post-fire recovery efforts.

SOURCE WATER PROTECTION AREAS

Watersheds are areas of land that drain water, sediment, and dissolved materials into common waterbodies, connecting landscapes, ecosystems, and societies. Their health is crucial for both nature and human prosperity (EPA 2022). Key components include headwater streams, wetlands, floodplains, riparian corridors, biotic refugia, instream habitat, biotic communities, and riparian vegetation. Healthy watersheds provide essential ecosystem services like clean and reliable drinking water supplies, recreation opportunities, habitat, flood protection, and increased property values (EPA 2022). Wildfires can significantly impact watershed health, especially when they are large and severe. Native land cover, sediment transport, stream flows, and aquatic habitat can be dramatically altered, which may result in impacts to watershed health and water quality (Wildfire Ready Watersheds 2023) (Figure A.13).

Boulder County's largest municipality, the City of Boulder, has source water protection areas within the County, along with other municipalities and unincorporated areas. For the City of Boulder, the primary zones of protection within the County include the Barker Reservoir Watershed and upper North Boulder Creek watershed (i.e., area west of Nederland), as well as the Boulder Reservoir Watershed (City of Boulder 2023).

Several projects proposed by Boulder County in the 2011 Boulder County CWPP center on the issue of post-wildfire impacts to watershed systems (see Table 1.2). Effort has been taken to incorporate critical water resource concerns and priority areas in fuel reduction project rankings to effectively allocate pre-fire mitigation measures (Boulder County 2011). A few of the key post-fire impacts to water supplies include increased sediment transport (reducing water storage, increasing nutrient and metal concentrations), related algal growth and taste and odor issues in drinking water, and overall increased water treatment costs (Boulder County 2011; City of Boulder 2023). Pre-fire fuel reduction efforts can mitigate these impacts by reducing the intensity and burned area in priority watershed stretches.

To address these concerns, the County's watershed partners will continue implementing forest health projects to minimize post-fire impacts to water supplies. To help accomplish this, the Boulder Watershed Collective uses the Wildfire Erosion and Sediment Transportation Tool (WESTT) developed for the City of Boulder by the Colorado Forest Restoration Institute to identify areas that are susceptible to enhanced post-fire erosion into water systems following a severe wildfire.

Explore the story map below to learn more about "proactive planning for wildfire and flood sediment in the North, Middle, and South Boulder Creek Watersheds" (Jagt 2020):

<https://storymaps.arcgis.com/stories/a76eaa904aaa4c0f87fee151d36794c>



Figure A.13. Surface erosion example in Boulder County.

VALUES EXPOSED TO WILDFIRE

Earlier compilation of the critical infrastructure in the planning area, coupled with public outreach and Core Team input, has helped in the development of a list of community values exposed to wildland fire. These data are also supplemented with the COAL HVRA data explained in Chapter 3. The public was encouraged to provide additional community values exposed to wildfire during public meetings and within the public survey for the project.

Community values include natural, cultural, and socioeconomic values (see Figures A.14–A.19). It is important to note that although an identification of community values can inform treatment recommendations, a number of factors must be considered in order to fully prioritize areas for treatment; these factors include treatment type, land ownership constraints, locations of ongoing projects, available resources, and other physical, social, or ecological barriers to treatment.

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

NATURAL COMMUNITY VALUES

An in-depth outline of Boulder County's critical natural resources can be found within the Boulder County Comprehensive Plan's Environmental Resources Element. The Element describes and outlines the significance of Critical Wildlife Areas, Rare Plant Areas, Wetlands, Riparian Areas, Significant Natural Communities, High Biodiversity Areas, and Environmental Conservation Areas. This living document offers detailed information and is periodically updated to reflect new knowledge and changes in environmental condition (Boulder County 2020).

The CWPP planning area has a variety of natural values of particular concern to land managers (Figure A.14). Examples of natural values identified by the public and the Core Team include the following:

- Local parks, open spaces, natural areas
- Arapaho National Forest
- Trail systems
- Agricultural land and preserves
- Watersheds and water resources
- Scenic viewsheds
- Critical habitat for wildlife
- Reservoirs, creeks, lakes, and other water (Figure A.15)

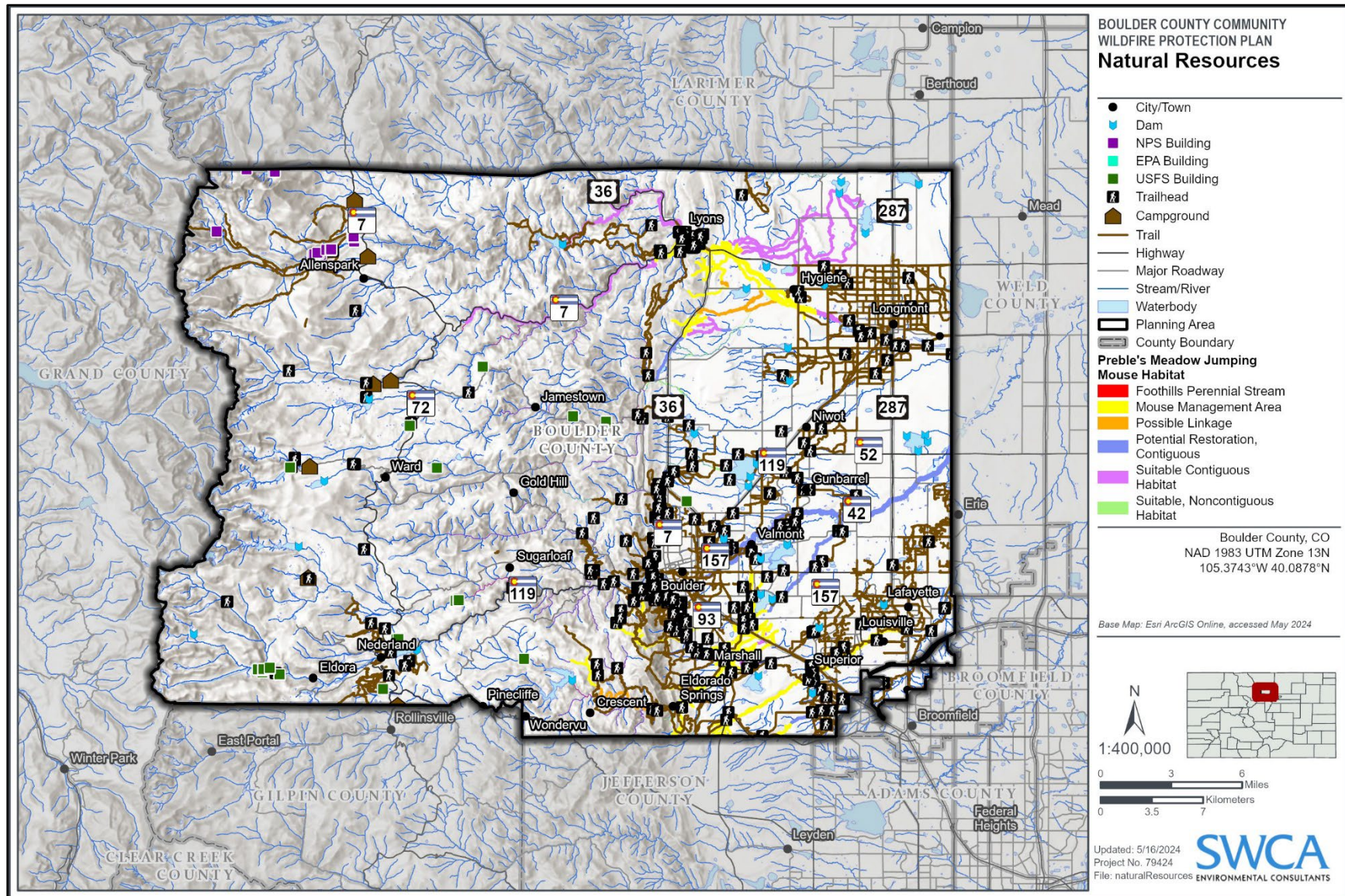


Figure A.14. A map of natural community values in and around the planning area.



Figure A.15. Example of a natural community value in the planning area, a waterbody.

SOCIOECONOMIC COMMUNITY VALUES

Socioeconomic values include population, recreation, infrastructure, and the built environment (Figure A.16). Examples include the following:

- Communications infrastructure (e.g., cell phone and radio towers)
- Tourism values (e.g., restaurants, recreational facilities, rental houses/cabins)
- Schools
- Public safety infrastructure
- Public works
- Highways
- Grocery and hardware stores
- Churches
- Care homes, senior housing, day care, and other group homes
- Water storage (Figure A.17)
- Recreation sites (e.g., trails, parks)
- Hospitals

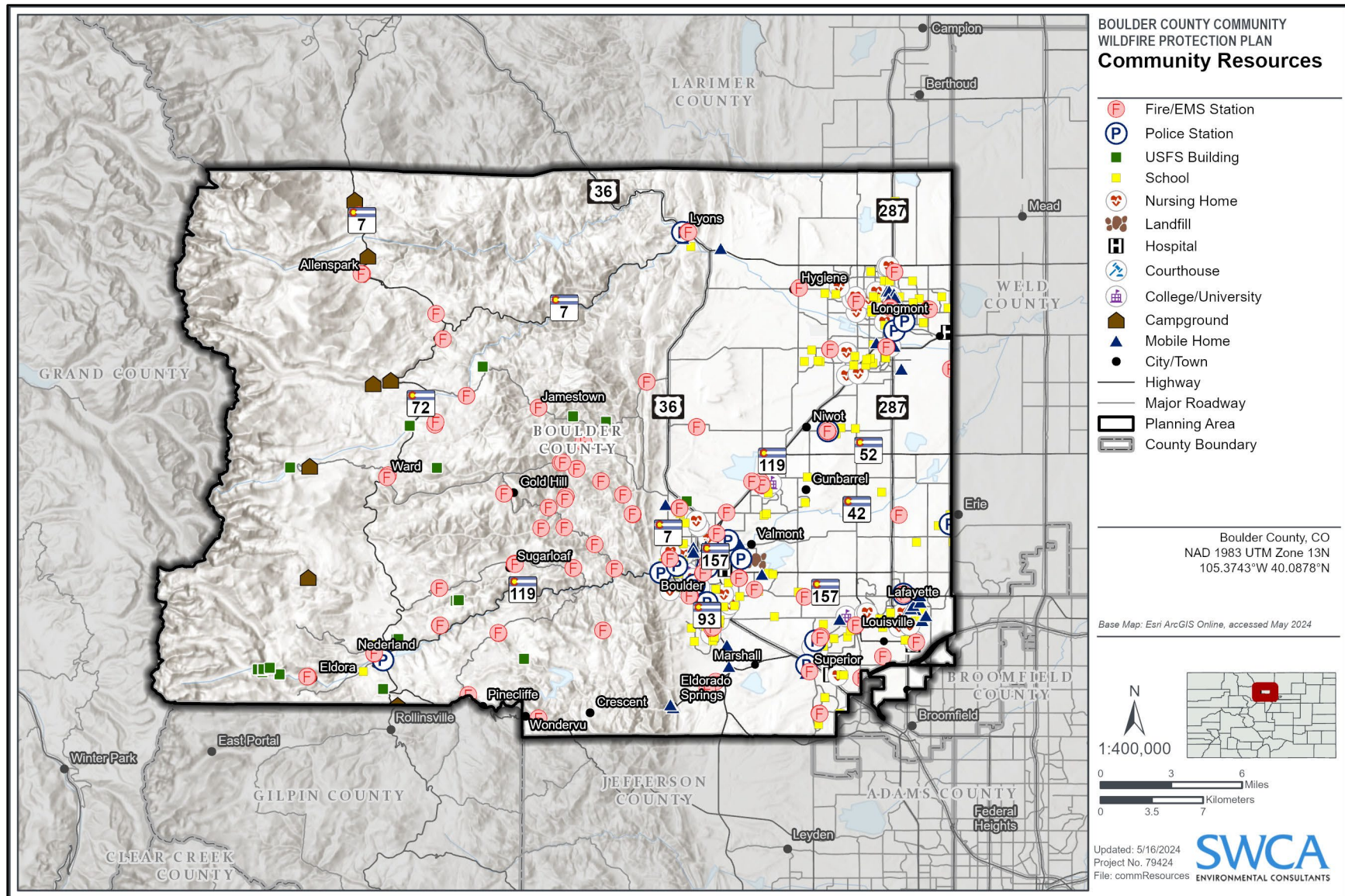


Figure A.16. A map of socioeconomic community values in and around the planning area.

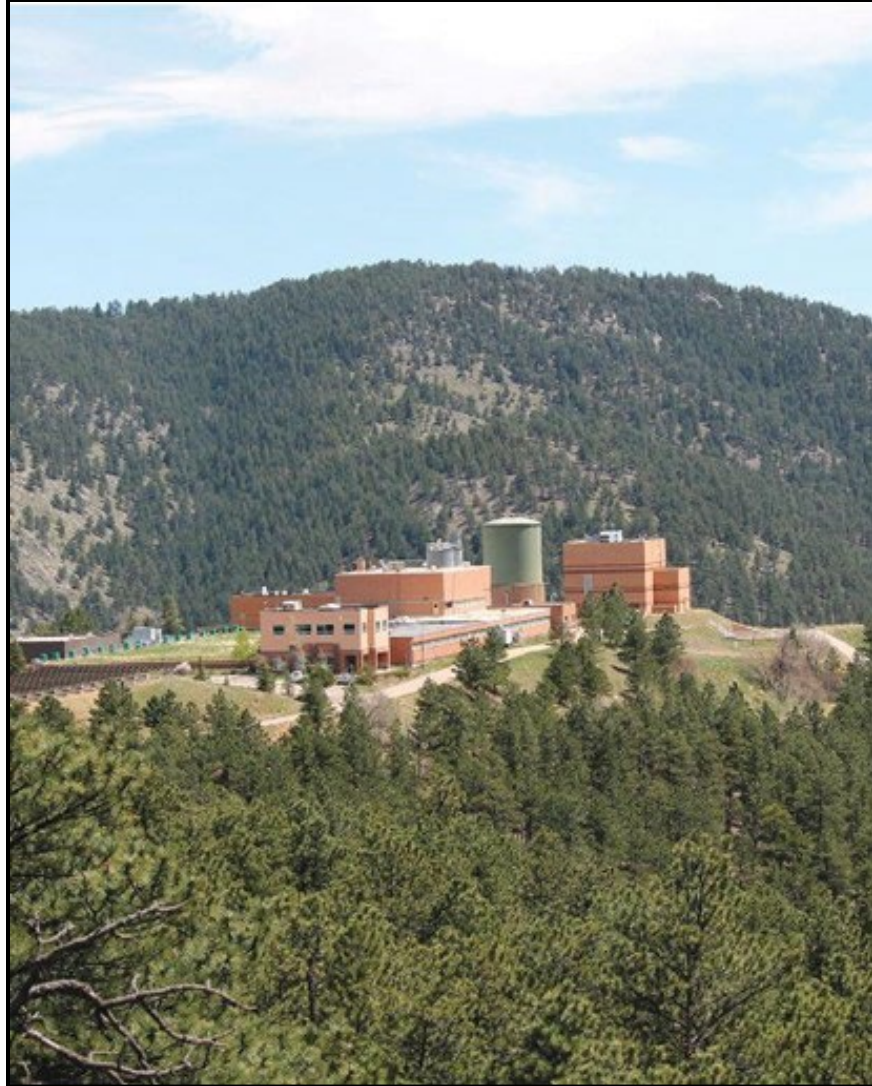


Figure A.17. Example of a socioeconomic value at risk, Betasso Water Treatment Plant, City of Boulder’s primary water treatment plant (Boulder County n.d.).

CULTURAL COMMUNITY VALUES

Many historical landmarks are scattered throughout the planning area (Figure A.18). The following cultural community values have been identified by the Core Team and the public in the CWPP planning area:

- Significant Indigenous heritage sites
- Theatres and music venues
- Chautauqua Park (Figure A.19)
- Arnett-Fullen House
- Walker Ranch Historic District
- Boulder Creek Bridge
- Hannah Barker House
- Squires-Tourtellot House
- Historic Valmont School House 1911
- Fort Chambers/Boulder County Poor Farm
- Museums, galleries, public art, and murals
- Cemeteries
- Flagstaff Memorial
- Veterans Memorial Park
- Peace Memorial Bridge
- Steve Canyon Statue
- Lazy T Ranch
- Carnegie Library
- Hotel Boulderado
- Norlin Quadrangle Historic District
- Places of worship
- Saint Catherine's Chapel on the Rock
- McKenzie Well
- Significant Indigenous Heritage sites
- City of Longmont St. Vrain memorial Building
- Longmont Memorial Rose Garden
- Mountain View Memorial Park
- Fallen Firefighter's Memorial Park
- Heather McRoberts Memorial Park
- Dacono Memorial
- Boulder Historic Preservation
- University of Colorado
- Town of Superior Grasso Park

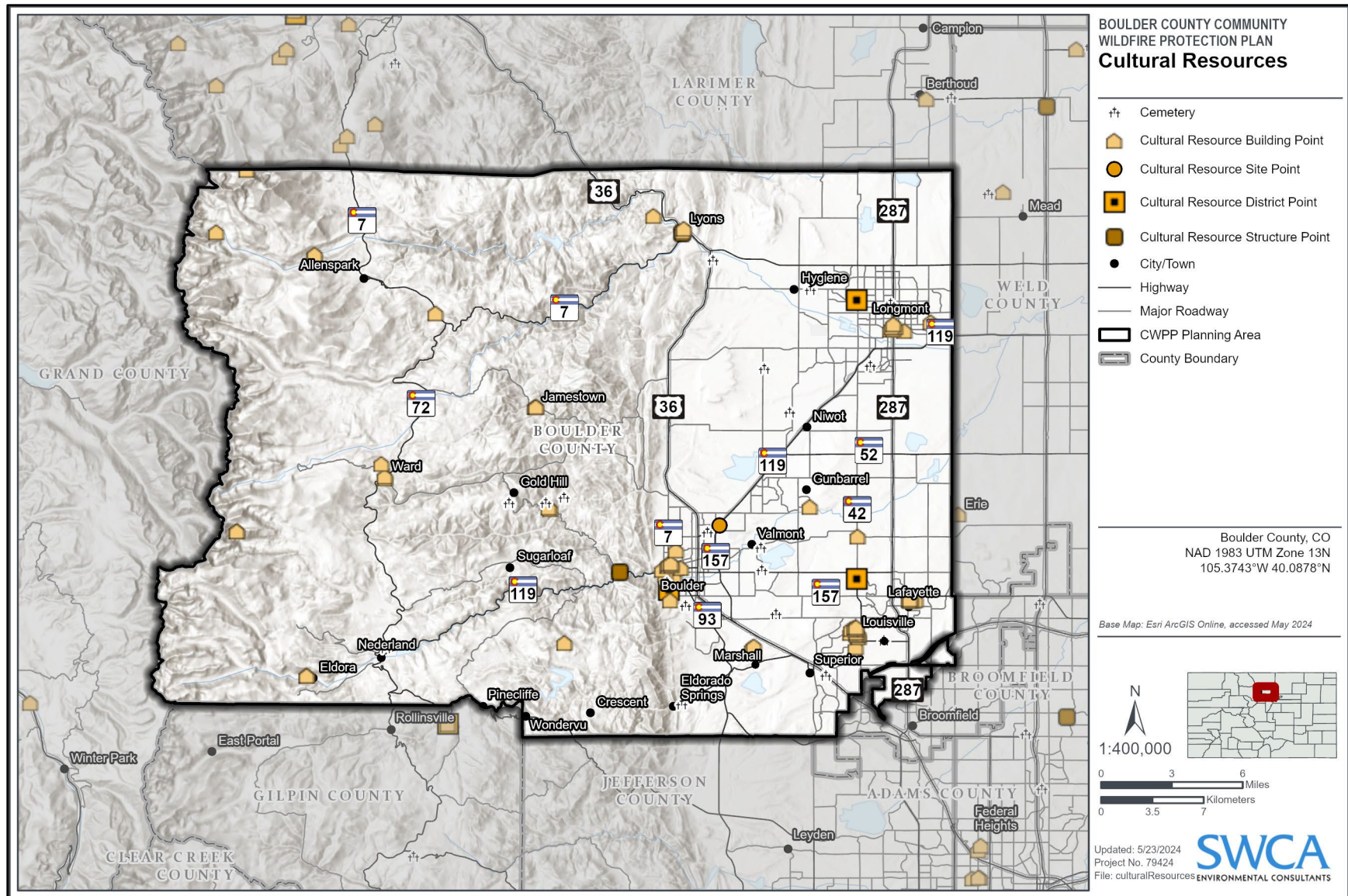


Figure A.18. A map of cultural and historic community values in and around the planning area.



Figure A.19. Example of a cultural value at risk, the Altona Schoolhouse.

Source: Boulder County (n.d.).

PUBLIC EDUCATION AND PREPAREDNESS RESOURCES

Public education and outreach programs are a common factor in virtually every jurisdiction involved with wildfire response. The emphasis of shared responsibility in wildfire preparedness and mitigation is permeating wildfire mitigation programs across all scales. Boulder County emphasizes that the region is “highly prone to potentially catastrophic events such as wildfires”, underscoring the importance of preparation for a swift and effective response (Boulder County 2024a). Education and engagement play a pivotal role in Boulder County’s approach to facilitating greater community safety and resilience to disasters and other emergencies.

COUNTY PROGRAMS AND RESOURCES

Boulder County Wildfire Partners

Boulder County Wildfire Partners encompasses a range of public education and wildfire mitigation initiatives, aiming to enhance community safety across Boulder County. Community Mitigation Planning sessions, including virtual information sessions and Q&A sessions, engage residents in developing and implementing long-term risk reduction strategies tailored to their communities (Wildfire Partners 2024). The expansion of outreach efforts to the eastern portion of the county highlights their commitment to extending valuable wildfire mitigation services to all residents, fostering resilience countywide. The program’s success is evident through significant community engagement, with numerous applications and chipping events covering a wide range of homes across Boulder County (Boulder County 2023h). Moreover, the provision of individual home assessments and financial awards

underscores the program's dedication to empowering homeowners with the knowledge and resources to mitigate wildfire risks effectively. Through outreach events, educational presentations, and collaborations with local agencies, the Boulder Wildfire Partners continues to play a vital role in building resilient communities through education and mitigative programs (Boulder County 2023d).

To learn more about the Boulder County Wildfire Partners Program, please visit:

<https://wildfirepartners.org/about/>.

Boulder Office of Disaster Management

The Boulder ODM provides a webpage with numerous educational resources on disaster preparedness. From the main landing page, you will be able to find links to valuable emergency resources such as the Hazard Mitigation Plan, countywide evacuation map, and fire restrictions. The Boulder ODM encourages the public to stay informed about emergency alert systems and the plans in place for disaster response. You can sign up for the emergency notification system and find other useful resources here:

<https://boulderodm.gov/emergency-home/>.

Boulder County Office of Disaster Management Disaster Strong Preparedness Series

In an effort to increase community preparedness, Boulder ODM has created the Disaster Strong Preparedness Series, which consists of workshops and resources to increase the public's knowledge and skills related to disaster preparedness. The Disaster Strong Series workshops cover a variety of topics, including disaster preparedness basics, preparedness for access and functional needs, large animal preparedness, and train-the-trainer education. New topics are continually added to meet the needs of the community.

Resource documents can also be found at: <https://boulderodm.gov/preparedness/resource-library/>.

A list of upcoming workshops and events from ODM can be found at:

<https://boulderodm.gov/preparedness/events-workshops/>.

Boulder County Parks and Open Space

Boulder County Parks and Open Space maintains a webpage of educational services and resources provided by the department. This includes guides, brochures, and other educational resources about open space in the county, links to the CSU extension office page, and information on tours and educational programs. Also available are research reports with detailed information and studies on the ecology and ecosystems of Boulder County ranging from species-specific reports to disturbance response studies. Visit the Boulder County Parks and Open Space webpage to explore all the educational resources available: <https://bouldercounty.gov/open-space/education/>.

Boulder County Financial Resources

Multiple financial assistance programs are available from state and federal sources to aid homeowners in recovering from wildfire and other natural hazards. Visit the links below for additional information on eligibility and available assistance through each program.

Colorado Disaster Rebuild Programs: <https://cedproject.org/rebuild/>

State Housing Recovery Programs (HRP): <https://dlg.colorado.gov/housing-recovery-program>

FEMA Assistance for Residents & Businesses: Contact FEMA: 1-800-621-FEMA (3362) or 1-800-462-7585 (TTY) for the hearing and speech impaired.

Internal Revenue Service (IRS): <https://www.irs.gov/businesses/small-businesses-self-employed/faqs-for-disaster-victims#affectedtaxpayersandrecords>

Marshall Fire Recovery Resources: <https://bouldercounty.gov/disasters/wildfires/marshall/>

BOULDER WATERSHED COLLECTIVE

The Boulder Watershed Collective has been an important non-profit partner, providing community engagement, wildfire mitigation, as well as defensible space and home hardening education. These include fuel reduction projects in Devil's Thumb and Wonderland, in collaboration with climate initiatives, Boulder Fire-Rescue, and HOAs. The organization collaborates with communities, fire districts, and agency partners within the Boulder Creek Watershed to identify gaps and reduce wildfire risk at both community and landscape scales. Additionally, the Boulder Watershed Collective facilitates on-the-ground forest watershed mitigation and restoration projects, empowering individuals, and communities to play an active role in enhancing forest health and resilience.

For additional information regarding ongoing projects and future events please visit: <https://www.boulderwatershedcollective.com/events-1>.

THE WATERSHED CENTER

The Watershed Center plays a vital role in post-fire recovery in Boulder County, focusing on monitoring, restoration, and community engagement. Following significant wildfires like the Cal-Wood and Lefthand Canyon Fires, the organization conducted extensive post-fire monitoring to assess the impacts to watersheds. Their community science initiative, Fire Followers, mobilized volunteers to track vegetation recovery, providing valuable data for informed decision making. The Watershed Center also collaborates with landowners to implement practical, low-tech restoration solutions, such as erosion-control measures and planting native species, to stabilize the landscape and promote ecological recovery. These efforts are integral to enhancing the resilience and health of Boulder County's watersheds in the aftermath of wildfires.

For additional information regarding The Watershed Center's work with post-fire ecological recovery, please visit: <https://watershed.center/project/post-fire-ecological-recovery/>.

BOULDER VALLEY AND LONGMONT CONSERVATION DISTRICTS

The Boulder Valley and Longmont Conservation Districts plays a critical role in wildfire mitigation and post-fire recovery in Boulder County. Established during the Dust Bowl era to combat soil erosion, these districts now focus on a wide range of conservation efforts. They collaborate with the Natural Resources Conservation Service (NRCS) and the Colorado State Conservation Board to provide technical and financial assistance to private landowners, helping them develop comprehensive conservation plans. These districts focus on improving forest health and reducing wildfire risk through various initiatives. They participate in efforts like the Boulder County Fireshed, which involves multiple agencies working together

to prioritize and implement forest restoration and wildfire mitigation projects across different land ownerships.

For additional information regarding ongoing projects and future events please visit: <https://bouldervalley-longmontcd.colorado.gov/>.

BOULDER COUNTY FIRESHED

The Boulder County Fireshed is a collaborative initiative formed in August 2020 by federal, state, and local governments, along with non-profit organizations, to reduce wildfire risk in Boulder County through coordinated forest management across all lands. This partnership includes the USFS, Boulder County, Colorado Parks and Wildlife, CSFS, local municipalities like Longmont and Boulder, and various conservation and restoration groups. The Boulder County Fireshed aims to create a network of resilient forests that can better absorb and recover from natural disturbances. Its goals include engaging stakeholders in meaningful ways, supporting both wildland and prescribed fire management, and fostering ecosystems that support water quality, habitat, and recreation.

For additional information regarding ongoing projects and grant updates, please visit: <https://bouldercounty.gov/property-and-land/forest-health/fireshed/>

LOCAL PROGRAMS AND RESOURCES

Each city and municipality within Boulder County maintain resources and guidance specific to their communities. In some instances, CWPPs exist for an individual city as well. Please check the website of for your municipality for resources, programs, and mapping specific to your area. City-specific CWPPs generally include more locally specific information such as risk detail and response resources.

STATE PROGRAMS AND RESOURCES

COLORADO STATE FOREST SERVICE

CSFS maintains a variety of resources and programs to aid homeowners, landowners, and communities in managing forests, utilizing wood products, and preparing your property and community for wildfire. For forest health and management, a number of research papers, guides, and funding sources are available which can help landowners understand their forested land and manage it in a resilient manner. CSFS also houses the Colorado Forest Atlas, which includes interactive mapping for the 2020 Forest Action Plan and a risk viewer. A library of wildfire mitigation resources is also available, including defensible space and home hardening guides, a local risk viewer with interactive mapping, and fire-adapted communities' resources. Visit the link below to explore the many resources, tools, and funding opportunities available through the CSFS: https://csfs.colostate.edu/wp-content/uploads/2021/04/2021_CSFS_HIZGuide_Web.pdf.

COLORADO DIVISION OF FIRE PREVENTION AND CONTROL

DFPC manages several programs and training to aid communities in preparing for wildfire and improving emergency response. On the division website, you can find the Colorado Wildfire Preparedness Plan, Wildfire Information Resource Center, and a number of guides and resources to aid homeowners in preparing their properties, preventing wildfires, and planning for evacuation. Information is also available on active, contained, and historic wildfires with associated data. Professional qualifications, training, and certifications for firefighters are available through the website along with information on various funding sources. Explore the many resources, trainings, and data available through the DFPC site here:

<https://dfpc.colorado.gov/>

COLORADO DEPARTMENT OF NATURAL RESOURCES

The Colorado Department of Natural Resources Division of Forestry website includes links and information about several state programs and resources related to forest health and wildfire resilience, including an overview of the state's forestry program and information about the Colorado Forest Health Council. In 2021, CDNR completed an analysis of wildfire mitigation efforts and recommendations, which can be found at the site. Finally, the site also provides information about the Colorado Strategic Wildfire Action Program, which aims to increase on-the-ground mitigation efforts by funding Conservation Corps crews, SWIFT crews, and workforce development training. Follow the link for additional information about CDNR programs and resources: <https://dnr.colorado.gov/>.

COLORADO DEPARTMENT OF LOCAL AFFAIRS

The Colorado Department of Local Affairs manages multiple funding sources related to wildfire mitigation, prevention, and recovery for residents. Notably, the Wind and Wildfire Home Protection Mitigation Program was launched in 2023, which aids homeowners impacted by a wildfire in rebuilding with fire resilience considerations such as fire-resistant windows and fencing upgrades. The department often releases funds specific to a declared wildfire disaster. Also available is information on home codes pertinent to wildfire resilience. The Department of Local Affairs also houses the Colorado Resiliency Office, which has additional resources on emergency preparation, wildfire recovery, and climate and disaster resilience. Follow the link below for all Department of Local Affairs resources and funding:

<https://cdola.colorado.gov/>

FIRE ADAPTED COLORADO

FAC was developed from the broader non-profit group, Fire Adapted Communities Learning Network, a national group working to improve resilience capacity for fire-prone communities. The group facilitates conferences and learning events, provides homeowner and community resources and guides, and connects communities with mitigation specialists in the state. To view all of the resources and programs available through FAC, please visit the link: <https://fireadaptedco.org/>.

COLORADO DIVISION OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT

The CDHSEM offers numerous services, including those geared toward prevention, protection, mitigation, response, and recovery. CDHSEM also help facilitate pre- and post-disaster funding to local governments. Their emergency management website can be accessed here:

<https://dhsem.colorado.gov/emergency-management-office>.

NATIONAL PROGRAMS AND RESOURCES

WILDFIRE RISK TO COMMUNITIES

The USFS developed this interactive tool to provide citizens with an easy to use tool for determining their local risk factor and understanding the factors contributing to local risk. The tool is free to use and provides an overall risk rating and a breakdown of contributing factors based on the selected location. The risk assessment also shows the roles of different community members in preventing and recovering from a wildfire. The link below shows the assessed risk for Boulder County:

<https://wildfirerisk.org/explore/overview/08/08013/0800007850/>

READY, SET, GO!

The Ready, Set, Go! Program, managed by the International Association of Fire Chiefs, was launched in 2011 at the National WUI conference. The program seeks to develop and improve the dialogue between fire departments and residents, educating residents who live in high-risk wildfire areas on how to best prepare themselves and their properties for wildfire.

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

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

Set – Pack your emergency items. Stay aware of the latest news and information on the fire from local media, your local fire department, and public safety.

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

FEDERAL EMERGENCY MANAGEMENT AGENCY

FEMA provides a number of educational resources, funding programs, research, and other tools to help communities understand wildfire better and increase actions that improve resilience. Resources are categorized into before, during, and after an event and include information on evacuation preparations, insurance, alerts, warnings, sheltering, post-burn flooding, debris flow, and recovery first steps. Available

funding programs are related to both preparations and recovery. To view all FEMA resources, please follow the link: <https://community.fema.gov/ProtectiveActions/s/article/Wildfire>.

U.S. ENVIRONMENTAL PROTECTION AGENCY

The EPA maintains wildfire resources that can help communities better prepare for an recover from a disaster. The EPA is a particularly good resource for smoke and air quality related research and guidance. The agency manages a local air quality search tool, has guides on dealing with wildfire smoke, and information on the health effects of smoke. A full list of EPA resources and research is available at the agency website link: <https://www.epa.gov/natural-disasters/wildfires>.

READY.GOV

Ready.Gov is a program developed by the Department of Homeland Security intended to provide disaster and emergency information and preparation resources. Similar to FEMA resources, documents and information are categorized by before, during, and after an emergency. The site provides guides, educational documents, and other resources to help citizens harden their homes and foster defensible space, plan for a wildfire, stay safe during an event, and safely return home or rebuild following a wildfire. The full list of resources is available here: <https://www.ready.gov/wildfires>.

NATIONAL FIRE PROTECTION ASSOCIATION FIREWISE USA

The NFPA is a global non-profit organization devoted to eliminating death, injury, and economic loss due to fire. Its 300 codes and standards are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation around the world (NFPA 2013).

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

The NFPA is a premier resource for fire data analysis, research, and analysis. The Fire Analysis and Research division conducts investigations of fire incidents and produces a wide range of annual reports and special studies pertaining to fire hazards.

NATIONAL INTERAGENCY FIRE CENTER

The NIFC provides a wide array of fire resources and services and can provide communication assistance to over 32,000 firefighters and 50 major events at any given time (NIFC 2022). The program also offers wildfire forecasts and predictions using fuel and weather data collected from their remote automated weather base with over 2,000 weather stations. Additionally, the NIFC has a training branch where national curriculums are developed, including FireWorks, an educational program designed for kids K-12. The program teaches children about wildland fire science, ecosystem fluctuations, human interaction on the environment, and other environmental science topics.

NIFC public education resources can be found here: <https://disastersafety.org/wildfire/wildfire-ready/>

U.S. FIRE ADMINISTRATION'S WUI TOOLKIT

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

WILDFIRE RESEARCH CENTER (WiRē)

Wildfire Research Center (WiRē) is a non-profit organization that works with local wildfire services to highlight community-tailored pathways to reduce risk to wildfire while simultaneously promoting pathways to fire adaptation. WiRē's mission states that fire adaptation is "about living with fire", while "creating safe and resilient communities that reduce wildfire risk on their properties before a fire, and supporting effective response when fires threaten a community." WiRē states that wildfire is an integral component of many ecosystems, and that safe fire must be allowed to ensure healthy forests.

To achieve its goals and serve communities, WiRē typically assesses factors contributing to wildfire risks; factors include building materials, vegetation near homes, background fuels, local topography, and access to emergency fire services. Additionally, they conduct social surveys to gauge residents' perceptions about wildfire, wildfire risk, risk mitigation behavior, and assess their willingness to take action in reducing wildfire risks.

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

COMMUNITY NAVIGATORS

The Community Navigators Program (CNP) supports historically underserved communities in collaboration with the USFS. The CNP connects communities to appropriate resources for building climate resilience such as access funding and partnership support. The program aims to create mutually beneficial relationships between local communities, the USFS, and other federal agencies that contribute to community and ecosystem resilience. Through their website, community leaders can request a navigator; resources are available in Spanish and English and accessibility accommodations are available.

For more information, please visit: <https://communitynavigators.net/>.

AMERICAN RED CROSS

The American Red Cross is a leading disaster response and recovery agency primed to provide disaster relief. Additionally, the Red Cross provides a number of preparation guides and resources for individuals and families and empower community members to assist in relief and recovery efforts. Following the Marshall Fire, the Red Cross had over 100 volunteers assisting victims in recovery. For the full list of Red Cross resources and trainings, follow the link: <https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/wildfire.html>.

MISCELLANEOUS RESOURCES

Current available resources and lessons learned that can be assessed for future wildfire preparedness strategies.

FIRE ADAPTED COMMUNITIES PATHWAYS INTERACTIVE TOOL

This tool helps community members properly identify the most beneficial adaptation methods for their local environment: <https://facpath.fireadaptednetwork.org/>.

CLIMATE MAPPING FOR RESILIENCE AND ADAPTATION PORTAL

Provides a live dashboard to help communities see extreme weather and other hazards from climate change: <https://resilience.climate.gov/#real-time-data>.

COMMUNITY PLANNING FOR WILDFIRE ASSISTANCE PROGRAM

Assists communities with wildfire risk-reduction communications, increasing land use planning capacity, and collaborating with agencies to identify overlap in scopes of work: <https://cpaw.headwaterseconomics.org/>

WIRĒ – WILDFIRE RESEARCH

An interdisciplinary collaboration on community adaptability to wildland fire: <https://wildfireresearchcenter.org/>

MARSHALL FIRE REPORT

Investigative summary and review: <https://assets.bouldercounty.gov/wp-content/uploads/2023/06/marshall-fire-investigative-summary.pdf>

FOURMILE FIRE REPORT

A review of the physical setting, infrastructure, pre-fire conditions, fire behavior, fire suppression, fuel treatment efficacy, home loss, social and economic impacts, and risk management: https://www.fs.usda.gov/rm/pubs/rmrs_gtr289.pdf



APPENDIX B:

Fire Response Capabilities

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FIRE RESPONSE CAPABILITIES

The wildland fire community is well known for its development of mutual aid agreements at the federal, state, and local levels. Such automatic aid agreements allow for the closest forces to respond to an incident as quickly as possible regardless of jurisdiction.

Fire management in Colorado relies on a cooperative, interagency partnership among federal, state, and local entities. Wildland fire response for large fires is typically supported and coordinated by regional interagency dispatch centers in Colorado. These dispatch centers are part of the larger Rocky Mountain Area Coordination Center.

Incident management within Boulder County is first coordinated by the local police and fire departments based on the incident's location for non-emergency and emergency calls 24 hours per day, seven days per week. When an incident is reported on lands within the County, the Boulder County Communications Center (BCC) will be notified as soon as possible. The BCC acts as dispatch for initial attack on ignitions falling inside county and local Fire Protection Districts (FPDs). If the incident does not fall within their dispatch jurisdiction, BCC will notify the Fort Collins Interagency Dispatch Center (FCIDC) for initial attack dispatch concerning all Rocky Mountain National Park and Arapaho and Roosevelt National Forest resources. The Division of Fire Prevention and Control (DFPC) will also be notified if a wildland fire on non-federal land escapes initial attack, threatens structures, or requires air resources. Upon response to an incident, the assigned initial attack incident commander will size up the wildland fire and communicate with the appropriate dispatch center to ensure that adequate resources are deployed (Geographic Area Coordination Centers [GACC] 2023).

When a fire occurs within the jurisdictional boundaries of Boulder County, the responsibility of incident commander falls upon the FPD Fire Chief of associated district of the fire's location, who may assume command of the fire or assign a qualified incident commander to lead wildfire operations. However, if an incident exceeds the capacity of that FPD or occurs in an unincorporated area, such as the source water protection zone, incident command defaults to the associated county sheriff, who will identify a local incident commander whose qualifications are adequate for managing the wildfire complexity type. The Sheriff's Office will often assume evacuation management roles during wildfire incidents. The authority of fire chiefs and the sheriff is derived from the Colorado Revised Statutes (Colorado General Assembly 2022a). If an incident occurs on land managed by the USFS, BLM or NPS, the respective managing agency is responsible for the response and establishment of an incident commander who bears the power of declaring evacuations.

LOCAL RESPONSE

In the event of an emergency call 911. The 911 dispatcher will send the appropriate response resource to the incident. 911 calls reporting suspicious smoke or clouds are highly valued as they can help locate wildfire ignitions.

Boulder County's fire response capabilities are spread across 23 FPDs: Allenspark FPD, Berthoud FPD, Big Elk Volunteer Fire Department (VFD), City of Boulder Fire-Rescue, Boulder Mountain FPD, Boulder Rural FPD, Coal Creek FPD, Fourmile FPD, Gold Hill VFD, Hygiene FPD, Indian Peaks FPD, Jamestown VFD, Lafayette FD, Lefthand FPD, Longmont FD, Louisville FD, Lyons FPD, Mountain View FPD, Nederland FPD, Pinewood Springs FPD, Sugarloaf FPD, Sunshine FPD, and Timberline FPD. Fire response areas for the majority of these districts are shown in Figure B.1. Representatives from each of

these entities were surveyed to compile the fire department concerns, needs, and resources. See results from these surveys below.

Each FPD focuses its risk reduction efforts based on the challenges faced individually. Fire Chiefs from surrounding FPDs were asked to complete a survey summarizing their Fire Department's capabilities and provide feedback on department needs and community wildfire concerns. From the FPD survey it is clear there is concern for areas like Flagstaff Mountain, Eldorado Springs, Lower Sunshine Canyon, Lake Valley Estates, and many other areas in western Boulder County due to topography, fuels, egress/ingress, and population density.

Most FPDs with jurisdiction in the planning area conduct public outreach or training on wildfire. The majority of FPDs have reported that additional training could benefit their jurisdictions, including live fire or field-based training exercises and participation on prescribed fires with cooperators. Financial support is a consistent theme among the identified needs, ranging from funding for training and personnel (Mitigation Specialists) to acquiring essential equipment like new radios, water tenders, and engines.

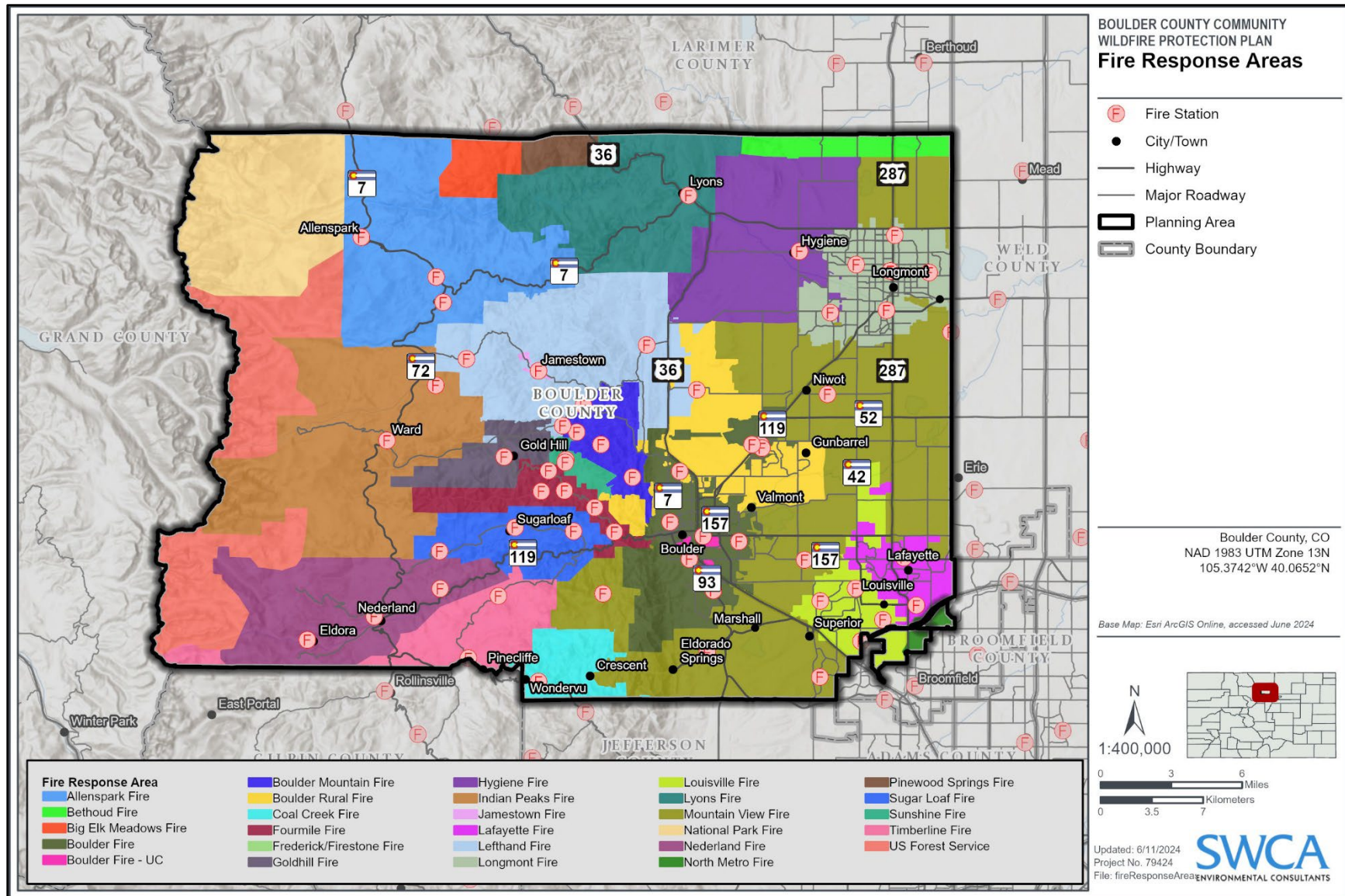


Figure B.1. Fire response areas within Boulder County.

Boulder Fire-Rescue Department

The Boulder Fire-Rescue Department (BFRD) is dispatched by the Boulder Police & Fire Communication and is a part of the Boulder County Hazmat Authority. The BFRD serves out of five stations throughout the City of Boulder, a station in Gunbarrel, Arapahoe Ridge, a Wildland Station, as well as a training center. The BFRD covers 25 square miles throughout Boulder County (Table B.1) and has mutual aid agreements with Boulder Rural Fire Rescue, Boulder Mountain FPD, Hygiene FPD, Lafayette Fire Department, Lefthand FPD, Longmont Fire Department, Louisville FPD, and Mountain View Fire Rescue.

For additional information on BFRD’s fire response, please view the Boulder Fire Rescue Master Plan here: <https://bouldercolorado.gov/projects/boulder-fire-rescue-master-plan>.

Table B.1. Fire Resources for the Boulder Fire-Rescue Department

Fire Department Statistics:			
<u>Fire Protection District:</u> Boulder Fire-Rescue			
<u>Communities Served:</u> Boulder and associated lands (OSMP, Utilities, and Parks and Recreation)			
<u>Full-time Firefighters:</u> 127	<u>Red-Carded Firefighters:</u> 95	<u>Volunteer Firefighters:</u>	0
<u>Water Tender:</u>	<u>Wildland Engines</u>		
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 3	3	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 10	Type 6: 3	3	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 4	<u>Fire Shelters:</u> 130		
<u>Portable Pumps:</u> 2			

Boulder County Sheriff's Office: Fire Management Program

The Fire Management Program, under the Boulder County Sheriff's Office, was established to enhance resources supporting local fire departments within Boulder County. Its core responsibility involves coordinating responses to wildland fires countywide (Table B.2). A Fire Duty Officer (FDO) ensures 24/7 coverage throughout the year in response to wildfire threats. As the national fire season unfolds, the program extends its support to regional and federal partners engaged in suppression efforts across the state and nation. Serving as the Sheriff's subject matter expert, the program oversees wildfire suppression, prescribed burning, and fire restriction implementation. It also collaborates closely with local volunteer and paid fire departments to address their suppression and coordination needs effectively.

Table B.2. Fire Resources for the Boulder County Sheriff's Office: Fire Management Program

Fire Department Statistics:			
<u>Fire Protection District:</u> Boulder County Sheriff's Office: Fire Management Program			
<u>Communities Served:</u> Boulder County and encapsulated fire districts			
<u>Full-time Firefighters:</u> 13	<u>Red-Carded Firefighters:</u> 13		<u>Volunteer Firefighters:</u> 0
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 0	Type 6: 2	2	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 4	<u>Fire Shelters:</u> 20+		
<u>Portable Pumps:</u> 2			

Allenspark FPD

The Allenspark FPD operates under a 911 dispatch system through Boulder County Communication as a special district where the district receives all operational funding from donations and property tax revenues. The Allenspark FPD's response area covers approximately 160 square miles in rural Larimer and Boulder Counties (Table B.3) providing Fire Protection and Emergency Medical Services, Search and Rescue, Camp Inspections, Fire Prevention, and mutual aid to neighboring districts such as Estes Valley, Lyons, Indian Peaks, Lefthand FPD, Pinewood Springs FPDs, and the U.S. Forest Service.

For additional information on Allenspark FPD's fire response, please view the 2009 Allenspark FPD CWPP here (update is in progress): <https://www.allensparkfire.com/preparedness-and-prevention>.

Table B.3. Fire Resources for the Allenspark FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Allenspark			
<u>Communities Served:</u> Allenspark, Raymond/Riverside, Meeker Park, Tahosa North. From MM 26 to 5.5 on Highway 7, and from MM 54 to 49 on Highway 72.			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 23	<u>Volunteer Firefighters:</u>	27
<u>Water Tender:</u>	<u>Wildland Engines</u>		
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 3	Type 3: 0	0	0
Type 3: 2	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 2	2	0
Type 1: 0	Type 6: 1	1	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 3	<u>Fire Shelters:</u> 26		
<u>Portable Pumps:</u> 2			

Berthoud FPD

The Berthoud FPD district spans 103 square miles and operates out of two stations, serving the Town of Berthoud and surrounding areas including Boulder, Larimer, and Weld Counties (Table B.4). The district includes significant portions of Interstate 25 and U.S. Highway 287, in addition to Carter Lake, a 1,100-acre reservoir. Assessing their available water resources as high, the Berthoud FPD relies on hydrants within Berthoud town, a robust tender system in county areas, and several large lakes for drafting as primary water sources for fire suppression.

Table B.4. Fire Resources for the Berthoud FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Berthoud			
<u>Communities Served:</u> Berthoud and unincorporated area.			
<u>Full-time Firefighters:</u> 38	<u>Red-Carded Firefighters:</u> 48	<u>Volunteer Firefighters:</u>	4-10
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 1	Type 3: 3	3	0
Type 3: 0	Type 4: 1	1	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 4	Type 6: 3	3	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 3	<u>Fire Shelters:</u> 65		
<u>Portable Pumps:</u> 2			

Big Elk VFD

The Big Elk VFD services the community of Big Elk Meadows and the area between the communities of Estes Park and Lyons near Colorado Highways 7 and 36 (Table B.5). The Big Elk VFD has identified egress out of Big Elk Meadows as a concern due to a single, 5-mile-long road, providing sole egress. Additionally, Johnny Park has been identified as a priority area for high wildfire risk, and the VFD requires an updated CWPP to address the wildfire mitigation concerns in the community.

Table B.5. Fire Resources for the Big Elk VFD

Fire Department Statistics:			
<u>Fire Protection District:</u> Big Elk VFD			
<u>Communities Served:</u> Big Elk Meadows and Pinewood Springs			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 12		<u>Volunteer Firefighters:</u> 20
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 1	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 0	Type 6: 2	2	0
Type 2: 1	Type 7: 3	3	0
<u>Port-A-Tanks:</u> 4	<u>Fire Shelters:</u> 22		
<u>Portable Pumps:</u> 2			

Boulder Mountain FPD

The Boulder Mountain FPD caters to around 1,000 residences situated in Boulder Heights, Pine Brook Hills, Carriage Hills, Wagonwheel Gap, Buckingham Hills, and Valley Lane areas (Table B.6). Comprised of emergency medical responders, firefighters, a Fire Chief, Wildfire Mitigation Crew, Auxiliary, and a Board of Directors, Boulder Mountain FPD operates with the primary objective of delivering swift, efficient, and well-coordinated responses to fire and other emergency incidents. Boulder Mountain FPD operates from three stations and handles approximately 150 calls annually, encompassing fire, rescue, medical, accident, and service incidents, while also extending mutual aid to neighboring districts.

For additional information on Boulder Mountain FPD's fire response, please view Boulder Mountain's 2009 Wildland Urban Interface CWPP here: https://static.colostate.edu/client-files/csfs/documents/BoulderMountainFPD_CWPP_2006.pdf.

Table B.6. Fire Resources for the Boulder Mountain FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Boulder Mountain			
<u>Communities Served:</u> Boulder Heights, Pinebrook Hills, Carriage Hills, others unincorporated areas within Boulder County			
<u>Full-time Firefighters:</u> 25	<u>Red-Carded Firefighters:</u> 41	<u>Volunteer Firefighters:</u>	37
<u>Water Tender:</u>	<u>Wildland Engines</u>		
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 1	1	0
Type 3: 2	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 3	Type 6: 4	4	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 3	<u>Fire Shelters:</u> 60		
<u>Portable Pumps:</u> 1			

Boulder Rural FPD

The Boulder Rural FPD serves approximately 25 square miles of unincorporated areas north, west, and east of the city of Boulder (Table B.7). The Boulder Rural FPD has two stations and has automatic and/or mutual aid agreements with six other surrounding districts and departments. Responsible for approximately 17,000 residents in its district, the Boulder Rural FPD receives over 800 calls each year, with nearly 60% of calls being medical.

For additional information on Boulder Rural FPD's fire response, please view the 2007 Boulder Rural FPD Wildland Urban Interface CWPP here: https://static.colostate.edu/client-files/csfs/documents/BoulderRuralFPD_CWPP_2007.pdf.

Table B.7. Fire Resources for the Boulder Rural FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Boulder Rural			
<u>Communities Served:</u> Gunbarrel, Lower Sunshine Canyon, Lee Hill and other unincorporated Boulder County areas.			
<u>Full-time Firefighters:</u> 20	<u>Red-Carded Firefighters:</u> 21	<u>Volunteer Firefighters:</u> 1	
<u>Water Tender:</u>	<u>Wildland Engines</u>		
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 1	1	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 2	Type 6: 1	1	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 2	<u>Fire Shelters:</u> 25		
<u>Portable Pumps:</u> 1			

City of Lafayette Fire Department

The City of Lafayette Fire Department services the community of Lafayette with structure and wildfire response resources as well as emergency medical services (Table B.8). The fire department has identified grassland fuels in open spaces throughout the community as a primary wildfire risk. The fire department has identified wildfire related trainings and joint-agency prescribed burns as critical needs for the jurisdiction.

Table B.8. Fire Resources for the City of Lafayette Fire Department

Fire Department Statistics:			
<u>Fire Protection District:</u> City of Lafayette Fire Department			
<u>Communities Served:</u> Lafayette.			
<u>Full-time Firefighters:</u> 36	<u>Red-Carded Firefighters:</u> 36		<u>Volunteer Firefighters:</u> 0
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 2	Type 6: 2	2	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 0	<u>Fire Shelters:</u> 12		
<u>Portable Pumps:</u> 2			

Coal Creek Canyon FPD

The Coal Creek Canyon FPD services 224 square miles in Boulder, Jefferson and Gilpin Counties (Table B.9). The FPD staffs four stations across the service area and has automatic aid or mutual aid agreements with five adjacent fire protection entities. The FPD identified the Black Gulch area as a primary area of wildfire risk and egress concerns for Wondervu, Coal Creek Heights, and Spruce Canyon. The FPD would like an organization similar to Wildfire Partners to be available to residents of Jefferson and Gilpin Counties.

Table B.9. Fire Resources for the Coal Creek Canyon FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Coal Creek Canyon			
<u>Communities Served:</u> Coal Creek Canyon FPD.			
<u>Full-time Firefighters:</u> 1	<u>Red-Carded Firefighters:</u> 57	<u>Volunteer Firefighters:</u>	59
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 1	Type 3: 0	0	0
Type 3: 0	Type 4: 1	1	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 4	Type 6: 4	4	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 6	<u>Fire Shelters:</u> 60		
<u>Portable Pumps:</u> 1			

Four Mile FPD

The Four Mile FPD services the Four Mile Canyon community with automatic aid agreements in place for the Sunshine Canyon and Gold Hill communities (Table B.10). The FPD provides structure and wildland fire, emergency medical, and technical rescue services to residents. The FPD has identified the Logan Mill area as high wildfire risk with poor egress. The greatest needs to the community include hazardous fuel mitigation and implementing defensible space around residential buildings.

Table B.10. Fire Resources for the Four Mile FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Four Mile FPD			
<u>Communities Served:</u> Four Mile Canyon			
<u>Full-time Firefighters:</u> 4	<u>Red-Carded Firefighters:</u> 14		<u>Volunteer Firefighters:</u> 15
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 2	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 3	3	3
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 0	Type 6: 2	2	2
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 6	<u>Fire Shelters:</u> 40		
<u>Portable Pumps:</u> 5			

Gold Hill FPD

The Gold Hill FPD services 12 square miles, including the areas of Aiamakee, Slide Mountain, and Switzerland Trail (Table B.11). The FPD has automatic aid or mutual aid agreements with three adjacent fire protection entities. The FPD has identified egress as a major issue in the area due to many narrow one-lane roads. Priorities for the FPD include creating defensible space and linking landscape fuel treatments with wildfire mitigation around homes. The FPD is supported by a 60,000-gallon community cistern but has acknowledged more cisterns are necessary for adequate fire suppression water resources.

Table B.11. Fire Resources for the Gold Hill FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Gold Hill FPD			
<u>Communities Served:</u> Gold Hill.			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 6	<u>Volunteer Firefighters:</u>	20
<u>Water Tender:</u>	<u>Wildland Engines</u>		
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 1	1	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 1	Type 6: 0	0	0
Type 2: 0	Type 7: 1	1	0
<u>Port-A-Tanks:</u> 4	<u>Fire Shelters:</u> 20		
<u>Portable Pumps:</u> 2			

Hygiene FPD

The Hygiene Fire Protection District (HFPD) functions as a volunteer fire department, dedicated to serving the Hygiene community (Table B.12), spanning over 55 square miles between Lyons and Longmont, Colorado. Established in 1960 by local farmers and ranchers, for the purpose of preserving and protecting life and property during fires in its district, the HFPD currently caters to a population of 4,500 residents and responds to around 300 calls annually. The department comprises Reserve and Volunteer Firefighters, Wildland Mitigation Coordinators, Fire Marshal/Fire Investigator, EMS Training Coordinator, Training Captain, Assistant Chief, and Fire Chief.

Table B.12. Fire Resources for the Hygiene FPD

Fire Department Statistics:			
Fire Protection District: Hygiene			
Communities Served: Hygiene and surrounding areas.			
Full-time Firefighters: 0	Red-Carded Firefighters: 40		Volunteer Firefighters: 47
Water Tender:		Wildland Engines	
Type 1: 0	Total Number:	4WD/AWD:	Brush Breaker:
Type 2: 2	Type 3: 1	1	0
Type 3: 2	Type 4: 0	0	0
Structure Engines:	Type 5: 0	0	0
Type 1: 2	Type 6: 2	2	0
Type 2: 0	Type 7: 0	0	0
Port-A-Tanks: 2	Fire Shelters: 15		
Portable Pumps: 0			

Jamestown VFD

The Jamestown VFD services a 1-square-mile area in Boulder County that includes the communities of Golden Age Hill, James Canyon, James Creek, Lefthand Canyon, McCorkle Gulch, Moorhead, Overland, and Porphyry Mountain (Table B.13). The VFD has identified much of the service area as high wildfire risk with egress being a major concern for narrow roads throughout the area. The VFD has identified a need to link defensible space and fuel treatment mitigation actions with neighboring agencies and existing burn scars. The VFD would benefit from apparatus upgrades as well as joint prescribed fire trainings.

Table B.13. Fire Resources for the Jamestown VFD

Fire Department Statistics:			
<u>Fire Protection District:</u> Jamestown VFD			
<u>Communities Served:</u> Jamestown.			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 10	<u>Volunteer Firefighters:</u>	20
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 1	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 0	Type 6: 1	1	0
Type 2: 1	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 4	<u>Fire Shelters:</u> 15		
<u>Portable Pumps:</u> 2			

Lefthand FPD

The Lefthand Fire Protection District (FPD) covers 51 square miles of rural Colorado (Table B.14), with elevations ranging from 5,400 feet in the east to 8,800 feet in the west. Bounded by two steep, narrow canyons—Lefthand Canyon and James Canyon—the district forms the Lefthand watershed. Serving various communities housing approximately 1,500 residents, the Lefthand FPD offers emergency medical services, structure fire response, hazardous material response, rescue operations, and wildland fire response, suppression, and mitigation. The district handles all 911 calls within its boundaries and supports neighboring fire departments in Boulder County through mutual aid agreements.

For additional information on Lefthand FPD's wildfire response, please view the 2015 Lefthand FPD CWPP here: https://wp.lefthandfire.org/wp-content/uploads/2020/04/Lefthand_FPD_2015_CWPP_Update_lowrez1.pdf.

Table B.14. Fire Resources for the Lefthand FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Lefthand			
<u>Communities Served:</u> Altona, North Foothills Ranch, Mountain Ridge, Lake of the Pine, Crestview, Neva/Nebo neighborhoods, Olde Stage, Lefthand, Glendale, Nugget Hill, Licksillet, James Canyon, 87/87J, Sky Ranch, High lake, Bar K Ranch, Matheune's Highlands, Glacier View, and South Springs.			
<u>Full-time Firefighters:</u> 13	<u>Red-Carded Firefighters:</u> 50	<u>Volunteer Firefighters:</u> 46	
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 1	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 2	Type 3: 5	5	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 3	Type 6: 4	4	0
Type 2: 2	Type 7: 2	2	0
<u>Port-A-Tanks:</u> 6	<u>Fire Shelters:</u> 60		
<u>Portable Pumps:</u> 4			

Longmont Fire Department

The Longmont Fire Department services 25 square miles in Boulder and Weld Counties (Table B.15). The fire department staffs six fire stations and is supported by a training facility and command center. The fire department has identified the Button Rock Preserve and Watershed as a high wildfire risk area due to the importance of drinking water assets at risk of wildfire. The fire department would benefit the most from increased public education programs and efforts to reduce wildfire ignitions caused by unhoused populations. The fire department has identified a need for additional personal protective equipment and courses for obtaining NWCG qualifications.

Table B.15. Fire Resources for Longmont Fire Department

Fire Department Statistics:			
<u>Fire Protection District:</u> Longmont Fire Department			
<u>Communities Served:</u> City of Longmont.			
<u>Full-time Firefighters:</u> 100	<u>Red-Carded Firefighters:</u> 30	<u>Volunteer Firefighters:</u>	0
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 1	1	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 3	3	0
Type 1: 9	Type 6: 3	3	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 0	<u>Fire Shelters:</u> 50		
<u>Portable Pumps:</u> 0			

Louisville FPD

The Louisville Fire Protection District covers 15.5 square miles across Boulder County (Table B.16), operating from three fire stations and a training center. The team comprises 42 active firefighters and emergency medical technicians (EMTs)/emergency medical responders (EMRs) who undergo training to adeptly handle both wildland and structure firefighting. Aside from responding to emergencies within its designated district, the Louisville Fire Protection District extends support to five surrounding districts through mutual/automatic aid agreements. This collaborative approach ensures a more comprehensive and effective emergency response system across the broader community.

Table B.16. Fire Resources for the Louisville FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Louisville			
<u>Communities Served:</u> Louisville and Unincorporated Boulder County			
<u>Full-time Firefighters:</u> 40	<u>Red-Carded Firefighters:</u> 35	<u>Volunteer Firefighters:</u> 8	
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 4	Type 6: 1	1	0
Type 2: 4	Type 7: 1	1	0
<u>Port-A-Tanks:</u> 2	<u>Fire Shelters:</u> 20		
<u>Portable Pumps:</u> 1			

Lyons FPD

The Lyons FPD services 66 square miles in Boulder and Larimer Counties (Table B.17). The FPD staffs two stations and is supported by multiple command and utility vehicles in addition to the fire apparatus listed in Table B.17. The FPD has identified concerns with water resources in rural areas due to a lack of available hydrants. Additionally, the FPD has a need for increased funding, staffing, and wildfire mitigation work for effectively reducing wildfire risk and maintaining preparedness. The Blue Mountain Ranch was identified as high wildfire risk within the FPD service area. The FPD would benefit from increased funding and more live fire exercises and trainings.

Table B.17. Fire Resources for the Lyons FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Lyons FPD			
<u>Communities Served:</u> Lyons, Allenspark, Lefthand, Hygiene			
<u>Full-time Firefighters:</u> 16	<u>Red-Carded Firefighters:</u> 23	<u>Volunteer Firefighters:</u> 7	
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 2	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 1	1	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 2	Type 6: 4	4	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 2	<u>Fire Shelters:</u> 35		
<u>Portable Pumps:</u> 1			

Mountain View FPD

The Mountain View FPD efficiently operates out of 12 stations, covering a vast 250-square-mile area (Table B.18). Their comprehensive services encompass fire response, EMS, hazardous material handling, tech rescue, wildland fire assistance, and management of all other emergency incidents. This assistance reaches a substantial population of 77,000 permanent residents and over 60,000 daily commuters. The Mountain View FPD is dedicated to preserving and safeguarding the community from hazards with a commitment to preparedness, prevention, education, and emergency response initiatives.

For additional information on Mountain View FPD's wildfire response please visit the Mountain View FPD CWPP Hub here: <https://mountain-view-fpd-cwpp-mvfpd.hub.arcgis.com/>.

Table B.18. Fire Resources for the Mountain View FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Mountainview			
<u>Communities Served:</u> Mead, Erie, Niwot, Superior, Dacono, Unincorporated Boulder and Weld Counties.			
<u>Full-time Firefighters:</u> 160+	<u>Red-Carded Firefighters:</u> 150	<u>Volunteer Firefighters:</u> 0	
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 4	Type 3: 5	5	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 14	Type 6: 6	6	0
Type 2: 3	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 8	<u>Fire Shelters:</u> 170		
<u>Portable Pumps:</u> 12			

Nederland FPD

The Nederland Fire Protection District services 56 square miles in Boulder County (Table B.19). The FPD staffs three stations and is supported by multiple command and utility vehicles in addition to the firefighting equipment listed in Table B.19. The FPD has identified issues with the cistern and hydrant system, with 50% of the hydrants in the service area lacking adequate water pressure. The highest wildfire risk area in the FPD is the West Magnolia camping area. The communities of Big Springs and Eldora have inadequate egress. The FPD would benefit the most from additional apparatus, radios, and personnel. The communities that Nederland FPD serves have a need for hazardous fuel mitigation, home hardening upgrades, and additional ingress/egress options.

Table B.19. Fire Resources for the Nederland FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Nederland FPD			
<u>Communities Served:</u> Nederland, Eldora, St. Anton, Bonanza, and unincorporated Boulder County			
<u>Full-time Firefighters:</u> 5	<u>Red-Carded Firefighters:</u> 19	<u>Volunteer Firefighters:</u>	28
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 3	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 1	Type 3: 0	0	0
Type 3: 0	Type 4: 1	1	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 3	Type 6: 4	4	3
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 6	<u>Fire Shelters:</u> 40		
<u>Portable Pumps:</u> 0			

North Metro Fire Rescue District

The North Metro Fire Rescue District, originally called the West Adams County FPD, services a 58-square-mile district covering Broomfield County, the City of Northglenn, and unincorporated area of Adams, Boulder, Jefferson, and Weld Counties (Table B.20). Operating from seven stations strategically placed throughout the district, alongside their headquarters and Training Center Complex, the district works to protect a population exceeding 125,000 residents. North Metro Fire is equipped and committed to ensuring public safety through fire suppression, wildland firefighting, emergency medical services and patient transportation, hazardous materials response, and technical rescues.

For additional information on North Metro Fire Rescue District's wildfire response please view the North Metro Fire Rescue District's 2019- 2025 Strategic Plan here:

<https://www.northmetrofire.org/DocumentCenter/View/1412/2019---2025-Strategic-Plan->

Table B.20. Fire Resources for the North Metro Fire Rescue District

Fire Department Statistics:			
<u>Fire Protection District:</u> North Metro Fire Rescue District			
<u>Communities Served:</u> Broomfield, Northglenn, portions of unincorporated Boulder, Adams, Jefferson, and Weld Counties			
<u>Full-time Firefighters:</u> 135	<u>Red-Carded Firefighters:</u> 25	<u>Volunteer Firefighters:</u>	0
<u>Water Tender:</u>	<u>Wildland Engines</u>		
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 10	Type 6: 3	3	3
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 0	<u>Fire Shelters:</u> 30		
<u>Portable Pumps:</u> 2			

Pinewood Springs FPD

The Pinewood Springs FPD is a volunteer fire department providing services to the community of Pinewood Springs and Estes Park Estates, sections of Larimer and Boulder counties, the adjacent National Forest areas (Roosevelt National Forest), and the U.S. Highway 36 corridor (Table B.21). The Pinewood Springs FPD covers 40 square miles, operating out of one station, providing emergency response services to over 1,100 full time residents.

For additional information on Pinewood Springs FPD's wildfire response please view the updated 2023 Pinewood Springs FPD CWPP here:

<https://www.pinewoodspringsfire.org/files/72899324b/2023+CWPP+FINAL.pdf>.

Table B.21. Fire Resources for the Pinewood Springs FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Pinewood Springs			
<u>Communities Served:</u> Pinewood Springs, unincorporated Boulder and Larimer Counties			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 11	<u>Volunteer Firefighters:</u>	17
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 2	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 0	Type 6: 2	2	0
Type 2: 1 (AWD)	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 2	<u>Fire Shelters:</u> 25		
<u>Portable Pumps:</u> 1			

Sugarloaf FPD

The Sugarloaf FPD operates as a volunteer fire department, serving Sugarloaf and Boulder counties including parts of Colorado Highway 119, Sugarloaf Road and Magnolia Road (Table B.22). Situated at elevations ranging from 5,900 to 9,200 feet above sea level, the Sugarloaf FPD covers 17 square miles, including nearly 600 homes, a water treatment plant for the city of Boulder, Boulder County Open Space, City of Boulder Mountain Parks, and several thousand acres of the Arapaho and Roosevelt National Forests. The district typically responds to around 140 calls annually.

For additional information and resources from the Sugarloaf FPD please view the 2023 Boulder West Wildfire Authority CWPP (including Sugarloaf FPD, Four Mile FPD, Gold Hill FPD, and Sunshine FPD) here: https://csfs.colostate.edu/wp-content/uploads/2023/05/2023_CWPP_Boulder_West_Wildfire_Authority.pdf.

Table B.22. Fire Resources for the Sugarloaf FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Sugarloaf			
<u>Communities Served:</u> Sugarloaf and Boulder Counties			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 27	<u>Volunteer Firefighters:</u>	40
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 3	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 2	2	0
Type 1: 0	Type 6: 1	1	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 6	<u>Fire Shelters:</u> ~45		
<u>Portable Pumps:</u> 0			

Sunshine FPD

The Sunshine Fire Protection District services 4 square miles in Boulder County and staffs two fire stations (Table B.23). The FPD lacks adequate water resources for extended wildfire suppression operations due to needing to draft water for fire apparatus. The FPD has identified high wildfire risk between 4000 and 5000 Sunshine Canyon Road due to the high frequency of lightning strikes the area experiences. The FPD has identified a need for wildland fire-specific equipment and personal protective equipment. Additionally, the communities that the FPD serves have a need for increased fuel treatments and defensible space.

Table B.23. Fire Resources for the Sunshine FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Sunshine FPD			
<u>Communities Served:</u> Sunshine Canyon, Town of Sunshine			
<u>Full-time Firefighters:</u> 0	<u>Red-Carded Firefighters:</u> 24	<u>Volunteer Firefighters:</u> 28	
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 0	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 1	1	0
Type 3: 0	Type 4: 1	1	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 1	Type 6: 2	2	0
Type 2: 0	Type 7: 0	0	0
<u>Port-A-Tanks:</u> 2	<u>Fire Shelters:</u> 32		
<u>Portable Pumps:</u> 1			

Timberline FPD

The Timberline Fire Protection District functions as a volunteer fire department, covering Boulder and Gilpin counties (Table B.24) from Nederland in Boulder County to Black Hawk and Central City near Interstate 70. With 10 stations, Timberline FPD responds to emergencies for about 6,000 year-round residents, and experiences a seasonal population surge of 15,000 to 20,000 visitors. In addition to covering their own district, Timberline FPD provides mutual aid to neighboring fire districts and deploys personnel and apparatus to wildfires nationally.

Table B.24. Fire Resources for the Timberline FPD

Fire Department Statistics:			
<u>Fire Protection District:</u> Timberline			
<u>Communities Served:</u> Gilpin and Boulder Counties			
<u>Full-time Firefighters:</u> 9	<u>Red-Carded Firefighters:</u> 40		<u>Volunteer Firefighters:</u> 40
<u>Water Tender:</u>		<u>Wildland Engines</u>	
Type 1: 2 (4WD)	<u>Total Number:</u>	<u>4WD/AWD:</u>	<u>Brush Breaker:</u>
Type 2: 0	Type 3: 0	0	0
Type 3: 0	Type 4: 0	0	0
<u>Structure Engines:</u>	Type 5: 0	0	0
Type 1: 4 (4WD)	Type 6: 5	5	0
Type 2: 0	Type 7: 2	2	0
<u>Port-A-Tanks:</u> 2	<u>Fire Shelters:</u> 50		
<u>Portable Pumps:</u> 2			

STATE RESPONSE

Colorado Division of Fire Prevention and Control

The Colorado Division of Fire Prevention and Control (DFPC) is the lead state agency for fire. DFPC's Wildland Fire Management Section (WFMS) is responsible for wildland fire management on local and state lands and aids in the coordination of wildfire management across local, state, and federal agencies. DFPC states that its priority wildland fire mission is "to assist and support local agencies and counties with a range of wildfire management programs including administrative, technical, preparedness and planning, funding, response, and prescribed fire functions" (DFPC 2022b). All fire response agencies operating within Boulder County will adhere to the Incident Command System (Figure B.2) for ensuring efficient and effective mutual response operations.

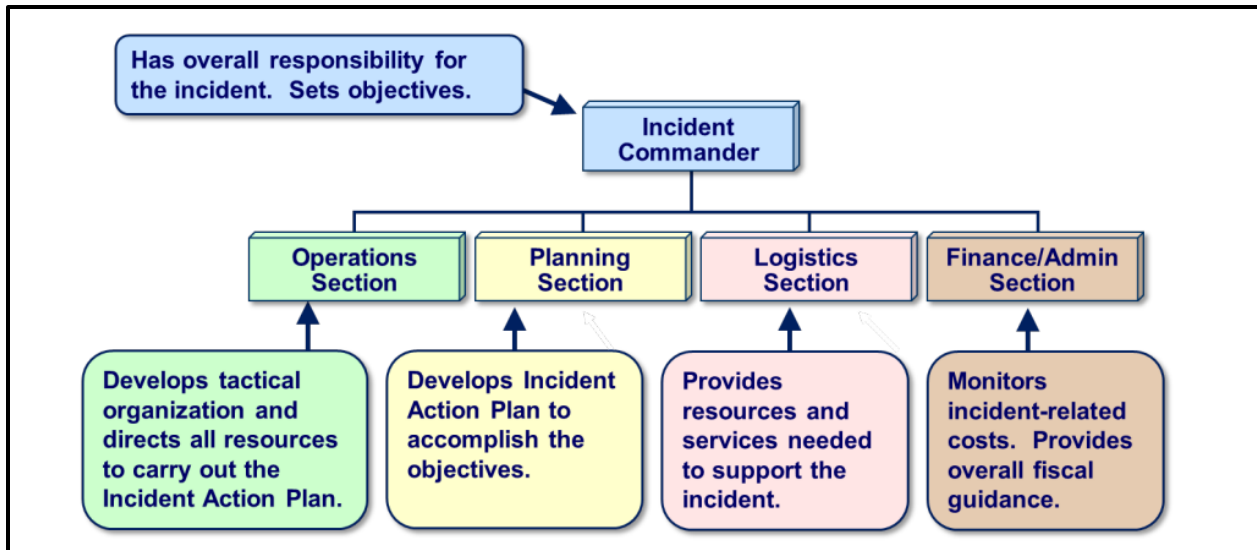


Figure B.2. Incident Command System organizational functions chart describing the structure and primary responsibilities of each section under the Incident Commander in the event of an incident.

On non-federal lands, wildfire management follows a hierarchy of local jurisdiction, to county sheriff, and, finally, to the State of Colorado. The chief of a local FPD is responsible for fires that occur within the boundaries of their district. If a fire is outside of the chief's ability to manage, it is the duty of the county sheriff to assume the responsibility for coordinating fire suppression efforts and requesting assistance from the DFPC. The county sheriff is also responsible for coordinating fire suppression efforts in unincorporated areas of the county. In the event that the county sheriff and DFPC have determined that the County's capacity has been exceeded, the DFPC director will approve state assistance based on the assessment of capacity and availability of funds. If state assistance is approved, the fire becomes a state responsibility area and DFPC assumes cost and management responsibility, along with ongoing involvement from local and County partners (DFPC 2022b).

Boulder County falls in the Coal Creek Region of the Northeast District of DFPC. The Fort Collins Interagency Dispatch Center is responsible for dispatching the initial attack resources of state responsibility areas in the DFPC Northeast District (BLM Colorado State Office n.d.). In Colorado, the state can either provide assistance for fighting fires or be responsible for fighting fires.

FEDERAL RESPONSE

Arapaho and Roosevelt National Forests Pawnee National Grassland

Fire response for the national forest is a multiagency effort with primary response being the responsibility of local ranger districts and the Roosevelt Interagency Hotshot Crew (USDA n.d.[a]). The crew is stationed in Fort Collins but provides response capacity nationwide. Response for the national forest and national grassland is dispatched through the Fort Collins Interagency Dispatch Center (GACC 2023). Additional fires response resources include the Northern Colorado Interagency Helitack and Jeffco Airtanker base, which are headquartered in Broomfield, Colorado. Both organizations are able to provide regional air support for large and small wildfire incidents (USDA n.d.[b], n.d.[c]).

Rocky Mountain National Park

Fire response for Rocky Mountain National Park is managed by the National Park Service and is stationed out of Estes Park, Colorado. The northwestern corner of Boulder County falls under the management of Rocky Mountain National Park. The NPS shares facilities with Estes Valley FPD and is able to deploy several type 6 firefighting apparatus as well as the Alpine Interagency Hotshot Crew. The Alpine Hotshots are a national resource and can respond to incidents anywhere in Boulder County (NPS 2024).

WATER AVAILABILITY AND SUPPLY

The available water resources for fire suppression operations within Boulder County include a combination of municipal hydrants, cisterns, water shuttling, and persistent ponds. Fire suppression operations in areas beyond hydrant service zones rely on cisterns and water shuttling via tenders and engines. As part of the 2024 CWPP Update, Boulder County fire response organizations rated available water resources for fire suppression efforts within their jurisdictions. Most jurisdictions reported acceptable availability of water resources, but certain areas lack hydrants and rely on available port-a-tanks or require water shuttling operations increasing suppression costs and fire control times. Based on the FPD surveys sent out to Fire Chiefs in all FPDs in Boulder County, Pinewood Springs FPD rated their district with the least access to available water sources for fire suppression. Water resources for fire suppression throughout the service area and surrounding region are displayed in Figure B.3. While the scale of the map can make it difficult to discern hydrant locations, the takeaway is that within municipal city limits, water resources are more plentiful while in more rural portions of the planning area, it can be more difficult to find municipal suppression resources.

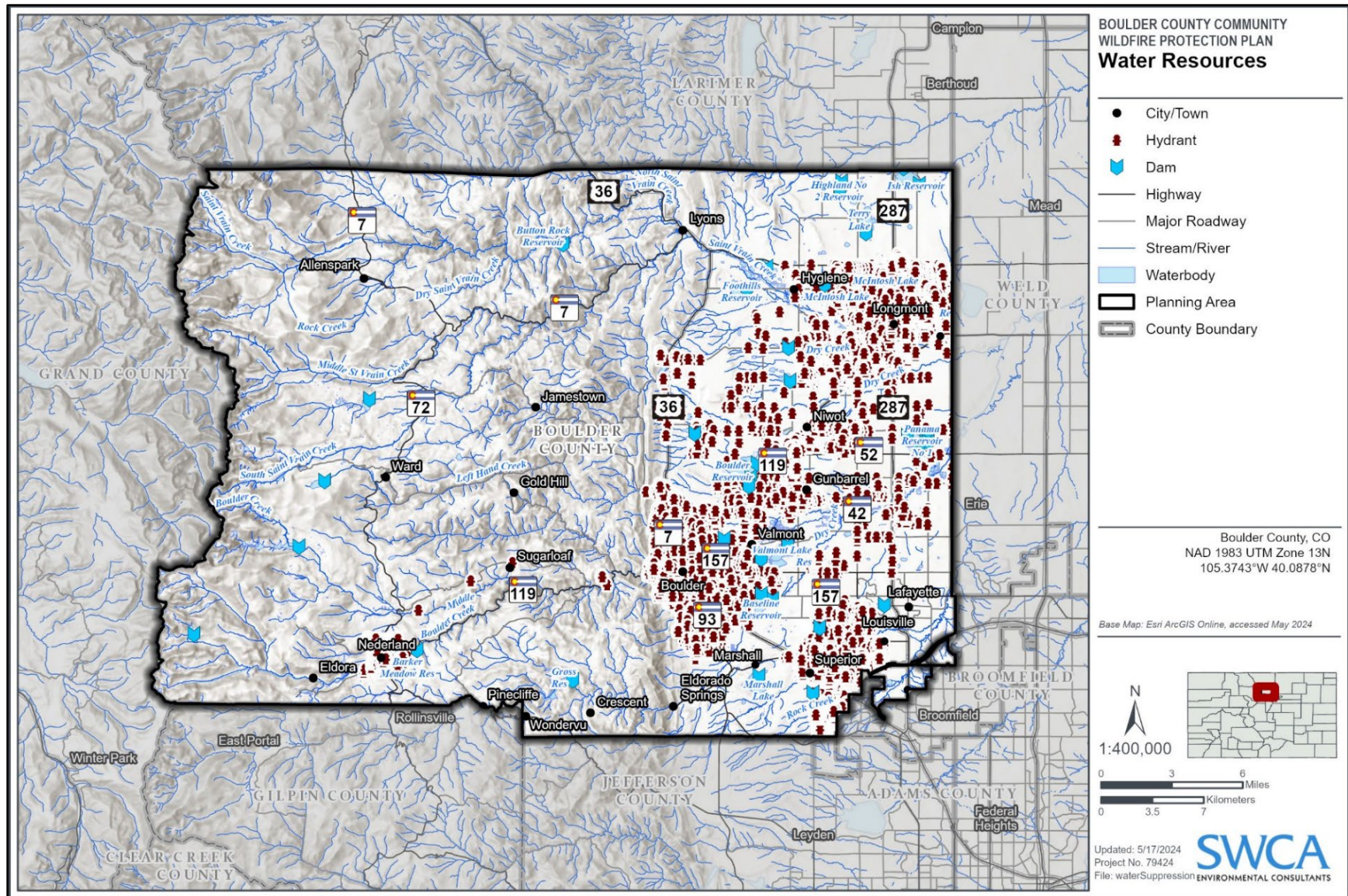


Figure B.3. Map of water resources available for fire suppression for the planning area and surrounding region.

Note: This hydrant dataset is not complete. For the most current information on the fire hydrant system, please reach out to your fire protection district and/or local officials.

EVACUATION RESOURCES

Evacuation relies on both cooperative planning and the capability of residents to effectively comprehend and execute planned evacuation procedures. The Boulder Office of Disaster Management's (ODM's) Multi-Hazard Mitigation Plan highlights the need for evacuation planning for wildfire (Boulder ODM 2022).

Boulder County 2022-2027 Hazard Mitigation Plan: <https://assets.boulderodm.gov/wp-content/uploads/2020/12/hazard-mitigation-plan.pdf>

ODM has developed an [Emergency Preparedness Resource Library](#) to support residents in planning for emergencies and other events. The resource library contains the following among others:

- Creating a Plan Worksheet
- Evacuation Decision Making Information
- Pedestrian Evacuation Preparedness
- Information on Pet and Animal Evacuation
- Information on Shelter in Place

You can find more on ODM events and workshops here: <https://boulderodm.gov/preparedness/events-workshops/>.

The public should follow the latest guidance from trusted sources, such as official government agencies, regarding evacuation orders. Additionally, if you feel unsafe you should evacuate immediately even if you have not received an emergency alert, and individuals who need extra time to mobilize should leave when they receive an evacuation warning. Current evacuation orders should always be adhered to and supersede all information presented in the Boulder County CWPP.

Road Systems

The majority of communities in the eastern portion of the planning area consists of urban and rural roadways with few hazardous features or obstructions for emergency response vehicles and personnel. The primary concern arises in the mountainous canyons of western Boulder County, posing challenges for wildfire evacuations due to steep slopes that limit access for emergency responders and egress routes. Certain trailheads in the planning area's foothills, accessible only via unsurfaced roads (Figures B.4 and B.5) through variably forested areas, are often narrow, lengthy, and winding, with many dead-ends and blind corners. These access roads present heightened hazards during emergency evacuations, especially in areas where thick, dense vegetation lines the roads and dense wildfire smoke can obstruct visibility. Fuel treatments may be needed along some roads where vegetation is overhanging and could prevent safe evacuation of residents or safe access by emergency responders.



Figure B.4. Example of some of the many unpaved and winding roads in the planning area.

Source: City of Boulder (n.d.).



Figure B.5. Example of a narrow access road within Boulder County.

People

The safe and efficient evacuation of people from wildfire requires emergency notification systems, preplanning of evacuation routes, and effective public education and outreach on emergency preparedness. The following sections detail these elements within the county.

Emergency Notification Methods

Boulder County utilizes Everbridge for emergency notification and communication, which functions by sending text and voice messages from local emergency response agencies to the phone numbers and email addresses of those who have signed up and “opted in” for emergency alerts. To reach members of the community who use a primary language other than English, Boulder County also utilizes the ReachWell App, which allows users to receive emergency alert content in over 100 languages. The City of Boulder is also offering a Prepared911 program, where dispatchers in the Boulder Police Department and Fire Communication Center can accept live streamed videos from callers, allowing first responders to respond quickly and appropriately to emergency situations.

Following the Marshall Fire in 2021, Boulder County made numerous improvements to their alert and warning systems including updates to Everbridge making the platform more interactive, enhanced public safety partnerships with Boulder County law and fire agency stakeholders, outdoor warning sirens (currently in Boulder, Eldorado Springs, Erie, Jamestown, Lafayette, Louisville, Lyons, and Superior), and pre-defined alerting areas developed by public safety official for the entire county (Boulder County Sheriff’s Office 2023). In 2022 the county also launched a new emergency alert capability allowing police and fire departments to send Integrated Public Alert Warnings (IPAWS) including Wireless Emergency Alerts (WEA). It is important to note that temporary residents or tourists may not be signed up for emergency alert notifications. The use of IPAWS, including WEA will allow City of Boulder officials to reach out-of-town visitors, unhoused individuals, along with people outside of their opt-in address during life-threatening emergencies. These alerts will reach all enabled cell phones in a specific geographic region without requiring users to opt in or subscribe to the service.

See the following resources to sign up for emergency alerts and Prepared911 for Boulder County and the city of Boulder:

- Everbridge: <https://member.everbridge.net/453003085612231/login>
 - Understanding Emergency Alerting System: <https://assets.bouldercounty.gov/wp-content/uploads/2023/05/understanding-emergency-alerting-systems.pdf>
- Prepare911: <https://www.prepared911.com/>

In addition to the alert systems utilized in and adjacent to the planning area, word of mouth also plays a role in emergency notification, especially in more rural areas where residents may not be subscribers to opt-in alerting systems. When safe to do so, residents should call or text friends, neighbors, and contacts to ensure that they are aware of active alerts.

Community Emergency Response Team

Developed by the Federal Emergency Management Agency (FEMA), the Community Emergency Response Team (CERT) training is a program that educates community members about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical.

For more information, visit FEMA's CERT webpage: <https://www.fema.gov/emergency-managers/individuals-communities/preparedness-activities-webinars/community-emergency-response-team>

Animals and Livestock

In the event of a wildfire, it is important that residents and fire responders within Boulder County have a plan for evacuation of pets and livestock. The loading of horses, for example, during a fire and smoke situation, and transport of stock vehicles down narrow roads under stressful situations, can be very difficult.

The Colorado State University has additional resources for livestock and animals, you can view those resources here: <https://extension.colostate.edu/disaster-web-sites/fire-resources/fire-livestock-resources/>

However, additional public education could emphasize the need for individuals to have a plan for the evacuation of pets and horses in addition to their family, ensuring a lack of planning doesn't slow or prevent evacuation.

Large animals and livestock can be sheltered at the Boulder County Fairgrounds in the event of a wildfire. Additionally, small animals can be sheltered at the Longmont Human Society and Human Society of Boulder Valley during a wildfire. Animals will be held safely while their owners evacuate and will not be available for adoption.



APPENDIX C:

Planning and Policy Background

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PLANNING PROCESS

The SAF, in collaboration with the National Association of Counties and the National Association of State Foresters, developed a guide entitled *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (SAF 2004) to provide communities with a clear process in developing a CWPP. While this guide is now dated, the eight steps for developing a CWPP are still relevant and have been followed in preparing the Boulder County CWPP:

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

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

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

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

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

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

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

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

FIRE MANAGEMENT POLICY

The responsibility for WUI fire prevention and protection lies with property owners and state, county, and municipal governments. Property owners must comply with existing state statutes and local regulations. The current federal fire policy states that protection priorities are 1) life, 2) property, and 3) natural resources. These priorities often limit flexibility in the decision-making process, especially when a wildland fire occurs within the WUI.

The following expands on the "Relevant Plans for Alignment" discussions in Table 1.1, offering more detail on each plan or policy's purpose and indicating where additional information can be found.

LEGISLATIVE DIRECTION

County Direction and Codes

Boulder County Sheriff's Office

In Colorado, each County Sheriff has a statutory responsibility to coordinate wildland fire response within their specified county. Because of the diversity of Colorado, this takes on many different forms throughout the state. The wildland fire history, expansive WUI, and the responsibility for resource management on county lands has created a necessity for resources to supplement the capabilities of the local fire departments within Boulder County.

The County's Fire Code Review Committee oversees the adoption of fire codes from Boulder County FPDs by making recommendations to the Board of County Commissions regarding code acceptance. The promotes effective fire safety standards throughout the County by conducting thorough reviews and ensuring consistency (Boulder County 2024b).

County Burn Permits

In Boulder County, controlled burns are permitted when proper procedural guidelines are adhered to. Open burning permits are required when burning slash piles, while agricultural burns need to be registered, and broadcast burns require a burn plan approved by a County Official. Before conducting any open burn, individuals must read Boulder County's Guide to Burning, ensure no alternatives exist, and comply with regulations. Prior to the burn, the application or registration must be approved and the intent to burn must be logged online or via hotline. Following the fire, completion must be logged, and the proper extinguishing and mop-up guidelines must be followed.

For more information on burn permits, please visit the following webpage:

<https://bouldercounty.gov/safety/fire/burn-permits/>

State Direction

Colorado Minimum CWPP Standards

The 2022 Colorado State Forest Service (CSFS) Minimum Standards for Developing CWPPs provide basic guidelines that have been updated according to Colorado Senate Bill 09-001. The purpose of the described standards is to provide a foundation for supporting healthy, resilient, and fire-adapted communities. The plan has been developed into three overarching goals, which are broken into sub-goals as well as related action items (CSFS 2022a). These goals include but are not limited to:

1. Promote Community Fire Adaptation: Through a deeper understanding of living with wildfire, facilitate social community adjustments, wildfire risk reduction through community enhancement, and an increase of pace and scale of wildfire risk reduction efforts.
2. Reduce the Risk of Uncharacteristic Wildfire: Reduction of wildfire severity through forest alteration, maintenance and enhancement of species and structural diversity, and revegetation of sites through species transitions before and after disturbances.

3. **Promote the Role of Fire in Ecological Processes:** Fundamental sustainability through ecological functions, improving the understanding of the role of fire in Colorado's ecosystems, and increasing the use of managed and prescribed wildfire.

The standards specify that the planning process should be as inclusive as possible to address the needs of socially vulnerable populations and ensure all residents' concerns are represented in the plan. CSFS also requires mapping of the WUI, completion of a Risk-Hazard Assessment, and identification of priority projects including fuel treatment recommendations. These requirements aim to provide the community with actionable recommendations on risk reduction and resilience. The USFS recommends updating CWPPs at 5-year intervals to ensure project objectives, demographics, and Risk-Hazard assessments are relevant (CSFS 2022a).

For additional details on the 2022 CSFS Minimum Standards, please visit: https://csfs.colostate.edu/wp-content/uploads/2022/03/2022-CSFS_CWPP_Min_Standards.pdf.

Colorado Strategic Wildfire Action Program

In 2021, Colorado Senate Bill 21-258 was signed by Governor Polis. This bill designates \$17.5 million to immediately address the wildfire crisis in Colorado through mitigation and community resilience work. This objective will be realized by increasing funding to the Forest Restoration and Wildfire Risk Mitigation Grant Program and other fire-related funding mechanisms, providing funds to hire additional mitigation and firefighting personnel, and establishing a hazard mitigation and capacity development fund. This bill marks a statewide recognition of the extreme hazards wildfires create and an investment in creating more fire-resilient landscapes (CDNR 2022a).

Colorado Forest Action Plan

In 2020, the CSFS developed Colorado's Forest Action Plan (CSFS 2020). The purpose of the plan was to provide a framework for addressing the "current conditions and trends in Colorado's forests, as well as the current threats and challenges the state's forests face across political, jurisdictional and ecological boundaries." Priorities of the Forest Action Plan include the following: "Conserve and manage working forest landscapes", "protect forests from threats", and "enhance public benefits from trees and forests". This plan is centered around six themes, but the four themes most important this CWPP are:

1. **Forest Conditions** focuses on the current conditions of Colorado's forests, present and future pressures, and the challenges forests are facing from climate change (e.g., longer fire seasons and more uncharacteristic wildfires).
2. **Living with Wildfire** focuses on the natural role wildfire plays in Colorado's forests and rangelands. It emphasizes that fire exclusion and suppression efforts of the past are no longer appropriate and, when combined with the impacts of climate change, have put communities at heightened risk from wildfire. It also states that communities must practice wildfire risk reduction strategies as WUIs expand across the state.
3. **Watershed Protection** focuses on the risks that uncharacteristic droughts and wildfires pose to Colorado's watersheds. This theme emphasizes the link between forest health and watershed health.
4. **Forest Products** focuses on the importance of the logging industry in Colorado and describes the economic impact that declines in forest health (e.g., wildfire, overgrowth, and disease and insect associated mortality) have had on the industry.

This plan estimates that 10% of Colorado's 24 million acres of forest are in "urgent need of treatment to address forest health, wildfire risk and watershed protection threats, at a cost of approximately \$4.2 billion." This plan provides detailed direction for Colorado to meet its forest treatment goals.

HB22-1111 (Insurance Coverage for Loss Declared Fire Disaster)

In 2022, Colorado passed HB-1111, which increases the amount of lost property insurers must cover upfront and extends the time frame that victims of wildfire have to rebuild their homes. This bill was signed by Governor Polis in 2022 and outlines standards and restrictions for home insurers when covering instances of total loss from wildfire events. This bill includes, but is not limited to, the following requirements:

- There will be a minimum of 24 months to collect additional living expense coverage with two extensions of 6 months.
- Homeowners cannot be denied insurance payment if they decide to rebuild in a different location than their previous home or if building code updates will make rebuilding costs higher than the home value.
- If a policy requires repair or rebuild in order for the owner to collect payments, the owner shall be allowed 36 months to submit invoices.
- Homeowners have the right to use all available rebuild benefits to buy a replacement home.
- Homeowners can collect 65% of contents benefits without having to inventory a lifetime of possession.
- Homeowners have the right to know how an insurer calculated depreciation.

Additional measures of this bill ensure homeowners can recoup money from furniture and other items lost in a fire and establishes a mandatory time that insurers must cover living expenses. This bill applies only to future declared fire disasters (Colorado General Assembly 2022b).

Federal Direction

Federal wildfire planning has historically been guided by the U.S. Department of the Interior (DOI), who stated in its 2017 Wildland Fire Management Department Manual (DOI 2017) that all public lands with burnable vegetation must have a fire management plan. Subsequent efforts, including the National Fire Plan (NFP) in 2000 and the Healthy Forests Restoration Act (HFRA) in 2003 (revised in 2009), which further incentivized the development and highlighted the importance of CWPPs, emphasized collaboration, and expedited hazardous fuels reduction projects (Public Law 108–148, 2003; H.R. 4233 - Healthy Forest Restoration Amendments Act of 2009). CWPPs are an effort to enhance collaborative wildfire management approaches between federal agencies and communities, prioritize treatment areas, and secure grant funding priority to communities with an established CWPP.

In 2023, the Wildfire Leadership Council sought to update and enhance the strategic direction of the 2014 National Cohesive Wildland Fire Management Strategy framework. This was done through the 2023 National Cohesive Wildland Fire Management Strategy Addendum Update (Forests and Rangelands 2023). The updated strategy highlights critical emphasis areas that were not identified in the previous framework.

Included among these emphasis areas are:

1. Climate change
2. Workforce capacity, health, and well-being
3. Community resilience (preparation, response, and recovery)
4. Diversity, equity, inclusion, and environmental justice

Thorough analysis of these emphasis areas is provided for within the addendum update report, along with new management options to address them.

PAST PLANNING EFFORTS

Local

2004 Boulder County Noxious Weed Management Plan: The purpose of this plan is to establish effective management practices for noxious weeds within Boulder County that threaten the ecology and economy of the county. The plan highlights methods and practices that use various environmentally harmless and economically feasible techniques. The plan also aligns with state mandates and the Boulder County Comprehensive Plan (Boulder County 2004). Updates to the 2004 Boulder County Noxious Weed Management Plan are in progress and will be approved by approximately June 2024.

2010 Boulder County Parks and Open Space Forest Management Policy: This 2010 policy aims to preserve rural land, natural resources, cultural resources, and recreational resources. The policy establishes goals for healthy forest ecosystems, fire management, insects and diseases, and biomass utilization. Monitoring strategies, agency collaboration, and public involvement are also incorporated into the Forest Management Policy (Boulder County 2010).

2011 Boulder County CWPP: The aim of this CWPP was to reduce the risk of wildfire to people, property, and natural resources in Boulder County. This CWPP outlined a comprehensive approach to wildfire mitigation that includes recommendations for reducing hazardous fuels, creating defensible space, improving emergency response, and increasing public awareness and education. Emphasized within the plan is the importance of community action in coordinating defensible space work with neighbors, creating community fuel breaks, securing funding for mitigative action, and encouraging nearby landowners to reduce hazardous fuels on their property. The Boulder County CWPP was developed through a collaborative process involving local, state, and federal agencies, as well as community members and stakeholders, with a funding strategy that utilizes grants, local tax dollars, and using existing resources more efficiently (Boulder County 2011).

2012 Boulder County Parks and Open Space Water Policy: The purpose of this policy is to guide the uses of water owned and managed by Boulder County Parks and Open Space. The policy provides a framework for Boulder County staff to use and applies to County properties or properties held by other municipalities in partnership with the County. The policy aims to manage water in an effective, sustainable, and efficient manner while supporting agriculture, maintaining riparian corridors, and other recreational and environmental functions (Boulder County 2012).

2021 Boulder County Parks and Open Space Cropland Policy: The goal of this policy is to conserve natural, cultural, and agricultural resources through sound resource management. This policy directs Boulder County Parks and Open Space in the management of cropland on agricultural properties owned

by the County and leased to tenants and applies to farmers managing croplands on County-owned open space. Sustainability and accountability are at the forefront of this policy (Boulder County 2021a).

2022 Boulder County Parks and Open Space Prairie Dog Habitat Element of the Grassland

Management Plan: This element of the Grassland Management Plan aims to balance wildlife habitat protection goals with preservation of agriculture. The plan promotes the County's agricultural heritage and highlights a management strategy that results in prairie dogs thriving where appropriate on County-managed properties. The overarching goal is to preserve, protect, and enhance prairie dog populations in suitable grassland habitats (Boulder County 2022a).

2023 Grassland Management Story Map: The Watershed Center, in collaboration with the Boulder County Fireseeded Grasslands Working Group, created an easily accessible story map that aims to provide information about grassland management in Boulder County to the public. The story map is guided by the County's Grassland Management Plan and presented in a digestible format that highlights actions that communities and individuals can take, common management practices, and long-term grassland management projects currently being taken by the County (Boulder County 2023e).

Boulder County Parks and Open Space Management Plans: Boulder County creates and adopts unique management plans tailored to their Parks and Open space. Most of the management plans adopted by Boulder County are location-specific and collaborative between the County, local municipalities, key stakeholders, and residents. The goal of these plans is to guide management, use, and development of open space within Boulder County (Boulder County 2024d).

Boulder County Species Conservation and Recovery Plans: Boulder County Parks and Open Space currently has Species Conservation and Recovery Plans (SCRPs) published for 14 species of flora and fauna. These plans are to be used by private landowners, the public, and Boulder County staff to inform land management strategies. Boulder County staff continue to develop SCRPs as supplements to the Boulder County Comprehensive Plan (Boulder County 2024g).

Boulder County Comprehensive Plan and Boulder County Land Use Code: The Comprehensive Plan was developed to ensure the County makes decisions affecting the future of the county's lands in a coordinated and responsible manner that reflects the values of the county. The Boulder County Land Use Code protects and promotes the health, safety, and general welfare of the present and future inhabitants of Boulder County and guides future growth, development, and distribution of land uses within Boulder County. Both the Comprehensive Plan and Land Use Code guide the physical development of unincorporated Boulder County (Boulder County 2020).

Boulder County Comprehensive Plan Natural Hazards Element: The Natural Hazard Element aims to limit inappropriate development in hazard areas and mitigate existing risk. This element highlights the elevated risk of development in the WUI, the fire-dependence of local ecosystems, opportunities for interjurisdictional and interagency cooperation, and forest management (Boulder County 2020).

Boulder County Hazard Mitigation Plan: The 2022 HMP was produced as an update to the 2016 HMP to protect life and property from natural hazards. The plan assesses all natural hazards that have the potential to occur in the county and outlines recommendations for mitigating hazards and protecting the community and infrastructure. The 2022 update includes consideration for climate change impacts on hazard severity and frequency. The plan is assessed annually to record project progress and accomplishments (ODM 2022).

Boulder County OSCAR Sustainability, Climate Action, and Resilience Plan: The 2022 Sustainability, Climate Action, and Resilience Plan was developed to improve environmental justice and sustainability and outline a path for achieving climate action and resiliency goals. The plan is broken into

strategic priorities, including those for air quality, climate, ecological health, energy and buildings, local food and agriculture, transport, water, and circular economy. Each priority includes strategies for improvements such as policy and individual actions (Boulder OSCAR 2023).

State

2018–2023 Colorado Hazard Mitigation Plan: The 2018–2023 Colorado Hazard Mitigation Plan was developed by the Colorado Department of Public Safety in 2023. The Plan is designed to maintain a framework for implementing hazard mitigation actions and minimizing the impacts of hazards across the State. The Plan breaks down planning into categories regarding identifying hazards, implementation, and response capabilities, planning at local levels, and maintaining plans. Wildfire is identified as a high annual hazard with large associated economic losses. Recommended mitigation actions include developing and maintaining CWPPs (Colorado Department of Public Safety 2018).

2019 State Emergency Operations Plan: The State Emergency Operations Plan was implemented in 2023 by the Colorado Division of Homeland Security and Emergency Management. The purpose of the Plan is to establish guidelines on how Colorado provides response and recovery actions for emergencies and disasters. The Plan provides a single framework for response, with specific details of response varying based on the type and severity of incident. For wildfire, the plan emphasizes the importance of preparedness, coordinated interagency response, and clear assignment of responsibilities (CDHSEM 2023).

2020 Colorado State Forest Action Plan: The Colorado State Forest Action Plan was developed by the CSFS in 2020. The Plan provides a framework for identifying forest stewardship priorities within the state by accounting for forest constraints, threats, trends, and jurisdictional boundaries. The Plan breaks forest management into six categories: conditions, living with wildfire, watershed protection, wildlife, urban and community forestry, and forest products. Strategies for cooperatively addressing these categories while achieving healthy forest goals are also discussed. Key wildfire priorities outlined in the Plan include promoting community wildfire adaptation, reducing risks of severe wildfires, and promoting the ecological role of wildfires (CSFS 2020).

2023 Wildfire Preparedness Plan: The 2023 Wildfire Preparedness Plan was prepared by the Colorado Division of Fire Prevention and Control and provides an overview of the Division's wildfire response capabilities. Specific numbers and types of ground, aviation, and other support resources are outlined, along with additional needs and considerations (DFPC 2023).

Federal

National Fire Plan: The National Fire Plan (Managing the Impact of Wildfires on Communities and the Environment) was implemented by the U.S. Department of the Interior and the USFS in 2000. The Plan was established to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient firefighting capacity for the future. Focuses of the Plan are on firefighting preparedness and accountability, forest restoration, hazardous fuels reduction, community assistance, and research (Forests and Rangelands 2000).

A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-year Implementation Strategy: This Plan was most recently updated in 2006 and focuses on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, mitigating risks to communities, providing economic benefits, and improving fire prevention and suppression strategies. The Plan also emphasizes information sharing and monitoring of accomplishments and forest conditions, a long-term commitment to maintaining the essential resources for implementation, a

landscape-level vision for restoration of fire-adapted ecosystems, the importance of using fire as a management tool, and continued improvements to collaboration efforts (Forests and Rangelands 2006).

Arapahoe and Roosevelt National Forests and Pawnee National Grassland Land and Resource

Management Plan: The Plan was revised in 1997, last updated in 2019, and is the guiding land management document for the Arapahoe National Forest. The Plan recognizes the natural role and importance of wildfire in mountain ecosystems and outlines that significant efforts should be made to reduce wildfire hazards. These efforts include fuel management such as targeted timber harvest, wildfire-habitat improvement, and invasive species control to reduce risk to lives and property while improving forest health. Public education around wildfire protection is also emphasized in the Plan (USFS 2019).

Rocky Mountain National Park Master Plan: The 1976 Rocky Mountain National Park Master Plan Outlines a comprehensive vision for the management and preservation of Colorado's largest national park, encompassing a wide range of mountainous environments. Developed through extensive consultation with stakeholders and the public, the plan aims to balance conservation efforts with visitor experience and enjoyment. Key elements include strategies for protection wildlife habitats, managing recreational activities sustainably preserving historical and cultural resources, and addressing infrastructure needs. by integrating environmental stewardship with visitor education and engagement, the plan seeks to ensure the long-term health and vitality of the park while providing a meaningful experience to visitors (NPS 1976).

The National Cohesive Wildland Fire Management Strategy: The Strategy outlines a holistic approach to the future of wildfire management, with the goal of managing forests to coexist with wildland fire but containing incidents when necessary. The Strategy maintains that this goal will be achieved by restoring and maintaining landscapes, developing fire-adapted communities, and maintaining sufficient wildfire response capabilities (Forests and Rangelands 2021).

PUBLIC LAND MANAGEMENT

LAND MANAGEMENT STRATEGIES

Local and State Land

Land management practices related to wildfire mitigation in Boulder County adhere to the guidance outlined in the Boulder 2011 County CWPP. The plan provides guidance for mitigating wildfire risk to residents, property, and the environment by outlining strategies for reducing hazardous fuels, establishing defensible space, enhancing emergency capabilities, and raising public awareness.

The Boulder County Comprehensive Plan, adopted in April of 2020, outlines focus areas, including ecosystem health, agricultural sustainability, recreation, community involvement, and financial sustainability, to guide land use and reflect the accepted principle that future land use decisions affecting county land should be made in a responsible and coordinated manner (Boulder County 2020). Public land in the planning area aligns with state guidance, as reflected in the 2020 Forest Action Plan by the CSFS, emphasizing management goals, fuel reduction treatments in priority regions and providing guidance on fund allocation for maximum impact (CSFS 2020).

Moreover, the 2023 Colorado Wildfire Preparedness Plan plays a pivotal role in shaping wildfire mitigation as it pertains to planning and land management strategies in Colorado (DFPC 2023). It covers aerial firefighting, equipment availability, personnel staffing, aligning with statewide mobilization planning and providing a breakdown of the hierarchy of local, County, and State jurisdictions when dealing with fires

(DFPC 2023). See Appendix A, “Fire Response Capabilities,” for more information regarding incident management.

The State of Colorado has joined forces with major federal agencies, namely the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture, Bureau of Indian Affairs, and National Park Service, to form the Colorado Cooperative Wildland Fire Management and Stafford Act Response Agreement. The agreement focuses on interagency cooperation, the use of interagency fire resources, operations, and preparedness (DFPC 2021).

Federal Land

Arapahoe and Roosevelt National Forests (USFS)

The Arapaho and Roosevelt National Forests are managed by the USFS. Situated along the Continental Divide, these forests showcase Colorado's diverse mountain ecosystems with glacial peaks, snowfields, lakes, alpine tundra, and varied vegetation (USFS 2022). These forests are intersected by the boundaries of the Boulder Source Water Protection Zone, specifically the Barker Reservoir Watershed (Middle Boulder Creek watershed) and North Boulder Creek watersheds, which are densely forested. These areas, known for high recreational use, feature popular destinations like Rainbow Lakes, the Fourth of July Trail, and West Magnolia. However, due to concerns such as damaged vegetation, compromised water quality, and the wildfire risk associated with illegal campfires, the USFS has implemented restrictions on backcountry dispersed camping in recent years (City of Boulder 2023).

The 1997 revision of the Land and Resource Management Plan guides the Arapahoe and Roosevelt National Forests' land management. Strategies to reduce wildfire hazards include fuel management (prescribed burns, mechanical thinning), targeted timber harvest, wildfire-habitat improvement, and invasive species control. Emphasizing human-caused fire prevention, community protection, collaborative efforts, and public education, the plan recognizes the natural role of wildfire in mountain ecosystems (USFS 2022).

Rocky Mountain National Park (NPS)

Rocky Mountain National Park is managed by the National Park Service (NPS). With a focus on preserving the natural integrity of the park, the NPS aims to maintain a balance between human use and conservation (NPS 2024). The park embraces a philosophy of minimal development, preferring to rearrange or reduce existing facilities rather than introducing major new developments. Emphasis is placed on minimizing human impact, with careful attention to the preservation of natural processes and ecosystems. Management objectives include allowing for year-round access, resource preservation, and ensuring that visitors can properly utilize the landscape and leave the park with lasting understanding of the park's natural and historic offerings (NPS 1976).

Due to the inevitable and vital role of wildfire in the Rocky Mountain National Park's landscape, great emphasis is placed on wildland fire management. The Wildland Fire Management team, part of the Resource Stewardship division, aims to enhance safety while preserving natural and cultural resources throughout the park. Their strategy is comprised of a comprehensive fuels program and effective wildfire response. This involves strategic fuels load reduction through vegetation thinning and prescribed burns, with the goal of reducing fire duration and allowing for safe firefighting conditions. In addition, the team collaborates with agencies like the Alpine Hotshots to respond to fires in with effective and appropriate action (NPS n.d.)

Table Mountain Field Site and Radio Quiet Zone (U.S. Department of Commerce)

The U.S. Department of Commerce Table Mountain Field Site and Radio Quiet Zone is located among the open space north of Boulder just east of U.S. Route 36. The site serves as a hub for the research activities of several entities, including the Institute of Telecommunications Sciences, the National Ocean, and Atmospheric Administration (NOAA), the National Institutes of Standards and Technologies (NIST), the National Telecommunications and Information Administration (NTIA), and the U.S. Geological Survey (USGS). The site's management responsibilities reside with the Director of the ITS (NTIA 2023).

NIST Boulder Laboratories (U.S. Department of Commerce)

Managed under the U.S. Department of Commerce, the NIST Boulder Laboratories support manufacturing and innovation by providing research, measurements, technology, tools, data, and services for various industries. The laboratories employ over 350 scientific, technical, and support staff, hosting hundreds of visiting researchers, students and contractors (NIST 2022, 2023b)

National Center for Atmospheric Research (National Science Foundation)

Established by the National Science Foundation, the National Center for Atmospheric Research's (NCAR's) mission is to provide the global atmospheric and earth system science community with cutting-edge resources and facilities. Among a wide range of other focuses, the center's scientists are actively engaged in projects such as improving wildfire behavior models, studying the air quality impacts of smoke plumes, and exploring the influence of climate change on wildfires (NCAR 2023a, 2023b).



APPENDIX D:

Fire Behavior Modeling/GIS Background and Methodology

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FIRE BEHAVIOR MODELING AND METHODOLOGY

COLORADO ALL LANDS QUANTITATIVE WILDFIRE RISK ASSESSMENT

Fire behavior models were sourced from the Colorado All Lands (COAL) Quantitative Wildfire Risk Assessment developed by Pyrologix LLC in partnership with several federal and state land management agencies across Colorado. Efforts to create the quantitative wildfire risk assessment began in 2019 and concluded in 2021 (Pyrologix 2022a). The assessment utilizes a collaboratively calibrated fuelscape, state-of-the-art modeling methodologies, and a set of collaboratively defined HVRAs standardized across Colorado.

This risk assessment improves upon previous risk assessment efforts by improving the burnable calibrations for various fuel types like urban and agricultural fuels in addition to removing data seam lines. The assessment incorporates both stochastic and deterministic models to accurately model wildfire behavior (deterministic) and then predict burn probabilities and integrated hazards (stochastic). Deterministic models utilize known inputs to calculate a single deterministic answer. In contrast, stochastic models utilize known inputs in thousands of simulated scenarios, also known as a Monte Carlo simulation, to calculate the probability of different answers occurring. Additionally, the COAL Quantitative Wildfire Risk Assessment makes use of conditional outputs and probabilistic outputs to inform users of objective hazards (conditional) and calculated risk (probabilistic). More on these statistical theories as well as modeling methodology is explained below.

CONDITIONAL VS. PROBABILISTIC OUTPUTS

The COAL Quantitative Wildfire Risk Assessment makes use of conditional model outputs multiplied by probabilistic model outputs to produce spatial risk metrics for the operational, fire effects and integrated hazard products listed below. Conditional outputs show results for the entire landscape as if everything had the same chance of burning and show modeled wildfire behavior and hazard as a result of existing conditions. The probabilistic outputs are a product of conditional metrics multiplied by burn probability which is predicted by simulating thousands of fires based on historic weather and wind conditions for the area. This is done for each grid square (30 m) on the landscape to create a gradient (raster) of probability for metrics such as burning, operational control, and risk to structures. Conditional outputs are typically best utilized by operational resources who want to see what the fire behavior would be like during an active wildfire incident, regardless of probability. Alternatively, probabilistic outputs give a more comprehensive representation of wildfire risk on the landscape and are best for prioritization and community planning efforts, as they incorporate the odds of any future fire impact.

FIRE BEHAVIOR MODELS

LANDFIRE

LANDFIRE is a national remote sensing project that provides land managers with a data source for all inputs needed for fire behavior models (fuels, topography and canopy characteristics). The database is managed by the USFS and the USDOJ and is widely used throughout the United States for land

management planning. More information can be obtained from <http://www.landfire.gov>. The COAL Quantitative Wildfire Risk Assessment utilized many of the fuel models housed within LANDFIRE but made significant adjustments to create a better match for Colorado's fire environment (Pyrologix 2022b). Specifically, Pyrologix has recalibrated previously non-burnable fuels to account for burnable agricultural and urban lands such as parks. Additionally, the updated fuelscape removes raster tile seamlines in raster datasets which have occurred throughout the district in base LANDFIRE remaps. To produce locally accurate fire behavior results, a 2-day fuel calibration workshop was held in Lakewood, Colorado with a group of interagency fire and fuels experts from across Colorado (Pyrologix 2022b).

FSim

FSim (Large Fire Simulator) is a wildfire simulation program developed by the USFS fire sciences laboratory in Missoula, Montana. The program utilizes a stochastic Monte Carlo method to simulate hundreds of thousands of fire events across large land areas using a variety of input parameters such as fire occurrence, terrain, weather, and fuel conditions (Pyrologix 2022c). This analysis method allows for the quantification of wildfire risk as it relates to fire impact probabilities and sizes. Pyrologix has used FSim for the COAL Quantitative Wildfire Risk Assessment to calculate outputs associated with wildfire likelihood and burn probability for the integrated hazard products (Pyrologix 2022c).

WildEST

Pyrologix recognized the challenges of estimating wildfire intensity with a stochastic simulator such as FSim. Stochastic models rely on a robust sample size, so, in low fire occurrence areas stochastic simulators will be less reliable due to the small sample size. Therefore, Pyrologix developed a custom utility called WildEST (Wildfire Exposure Simulation Tool). WildEST is a deterministic model that calculates intensity values from weighing spatially continuous weather input variables based on how likely they will occur on the landscape (Pyrologix 2022c). Deterministic values are more robust than FSim's stochastic values, especially in areas with relatively low wildfire occurrences such as the City of Boulder. Pyrologix has used WildEST to calculate wildfire intensity outputs (flame front characteristics) such as flame lengths and rate of spread for the COAL Quantitative Wildfire Risk Assessment (Pyrologix 2022c). The deterministic fire behavior outputs were derived from WildEST simulations using 216 real-world weather scenarios. See the Historical Weather section below.

FIRE BEHAVIOR MODEL INPUTS

The assessment utilizes LANDFIRE's 2016 fuel model remap for producing a current conditions fuelscape for the COAL statewide assessment. Significant updates to the fuelscape were conducted after the release of LANDFIRE's 2019 remap. Additionally, Pyrologix made use of 2021 satellite imagery to calculate continuous vegetation cover and height classifications to predict wildfire behavior more accurately. Furthermore, the 2020 fire season had a significant impact on fuels and in order to represent current conditions Pyrologix updated the fuelscape to incorporate changes in fuels resulting from the 2020 fire season (Pyrologix 2022a). Current conditions are constantly changing, and it is imperative to constantly update the source fuel model data for maintaining reliable fire behavior and wildfire risk results.

An in-depth overview of Pyrologix's fuelscape inputs are available here:

http://pyrologix.com/reports/COAL_FuelscapeReport.pdf

The following is a list of fuel characteristic inputs used in the creation of the COAL fuelscape:

- Surface Fuels
- Canopy Fuels
 - Canopy Cover
 - Canopy Height
 - Canopy Bulk Density
 - Canopy Base Height
 - Canopy Overrides
- Recent Disturbances
- Developed Ruderal Vegetation Types
- Canopy Bulk Density Adjustments for Insects and Disease
- Custom Fuel Model Assignments
 - High Elevation-Subalpine Vegetation
 - Burnable Agriculture and Urban Fuel Models

TOPOGRAPHY

Topography is important in determining fire behavior and is a required input for FSim and WildEST models. Steepness of slope, aspect (direction the slope faces), elevation, and landscape features can all affect fuels, local weather (by channeling winds and affecting local temperatures), which in turn influence the behavior of wildfire (Figure D.1). Boulder County contains complex topography in the western portion of the planning area in particular.

More detailed information regarding topography in the planning area can be found in Appendix A.

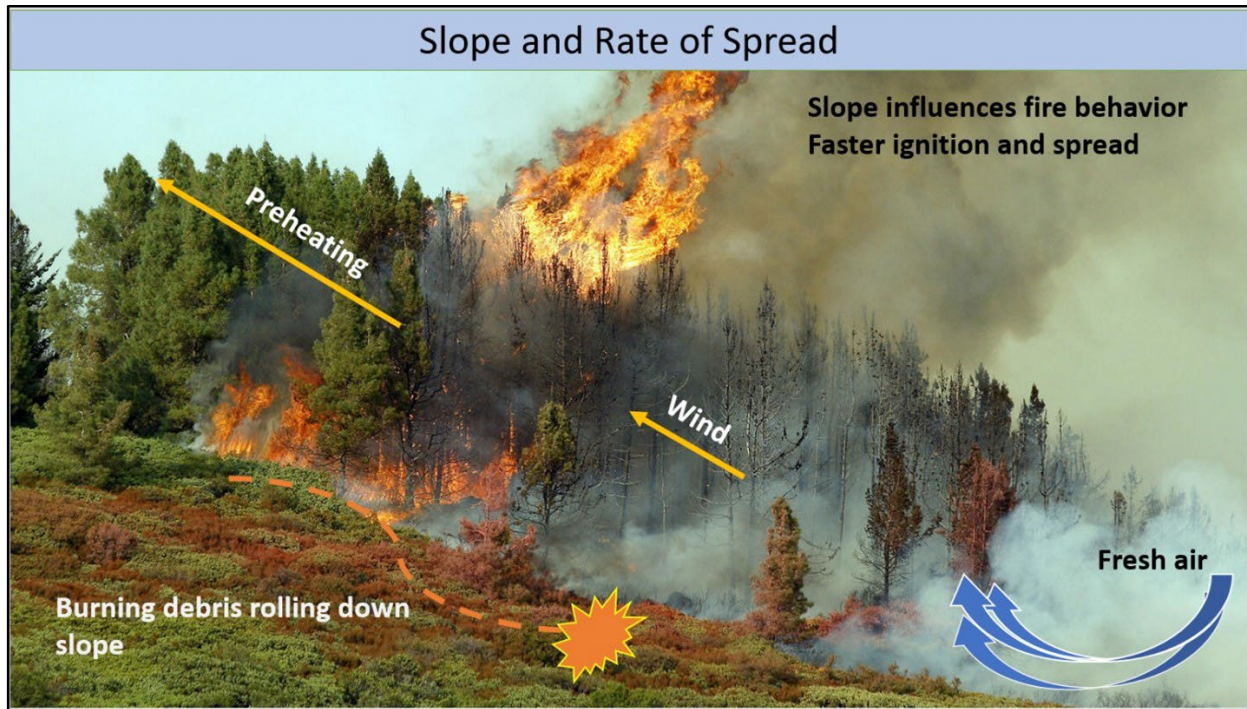


Figure D.1. Effect of topography on fire behavior.

HISTORICAL WILDFIRE OCCURRENCE

Fire occurrence data spanning 26 years from 1992 to 2017 were used to develop model inputs, an ignition density grid, and model calibration targets (Pyrologix 2022c). For detailed information on historical wildfire occurrence methodology go to: http://pyrologix.com/reports/COAL_HazardReport.pdf. See the Fire History section in Chapter 2 for detailed information on wildfire history in and around the Boulder.

Fire Occurrence Density

Pyrologix utilized the program FSim to create an ignition density grid to represent the relatively large fires that may occur across Colorado. The ignition density grid within FSim produced a spatial pattern of large fire occurrences which were calibrated with historical wildfire occurrences across five different calibration regions within Colorado to produce a viable prediction of large fires throughout Colorado. Within the planning area, fires ignition densities are greatest around the community of Nederland and north of Nederland, south of Ward, east of Route 72.

HISTORICAL WEATHER

Of the three fire behavior components, weather is the most likely to fluctuate. Accurately predicting fire weather remains a challenge for forecasters. As rising temperatures dry fuels in the late spring, summer and early fall, dry conditions can be exacerbated, creating an environment that is susceptible to wildland fire. Fine fuels (grass and leaf litter) can cure rapidly, making them highly flammable in as little as 1 hour following light precipitation. Low live fuel moistures of grass, shrubs, and trees can significantly contribute to fire behavior in the form of fast rates of spread, crowning and torching.

A selected list of ten Remote Automatic Weather Stations (RAWS) was used to produce FSim results. Selected RAWS were distributed across Colorado with relatively long and consistent records. RAWS were also selected using suggestions from local fire personnel with knowledge of RAWS with the most representative data. FireFamilyPlus Version 4.1 was used to generate fire risk files for each RAWS (Pyrologix 2022c). The weather inputs used within FSim were:

- Monthly distribution of wind speed and direction
- Live and dead fuel moisture content
- Seasonal trends in the mean and standard deviation of the Energy Release Component (ERC)
 - ERC values were sourced from Dr. Matt Jolly's publicly available ERC raster for the period 1992-2017.
 - ERC sample sites were distributed throughout Colorado similar to RAWS.

Additionally, Pyrologix utilized FSim to generate stochastic fire ignitions based on historical relationships between large fires and ERC. This was then used to determine burn probabilities.

FIRE BEHAVIOR MODEL OUTPUTS

BURN PROBABILITY

Burn probability (Figure D.2) is calculated using FSim large fire simulator. FSim places hundreds of thousands of ignitions on the modeled landscape. The ignition locations are randomly assigned, with a slight bias to where fires have historically occurred. The physics-based growth model allows these ignitions to spread according to the complete historical distribution of fire weather for the area. Some modeled fires do not spread, some spread minimally under mild weather conditions, and some grow very large under extreme weather conditions. After many iterations, the landscape is saturated with modeled fire perimeters to assign a mean annual burn probability. Every 30 square meters (after downscaling) is assigned a burn probability of low to high, which was based on the local fuels, topography, and weather for that area. Calibration was done to ensure that the number and size of modeled fires align with what has occurred historically, while still allowing for larger and more extreme rare events. Burn probability is an important component of the wildfire risk framework as it is necessary for calculating expected results (see the expected risk to potential structures map [Figure 3.10 or Figure D.13]).

RATE OF SPREAD

Rate of spread (Figure D.3) is calculated in WildEST and is a weighted average rate quantified in meters per minute for each pixel in the fuelscape. Rate of Spread includes contributions from crown fire under given weather scenarios. Within Boulder County, rates of spread range from 0 to 64 meters per minute. In the steep sub-alpine regions of western Boulder County, with high timber fuel loads, rates of spread are the highest between 32 and 64 meters per minute. At more moderate elevations and lower as you move east in the County, rates of spread are lower between 0 and up to 16 meters per minute, depending on topography, fuel, and other factors as aforementioned.

FLAME LENGTH

Flame length (Figure D.4) is calculated by WildEST and is a weighted-average flame length quantified in feet for each pixel in the fuelscape. Flame length includes contributions from crown fire under severe weather scenarios. For example, high winds may cause fire to spread in the crown of trees. This crown fire flame length is then incorporated into the flame length output where topography, weather, and fuels are conducive to crown fire occurring. Flame lengths are highest (11–25+ feet) in the forested regions of the western portion of the County. Much of the open space and grasslands in the east are modeled to experience potential flame lengths of 0 to 8 feet with higher flame lengths expected in the grasslands west of Superior and south of Boulder as well as surrounding the town of Lyons.

PROBABILITY OF OPERATIONAL CONTROL

The probability of exceeding flame length thresholds for manual control of wildfire is 4 feet (Figure D.5), and for the mechanical control of wildfire, it is 8 feet (Figure D.6). Within Boulder County, the area with the greatest probability of exceeding both manual and mechanical control is in the forested sub alpine and montane areas in the western portion of the County. In the eastern portion of the County, operational control is modeled to be more difficult in the open space south of the City of Boulder and in the areas surrounding the Town of Lyons. Operational control is most attainable in the more populated eastern Plains of the County north of Lafayette and south of Lyons.

EMBER LOAD INDEX

Ember load Index (ELI) is derived from modeled fire behavior at the head of the fire and represents the relative ember load being received at any given pixel (30 m). To calculate this, simulated embers are produced and launched based on fire behavior, topography, wind, fuel, and canopy characteristics at the source. Burn probability is incorporated before the embers are distributed downwind where the model tracks the number of hot embers reaching the source to derive the ember load index.

The COAL modeling process allows ember production from grass and brush, in addition to timber. The ember load index map (Figure D.7) identifies areas where buildings will need to resist ignition from embers, as well as the priority for doing so based on burn probability. Ember production is highly variable and difficult to model. This product should be used as a relative potential ember production, from few to many, rather than an actual real-world count of anticipated embers. Ember loads are lowest in urban areas, moderate in eastern County grassland areas, high in forested areas of the western portion of the County, and the highest in the sub-alpine west of Nederland and Ward.

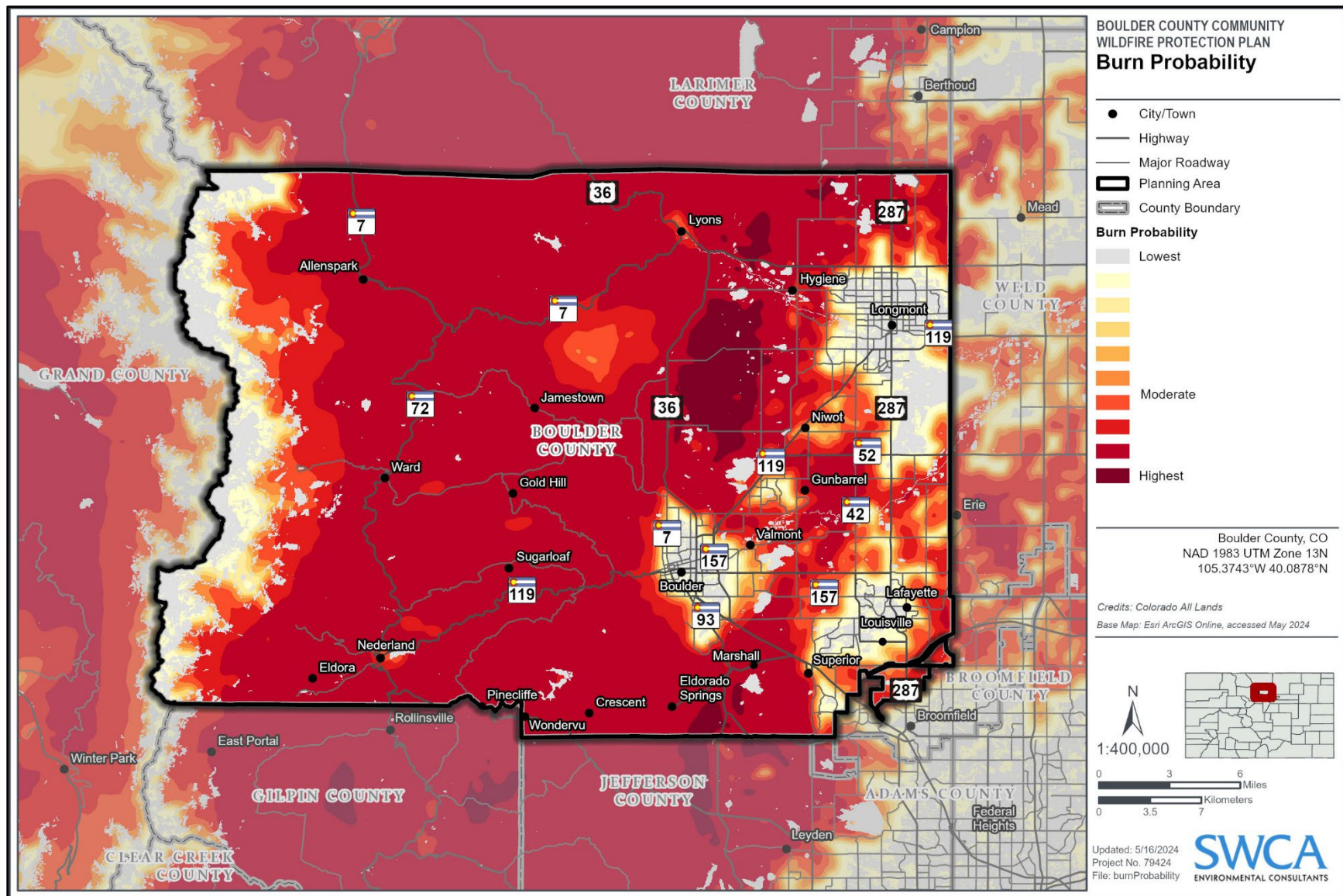


Figure D.2. Burn probability showing the likelihood of a wildfire burning on the landscape from lowest to highest probability.

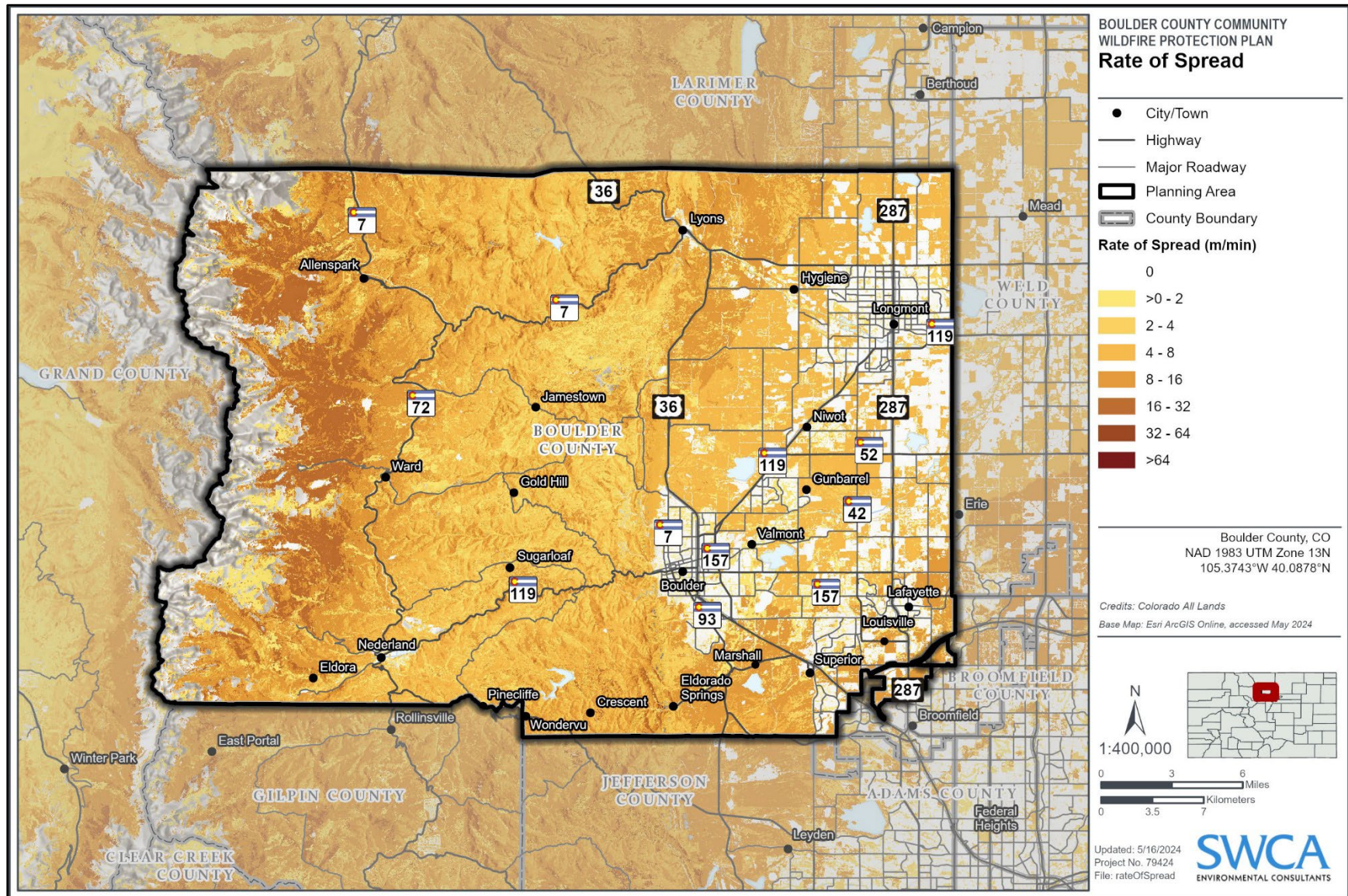


Figure D.3. Modeled rate of spread of wildfire for the planning area.

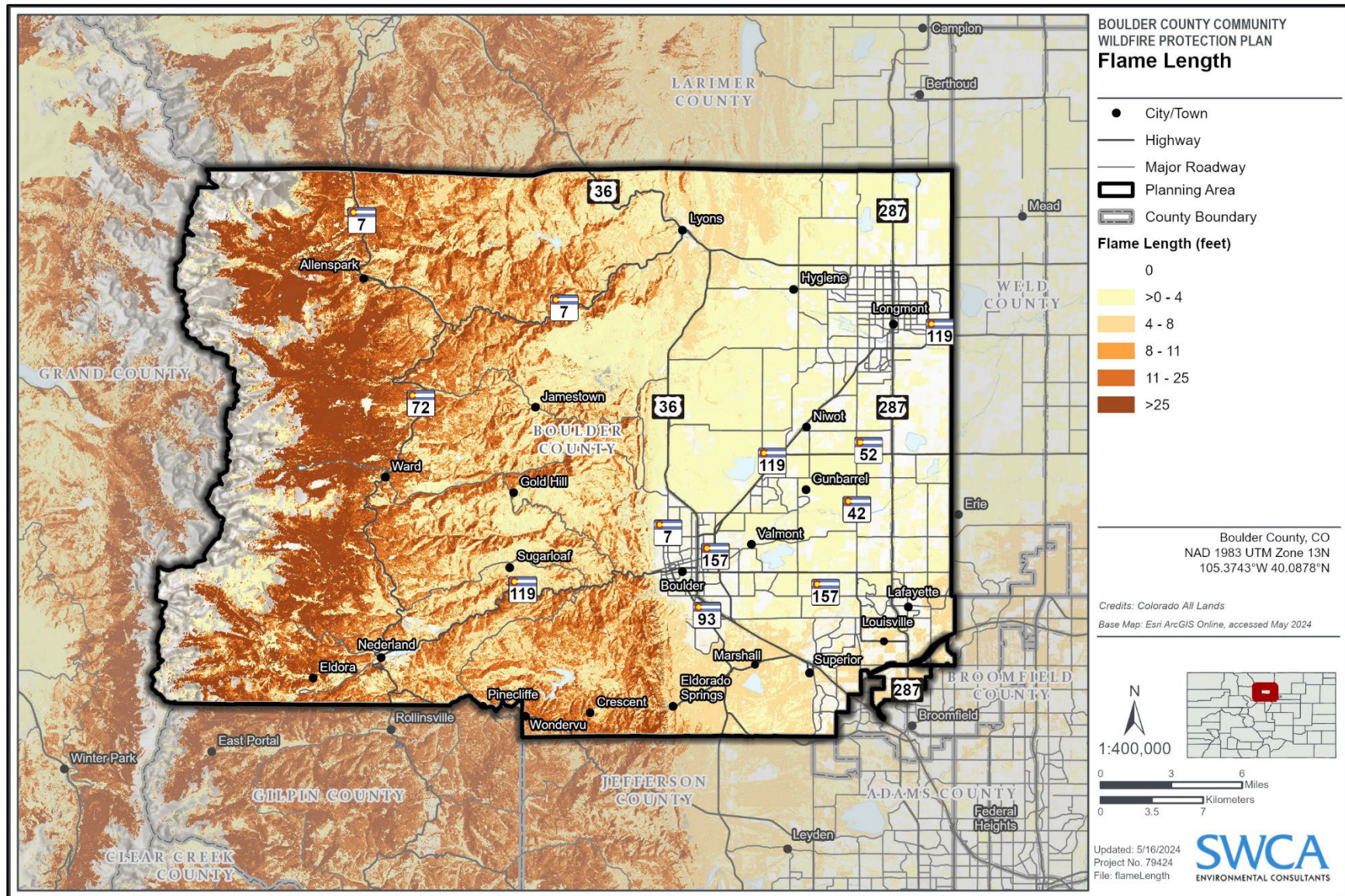


Figure D.4. Modeled flame length of wildfire for the planning area.

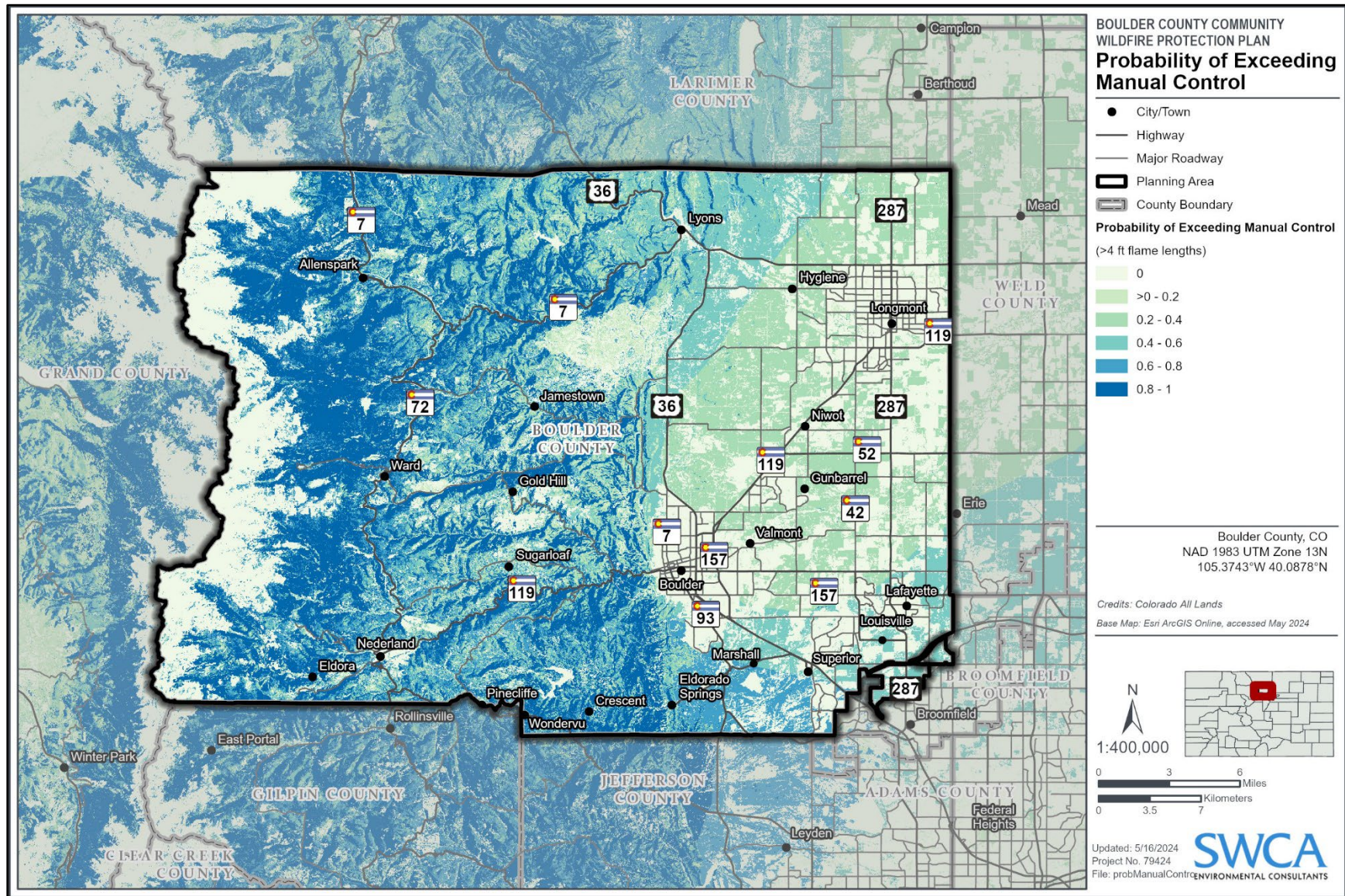


Figure D.5. Modeled probability of exceeding manual control (probability of flame lengths being greater than 4 feet) for the planning area.

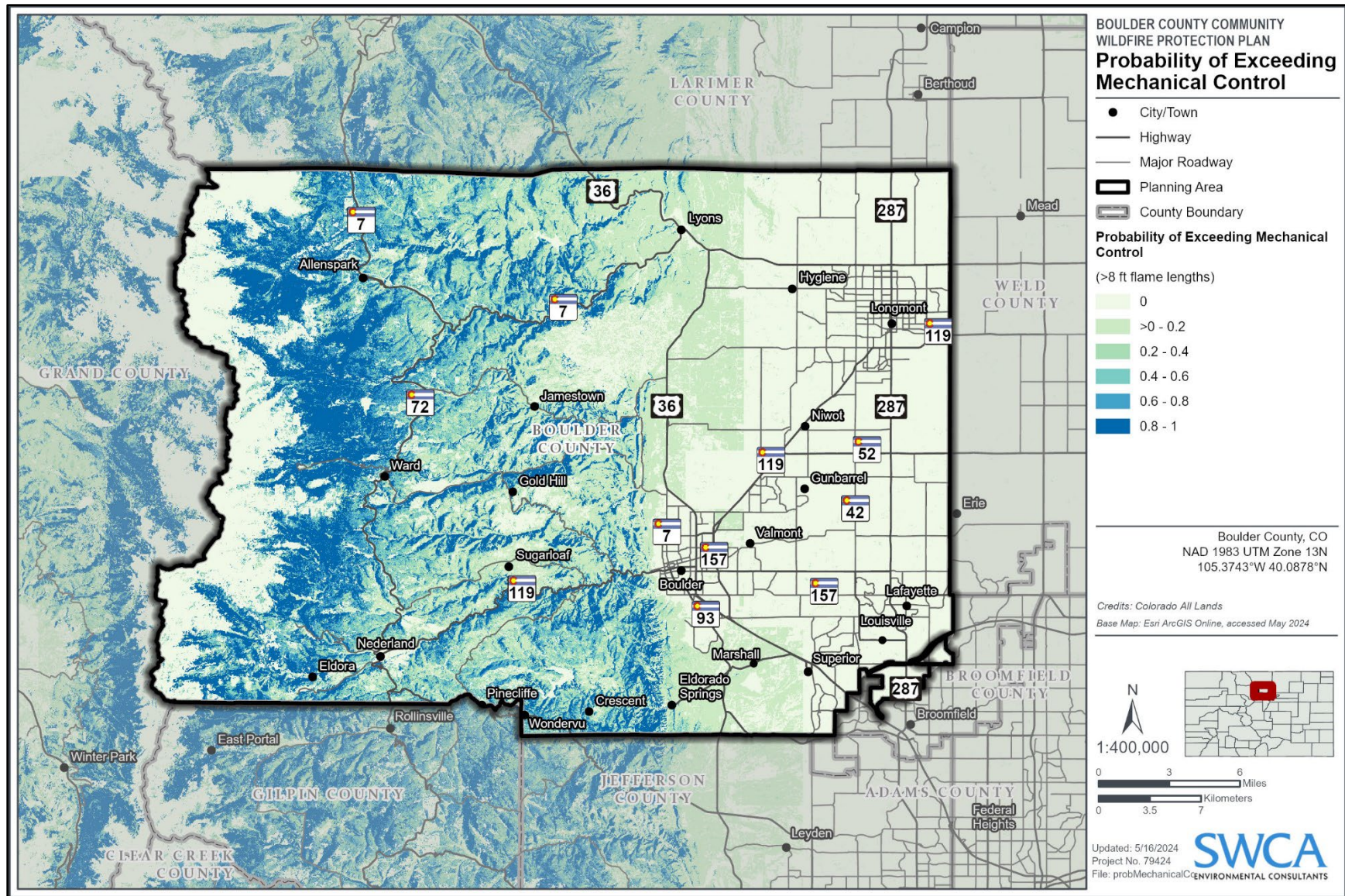


Figure D.6. Modeled probability of exceeding mechanical control (probability of flame lengths being greater than 8 feet) for the planning area.

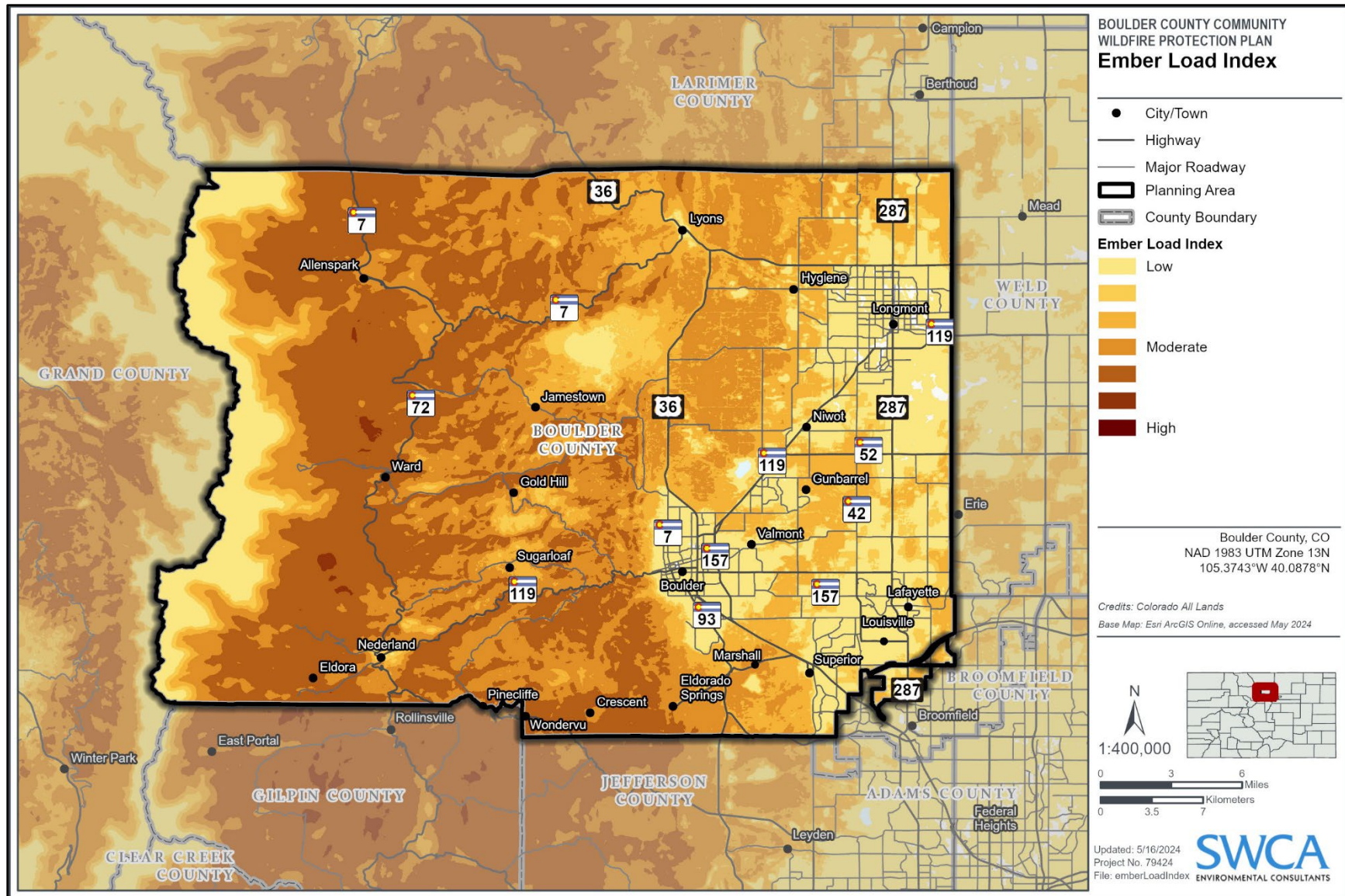


Figure D.7. Modeled ember load index on the landscape for the planning area. A higher ember load index number represents the probability of that area experiencing more embers during a wildfire.

RISK TO ASSETS (TOTAL EXPECTED NET VALUE CHANGE)

For the purposes of this CWPP and for describing risk more clearly to the public, Pyrologix's Total Expected Net Value Change (TeNVC) product has been renamed "risk to assets" in this plan.

To begin, response functions (RF) and relative importance per pixel (RIPP) were calculated for each of the four HVRA datasets. RF and RIPP were combined with estimates of flame-length probability to estimate conditional net value change (cNVC). Outputs were adjusted using the RIPP of each HVRA. Total conditional net value change (TcNVC) was calculated by summing the total of cNVC for each HVRA at every pixel on the landscape. The TeNVC (AKA "risk to assets") was calculated from TcNVC by multiplying TcNVC with burn probability. The resulting risk to assets map (Figure D.8) is a comprehensive risk product that incorporates modeled fire behavior, burn probability, and weighted assets.

Each HVRA was evaluated for impacts from flame length probabilities independently of each other to avoid skewing of risk outputs when conditional values were multiplied with burn probability to attain expected risk values.

COAL HIGHLY VALUED RESOURCES AND ASSETS (HVRAs)

The following four HVRA datasets (Figures D.9 through D.12) were used to calculate the risk to assets dataset (see Figure D.8). See the Wildfire Risk in Boulder County subsection in Chapter 3 for in-depth descriptions of each HVRA and how they were weighted in the COAL Quantitative Wildfire Risk Assessment.

INTEGRATED HAZARDS

EXPECTED RISK TO POTENTIAL STRUCTURES

The expected risk to potential structures (eRPS) dataset (Figure D.13) gauges the combined risk of wildfires based on their likelihood, intensity, and potential impact on potential structures. eRPS was calculated using flame-length probabilities generated from WildEST. eRPS helps answer the question, "how vulnerable would a house or building be if located here?" This helps compare wildfire risks in existing residential areas versus potential construction sites. eRPS is determined by multiplying the conditional risk to structures (cRPS) with burn probability.

WILDFIRE HAZARD POTENTIAL

Wildfire hazard potential (WHP) is calculated from a combination of burn probability and conditional flame length converted into an index (Figure D.14). A weighted resistance to control measure is applied based on the fire line production rates associated with the Scott and Burgan 40 fuel models. Wildfire hazard potential is a good output for determining the likelihood of a fire occurring, the intensity range if it did, and a rough measure of control difficulty. WHP is a useful tool for evaluating fuel treatment priorities based on burn probability.

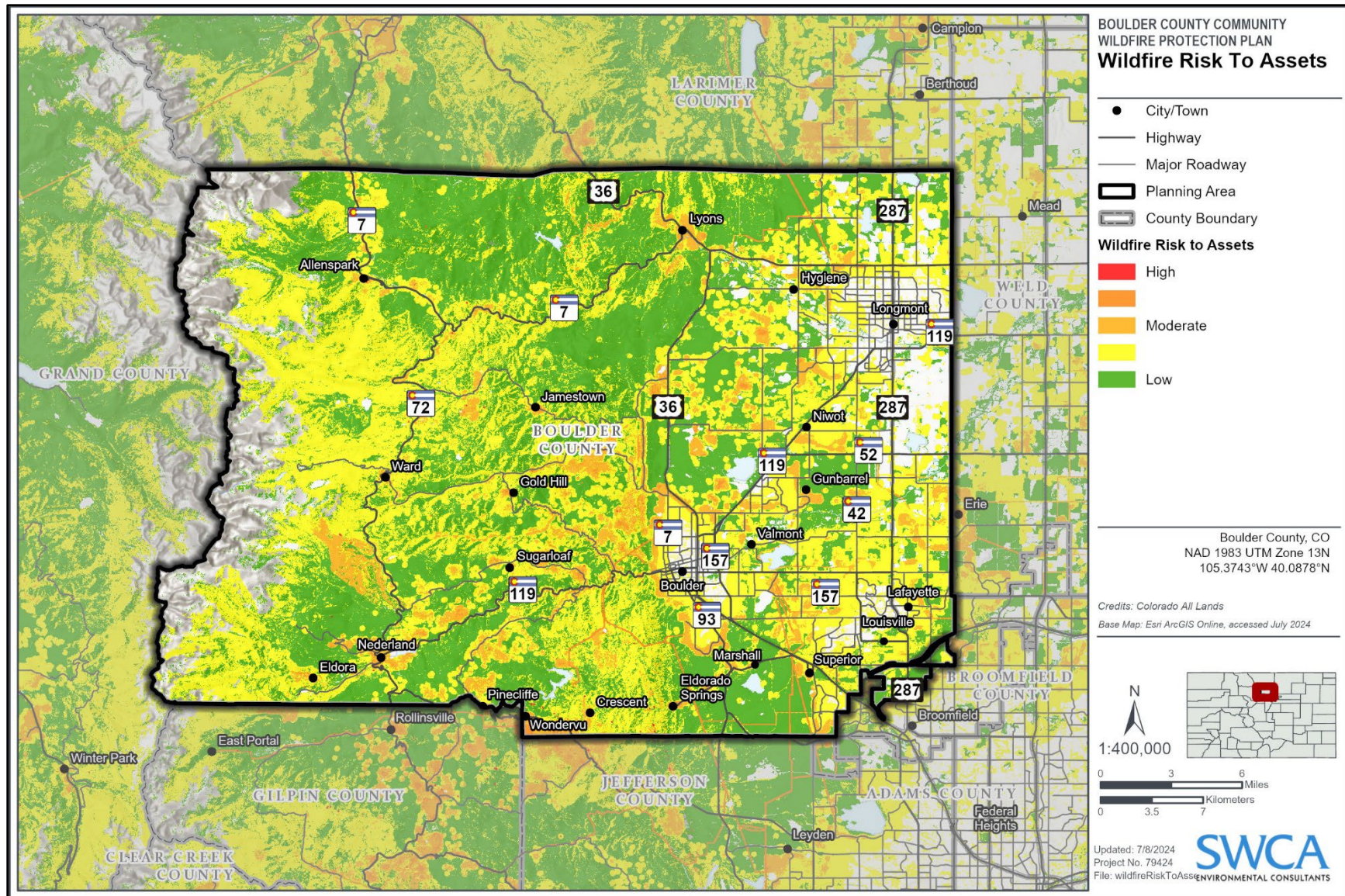


Figure D.8. Wildfire risk to assets sourced from the COAL Quantitative Wildfire Risk Assessment.

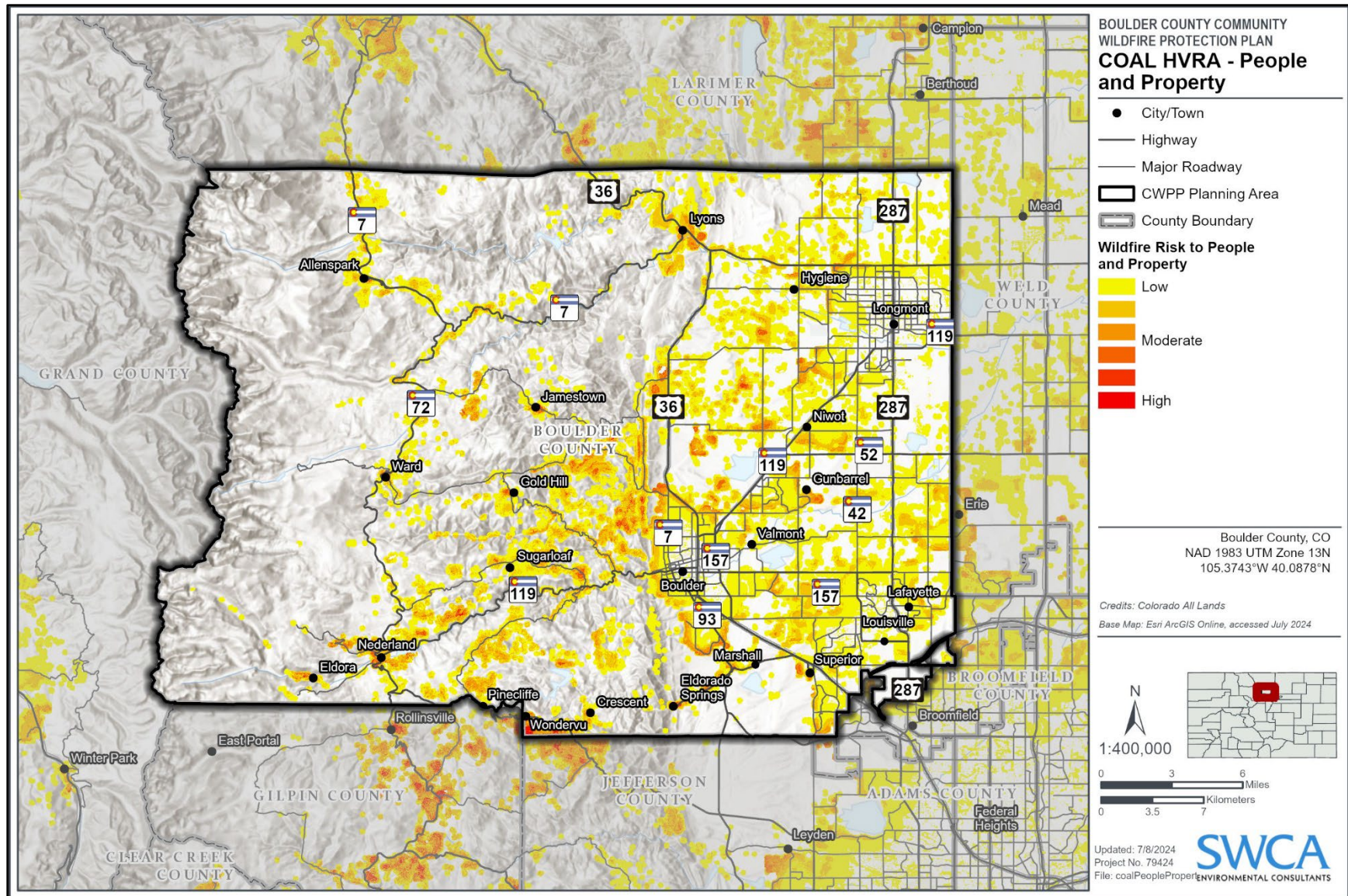


Figure D.9. COAL HVRA people and property based on housing unit density classifications. The relative importance weighting of people and property in the Quantitative Wildfire Risk Assessment is 53%.

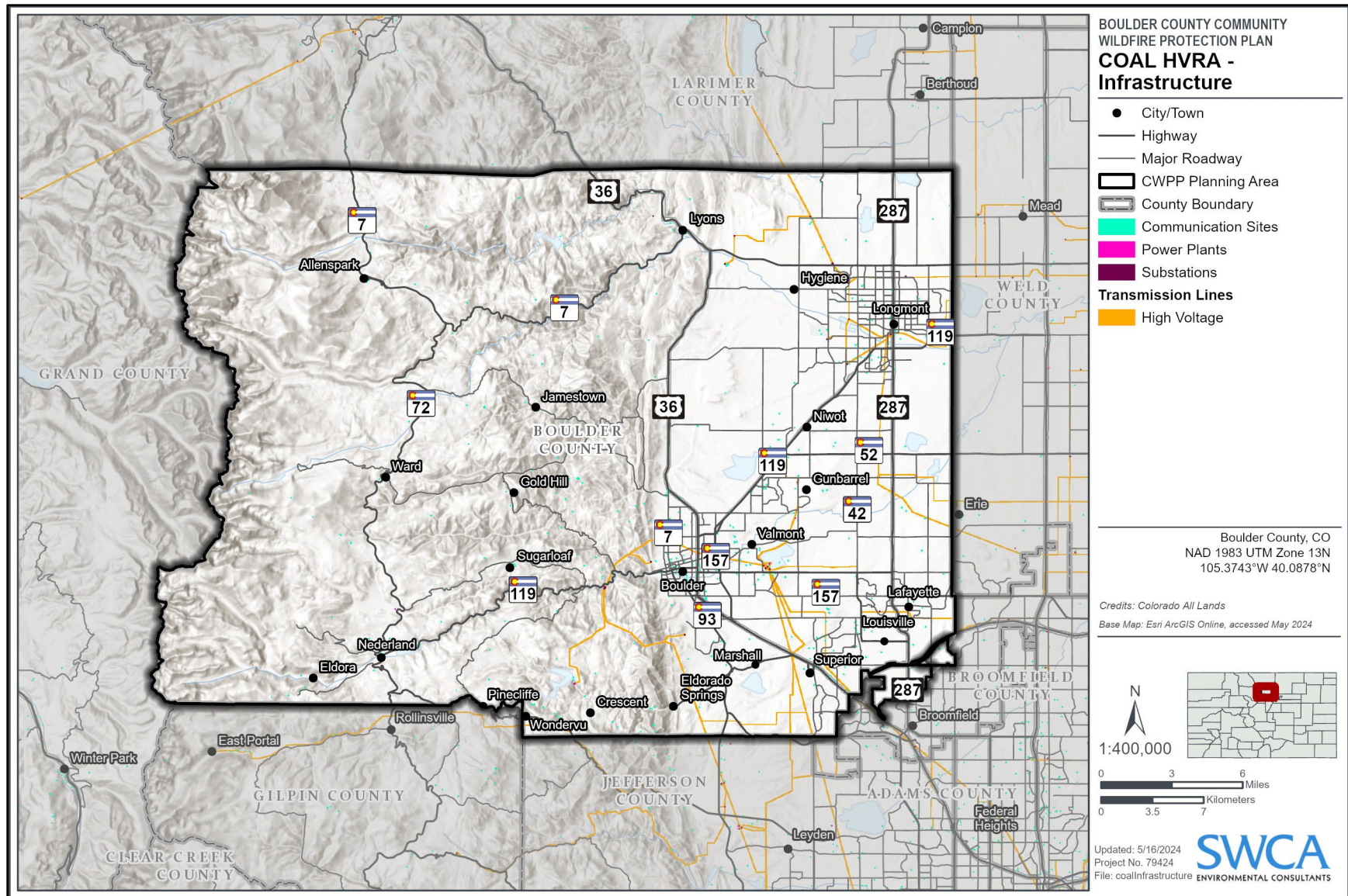


Figure D.10. COAL HVRA infrastructure based on energy and communication infrastructure. The relative importance weighting of infrastructure in the Quantitative Wildfire Risk Assessment is 32%.

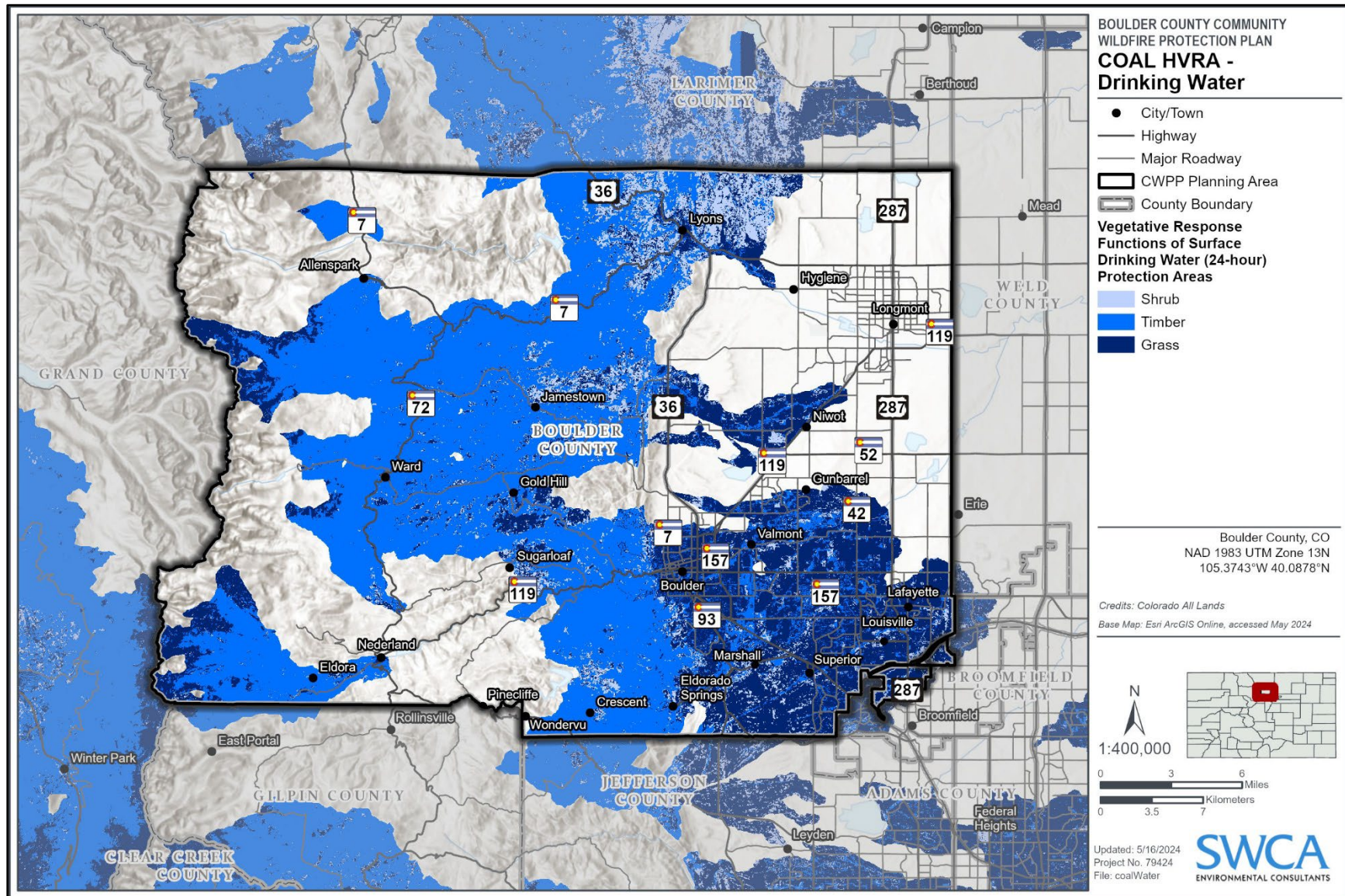


Figure D.11. HVRA drinking water based on surface drinking water protection areas. The relative importance weighting of drinking water in the Quantitative Wildfire Risk Assessment is 10%.

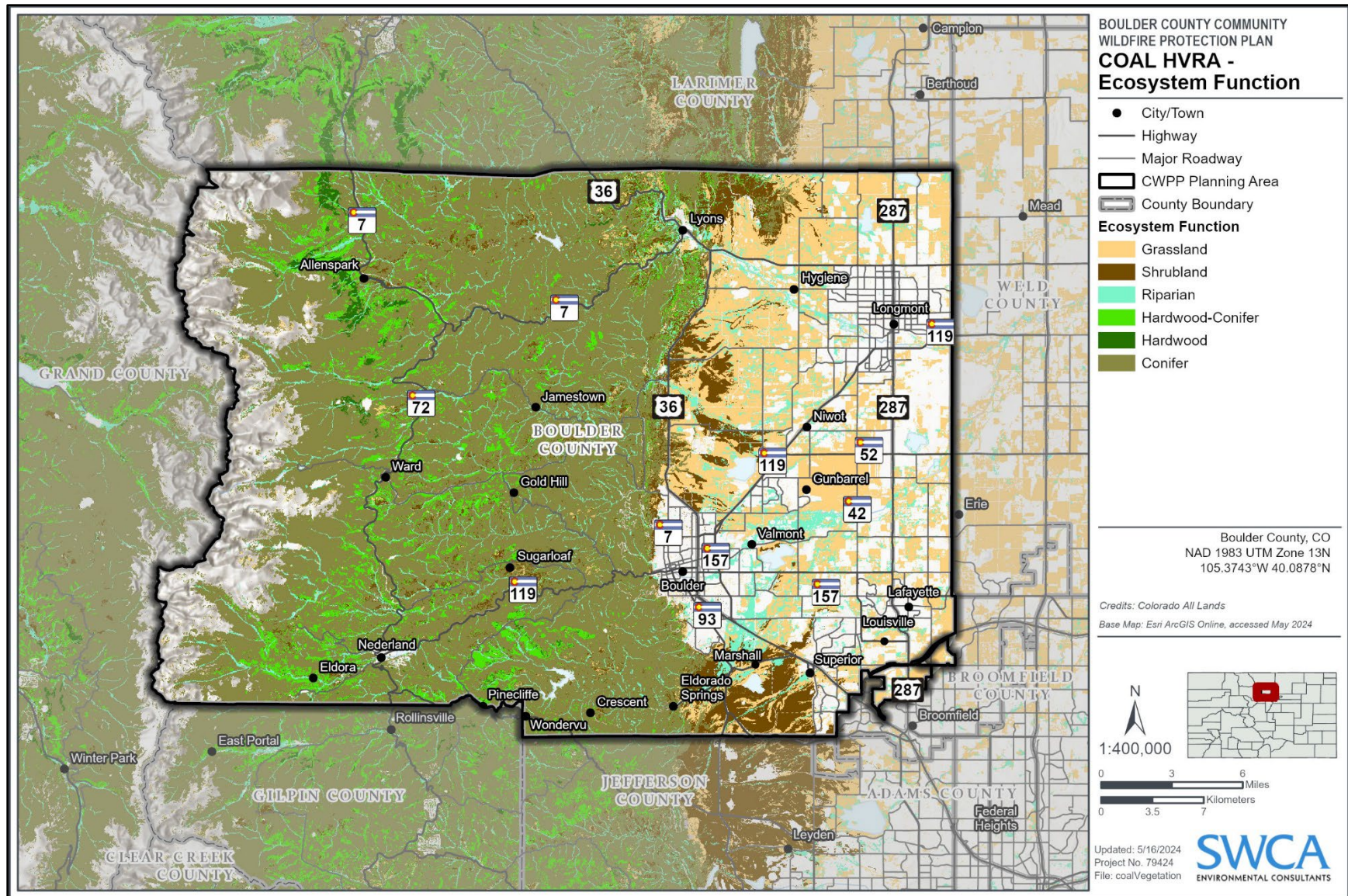


Figure D.12. COAL HVRA vegetation based on ecosystem function classification. The relative importance weighting of vegetation in the Quantitative Wildfire Risk Assessment is 5%.

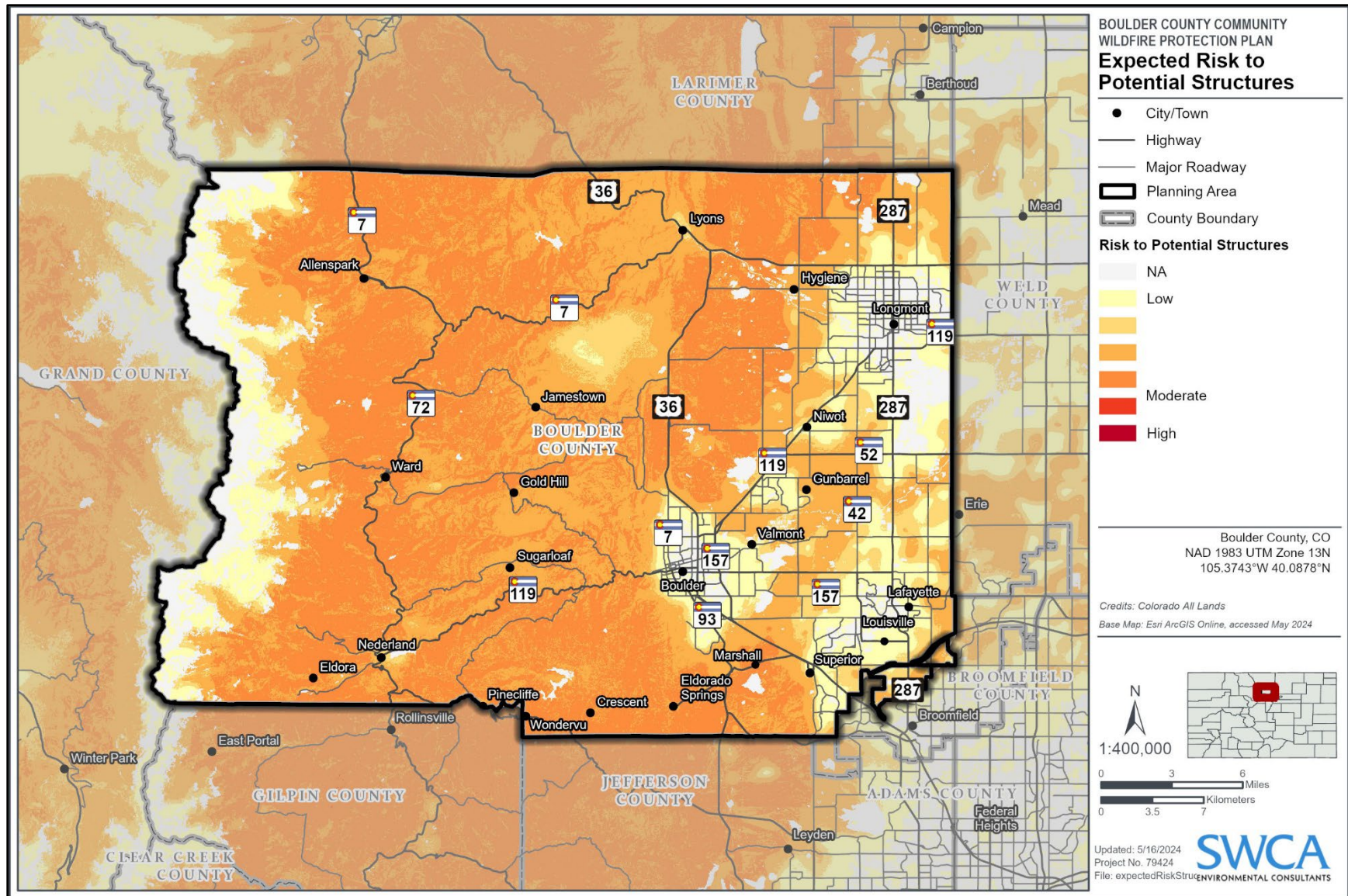


Figure D.13. Modeled expected risk to potential structures on a 6-point low-to-high scale for the planning area.

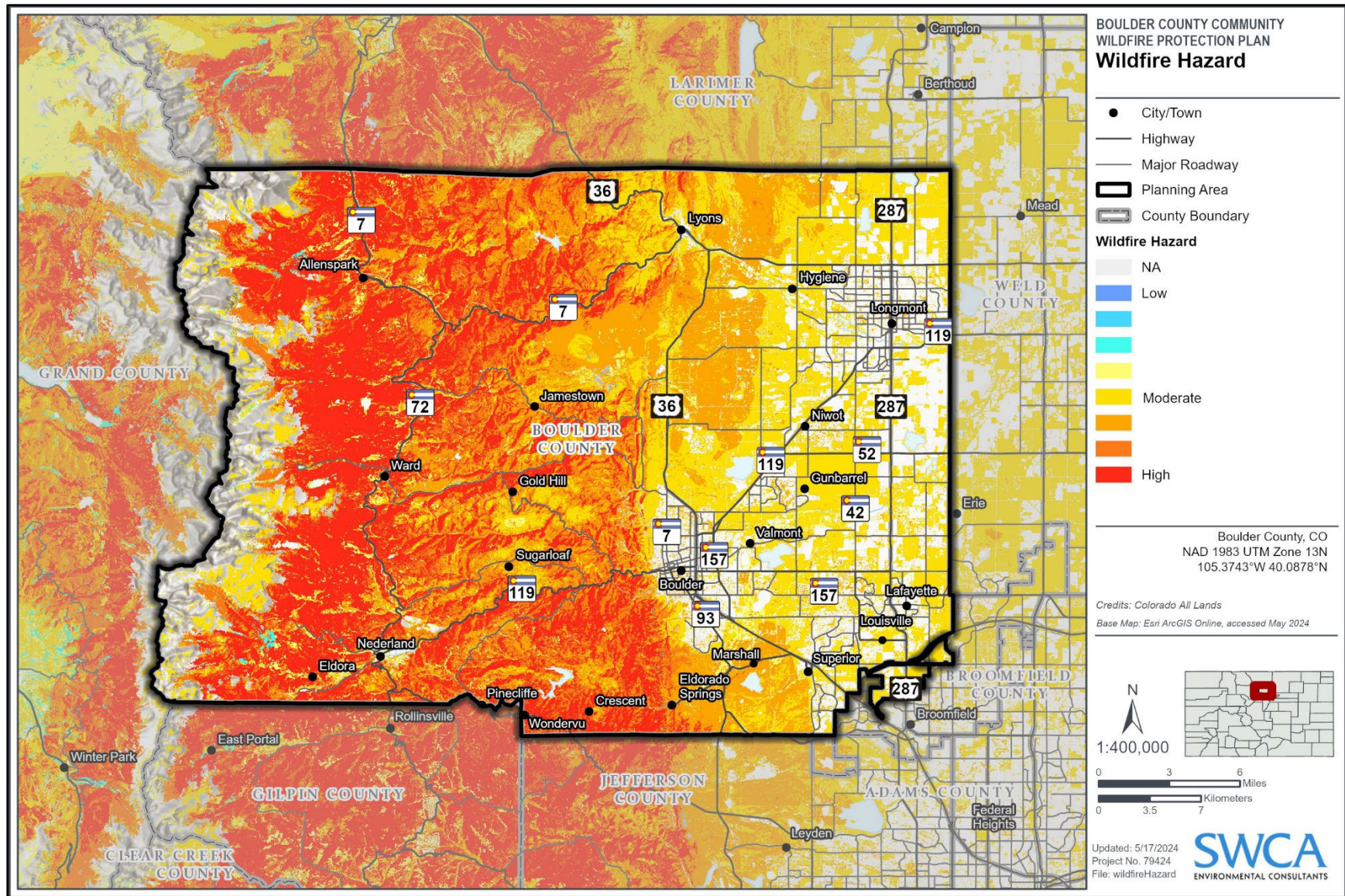


Figure D.14. A map showing the modeled wildfire hazard on an 8-point, low-to-high scale for the planning area. NA represents non-burnable or highly urban areas within the wildfire behavior model.

SUPPRESSION DIFFICULTY INDEX

Suppression difficulty index (SDI) (Figure D.15) does not incorporate burn probability in the source data and is based on a severe fire weather scenario. SDI is a function of flame length outputs, topography, fire line production rates, and the distance of evaluated cells (30 meters) from trails and roads. SDI is a good output for determining how difficult it would be for resources to park, hike to, and suppress a wildfire. This output should not be used to evaluate the risk to structures and instead shows areas where fires would be difficult to suppress under severe fire weather conditions.

ALTERNATIVE MODELING SCENARIOS

The fire behavior model outputs for flame length and rate of spread (see Figures D.3 and D.4) were calculated by obtaining the weighted average of 216 different scenarios from the WildEST model. Scenarios were modeled using different weather input parameters including wind speed, wind direction, and fuel moisture data.

Analyzing modeled fire behavior as weighted averages across a large landscape is helpful for comparing one area's overall potential to another, but averages will underestimate real-world fire behavior when fire danger conditions are high to very high. For this reason, the following alternative modeling scenarios are shown, to assist in evaluating expected fire behavior under different fire danger and wind conditions. It is important to note that active crown fire probability is the likelihood of a crown fire occurring on the landscape and actively burning.

Fire Danger Rating

The Energy Release component (ERC) is a commonly utilized fire danger rating value that calculates the potential energy of a fire based on weather and climate conditions, and live and dead fuel moisture. As live fuels cure and dead fuels dry, ERC values typically increase, signifying heightened fire potential. Conversely, when fuel moisture content rises due to factors like precipitation or increased humidity, ERC values tend to decrease, indicating reduced fire risk (NIFC n.d.).

Three fire danger ranges were modeled in WildEST based on dead fuel moistures that are typically observed within ERC percentile ranges: Moderate (70–80th), High (80–90th), and Very High (90–97th). The below figures show gridded outputs for different fire danger (ERC) and wind speed scenarios. Wind directions were weighted based on their historical occurrence. These subsets of the 216 WildEST runs offer insights into how wildfires may behave under varying fuel moisture and wind conditions, aiding in risk assessment and planning efforts. The maps (Figures D.16–D.19) derived from these alternative modeling scenarios provide valuable insights into potential wildfire outcomes under different fire danger scenarios.

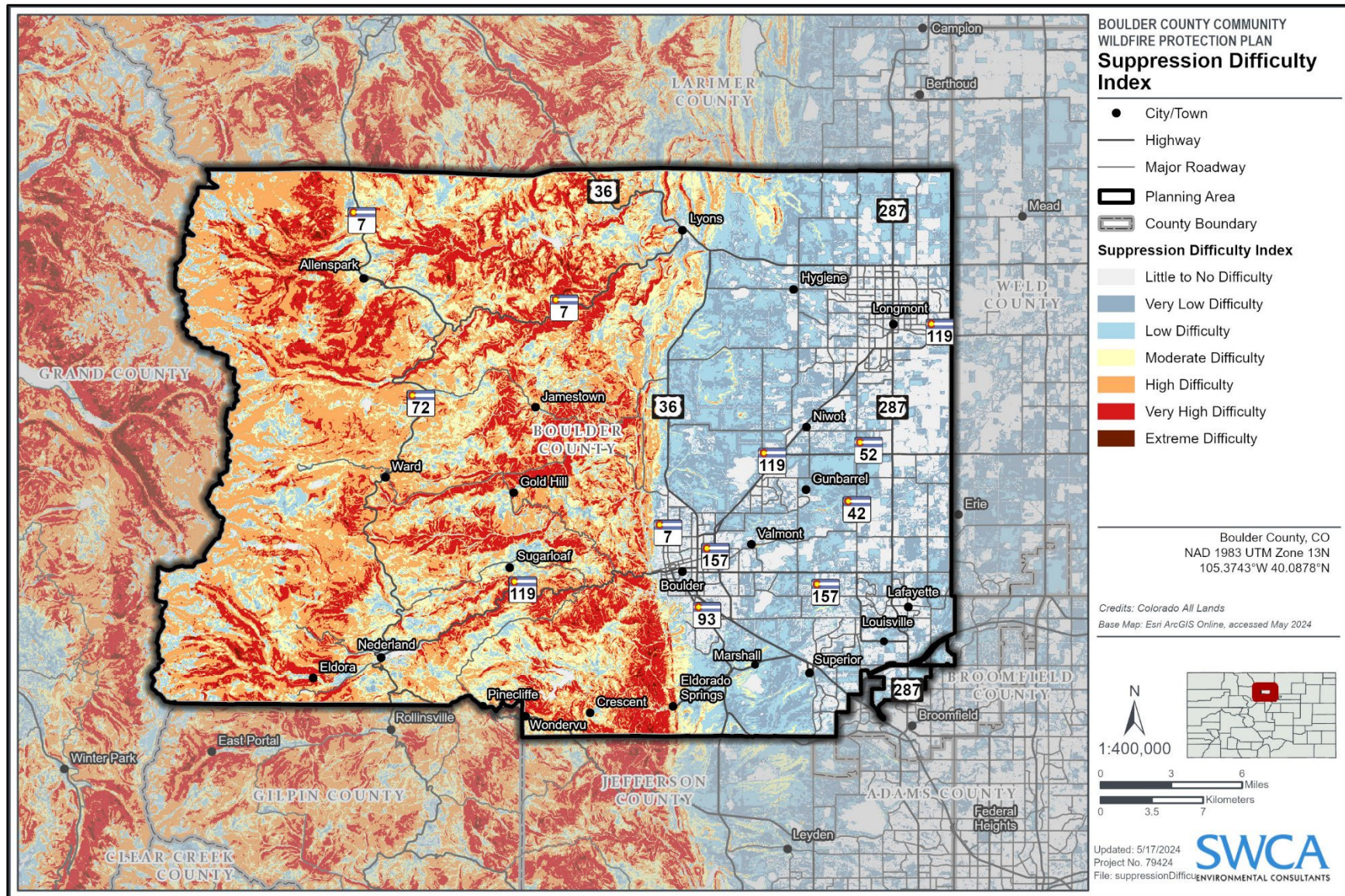


Figure D.15. Modeled SDI on a 7-point scale from little to extreme difficulty for the planning area.

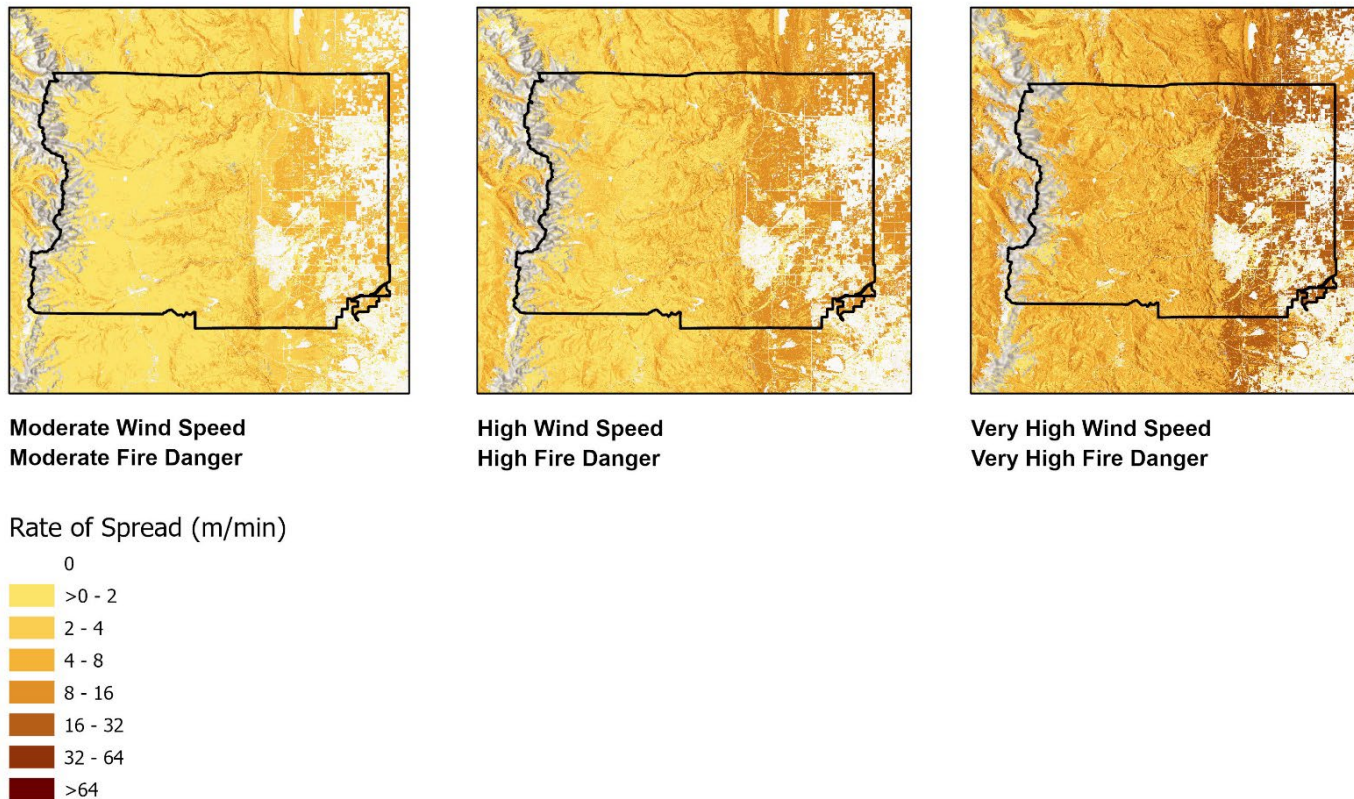
Alternative Modeling Scenarios - Rate of Spread

Figure D.16 Comparison of rate of spread (ROS) across three custom weather scenarios generated for Boulder County. Left to right: moderate, high, and very high wildfire risk scenarios.

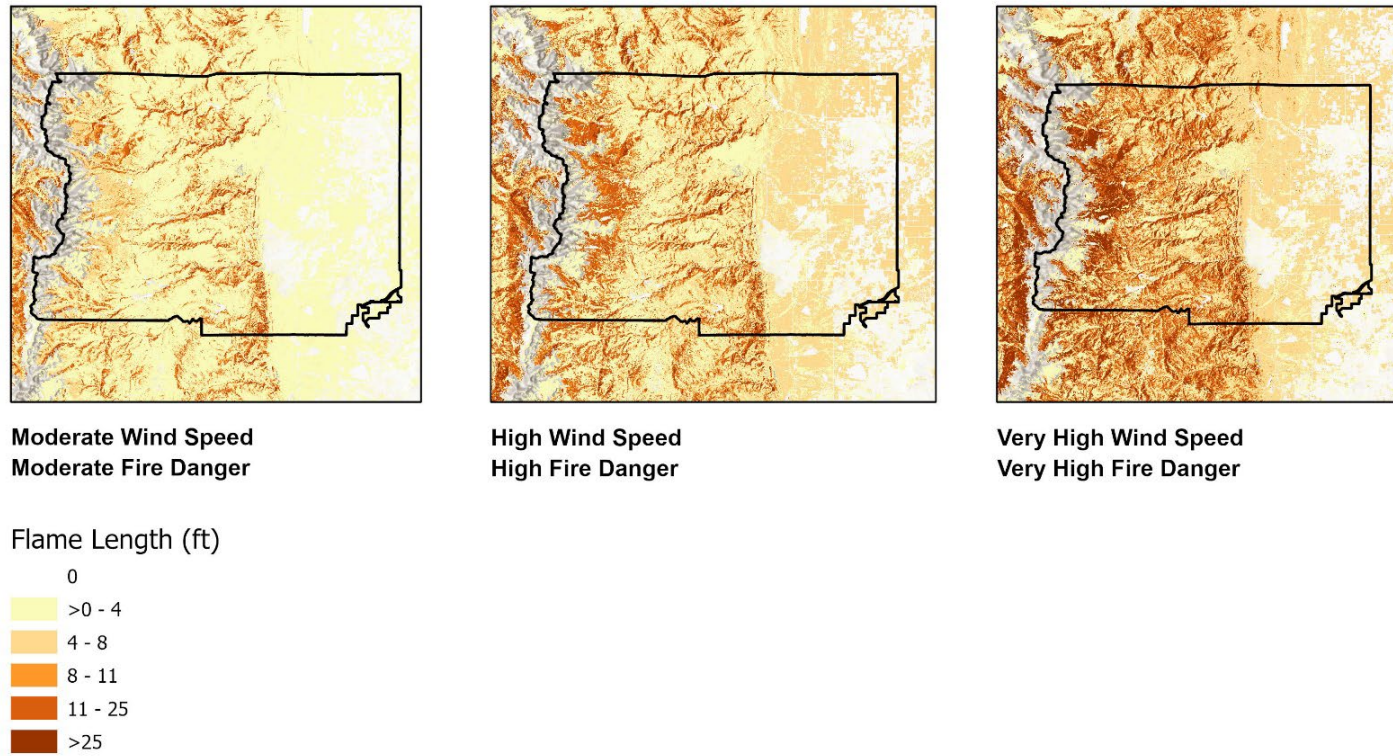
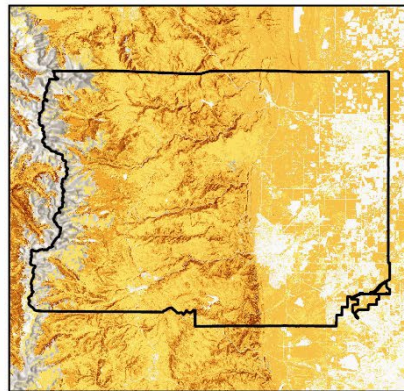
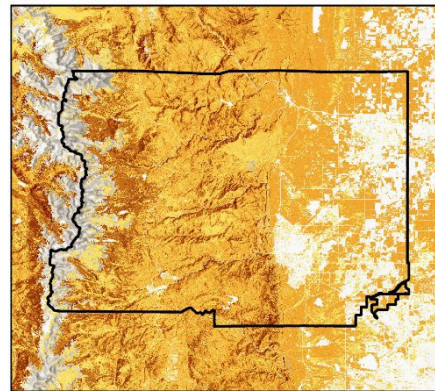
Alternative Modeling Scenarios - Flame Length

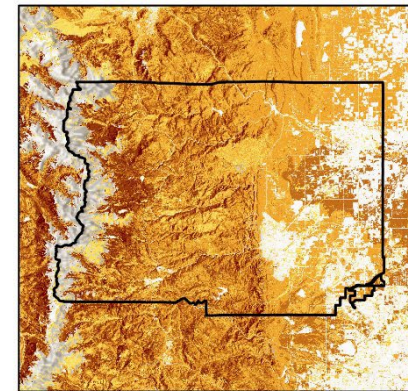
Figure D.17 Comparison of flame length (FL) across three custom weather scenarios generated for Boulder County.

Alternative Modeling Scenarios - Fireline Intensity

**Moderate Wind Speed
Moderate Fire Danger**



**High Wind Speed
High Fire Danger**



**Very High Wind Speed
Very High Fire Danger**

Fireline Intensity (kW/m)

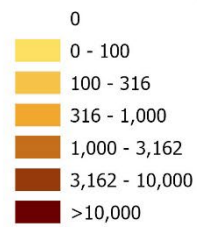


Figure D.18. Comparison of fireline intensities across three custom weather scenarios generated for Boulder County.

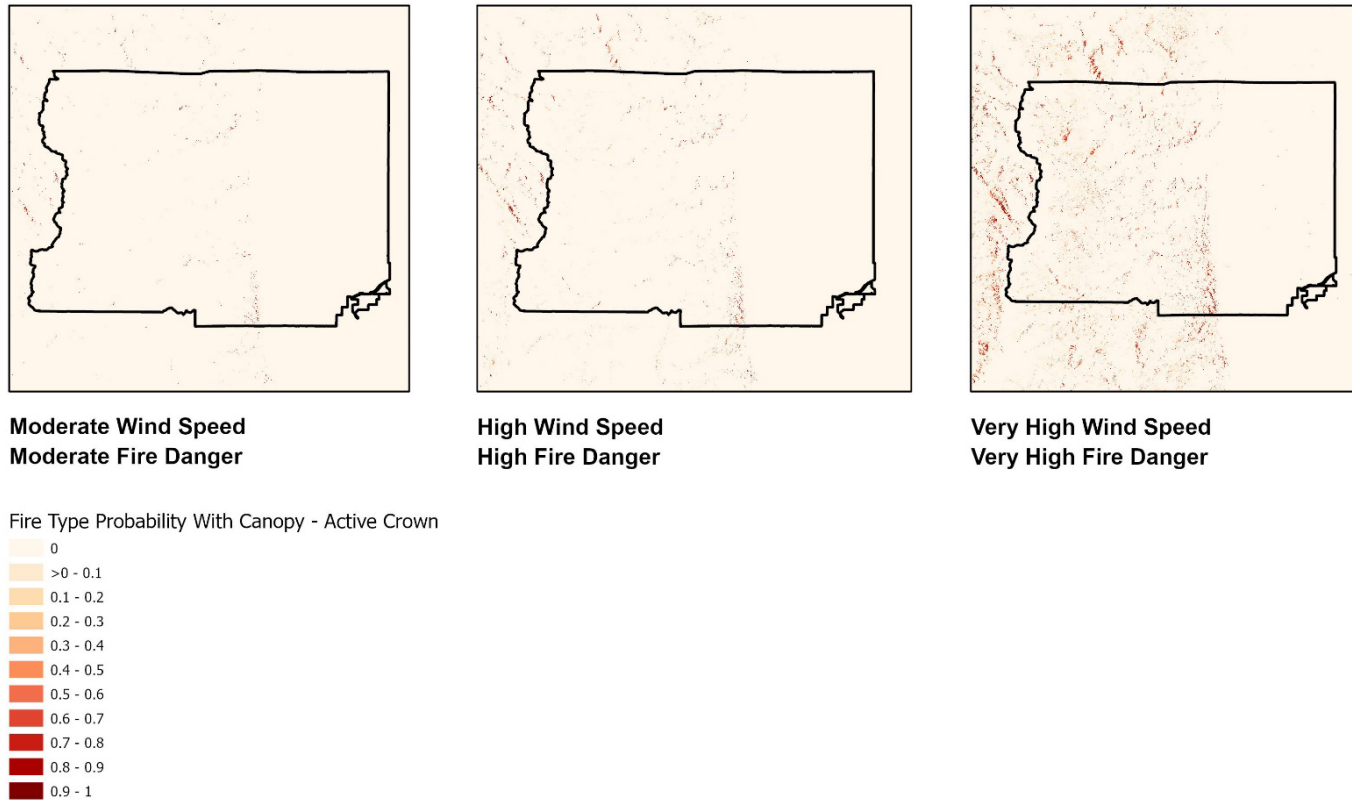
Alternative Modeling Scenarios - Probability of Active Crown Fire

Figure D.19. Comparison of the probability of active crown fire across three custom weather scenarios generated for Boulder County.



APPENDIX E:

Fuel Treatment Types and Methods

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FUELS TREATMENT

This appendix focuses first on treatments that can be performed in the home ignition zone (HIZ) and then describes the importance of and considerations for treatments beyond structures. After these discussions, additional information is provided regarding individual methods for fuels treatment types that can be applied across the landscape.

HOME IGNITION ZONES AND DEFENSIBLE SPACE

Defensible space within the HIZ is perhaps the fastest, most cost-effective, and most efficacious means of reducing the risk of loss of life and property. Although fire agencies can be valuable in providing guidance and assistance, creating defensible space is the responsibility of the individual homeowner (Figure E.1).

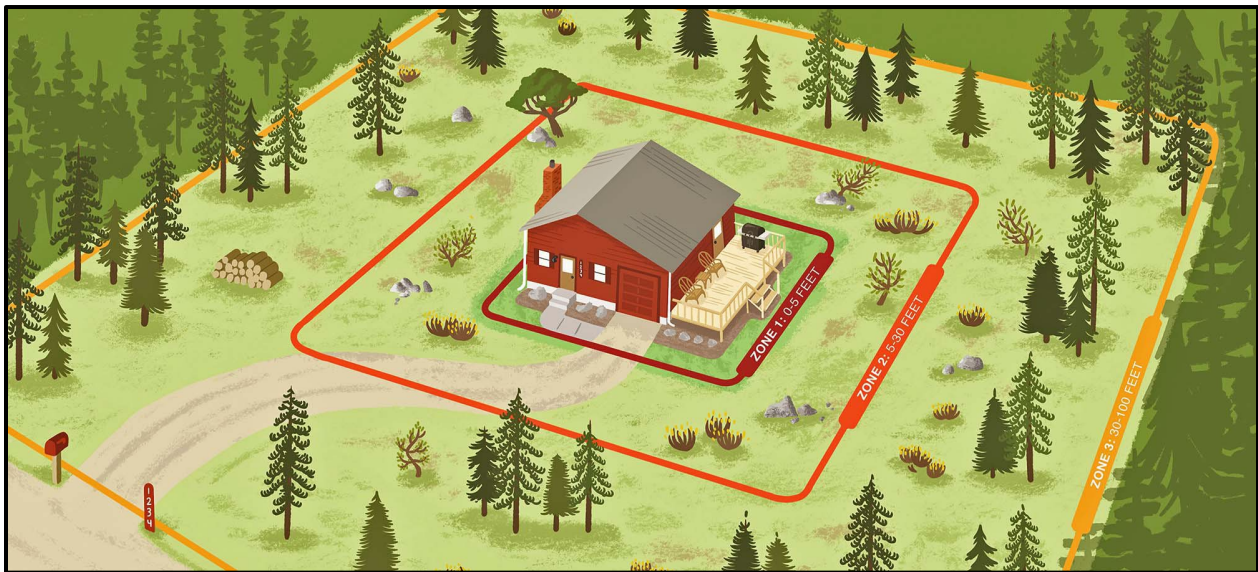


Figure E.1. HIZs providing clearance between a structure and adjacent woodland or forest fuels.

Source: CSFS (2021b)

Effective defensible space consists of creating an essentially fire-free zone adjacent to the home, a treated secondary zone that is thinned and cleaned of surface fuels, and (if the parcel is large enough) a transitional third zone that is basically a managed forest area (Figure E.1). These components work together in a proven and predictable manner. Zone 1 keeps fire from burning directly to the home; Zone 2 reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember production; and Zone 3 does the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition (Figure E.1).

The Home Ignition Zones are described below:

Zone 1 This zone, which consists of an area of 0-5 feet around the structure, is designed to prevent flames from coming in direct contact with the structure. Use nonflammable, hard surface materials in this zone, such as rock, gravel, sand, cement, bare earth or stone/concrete pavers.

Recommendations for treating Zone 1 include (NFPA 2022):

- Remove all flammable vegetation, including shrubs, slash, mulch and other woody debris.

- Do not store firewood or other combustible materials inside this zone.
- Prune tree branches hanging over the roof or decks and remove all fuels within 10 feet of the chimney.
- Regularly remove all pine needles and other debris from the roof, deck, and gutters.
- Rake and dispose of pine needles, dead leaves, mulch, and other organic debris within 5 feet of all decks and structures. Farther than 5 feet from structures, raking material will not significantly reduce the likelihood of ignition and can negatively affect other trees.
- Do not use space under decks for storage.

Zone 2 This zone, which consists of an area of 5-30 feet around the structure, is designed to give an approaching fire less fuel, which will help reduce its intensity as it gets nearer to your home or any structures.

Recommendations for treating Zone 2 include (NFPA 2022):

- Mow grasses to 4 inches tall or less.
- Avoid large accumulations of surface fuels such as logs, branches, slash, and mulch.
- Remove enough trees to create at least 10 feet* of space between crowns. Measure from the outermost branch of one tree to the nearest branch on the next tree.
- Small groups of two or three trees may be left in some areas of Zone 2. Spacing of 30 feet* should be maintained between remaining tree groups to ensure fire doesn't jump from one group to another.
- Remove ladder fuels under remaining trees. This is any vegetation that can bring fire from the ground up into taller fuels.
- Prune tree branches to a height of 6 to 10 feet from the ground or a third of the total height of the tree, whichever is less.
- Remove stressed, diseased, dead, or dying trees and shrubs. This reduces the amount of vegetation available to burn and improves forest health.
- Common ground junipers should be removed whenever possible because they are highly flammable and tend to hold a layer of flammable material beneath them.
- You can keep isolated shrubs in Zone 2, as long as they are not growing under trees. Keep shrubs at least 10 feet* away from the edge of tree branches.
- Periodically prune and maintain shrubs to prevent excessive growth. Remove dead stems annually.
- Spacing between clumps of shrubs should be at least 2 to 5 times¹ their mature height. Each clump should have a diameter no more than twice the mature height of the vegetation. Example: For shrubs that grow 6 feet tall, space clumps 15 feet apart or more (measured from the edge of the crowns of vegetation clumps). Each clump of these shrubs should not exceed 12 feet in diameter.

¹ Horizontal spacing recommendations are minimums and can be increased to reduce potential fire behavior, particularly on slopes. Consult a forestry, fire, or natural resource professional for guidance with spacing on slopes.

Zone 3 This zone, which consists of an area of 30-100 feet around the structure, focuses on mitigation that keeps fire on the ground, but it is also a space to make choices that can improve forest health. Healthy forests include trees of multiple ages, sizes, and species, where adequate growing room is maintained over time. If the distance of 100 feet to the edge of Zone 3 stretches beyond your property lines, it is encouraged to work with adjoining property owners to complete an appropriate defensible space. If your house is on steep slopes or has certain topographic considerations, this zone may be larger.

Recommendations for treating Zone 3 include (NFPA 2022):

- Mowing grasses is not necessary in Zone 3.
- Watch for hazards associated with ladder fuels. The chance of a surface fire climbing into the trees is reduced in a forest where surface fuels are widely separated and low tree branches are removed.
- Tree crown spacing of 6-10 feet is suggested. Consider creating openings or meadows between small clumps of trees so fire must transition to the ground to keep moving.
- Where practical, prune tree branches to a height of 6-10 feet from the ground or a third of the total height of the tree, whichever is less.
- Any approved method of slash treatment is acceptable in this zone, including removal, piling and burning, lop and scatter, or mulching. Lop-and-scatter or mulching treatments should be minimized in favor of treatments that reduce the amount of woody material in the zone. The farther this material is from the home, the better.

Please see the figures below for a visual representation of the recommended tree spacing (Figure E.2), minimum vertical clearance (Figure E.3), as well as spacing on slopes (Figure E.4).

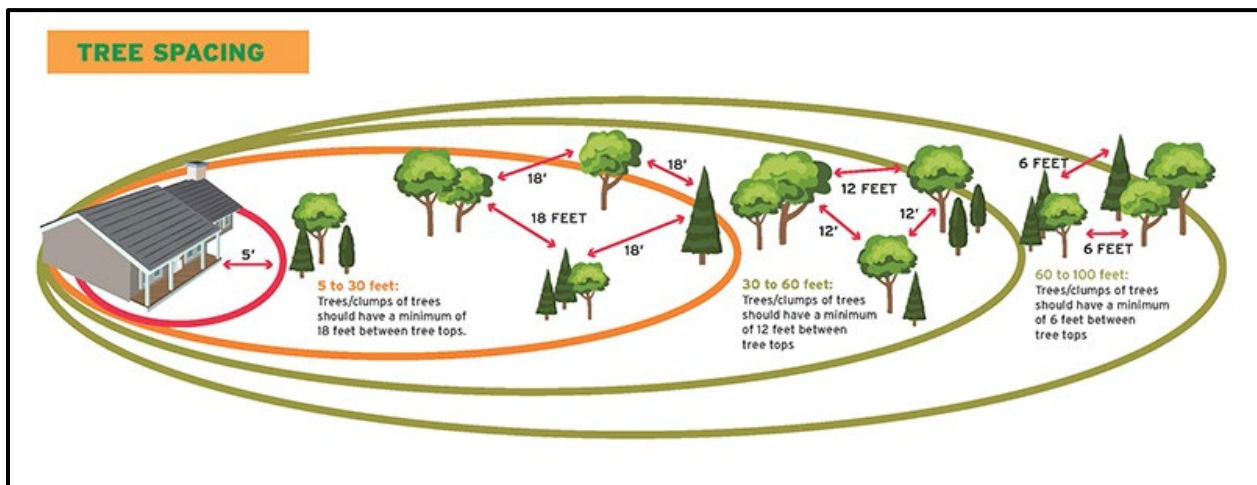


Figure E.2. Recommended tree spacing.

Source: NFPA (2022)



Figure E.3. Recommended minimal vertical clearance.

Source: CAL FIRE (2022)

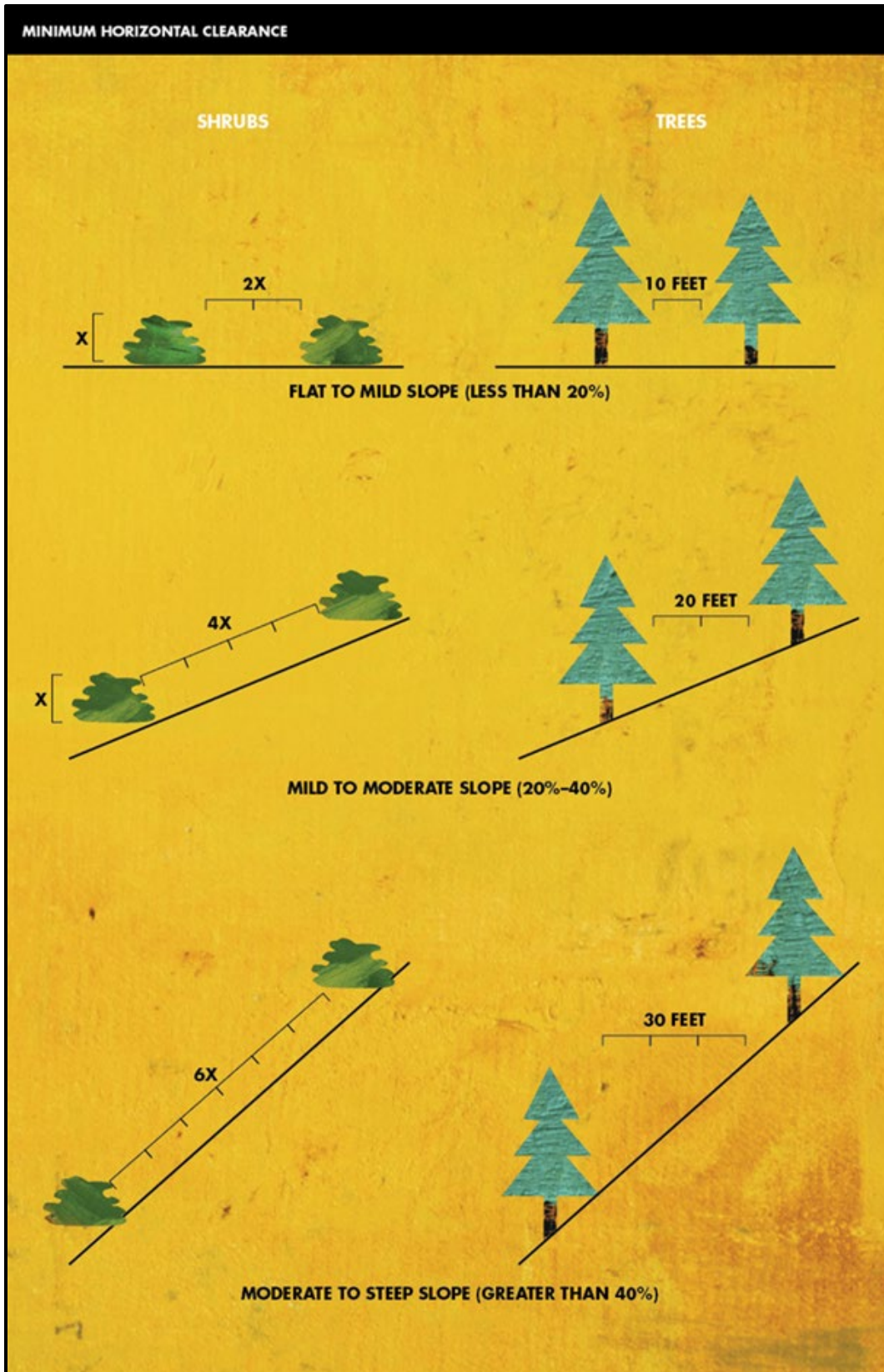


Figure E.4. Recommended minimal horizontal clearance.

Source: CAL FIRE (2022)

Specific recommendations should be based on the hazards adjacent to a structure such as slope steepness and fuel type. Wildfire Partners offers valuable risk reduction recommendations to help homeowners prepare their homes and HIZ for wildfires: <https://assets-partners.bouldercounty.gov/wp-content/uploads/sites/5/2023/12/nfpa-firewise-how-to-prepare-your-home-for-wildfires.pdf>.

In addition to their guidance, the CSFS's *The Home Ignition Zone* (CSFS 2021b) guidance serves as another essential resource for homeowners seeking to protect their properties: https://csfs.colostate.edu/wp-content/uploads/2021/04/2021_CSFS_HIZGuide_Web.pdf.

Assisting neighbors may be essential in many cases. Homeowners should consider assisting the elderly, sharing ladders for gutter cleaning, and assisting neighbors with large fuels thinning needs. Homeowner actions have been found to also motivate neighbors to act, increasing the scope of the wildfire mitigation across a community (Evans et al. 2015). Adopting a phased approach can make the process more manageable and encourage maintenance while also aligning with defensible space and home ignition zone guidance from CSFS and Wildfire Partners (Table E.1).

Table E.1. Example of a Phased Approach to Mitigating the Home Ignition Zone

Year	Project	Actions
1	Basic yard cleanup (annual)	Dispose of clutter and dead branches in the yard and under porches. Move firewood to >30 feet from home. Mow and rake grass. Clean off roofs and gutters. Remove combustible vegetation near structures, especially junipers. Coordinate fuels disposal as a neighborhood or community. Post 6-inch reflective address numbers visible from road.
1–2	Understory thinning near structures	Repeat basic yard cleanup. Prune trees up to 6–10 feet. Prune branches back 15 feet from chimneys. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
1–3	Understory thinning on private property along roads and drainages	Prune trees up to 6–10 feet. Trim or cut down brush. Evaluate the need to thin diseased trees. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
2–4	Overstory treatments on private property	Evaluate the need to thin mature or diseased trees. Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness.
5	Restart defensible space treatment cycle	Continue the annual basic yard cleanup. Evaluate need to revisit past efforts or catch those that were bypassed.

FUEL BREAKS AND OPEN SPACE TREATMENTS

The next location priority for fuels treatments should be where the community meets wildland. This may be the outer margins of a town or an area adjacent to occluded open spaces such as a park. Fuel breaks

(also known as shaded fuel breaks) are strips of land where fuel (for example, living trees and brush, grasses, dead branches, leaves, or downed logs) has been modified or reduced to limit the fire's ability to spread rapidly. Fuel breaks should not be confused with firebreaks, which are areas where vegetation and organic matter are removed down to mineral soil. Shaded fuel breaks may be created to provide options for suppression resources or to provide opportunities to introduce prescribed fire. In many cases, shaded fuel breaks may be created by thinning along roads and POD boundaries. This provides access for mitigation resources and firefighters, as well as enhancing the safety of evacuation routes.

Wildfires frequently burn across jurisdictional boundaries, sometimes on landscape scales. As such, these larger treatments need to be coordinated on a strategic level. This requires coordination between projects and jurisdictions, as is currently occurring. The Boulder County Fireshed is an ongoing example of federal, state, and local governments joining with nonprofit entities in a collaborative effort to reduce wildfire risk in the county. Specifically, land managers have carried out numerous pre- and post-fire forest restoration projects across the county and have ongoing projects planned that are designed to reduce hazardous fuels to protect communities and resources, while restoring fire-adapted communities.

Farther away from WUI communities, the emphasis of treatments often becomes broader recognizing the unique challenges posed by the open landscapes. While reducing the buildup of hazardous fuels remains important, other objectives are often included, such as promoting ecosystem health, enhancing resiliency to catastrophic wildfires, and addressing the impacts of climate change.

In eastern Boulder County it is important to address fuel breaks extending beyond the conventional forested landscapes. The treatments here involve managing the proliferation of dry grasses and fine fuels, requiring a tailored approach to create effective fuel breaks (Figures E.5–E.7). This approach is important in minimizing the risk of grassland wildfires that can quickly spread across these vast open spaces. Fuel breaks in grasslands may involve actions such as mowing or prescribed burns to reduce the height and density of grasses (DOI 2023). Timing these treatments is essential to balance moisture content and protect local wildlife. The ideal time to mow or conduct a prescribed burn is when grasses have cured, as they are most flammable at this stage. However, in seasons with higher moisture, treatments may need to be adjusted for increased moisture in the vegetation, ensuring the fuel breaks remain effective (Clark et al. 2023).

Monitoring early-season moisture levels is also vital, and incorporating mid- to late-summer grazing can help reduce vegetation biomass, decreasing potential fuel loads as fall approaches (Clark et al. 2023). Simultaneously, it is important to consider local wildlife, particularly ground-nesting birds, which typically complete their nesting by mid-July in the Front Range and mid-August at higher elevations (Boulder County Audubon 2021). Scheduling fuel treatments after these nesting periods helps This approach minimizes disruption to wildlife habitats while maintaining the efficiency of wildfire mitigation efforts.

Additionally, reestablishing native vegetation in these areas offers long-term benefits, as native plants generally retain higher moisture content during the hotter, drier months of August and September, thereby reducing fire risk. Incorporating low-growing native vegetation in buffer zones can further enhance the effectiveness of fuel breaks, creating a more resilient landscape that supports both wildfire mitigation and ecological health.



Figure E.5. Mechanical fuels reduction treatment, Antelope Park, Button Rock Preserve.

Source: BCPOS (2023).



Figure E.6. Slash pile burning at Walker Ranch, post-thinning.

Source: BCPOS (2023).



Figure E.7. Fuels reduction project in Harney Lastoka South open space, utilizing grazing treatments.

FUEL TREATMENT METHODS

Several treatment methods are commonly used for hazardous fuels reduction, including manual treatments, mechanized treatments, prescribed fire, and grazing (Table E.2). Due to the variability of the planning area's topography, vegetation type, and distribution, certain treatments will be appropriate for specific landscapes. **Specific information on fuel treatment recommendations for each vegetation type found in the county is provided in Chapter 4 along with a map of recommended fuel treatment locations and approach.** This brief synopsis of treatment options is provided for general knowledge; specific projects will require further planning. The appropriate treatment method and cost will vary depending on factors such as the following:

- Average size/diameter class of material
- Proximity to structures
- Size/complexity of project
- Transportation fuel costs
- Steepness of slope
- Access for product transportation
- Volume of biomass
- Project objectives

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

In addition, post-treatment fuel clean-up is a must as neglected piles of vegetation may result in increased fire risk.

Table E.2. Summary of Fuels Treatment Methods

Treatment	Comments
Machine mowing	Appropriate for large, flat, grassy areas on relatively flat terrain.
Manual treatment with chipping or pile burning	Requires chipping, hauling, and pile burning of slash in cases where lop and scatter is inappropriate. Slash tree limbs to 6 feet from ground or max of 1/3 of tree height Remove ladder fuels below / near trees. Pile burning must comply with smoke management policy. Permits administered on behalf of the state by the Boulder County Division of Natural Resources.
Brush mastication	Brush species tend to re-sprout vigorously after mechanical treatment. Frequent maintenance of treatments is typically necessary. Mastication tends to be less expensive than manual (chainsaw) treatment and eliminates disposal issues.
Timber mastication	Effective on materials up to 6 inches in diameter, slopes up to 30%, and in combination with tree thinning treatments. Removing smaller-diameter trees that act as ladder fuels enhances the effectiveness of mastication. Mastication of treetops and slash can significantly reduce fuel loads. Reduces disposal issues of smaller-diameter fuels. Environmental impact of residue being left on-site is still being studied.
Prescribed fire	Can be very cost effective for public land, with location considerations and constraints. Ecologically beneficial. Can be used as training opportunities for firefighters. May require manual or mechanical pretreatment. Carries risk of escape. Unreliable scheduling due to weather and smoke management constraints.
Mechanical	Mechanical treatments using feller bunchers, skidgines, and cut-to-length hot saw machines can be conducted on slopes less than 40%. Steeper slopes require tracked machines, while more gradual inclines can be operated on with wheeled machines. Slopes greater than 40% require arial logging operations such as a skyline.
Grazing	Can be cost effective depending on species utilized. Ecologically beneficial. Can be applied on steep slopes and shrubby and flashy fuels. Requires close management.

MANUAL TREATMENT

Manual treatment refers to crew-implemented cutting with chainsaws and other hand tools. Although it can be more expensive than mechanized treatment, crews can access many areas that are too steep or otherwise inaccessible with machines. Treatments can often be implemented with more precision than prescribed fire or mechanized methods allow. Merchantable materials and firewood can be removed while non-merchantable materials are often lopped and scattered, chipped, or piled and burned on-site, as shown in Figure E.8. Care should be exercised to not increase the fire hazard by failing to remove or

treat discarded material in a site-appropriate manner. Additional information on specific manual fuel treatments is included below.

Hand Felling and Piling

Hand felling is generally used for smaller-diameter trees and understory ladder fuels (shrubs, low limbs downed branches). This method is appropriate on smaller sites or where precise thinning is needed such as near homes and structures and in environmentally sensitive areas. Vegetation that is removed by hand is then piled in mounds to be dried and burned during cold, moist months. In Colorado, slash piles are limited to 8 × 8 × 8 feet, or 512 cubic feet (CDPHE 2024). Figure E.8 demonstrates appropriate size and spacing for slash piling.



Figure E.8. Manual cut/pile fuels reduction project removing small-diameter material at Hall Ranch (Photo BCPOS)



Figure E.9. Before and after images taken by Wildfire Partners, Boulder County to reduce hazardous fuels in the HIZ surrounding structures.

Source: Boulder County (2024).

Hand Felling and Lop and Scatter

Similar to hand felling with piling, felling and lop and scatter is an appropriate treatment method for smaller treatment areas and where it may not be feasible to burn piles later or when trying to improve soil organic matter content. With this treatment method, small trees, shrubs, and ladder fuels are cut by hand then masticated to reduce their size. The slashed material is then spread across the forest floor to reduce fuel volume and height. Care should be taken when utilizing this method near homes to ensure defensible space zone standards are maintained.

Mosaic Thinning

Mosaic thinning may be a cost-intensive method for treating forested lands. With this treatment, selective thinning with chainsaws and hand tools occurs under the guidance of a forester or mitigation expert. Exact treatment intensity and methodology will vary from site to site depending on need and present species.

Pruning and Limbing

With this treatment method, branches are removed from mature trees to reduce ladder fuels and potential fire intensity. Trees are treated based on branch height and distance from neighboring trees. This method is most effective for maintaining defensible space as outlined above.

MECHANIZED TREATMENTS

Mechanized treatments include mowing, mastication (shredding timber), and whole tree felling (Figure E.10), mechanized cut to length logging, and aerial skyline systems. The decision to use mechanized methods as opposed to hand felling or prescribed fire treatments depends on a variety of factors including:

- Scale of the treatment project (number of acres, stand maturity, fuel loading).
- Ecological restoration goals
- Slope steepness
- Availability of resources and personnel
- Wildfire mitigation goals (fuel break, fire break, reduced fuel loading)
- Alignment with nearby fuel treatment efforts and future planned treatments

Mechanized fuel treatments are often effective in treating larger project areas that contain high fuel loads. Pairing mechanized treatments with monitoring, restoration practices, and even prescribed fire is essential to managing land holistically for multiple resource benefit. Fuel treatment projects often make use of a variety of methods to accomplish different goals.



Figure E.10. Example of mechanical thinning, Boulder County Parks and Open Space DNR COSWAP project Button Rock 2023.

Source: Meg Halford

Mowing

Mowing can effectively reduce grass and brush fuels adjacent to structures and along highway rights-of-way and fence lines (Figure E.11). For heavier fuels, several different masticating machines can be used, including drum- or blade-type masticating heads mounted on machines and ranging in size from a small skid-steer to large front-end loaders. Mowing and mastication do not reduce the amount of on-site biomass but alter the fuel arrangement to a less combustible profile.

In extreme risk areas more intensive fuels treatments may be necessary to keep the fire on the ground surface and reduce flame lengths. Within the fuel break, shrubs should be removed, and tree branches should be pruned 5 to 6 feet from the ground and with space between the trees. Specific height and spacing recommendations can be found in CSFS and Wildfire Partners guides and resources listed in Appendix A, including information on Wildfire Partners program, Ready, Set, Mow.



Figure E.11. Example of overgrown and hazardous vegetation encroaching on roadways/fuel breaks being mowed in Colorado Springs.

Source: KDRO News (2021).

Mastication

Mastication, also known as mulching, is the process of chopping, grinding, or shredding woody biomass to decrease fuel volume on a site and reducing vertical fuel. The process involves utilizing an attachment on a tractor or heavy machinery that chips shrubs and trees without manually felling trees. The wood is spread across the forest floor, which reduces crown fire potential and fireline intensity.

Mechanical feller buncher/processors are used for whole tree removal and processing. The processed logs are typically utilized for a variety of low-value products, while the slash (tops and limbs) is of negative value and disposed of by chipping, grinding, or burning on-site (Jain et al. 2018).

Chipping

Chipping is an effective way to reduce large woody slash that is collected from manual mitigation efforts (Figure E.12). It involves using a chipping machine that shreds the large wood into 3-inch or smaller chips that can be spread across the forest floor, used as mulch or disposed of (Jain et al. 2018). Wildfire Partners manages an annual chipping program where county residents can sign up to have a chipper brought to their neighborhood or house; the wood chips are then donated to local farms.



Figure E.12. The Boulder Mountain Fire Protection District hand thinning and chipping branches around a mountain home near Pinebrook Hills on October 3, 2021.

Source: Cliff Grassmick/Staff Photographer

Patch Cuts

The patch cut fuel treatment method is effective for treating mature lodgepole pine stands. Implementing patch cuts involves removing various sized clumps of trees of varying distances apart throughout a stand. Mature and dense lodgepole pine stands have adapted to high-severity, stand-replacing fire due to the prevalence of crown fire (Zimmerman and Omi 1998). Creating patches in the canopy reduces wildfire intensity by mimicking natural stand-replacing fire, allowing tree stands to regenerate in an age class mosaic (Keyes et al. 2014). Patch cuts are necessary to treat mature lodgepole pine that develop shallow roots and can be susceptible to wind throw if thinned using traditional crown spacing methods. Young lodgepole pine (<30 years) can effectively be thinned as rooting depth will increase over time with reduced competition. Patch cut size and thinning prescriptions should be determined by a certified forester contingent on treatment goals and site characteristics.

GRAZING

Grazing can be an effective and beneficial fuel treatment method to reduce the risk of severe wildfires, while enhancing habitat for numerous native grassland plants and animals and reducing invasive plant species (OSMP 2022) (Figure E.13). By strategically managing livestock to consume and modify vegetation, grazing can be used to reduce the amount, height, and continuity of vegetation (OSMP 2022).

Grazing is a dynamic fuel management tool and its success relies on sufficient understanding of critical control points such as the species of livestock being grazed (cattle tend to herd around water sources), goat (goat saliva contains compounds which allow them to consume tannins within plants, damaging to other animals), sheep, or combination), targeted plant species (annual vs perennial), the time of year (varying plant nutrition content), animal grazing concentration (intensity), the duration of grazing, plant palatability, and animal age and nutritional needs (Surviving Wildfire 2020).

For more information on the BLM Colorado Grazing Standards and Guidelines visit:

<https://www.blm.gov/sites/blm.gov/files/BLM%20Colorado%20Grazing%20Standards%20and%20Guidelines.pdf>



Figure E.13. Goats grazing a field in the town of Superior, fall of 2023.

Source: Meg Halford

PREScribed BURNING

Prescribed burning is the single most effective tool to reduce the threat of extreme fire behavior by removing excessive standing plant material, litter, and woody debris while limiting the encroachment of shrubby vegetation (Moore et al. 2024) (Table E.3; Figure E.14). All prescribed fire operations should be conducted in accordance with federal and state laws and regulations. Boulder County maintains a record of planned, current, and completed prescribed burns in the county at the following website:

<https://bouldercounty.gov/open-space/management/prescribed-burns/>

Table E.3. Types of Prescribed Fire Treatments

Treatment	Comments
Broadcast Burning	Consists of burning larger areas of land that have been prepped for prescribed burning operations. Preparation includes fuel reduction, fuel rearrangement, containment line construction, smoke abatement, and contingency planning. Broadcast burns can be implemented in various fire-adapted fuel types such as lodgepole pine, ponderosa pine, and annual grasslands. Monitoring of broadcast burn units is important for achieving desired results and mitigating ecological consequences such as high tree mortality.

Treatment	Comments
Ditch Burning	Consists of burning built up fuels along and in irrigation ditches. Burning is contained to the ditch and area immediately surrounding the ditch. Due available moisture, vegetation within the ditch can grow quickly but can also be efficiently managed with fire.
Pile Burning	Consists of burning piles of cut, gathered, and stacked vegetation. Pile burning is often simpler to implement than broadcast burning and can be conducted in the winter when wildfire risk is low. Pile burning is effective in removing fuels from a landscape but can have consequences to soil health due to the intense heat of piles scorching the ground.
Agricultural Burning	Consists of burning agricultural lands such as hay fields and wheat stubble to remove vegetation, improve soil health, increase productivity, and reduce wildfire risk. Agricultural burning is conducted during key times of the year that are conducive to the growing season of desired crops.
Cultural Burning	See “Cultural Burning” below to learn more.



Figure E.14. Prescribed broadcast forest burn at Heil Valley Ranch (BCPOS 2014)

Public safety is the primary consideration in the design of any prescribed burn plan. Use of prescribed fire on public land should be carried out within the confines of the agency’s fire management planning documents and requires individual prescribed burn plans that are developed for specific burn units and consider smoke management concerns and sensitive receptors within the WUI. Smoke monitors should be placed in areas where smoke concerns have been raised in the past.

Following any type of fuels reduction treatment, post-treatment monitoring should continue to ensure that management actions continue to be effective throughout the fire season. The vegetation within this ecosystem can change rapidly in response to drought or moisture from year to year and during the course of the season, so fuels treatments should be adjusted accordingly. To learn more about firing techniques, visit the EFIRE Fire Techniques webpage: <https://efire.cnr.ncsu.edu/efire/fire-techniques/>.

Boulder County provides resources with safety tips and instructions for burning. It is also recommended that residents and land managers consider reasonable alternatives to burning if the primary purpose is material disposal. Several burns may be needed to meet full resource management objectives, so a maintenance plan is needed to ensure success.

For more information and to access the burn permit application for, please visit:

<https://bouldercounty.gov/safety/fire/burn-permits/>.

Agricultural burning of field and ditches is a common practice among agricultural areas of Boulder County. The process typically functions to clear land, fertilize soil, or prepare for planting of new crops. Awareness of smoke dispersal, obtainment of proper permits, and alerting proper personnel prior to burn operations are critical components of agricultural burning. Historically, wildfire risks associated with agricultural burning have been low in Boulder County but escape occasionally occurs.

The City of Boulder enforces a permanent burn ban within its city limits, prohibiting open burning, including burnable piles, fire pits, and bonfires of any size or flammable material. The ban also extends to portable outdoor fire pits. Outside of the city, a permit from must be obtained for a resident or land manager to start a prescribed burn on a designated property.

According to Frank Kanawha Lake, a research ecologist with the USFS and a wildland firefighter of Karuk descent, “[Cultural burning] links back to the tribal philosophy of fire as medicine. When you prescribe it, you’re getting the right dose to maintain the abundance of productivity of all ecosystem services to support the ecology in your culture” (Roos et al. 2021).

Cultural Burning

Across the American West, fire has historically been a means of forest management and restoration by Indigenous communities for thousands of years (Carter et al. 2021; Roos et al. 2021). Research shows that use of wildfire by Indigenous communities prior to European settlement frequently served to reduce fuel loads, maintain wildlife habitat, and reduce wildfire severity (Carter et al. 2021). In many areas, cultural burning took a hiatus during the era of fire suppression in the twentieth century due to land management agencies’ enforcement of differing practices. However, this has been changing over the past few decades, and cultural burning is again becoming an accepted practice for land management in some areas.

Utilizing traditional indigenous wildfire management practices can help create and maintain fire-resilient WUI communities. Integrating cultural practices into prescribed burning also broadens participation and can increase support for burning activities. Tribally led prescribed burns highlight the historical use of fire on the landscape and can initiate conversations and educational opportunities around the role and history of fire on the landscape.

Although cultural burning is included under the umbrella of prescribed burns, it holds a different meaning and has more purposes than a typical prescribed burn (Fire Adapted Communities New Mexico [FACNM] 2021). Cultural burns are “pertinent and substantial to the cultural livelihood” with over 70 identified purposes (FACNM 2021).

Rather than focusing solely on fuel reduction, or as a means of wildfire mitigation, cultural burning is done with a more holistic view, under the philosophy of “reciprocal restoration,” meaning, as stewardship

responsibilities to the land are fulfilled, those actions will in turn benefit the peoples who depend on those ecosystems (Long et al. 2021). Cultural burning is typically performed with a variety of objectives, such as landscape management, ecosystem and species biodiversity and health, transmission of environmental and cultural knowledge, ceremonies and spiritual wellbeing, a sense of place, and material services (i.e., food, medicine, plant materials, etc.). Extensive site preparation is typically done before a burn, and post-burn monitoring and additional cultural practices are a common factor of the land stewardship tradition (Long et al. 2021).

“Cultural burning by Native Americans interconnected them not only to the land but to their animal, reptile, bird and plant spiritual relatives. Therefore, conducting a cultural burn relates to what they burned, how they burned it, and why they burned it.”

- Ron W. Goode, Tribal Chair, North Fork Mono Tribe

Benefits of Prescribed Fire to Grasslands

The Watershed Center’s story map for Grassland Management in Boulder County highlights a range of benefits associated with conducting prescribed fire in grassland areas. Among these benefits is the promotion of native vegetation, particularly fire adapted species. Additionally, prescribed fires revitalize grass-dominant habitats by re-establishing keystone ecological processes and returning nutrients to the soil. Prescribed fires also play a crucial role in limiting the establishment and spread of invasive species and preventing the encroachment of trees and shrubs into grasslands. This reduction in woody undergrowth, known as ladder fuels, is particularly vital in foothill areas. Collectively, these benefits create a healthier ecosystem that positively impacts a range of wildlife, including native pollinators, small mammals, and various bird species.

For more information on managing grasslands, please visit the Watershed Center’s ArcGIS Story Map: <https://bouldercounty.gov/news/grassland-management-in-boulder-county-story-map-now-available/>

Impacts of Prescribed Fire to Communities

Prescribed fires can have impacts on air quality that may impact local communities. Impacts on a regional scale are typically only acute when many acres are burned on the same day, which is uncommon in this region. Local problems are occasionally acute due to the large quantities of smoke that can be produced in a given area during a short period of time. Residents with respiratory problems may be impacted during these burning periods since smoke consists of small particles of ash, partly consumed fuel, and liquid droplets that are considered air pollutants.

Other combustion products include invisible gases such as carbon monoxide, carbon dioxide, hydrocarbons, and small quantities of nitrogen oxides. In general, prescribed fires produce inconsequential amounts of these gases compared to wildfires.

Effective smoke management is a vital component of planning and conducting prescribed fires as smoke has the potential to exceed air quality and pollution standards regulated by the EPA and the state of Colorado (Colorado General Assembly 2020). It is important to note the differences in air quality effects produced by a large wildfire versus a controlled prescribed fire (see Figures E.15a–E.15c). The Colorado Department of Public Health and Environment has smoke management guidelines that protect the health and welfare of Californians from the impacts of smoke.



a.



b.



c.

Figure E.15a–c. The left image (a) is an example of the smoke released during a prescribed burn on a grassland in Weld County, Colorado.

Source: CBS News Colorado (2021). The image on the right (b) and below (c) is an example of the darker and more dispersed smoke that can be released during a wildfire such as the Marshall fire in 2021.

Source: Trevor Hughes/USA Today Network/Reuters, Helen H. Richardson/Denver Post/Getty Images.

In addition, the NWCG released the NWCG Smoke Management Guide for Prescribed Fire in 2020 (NWCG 2020). This plan is designed to act as a guide to all those who use prescribed fire. Smoke management techniques, air quality regulations, public perception of prescribed fire, foundational science behind prescribed fire, modeling, smoke tools, air quality impacts, and more are all discussed in this plan. The document is meant to pair with NWCG's Interagency Prescribed Fire Planning and Implementation Procedures Guide for planning and addressing smoke when prescribed fire is used (NWCG 2020).

To view the plan, please visit: <https://www.nwcg.gov/publications/pms420-3>.

Effects of smoke can be managed by burning on days when smoke will blow away from smoke-sensitive areas. Precautions are taken when burning near populated areas, highways, airports, and other smoke sensitive areas. Any smoke impact downwind is considered before lighting a fire. Smoke management is a significant component of all prescribed burn plans.

Other mitigating actions include alerting the public of upcoming burning activities, including the purpose, best conditions for ensuring good smoke dispersal, duration, size, and location of projects. Local radio, newspapers, social media, and TV can provide broad coverage for alerts. Land management agencies in the planning area consistently work with concerned citizens regarding smoke management and attempt to provide solutions such as the placement of smoke monitors at sensitive sites.

Prescribed fire is a key action to reduce hazardous fuels in the county and across the broader landscape (Figure E.16). Current fuel loads far exceed healthy levels and are unable to be addressed solely with hand and mechanical treatments. Public acceptance and support are critical to implementing prescribed burning projects. As such, federal, state, and county representatives must coordinate education efforts related to burning activities to reduce resistance to planned actions. This can include information on the rationale for the prescribed fire, precautions and resources related to smoke, and risk information to ease homeowner concerns.



Figure E.16. Photograph showing a prescribed burn.

Thinning and Prescribed Fire Combined

Combining thinning and prescribed fire can be the most effective treatment (Graham et al. 2004). In ecosystems where fire exclusion or disease has created a buildup of hazardous fuels, prescribed fire cannot be safely applied, and pre-burn thinning is required. The subsequent use of fire can further reduce residual fuels and reintroduce this ecologically imperative process. The National Association of Forest Service Retirees (NAFSR) published a paper on “America’s Forest Management Crisis – A National Catastrophe” (NAFSR 2021) where they observed the effectiveness of pairing thinning treatments with prescribed fire (Figure E.17).



Figure E.17. Photograph taken after the 2021 Bootleg Fire in Oregon highlighting the effectiveness of forest thinning and prescribed fire compared to just thinning treatments or no treatment.

Source: NAFSR (2021).

MANAGEMENT OF NON-NATIVE PLANTS

The USDA maintains a list of introduced, invasive, and noxious plants by state (USDA 2022). Fuel treatment approaches should always consider the potential for introduction or proliferation of invasive non-native species as a result of management actions. Invasive species, particularly winter annual invasive grasses, have been shown to increase fire frequency, temperature, flame length, and rate of spread. Removal of these species can be beneficial and help reduce wildfire impacts (Figure E.18). For example, species like Russian thistle (*Salsola tragus*), kochia (*Bassia scoparia*), and diffuse knapweed (*Centaurea diffusa*) form tumbleweeds that can ignite and move across the landscape, spreading fire rapidly.

Efforts to remove invasive species that contribute to wildfire risk are crucial. These plants often create dense, continuous fuel beds that are easily ignited and burn intensely. By removing invasive species, fire behavior can be mitigated, reducing the likelihood of high-intensity fires. Additionally, the removal of invasive plants allows native vegetation to reestablish, which typically maintains higher moisture levels and is less flammable, thereby creating a more fire-resilient ecosystem (see Figure E.18). The benefits of removing invasive species extend beyond fire risk reduction, contributing to the overall health and biodiversity of the ecosystem.

For more resources on non-native plant identification, visit: <https://bouldercounty.gov/property-and-land/land-use/noxious-weeds/identification-of-noxious-weeds/>.

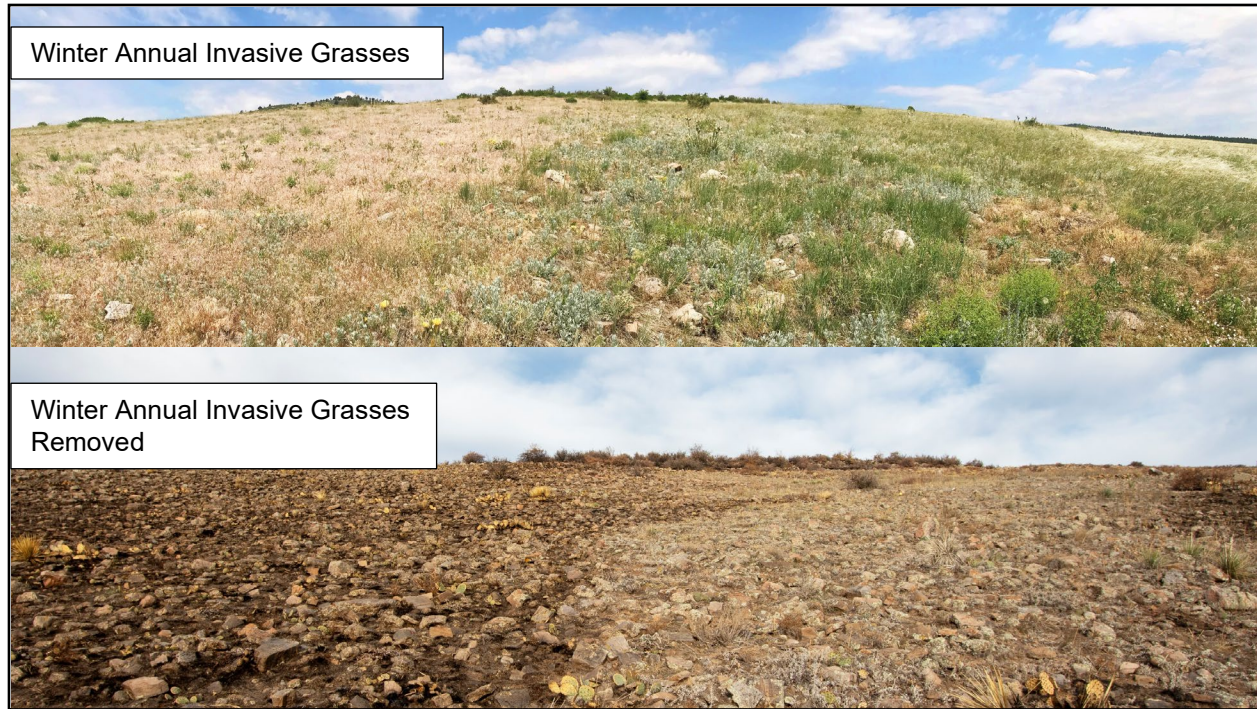


Figure E.18. Pre-treatment and post-treatment photographs of invasive grass control (provided by Boulder County Invasive Weeds Management).

WASH STATE

APPENDIX F:

Post-Fire Recovery and Restoration

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POST-FIRE RESPONSE AND RESTORATION

Experiencing a wildfire is a traumatic and highly impactful event that takes time and energy to fully recover from. Support from neighbors, community, and government is essential to returning your home and environment to a safe and healthy state (Boulder County 2024j). The recovery process often involves many of these steps:

- Damage assessment and hazard identification.
- Returning home and cleaning up.
- Coordinating and mobilizing a group of teams in the community to respond to post-fire related emergencies (not to be confused with initial fire response).
- Identifying immediate needs and critical resources impacts (impacts to wells, food sources, and other necessities).
- Temporary housing and replacing goods.
- Rebuilding communities and assessing economic needs—securing the financial resources necessary for communities to rebuild homes, businesses, and infrastructure.
- Restoring the damaged landscape—restoration of watersheds, soil stabilization, and tree planting.

Prioritizing the needs of socially vulnerable residents/communities who have specific circumstances, such as individuals living in poverty, minorities, people without vehicles, people with disabilities, older adults, and people with limited English proficiency, is imperative in the post-fire recovery process. Municipal and County governments will often establish websites and other guiding resources specific to the recovery process of a recent fire, such as the recovery page created for the Marshall Fire:

<https://bouldercounty.gov/disasters/wildfires/marshall/>. Pages such as this are an ideal place to start working through the recovery process by identifying next steps and speaking with representatives.

BACKGROUND

Over the last 50 years, Boulder County has experienced several major destructive wildfires, collectively destroying approximately 1,350 homes, burning over 36,000 acres, and threatening the lives and properties of thousands of residents (Boulder County 2024i). Despite the ongoing challenges, Boulder County remains at the forefront of community wildfire protection efforts, with residents, communities, and government agencies actively engaged in wildfire mitigation strategies and post-fire response and restoration actions to prevent further impacts to human life and other valued resources.

The most significant fire in recent years was the Marshall Fire, which resulted in 6,026 acres burned and over 1,000 homes or commercial structures destroyed or damaged (Boulder County 2023f). The fire spread quickly due to high winds and dry conditions, and left debris, ash, and partially burnt vegetation in its wake. Additionally, the fire dramatically reduced vegetative cover, resulting in exposed mineral soils prone to water repellency and increasing runoff. This exposed mineral soil is readily transported during rain events and likely resulted in elevated soil erosion and sediment loading in streams, creeks, and rivers (Burned Area Emergency Response [BAER] 2021).

Both a comprehensive dashboard showing progress towards recovery and a webpage with information and various recovery resources from the Marshall Fire can be found through the following links:

- Marshall Fire Dashboard: <https://bouldercounty.gov/marshall-fire-recovery-dashboard/>
- Marshall Fire and Wind Event Recovery: <https://bouldercounty.gov/disasters/wildfires/marshall/>

For additional wildfire recovery information, Boulder County hosts a Fire Recovery Guide, as well as links for financial assistance, safe cleanup, and ways the community can get involved on its website: <https://bouldercounty.gov/disasters/wildfires/recovery-3/>.

Debris Flow

The recent increase in severe fires has highlighted the numerous complexities of post-fire response. Research indicates that high-severity burn areas may produce erosion and runoff rates 5 to 10 times higher than the rates produced by moderate-severity burn areas (Sierra Nevada Conservancy 2021). Following a fire, heavy rains may result in widespread floods carrying trees, boulders, and soil through canyons, ultimately damaging communities and critical infrastructure. Slope-adjacent roadways are particularly vulnerable to debris flow.

Learn more about debris and mud flow here: <https://coloradogeologicalsurvey.org/hazards/debris-flows/>

Post-Fire Flooding

Post-fire flooding is a significant concern in burn areas, with severely burned landscapes susceptible to flash floods that can inundate canyons and deposit debris and mud. Even small rain events of 0.35 inches in 15 minutes or 0.75 inches in one hour can trigger flash floods, prompting Flash Flood Warnings for immediate action to protect life and property. Advisories are issued for minor flooding that may not pose an immediate threat but can be upgraded to Warnings with additional rainfall. The risk is heightened by saturated soils, which are more common in the spring, and afternoon thunderstorms during the monsoon season. Debris flows resulting from these conditions can be unpredictable, emphasizing the need for vigilance and preparedness (Colorado Geological Survey 2021).

Community Response and Recovery Boulder County After the Disaster Guidebook

Even after the flames are extinguished, several dangers persist after a wildfire. These hazards include potential flash flooding, structural damage, downed powerlines, unstable roads, weakened trees, remaining hot spots, and the presence of wildlife predators in the area. Boulder County has developed a guidebook with safety tips, resources, and supplies checklists to aid property owners in navigating the return and recovery process. Homeowners that have experienced property damage during a wildfire event are advised to make an initial trip to assess the damage, identify post-fire hazards, and plan for necessary restoration tasks before starting cleanup or returning home. Returning to your property should only be done once emergency personnel have deemed it safe to do so. The recovery process begins with assessing and documenting losses, taking pictures, and notes.

Livestock and large pet owners delay bringing their animal back to the property until the extent of damage and existing hazards are well understood. Livestock should be sheltered somewhere safe from post-fire impacts until the hazards have subsided.

For more information in post-fire actions and a supply list, please visit:

https://mcusercontent.com/2263fe298f4df255d22b80097/files/9262ab8f-acc3-2b00-5040-3a916c7c342b/Boulder_County_After_the_Disaster_Guidebook_CSU_Extension_V3.pdf

Boulder Office of Disaster Management

The Boulder Office of Disaster Management (ODM) manages recovery beginning with mass care services, impact assessment and emergency debris management. Once the response phase is declared over the ODM continues to manage the transition to the longer-term recovery structure.

Following the Marshall Fire, the City of Boulder and Boulder County partnered with communities and agencies to provide comprehensive post-fire and post-wind event recovery resources and information to citizens. Boulder County hosts a recovery web page that provides information and resources regarding:

- Emotional support
- Financial help
- Rebuilding
- Insurance (debris, home, wildfire)
- Property taxes and valuation

Explore the recovery web page to learn more about what Boulder area governments are doing to provide post-disaster recovery resources: <https://bouldercounty.gov/disasters/wildfires/marshall/>.

City of Boulder Open Space and Mountain Parks Disaster Recovery

The City of Boulder Office of Open Space and Mountain Parks regularly organizes recovery efforts for major disasters affecting the Boulder and surrounding communities and landscapes. A prime example includes the 2013 floods.

- More than 1,480 volunteers donated 8,000 hours to help rebuild and restore shared open space.
- Volunteers helped OSMP to complete more than 120 projects to repair trails and restore areas affected by the floods.

Recovery Navigators

The Recovery Navigator Program began on July 25, 2022. Recovery Navigators provided monthly reports on Marshall Fire recovery progress and convened over 1,150 appointments with citizens to help with personal disaster recovery efforts. Marshall recovery navigation services are scheduled to end March 2024. However, the success of the Recovery Navigators program paves the way for future disaster recovery efforts in and around Boulder.

Recovery Navigators worked one-on-one with individuals and families to provide a broad array of support, including:

- applying to rebuilding grant funds
- applying to unmet needs grant funds
- access to financial planning resources

- advocacy and connections to state and federal programs (DOLA, SBA, FEMA)
- connections with local jurisdiction building departments
- access to additional resources from area nonprofits
- help developing individualized recovery plans
- providing referrals to legal and insurance claims advisors
- comprehensive recovery planning resources
- mental health services

Explore the Recovery Navigators Program here: <https://bouldercountynavigatingdisaster.gov/>

Community Emergency Response Team

Developed by the Federal Emergency Management Agency (FEMA), the Community Emergency Response Team (CERT) training is a program that educates community members about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, and team organization. Supplemental training modules are available to better assist professional responders in a variety of emergency situations. Advanced training includes topics such as animal response, emergency communications, traffic and crowd management, and flood response.

In addition, each community is encouraged to create its own type of a Post-Fire Coordination Group (PFCG) to direct the response to any ensuing post-wildfire natural hazards and aid in determining post-fire mitigation actions. The PFCG should work directly with local, state, or federal agencies, emergency response officials, and others to aid in a coordinated response. Primary duties of the PFCG include coordinating the exchange of information among agencies, assembling and exchanging geospatial data, assisting public communications, and coordinating with elected officials (Colorado Silver Jackets 2021).

The recovery coordinator should become familiar with representatives from local, state, and government agencies that will be helping with coordination or funding of post-fire recovery. Any large wildfire will also involve an Incident Command System (ICS), an appropriately sized team assigned to aid in post-fire recovery. Learn more are <https://www.nps.gov/articles/wildland-fire-incident-command-system-levels.htm>.

Wildfire Recovery and Returning Home

Recovery from wildfire impacts can vary greatly across income levels and demographics. Rural areas, low-income neighborhoods, and immigrant communities generally do not have the necessary resources to cover insurance and rebuilding expenses that occur after a fire. As a result, many of these areas take more time to recover than those with greater access to resources. In addition, the occurrence of wildfire can worsen existing mental health conditions and lead to post-traumatic stress, low self-esteem, and depression for at-risk populations (Boulder County 2024e).

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

When driving, watch for trees, brush, and rocks which may have been weakened or loosened by the fire. Be aware of any damage or debris on roads and driveways. Traffic may be delayed, or lanes closed due

to firefighter operations. Use extreme caution around trees, power poles, and any other tall objects that may have been weakened by the fire (Colorado Silver Jackets 2021).

Even if the fire did not damage your house, do not expect to return to normal routines immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Request that the fire department or utility companies turn the utilities back on once the area is secured. Similarly, water supply systems may have been damaged; do not drink from the tap until you have been advised that it is safe to do so. Finally, keep a “fire watch”; look for smoke or sparks in houses and other buildings (CDHSEM 2022). Once at home, check for the following (CDHSEM 2022):

- Use caution when walking through burned areas. Hazards, such as hot spots and flare ups, may still exist.
- Keep a “fire watch” for several hours after returning to watch for smoke and sparks.
- Leave immediately if there is heat or smoke coming from a damaged structure.
- Avoid damaged or fallen power lines, poles, and downed wires.
- Mark ash pits properly and warn others of them. Stay clear of pits when possible.
- Keep animals close by- do not allow them to wander as hot spots and embers can burn their paws.
- Listen to instructions given by those in charge. Remain calm and deal with the most urgent issues first.
- If there is damage to your property, contact your insurance company.

Insurance Claims

Your insurance agent is the best source of information for submitting a claim. If you do not have insurance, reach out to local disaster recovery groups, such as the Recovery Navigators listed above. It is recommended you take photos of your home, both inside and out, in preparation of an emergency. Keep the photos in a safe place as this will make the insurance claim process easier. Most expenses incurred during the time you are displaced may be reimbursed, so be sure to keep all receipts. Additional items that may be covered are extra transportation costs to and from work or school, telephone installation, furniture rental, extra food costs, and water damage. Do not start any repairs without the approval of your claims adjuster (Colorado Division of Insurance 2020).

Natural disasters aren’t always predictable, but there are steps property owners can take to better prepare for an emergency.

- Review your insurance policy annually to see if your home is adequately insured
- Know your “loss of use” section – these cover living expenses should your home become unlivable due to fire, smoke, or otherwise

You can view a guide on creating a home inventory here: <https://www.iii.org/article/how-create-home-inventory>

Learn more about insurance decisions in the Colorado Property and Insurance Wildfire Preparedness Guide: https://93j20c.p3cdn2.secureserver.net/wp-content/uploads/2021/08/Wildfire_22x8.5_2021.pdf

United Policy Holders also provides insurance resources for property damage and loss:

<https://uphelp.org/>

Community Safety: Post-Fire Hazards and Evacuation

Following wildfires, communities face a range of post-fire hazards and evacuation challenges that demand careful planning to mitigate risks and safeguard lives and property. The most dangerous natural hazards after a fire are potential flash floods and landslides that can occur with rainfall in a burned area. It is crucial to be aware of your surroundings and take note of heavy rainfall, weak or loose rock and soil, improper construction and grading, and steep slopes that could require hasty evacuation (Colorado Geological Survey 2021). Develop an evacuation plan with your household and stay away from waterways and pay special attention to weather forecasts and statements from local authorities. Always have a household inventory with copies of critical documents (Colorado Geological Survey 2021).

Mobilizing Your Community

Wildfires that produce extensive damage require a community-scale response. The local Emergency Manager will collaborate with state and federal partners to manage disaster response and urgent needs. Additional mobilization of a response and recovery team or group of teams in a community can function as a vital part of the recovery procedure (Colorado Silver Jackets 2021).

Communication

After a team is assembled and immediate tasks are identified, find the best way to spread information in your community. You may distribute flyers, set up a voicemail box, work to find pets or livestock that have been displaced, develop a mailing list for property owners, hold regular public meetings, etc. It is important that a long-term communications plan is developed (Natural Hazards Center 2020). Applying the following steps can aid in successful communication (Colorado Silver Jackets 2021):

- Communicate through familiar and trusted messengers
- Provide clear, actionable information
- Tailor messages and information pathways for target audience
- Communicate hazards that still exist
- Use diverse communication networks
- Ensure cross-organizational communication
- Work with educational institutions
- Encourage alert system participation

Long-Term Community Recovery

On non-federal land, recovery efforts are the responsibility of local governments and private landowners. Challenges associated with long-term recovery arise when homes were saved but are located in high severity burn areas or within other hazard prone areas. Economically, essential businesses that were burned, damaged, or otherwise forced to close pose a challenge to communities of all sizes. Given these complications, rebuilding and recovery efforts can last for years, with invasive species control and ecosystem restoration lasting even longer (Coalition for the Upper South Platte [CUSP] 2016). It is critical

that a long-term plan is in place and there is sufficient funding and support to properly restore the ecosystem and community.

To learn about more post-fire recovery resources, visit the After the Flames website here:

<https://aftertheflames.com/resources/>.

Additionally, to learn more about post-fire restoration, please view this CSU webinar recording here:

<https://www.youtube.com/watch?v=VI4QXie8PIg>.

FEDERAL PROGRAMS

Burned Area Emergency Response

One example of a post-fire response program is the USFS's post-fire emergency stabilization program, called the Burned Area Emergency Response (BAER) program. The goal of the BAER program is to discover post-wildfire threats to human life and safety, property, and critical natural or cultural resources on USFS lands and take appropriate actions to mitigate unacceptable risks (BAER 2021).

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

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

In addition, both the USFS and CSFS provide science-based frameworks to guide post-fire restoration efforts in State Forest lands of Colorado. This guidance outlines methods of ecological management and a step-by-step framework for agencies to follow in post-fire planning (CSFS 2022a). A list of resources to guide post-wildfire rehabilitation is available at: <https://csfs.colostate.edu/forest-management/restoration->

[rehabilitation/](#). Resources include methods for controlling erosion, vegetation recovery for forests and grasslands, and species-specific post-fire management.

Emergency Watershed Protection Program

As another example, the NRCS's Emergency Watershed Protection (EWP) program provides technical and financial services for watershed repair on public (state and local) and private land. The goal is to reduce flood risk through funding and expert advice on land treatments. The EWP program can provide up to 75% of funds and remaining funds are often paid with in-kind volunteer labor (CUSP 2016). This funding is used by the State Emergency Rehabilitation Team (a multi-agency group assembled by the NRCS) to develop specific recovery and treatment plans.

Examples of potential treatments include (CSFS 2022a):

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

The Colorado State Forest Service maintains a webpage with Colorado-specific forest and grassland restoration resources. This page includes guides on soil and erosion treatment techniques, rehabilitation and replanting for success guides, and a link to the Colorado Post-Fire Playbook. These resources are available here: <https://csfs.colostate.edu/forest-management/restoration-rehabilitation/>

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

The effectiveness of various treatments is described at: https://www.fs.usda.gov/rm/pubs/rmrs_gtr240.pdf

Information on native grasslands and planting recommendations is available at: <https://bouldercountyopenspace.org/i/science/native-grasslands-boulder-county/>

POST-FIRE TREATMENTS AND MANAGEMENT

WESTT Tool

Hillslope Treatments

Cover Applications:

Dry mulch: provides immediate ground cover with mulch to reduce erosion and downstream flow.

Wet mulch (hydromulch): provides immediate cover to hold moisture and seeds on slopes using a combination of organic fibers, glue, suspension agents, and seeds (most effective on inaccessible slopes).

Slash spreading: provides ground cover to reduce erosion by felling trees in burned areas.

Seeding: reduces soil erosion over time with an application of native seed mixtures (most successful in combination with mulching). Breaking up and loosening topsoil to break down the hydrophobic layer on top of the soil is also effective.

Erosion Barrier Applications:

Erosion control mat: organic mats staked on the soil surface to provide stability for vegetation establishment.

Log erosion barrier: trees felled perpendicular to the hillslope to slow runoff.

Fiber rolls (wattles): rolls placed perpendicular to the hillslope to reduce surface flows and reduce erosion.

Silt fencing: permeable fabric fencing installed parallel to the slope contour to trap sediment as water flows down the hillslope.

Channel Treatments

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

In-channel tree felling: felling trees in a staggered pattern in a channel to trap debris and sediment.

Grade stabilizer: structures made of natural materials placed in ephemeral channels for stabilization.

Stream bank armoring: reinforcing streambanks with natural materials to reduce bank cutting during stream flow.

Channel deflector: an engineered structure to direct flow away from unstable banks or nearby roads.

Debris basin: constructed to store large amounts of sediment moving in a stream channel.

Forest Restoration and Management

The timeline and success of forest recovery in a post-wildfire landscape is heavily dependent on the severity of the burn, the number of surviving trees, and the availability of seedlings and labor for planting. A severely burned site may require multiple years before seedlings can be transplanted with success due to soil impacts and seeding requirements. It may be necessary to implement soil erosion and slope control measures prior to replanting as unstable soil may wash away and carry newly planted seedlings with it. CSFS maintains a number of guides and resources to improve the success of reforestation and identify the appropriate species for your site.

Post-fire Replanting: Tips for Safety and Success: <https://csfs.colostate.edu/wp-content/uploads/2020/11/FINAL-Post-Fire-Replanting-and-Safety-Tips-May2019.pdf>

Planting Trees after Wildfire Webinar: <https://www.youtube.com/watch?v=gCNyKeZ9C1g>

Soil Erosion Control after Wildfire: <https://csfs.colostate.edu/wp-content/uploads/2018/07/06308.pdf>

Burned Tree Assessment and Treatment Guides:

Aspen: <https://static.colostate.edu/client-files/csfs/documents/How-to-Aspen.pdf>

Douglas-Fir: <https://static.colostate.edu/client-files/csfs/documents/How-to-Dougfir.pdf>

Gambel Oak and Serviceberry: <https://static.colostate.edu/client-files/csfs/documents/How-to-gambel-oak-and-serviceberry.pdf>

Pinon Pine-Juniper: <https://static.colostate.edu/client-files/csfs/documents/How-to-PJ.pdf>

Ponderosa and Lodgepole Pine: <https://static.colostate.edu/client-files/csfs/documents/How-to-Ponderosa-and-lodgepole.pdf>

Grassland and Plains Management

Planting native species: Post-wildfire landscapes can be prone to nonnative plant invasion. Planting native seeds improves the likelihood of native species recovering. Proper management of grasslands is also essential to limiting fuel loading and the potential of future fire outbreaks. Boulder County maintains multiple resources related to grassland planting and management:

Native Grasslands of Boulder County: <https://bouldercountyopenspace.org/i/science/native-grasslands-boulder-county/>

Grassland Management Story Map:
<https://storymaps.arcgis.com/stories/62435c5cd6554d4d8143dd0c967fc2d3>

Road and Trail Treatments

Outsloping and rolling dips (water bars): alter the road shape or template to disperse water and reduce erosion.

Overflow structures: protect the road by controlling runoff and diverting stream flow to constructed channels.

Low water stream crossing: culverts replaced by natural fords to prevent stream diversion and keep water in the natural channel.

Culvert modification: upgrading culvert size to prevent road damage.

Debris rack and deflectors: structure placed in a stream channel to collect debris before reaching a culvert.

Riser pipes: filter out debris and allow the passage of water in stream channels.

Catchment-basin cleanout: using machinery to clean debris and sediment out of stream channels and catchment basins.

Trail stabilization: constructing water bars and spillways to provide drainage away from the trail surface.

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

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

Timber Salvage

Many private landowners may decide to harvest trees killed in a fire, a decision that can be controversial. Trees remaining post-fire can be instrumental for soil and wildlife habitat recovery, but dead standing

trees may also pose safety concerns and fuel loadings may still be conducive to future high intensity wildfires. Burned soils are especially susceptible to soil compaction and erosion so it is recommended to have professionals perform the timber salvage. Several programs assist landowners with timber salvage, including the NRCS Environmental Quality Incentives Program (EQIP) (CUSP 2016). Colorado State Forest Service also maintains a database of companies that will assist with timber salvage or mulching from mitigation activities: <https://csfs.colostate.edu/colorado-forest-products-database/wood-mulch/>.

Invasive Species Management

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

Planting native seeds is an economical way to restore a disturbed landscape. Vegetation provides protection against erosion and stabilizes exposed soils. To be successful, seeds must be planted during the proper time of year, using correct techniques. Use a native seed mixture with a diversity of species and consider the species' ability to compete with invasive species. If you choose to transplant or plant native species, consider whether the landscape has made a sufficient recovery to ensure the safety of the individuals (CSFS 2022a).

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APPENDIX G:

Community Engagement and Input

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COMMUNITY OUTREACH

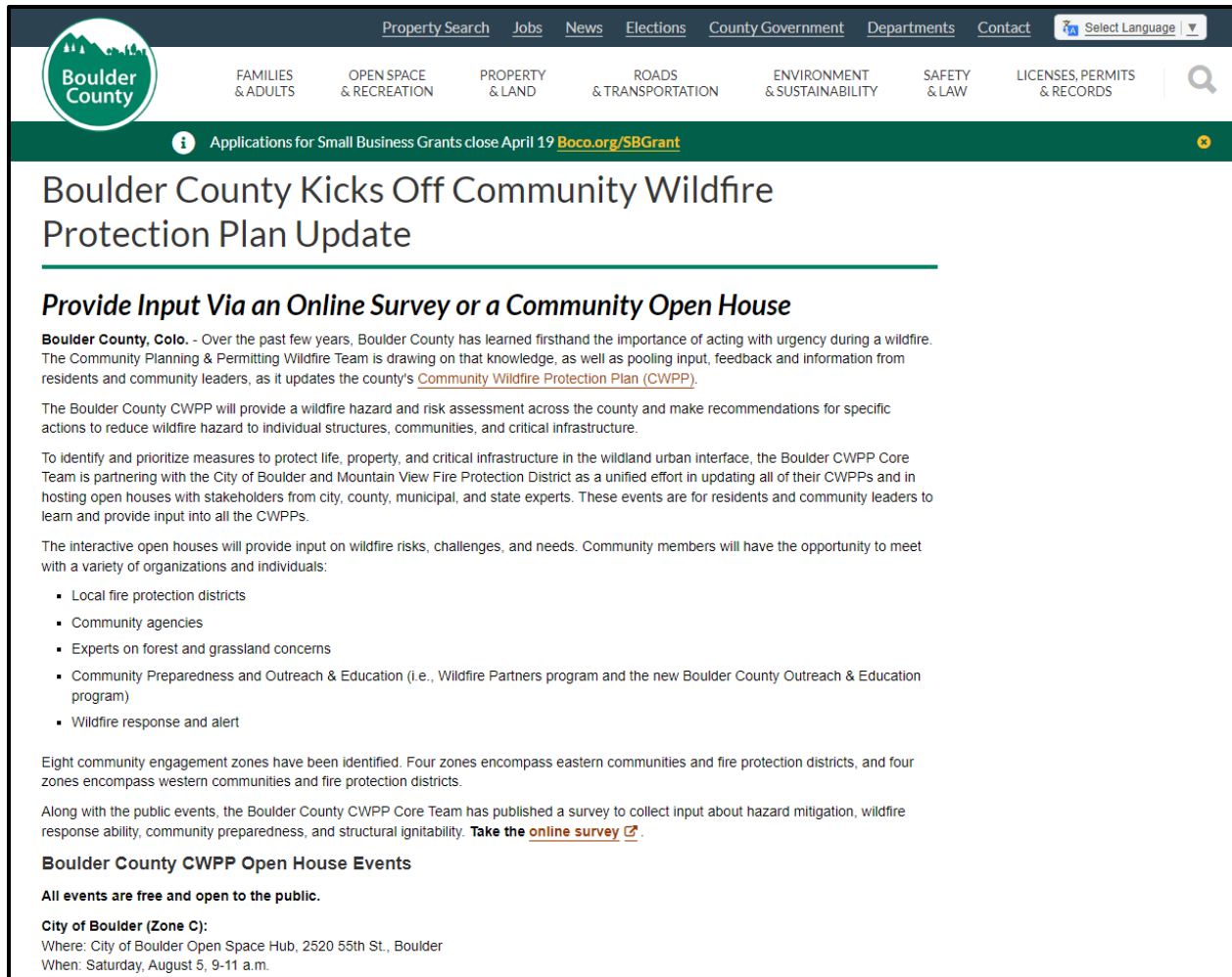
Throughout the project, the Core Team utilized online resources, public engagement events and surveys, and an online Story Map to gather public feedback.

To maximize audience reached, online resources were used to provide information to the public and solicit feedback. Figures G.1 through G.10 show examples of online posts.

Due to the size of the planning area, a zoned approach was also used to distribute information about the 2024 CWPP update across the entire planning area and ensure the feedback received was representative of Boulder County as a whole. Table G.1 shows the different zones within the planning area and how engagement events were planned to cater to each zone.

Table G.1. Public Engagement Open House Events

PLANNED PUBLIC ENGAGEMENT OPEN HOUSE EVENTS		
ZONE	DATE/TIME	LOCATION
Central North: Boulder Mountain FPD, Jamestown FPD, Indian Peaks FPD, and Lefthand FPD	Saturday, April 20, 2024, from 9:00 – 11:00 a.m.	Lefthand Fire Station, Boulder
Central South: Boulder Rural FPD, Gold Hill FPD, Fourmile FPD, Sugarloaf FPD, and Sunshine FPD	Saturday, November 4, 2023, from 9:00 – 11:00 a.m.	Fourmile Fire Station, Boulder
North Zone: Allenspark, Big Elk Meadows FPD, Pinewood Springs FPD, and Lyons FPD	Saturday, September 16, 2023, from 9:00 – 11:00 a.m.	Allenspark Fire Station
South Zone: Nederland FPD, Coal Creek Canyon FPD, Mountain View FPD, and Timberline FPD	Saturday, October 7, 2023, from 10:00 a.m. – 12:00 p.m.	Nederland Community Center
Zone A: Longmont FPD, Niwot FPD, Boulder Rural FPD, Hygiene FPD, and Mountain View FPD	Monday, March 18, 2024, from 6:00 – 8:00 p.m.	Boulder Rural Fire Station, Boulder
Zone B: Lafayette, Erie, Gunbarrel, Boulder Rural FPD, Lafayette Rural FPD, Mountain View FPD, and North Metro FPD	Wednesday, August 30, 2023, from 6:00 – 7:30 p.m.	Erie Open Space Building
Zone C: City of Boulder	<ul style="list-style-type: none"> Saturday, August 5, 2023, from 9:00 to 11:00 a.m. (in person) Thursday, November 2, 2023, from 4:30 – 4:30 p.m. (virtual) Saturday, March 16, 2024, from 9:00 to 11:00 a.m. (in person) 	Open Space Hub, Boulder and Zoom
Zone D: Louisville, Superior, Marshall, and Eldorado Springs	Saturday, June 10, 2023, from 9:00 – 11:00 a.m.	Superior Community Center



The screenshot shows the Boulder County website with a dark blue header. The header includes the Boulder County logo on the left and a navigation menu with links: Property Search, Jobs, News, Elections, County Government, Departments, and Contact. On the right, there is a 'Select Language' dropdown and a search icon. Below the header is a green banner with a white 'i' icon and the text: 'Applications for Small Business Grants close April 19 [Boco.org/SBGrant](\"http://Boco.org/SBGrant\")'. The main content area has a white background. The title 'Boulder County Kicks Off Community Wildfire Protection Plan Update' is in a large, bold, black font. Below the title is a green horizontal line. The section 'Provide Input Via an Online Survey or a Community Open House' is in a bold, italicized black font. The text below this section explains the importance of the update and the role of the community. It mentions that the Boulder County CWPP Core Team is partnering with the City of Boulder and Mountain View Fire Protection District. It also lists the topics that will be discussed at the open houses: Local fire protection districts, Community agencies, Experts on forest and grassland concerns, Community Preparedness and Outreach & Education (i.e., Wildfire Partners program and the new Boulder County Outreach & Education program), and Wildfire response and alert. It states that eight community engagement zones have been identified. Finally, it mentions that the Boulder County CWPP Core Team has published a survey to collect input about hazard mitigation, wildfire response ability, community preparedness, and structural ignitability, and provides a link to 'Take the online survey'.

Boulder County, Colo. - Over the past few years, Boulder County has learned firsthand the importance of acting with urgency during a wildfire. The Community Planning & Permitting Wildfire Team is drawing on that knowledge, as well as pooling input, feedback and information from residents and community leaders, as it updates the county's [Community Wildfire Protection Plan \(CWPP\)](#).

The Boulder County CWPP will provide a wildfire hazard and risk assessment across the county and make recommendations for specific actions to reduce wildfire hazard to individual structures, communities, and critical infrastructure.

To identify and prioritize measures to protect life, property, and critical infrastructure in the wildland urban interface, the Boulder CWPP Core Team is partnering with the City of Boulder and Mountain View Fire Protection District as a unified effort in updating all of their CWPPs and in hosting open houses with stakeholders from city, county, municipal, and state experts. These events are for residents and community leaders to learn and provide input into all the CWPPs.

The interactive open houses will provide input on wildfire risks, challenges, and needs. Community members will have the opportunity to meet with a variety of organizations and individuals:

- Local fire protection districts
- Community agencies
- Experts on forest and grassland concerns
- Community Preparedness and Outreach & Education (i.e., Wildfire Partners program and the new Boulder County Outreach & Education program)
- Wildfire response and alert

Eight community engagement zones have been identified. Four zones encompass eastern communities and fire protection districts, and four zones encompass western communities and fire protection districts.

Along with the public events, the Boulder County CWPP Core Team has published a survey to collect input about hazard mitigation, wildfire response ability, community preparedness, and structural ignitability. [Take the online survey](#).

Boulder County CWPP Open House Events

All events are free and open to the public.

City of Boulder (Zone C):
Where: City of Boulder Open Space Hub, 2520 55th St., Boulder
When: Saturday, August 5, 9-11 a.m.

Figure G.1. Article on Boulder County website announcing CWPP update.

WE WANT YOUR INPUT**Boulder County to Host Public Open Houses for
2024 Community Wildfire Protection Plan (CWPP) Update**

On August 30, 2023, Boulder County will host a CWPP Community Engagement open house at the Erie Open Space Building (150 Bonnell Avenue, Erie, Colorado 80516) for the 2024 Boulder County Community Wildfire Protection Plan (CWPP) Update. The open house events are an opportunity for the community to learn about the CWPP, visit with Boulder County staff, local municipal managers, the fire protection districts, and other stakeholders as well as provide input and comments to inform the CWPP development. This will be the second Community Engagement open house in a series of planned Community Engagement open house events. Information on the CWPP process will be on display and light refreshments will be provided; a short presentation will take place at 6:00 PM.

All community members are welcome and encouraged to attend this event. Some information at the August 30th event will be specific to Lafayette, Erie, Gunbarrel, the Boulder Rural Fire Protection District, the Lafayette Rural Fire Protection District, the Mountain View Fire Protection District, and North Metro Fire Protection District. If you missed the first community engagement event for Superior, Louisville, Marshall and Eldorado Springs, please attend this event to provide your input! Additional public meetings are planned for other areas in Boulder County. Some event details are subject to change, so please keep an eye out for future updates.

Boulder County has taken proactive measures to protect its communities and infrastructure from wildfire hazards by contracting SWCA Environmental Consultants to develop an updated CWPP for 2024. The CWPP identifies wildfire risks in the wildland-urban interface (WUI), which refers to the area between wildland and human development.

A crucial aspect of the CWPP is to recommend strategies for hazardous fuels reduction, public outreach and education, structural ignitability reduction, and improved fire response capabilities. By addressing these areas, the County aims to heighten the safety of its residents and critical infrastructure in the face of potential wildfires. The CWPP will serve as a guiding document that will assist the County and landowners in making informed decisions with respect to wildfire preparation and management.

For more information on the project, please visit: <https://boulder-county-cwpp-bouldercounty.hub.arcgis.com/>

Figure G.2. Press release announcing CWPP community engagement open houses (listing all events below) and describing the planning process.



Figure G.3. Longmont Leader article.

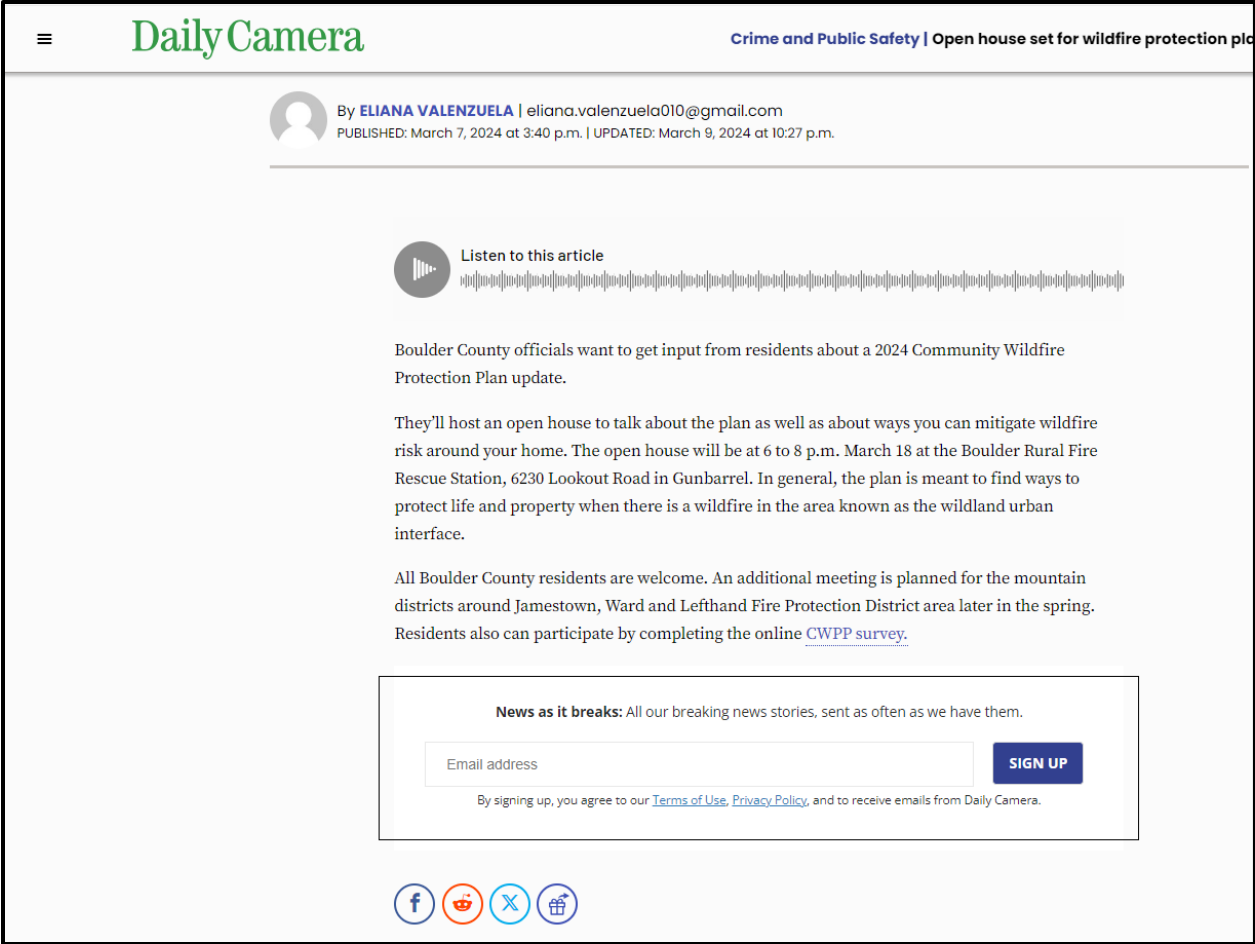


Figure G.4. Article from the Boulder Daily Camera informing residents how they can provide input for the Boulder County CWPP update, including through the public survey or community engagement open houses.

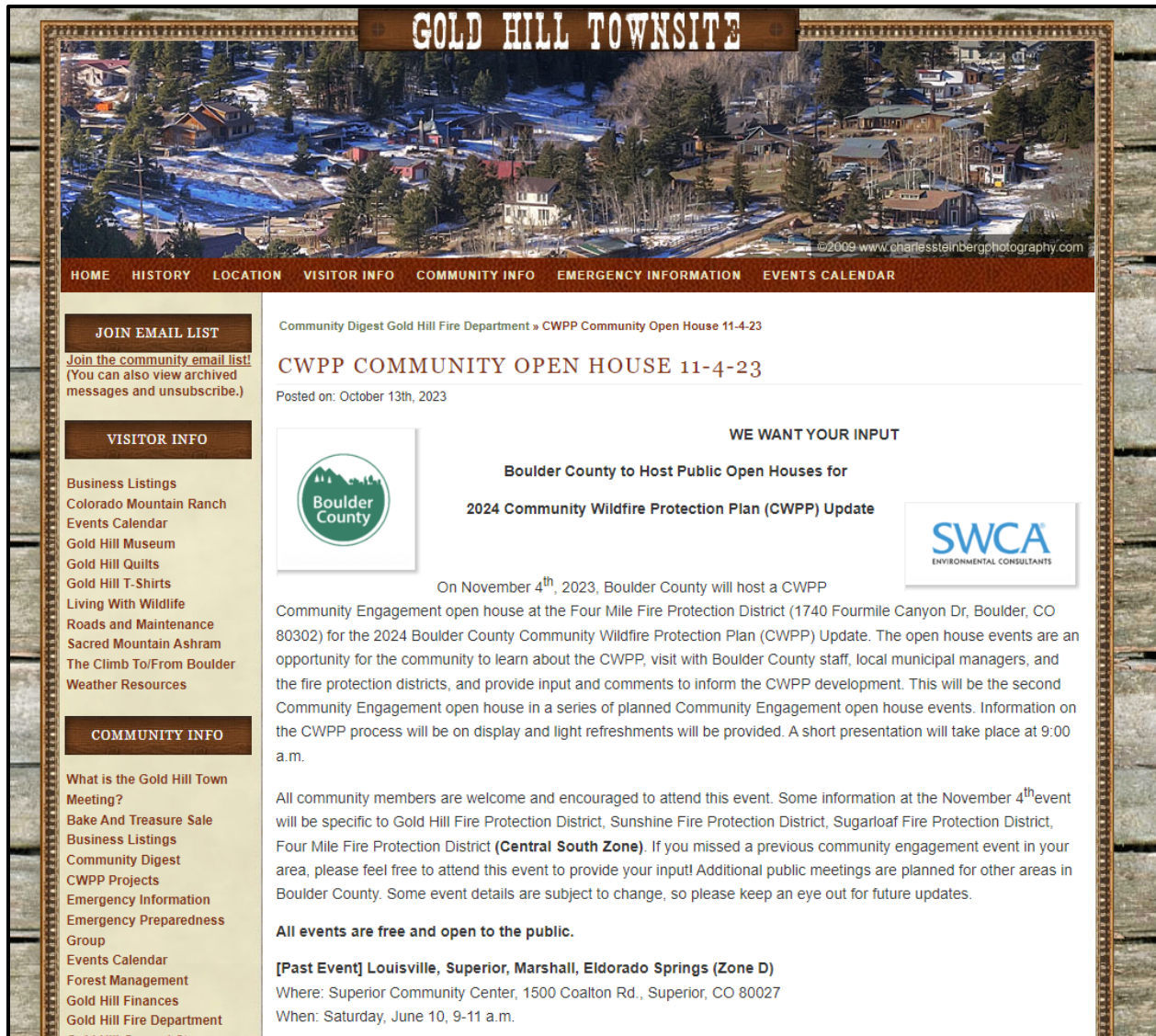


Figure G.5. Press release from the Town of Gold Hill announcing the next community engagement open house and encouraging public participation.



Longmont Public Safety Department

[More info...](#)

[Subscribe](#)

Activity

REMINDER: Boulder County to Host Public Open House for 2024 Community Wildfire Protection Plan (CWPP) Update

Longmont Department of Public Safety [Robin Ericson](#) from Longmont Public Safety Department · 18 Mar

On March 18th, 2024, Boulder County will host a Community Engagement open house at Boulder Rural Fire Rescue Station to gather input on the 2024 Boulder County Community Wildfire Protection Plan (CWPP) Update. This is an opportunity for the community to learn about the CWPP, visit with Boulder County staff, local municipal managers, and fire protection districts, and provide input to inform the CWPP development. A short presentation will occur at 6:00 p.m. Information on the CWPP process will be displayed, and light refreshments will be provided.

Boulder County is working with the environmental consulting firm SWCA to develop and update its 2011 CWPP. The creation of the CWPP is a collaborative process to identify fire hazards and community values at risk within Boulder County. The CWPP helps to prioritize fire mitigation projects and funding across the county. It serves as a guiding document to assist the County and landowners in making informed decisions for wildfire preparation and management, prioritizing the safety of residents, their homes, and critical infrastructure.

All community members are encouraged to attend this meeting. Some information at the March 18th event will be specific to the Longmont Fire Department, Niwot Fire Protection District, Boulder Rural Fire Protection District, Berthoud Fire Protection District, Hygiene Fire Protection District, and Mountain View Fire Protection District (Zone



Figure G.6. Press release from the Longmont Public Safety Department.



Figure G.7. Flyer from Boulder County encouraging community members to attend the next community engagement open house.



Figure G.8. Article on Boulder Daily Camera encouraging residents to comment on the Boulder County CWPP draft.

BOULDER COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

THE PLAN

Boulder County (county) has contracted SWCA Environmental Consultants to work in collaboration with municipal, state, and federal land management agencies to develop the 2024 Boulder County Community Wildfire Protection Plan Update (CWPP).

A CWPP is designed to assist the county and property owners in mitigating wildfire risk by assessing areas at risk and recommending measures to decrease those risks. You (the public) can play a part in crafting fire mitigation recommendations to reduce risk in your community. Read below to find out more about the collaborative Community Wildfire Protection Plan process and public involvement.



WHAT DOES A COMMUNITY WILDFIRE PROTECTION PLAN DO?

- Identify areas at risk for wildland fire
- Make recommendations for homeowners to reduce fire risk
- Make recommendations for hazardous fuels treatments (vegetation thinning)
- Ask the public to share ideas about wildfire prevention and identify community values at risk
- Prioritize areas for wildfire mitigation funding

WHY YOU SHOULD BE INVOLVED

A CWPP is designed to assist the county and landowners in mitigating wildfire risk. It is important that this process is collaborative. The county has a comprehensive community engagement plan that provides residents, partners, and stakeholders with the opportunity to provide input. Please scan the QR code to visit the CWPP hub site where you can find more information, upcoming events, surveys, and ways to submit your comments and questions.



COMMUNITY FACT

The 2024 Boulder County CWPP is being developed in conjunction with the 2024 City of Boulder and 2023 Mountain View Fire Protection District CWPPs.

All three plans will align to identify hazards and reduce wildfire risk in and around Boulder County.

PROJECT CONTACT ARIANNA.PORTER@SWCA.COM

Figure G.9. Boulder County CWPP flyer.

EL CONDADO DE BOULDER

PLAN COMUNITARIO DE PROTECCIÓN CONTRA INCENDIOS FORESTALES

EL PLAN

El condado de Boulder (condado) ha contratado a SWCA Environmental Consultants para trabajar en colaboración con agencias de manejo de tierras municipales, estatales y federales para desarrollar la Actualización del Plan Comunitario de Protección contra Incendios Forestales del Condado de Boulder 2024 (PCPIF).

Un PCPIF está diseñado para ayudar al condado y a los propietarios de propiedades a mitigar el riesgo de incendios forestales mediante la evaluación de áreas en riesgo y recomendando medidas para disminuir esos riesgos. Usted (el público) puede participar en la elaboración de recomendaciones para la mitigación de incendios para reducir el riesgo en su comunidad. Lea a continuación para obtener más información sobre el proceso colaborativo del PCPIF y la participación pública.



¿QUÉ HACE UN PLAN COMUNITARIO DE PROTECCIÓN CONTRA INCENDIOS FORESTALES?

- Identificar áreas en riesgo de incendios forestales
- Hacer recomendaciones para tratamientos de combustibles (vegetación) peligrosos (adelgazamiento de la vegetación)
- Priorizar áreas para la financiación de la mitigación de incendios forestales
- Hacer recomendaciones para que los propietarios reduzcan el riesgo de incendio
- Pedir al público que comparta ideas sobre la prevención de incendios forestales e identifique los valores comunitarios en riesgo

POR QUÉ DEBERÍA PARTICIPAR

Un PCPIF está diseñado para ayudar al condado y a los propietarios de tierras a mitigar el riesgo de incendios forestales. Es importante que este proceso sea colaborativo. El condado tiene un plan completo de participación comunitaria que brinda a los residentes, socios y partes interesadas la oportunidad de aportar sus comentarios. Por favor, escanee el código QR para visitar el sitio central del PCPIF, donde usted puede encontrar más información, próximos eventos, y encuestas y formas de enviar sus comentarios y preguntas.



DATO DE LA COMUNIDAD

El PCPIF del condado de Boulder 2024 se está desarrollando junto con los PCPIF de la Ciudad de Boulder 2024 y el Distrito de Protección contra Incendios de Mountain View 2023.

Los tres planes se alinearán para identificar peligros y reducir el riesgo de incendios forestales en el condado de Boulder y sus alrededores.

CORREO ELECTRÓNICO DE CONTACTO ARIANNA.PORTER@SWCA.COM

Figure G.10. Boulder County CWPP flyer in Spanish.

PUBLIC ENGAGEMENT EVENT FEEDBACK

During the CWPP process, the Core Team facilitated eight open house public engagement events, four in eastern Boulder County and four in western Boulder County. Over 187 residents attended an event. Those that attended public engagement events were able to submit a short survey to provide their feedback on what they learned, as well feedback regarding development of the CWPP. Responses were compiled and sorted into four categories: 1) resilient landscapes; 2) fire-adapted communities; 3) safe, effective wildfire response; and 4) public and environmental health. Event survey feedback was consolidated with comments collected in person and through the community survey. Results are presented in Figures G.11 through G.15.

During outreach events, comments were often gathered from one-on-one and group conversations or written on sticky notes and note boards. Creating a master list of comments ensured all feedback was considered for inclusion in the plan. Responses were further analyzed in these categories and incorporated into recommendations. Multiple choice community survey results (below) were used to gauge community priorities and guide plan content. Common feedback provided by community members includes:

- Continuing coordinated fuels management with an emphasis on limiting treatment to specified zones to maintain habitat and identifying cost-effective methods to clear forest floor overgrowth.
- Advocating for fuel treatment methods that avoid clear cuts and focus on surface fuels.
- Continuing education and outreach through open house style events that promote home hardening.
- Incorporating home hardening guidance into community planning efforts and hosting neighborhood-specific information sessions to identify recommended actions for each area.
- Providing more incentives for xeriscaping, resilient livable spaces, and other home hardening measures.
- Enforcing regulations and imposing penalties for non-compliance with wildfire mitigation measures.
- Advocating for more collaboration between municipalities to improve evacuation route signage and improve infrastructure along evacuation routes.
- Improving evacuation route signage and traffic control, specifically in priority areas and communities within the WUI.
- Protecting forests, wildlife habitats, and water resources with an emphasis on sustainable wildfire management strategies.

The charts displayed in Figures G.11 through G.15 show the concerns and priorities of public engagement event attendees. These results are not representative of the entirety of Boulder County but rather represent community members who collaborated with the CWPP Core Team during open house events and provided their priorities and concerns via written feedback. Written feedback was compiled and categorized to be more easily visualized. It is important to note that while the sample size of responses is small, all engagement zones are represented, and individual written responses were reviewed and carefully categorized into the following graphs (see Figures G.11–G.15.). See the bullet points below each figure for examples of written responses that are included in each category.

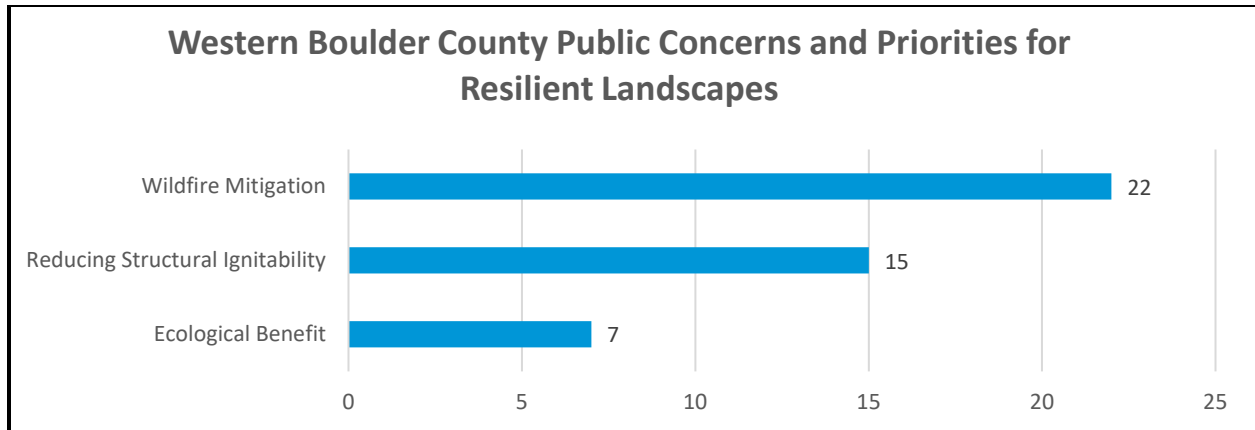


Figure G.11. Public feedback regarding resilient landscapes compiled from written comments gathered during four in-person CWPP planning open house public engagement events in western Boulder County.

Figure G.11 demonstrates the primary types of feedback received relating to the theme of Resilient Landscapes at the four CWPP open house public engagement events in western Boulder County. Specific topics that were of most interest to the public under each category include:

- **Wildfire Mitigation** – Logging, prescribed fire, strategic mitigation projects, use of PODS, priority areas, coordinated fuels management, community-wide mitigation, mowing railroads and road sides.
- **Reducing Structural Ignitability** – Home assessments, prioritizing home hardening with financial support, defensible space, Firewise landscaping.
- **Ecological Benefit** – Biomass, wood utilization, wildlife benefit, monitoring ecological function, environmental restoration projects.

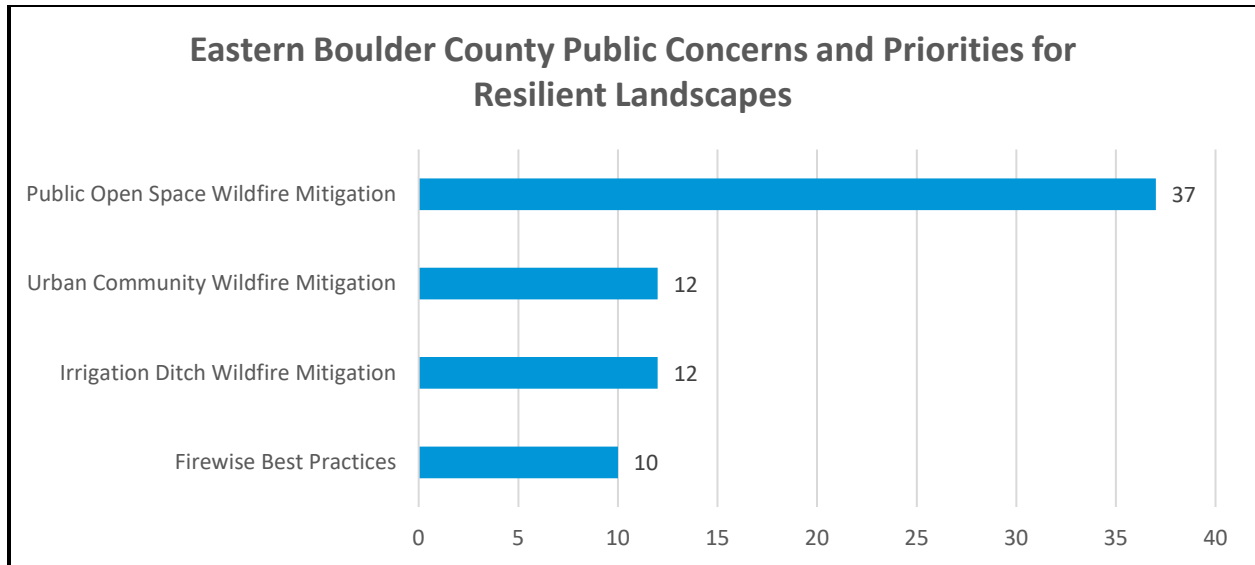


Figure G.12. Public feedback regarding resilient landscapes compiled from written comments gathered during four in-person CWPP planning open house public engagement events in eastern Boulder County.

Figure G.12 demonstrates the primary types of feedback received relating to the theme of Resilient Landscapes at the four CWPP open house public engagement events in eastern Boulder County. Specific topics that were of most interest to the public under each category include:

- **Public Open Space Wildfire Mitigation** – Grassland open spaces, trails, grassland buffers, junipers, dead trees, hay bales, mowing sides of railroad tracks (eastern and western portions of the county), non-native plant management.
- **Urban Community Wildfire Mitigation** – Mowing, grazing, prescribed burning near communities and/or on private lands/property, community-wide mitigation, urban conflagration, backyard maintenance.
- **Irrigation Ditch Wildfire Mitigation** – Treating ditches, working with ditch companies, removing dead and down fuel.
- **Firewise Best Practices** – Defensible space, home hardening, HOA covenants, Firewise landscaping, lack of landlord interest, home reconstruction, funding for home hardening.

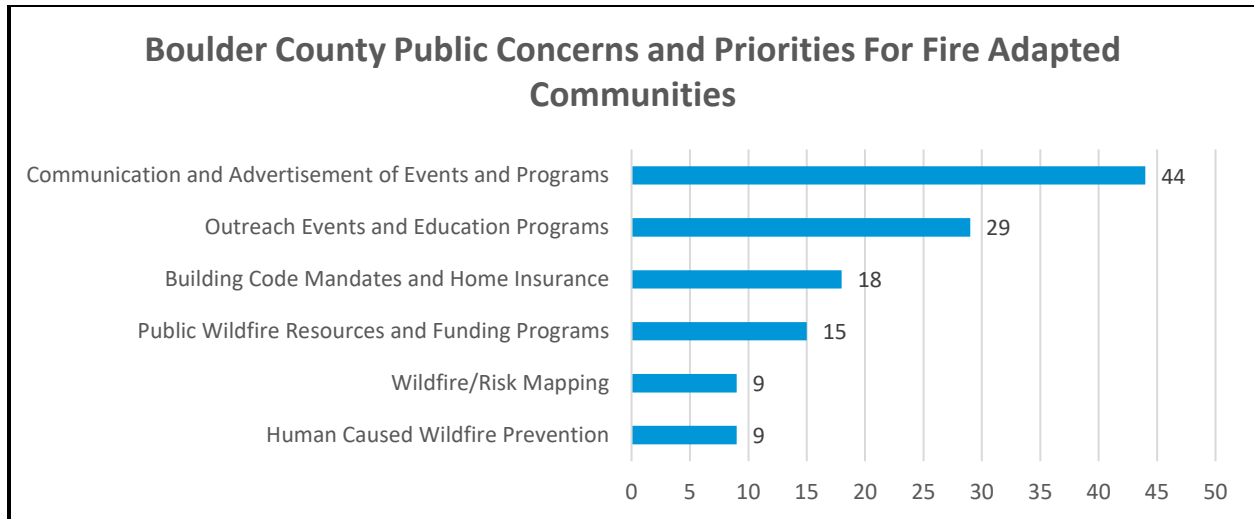


Figure G.13. Public feedback regarding fire-adapted communities compiled from written comments gathered during eight in-person CWPP planning open house public engagement events held across Boulder County.

Figure G.13 demonstrates the primary types of feedback received relating to the theme of Fire-adapted Communities at the eight CWPP open house public engagement events in Boulder County. Specific topics that were of most interest to the public under each category include:

- **Communication and Advertisement of Events and Programs** – Strategic communications on events, workshops, field trips, county updates on programs and services, county updates on annual budgets as they pertain to sales tax funding; the education of new residents on wildfire risks and hazards; consistent messaging across the county, multiple jurisdictions, and groups; increased outreach in local newspapers, flyers, public newsletters, and news releases.
- **Outreach Event and Education Programs** – Fire preparedness workshops, Ready-Set-Go workshops, neighborhood ambassador programs, Train the Trainer program, defensible space workshops, more field trips and demonstrations, increased local community events and HOA events, information on home construction and retrofits, landscaping, and home hardening, HOA education and covenant changes, HOA guidelines, increased planning documents for urban and eastern plains residents.
- **Building Code Mandates and Home Insurance** – Building code mandates, potential land use planning zones, home insurance concerns and financial assistance.
- **Public Wildfire Resources and Funding Programs** – Continue and bolster existing county programs (community, chipping, sort yards, home and community assessments), improve communications and wildfire partners workshops, demos and home hardening youth corps programs, increased teen/youth programs for slash removal, chipping, raking, and smaller defensible space measures around homes.
- **Wildfire/Risk Mapping** – clarity on the meaning and takeaways from wildfire risk maps, inclusion of a map of HOA locations in the county wildfire risk map.
- **Human Caused Wildfire Prevention** – Robust messaging campaign with partners on illegal campfires, burning on private lands, no smoking on hiking trails, cigarette butt campaign, open burn bans.

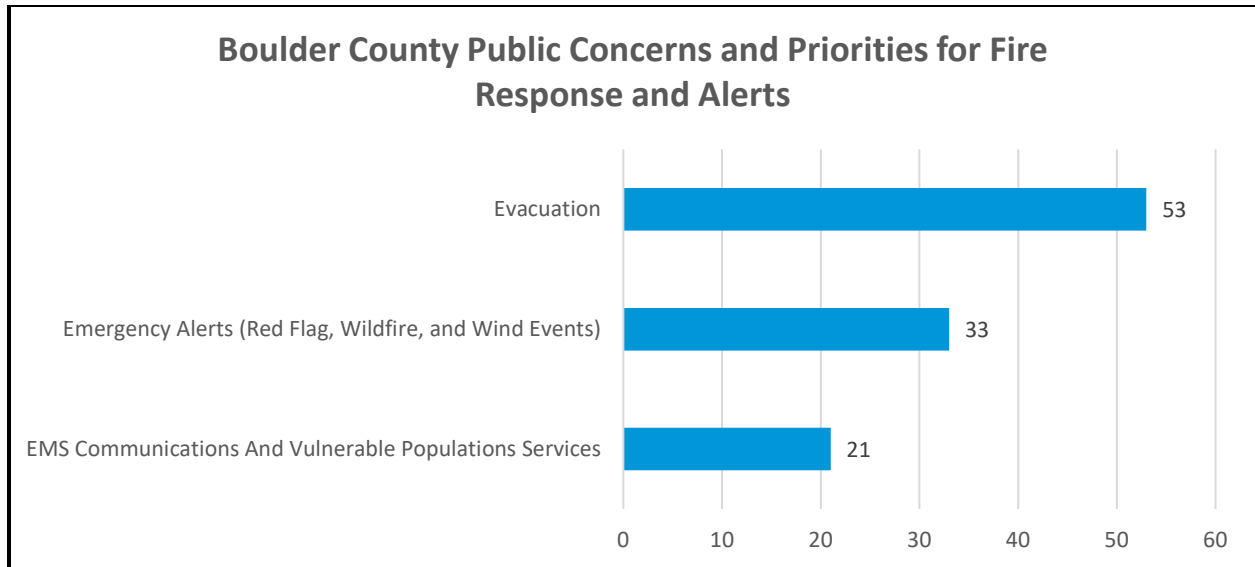


Figure G.14. Public feedback regarding fire response and alerts compiled from written comments gathered during eight in-person CWPP planning open house public engagement events held across Boulder County.

Figure G.14 demonstrates the primary types of feedback received relating to the theme of Safe, Effective Wildfire Response at the eight CWPP open house public engagement events in Boulder County. Specific topics that were of most interest to the public under each category include:

Evacuation – Evacuation planning and alerts.

Emergency Alerts – Alerts for red flag, wildfire, and high wind events; reverse 911, lack of cell service/poor cell service.

EMS Communications and Vulnerable Populations Services – Communications (before, during, and after events), communications to socially-vulnerable groups.

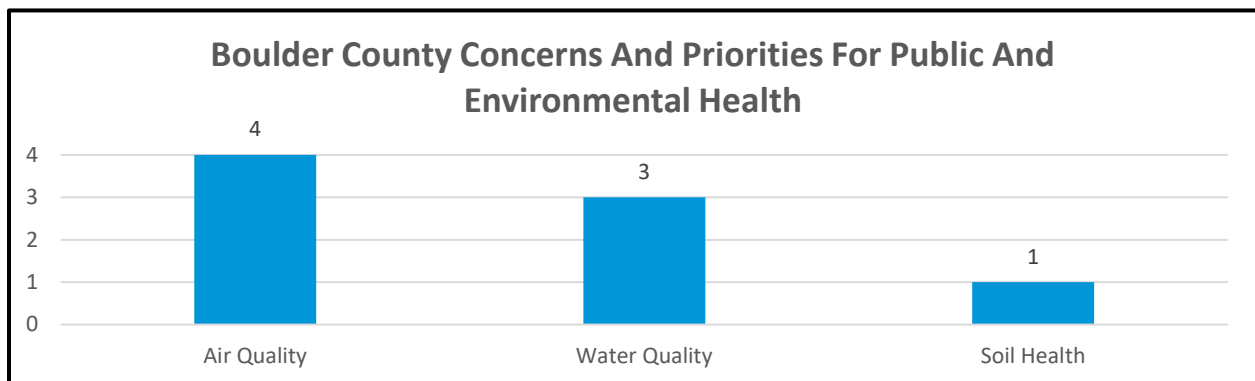


Figure G.15. Public feedback regarding public and environmental health compiled from written comments gathered during eight in-person CWPP planning open house public engagement events held across Boulder County.

COMMUNITY SURVEY

As part of the CWPP public engagement process, SWCA held a public survey period from June 2023 through May 2024. **Feedback received during this feedback process was addressed through diligent adaptations and additions to the plan's content and mitigative recommendations.** Figures G.16 through G.35 show a range of survey outcomes illustrated with charts and response percentages.

The survey was provided in Spanish and English. Printed copies were available at all CWPP community open house events for those residents who have unreliable internet access or who simply prefer to complete the survey by hand. Over 1,100 surveys were submitted.

The survey captured basic demographic data along with residents' knowledge base, attitudes, and opinions related to wildfire factors such as perceived risk, values at risk, structural preparedness, and public outreach/communication. The data collected from the survey compliments the feedback gathered at each CWPP Open House event, giving a fuller picture of community members' levels of concern, preparedness, engagement, and understanding of living with wildfire in Boulder County.

In general, the community is more concerned about wildfires than they were 5 years ago and advocated for fuels management with a focus on protecting human lives, property, infrastructure, and natural resources. Community members expressed interest in continued and coordinated fuels management and invasive species control with an emphasis on surface fuels. Additionally, community members highlighted the need to improve safe and effective wildfire response (evacuation routes, signage, accessibility for vulnerable populations) and potentially implement a dual-purpose emergency siren for fire and post-fire flood/debris flow alerts. This feedback aligns with the successful passage (72%) of the wildfire mitigation sales tax in November 2022.

Note: Variations in the quantity of responses across survey questions are due to respondents abstaining from certain questions. A total of 1,140 community survey responses were collected throughout the project lifespan. The results are summarized below.

4. What is your age?

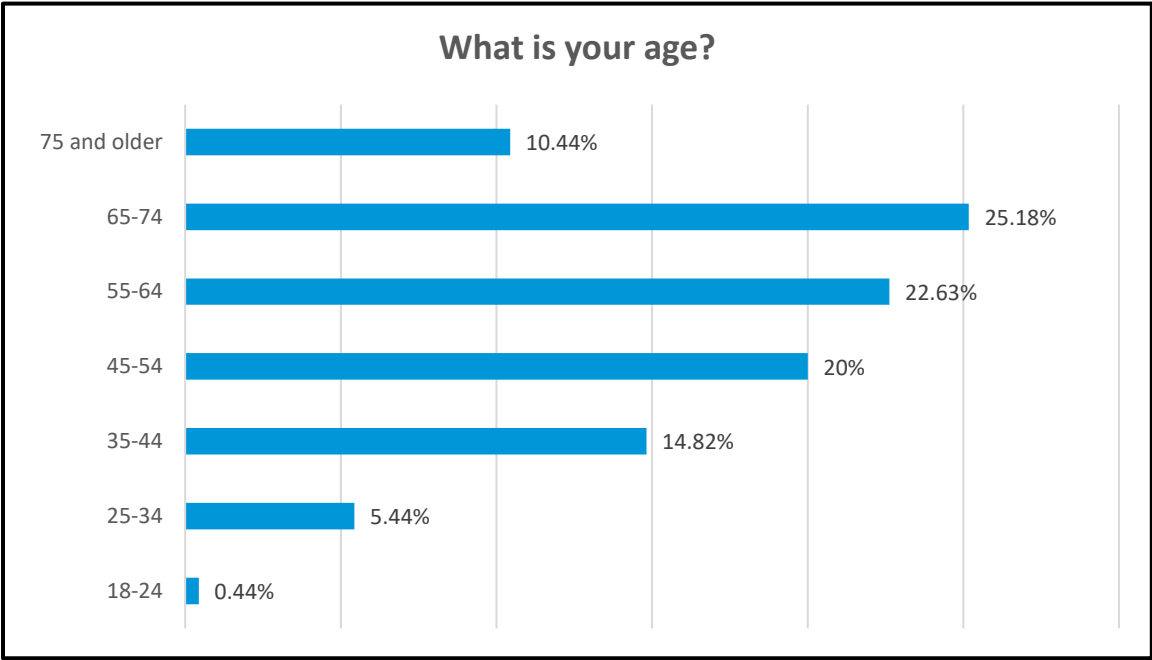


Figure G.16. Community survey response summary.

5. How long have you lived at this residence?

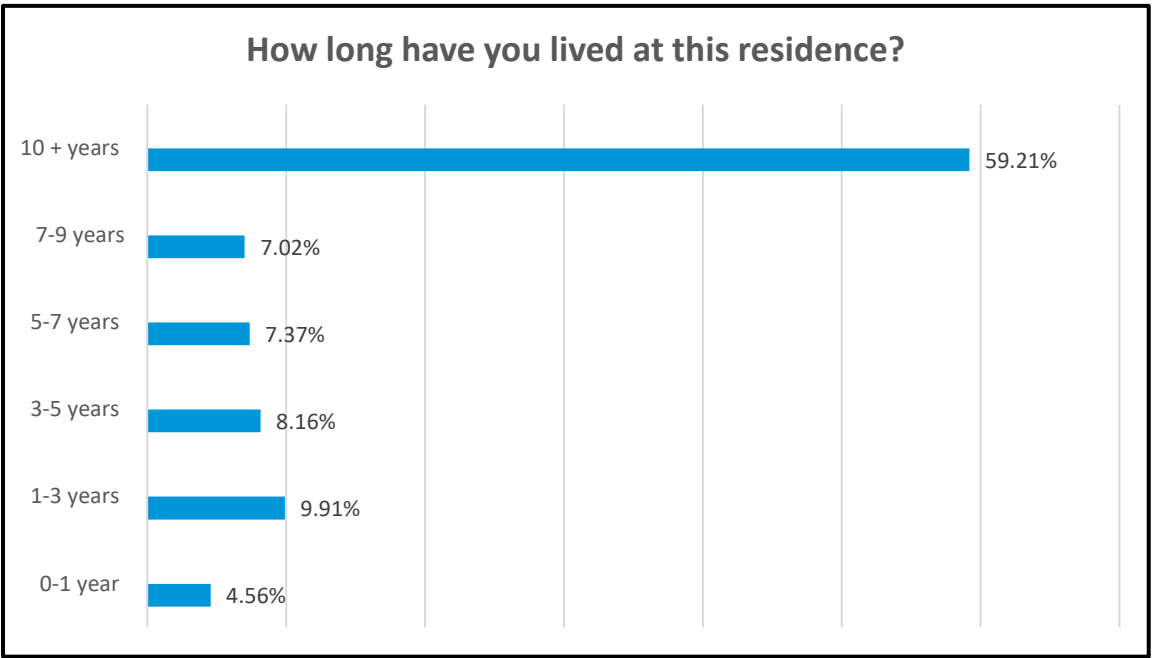


Figure G.17. Community survey response summary.

6. Do you rent or own your home?

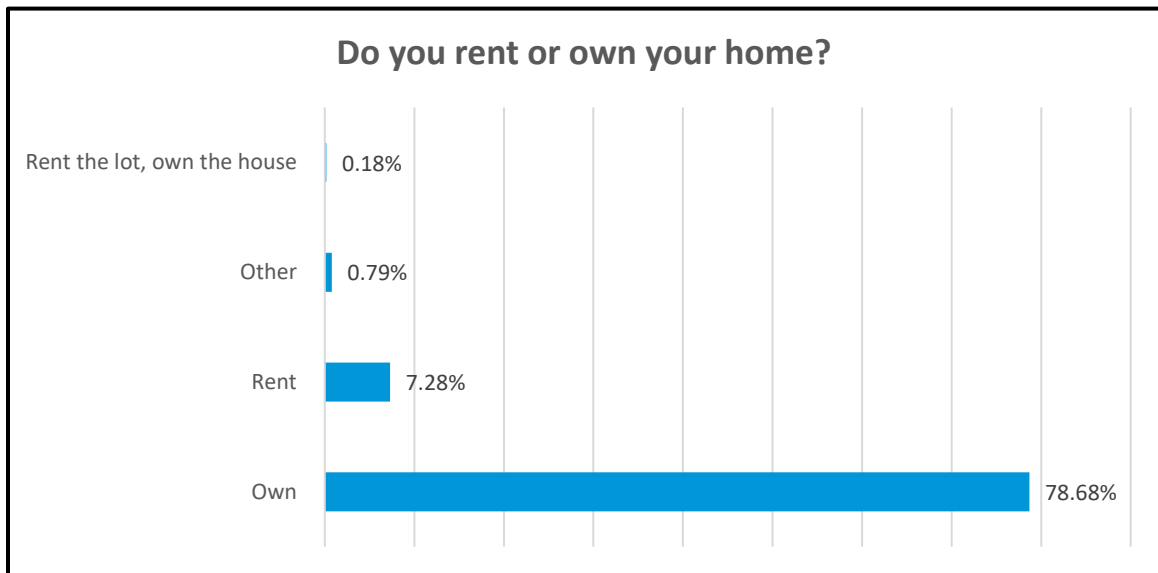


Figure G.18. Community survey response summary.

7. Do you identify as a person with a disability by the Americans with Disabilities Act (ADA)?

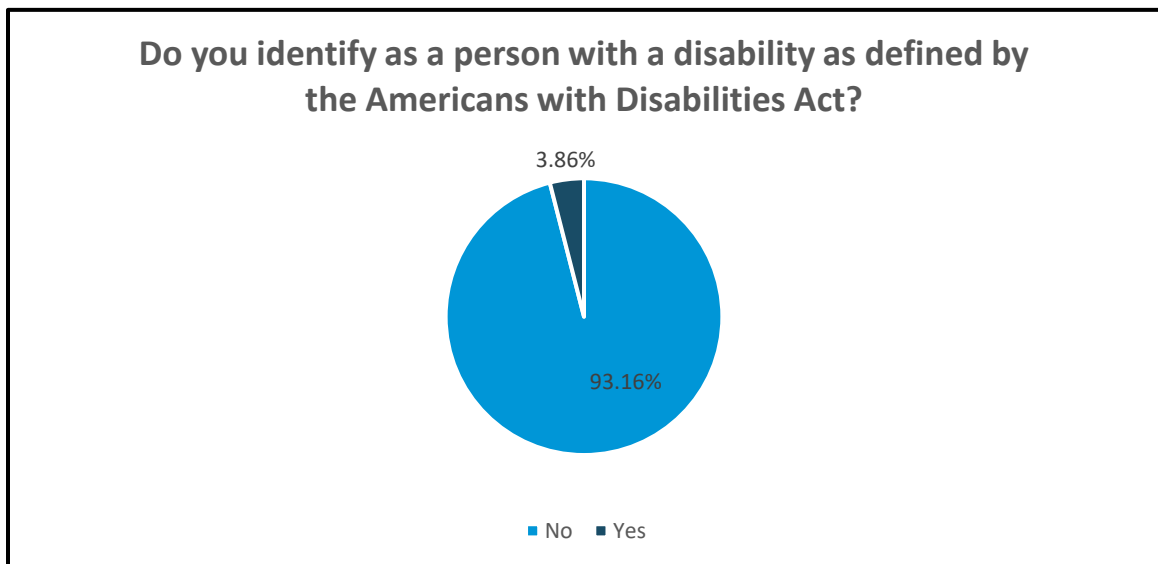


Figure G.19. Community survey response summary.

8. How many times have you evacuated from your residence because of wildfire or threat of wildfire in the last 10 years (mandatory or voluntary)?

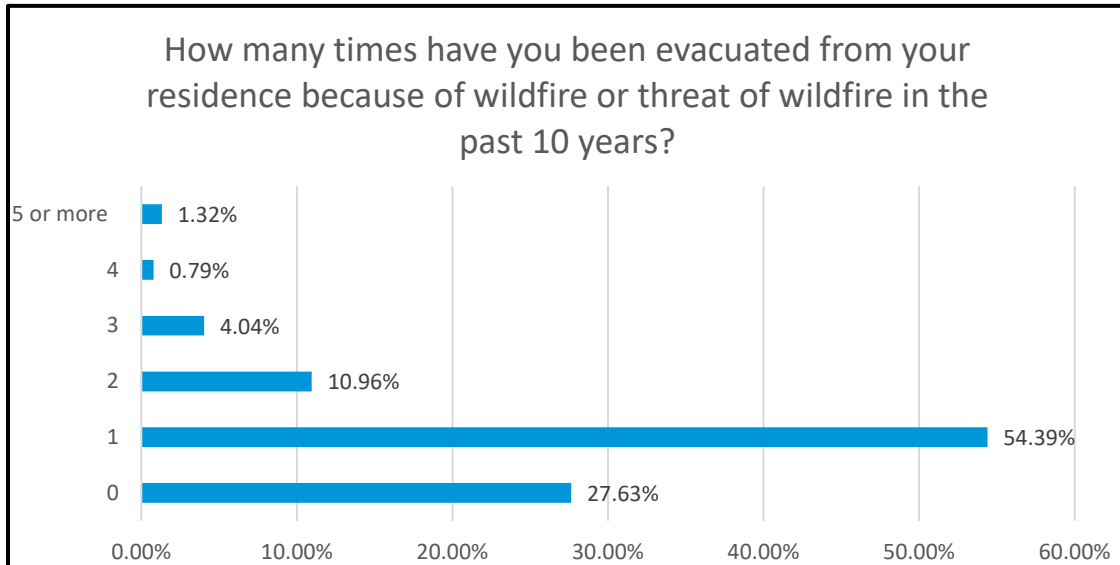


Figure G.20. Community survey response summary.

9. What is your level of familiarity or knowledge about wildfire?

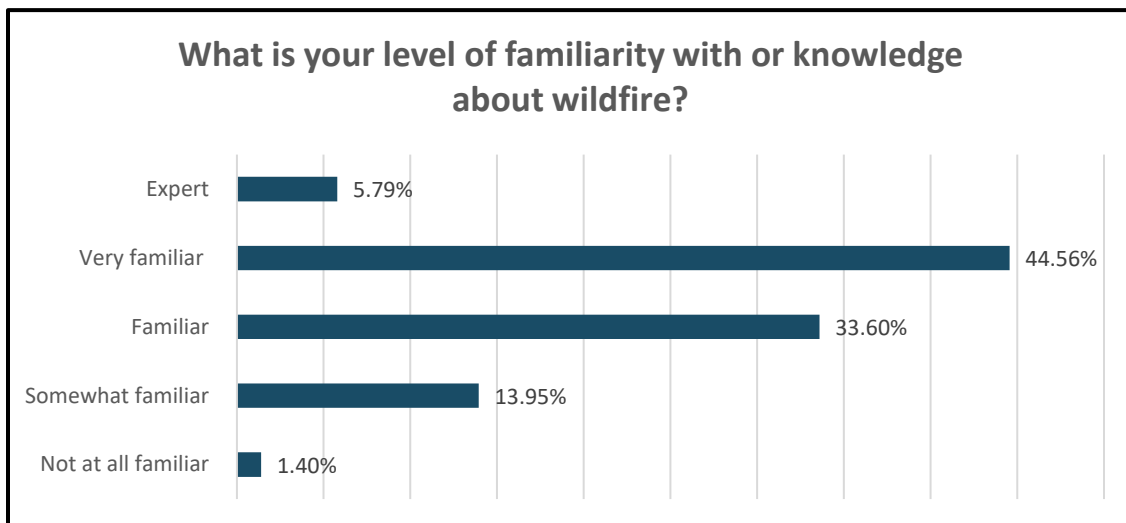


Figure G.21. Community survey response summary.

10. **How concerned/worried are you about the risk of wildfire where you live, and the threat wildfire poses to your primary residence?**

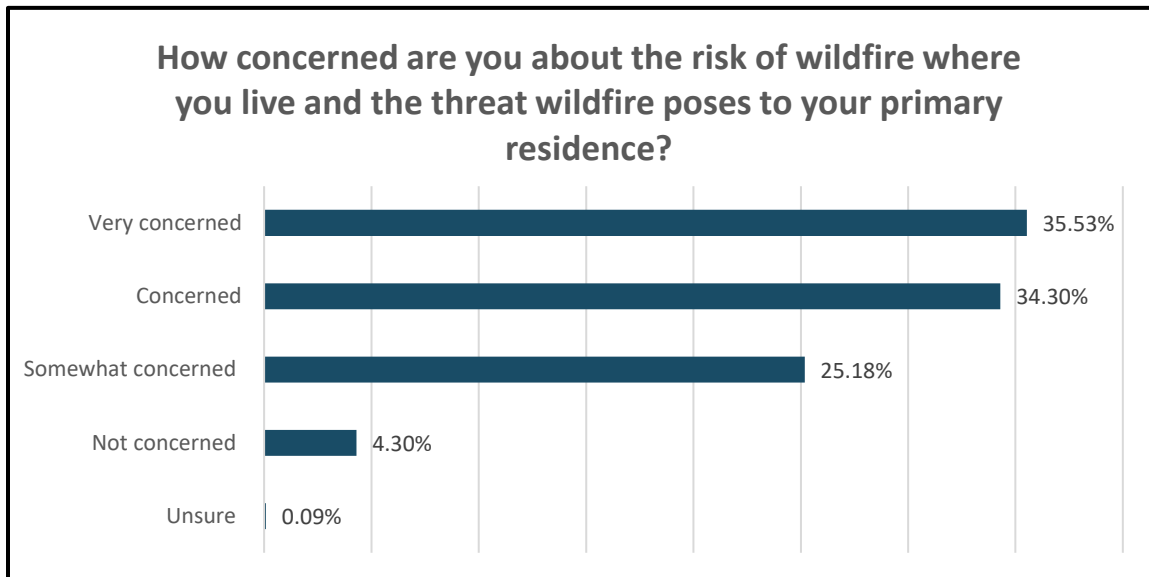


Figure G.22. Community survey response summary.

11. **Compared to five years ago, how would you describe your level of concern/worry regarding your safety from wildfires and the safety of your family, home, and assets?**

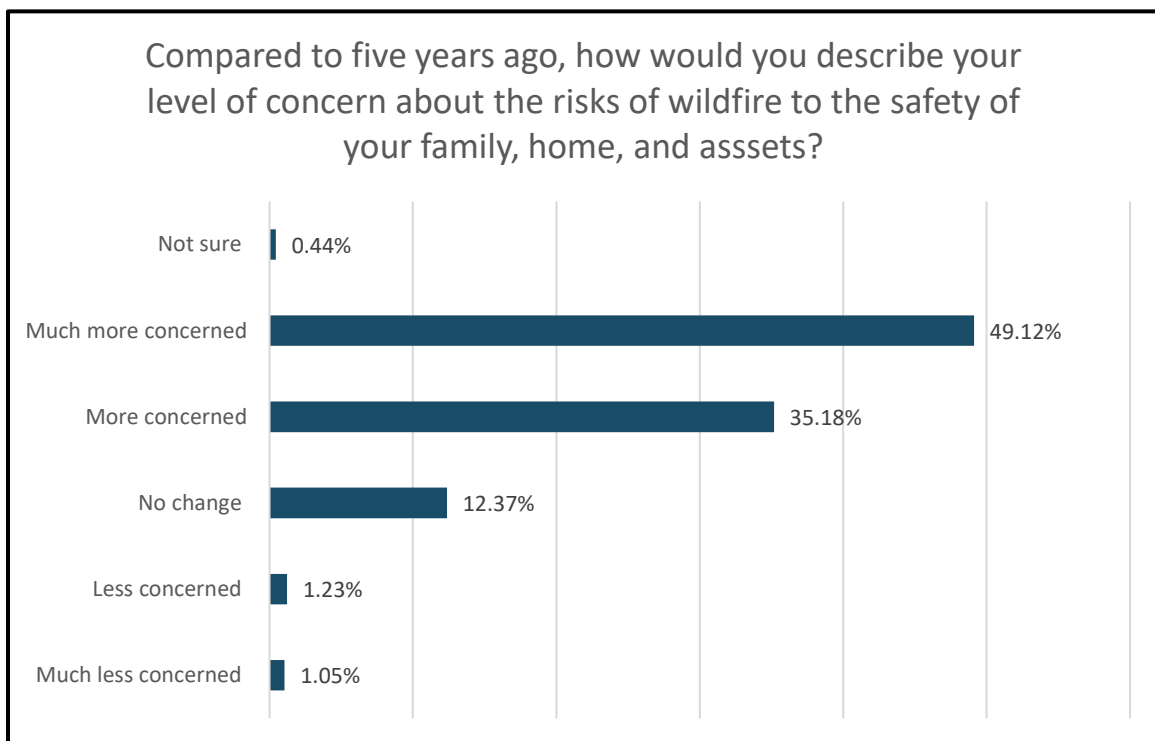


Figure G.23. Community survey response summary.

12. Are you familiar with where to get updates and information regarding wildfire evacuation?

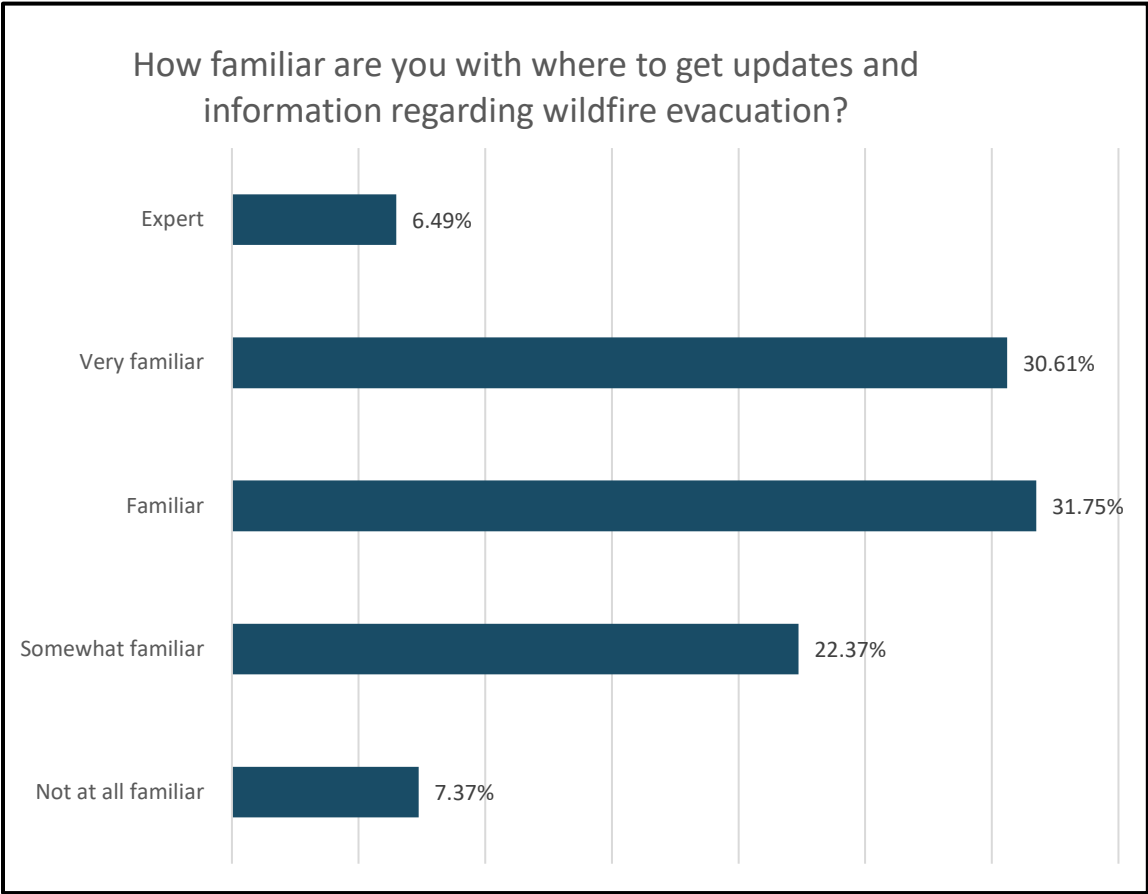


Figure G.24. Community survey response summary.

13. What are the greatest concerns that you have about the risk from wildfire?



Figure G.25. Community survey response summary.

14. Are you familiar with home hardening concepts and how they pertain to your home?

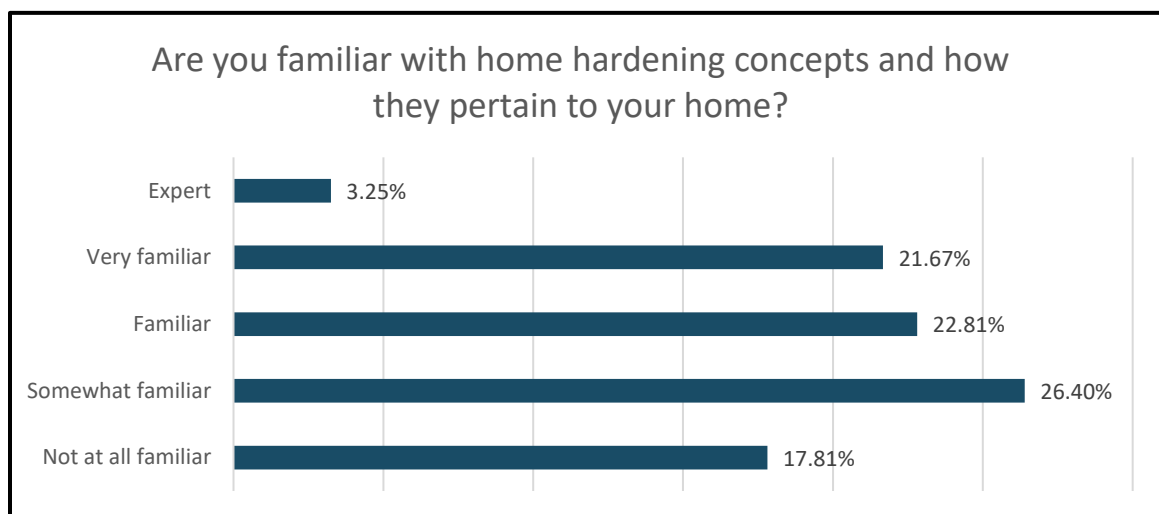


Figure G.26. Community survey response summary.

15. Are you interested in implementing home hardening on your own residential property?

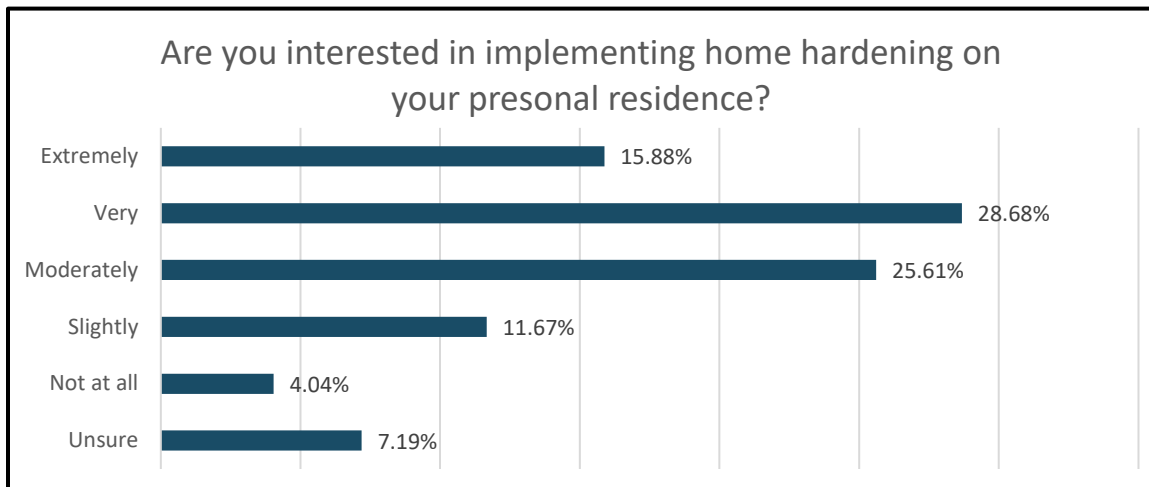


Figure G.27. Community survey response summary.

16. If a cost-share grant or incentive program were available, would you participate in it to better prepare your home and property from wildfire risk?

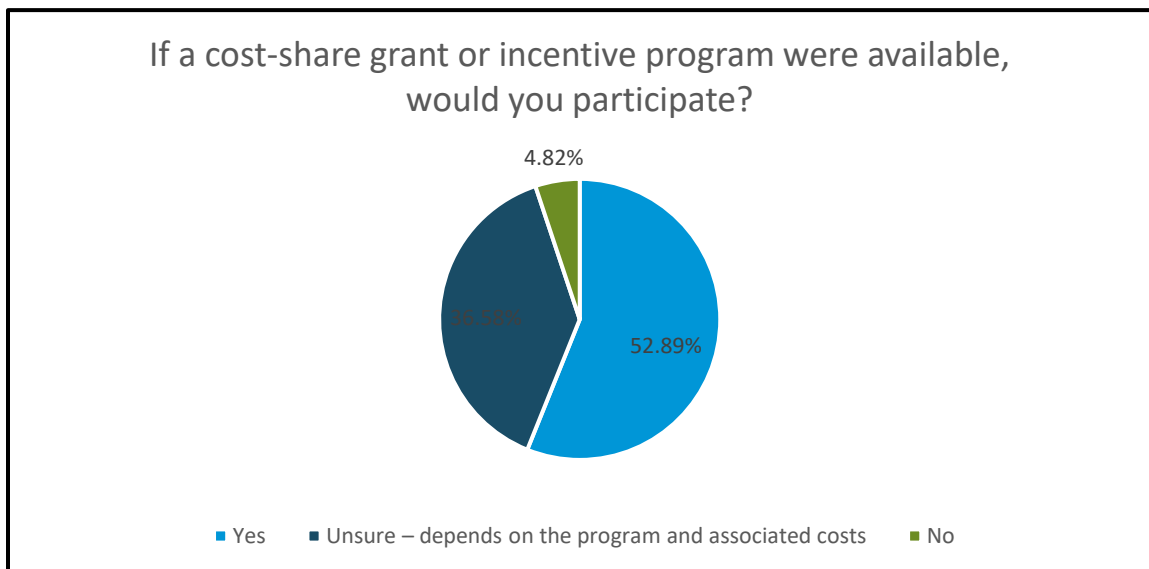


Figure G.28. Community survey response summary.

17. Have you participated in Community Wildfire Protection Plan (CWPP) efforts in the last 10 years?

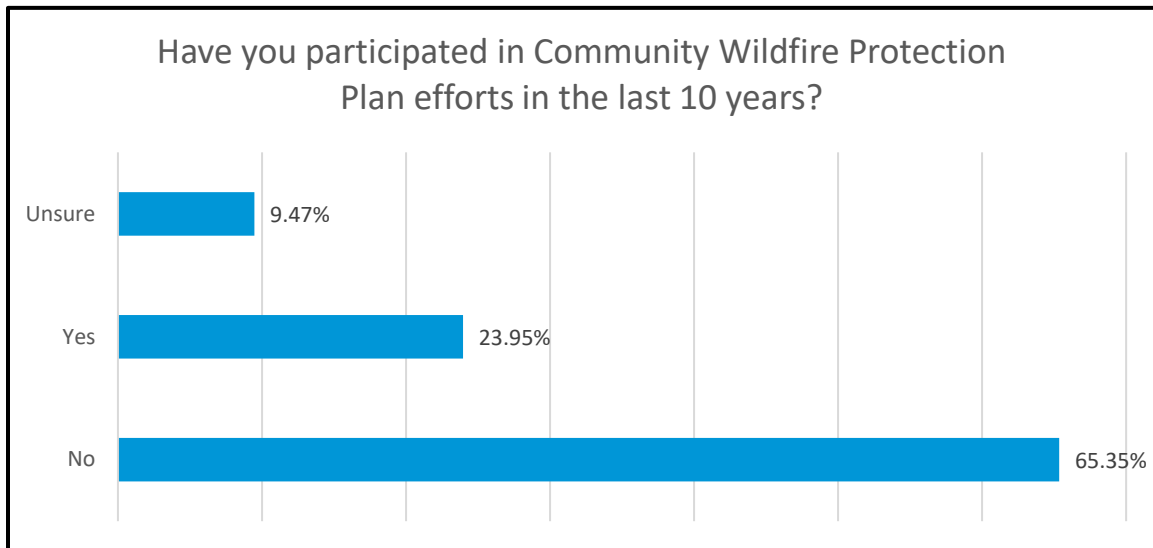


Figure G.29. Community survey response summary.

18. Has your community participated in CWPP efforts in the last 10 years?



Figure G.30. Community survey response summary.

19. If your community has a CWPP, how familiar are you with the plan?

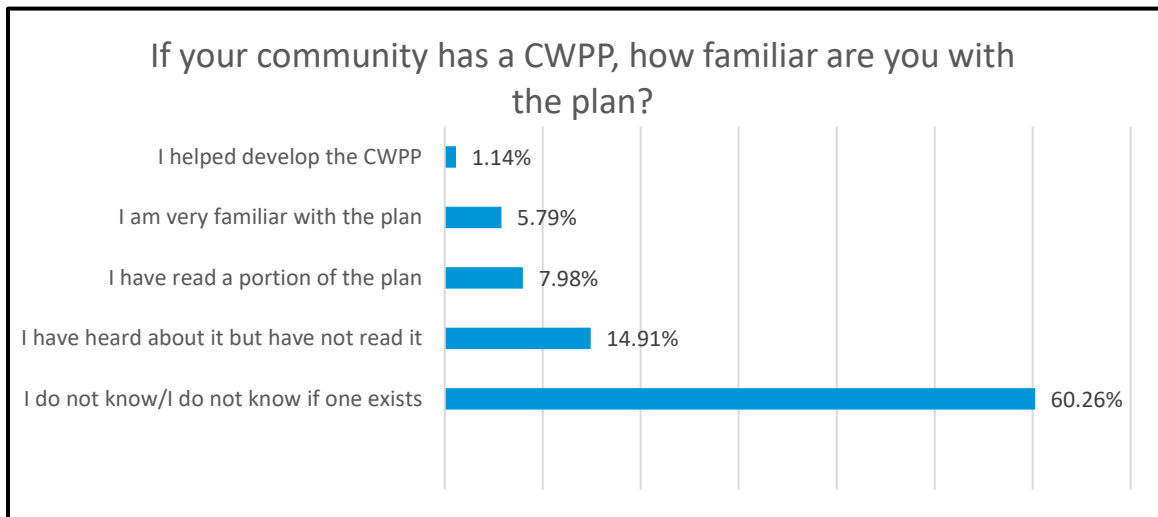


Figure G.31. Community survey response summary.

20. Do you have knowledge about how the natural environment (changes in temperature, relative humidity, wind, drought, etc.) can influence fire behavior?

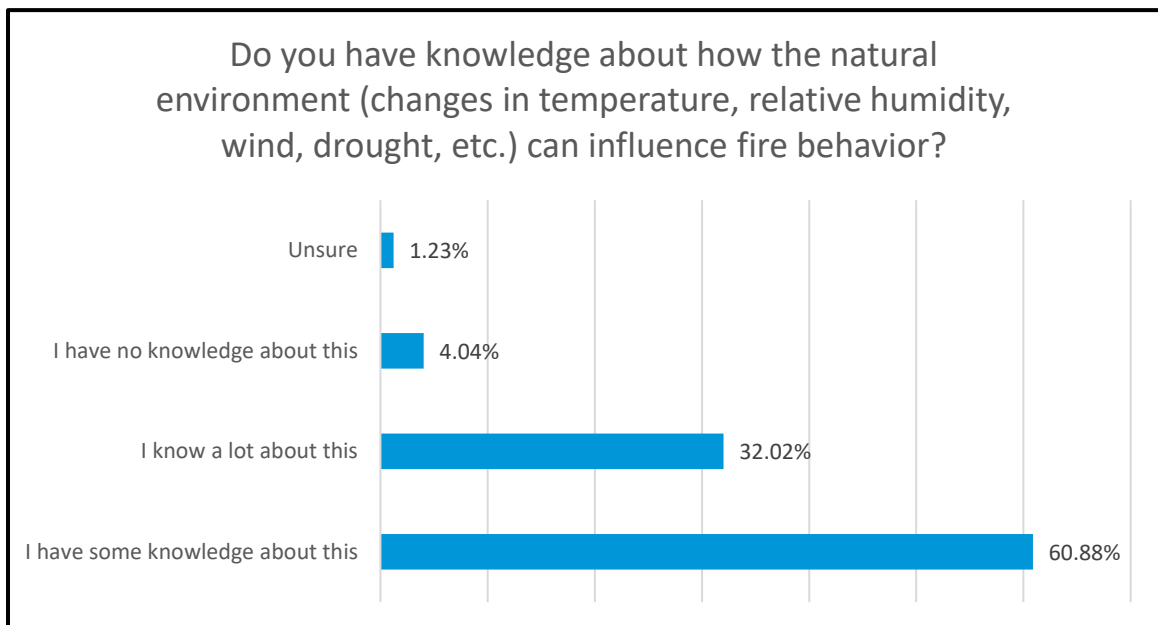


Figure G.32. Community survey response summary.

21. Do you think your community could do better to prepare for and prevent wildfires?

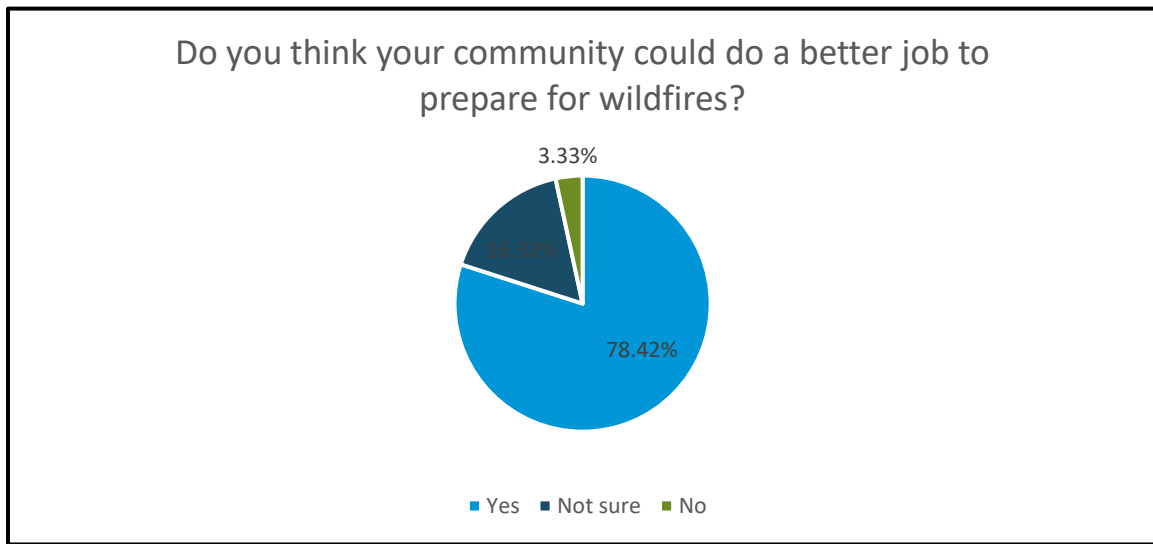


Figure G.33. Community survey response summary.

22. Do you believe you would know how to safely evacuate in the event of a wildfire?

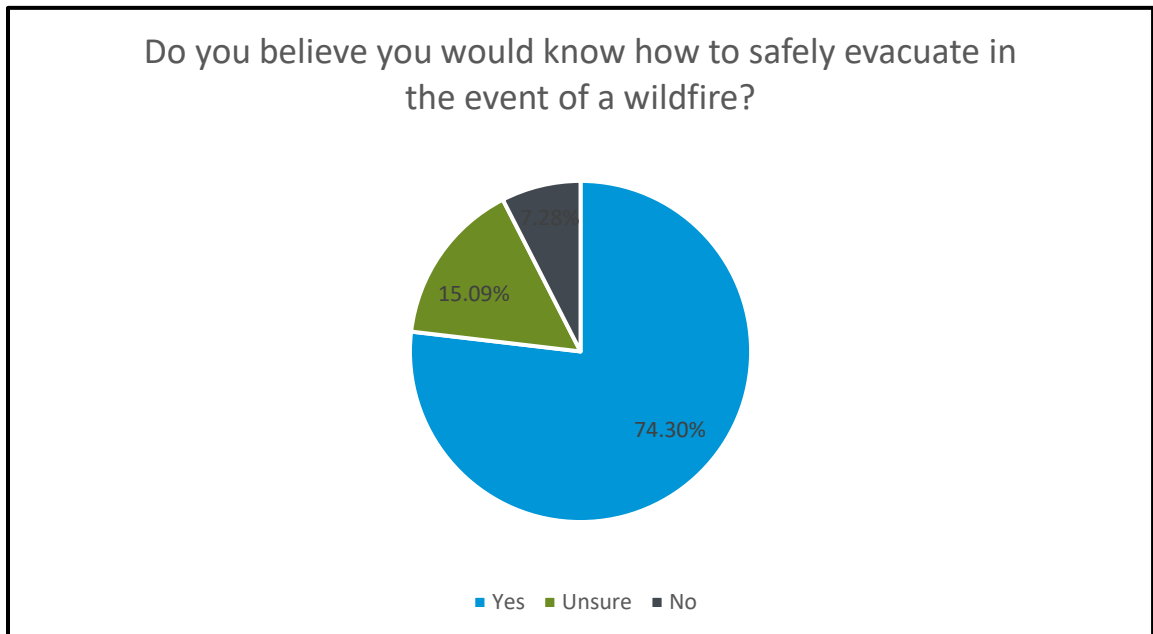


Figure G.34. Community survey response summary.

23. **Would you like to see more projects in your community that treat and reduce hazardous vegetation?**

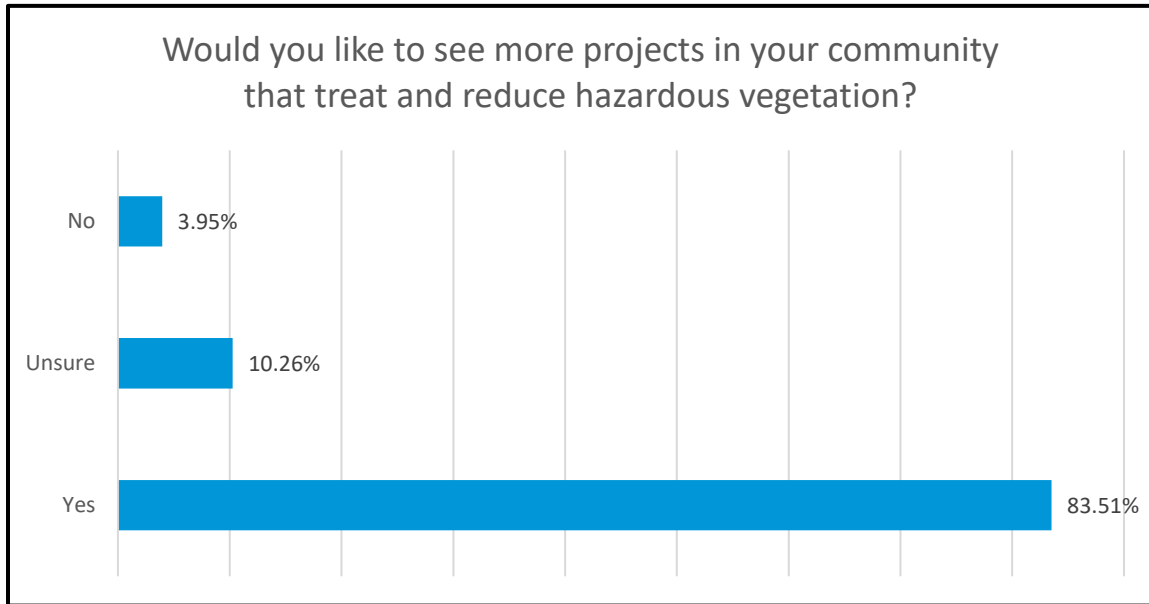


Figure G.35. Community survey response summary.

STORY MAP

Boulder County developed the CWPP [story map](#) to facilitate further engagement with the public. The story map provides opportunities for both information sharing and gathering between the public and the County. The story map has several tabs, each demonstrating information from various chapters in the CWPP document.

The introductory tab presents the purpose of the story map, project history, instructions for navigating the content, and the National Cohesive Wildland Fire Management Strategy framework. Next, the public involvement tab summarizes past and ongoing efforts to engage the public in the effort. The fire environment, wildfire risk assessment, mitigation strategies, and monitoring and updates tabs will contain the bulk of the CWPP content. These tabs introduce the WUI concept; fire ecology, community values and fire history in the county; information regarding Boulder County fire planning and response; areas with high versus low risk; wildfire mitigation actions; and monitoring strategies for projects.

The story map also links the viewer to the CWPP document and contact information for the Boulder County CWPP planning team. The figures below (G.36–G.38) demonstrate the general layout of the story map. Maps within the story map will be interactive, with several clickable layers providing information on numerous aspects of wildfire, including but not limited to communities in high-risk areas, vegetation and fuels, current mitigation projects, and fire behavior.

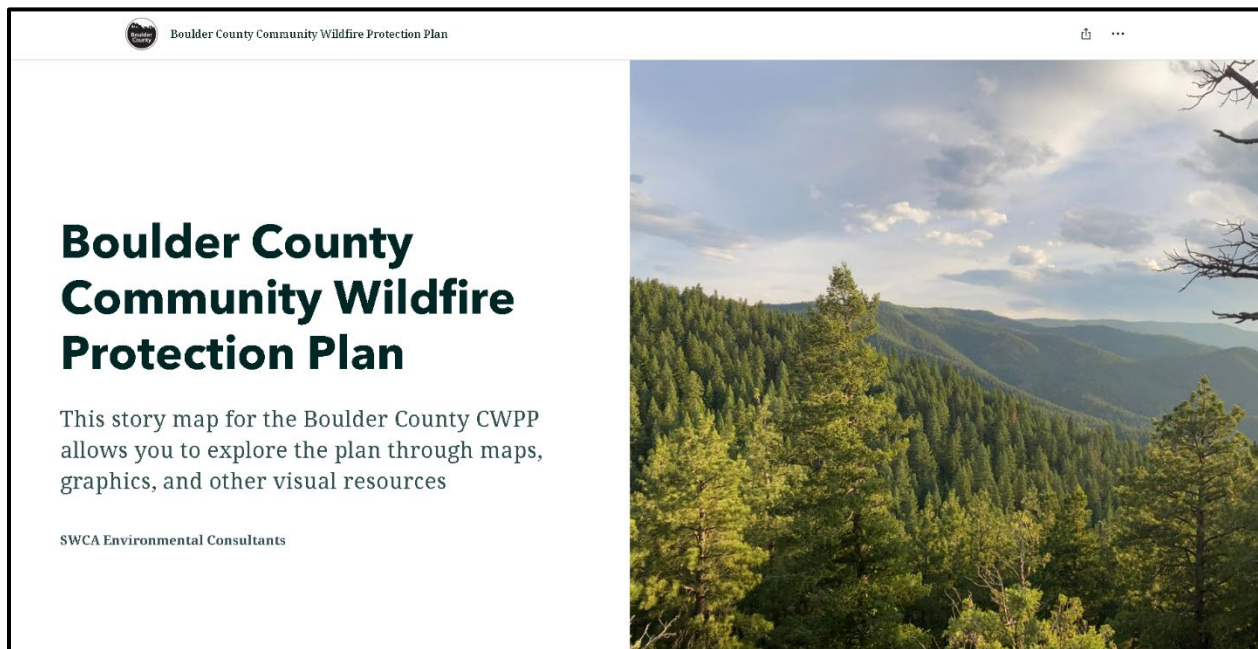


Figure G.36. CWPP story map opening page.

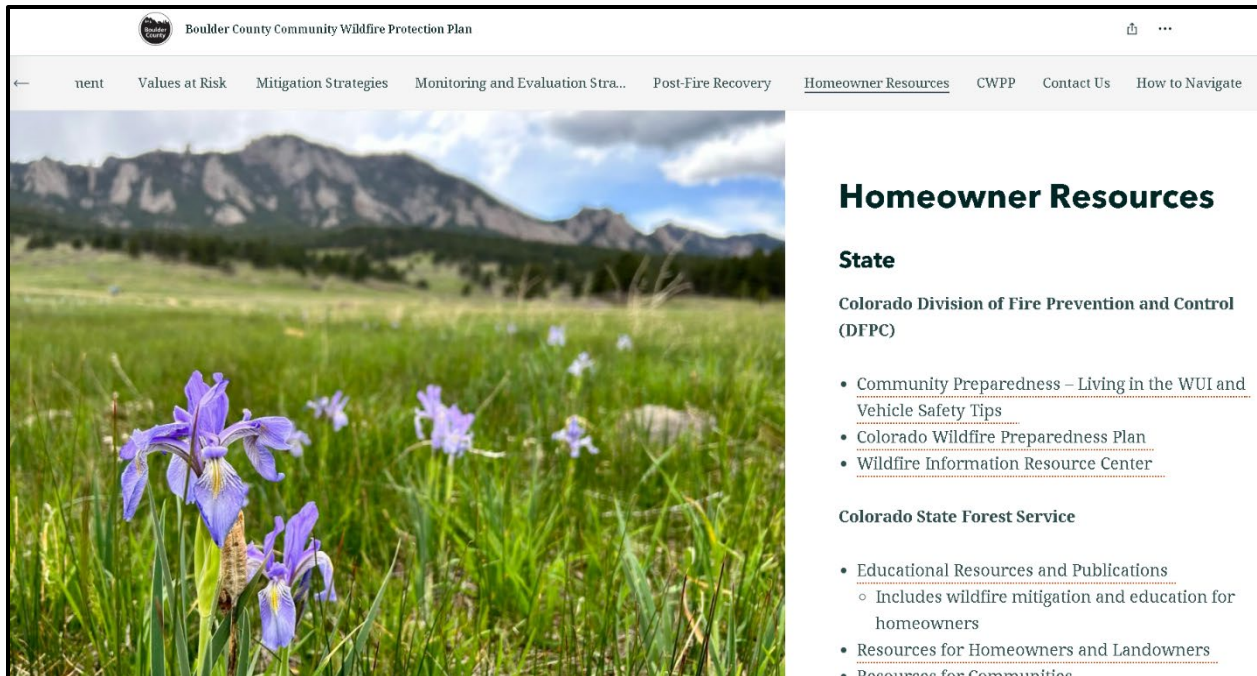


Figure G.37. Story map homeowner resources tab sample.

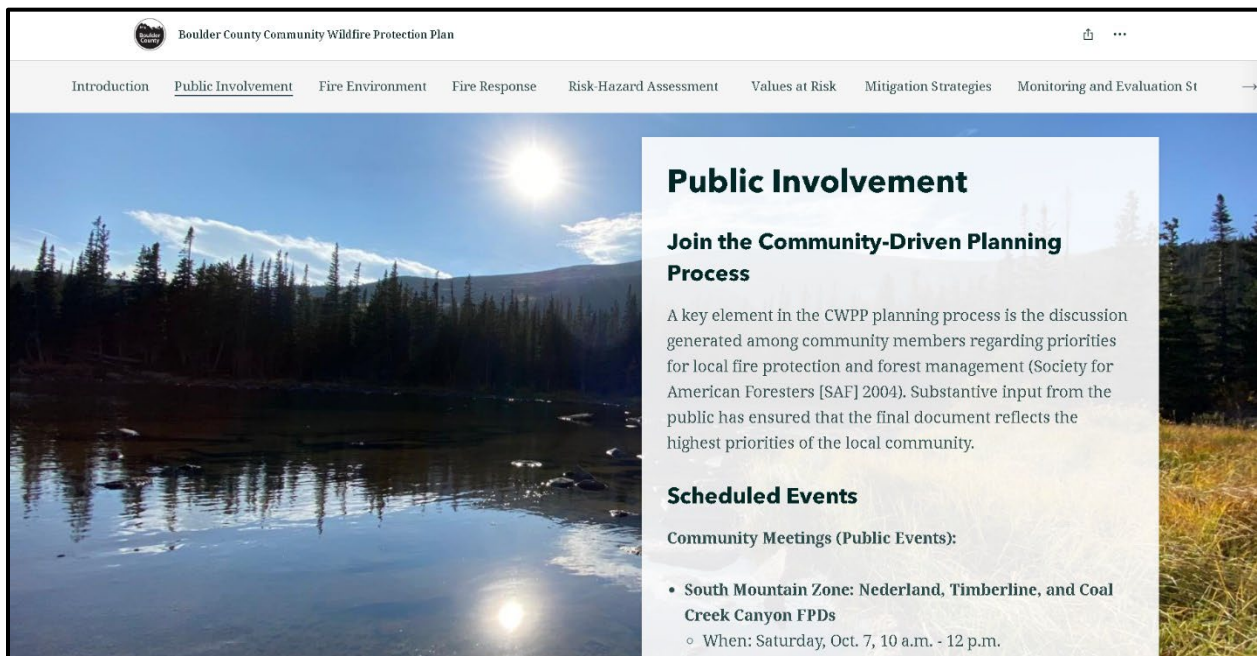


Figure G.38. Story map public involvement tab sample.

DRAFT CWPP PUBLIC REVIEW PERIOD

From June 7 to June 21, 2024, the public were able to submit comments on the draft CWPP. Over 70 comments were received, resulting in updates and alterations to the document before the final draft was completed.

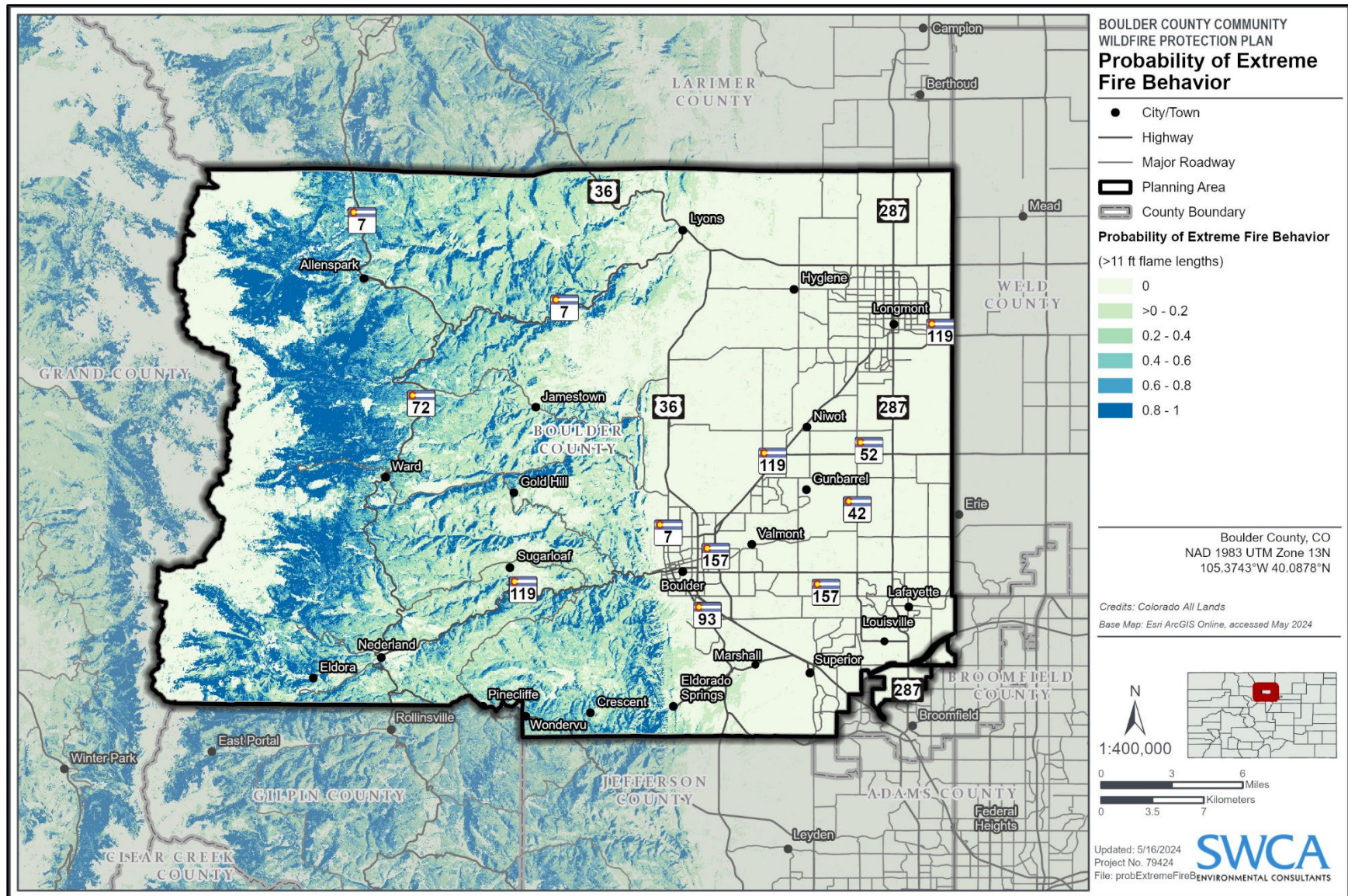
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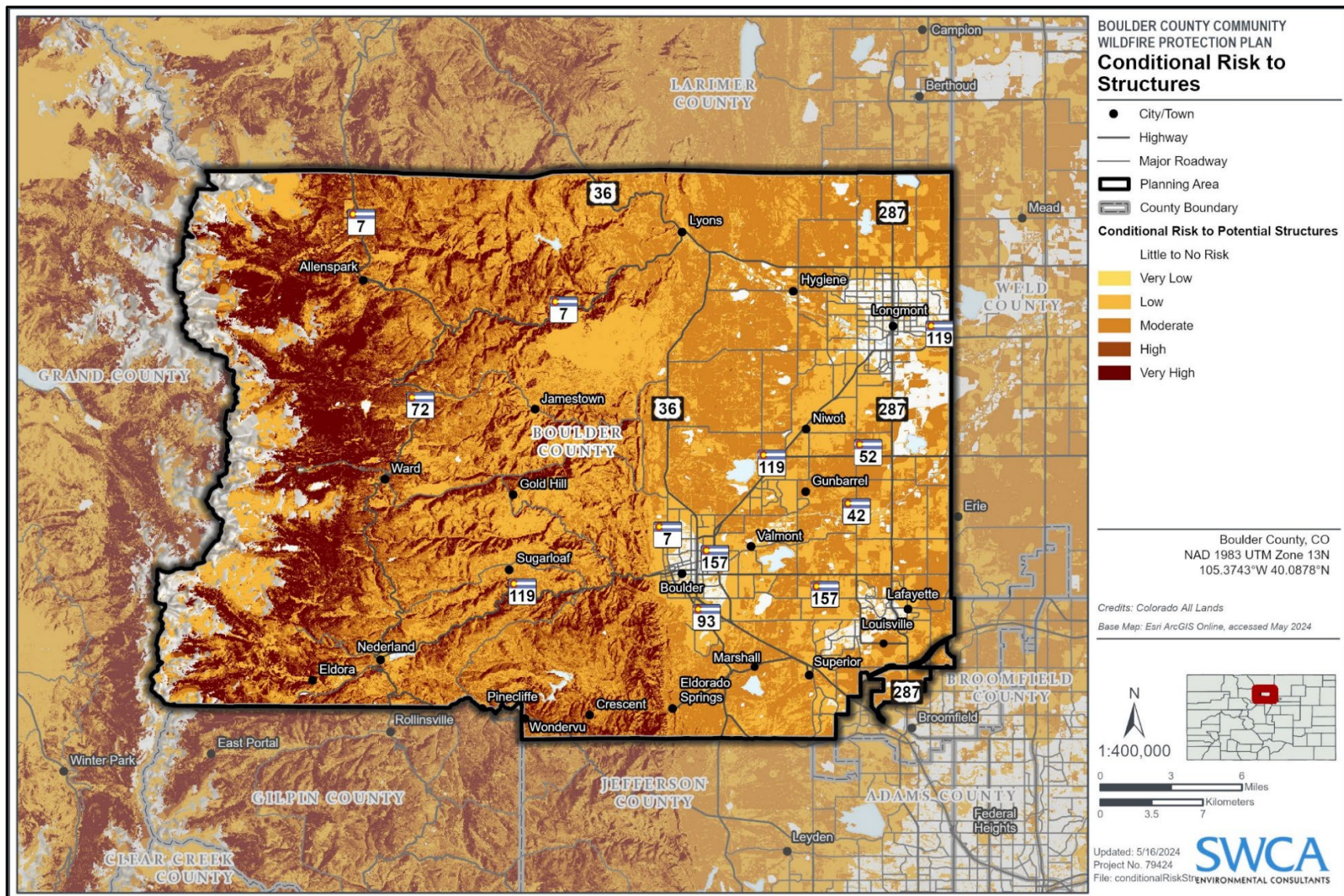
APPENDIX H:

Additional Mapping

This appendix includes various map layers, including those used in the COAL Quantitative Wildfire Risk Assessment for Boulder County. Further details on how individual maps were developed are included in Appendix D, *Fire Behavior Modeling/GIS Background and Methodology*. Generally, a range of potential fire scenarios were modeled, but some analyses, such as suppression difficulty and flame length, utilized only severe fire weather because the desired output requires determining conditions during an extreme fire event.



Map H.1. COAL probability of extreme fire behavior. This probability was determined based on potential flame lengths and the probability of flame lengths over 11 feet.



Map H.2. Conditional risk to structures. Conditional risk to structures combines fire behavior factors with the vulnerability a structure would have if located in that area. The analysis incorporates likelihood of a fire and intensity of a potential fire to compare risk in existing residential areas with undeveloped locations.

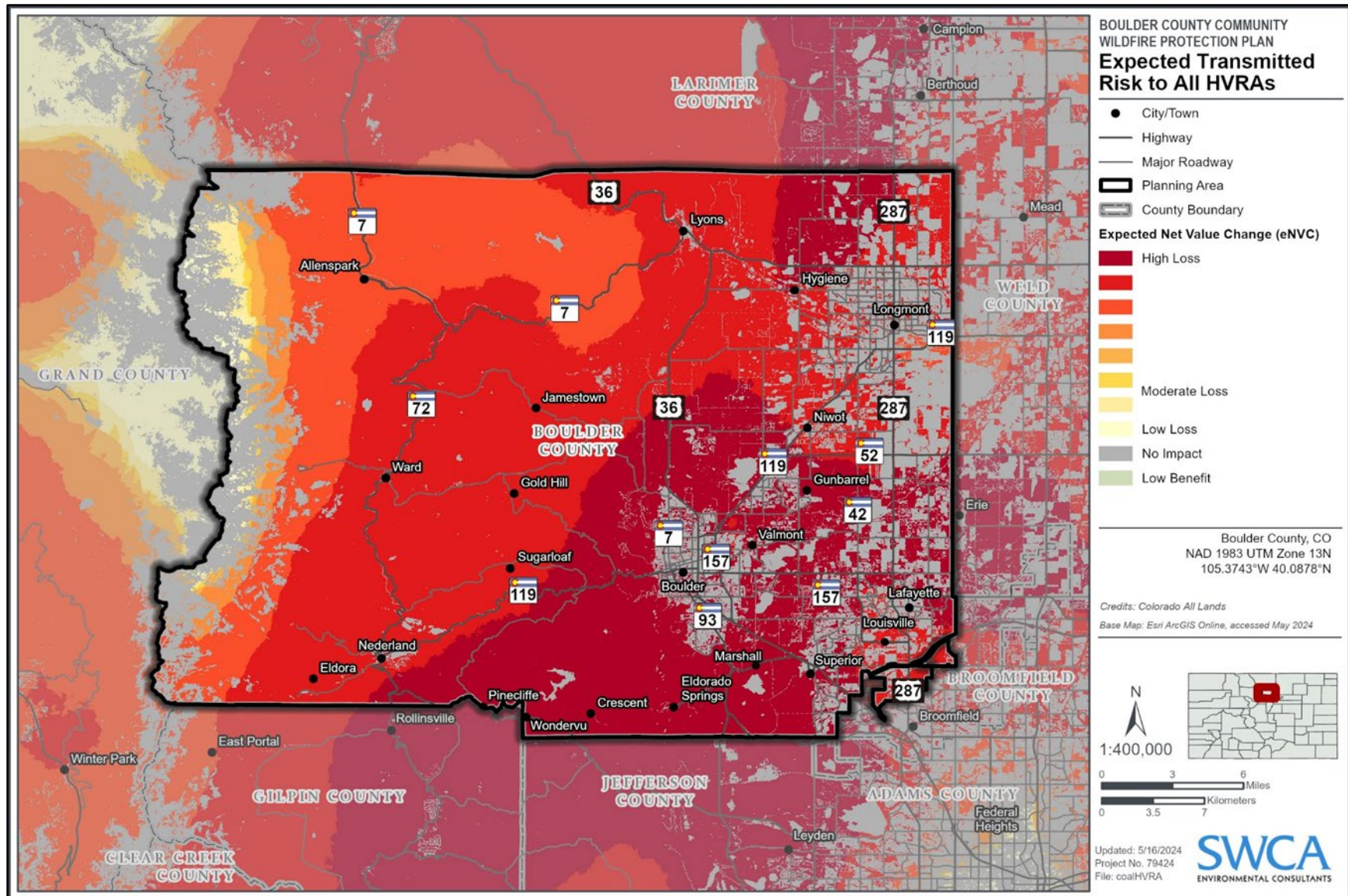


Figure H.3. Expected transmitted risk to HVRAs. COAL risk assessment data were used to predict potential loss to defined HVRAs.

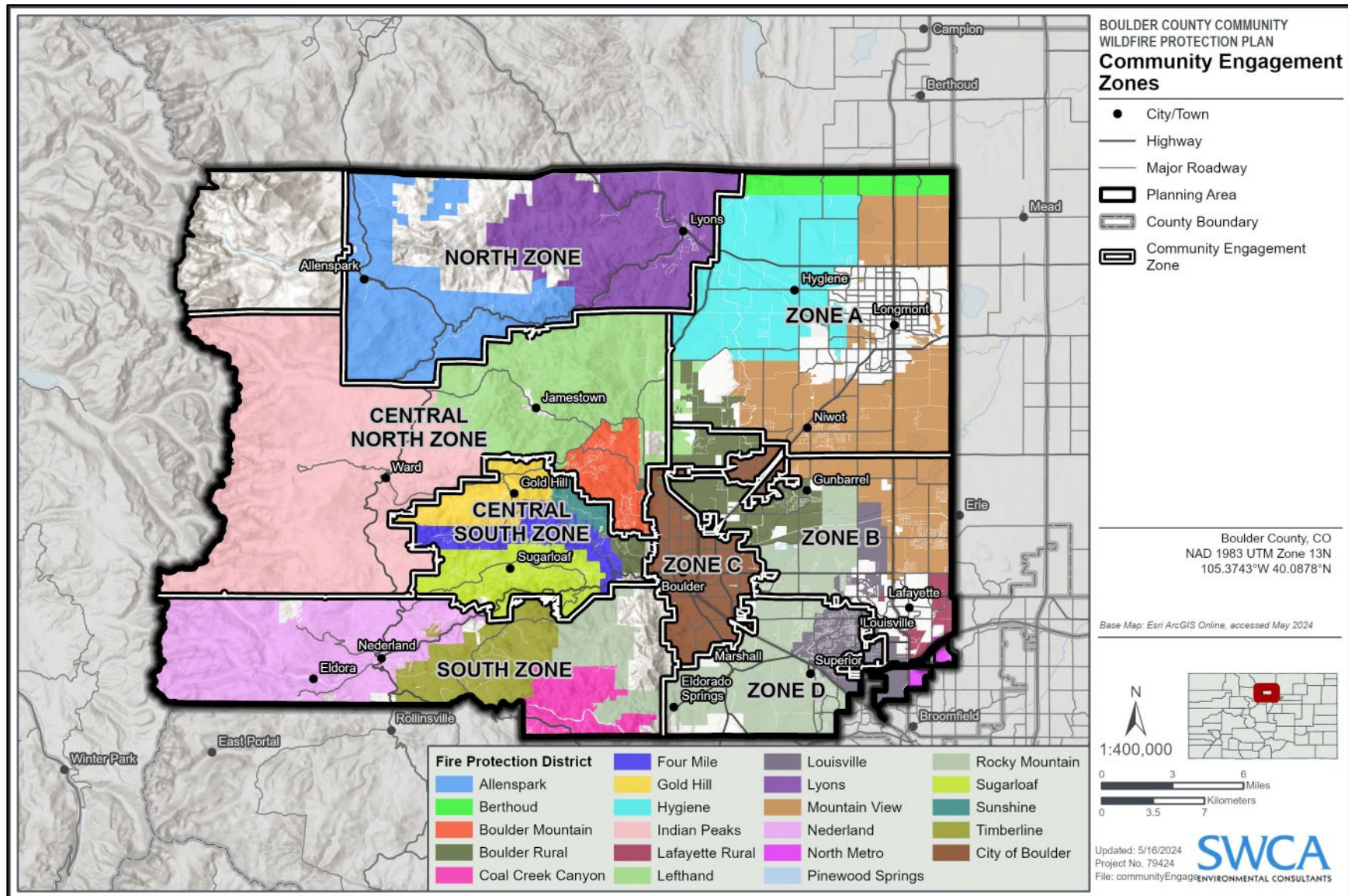


Figure H.4. Community engagement zones. Zones were defined by the Core Team to ensure the needs and concerns of each community were identified through in-person events. Community engagement events were conducted for each zone individually.

TABLE

APPENDIX I: Funding Sources

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FUNDING SOURCES

The following section provides information on federal, state, and local funding opportunities for conducting wildfire mitigation, community education, and emergency response improvement projects. The priorities and application requirements of individual funding programs often change from year to year. Please follow the links provided to find the most up-to-date information on each funding opportunity. It should be noted that matched funding can be an excellent funding strategy, when possible.

LOCAL FUNDING INFORMATION

Source: Rebuild Grant Program

Agency: Community Foundation Boulder County

Website: https://disaster-recovery.impactdf.org/wp-content/uploads/2023/12/CFBC-Rebuild-Grant-Program-Guidelines_NO-SMOKE-ASH.pdf

Source: Housing Support Program

Agency: Community Foundation Boulder County

Website: <https://disaster-recovery.impactdf.org/wp-content/uploads/2023/12/CFBC-HSP-Guidelines-122723.pdf>

Source: Strategic Fuels Mitigation Grant Program

Agency: Boulder County

Website: <https://bouldercounty.gov/disasters/wildfires/mitigation/strategic-fuels-mitigation-grant-program/>

Source: Unmet Needs Program

Agency: Community Foundation Boulder County

Website: <https://disaster-recovery.impactdf.org/wp-content/uploads/2023/12/CFBC-Unmet-Need-Grant-Program-Guidelines-122723.pdf>

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

Agency: National Forest Foundation (NFF)

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

Source: Matching Awards Program

Agency: National Forest Foundation (NFF)

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

STATE FUNDING INFORMATION

Source: Colorado State Forest Service Grants & funding Assistance

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/grants/>

Source: Wildfire Mitigation Outreach Grant Program

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/grants/wildfire-mitigation-outreach/>

Public Programs

- Forest Restoration & Wildfire Risk Mitigation: <https://csfs.colostate.edu/grants/forest-restoration-wildfire-risk-mitigation/>
- Wildfire Mitigation Incentives for Local Government: <https://csfs.colostate.edu/grants/wildfire-mitigation-incentives-for-local-government/>
- Wildfire Mitigation Resources & Best Practices Grant Program: <https://csfs.colostate.edu/grants/wildfire-mitigation-resources-best-practices-grant-program/>

Source: Forest Legacy Program

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/forest-legacy-program/>

Source: Forest Ag Program

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/forest-ag-program/>

Source: Forest Stewardship Program

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/forest-stewardship-program/>

Source: Wildfire Mitigation Outreach Grant Program

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/grants/wildfire-mitigation-outreach/>

Source: Homesite Assessments

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/homeowners-landowners/homesite-assessments/>

Source: Colorado Tree Farm Program

Agency: Colorado State Forest Service

Website: <https://csfs.colostate.edu/tree-farm/>

Source: Northern Colorado Fireshed Fund

Agency: Northern Colorado Fireshed Collaborative/ National Forest Foundation

Website: <https://nocofireshed.org/round-2-fireshed-capacity-funding-now-open/>

Source: Great Outdoors Colorado Planning and Capacity

Agency: Great Outdoors Colorado

Website: <https://goco.org/programs-projects/grant-programs/planning-and-capacity>

Source: Various Funding Sources

Agency: Colorado Division of Fire Prevention and Control (DFPC)

Website: <https://dfpc.colorado.gov/sections/grants>

Source: Colorado Strategic Wildfire Action Program

Agency: Colorado Department of Natural Resources

Website: <https://dnr.colorado.gov/divisions/forestry/co-strategic-wildfire-action-program>

Source: Colorado Housing Recovery Program

Agency: Colorado Department of Local Affairs

Website: <https://dlg.colorado.gov/housing-recovery-program>

Source: Wind and Wildfire Home Protection Mitigation Program

Agency: Colorado Department of Local Affairs

Website: <https://disaster-recovery.impactdf.org/wp-content/uploads/2023/12/Wind-and-Wildfire-Protection-Program-Summary-12.28.23.docx.pdf>

Source: Colorado Wildfire Resilient Home Grant

Agency: Colorado Division of Fire Prevention and Control

Website: <https://dfpc.colorado.gov/sections/fire-and-life-safety/crr-education-branch/community-risk-reduction-crr>

FEDERAL FUNDING INFORMATION

Source: Community Wildfire Defense Grant

Agency: U.S. Forest Service

Website: <https://www.fs.usda.gov/managing-land/fire/grants>

- Source:** Tribal Lands Landscape Scale Restoration Grants
Agency: First Nations Development Institute
Website: <https://www.firstnations.org/projects/landscape-scale-restoration/>
- Source:** Building Resilient Infrastructure and Communities (BRIC) Grant Program
Agency: U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA)
Website: <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>
- Source:** Hazard Mitigation Grant Program (HMGP)
Agency: FEMA
Website: <https://www.fema.gov/grants/mitigation/hazard-mitigation>
- Source:** Hazard Mitigation Grant Program (HMGP) – Post Fire
Agency: FEMA
Website: <https://www.fema.gov/grants/mitigation/post-fire>
- Source:** Fire Management Assistance Grant (FMAG)
Agency: FEMA
Website: <https://www.fema.gov/assistance/public/fire-management-assistance>
- Source:** Regional Catastrophic Preparedness (RCP) Grants
Agency: FEMA
Website: <https://www.fema.gov/grants/preparedness/regional-catastrophic>
- Source:** America the Beautiful Challenge
Agency: National Fish and Wildlife Foundation
Website: <https://www.nfwf.org/programs/america-beautiful-challenge>
- Source:** Emergency Forest Restoration Program (EFRP)
Agency: USDA Farm Service Agency (FSA)
Website: <https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/emergency-forest-restoration/index>
- Source:** Environmental Quality Incentives Program (EQIP)
Agency: National Resource Conservation Service (NRCS)
Website: <https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives>
- Source:** Emergency Watershed Protection (EWP) Program
Agency: National Resource Conservation Service (NRCS)
Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/>

Source: Funding for Fire Departments and First Responders
Agency: U.S. Department of Homeland Security, U.S. Fire Administration
Website: <https://www.fema.gov/grants/preparedness/firefighters/assistance-grants>

Source: Specific EPA Grant Programs
Agency: Environmental Protection Agency (EPA)
Website: <https://www.epa.gov/grants/grants-your-region-information-specific-epa-region-8>

Source: Conservation Innovation Grants (CIG)
Agency: National Resource Conservation Service
Website: <https://www.nrcs.usda.gov/programs-initiatives/cig-conservation-innovation-grants>

Source: Catalog of Federal Funding Sources; Land Resources
Agency: Multiple
Website: <https://ordspub.epa.gov/ords/wfc/f?p=165:512:16627993499812:::512::>

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

- Forest and Woodlands Resource Management Grant: <https://sam.gov/fal/3258dad2c3d247a9a8fcdedb398e3195/view>
- Environmental Education Grant: <https://www.epa.gov/education/grants>
- Public Assistance Grant Program: <https://www.fema.gov/assistance/public>
- Hazard Mitigation Grant: <https://www.fema.gov/grants/mitigation/hazard-mitigation>

Source: Catalog of Federal Funding Sources; Water Resources
Agency: Multiple
Website: <https://ordspub.epa.gov/ords/wfc/f?p=165:12:16627993499812:::12::>

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

- Water Conservation Field Services Program: <https://www.usbr.gov/waterconservation/>
- Colorado Community Development Block Grant: <https://oedit.colorado.gov/community-development-block-grant-planning-feasibility-studies-grant#:~:text=The%20Community%20Development%20Block%20Grant%20%28CDBG%29%20Planning%20and,least%20one%20full-time%20equivalent%20job%20per%20%2420%2C000%20funded.>
- Colorado State Water Quality Grants: <https://cdphe.colorado.gov/water-quality/funding-grants-and-loans/water-quality-grants>

Source: Firewise Communities
Agency: Multiple
Website: <https://www.nfpa.org/about-nfpa/awards>

- Source:** The National Fire Plan (NFP)
Agency: DOI and USDA
Website: <http://www.forestsandrangelands.gov/>
- Source:** Staffing for Adequate Fire and Emergency Response (SAFER)
Agency: FEMA
Website: <https://www.fema.gov/grants/preparedness/firefighters/safer>
- Source:** The Fire Prevention and Safety Grants (FP&S)
Agency: FEMA
Website: <https://www.fema.gov/grants/preparedness/firefighters/safety-awards#:~:text=Awards%20%20%20Organization%20%20%20,%20%20%241%2C499%2C957%20%2016%20more%20rows%20>
- Source:** GSA-Federal Excess Personal Property
Agency: USFS
Website: <https://www.gsa.gov/tools-overview/personal-property-disposal-and-auctions-tools>
- Source:** Assistance to Firefighters Grants (AFG)
Agency: FEMA
Website: <https://www.fema.gov/grants/preparedness/firefighters>.
- Source:** Wildland Urban Interface Grant Program
Agency: Council of Western State Foresters/USFS
Website: <https://www.westernforesters.org/wui-grants>
- Source:** Action, Implementation, & Mitigation Grant
Agency: Coalitions and Collaboratives/USFS
Website: <https://co-co.org/get-involved/grants/aim-grant/>
- Source:** U.S. Endowment for Forestry and Communities
Agency: U.S. Environmental Protection Agency, Natural Resources Conservation Service (NRCS), U.S. Forest Service, U.S. Department of Defense, U.S. Economic Development Agency
Website: <https://www.usendowment.org/>

PRIVATE FUNDING INFORMATION

- Source:** State Farm Good Neighbor Citizenship (GNC) Grants
Agency: State Farm
Website: <https://www.statefarm.com/about-us/corporate-responsibility/community-grants/good-neighbor-citizenship-grants>

Source: Environmental Systems Research Institute (ESRI) Conservation Program

Agency: ESRI

Website: <https://www.esri.com/en-us/home>

Source: Patagonia Environmental Grants and Support

Agency: Patagonia

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

Source: Leonardo DiCaprio Foundation Grants

Agency: Leonardo DiCaprio Foundation

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

OTHER FUNDING INFORMATION

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

- Western Forestry Leadership Coalition: <https://www.thewflc.org/>
- USDA Information Center: <https://www.nal.usda.gov/main/information-centers>
- USFS Fire Management website: https://www.fs.usda.gov/science-technology/fire_put
- National Fire Protection Association: <http://www.nfpa.org>
- National Interagency Fire Center, Fire Prevention, Education, and Mitigation: <https://www.nifc.gov/fire-information/fire-prevention-education-mitigation>
- U.S. Fire Administration: <https://www.usfa.fema.gov/index.html>
- Infrastructure Investment and Jobs Act Resources: <https://www.gfoa.org/the-infrastructure-investment-and-jobs-act-ijja-was>

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WASH STATE

APPENDIX J:

Local Project Planning

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LOCAL PROJECTS AND ACTION PRIORITIES:

The tables below (Tables J.1–J.20) summarize and prioritize local level wildfire mitigation projects by local, federal, and state agencies, and other non-governmental organizations operating within Boulder County. Many of these projects are also identified and link to local Fire Protection District CWPPs or other agency or nonprofit management plans. For entities without their own local CWPP, it is suggested to incorporate the County's CWPP recommendations into local mitigation and preparedness planning as applicable.

Each table depicts local level planning efforts and a breakdown of specific projects, their corresponding priorities, goals, and proposed treatments, along with the entities responsible for their implementation. The tables depict local level projects identified for future planning and funding opportunities. Projects and action items listed in these tables are subject to change in priority, goals, and objectives as local planning efforts take place. These local planning efforts align with the National Cohesive Strategy recommendations included in Chapter 4 of the CWPP.

U.S. FOREST SERVICE ROOSEVELT NATIONAL FOREST, BOULDER RANGER DISTRICT

Table J.1. USFS Roosevelt National Forest, Boulder Ranger District Local Projects and Action Priorities

Project Name	Priority 1 High 10 Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Gold Lake	1	Gold Lake	2,500	20	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, shaded fuel break, pile burning, prescribed burning	Gold Lake Ranch, Boulder County, and Jamestown	County Land Bell Gulch and Walker Mtn., POD Boundary, Anchor off Lefthand Fire
Allenspark	2	Allenspark, Meeker Park	2,500	500+	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, shaded fuel break, pile burning, prescribed burning	NPS and Boulder County	Pod Boundary. Affected Communities – Allenspark, Meeker Park, Ski Rd.
Jamestown	3	Jamestown	2,000	300	Fuels Mitigation- Forests	Forest thinning-hand, shaded fuel break, pile burning, prescribed burning	Boulder County and Jamestown	POD Boundary. Affected – Jamestown, Cal-wood, and Balarat Outdoor Education School
Button Rock	4	Johnny Park Rd.	2,500	200	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, shaded fuel break, pile burning, prescribed burning	City of Longmont and Boulder County	POD Boundary. Affected – Lyons
Gold Hill	5	Gold Hill, Switzerland Trail	1,500	100	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, shaded fuel break, pile burning, prescribed burning	Boulder County	POD Boundary. Affected – Gold Hill
South St. Vrain Canyon	6	South St. Vrain Canyon	500	100	Fuels Mitigation- Forests	Prescribed burning	Boulder County	POD Boundary. Affected – Lyons
Riverside	7	Raymond, Riverside, Peaceful Valley, Beaver Reservoir.	3,500	300	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, shaded fuel break, pile burning, prescribed burning	Boulder County	POD Boundary. Affected – Raymond, Riverside, Bunce School, Peaceful Valley
Boulder Heights	8	Boulder Heights, Lefthand Canyon, James Canyon	750	100	Fuels Mitigation- Forests	Prescribed burning, forest thinning-hand, pile burning, shaded fuel break	Boulder County and City of Boulder	POD Boundary. Affected – Boulder Heights, Jamestown

Project Name	Priority 1 High 10 Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Nederland	9	Nederland, Sugarloaf, Magnolia Rd.	3,500	1200	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, shaded fuel break, pile burning, prescribed burning	City Of Boulder, City of Nederland, and Boulder County	POD Boundary. Affected – Eldora, Nederland
Brainard Rd. POD Boundary	10	Brainard Lake Rd., Ward	500	10	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, pile burning, shaded fuel break	Boulder County	POD Boundary. Affected – Ward

COLORADO STATE FOREST SERVICE

Table J.2. Colorado State Forest Service Local Projects and Action Priorities

Project Name	Priority 1 High 10 Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Arkansas Mountain	N/A	Sugarloaf	92	10	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual and pile burning	CSFS, BWC, and Four Mile FPD	N/A
Ceran St. Vrain	N/A	St. Vrain Canyon	110	4	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	CSFS, Lefthand FPD, and the Boulder Valley and Longmont Conservation Districts	N/A
Conifer Hill	N/A	St. Vrain Canyon	TBD	30	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual	CSFS, TWC	N/A
County Rd 99	N/A	CCC	54	21	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual	CSFS, BWC	N/A
Crescent Park	N/A	CCC	TBD	TBD	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual	CSFS, BWC	N/A
Dry Gulch	N/A	Sunshine	70	15	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	Sunshine FPD, CSFS	N/A

Project Name	Priority 1 High 10 Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Gross Res	N/A	Gross Reservoir/CCC	50	1	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual	DW	N/A
Halverson	N/A	St. Vrain Canyon	33	1	Fuels Mitigation- Forests	Pile burning	CSFS	N/A
Kielsmeier	N/A	Upper CCC	31	1	Fuels Mitigation- Forests	Forest thinning-hand, pile burning	CSFS, BWC	N/A
Los Lagos	N/A	Upper CCC	80	5	Fuels Mitigation- Forests	Forest thinning-mechanical	CSFS, BWC	N/A
Miramonte	N/A	CCC	70	1	N/A	N/A	CSFS, JCD	N/A
Pinecliffe Association Inc	N/A	CCC	160	1	N/A	N/A	CSFS, BWC	N/A
Storm-Wallace	N/A	St. Vrain Canyon	48	2	Fuels Mitigation- Forests	Forest thinning- mechanical/manual, pile burning	CSFS	N/A
Button Rock - Spillway Knoll	N/A	St. Vrain Canyon	22	1	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	CSFS, City of Longmont	N/A

Note: CCC = Coal Creek Canyon; DW =Denver Water; JCD = Jefferson Conservation District; TWC = The Watershed Center; N/A = not applicable; TBD = to be determined

BOULDER OFFICE OF DISASTER MANAGEMENT

Table J.3. Boulder Office of Disaster Management Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Disaster Strong Preparedness Workshops	3	City of Boulder, Boulder County*	N/A	N/A	Outreach and Education	N/A	N/A	<p>Hosting the various workshop types in the following frequency, or more often as demand needs: Disaster Strong: Preparedness Basics - once per quarter</p> <ul style="list-style-type: none"> Disaster Strong: Train-the-Trainer - twice annually Disaster Strong: Pet Preparedness - twice annually <p>Community members can sign-up at https://boulderodm.gov/preparedness/events-workshops/</p> <p>Workshops cover topics of Boulder County hazard profile, alert and warning, personal risk assessment, and planning (along with specifics for train-the-trainer and pet preparedness).</p>

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Multi-Language Disaster Preparedness Resources	1	Online	N/A	N/A	Outreach and Education	N/A	Boulder County Language Access	All educational handouts/graphics will be available in English, Spanish, Mandarin, Vietnamese, Korean, and Russian; goal is to have these on the website by 3/1/24 (translations have been done, and are getting the language put into our document templates).
Public Signage for Disaster Preparedness	5	Various public locations throughout the county – to be determined	N/A	N/A	Outreach and Education	N/A	N/A	Public signage with base-level preparedness and alert and warning messaging to be developed and put up in permanent or semi-permanent ways at various public locations around town and at trailheads.
Disaster Preparedness Resource Library	3	Online	N/A	N/A	Outreach and Education	N/A	N/A	Online library of all resources including handouts, graphics, worksheets, and videos created specifically for our community in Boulder County. Can be accessed at: https://boulderodm.gov/preparedness/resource-library/ .

Project Name	Priority 1 - High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Online Disaster Preparedness Resources	3	Online	N/A	N/A	Outreach and Education	N/A	N/A	Revamp of Boulder ODM website included updates to preparedness page of site (https://boulderodm.gov/preparedness/) which includes information on Boulder County hazards, personal risk assessment, creating a plan, grab lists, evacuation, shelter in place, and specific resources for individuals with access and functional needs, and for pets and animal preparedness.
Conflagration Planning	1	City of Boulder	N/A	N/A	Planning	Defensible space	Local fire agencies, OSMP	ODM-led initiative around conflagration prevention.
Evacuation Planning	1	City of Boulder, Eldorado Springs	N/A	N/A	Planning	N/A	Local fire and law enforcement agencies, planning and permitting	Fire and law enforcement have worked together to identify critical routes that need to have traffic managed during evacuations, and continued work will be occurring around evacuation planning for more generalized areas in early spring of 2024 to ensure we are taking access and functional needs and high levels of pedestrian/non-driving traffic into account. Eldorado Springs and City of Boulder have brought up some pointed concerns which is why work is happening around those areas specifically.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Multi-Language Disaster Preparedness Resources	1	Online	N/A	N/A	Outreach and Education	N/A	Boulder County Language Access	All educational handouts/graphics will be available in English, Spanish, Mandarin, Vietnamese, Korean, and Russian; goal is to have these on the website by 3/1/24 (translations have been done, and are getting the language put into our document templates).

*Note: Not typically hosted in Louisville, Lafayette, Erie, or Longmont as they have their own Emergency Manager or Emergency Management agency.

BOULDER COUNTY PARKS AND OPEN SPACE

Table J.4. Boulder County Parks and Open Space Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Riverside Ranch	1	South of Buttonrock Reservoir, Riverside Ranch Open Space	200	1	Fuels Mitigation-Forests	Forest thinning-manual	USFS, BC Sheriff's office	Thinning
Steep and Dark	1	Hall Ranch	100	1	Fuels Mitigation-Forests	Forest thinning-manual	Same as Riverside Ranch	Thinning
Meyer's Gulch	3	Walker Ranch	262	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration, aspen enhancement
Heil PA10U1-9	2	Heil Valley Ranch	150	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Billings	4	Billings Open Space	160	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration
Ned Sort Yard	2	Nederland CFSY	36	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Patch cuts, forest restoration, aspen enhancement
Overland	1	Overland Open Space	3.2	1	Fuels Mitigation-Forests	Forest thinning-manual	N/A	Forest restoration
Reynolds PA3	5	Reynolds Ranch	30	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Patch cuts
Peppers/Tungsten	8	McCasin Peppers/Tungsten	114	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration, patch cuts
Reynolds PA2U5,6	9	Reynolds Ranch	52	-	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Patch cuts
Tucker	3	Tucker Open Space, W. of Nederland	100	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	The Boulder Watershed Collective	Forest restoration, patch cuts
772	5	Wallace Open Space, S. of Allenspark	100	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration
Bunce School Rd.	9	Open Space properties along Bunce School Rd.	300	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration, patch cuts
ACCC	10	Adams-Cowger\Cabin Creek	160	1	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Forest restoration
Walker	7	Walker Ranch	200	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Broadcast
Arkansas	6	Betasso Preserve	262	1	Fuels Mitigation-Forests	Prescribed burning	Boulder County Sheriff's Office	Broadcast
Nelson Loop	1	Hall Ranch	415	1	Fuels Mitigation-Forests	Prescribed burning	Boulder County Sheriff's Office	Broadcast

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Rabbit	2	Ron Stewart Preserve at Rabbit Mountain	400	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Broadcast
Gaynor	1	South of Longmont	1,600 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Jim Henry	1	119th & Oxford Rd	8,500 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Howell Ditch	1	115th & Mineral	10,566 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Faul & Kragh	1	115th & Vermilion	5,000 feet; 20 acres	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch and field
Josephine Roche	2	119th & Arapahoe Rd.	2,000 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Pella	2	75th & St. Vrain Rd.	5,840 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Walden	2	75th & Jay Rd.	3,050 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Leggett	2	Southeast of Longmont	18,000 feet	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Ditch
Marfell	1	119th & Arapahoe Rd.	30	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Broadcast
Doniphan	1	115th & Lookout Rd.	1.3	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Broadcast
Dawson	1	109th & Jasper	3.6	1	Fuels Mitigation-Grasslands	Prescribed burning	Boulder County Sheriff's Office	Broadcast
Reynolds Piles	2	Reynolds Ranch	25	1	Fuels Mitigation-Forests	Pile burning	Boulder County Sheriff's Office	Piles
Sherwood Piles	2	Sherwood Gulch, Northwest of Nederland	15	1	Fuels Mitigation-Forests	Pile burning	Boulder County Sheriff's Office	Piles
West Hall Piles	1	Hall Ranch	116	1	Fuels Mitigation-Forests	Pile burning	Boulder County Sheriff's Office	Piles

Note: CFSY = Community Forestry Sort Yards; ACCC = Adams-Cowger/Cabin Creek

TOWN OF ERIE PARKS AND OPEN SPACE

Table J.5. Town of Erie Parks and Open Space Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Winter Annual Grass Control - Rejuvra Treatments	3	Adjacent to Vista Pointe, Erie Commons, Grandview, Collier's Hill, and Erie Highlands Neighborhoods/D developments	150	Only occurring on Town of Erie-owned and maintained property.	Fuels Mitigation-Grasslands	Defensible space	None	There was not a truly applicable selection for our proposed treatment in the drop-down list. The project involves pre-emergent herbicide use along our main open space corridor, which is adjacent to many neighborhoods. We would consider this more of a grassland fuels treatment to reduce the fuel loading from winter annual grasses.
Fenceline/Property Line Mowing of Open Space Abutting Private/HOA Land	1	Throughout town, all areas adjacent to open space maintained by the town.	10.49 miles	Only occurring on Town of Erie-owned and maintained property.	Fuels Mitigation-Grasslands	Grasslands-mowing	None	N/A
Goat Grazing for Fuel Reduction	8	Select areas throughout town	50	Only occurring on Town of Erie-owned and maintained property.	Fuels Mitigation-Grasslands	Grasslands-grazing	None	N/A

TOWN OF SUPERIOR

Table J.6. Town of Superior Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Goat Grazing- Hot Weather Season	1	Coalton Trailhead, Harney Lastoka open space	30	1	Fuels Mitigation- Grasslands	Grasslands-grazing	Goat contractor and Butterfly Pavilion	Contractor also broadcasts high-plains native shortgrass seed mixes ahead of each grazed area to restore native prairie, plot sampling by Butterfly Pavilion.
Goat Grazing- Cool Weather Season	1	Vista Corridor open space	12.5	1	Fuels Mitigation- Grasslands	Grasslands-grazing	Goat contractor, Boulder County Wildfire Partners	Contractor also broadcasts high-plains native shortgrass seed mixes ahead of each grazed area to restore native prairie.
Goat Grazing- Cool Weather Season	1	Open space between The Ridge and Water Treatment Plant, west of McCaslin	7	1	Fuels Mitigation- Grasslands	Grasslands-grazing	Goat contractor	Contractor also broadcasts high-plains native shortgrass seed mixes ahead of each grazed area to restore native prairie.
Goat Grazing- Cool Weather Season	1	Inside Superior Water Treatment Plant	3	1	Fuels Mitigation- Grasslands	Grasslands-grazing	Goat contractor	Contractor also broadcasts high-plains native shortgrass seed mixes ahead of each grazed area to restore native prairie.
Goat Grazing- Cool Weather Season	1	Private property owner, Aweida properties, adjacent to Superior Vista Corridor open space	10	1	Fuels Mitigation- Grasslands	Grasslands-grazing	Goat contractor	Contractor also broadcasts high-plains native shortgrass seed mixes ahead of each grazed area to restore native prairie.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Mowing	2	Town Hall, West of McCaslin, Sycamore, Children's Park, The Ridge, Depot Street, Eastside of McCaslin, 3rd & Charles St. (Trails), Town 15, 88th St, Honey Creek Lane, Water Treatment Plant, Calmante sidewalk	60	1	Fuels Mitigation-Grasslands	Grasslands-mowing	Landscape contractor	The Town expanded mowing along trails to 5 to 10 feet on either side, along residential fences, west of Sagamore 20-foot buffer, south of Depot 20-foot buffer, south of the Ridge development 20 feet, either side of McCaslin 20 to 50 feet.
Hazardous Vegetative Fuels Reduction Mitigation	2	Rock Creek, Sagamore, and original town. New open space parcels in original town.	20	1	Fuels Mitigation-Grasslands	Defensible space	Landscape contractor	Disposal of hazardous fuels on empty lots/Operation Adopt a Neighbor Volunteer Program
Noxious Weed Removal Ambassador Program	3	Superior open space	50	1	Fuels Mitigation-Grasslands	Shaded fuel break	Volunteers	This program allows for volunteers who are familiar with noxious weeds in the area to remove them and educate the community on what native species we want to continue to grow to help the landscape.
Boulder County Youth Corps- Hot weather Season	4	Open space and trailheads	55 (acreage is approximate)	1	Fuels Mitigation-Grasslands	Defensible space	Youth Corps	Fuels reduction projects that consist of ladder fuel loads and removing invasive species, removal of old wood fence posts.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Community Mitigation Program	3	Online	N/A	N/A	Education and outreach	N/A	Wildfire Partners	Utilize Wildfire Partners expanded Community Mitigation Program for community assessments, chipping, technical assistance, and planning.
Preparedness Programming		Online	N/A	N/A	Education and outreach.	N/A	Large variety	Robust offering of preparedness programs for residents with the Disaster Preparedness and Recovery Department. Events may be found on the Town calendar and superiorcolorado.gov/ready .
Preparedness video library.		Online	N/A	N/A	Education and outreach.	N/A	Large variety	Educational preparedness videos, documents and resources may be found at superiorcolorado.gov/ready .
Preparedness Online Resource		Online	N/A	N/A	Education and outreach.	N/A	Large variety	General information about preparedness on the Disaster Preparedness and Recovery Department website at superiorcolorado.gov/ready .

CITY OF LAFAYETTE

Table J.7. City of Lafayette Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
South Boulder Canyon Ditch, Prescribed Fire	2	Indian Peaks Golf Course	4	1	Fuels Mitigation-Grasslands	Prescribed burning	None (Local FPD?)	N/A
Coal Creek Corridor Open Space	4	Southwest Lafayette	2	1	Outreach and Education	Prescribed burning	None (Local FPD?)	We hope to apply a fire prescription to this small area and implement an outdoor classroom to demonstrate the effects of fire on the grasslands.

CITY OF LONGMONT

Table J.8. City of Longmont Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Button Rock Preserve Forest Health	1	Button Rock Preserve	3,000	3	Fuels Mitigation-Forests	Forest thinning-mechanical/manual, defensible space, pile burning, prescribed burning, and shaded fuel breaks	USFS, Boulder County Parks and Open Space, CSFS, and private landowners	Multi-faceted approach, multi-year.

BOULDER VALLEY AND LONGMONT CONSERVATION DISTRICT

Table J.9. Boulder Valley and Longmont Conservation District Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Ski Road	1	Allenspark	103	3	Fuels Mitigation- Forests	Forest thinning- mechanical	N/A	N/A
Gold Hill Road	1	Gold Hill	65	2	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical	N/A	N/A
Silver Spruce Ranch	1	Hidden Lake	468	1	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual	N/A	N/A
Tahosa Valley	5	Meeker Park	1,771	350	Outreach and Education, Fuels Mitigation-Forests	Forest thinning- mechanical/manual	The Watershed Center	N/A
Roaring Fork	3	Meeker Park	106	14	Fuels Mitigation- Forests, Outreach and Education, Planning	Forest thinning- mechanical/manual	N/A	N/A
Conifer Hill	5	Raymond	200	37	Outreach and Education, Fuels Mitigation-Forests	Forest thinning- mechanical/manual	The Watershed Center, CSFS, BOCO	N/A
CR 99	4	Nederland	100	15	Outreach and Education, Fuels Mitigation-Forests	Forest thinning- mechanical/manual	Boulder Watershed Collective, CSFS	N/A
Tolland	1	Tolland	36	1	Fuels Mitigation- Forests	Forest thinning- mechanical	N/A	N/A
Button Rock	7	Lyons	300	8	Fuels Mitigation- Forests, Outreach and Education	Forest thinning- mechanical/manual	City of Longmont	N/A

CITY OF LOUISVILLE

Table J.10. City of Louisville Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Mitigation education and outreach	2	City of Louisville	N/A	N/A	Outreach and Education Community Engagement	N/A	Louisville Fire Protection District, Boulder County Wildfire Partners, Boulder County ODM, Boulder County Sheriff's Office	Build programming on private property mitigation and expand education and outreach opportunities with internal and external departments on mitigation initiatives for open spaces. Develop and implement programs to engage citizens, neighborhoods, and HOAs to improve disaster preparedness (home hardening, defensible space, and fire adapted concepts).
Expand capacity for mitigation initiatives	5	City of Louisville	N/A	N/A	Capacity Building	N/A	N/A	Expanding capacity on mitigation projects within the City.
Private property mitigation incentives	5	City of Louisville	N/A	N/A	Outreach and Education	N/A	Louisville Fire Protection District	Researching and developing mitigation incentives for the whole City.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Disaster Preparedness Education and Outreach	7	City of Louisville	N/A	N/A	Outreach and Education Community Mitigation Planning Conflagration Planning Support Socially Vulnerable Populations Collaboration and Partnerships	N/A	Louisville FPD, Boulder County ODM, Boulder County Wildfire Partners, City of Boulder	Expanding disaster preparedness events, education, and outreach on all hazards. Partner with Superior and Wildfire Partners to implement a new Community Mitigation Program in Louisville. Encourage neighborhoods to pursue Wildfire Partners Firewise certification to help preserve insurability. Participate in/support Boulder County ODM and Sheriff's Office, City of Boulder, and local FPDs initiatives around conflagration planning. Build trust and sustainable relationships with socially vulnerable communities in the City to improve preparedness and mitigation.
Disaster Preparedness Planning	1	City of Louisville	NA	NA	Evacuation Planning Response and Alert	NA	Boulder County ODM, Boulder County Sheriff's Office, Boulder County Community Planning, Louisville FPD	Incorporate evacuation planning in public works and police departments. Improve signage for evacuation routes. Communicate evacuation plans for vulnerable populations. Communicate improvements and progress made with or by the County.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Broadscale mowing across the entire property to create a large fuel break.	1	Howard Berry Water Treatment Plant	8		Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Mow the entire property to a height of 4 to 6 inches. Remove clippings within 30 feet of private fence lines during extended periods of hot, dry weather and at the end of the growing season. Timing: Near-term.
Complete removal of vegetation to create a fire break around the property due to elevated wildfire risk.	1	Howard Berry Water Treatment Plant	0.4 square miles		Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Remove all vegetation down to bare mineral soil to create a fire break within 10 feet of the property line on the east, south, and west sides. Marshall Road can serve as an adequate fire break to the north. Install gravel or other non-burnable materials to prevent vegetation from recovering in the fire break. Timing: Near- to mid-term.
Structure hardening and defensible space around critical infrastructure.	1	City of Louisville Howard Berry Water Treatment Plant	N/A		Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Follow guidance from the CSFS Home Ignition Zone Guide, including removal of all vegetation within 5 feet of structures and installing screens to prevent ember penetration into vents. Timing: Near- to mid-term. Explore the adoption and enforcement of defensible space measures and wildfire building codes.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Ditch maintenance to reduce risk of high flame lengths, passive crown fire, and ember production.	2	Howard Berry Water Treatment Plant Louisville Lateral and Community Ditch			Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Use mowing, prescribed burning, or grazing to create a fuel break extending 15 feet to either side of the ditches. Louisville Lateral is owned by City of Louisville, but management of Community Ditch will require coordination with Boulder County Parks and Open Space. Timing: Near- to mid-term.
Structure hardening around power poles.	2	Howard Berry Water Treatment Plant Six wooden power poles along Marshall Road			Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Re-treat old, wooden power poles and fill-in large cracks to reduce their flammability. Mow vegetation to less than 4 to 6 inches within 10 feet of each pole if vegetation is present. Timing: Near-term.
Broadscale mowing across the irrigated portion of the property to maintain recreational fields and serve as a fuel break.	1	Keith Helart Park	1 acre	City of Louisville Parks	Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Mow the irrigated portion of the property to a height of no more than 6 inches. Manage clippings within 30 feet of private fence lines during extended periods of hot, dry weather and at the end of the growing season. Timing: ongoing.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Ditch maintenance to create a fuel break.	1	Keith Helart Park At least 1.0 miles of Davidson Highline Lateral and Goodhue Ditch within and adjacent to the property.			N/A	N/A	N/A	Coordinate with ditch companies to manage vegetation within ditches and at least 15 feet along each side. Use goats, prescribed burning, and/or hand tools to remove shrubs and dead stems, prune tree branches, and reduce the quantity of dead litter. Vegetation management along these two ditches could create strategic fuel breaks for wildland firefighters engaging fires spreading from the west towards neighborhoods in north Louisville. Timing: Near- to mid-term.
Debris removal along the property fence line.	2	Keith Helart Park 650 feet of chain-link fence between Keith Helart Park and Callahan Open Space		City of Louisville Parks	Fuels Mitigation- Grasslands	Grasslands-mowing/grazing	N/A	At the end of the fall, use a leaf blower to remove dead leaves, pine needles, and other debris that has accumulated along the fence line between Keith Helart Park and Callahan Open Space. Timing: late-term (fall).
Structure hardening of gazebos.	2	Keith Helart Park Two wooden gazebos		City of Louisville Parks	Planning	Defensible space	N/A	Re-treat exposed wood and fill-in large cracks to reduce their ignitability. Timing: mid-term.
Broadscale mowing across the entire property to maintain recreational fields and serve as a large fuel break.	1	Annette Brand Park	7.4	City of Louisville Parks	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow the entire property to a height of no more than 6 inches. Manage clippings within 30 feet of private fence lines during extended periods of hot, dry weather and at the end of the growing season. Timing: Ongoing.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Ditch maintenance to reduce risk of high flame lengths, passive crown fire, and ember production.	1	Annette Brand Park 2.5 miles of Louisville Lateral			N/A	N/A	N/A	Use mowing or grazing to create a fuel break extending 15 feet to either side of the ditch. Timing: Near- to mid-term.
Debris removal along the property fence line.	2	Annette Brand Park 700 feet of chain-link fence between the Water Treatment Plant and Annette Brand Park.		City of Louisville Parks	Fuels Mitigation- Grasslands	Defensible space	N/A	At the end of fall, use a leaf blower to remove pine needles and other dead vegetation that has accumulated along the fence line between Water Treatment Plant and Annette Brand Park. Timing: late-term (fall).
Woody vegetation management to reduce the potential for passive crown fire and ember production from riparian area.	2	Annette Brand Park 0.5 acre in a small riparian area along the boundary between the Water Treatment Plant and Annette Brand Park		City of Louisville Forestry	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	Use hand tools to remove dead shrubs and prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Near- to mid-term.
Woody vegetation management to reduce the potential for passive crown fire and ember production from scattered trees across park.	2	Annette Brand Park Scattered trees within the park boundary		City of Louisville Forestry	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	Use hand tools to prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Remove leaves, pine needles, and debris from around the base of trees. Timing: Near-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Restoration of prairie ecosystem to reduce potential flame lengths and rates of spread.	1	North Open Space	30	City of Louisville Open Space	Fuels Mitigation- Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of prescribed burning, grazing, herbicide, and seeding to restore prairie ecosystems with short-statured, low-flammability native species separated by patches of bare soil. Some of the treatment area is already actively grazed by goats and cattle, and trails around the area can be used as potential control lines for prescribed burns. Timing: Ongoing to mid-term.
Mowing around property perimeter and exterior trails to create a fuel break.	1	North Open Space 1.5 miles The city currently mows 12-foot fuel breaks along 2 miles of the perimeter in North Open Space.		City of Louisville Open Space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks that are a total of 12 to 15 feet wide along exterior trails (width includes trails). If trails are not present within 30 to 100 feet of homes, mow 12 to 15 feet off the fence line in addition to the trail. Timing: Near-term.
Woody vegetation management to reduce potential of passive crown fire and ember production in cottonwood stand.	1	North open space Cottonwood stands	8	City of Louisville open space	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	CSFS Boulder Field Office	Use goats, prescribed burning, and/or hand tools to remove shrubs and dead stems and to prune tree branches. Dismantle wooden forts and remove logs or scatter them around the property so they can serve as wildlife habitat. Timing: Ongoing to near-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Ditch maintenance to reduce risk of high flame lengths, passive crown fire, and ember production.	1	North open space At least 0.7 mile of Davidson Ditch and at least 1.0 mile of Davidson Highline Lateral and Goodhue Ditch within and adjacent to the property.		City of Louisville open space	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	N/A	Coordinate with ditch companies to manage vegetation within ditches and at least 15 feet along each side. Use goats, prescribed burning, and/or hand tools to remove shrubs and dead stems, prune tree branches, and reduce the quantity of dead litter. Timing: Near- to mid-term.
Mowing along interior trails to create a fuel break and potential control lines for prescribed burns.	2	North open space	0.5 mile	City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks along interior trails that are 12 to 15 feet wide (width includes trails). Timing: Near-term.
Restoration of prairie ecosystem to reduce potential flame lengths and rates of spread.	1	Davidson Mesa open space	50	City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of prescribed burning, grazing, herbicide, and seeding to restore prairie ecosystems with short stature, low-flammability native species separated by patches of bare soil. Much of the area is already actively grazed by cattle and surrounded by trails, which can be used as potential control lines for prescribed burns. Timing: Ongoing to mid-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Mowing around property perimeter and exterior trails to create a fuel break.	1	Davidson Mesa open space 3.4 miles The city currently mows 12-foot fuel breaks along 2.4 miles of the perimeter in Davidson Mesa open space.		City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks that are a total of 15 to 30 feet wide along exterior trails (width includes trails). If trails are not present within 30 to 100 feet of homes, mow 15 to 30 feet off the fence line in addition to the trail. Timing: Ongoing to near-term.
Mowing along interior trails to create a fuel break and potential control lines for prescribed burns.	2	Davidson Mesa open space	1.7 miles	City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks along interior trails that are 12 to 15 feet wide (width includes trails). Timing: Ongoing to near-term.
Woody vegetation management to reduce potential of passive crown fire and ember production.	2	Davidson Mesa open space 3.5 acres along Davidson Ditch		City of Louisville open space	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	N/A	Use hand tools to remove dead stems and low branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Mow or leaf-blow litter that has accumulated in the bottom of the ditch. Timing: Ongoing.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Restoration of prairie ecosystem to reduce potential flame lengths and rates of spread.	1	Damyanovich open space	37	City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of prescribed burning, grazing, herbicide, and seeding to restore prairie ecosystems with short-statured, low-flammability native species separated by patches of bare soil. The isolation of the property from dense neighborhoods makes it a strong candidate for prescribed burning and adaptive management to learn effective restoration practices that can be applied on other properties. Currently, this property is hayed. Timing: Mid-term.
Mowing around property perimeter to create a fuel break and potential control lines for prescribed burns.	1	Damyanovich open space 1.0 miles The city currently mows 12-foot fuel breaks along 0.5 mile of the perimeter in Damyanovich open space.		City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks along property and fence lines that are 15 to 30 feet wide. Timing: Ongoing to near-term.
Ditch maintenance to create a fuel break.	2	Damyanovich open space 3.7 miles along the Louisville Lateral		City of Louisville open space	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	N/A	Use mowing or prescribed burning to create a fuel break extending 15 feet to either side of the Louisville Lateral to allow firefighters to engage wildfires spreading out of the west. Timing: Near to mid-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Broadscale mowing across the entire property to create a large fuel break.	2	North Water Treatment Plant	19		Fuels Mitigation-Grasslands	Grasslands-mowing		Mow the entire property to a height of 4 to 6 inches. Timing: Near-term.
Removal of flammable juniper and pine trees along fence line to reduce the potential for passive crown fire and ember production.	1	North Water Treatment Plant	N/A		Fuels Mitigation-Forests	Forest thinning-mechanical		Remove enough of the juniper and pine trees along the southeastern fence line to result in at least 10-foot crown spacing. Prune branches hanging 6 to 10 feet above the ground on remaining trees. If possible, remove all junipers and replace with fewer, more widely spaced, flame-resistant species. Timing: Near- to mid-term.
Structure hardening and defensible space around critical infrastructure.	1	North Water Treatment Plant	N/A		Fuels Mitigation-Grasslands	Grasslands-mowing		Follow guidance from the CSFS Home Ignition Zone Guide, including removal of all vegetation within 5 feet of structures and installing screens to prevent ember penetration into vents. Timing: Near- to mid-term.
Ditch maintenance to reduce risk of high flame lengths, passive crown fire, and ember production.	2	North Water Treatment Plant At least 0.7 mile of Davidson Ditch north of the property and 2.5 miles of Louisville Lateral to the south.	.		Fuels Mitigation-Grasslands	Grasslands-mowing		Coordinate with ditch companies to use mowing, prescribed burning, or grazing to create a fuel break extending 15 feet to either side of the ditches. Treatments along Davidson Ditch could allow firefighters to engage wildfires spreading from expansive grasslands to the north of the Water Treatment Plant. Timing: Near- to mid-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Debris removal along the property fence line.	2	North Water Treatment Plant 700 feet of chain-link fence between the Water Treatment Plant and Annette Brand Park.			Fuels Mitigation- Grasslands	Grasslands-mowing		At the end of the fall, use a leaf blower to remove pine needles and other dead vegetation that has accumulated along the fence line between Water Treatment Plant and Annette Brand Park. Timing: Near-term.
Woody vegetation management to reduce the potential for passive crown fire and ember production.	2	North Water Treatment Plant Trees along the boundary between the Water Treatment Plant and Annette Brand Park.			Fuels Mitigation- Forests	Forest thinning-mechanical		Remove dead shrubs and prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Near- to mid-term.
Mowing around property perimeter and exterior trails to create a fuel break.	2	0.7 miles. The city currently mows 12-foot fuel breaks along 0.5 mile of the perimeter in Dutch Creek open space.		City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks that are a total of 12 to 15 feet wide along exterior trails (width includes trails). If trails are not present within 30 to 100 feet of homes, mow 12 to 15 feet off the fence line in addition to the trail. Mow to maintain grass height less than 4 to 6 inches in height. Timing: Ongoing to near-term.
Riparian management along Coal Creek Corridor to reduce potential of long flame lengths, passive crown fire, and ember production.	2	Dutch Creek open space including Coal Creek riparian trail/corridor,	5.3	City of Louisville open space	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	Use goats, prescribed burning, and/or hand tools to remove shrubs and dead stems and to prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Near-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Restoration of prairie ecosystem to reduce potential flame lengths and rates of spread.	3	Dutch Creek open space including Coal Creek riparian trail/corridor	13.5	City of Louisville open space	Fuels Mitigation-Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of grazing, herbicide, and seeding to restore prairie ecosystems with short-statured, low-flammability native species separated by patches of bare soil. Timing: Mid-term.
Mowing along interior trails to create a fuel break and potential control lines for prescribed burns.	3	Dutch Creek open space including Coal Creek riparian trail/corridor	0.7 miles	City of Louisville Open Space	Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Mow fuel breaks along interior trails that are a total of 12 to 15 feet wide (width includes trails). Mow to 4 to 6 inches in height. Timing: Near-term.
Broadscale mowing across the entire property to maintain recreational fields and serve as a fuel break.	2	Elephant Park	1	City of Louisville Parks	Fuels Mitigation-Grasslands	Grasslands-mowing		Mow the entire property to a height of no more than 6 inches. Timing: Ongoing.
Pruning of lower limbs and removal of litter from under trees to reduce the potential for passive crown fire and ember production.	3	Elephant Park Four trees within the park boundary		City of Louisville Forestry	Fuels Mitigation-Forests	Forest thinning-mechanical/manual		Use hand tools to prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: mid-term.
Mowing along northern property perimeter to create a fuel break.	1	Avista Open Space 0.4 miles The city currently mows 12-foot fuel breaks along 0.4 mile of the perimeter in Avista open space.		City of Louisville Open Space	Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks along fence lines that are 15 to 30 feet wide. Mowing in the middle of the slope on the property line with Avista Hospital is unlikely to function as an effective fuel break. Working with Avista Hospital to ensure lawns are mowed and irrigated adjacent to the hospital is more important. Timing: Ongoing to near-term

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Restoration of prairie ecosystem to reduce potential flame lengths and rates of spread.	2	Avista open space	9	City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of prescribed burning (if there is public acceptance), grazing, herbicide, and seeding to restore prairie ecosystems with short-statured, low-flammability native species separated by patches of bare soil. This small property could be a good opportunity for adaptive management to learn effective restoration practices that can be applied on other properties. Timing: Mid-term.
Ditch maintenance to reduce risk of high flame lengths, passive crown fire, and ember production.	3	Daughenbaugh open space At least 0.5 mile of Goodhue Ditch along the western edge of Daughenbaugh and Warembourg open spaces.		City of Louisville open space	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	N/A	Coordinate with ditch companies to use goats, mowing, and/or hand tools to remove shrubs and dead stems, prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree and reduce grass height to less than 4 to 6 inches within 15-feet of either side of the ditch. Some of this work is already ongoing. Timing: Ongoing to near-term.
Mowing around exterior trail to create a fuel break.	3	Daughenbaugh open space	0.3 mile	City of Louisville open space	Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks that are a total of 12 to 15 feet wide along exterior trails (width includes trails). Timing: ongoing to near-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Mowing around property perimeter to create a fuel break.	1	Harper Lake open space and western corridor of Coyote open space 1.5 miles The city currently mows 12-foot fuel breaks along 1.3 miles of the perimeter in the area of Harper Lake open space and the western corridor of Coyote open space.			Fuels Mitigation-Grasslands	Grasslands-mowing	N/A	Mow 12 to 15 feet off fence line adjacent to homes and 30 feet along property line adjacent to HOA-maintained lawns. Coordinate with HOAs to expand perimeter mowing along fence lines adjacent to green belts. Timing: Ongoing to near-term.
Restoration of prairie to reduce potential flame lengths and rates of spread.	1	Harper Lake open space and western corridor of Coyote open space 3.0 acres in the western corridor of Coyote open space			Fuels Mitigation-Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of grazing, herbicide, and seeding to restore grasslands and prairies with short-statured, low-flammability native species separated by patches of bare soil. Successful restoration could eliminate the need to mow along fence lines in this area. Timing: Mid-term.
Woody vegetation management to reduce the potential for passive crown fire and ember production.	2	Harper Lake open space and western corridor of Coyote open space			Fuels Mitigation-Forests	Forest thinning-mechanical/manual	N/A	Remove junipers within 100 feet of fence lines and replace with low-flammability shrubs. Remove dead trees that do not serve as habitat trees and prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Ongoing to near-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Restoration of prairie ecosystem to reduce potential flame lengths and rates of spread.	3	Warembourg open space land to the east of the fishing pond where efforts are already underway to establish native shrubs.	17.5		Fuels Mitigation- Grasslands	Grasslands-grazing	Natural Resource Conservation Service and Boulder Valley and Longmont Conservation District	Use a combination of prescribed burning (if there is public acceptance), grazing, herbicide, and seeding to restore prairie ecosystems with short-statured, low flammability native species separated by patches of bare soil. Fire mitigation treatments are lower priority on this property, but this site could be a good opportunity for adaptive management to learn effective restoration practices that can be applied on other properties. Timing: Mid-term
Ditch maintenance to reduce risk of high flame lengths, passive crown fire, and ember production.	3	Warembourg open space At least 0.5 mile of Goodhue Ditch along the western edge of Daughenbaugh and Warembourg open spaces.			Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	At least 0.5 mile of Goodhue Ditch along the western edge of Daughenbaugh and Warembourg open spaces. Timing: Ongoing to near-term.
Mowing along exterior trails to create a fuel break.	3	Warembourg open space 1.3 miles The city currently mows 12-foot fuel breaks along 1.2 miles of the perimeter of Warembourg open space.			Fuels Mitigation- Grasslands	Grasslands-mowing	N/A	Mow to create fuel breaks that are a total of 12 to 15 feet wide along exterior trails (width includes trails). If trails are not present within 30 to 100 feet of homes, mow 12 to 15 feet off the fence line in addition to the trail. Timing: Ongoing to near-term.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Mowing around property perimeter to create a fuel break.	3	Tyler Canyon	0.7 mile	City of Louisville Parks	Fuels Mitigation-Grasslands	Grasslands-mowing		Mow 12 to 15 feet off fence line adjacent to homes and 30 feet along property line adjacent to HOA-maintained lawns. Coordinate with HOAs to expand perimeter mowing along fence lines adjacent to green belts. Timing: Near-term.
Woody vegetation management to reduce the potential for passive crown fire and ember production.	3	Tyler Canyon Trees and shrubs scattered across the property		City of Louisville Forestry	Fuels Mitigation-Forests	Forest thinning-mechanical/manual		Remove junipers within 100 feet of fence lines. Remove dead trees that do not serve as habitat trees, and prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Ongoing to mid-term.
Woody vegetation management to reduce potential for passive crown fire and ember production.	2	Louisville Recreation Center Campus and Arboretum Trees within the 3-acre Arboretum		City of Louisville Forestry	Fuels Mitigation-Forests	Forest thinning-mechanical/manual		Remove dead trees and prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Ongoing.
Mowing around property perimeter to create a fuel break.	2	Louisville Recreation Center Campus and Arboretum	0.5 mile	City of Louisville Parks	Fuels Mitigation-Grasslands	Grasslands-mowing		Mow 12 to 15 feet along the south and eastern perimeters of the property to create opportunities for firefighters to protect structures during wildfires. Mow to no more than 6 inches in height. Timing: Ongoing.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Landowners Involved	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Promote short-statured, low flammability plant material to create a fuel break.	2	Louisville Recreation Center Campus and Arboretum Within the 3-acre Arboretum		City of Louisville Parks	Fuels Mitigation-Grasslands	Grasslands-mowing		Remove lawn and replace with short-statured, low flammability plants to create a fuel break, increase biodiversity, and then eliminate the need to mow around the Arboretum. Timing: Ongoing.
Mowing along trails and around the Arboretum to create a fuel break.	3	Louisville Recreation Center Campus and Arboretum	0.8 mile	City of Louisville Parks	Fuels Mitigation-Grasslands	Grasslands-mowing		Mow 10 feet along either side of trails along the perimeter of the property and surrounding the Arboretum. Mow to no greater than 6 inches in height. Timing: Ongoing.
Mulch removal around trees and spot watering.	3	Louisville Recreation Center Campus and Arboretum Trees within the 3-acre arboretum		City of Louisville Forestry	Fuels Mitigation-Forests	Forest thinning-mechanical/manual		Remove leaves, pine needles, and debris from around the base of trees in the arboretum. Manage water for trees and grasslands to maintain high foliar moisture content.
Structure hardening of gazebo and restroom.	3	Louisville Recreation Center Campus and Arboretum	N/A	City of Louisville Parks	Planning	Defensible space		Re-treat exposed wood and fill in large cracks to reduce their ignitability. Timing: Long-term.
Woody vegetation management in riparian area to reduce potential for high flame lengths, passive crown fire, and ember production.	3	Louisville Recreation Center Campus and Arboretum Small riparian corridor north of the arboretum	1	City of Louisville Forestry	Fuels Mitigation-Forests	Forest thinning-mechanical/manual		Remove dead willow stems. Prune tree branches hanging 6 to 10 feet above the ground or a third of the total height of the tree. Timing: Mid-term.

THE WATERSHED CENTER

Table J.11. The Watershed Center Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Collaborative Grasslands Management Map	7	County-wide	N/A	N/A	Planning	N/A	Boulder County Fireshed Grasslands Working Group	Action item - Map will be incorporated into Grasslands Story Map in Spring 2024. As of February 2024, draft map has been developed, and we are waiting on several entities to share data to be incorporated.
List of prioritized grasslands management research questions	3	County-wide	N/A	N/A	Planning	N/A	Boulder County Fireshed Grasslands Working Group	Action item - In February 2024, survey will be distributed to land management/science partners to learn what specific knowledge gaps exist that prevent more effective grassland management. Deliverable will be a prioritized (based on currently available data, easy to collect data, partner buy in, etc.) list of research questions. Future goal will be to experimentally answer these research questions using local data.
Grasslands Story Map	10	County-wide	N/A	N/A	Outreach and Education	N/A	Boulder County Fireshed Grasslands Working Group	Action item - Keep Grasslands Story Map updated with topics as supported by Grasslands Working Group for outreach purposes. Story Map is currently public as of Spring 2023.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Raymond-Riverside Wildfire Mitigation Project	2	Raymond	80	5	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	Implementation scheduled for 2025.
Meeker Park Wildfire Mitigation Project	1	Meeker Park	40 (in phase 1, 100+ in later phases)	7	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	Implementation scheduled for 2024
Ski Rd Wildfire Mitigation Project	2	Allenspark	20	15	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	N/A	Project still in initial phases
Conifer Hill Wildfire Mitigation Project	2	Conifer Hill	200+	30	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	CSFS, Boulder County, BVLCD, Wildfire Partners	Project still in initial phases
Cabin Creek + Big Owl Mitigation Project	2	Tahosa Valley	200+	50	Fuels Mitigation- Forests	Forest thinning- mechanical	BVLCD	Project still in initial phases
St. Vrain Forest Health Partnership	1	St. Vrain Watershed	N/A	N/A	Outreach and Education, Planning, Capacity Building	N/A	St. Vrain Forest Health Partnership participants (100+ stakeholders), coordinated by The Watershed Center	https://watershed.center/rest-ore-forests/
Expand stakeholder input and community engagement in wildfire risk mitigation via surveys and parcel assessments.	1	St. Vrain Watershed	N/A	N/A	Outreach and Education, Planning	N/A	The Wildfire Research Center	N/A
Provide guidance and education to landowners throughout the watershed regarding best practices for forest management and wildfire mitigation.	1	St. Vrain Watershed	N/A	N/A	Outreach and Education, Planning	N/A	St. Vrain Forest Health Partnership participants (100+ stakeholders), coordinated by The Watershed Center	N/A

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Share information about projects across Boulder County in newsletters and on the St Vrain Forest Health Partnership Story Map.	1	St. Vrain Watershed	N/A	N/A	Outreach and Education, Planning	N/A	St. Vrain Forest Health Partnership participants (100+ stakeholders), coordinated by The Watershed Center	N/A
Develop and implement opportunities for broad public engagement.	1	St. Vrain Watershed	N/A	N/A	Outreach and Education, Planning	N/A	St. Vrain Forest Health Partnership participants (100+ stakeholders), coordinated by The Watershed Center	Develop and implement opportunities for broad public engagement.

Note: BVLCD = Boulder Valley Longmont Conservation District

BOULDER WATERSHED COLLECTIVE

Table J.12. Boulder Watershed Collective Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Middle Boulder Creek Watershed Wildfire Risk Reduction	5	Nederland area, portions of Magnolia, Sugarloaf, Fourmile/Gold Hill.	2,800	500	Planning	Forest thinning-mechanical/manual	Boulder County, City of Boulder, USFS, Fire Protection Districts, CSFS, and the Boulder Valley and Longmont Conservation District	Leverage completed USFS and Boulder County treatments to protect water resources and WUI communities.
South Boulder Creek Watershed Wildfire Risk Reduction	4	Portions of Magnolia, Coal Creek Canyon, Flagstaff, Eldorado Canyon.	4,000	300	Fuels Mitigation-Forests	Forest thinning-mechanical/manual	Boulder County, City of Boulder, USFS, Fire Protection Districts, CSFS, Jefferson Conservation District, and the Boulder Valley and Longmont Conservation District	Leverage completed USFS and Boulder County treatments to protect water resources.

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
North Boulder Creek Watershed Creek Wildfire Risk Reduction	6	Northwest of Nederland	2,000	100	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	Boulder County, City of Boulder, USFS, Fire Protection Districts, CSFS, and the Boulder Valley and Longmont Conservation District	Protect water resources, critical habitat and WUI communities.
Community Engagement	1	Boulder Creek Watershed	N/A	N/A	Outreach and Education	N/A	Boulder County, City of Boulder, USFS, Fire Protection Districts, CSFS, and the Boulder Valley and Longmont Conservation District	Work with partners to expand engagement opportunities which meet public and agency needs and facilitate fuels reduction and fire adapted communities.
Capacity Building	3	Boulder Creek Watershed	N/A	N/A	Capacity Building	N/A	Boulder County, City of Boulder, USFS, Fire Protection Districts, CSFS, non-profits, and local municipalities, and the Boulder Valley and Longmont Conservation District.	Retaining and building BWC staff capacity, as well as building capacity within partner agencies to achieve shared goals.
Building Fire Adapted Communities	2	WUI communities in the forest and grassland areas	N/A	N/A	Outreach and Education	N/A	Boulder County, City of Boulder, USFS, Fire Protection Districts, CSFS, non-profits, and local municipalities, and the Boulder Valley and Longmont Conservation	Use a holistic approach for multi-faceted community wildfire resilience.

Note: BWC = Boulder Watershed Collective

BOULDER MOUNTAIN FIRE PROTECTION DISTRICT

Table J.13. Boulder Mountain Fire Protection District Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Anne White Fuel Break	N/A	West of Pinebrook	10	8	Fuels Mitigation- Forests	Forest thinning-manual	Pine Brook Hills HOA	N/A
Bristlecone Fuel Break	N/A	Southwest of Pinebrook	12	6	Fuels Mitigation- Forests	Forest thinning-manual	Pine Brook Hills HOA	N/A
Wildhorse Fuel Break	N/A	West of Pinebrook	30	3	Fuels Mitigation- Forests	Forest thinning-manual	Pine Brook Hills HOA	N/A
Carriage Hills Community Fuel Breaks	N/A	Along road network in Carriage Hills	50	30	Fuels Mitigation- Forests	Forest thinning-manual	Carriage Hills HOA	N/A
West Coach Fuel Break	N/A	West of Carriage Hills	30	3	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A
Sunrise Fuel Break	N/A	West of Carriage Hills	10	2	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A
East Ridge Fuel Break	N/A	East of Boulder Heights	40	20	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A
Boulder Heights Community Fuel Breaks	N/A	North of Boulder Heights	50	20	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A
Silver Cloud Fuel Break	N/A	West of Boulder Heights	30	3	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A
Reed Ranch Community Fuel Breaks	N/A	Along road network in Reed Ranch	35	15	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A
Rembrandt Community Fuel Breaks	N/A	Along road network in Buckingham Hills	30	12	Fuels Mitigation- Forests	Forest thinning-manual	Private owners	N/A

BOULDER RURAL FIRE PROTECTION DISTRICT

Table J.14. Boulder Rural Fire Protection District Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Poorman Road Treatment	1	Along Poorman Rd west of Lenards Rd to Sunshine Canyon Dr.	15.2	4	Fuels Mitigation-Forests	Shaded fuel break	N/A	N/A
Model T Road Evacuation Route	1	Model T Road	9.3	6	Fuels Mitigation-Forests	Shaded fuel break	Sunshine FPD	To provide an escape route for residents and access for emergency vehicles.
Upper Sunshine Canyon Dr Treatment	1	Beginning at the water pump house and extends to the fire district border with Sunshine FPD.	12.5	16	Fuels Mitigation-Forests	Defensible space	N/A	N/A
Eagles Drive Treatment	1	Beginning at the intersection of Sunshine Canyon Drive and Eagles Drive. It utilizes the west asphalt driveway (14 Eagles Drive) extending south. After approximately 2,000 feet, a two-track road further extends this access road treatment.	23.7	8	Fuels Mitigation-Forests	Shaded fuel break	Four Mile FPD	N/A

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Leonards Rd (west side) / Model T Road Treatment	2	Starts at Poorman Rd and extends along the western edge of Leonards Rd up to Model T Rd.	11.1	8	Fuels Mitigation- Forests	Shaded fuel break	N/A	N/A
Leonards Rd (east side) Treatment	2	Between Leonards Rd and the homes above.	5.3	4	Fuels Mitigation- Forests	Defensible space	N/A	N/A
Seven Hill Drive Anemone Dr Treatment	2	Connect the Eagles Drive Treatment project with Sunshine Canyon Drive within the Seven Hills subdivision.	23.3	14	Fuels Mitigation- Forests	Shaded fuel break	N/A	N/A
Timber Trail Fuel break	4	West end of Timber Trail uphill to Anemone Drive.	2.4	3	Fuels Mitigation- Forests	Forest thinning-manual	N/A	N/A
Lower Sunshine Canyon Drive Treatment	4	Start at the water pump house and extend down Sunshine Canyon Drive to the border of the fire district with the City of Boulder.	30.2	38	Fuels Mitigation- Forests	Shaded fuel break	N/A	N/A
Sunshine Property Treatment	7	40.033903, -105.315947	8	1	Fuels Mitigation- Forests	Forest thinning-manual	Boulder Mountain FPD	Will also be used for outreach and education.
Lake Valley Community Treatment	8	South and west sides of the Lake Valley Community.	10	4	Fuels Mitigation- Grasslands	Defensible space	City of Boulder Parks and Open Space and Lefthand FPD	N/A

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Heatherwood Community Treatment	9	South and west sides of the Heatherwood community in Gunbarrel.	15	3	Fuels Mitigation- Grasslands	Defensible space	City of Boulder Parks and Open Space	N/A

MOUNTAIN VIEW FIRE RESCUE

Table J.15. Mountain View Fire Rescue Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
2101 Bison Dr.	1	2101 Bison Dr.	35	1	Fuels Mitigation- Forests	Pile burning	CSFS, Boulder County Fire Marshal	780 piles created by the CSFS, no initial clear direction for disposal, Mountain View Fire Rescue has been tasked with burning them due to private property and right of entry issues for state and local governments.
Flagstaff Community	3	Flagstaff Community	20	4	Fuels Mitigation- Forests	Pile burning	N/A	30 piles among four residents needing burned.
Niwot Sanitation	4	7359 North 95th	10	1	Fuels Mitigation- Grasslands	Prescribed burning	N/A	Burn to alleviate invasive weeds.
Flagstaff & Eldorado Springs Communities	2	Flagstaff & Eldorado Springs Communities	500	400	Outreach and Education	Defensible space	Wildfire Partners	Chipping and other resource availability for residents to minimize hazard fuels.

LEFTHAND FIRE PROTECTION DISTRICT

Table J.16. Lefthand Fire Protection District Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Cal-Wood fire recovery	1	N Foothills ranch	6	8	Fuels Mitigation- Forests	Forest thinning-manual	Lefthand FPD and homeowners	N/A
Sawtooth Springs	1	Overland road/Peak 2 Peak	18	1	Fuels Mitigation- Forests	Forest thinning-manual	CSFS	N/A
Upper St. Vrain	1	Overland road/Peak 2 Peak	140	4	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	CSFS and Boulder County	Forest Restoration & Wildfire Risk Mitigation/Strategic Fuels Mitigation Grant application
Nugget Hill re-entry	3	Nugget Hill/Lefthand Canyon	20	14	Fuels Mitigation- Forests	Forest thinning-manual	Lefthand FPD and homeowners	N/A
Defensible space	2	Lefthand FPD	60	50	Fuels Mitigation- Forests	Forest thinning-manual	Lefthand FPD and Wildfire Partners	N/A
Matheunes re-entry	3	Ceran St Vrain area	30	15	Fuels Mitigation- Forests	Forest thinning-manual	Lefthand FPD, CSFS USFS, and homeowners	N/A
Bar-K Southern	4	Upper Overland	60	12	Fuels Mitigation- Forests	Forest thinning-mechanical/manual	Lefthand FPD, CSFS USFS, and homeowners	N/A
Crestview	3	Middle Fork/Hwy 36	60	100	Fuels Mitigation- Forests	Forest thinning-manual	TBD	N/A
Olde Stage Rd	4	Lower foothills	60	40	Fuels Mitigation- Forests	Forest thinning-manual	TBD	N/A
Lake of the Pines	4	Lower foothills	80	80	Fuels Mitigation- Forests	Forest thinning-manual	TBD	N/A

SUGARLOAF FIRE PROTECTION DISTRICT

Table J.17. Sugarloaf Fire Protection District Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Arkansas mountain	1	Sugarloaf/ Mountain Meadows	120	15 to 20	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	Fourmile fire, Boulder watershed and homeowners	N/A
Millionaire escape route	3	And Dove Millionaire West Road	5	20	Fuels Mitigation- Forests	Forest thinning-manual	USFS and homeowners	N/A
Tree thinning on Road Sugarloaf, Narrows 2-mile to black tiger scar.	2	Around 2-mile marker to Black tiger	15	300	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	Boulder County, homeowners, and USFS	N/A
Tree thinning on road on Sugarloaf Road	2	Around mile marker seven until station three	100	100	Fuels Mitigation- Forests	Forest thinning-mech/hand	Boulder County, homeowners, and USFS	N/A
Kelly	5	Tall timbers	50	100	Fuels Mitigation- Forests	Forest thinning-mech	Homeowners	N/A
280 Mountain Pines draw	7	280 Mountain Meadows	3 to 5	150	Fuels Mitigation- Forests	Forest thinning-hand	Homeowners	N/A
Canyon view	7	North of Tall Timbers, down to Boulder Canyon	50	200	Fuels Mitigation- Forests	Forest thinning-mech/hand	USFS and homeowners	N/A
Arkansas mountain	1	Sugarloaf/ Mountain Meadows	120	15 to20	Fuels Mitigation- Forests	Forest thinning-mech/hand	Fourmile fire, Boulder watershed, and homeowners	N/A
Millionaire escape route	3	And Dove Millionaire West Road	5	20	Fuels Mitigation- Forests	Forest thinning-hand	USFS, homeowners	N/A

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Tree thinning on Road Sugarloaf, Narrows 2-mile to black tiger scar.	2	Around 2-mile marker to Black Tiger	15	300	Fuels Mitigation-Forests	Forest thinning-mech/hand	Boulder County, homeowners, and USFS	N/A

TIMBERLINE FIRE PROTECTION DISTRICT

Table J.18. Timberline Fire Protection District Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Porter Ranch	1	North Magnolia	140	35	Fuels Mitigation-Forests	Forest thinning-manual	Boulder Watershed Collective	Also completing egress work on main road.
Pincliffe Association	2	Pincliffe	160	40	Fuels Mitigation-Forests	Defensible space	Boulder Watershed Collective	Also completing egress work on main road.

NEDERLAND FIRE PROTECTION DISTRICT

Table J.19. Nederland Fire Local Projects and Action Priorities

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Tucker	2	West of Town	400	1	Fuels Mitigation-Forests	Pile burning and forest thinning-manual	Boulder County Parks & Open Space (BCPOS)	Tucker

Project Name	Priority 1- High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Mary Wingate	3	South of Town	15	1	Planning, Fuels Mitigation-Forests	Forest thinning- mechanical/manual and shaded fuel break	Town of Nederland	Mary Wingate
East Big Springs	1	Eastern edge of Big Springs	75	2	Fuels Mitigation- Forests, Planning	Forest thinning- mechanical/manual and shaded fuel break	USFS and Boulder County Parks & Open Space	East Big Springs
Town Shops	10	Between Switzerland Trail & Ridge Rd	<5	1	Fuels Mitigation- Forests	Forest thinning- mechanical/manual and defensible space	Town of Nederland	Town Shops
Hurricane Hill	8	USFS and BOCO land along ridge/hurricane hill	20	2	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	BCPOS, USFS	Hurricane Hill
Marysville/ Bryan	4	County and USFS land west of Marysville, South of Eldora	75	2	Fuels Mitigation- Forests	Shaded fuel break and pile burning	BCPOS, USFS	Marysville/Bryan
Haul Rd	9	Eastern portion of Haul Rd	5	2	Fuels Mitigation- Forests	Shaded fuel break and pile burning	USFS, Private	Haul Rd
St Anton Egress	4	Summer Rd area	10	3	Fuels Mitigation- Forests	Forest thinning- mechanical/manual	BCPOS, Private	St Anton Egress
Fourth of July	6	Southern portion of Fourth of July Rd, near Hessie Trailhead	20	3	Planning	Shaded fuel break	USFS, Private	Fourth of July
Blue Spruce/ McCaslin- Peppers	5	County open space land south of Blue Spruce	10	1	Fuels Mitigation- Forests	Shaded fuel break and pile burning	BCPOS	Blue Spruce/McCaslin- Peppers
North Boulder Creek	5	USFS land northwest of Ridge Rd	150	1	Fuels Mitigation- Forests	Forest thinning- mechanical/manual and pile burning	USFS	North Boulder Creek

LOUISVILLE FIRE PROTECTION DISTRICT

Table J.20. Louisville Fire Protection District Local Projects and Action Priorities

Project Name	Priority 1 - High 10 - Low	General Location	Approx. Acres (acres unless noted otherwise)	Approx. Number of Landowners	General Goals of the Project	Proposed Treatment(s)	Partners	Notes
Community Mitigation Programs	1	City of Louisville	25 square miles	N/A	Outreach and Education	N/A	Boulder County Wildfire Partners Community Mitigation Program, City of Louisville, and other local municipal partners	<p>The Louisville FPD and the City of Louisville will coordinate and partner with Boulder County's Wildfire Partners Outreach and Education program.</p> <p>Louisville FPD will also coordinate and partner with other local FPD outreach and education programs to reach residents, communities, and HOAs.</p> <p>Louisville FPD will coordinate planning efforts to engage Louisville communities to participate and implement Boulder County's community mitigation program.</p> <p>Communicate outreach and education events via social media, Louisville FPD website, newsletters, and other means.</p>
Community Mitigation Programs	8	Western and North portion of the City	50	1000	Fuels Mitigation-Grasslands	Mowing, grazing, prescribed burns	City of Louisville, Boulder County Wildfire Partners	Property inspections
Private Property Mitigation	8	City of Louisville	25 square miles	N/A	Planning	N/A	City of Louisville	Home Hardening amendments to building Codes
Open Space mitigation	6	Western and North portion of the City	50	1000	Fuels Mitigation-Grasslands	Defensible Space	City of Louisville, Boulder County	Identify firebreaks, mitigation with ditch companies

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