Chaffee County Community Wildfire Protection Plan

ENVISION CHAFFEE CO.

A FUTURE BUILT ON COMMON GROUND

CHAFFEE COUNTY WILDFIRE PROTECTION PLAN
LEADERS AND FUNDERS

CENTRAL COLORADO CONSERVANCY
Protecting the Lands and Waters that Sustain Us

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This document is intended to set forth a recommended plan only and imposes no obligations on the signatories. Specifically, executing this document in no way obligates Chaffee County to take any action requiring the commitment of funds in order to accomplish the Summary Recommendations.

Notwithstanding any other provision of the CWPP to the contrary, no term or condition of the CWPP shall be construed or interpreted as a waiver, express or implied, of any of the immunities, right, benefits, protection, or other provisions of the Colorado Governmental Immunity Act§ 24-20-101, et seq., C.R.S. (including future amendments) or as an acceptance by Chaffee County or any responsibility or liability with respect to the CWPP.

The Chaffee County CWPP has been developed by and agreed to by the following entities:

_____ 2-4/2020
Greg Felt, Chair **Date**
Chaffee County Board of Commissioners

_____ 2/4/2020
Adam Moore, Supervisory Forester **Date**
Colorado State Forest Service

_____ 2/4/2020
Dixon Villers, Chief **Date**
Buena Vista Fire Department

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Doug Bess, Chief **Date**
Salida Fire Department and South Arkansas Fire Protection District

_____ 2/4/2020
Robert Bertram, Chief **Date**
Chaffee County Fire Protection District

The Chaffee County CWPP has been developed by the following community leaders, who unanimously support the resulting treatment priority areas:

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Colorado Springs Utilities
Forest Program Manager — Eric P. Howell — 1-8-2020
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Chaffee County Next Generation Community Wildfire Protection Plan

Table of Contents

Report compiled and edited by Envision Chaffee County and Central Colorado Conservancy (C. Williams, K. Marquis, T. Flanagan, Z. Tucker) with generous input and guidance from the Envision Forest Health Council.

Chaffee County Next Generation Community Wildfire Protection Plan
Section I: Executive Summary

A. Overview

Chaffee County typifies the new reality of wildfire in the West. Decades of fire suppression and ensuing insect infestations have caused our forests to decline into very poor health. Forests are overly dense with high fuel loads. These unhealthy forests are further impacted by multiple insect epidemics, including a beetle epidemic resulting in 80 to 90% mortality of spruce trees countywide. The United States Forest Service (USFS) estimates that an average of five standing dead trees per acre across Chaffee County in 2017 will increase to about 120 per acre by 2020. 70% of the Upper Arkansas River Watershed is forested and designated under the 2014 Farm Bill, Section 602, as experiencing insect and disease epidemics.

Poor forest health is evidenced by more intense wildfire incidents that are happening more frequently. Ten years ago, the Upper Arkansas River headwaters region had experienced only one Type 3 wildfire—ever. In the decade since, there have been two more Type 3's (Treasure Fire 2012 and Lodgepole Fire 2016), our first Type 2 (Hayden Pass Fire 2016), and our first two Type 1's (Weston Pass Fire 2018 and Decker Fire 2019). The risk is a top community concern. Accelerated fuel treatments are needed to manage the increasing risk wildfire poses to the community.

Further, our research shows that the community is not prepared for a wildfire emergency. Many residents are lacking a complete evacuation plan, and roughly half of homeowners say they are unsure what to do to decrease risk on their property, or even where to go for information.

The Chaffee County community, including over 1,500 citizens and a Community Wildfire Protection Plan (CWPP) Leaders Team (including 36 leaders from 17 agencies, local government bodies, fire protection districts, water providers and nonprofit organizations) worked together to develop the Next Generation Community Wildfire Protection Plan. Over 16 months, community input was integrated with the most current data and iterative geospatial modeling of wildfire risk and treatment priorities, combined with assessment of community preparedness. Top priority needs were identified and a community action plan was developed to address those needs.

Community engagement included two survey tools with 1,240 total respondents (Chaffee County Wildfire Survey, Appendix A), three public meetings with more than 200 participants, engagement with local media, monthly email-news updates and a community summary report that makes outcomes and next steps transparent and accessible (see the Next Generation Community Wildfire Protection Plan Community Summary, Appendix B). Community engagement is described in Section II.

CWPP Leaders and technical experts from the Colorado Forest Restoration Institute (CFRI) at Colorado State University engaged to assess wildfire risk to six assets (or

"values at risk") prioritized by the community in order as follows: Firefighter and human life, drinking water supply, critical community infrastructure, homes (WUI), wildlife/habitat, and recreation assets important to the local economy. The team then prioritized treatments to most cost-effectively decrease risk to those assets. This was done with iterative modeling and input from the CWPP Leaders Team and from the broader community, as described in Section III and detailed in Appendices C (Wildfire Risk Assessment) and D (Treatment Prioritization). Data development involved collation of map layers, representing best available information on community assets at risk and fire behavior models. Deep community research on forest health and lessons learned from other communities provided additional information and ideas.

The outcome was a Treatment Priority Map unanimously approved by the CWPP Leaders Team with a **big** takeaway:

> **Treating 5 to 10% of the Chaffee County landscape may reduce the risk that severe wildfire poses to community assets by 50 to 70%.**

Said another way, best available models indicate 50% of the risk wildfire poses to community assets can be addressed with $50 million of treatment investment. The next $50 million can provide an additional 20% risk reduction. After that point, however, return rapidly diminishes. Reducing the remaining 30% of risk would cost an estimated $500 million. Clearly, limited available dollars must be focused where they can have the most "bang for the buck."

In addition to wildfire risk assessment and fuel treatment priorities, the CWPP Leaders Team assessed community wildfire preparedness. Community preparedness for a major wildfire event is a concern, including citizen evacuation planning and home preparedness (including lack of a sense of urgency to create defensible space and a lack of understanding of where to get information about necessary action).

However, community plans related to fire resilience are improving and the preparedness of local emergency management agencies is solid. This information is provided in Section IV. Appendix E provides a summary of all WUI communities.

Based on the above data, the CWPP Leaders Team is committed to action in this Next Generation CWPP. Action focused on the goals and objectives is outlined below and detailed in Section V. These goals build upon existing treatments and successes from the 2009 CWPP.

The outcome of the Chaffee County Next Generation CWPP process is profound and proposes substantial change to the way forest management is done in Chaffee County. The plan is to reduce the overall risk to the community's assets by nearly 50% in ten years by accelerating treatment on the right acres—as unanimously supported by the CWPP Leaders Team. This will take real change. Increased collaboration is required by priority areas that span jurisdictions, including 65% federal, 30% private and 5% state lands. Accelerated action requires additional funding and staff

resources. Agency leaders may have to manage the challenge of staff incentives currently focused on targets for acres treated vs. treating the right acres, and on treating a target number of acres vs. accelerating treatment to achieve a specific goal.

However, in Chaffee County, land management agencies and their community partners have the opportunity to take a big, new, collaborative and disciplined approach. Using this plan as a guide, we can achieve substantial progress toward a fire-ready future—together.

For questions on the plan or for additional information on community research and engagement, contact kim@envisionchaffeecounty.org.

B. CWPP Goals and Objectives

A summary of the Next Generation CWPP goals and objectives is as follows:

Goal 1, Fire-Resilient Forests and Productive Habitat

Accelerate multi-jurisdictional treatment and stewardship activity in Treatment Priority Areas to decrease the risk wildfire poses to community values at risk while also (as practicable) enhancing watershed health, habitat and agricultural productivity. The goals have two measurable objectives:

Objectives:

Goal 1, Objective A: Treating Together

Treat up to 30,000 acres by 2030 across jurisdictions, cutting the risk wildfire poses to community assets in half by focusing on the Treatment Priority Areas developed and agreed in this CWPP. Near-term milestones for this key objective are:

- **Treat 10,000 to 15,000 acres by the end of 2025,** including all treatment types/areas and subject to funding and conditions.

- Complete **Early Win projects by treating 1,500 priority acres in 2020/2021**, including 100 acres on private lands and 1,400 acres on public lands, including all treatment types and locations.

- **By the end of 2020, develop a pipeline with 4,000 acres of existing and new cross-jurisdictional projects** in priority areas, with about 80% public and 20% private land activities.

In the short term, execution of currently planned treatment projects may continue, but over two to five years, all organizations will shift treatment planning and execution focus to address the Treatment Priority Areas in this CWPP. On-the-ground conditions, landowner willingness, continuity with fire breaks and pre-existing treatments and other factors may, in some cases, render treatment inside the zones impossible and treatment outside the zones prudent. This will be at the discretion of local experts, with a bias toward delivering risk reduction in the Treatment Priority Areas.

Goal 1, Objective B: Envision Forest Health Council
Immediately develop the Envision Forest Health Council as a continuation and expansion of the CWPP Leaders Team. The Council will include leaders from 18 key organizations (as defined in Section V and modified over time as appropriate). The Council will work in partnership to deliver the Next Generation CWPP goals and objectives. Funding to facilitate the Envision Forest Health Council and to support new CWPP programs is in place through a three-year $258,000 grant to the Colorado State Forest Service (CSFS) and Envision Chaffee County from Chaffee Common Ground.

Goal 2, Fire-Adapted Communities
Build community engagement, understanding, preparedness, public support and realistic expectations for forest and fire management. This includes personal preparedness (such as evacuation plans), citizen action to decrease the risk wildfire poses to private lands and structures, and continuing to build upon strong local support for accelerated treatment—or "social license to treat." This goal has two measurable objectives:

Goal 2, Objective A: Chaffee Chips
Develop and implement Chaffee Chips, a county-wide program that empowers the community to act to create defensible space. The program is in development, and may include chipping, cutting, and trailers to haul slash.

Goal 2, Objective B: Collaborative Communications
Develop and implement **Envision Healthy Landscapes**, a program that will deliver coordinated communications that educate the public, increase awareness, maintain and improve support for forest treatments, encourage action and celebrate success. Three-year measures for the objective are:

Goal 3, Safe and Effective Wildfire Response
Enable safe and effective wildfire response, including collaborative preparedness for severe wildfires and evacuation events. The goal has one measurable objective:

Goal 3, Objective A: Zoning and Code
Update the regulatory environment with zoning and code updates that support fire resilience.

Goal 4, Effective Post-Fire Recovery
Develop proactive planning and projects for post-fire recovery, flood, and sediment management. The goal has one measurable objective:

Goal 4, Objective A:
Learn from and build upon lessons learned from the Decker Fire recovery to identify and prioritize appropriate pro-active county-wide projects.

Goal 5, Strategic Funding for Healthy Forests

Develop collaborative funding to deliver on the goals and objectives outlined above. The goal has two measurable objectives:

Goal 5, objective A:
Develop a roughly estimated $45-50 million over 10 years to support programs in goals 1 to 4 above. This estimate assumes a CFRI-calculated $1,500 per acre average treatment cost plus additional funds for additional human resources required to identify, develop and manage programs and projects.

Goal 5, Objective B:
Leverage Chaffee Common Ground forest health funds to support strategic investments in forest health, including $275,000 to $750,000/annum per the ballot measure allocations.

The Next Generation CWPP goals, objectives, measurable results and action plan are detailed in Section V.

C. Background—The Community Wildfire Protection Plan Framework

The Next Generation Community Wildfire Protection Plan builds on changes in federal wildfire policy that increased the participation and influence of local communities in addressing wildfires in the West. An important part of that effort is creation of a community wildfire protection plan (CWPP).

CWPPs and the process by which they are created are intended to:

- increase collaboration and cooperation between the community and federal, state, and local land management and wildfire agencies;
- help those agencies and interests identify high-priority treatment areas as well as the human and natural values and assets particularly at risk;
- identify projects designed to reduce wildfire risks in high priority areas;
- encourage local and regional interests to discuss the benefits and costs of various management options and implications for the community, forest, and watershed;
- create a comprehensive and long-lasting decision-making process; and
- identify the plans and resources needed to implement wildfire-related projects in the short and long term.

At a *minimum*, CWPPs are required to address the following criteria:

- collaboration among local government officials, fire agencies, and the state forestry agency while also working with interested parties and the appropriate federal land management agencies;
- prioritize fuel reduction by identifying areas for hazardous fuel reduction in at-risk communities and essential infrastructure, including types and methods of treatment on public and private lands; and
- reduce structural ignitability throughout at-risk communities.

The resulting plan must be approved by the applicable local government, local fire department(s), and the state agency responsible for forest management, i.e. the Colorado State Forest Service (HFRA 2003).[1] In addition to identification of wildfire-related priorities and projects, creation of the CWPP improves access to federal, state, and private funds for wildfire planning and project implementation.

D. Background—Building on 2009 CWPP Results

The first CWPP in Chaffee County was completed in 2009, with leadership from the Colorado State Forest Service (CSFS), and remains the base plan for this substantial update. Citizens and leaders in the Forest Health and Fire Protection Community in Chaffee County decided to take the 2009 plan to the next level, creating a Next Generation Community Wildfire Protection Plan. The Plan builds on the 2009 CWPP foundation, adding deep community engagement and momentum, latest data and new partners with current technology.

The 2009 Chaffee County Community Wildfire Protection Plan was a solid first step in building fire resilience, with the following goals, objectives and results to-date:

Goal 1: Collaborative Engagement

Create a "living" flexible document that incorporates a multi-agency approach.

Objectives and Results

1. Review the CWPP every two years and make changes as needed. Result: The plan was revisited annually to focus home assessment and education programs. The plan was revised in 2014 and in this 2020 revision.
2. Evaluate the identified priority list of WUI communities at a minimum of every five years, to ensure currency. Result: This list has not been updated.
3. Conduct quarterly meetings to monitor changing circumstances and review progress. Result: This happened on an annual basis within CSFS.

Goal 2: Public Safety and Awareness

Promote and develop materials and programs in prevention and education that improve community wildfire awareness and safety.

Objectives and results

1. Develop an initial assessment of subdivision risk to catastrophic wildfire and preparedness for wildfire and provide to the community. Result: Completed. The 2007-2008 assessments are still being used and an update should be considered, considering that 135 subdivisions filings have been added in the county since 2007, although just 12 include over ten lots (Appendix E).
2. Create a link to the Chaffee County website providing public access to progress and information for developing local community wildfire protection plans. Result: Complete.
3. Distribute copies of the CWPP to libraries and fire stations. Result: Complete.

[1] See also, 30-15-401.7 and 23-31-312 (3), Colorado Revised Statutes.

4. Promote the involvement of communities and or landowners to become a part of the Chaffee County CWPP by attending association meetings as requested. Result: CSFS attended 75% of community and HOA meetings as requested.
5. Provide information to individuals and homeowners associations for creating defensible space and reducing the susceptibility of structures to wildfire. Result: Information has been disseminated in many ways, but 2019 survey results indicate roughly half of the population remains unaware of where to find information.

Goal 3: Fuels Reduction

Facilitate appropriate hazardous fuel reduction by illustrating the areas of greatest wildfire hazard and developing the highest priorities for fuel abatement treatments.

Objectives and Results

1. Develop an initial county-wide assessment of wildfire hazard on both public and private lands. Results: Complete.
2. Provide a list of the three highest-priority areas within Chaffee County and focus treatment on these high-priority areas. Results: Community assessment was used to define priority areas. A Wildfire Risk Assessment program was developed and 3,000 assessments completed. An average of 50 fire mitigation site visits were completed per year, although resultant treatment action was not tracked. 79 projects were completed since 2013, leveraging the Title 3 cost share program.
3. Hold three to five public meetings per year to gather input from the stakeholders that are in the high-priority areas. Result: Complete, but a current community contact list is not available and is an action priority.
4. Re-evaluate those priorities at least every five years. Result: Not accomplished.
5. Provide support, through the coalition, to create cooperative efforts across jurisdictional or ownership boundaries on an ongoing basis as requested. Result: Cross-jurisdictional projects remain an opportunity area.

The Next Generation CWPP builds on this progress, adding new data and technology, community momentum, increasing collaboration and local funding.

Chaffee County Next Generation Community Wildfire Protection Plan
Section II: Community Engagement

A. Overview

Deep community engagement is at the root of this plan, and a key element that makes the plan unique is in its community support. The Next Generation Community Wildfire Protection Plan grew out of Envision Chaffee County, a community-led visioning, planning and implementation effort initiated in 2017 that engaged 1,500 citizens and more than 70 organizations. In the context of Envision, declining forest health and increasing risk of severe wildfires were identified as top community concerns. Among four vision statements, Envision Chaffee County adopted the following: “Our forests, waters, and wildlife are healthy and in balance with outdoor recreation.” Toward that end, the 2018 Envision Community Action Plan recommended developing a “next generation” community wildfire protection plan. A plan to help deliver the vision of healthy forests, waters and wildlife, and a plan that would build on the community engagement and momentum of Envision to create accelerated action.

Voters further endorsed action in November 2018 by approving new public funds to support healthy forests, build a fire-ready future and protect watersheds, wildlife habitat, agriculture, recreation areas and the local economy. The resulting Chaffee Common Ground fund will provide roughly $10 million over the next decade; including $2.5-5 million earmarked specifically for forest health treatment planning and action.

The Envision program and the ballot measure provided momentum the community and local leaders wanted to continue, with planning to focus on the most meaningful action. Forest health and fire leaders agreed that the best next step was to update the existing CWPP. Central Colorado Conservancy worked to establish funding for this effort, from the Colorado Department of Local Affairs and County of Chaffee, in August-September 2018. Work on the plan commenced in October 2018.

Between October 2018 and January 2020, eight working group meetings were held in Salida, CO, to develop this plan as an update to the prior CWPP. Top local and regional leaders from critical organizations provided over 1,500 hours – or 40 work weeks of planning time and expertise to develop the plan.

The leaders that gave their time and expertise to this work matter and so are listed here: United States Forest Service (USFS) - District Ranger Jim Pitts, Fire Management Officer Chris Naccarato and Mountain Zone Fuels Specialist Andrew White. Bureau of Land Management (BLM) - Rocky Mountain District Manager Cathy Cook, Field Manager Keith Berger, Fire Mitigation Specialist Ed Skerjanec, Fire Management Officer Ty Webb, and John Markalunas, Assistant Fire Management Officer for the Front Range Fire Management Unit. Colorado State Forest Service (CSFS) - Southwest Area Manager Damon Lange, Supervisory Forester Adam Moore, Supervisory Forester Sam Pankratz and Forester J.T. Shaver. Colorado Springs Utilities - Watershed

Planning Supervisor Mark Shea and Forest Program Manager Eric Howell. Chaffee County Commissioner Keith Baker. Chaffee County Office of Emergency Management Director Richard Atkins. Salida Fire Department and South Arkansas Fire Protection District Chief Doug Bess and Fire Inspector Kathy Rohrich. Chaffee County Fire Protection District Chief Robert Bertram and Battalion Chief Kent Maxwell (also Director of Colorado Firecamp). Buena Vista Fire Department Chief Dixon Villers. Colorado Parks and Wildlife (CPW) Area Wildlife Manager Jim Aragon. Arkansas Headwaters Recreation Area Manager Rob White. Arkansas River Watershed Collaborative Director Chelsey Nutter, Mitigation Specialist Andy Lerch, Mesa Antero Water Chair Rick Hum, Central Colorado Conservancy Executive Director Adam Beh.

Modeling and analysis was provided by experts at the Colorado Forest Restoration Institute at Colorado State University (Director Tony Cheng, Assistant Director Brett Wolk and Spatial Analyst Benjamin Gannon). The Rocky Mountain Research Station (Patty Champ and Hannah Brenker-Smith) provided invaluable support to community surveys.

Overall leadership and community facilitation was delivered by Envision Chaffee County; Co-led by Greg Felt (Chair, Chaffee Board of County Commissioners) and Cindy Williams (Board Chair, Central Colorado Conservancy). Central Colorado Conservancy provided facilitation, report preparation and community engagement (Cindy Williams, Kim Marquis, Kim Smoyer, Zach Tucker).

B. The Community Engagement Process

In addition to the CWPP Leaders Team engagement described above, multiple avenues were used for broader public engagement, including survey tools, public meetings, and ongoing outreach and information delivered through traditional and social media.

Figure I.1. Commissioner Greg Felt addresses the Poncha Springs wildfire meeting.

1. Chaffee Wildfire Survey

A comprehensive survey of community understanding and perceptions about forest health, fire resilience, treatment activities and preparedness for a major wildfire event was developed by Envision Chaffee County and the Rocky Mountain Research Station WiRe team. This survey is a transferable tool, available to other communities upon request. The online survey was administered during a three-week period during February and March 2019. A total of 1,035 people participated, 7% of county residents over 18 years

old. Major findings from the survey are described below, with the full Chaffee Wildfire Survey report provided in Appendix A.

Responses were representative of the county population, such as rural-urban residents and full- and part-time in the county, but respondents were older and wealthier compared to the county as a whole.

Regarding wildfire preparedness, the survey indicated that 80% of respondents thought that a major fire in the area was either “extremely” or “very” likely within the next five years. However, the data also indicates that nearly half of citizens were not prepared for such an event. For instance:

- 40% had no established evacuation plan;
- 40% had not signed up for the county’s reverse 911 emergency service;
- 44% were not confident they can get the wildfire information they need;
- 45% had no arrangements related to access to important documents and medications during an emergency;
- 62% had no arrangements related to children at home alone during an emergency; and
- 65% had no emergency procedures for pets or livestock.

The survey also indicated that county residents were not clear where to go for wildfire-related information. There was general awareness that local fire departments (24%) and the federal and state forest service (23%) are potential sources of information. However, when asked where they would go for information about decreasing wildfire risk to their home or property, the most common answer was some form of “I don’t know” (48%).

Survey responses indicated that private landowners have little sense of urgency to act to remove vegetation or to change the characteristics of their home to protect their residences from wildfire. Nearly 90% said they had already taken some action, and the majority felt that removing vegetation or changing the characteristics of their structure would have only a small to moderate impact on risk. However, the top factor that would encourage them to act was “information about what to do,” which is consistent with the lack of clarity about where to get such information noted above. This suggests an opportunity for education about why private lands treatment matters and what fully effective treatment entails, in order to develop increased urgency for action (assuming additional work on private lands is generally warranted). Once that sense of need is established, the data suggested that support to do the work and to remove cleared vegetation, combined with ongoing encouragement, would increase execution.

Regarding new private land development, the survey data appeared to indicate strong support for wildfire-related provisions in building codes.

Survey responses showed that citizens perceived forest health to be fair, while professionals considered it to be poor. The advancing beetle kill epidemic, high forest density and fuel loads related to decades of fire suppression, and increasing drought/climate change were perceived by citizens as top threats to forest health.

Responses also highlight very high concern about, and even animosity toward, growing recreation use by visitors to the county—cited as the second-highest threat to forest health, following insect infestations.

Regarding treatment activities on public lands, the survey indicated stronger than expected public support. A strong majority of residents (80-86%) supported land management activities to mitigate wildfire risks and about seven in ten thought these activities are beneficial to wildlife. The following percentages reflect the degree to which survey respondents found the following land management activities "acceptable": Tree, brush removal—86%, burn piles—80%, controlled burns—82%, and allow natural fire to burn—50%.

For those expressing concerns about treatments, the top issues were: 1) lack of trust in public agencies to conduct the work cost-effectively and responsibly (without undue visual/environmental impacts), 2) concern that such efforts are too small to have meaningful impact, and 3) with regard to controlled burns, concerns about safety (losing control), impacts to air quality and the need for better notification. These challenges could be addressed through more transparent planning and prioritization of treatment activities, more effective communication around treatment activities (pre- and post-work), and education about how the safety and air quality impacts of controlled burns are managed.

The CWPP Leaders Team reviewed survey results and noted stronger than expected public support for public land treatment activities, including thinning and controlled burns, as well as for new regulations to enhance public safety. The team also noted strong opportunities for collaborative education and outreach, programs enabling citizens to treat and to help them understand why action matters. These opportunities are addressed in the Community Action Plan (Section V) with the Chaffee Chips and Envision Healthy Landscapes programs.

2. Chalk Creek Canyon Wildfire Survey and Engagement Program

A more detailed second survey was conducted with the intent to develop deeper understanding of the barriers to private lands treatment and to test the ability of a survey tool to more deeply engage a smaller community.

Over the summer of 2019, the Colorado State Forest Service and the Wildfire Research Team at the Rocky Mountain Research Station (Fort Collins, CO) surveyed residents of Chalk Creek Canyon—from Mt. Princeton Hot Springs to St. Elmo—regarding:

- residents' knowledge of wildfire in general, their experience with wildfire, and their perception about current wildfire risks;
- residents' knowledge of methods to reduce wildfire risk and their participation in such activities; and
- constraints and incentives that would affect that participation.

A total of 410 surveys were sent to canyon residents and 205 completed surveys were returned (50%). Insights gained from the survey will be used to increase wildfire

knowledge and preparedness among canyon residents and throughout the county. As of this writing, survey responses are being analyzed. Results will be presented to canyon residents in the spring 2020 and at another meeting later in the summer for seasonal residents.

3. Public Meetings

Public meetings were used as tool to more deeply engage the community, educate and receive feedback on draft CWPP products. Three public meetings were held during 2019—May 16 and October 3 at the Poncha Springs Town Hall; and October 4 at the Buena Vista Community Center—to discuss wildfire issues and gather input on the developing wildfire plan. Roughly 200 residents attended. Representatives from Envision Chaffee County, U.S. Forest Service, Bureau of Land Management, Colorado State Forest Service, and local fire protection and emergency services agencies participated, guided by professional facilitation.

Poncha Springs, May 16, 2019. The meeting was organized around just-received results of the Chaffee Wildfire Survey. The survey generated not only an opportunity to engage community to share results and to test key conclusions, but also was leveraged as an opportunity to have frank discussion and to encourage action.

Local wildfire and emergency personnel celebrated the community's readiness for additional treatment action, and also shared concern about gaps in community preparedness for wildfire. The impacts of recent wildfires in Paradise, CA (Camp Fire) and the Waldo Canyon Fire, CO, were used as examples of the need for residents to prepare themselves for emergency situations.

Community members then worked in a series of "stations" to create personal wildfire readiness plans. At each station they were provided with information about what they could do to prepare for fire, and then given time to write down actions they would take. At one station, CSFS staff discussed sources of wildfire risks for homeowners (e.g., building features and surrounding vegetation), homeowner wildfire preparedness, and provided take-away information regarding what homeowners can do to reduce wildfire risks. At a second station, USFS and BLM staff discussed wildfire land treatment activities and the role that fire plays in maintaining forest health. Meeting participants were asked to identify action items to support public land treatment activities. In the third station, Office of Emergency Management and Chaffee Fire leaders shared information and provided take-away tools about how to develop personal evacuation plans. Citizens were energized by the work, leaving with action plans and information they were asked to share with friends and neighbors. This created a "ripple effect" of ongoing community discussion and personal action.

Poncha Springs and Buena Vista, October 3-4, 2019. These meetings were organized to educate the community by sharing draft map products of wildfire risk and treatment priorities, and to gather maximum community input to identify any issues or areas for improvement.

Introductory comments described the connection between the Envision Chaffee County effort and the process of updating the county CWPP. Posters displayed the results of key interim maps, including fire probability, fire intensity, composite wildfire risk (burn probability, intensity, community values at risk, and wildfire impacts on those values), and county fuel treatment priorities. A detailed discussion of these products and their development is provided in Section III.

Meeting participants were asked to review the posters and to use sticky notes to share their questions, comments, and concerns about the information depicted. Personnel from Envision Chaffee County, U.S. Forest Service, Bureau of Land Management, Colorado State Forest Service (CSFS), and local fire departments were available to answer questions. The community provided 220 written comments and questions. A written response to these community comments and questions was provided to all participants and to 1,500 Envision participants by email.

A key outcome was a strong community concern that the draft maps did not reflect the current health of spruce forests (experiencing up to 90% mortality from beetle epidemic). As a direct result of this input, CFRI and the CWPP Leaders Team decided to revise burn probability maps to reflect recent wildfire activity and current conditions in the spruce forest. This impacted treatment priority areas and enhanced community buy-in to the final products.

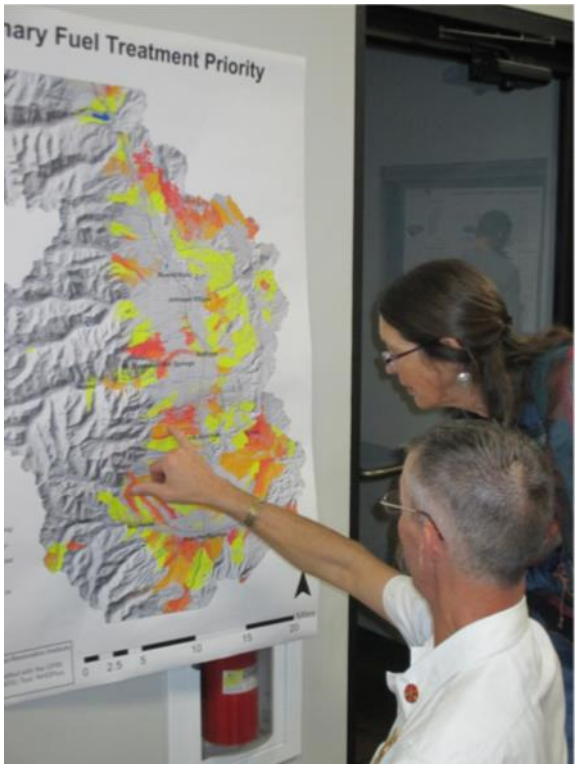


Figure I.2 Chaffee County Fire Protection District Battalion Chief Kent Maxwell discusses fuel treatment priorities during the Buena Vista wildfire meeting.

As part of the same meetings, programs and incentives in other counties were reviewed that assist or provide incentives to homeowners to address forest fuel conditions on their properties, such as slash hauling and community chipping days. Creating similar programs in Chaffee County was discussed, and participants were asked for their comments and concerns on these topics. Opinions gathered at the meetings by CSFS personnel indicated that, of potential scheduled services, trailers to remove fuel treatment materials was the most popular, and, of proposed automatic services, curbside chipping was the most desired. This input helped to develop the Chaffee Chips program.

4. Additional Public Engagement

In addition to surveys and public meetings, Envision used its established outreach tools and approaches to engage the community throughout the process.

The 1,500-name Envision newsletter list, active Facebook page and email address allowed the public to not only receive information but also ask questions and provide input. Newsletters were sent via e-mail once per month and social media pages were monitored and managed.

Social media and email proved invaluable to gather more than a thousand Chaffee Wildfire Survey responses in less than three weeks. Envision's original Forest Action Team and the CWPP Leaders Team helped launch a concerted two-week effort to share the survey link among as many organizations and community groups as possible. A poster with a QR Code allowed on-site participation from popular gathering spots such as coffee shops.

Meeting information was provided on the Chaffee County website, where public noticing is a popular information source. Media were provided full agendas and invitations to CWPP Leaders Team meetings, and were encouraged to attend and cover the series of public meetings. Fact Sheets were developed and distributed to assist the press in covering the long-term and detailed planning process. Press releases also were written and distributed to enhance communications. These efforts yielded in-depth newspaper coverage such as a full-page display of the draft Treatment Priority Area map printed in The Mountain Mail, Salida's daily newspaper.

Repeated dissemination of complete and ongoing information through multiple channels helped generate community understanding of and support for the plan. Ongoing opportunities for public input followed by ***meaningful responses and changes to the plan*** proved the key element to attaining community support. In short, the public was heard and their opinions were acted upon. The resulting Community Action Plan is truly a community-wide solution.

5. Community Research

To support this plan's conclusions, recommendations and ultimate success, research was conducted on forest health, fire resilience and best practices in wildfire preparedness. This included a deep study of preparedness in the WUI, model wildfire codes, other community planning approaches, and factors affecting the long-term adoption of new wildfire practices and policies, as well as an evaluation of post-wildfire recovery tactics, and monitoring and evaluating CWPP implementation and funding sources. Research also involved an in-depth study of Chaffee County's physical environment, including topics such as topography, climate, geology and soils, weather, vegetation zones, watersheds, water infrastructure, and recreational assets. The research includes in-depth educational information about types of wildfires, basic and historical wildfire regimes, drought and climate change, insect infestations and post-fire impacts such as sediment and debris flows. The Community Research Report is available upon request.

Chaffee County Next Generation Community Wildfire Protection Plan
Section III: Wildfire Risk Assessment and Treatment Prioritization

Overview

A critical conclusion from the Next Generation CWPP is that treating 5 to 10% of the total landscape in Chaffee County yields 50 to 70% reduction of the risks wildfire poses to assets prioritized by the community. The following sections provide a summary of the process, technical approach and final map products. Additional detail is available in the Chaffee County Wildfire Risk Assessment (Appendix C) and Chaffee County Fuel Treatment Prioritization (Appendix D) reports by CFRI. All analysis and map products were produced considering sub-watersheds. A sub-watershed is an area of land where surface water from rain or melting snow converges at a single point, such as a local stream or creek. Because of this approach, a single community may show different risk ratings or prioritization if they include multiple sub-watersheds.

Developing such a strong conclusion with unanimous buy-in required:

1) Iterative community input, from more than 1,500 citizens and the CWPP Leaders team of 36 leaders from the 17 agencies, government bodies and non-profit organizations most closely supporting fire protection and forest health;
2) the most current data reviewed and endorsed by local leaders, and
3) best practice geospatial modeling from the Colorado Forest Restoration Institute (CFRI) at Colorado State University.

Community input was part of an iterative process, integrated with data collection and geospatial modeling. The process included these steps:

- **Community Prioritizes General Values at Risk**: The community identified and prioritized seven assets or “values at risk,” with 1,035 citizens participating in the Chaffee Wildfire Survey (Appendix A).

- **Data Acquired to Map Values at Risk:** Data was collected to identify the seven values at risk at the more detailed level, including 28 map layers (Appendix C). For example, critical community infrastructure included map data of aircraft landing facilities, communication facilities like cell phone towers, power transmission lines, emergency services facilities and schools.

- **Ranking of Map Layers for Importance and Response to Fire:** The CWPP Leaders team next ranked the importance of each of these specific values at risk and a “response function” indicating how it might respond to fire of varying intensity (Appendix C).

- **Wildfire Risk Assessment:** Using this data, an initial Wildfire Risk Assessment was completed. This work includes predictions of burn probability and fire intensity, combined with modeling of potential impacts to values at risk. This process resulted in the **Composite Wildfire Risk Map,** indicating where the community’s valued assets are at the highest risk from wildfire.

- **Community Input:** The CWPP Leaders team reviewed the initial risk assessment products; maps of burn probability, wildfire behavior and composite wildfire risk and provided input based on local knowledge and on-the-ground experience. This generated some important changes to the initial products. For example, CWPP leaders were concerned that areas with one-way in-and-out access roads, exposing fire fighters and community members to the risk of entrapment during a wildfire, were not sufficiently represented. CWPP Leaders provided additional local information to better represent these areas. Similarly, water providers identified critical water infrastructure that was not included in the draft product, and provided additional data to CFRI. This iterative interaction added two months to the risk assessment process, but resulted in a risk assessment and Composite Wildfire Risk map that are more accurate and are unanimously supported by the CWPP Leaders.

- **Fuel Treatment Prioritization**: Building on the wildfire risk assessment, CFRI developed fuel treatment prioritization. This process included factoring in cost to identify where treatment can do the most to lower risk for the least amount of money. Treatment options considered included mechanical thinning, prescribed fire, mechanical thinning and prescribed fire ("complete treatment"), and mastication. Per-acre treatment costs were based on the opinions of local experts. Fuel Treatment Priority areas were assigned by assessing the level of reduced risk and the cost and feasibility of each treatment type. The result of this step was a draft **Treatment Priority Area map**.

- **Community Input:** Draft maps, including burn probability, fire intensity, composite wildfire risk and treatment priorities, were next shared with the community for input. Roughly 200 citizens participated in community map walks, providing 220 written comments. This step not only supported community buy-in, but also identified a consistent concern. Citizens felt that fire probability and, therefore, composite risk was under-estimated in areas of the county recently impacted by beetle infestation resulting in 80 to 90% spruce tree mortality.

- **Finalizing Risk Assessment and Fuel Treatment Priorities**: CWPP Leaders and CFRI took the community input seriously. CFRI completed additional assessment of modeled vs actual recent fire behavior in the spruce forest zone. The analysis indicated that state-wide models appear to under-predict current fire probability in spruce forests, where die-off has resulted in additional fuels and more open forests that are dry for more of the year. The CWPP Leaders team voted unanimously to adopt a modified burn probability model, addressing the community concern and, again, building a quality product with buy in. This also changed the final Fuel Treatment Priority Map.

- **End Product:** The final risk assessment and fuels treatment assessment was developed by CFRI, considering input from citizens and over 1,500 hours of work by the CWPP Leaders Team. The resulting Treatment Priority Map was unanimously endorsed by the CWPP Leaders Team.

A. Wildfire Risk Assessment

Wildfire risk assessment is comprised of three elements—the likelihood of wildfire, wildfire intensity, and the susceptibility of public and private resources and assets ("values at risk") to damage from wildfire.

CFRI and the CWPP Leaders Team adapted the wildfire risk assessment methods in the Colorado Wildfire Risk Assessment for use in Chaffee County. The CFRI model quantifies and maps the expected consequences of wildfire based on:

- predictions of burn probability and fire intensity across the county;
- the physical locations of values at risk;
- estimates of the impacts of wildfire on those values; and
- ratings of those values to represent their importance to the community.

B. Chaffee County Wildfire Simulations

Wildfire fuel hazard areas for the county were determined from predictions of burn probability and fire intensity. *Note*: the intent of this analysis is not to describe the behavior of a specific fire in the future, but to depict trends in fire occurrence and intensity over many potential future fire seasons (Gannon 2019). This technical data was combined with community input and iterative modeling, as described above, to produce two key products: Burn probability reflects the likelihood that wildfire will occur at a given location, and Flame length estimates the intensity with which wildfires will burn at various locations (maps available in Appendix C).

CWPP Leaders Team discussions noted that, 1) just because an area is mapped as low risk does not mean that wildfire cannot occur there and negatively impact existing values; and 2) it is also important to understand that, although the probability of a wildfire in a certain area may be low, the consequences may be high.

C. Chaffee County Values at Risk

The community prioritized values at risk used in this CWPP update, and the 2009 CWPP values at risk are summarized in Table III.1. Note that the community-driven prioritization was substantially different than that used in the 2009 CWPP. Map data on all values at risk, as well as data on prioritization and fire response are provided in Appendix C, and also available at the County of Chaffee Assessor's Office. Figure III.1 provides a summary or composite view of the values at risk.

Table III.1. Values at Risk Categories as ranked in the current and 2009 CWPPs.

Next Generation CWPP	**2009 CWPP**
Firefighters Lives	Population Density
Human Lives (Evacuation Routes)	Subdivisions
Drinking Water Supply (surface diversions, ground diversions, CSU Pipelines, CSU Buildings)	Watersheds
Critical Community Infrastructure (aircraft landing facilities, communication facilities, power transmission lines, emergency service stations, schools)	Economic Resources
Homes/Wildland-Urban Interface (1/2 mile around structures and 2 mile buffer on subdivisions)	Historical, Cultural Resources
Wildlife and Habitat (bighorn sheep winter range, black bear fall concentration, elk migration corridors, elk winter range, aquatic habitat, mule deer migration corridors, mule deer winter range, lynx range)	Endangered Species
Critical Recreational Assets (tourism businesses, Monarch Mountain ski area, USFS recreation opportunities, trails, AHRA, Browns Canyon National Monument, focused dispersed camping areas)	Utilities, Recreation Areas, Travel Corridors, Viewsheds, Aesthetics

1. Firefighter and Human Life Safety

Human life and safety refers to the lives of firefighters, residents and visitors during a wildfire. Components reflect: 1) the risk of entrapment because of difficulties that residents and/or visitors may have evacuating due to, for instance, single ingress/egress points and narrow roads, and 2) restrictions on WUI area access by firefighters due to, for instance, steep, tight turns that firefighting equipment cannot easily navigate. Access and evacuation routes in the county that would present hazardous conditions during a wildfire were identified by CWPP Leaders.

2. Drinking Water Supply and Infrastructure

Water infrastructure refers to watersheds and the built infrastructure that supplies water to the community, such as reservoirs, pump stations, diversion points, pipelines, and agricultural supply ditches.

3. Critical Community Infrastructure

Critical community infrastructure includes airports, power transmission lines, communication systems, and emergency services facilities and schools.

4. Wildland-Urban Interface

The wildland-urban interface (WUI) is where human-made structures and other assets are located near or within areas with flammable vegetation. The Chaffee County WUI for this CWPP is defined as the area within a one-half-mile radius around mapped structures plus a 2-mile buffer around identified subdivisions. This is the same definition used in the prior wildfire plan (CWPP 2009), although the list of subdivision filings has expanded, considering that 135 subdivisions have been added the county register since the data used in the 2009 plan. A full list of Chaffee County subdivisions is provided in Appendix E, which also includes a list of the 227 subdivision filings that are in the top two Treatment Priority Areas (highest and higher). A map of the ½ mile radius WUI, identifying high-density areas (≥ 1.5 structures per acre) and lower-density areas (< 1.5 structures per acre) is provided in Figure III.2.

5. Wildlife and Habitat

Wildlife is represented by factors prioritized by the CWPP Leaders Team, including: critical winter range and migration corridors for elk and mule deer; bighorn sheep winter range; fall concentration areas for black bears; lynx habitat; and fisheries, including the Arkansas River and its tributaries.

6. Recreational Assets

Recreational assets include the Arkansas River (e.g., rafting, fishing); the Arkansas Headwaters Recreation Area and Browns Canyon National Monument; recreation sites, including facilities, campgrounds, and dispersed camping areas; major trail systems, such as the Continental Divide, Colorado, and Crest trails; tourism-based businesses; and Monarch Mountain ski area.

7. Composite Wildfire Risk

All of the above geospatial data, fire probability and fire behavior modeling come together in a single critical model product and map of composite wildfire values at risk. This important map shows where the combined values are at highest risk from severe wildfire and areas where moderate wildfire may be of net benefit (Figure III.1 and Appendix C).

D. Chaffee County Treatment Priorities

The next step in the CWPP process identified priority fuel treatment locations and treatment types that would reduce wildfire risk most cost-effectively.

Fuel treatment priorities were optimized by weighing risk reduction benefits against fuel treatment costs while also accounting for treatment feasibility, and budget and use constraints. (See summary below and Appendix D for details.) To estimate treatment effectiveness, the effects of the various treatments on existing forest or woodland surface fuels and canopy conditions were simulated to characterize how a given treatment changed fire behavior and subsequent measures of risk. The model is supported by “data from published data on fuels reduction and forest restoration treatments in the western U.S. (Gannon 2019).”

Four proposed budgets were evaluated to determine the treatment types and locations and the degree to which those treatments would reduce wildfire risks, i.e., the most cost-effective fuel treatments for a level of funding. Figure III.2 provides a county land ownership map, setting context for the Treatment Priorities. The Treatment Priority Areas are summarized by the map in Figure III.3 and Table III.2 below.

Table III.2.
Proposed Treatment Budgets and Resulting Areas Treated

	Treatment priority (acres)				
Owner	**Moderate (estimated $200M cost)**	**High (estimated $100M cost)**	**Higher (estimated $50M cost)**	**Highest (estimated $10M cost)**	**Total**
BLM	17,757	8,313	6,976	1,159	34,205
Colorado Parks and Wildlife	75	28	13	57	172
CITY	0	7	26	2	35
NGO	0	0	2	0	2
PRIVATE	14,236	10,007	10,283	4,387	38,913
State Land Board	2,890	944	1,505	442	5,780
State Parks	57	39	20	0	116
USFS - PIKE	42,017	13,344	14,638	6,773	76,772
Total	77,033	32,682	33,462	12,819	155,996

The key take-away from this work is demonstrated by the risk reduction vs. cost graph (Figure III.5). The conclusion is profound. The first $50 million of treatment yields roughly 50% reduction in the risk wildfire poses to community assets. The next $50 million yields a further 20% reduction—a total of 70% reduction for $100 million. The next $100 million in spending further reduces risk by only 15%, and an additional $400 million is needed for the final 15%.

This data is the cornerstone of the Next Generation Community Wildfire Protection Plan. Based on the best available community input, data and modeling, spending $50 million to $100 million to treat 5 to 10% of the total landscape in Chaffee County can reduce risk to community assets by 50 to 70%. Treatment activity in other areas generally has much lower return on invested capital. Of course, this map cannot be prescriptive or replace the need for field assessment of current conditions and treatment feasibility, but

it should be strongly employed as a decision-making guide for all countywide treatment activities.

The Treatment Priority Map was unanimously endorsed by the CWPP Leaders Team. It is the strongest recommendation of the Next Generation CWPP that it be used to focus future treatment activities in locations with best benefit to cost.

The Treatment Priority assessment considered the following fuel treatment methods—mechanical thinning, prescribed fire, mechanical thinning and prescribed fire ("complete treatment"), and mastication. Per-acre treatment costs noted below were based primarily on the opinions of local experts.

- For **mechanical thinning**, a treatment cost of $1,800 per acre under ideal conditions was used. Where appropriate, costs were adjusted for slope steepness and distance from roads.
- For **prescribed fire**, a treatment cost of $1,000 per acre was used. Prescribed fire would be used primarily in ponderosa pine and dry mixed conifer forests.
- For **complete treatment**, a cost of $2,800 per acre was used, i.e., the sum of the costs for mechanical thinning and prescribed fire. Complete treatment would be used primarily in dense mid- to high-elevation forests. For the mechanical thinning portion, where appropriate, costs were adjusted for slope steepness and distance from roads.
- For **mastication**, a base cost of $700 per acre under ideal conditions was used. Mastication is restricted to pinyon-juniper woodlands. Where appropriate, Costs were adjusted for slope steepness and distance from roads.

Constraints by treatment type. The following constraints were applied to each treatment option.

1) **Mechanical thinning** was limited to areas with greater than 10% tree cover, but was excluded from designated wilderness areas, "upper tier roadless areas",[2] and Browns Canyon National Monument.
- For **prescribed fire**, constraints included: 1) no burning within 250 meters (825 feet) of structures in the wildland-urban interface; 2) prescribed fire was limited to 30% of the total budget to reflect limits on available personnel; and 3) use was limited to forests for which frequent fires is the natural fire regime (e.g., ponderosa pine and dry mixed forests). Prescribed fire would not be used in pinyon-juniper or high-elevation forest types (e.g., lodgepole or spruce-fir forests).
- **Complete treatment** was limited to areas with greater than 10% tree cover, but was excluded from designated wilderness areas, upper-tier roadless areas, and Browns Canyon National Monument.
- **Mastication** was limited to pinyon-juniper woodlands with greater than 10% tree cover and where slopes were ≤ 40%. Spending on mastication was limited to 20% of the total budget to restrict potential adverse ecological impacts from its

[2] In federal rules, an "upper tier roadless area" is similar to a wilderness designation, but more activities are allowed, such as use of motorized and mechanized equipment.

overuse. Use of mastication was excluded from designated wilderness areas, upper-tier roadless areas, and Browns Canyon National Monument.

A complete report on this work, including geospatial products, is provided in Appendices C and D. All map products are also available at the Chaffee County Assessor's Office.

E. About key maps

Maps were created considering sub-watersheds or small drainages; areas of land where surface water from rain or melting snow converges at a single point such as a local stream or creek. Because of this, one community may show different risk ratings or prioritization if it covers multiple drainages. Key maps include: Composite Risk (Figure III.1), Wildland Urban Interface (Figure III.2), and Treatment Priority (Figure III.4).

The Composite Risk map combines information on where assets the community values are located (human lives, drinking water supply, infrastructure, homes, wildlife habitat and key recreational assets) **and** where damaging wildfire is most likely to occur (based on vegetation types, how often the areas may be dry, slope, aspect etc.). Areas where the most assets are most at risk are shown in dark red. These are generally places with a combination of multiple things (homes or roads that provide a single evacuation route for many homes or visitors, major power lines, etc.) and vegetation/aspect/slope etc. that make severe wildfire more likely. Paler red areas represent moderate risk, generally drainages with fewer assets and/or a lower probability of severe wildfire. In some areas – such as important wildlife habitat without structures – moderate intensity wildfire can be beneficial. These areas are shown with green shading.

The Wildland Urban Interface map shows where homes and structures are located. Areas within a ½ mile radius of structures are shown in yellow. Areas with a higher density of structures are shown in red.

The Treatment Priority Area map (Figure III.4) shows areas where the risk that wildfire poses to community assets (Figure III.1) can be most cost-effectively reduced by implementing "treatments" such as thinning vegetation or creating fuel breaks. Areas in red provide the most "bang for the buck." These drainages or sub-watersheds generally can be treated at lower cost (because they are accessible, not too steep etc.) and also provide opportunity for treatments that matter – or have a high impact in protecting community assets. If the community had only $10M to spend on treatment activities, treating the areas in red (highest) would have the greatest impact, reducing the risk severe wildfire poses to community assets by 15 to 20%. If $50M were available, risk to community assets could be roughly halved by treating the red (highest) and red-orange (higher) drainages. If $100M were available, total risk could be reduced by roughly 70% by treating high to highest priority areas (red, red-orange and light orange drainages).

Of course, this science, while very good, is not perfect. So local forest health and fire professionals will develop treatments using these maps in combination with on-the-ground knowledge and experience.

Figure III.1. Composite values at risk map showing where combined values are at highest risk from severe wildfire and areas where moderate wildfire may be of net benefit

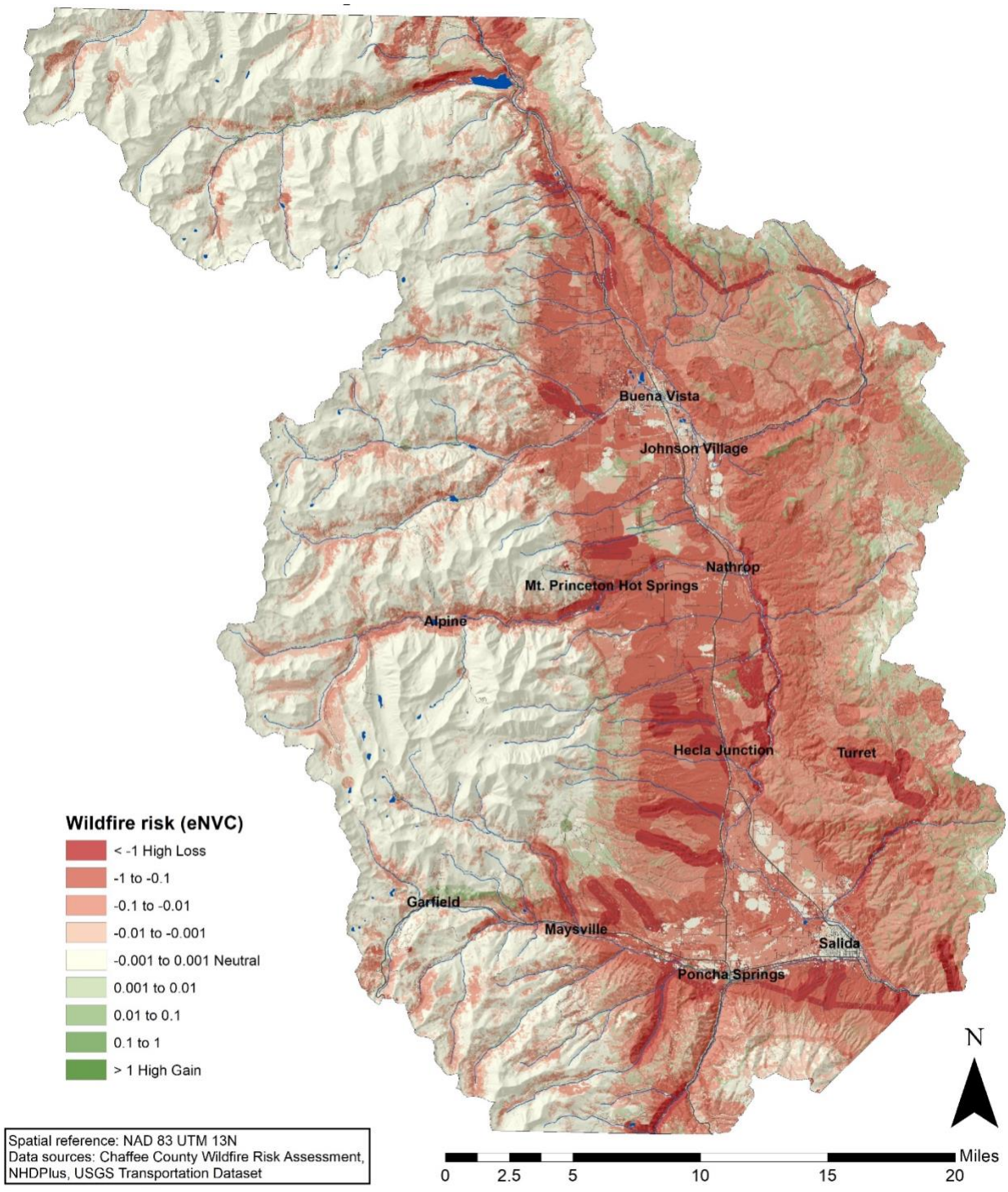


Figure III.2. Map of the ½ mile radius WUI, identifying high-density areas (≥ 1.5 structures per acre) and lower-density areas (< 1.5 structures per acre). Note: In addition to lands depicted here, the CWPP WUI includes a 2 mile buffer around subdivisions.

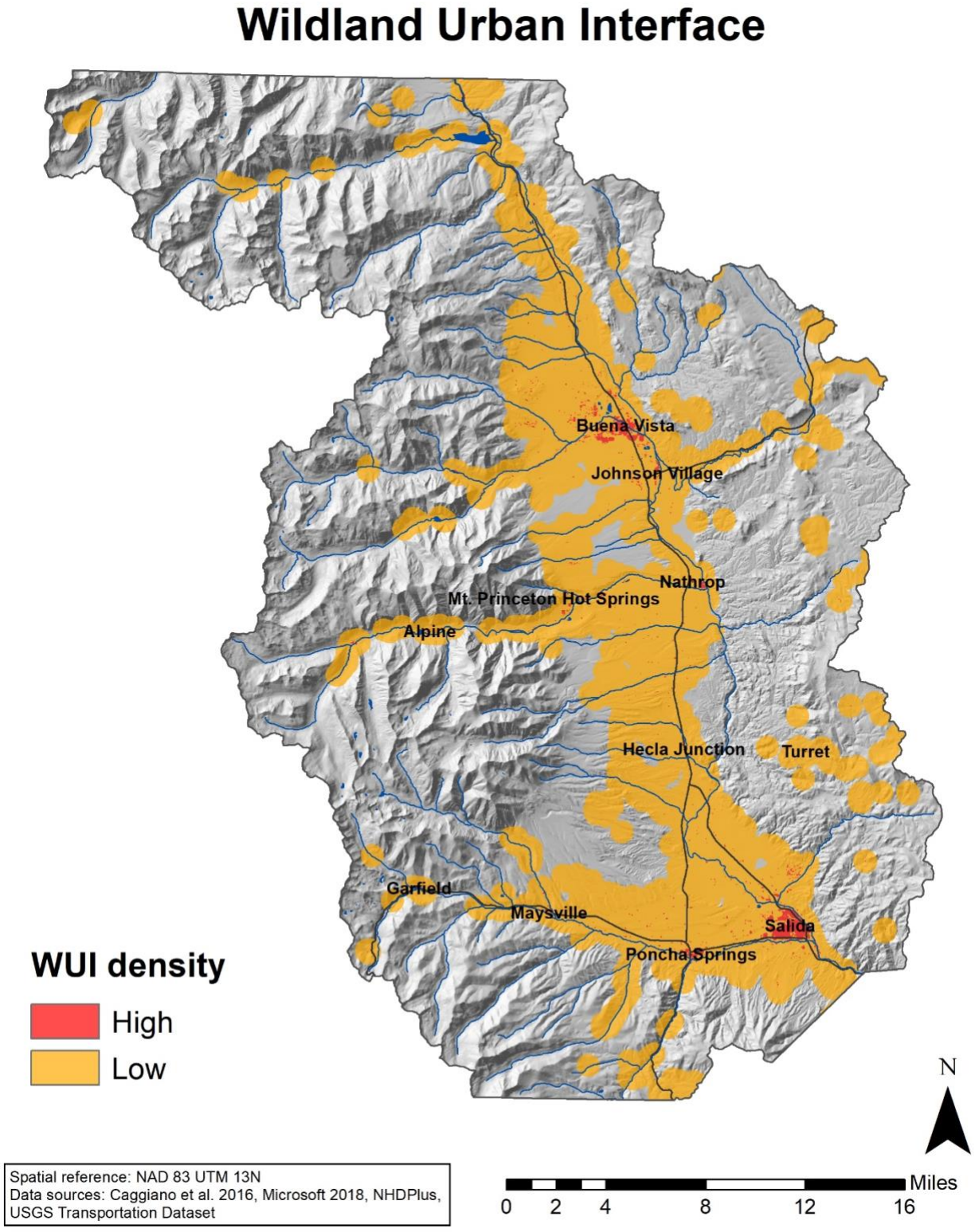


Figure III.3. Map showing land ownership in Chaffee County.

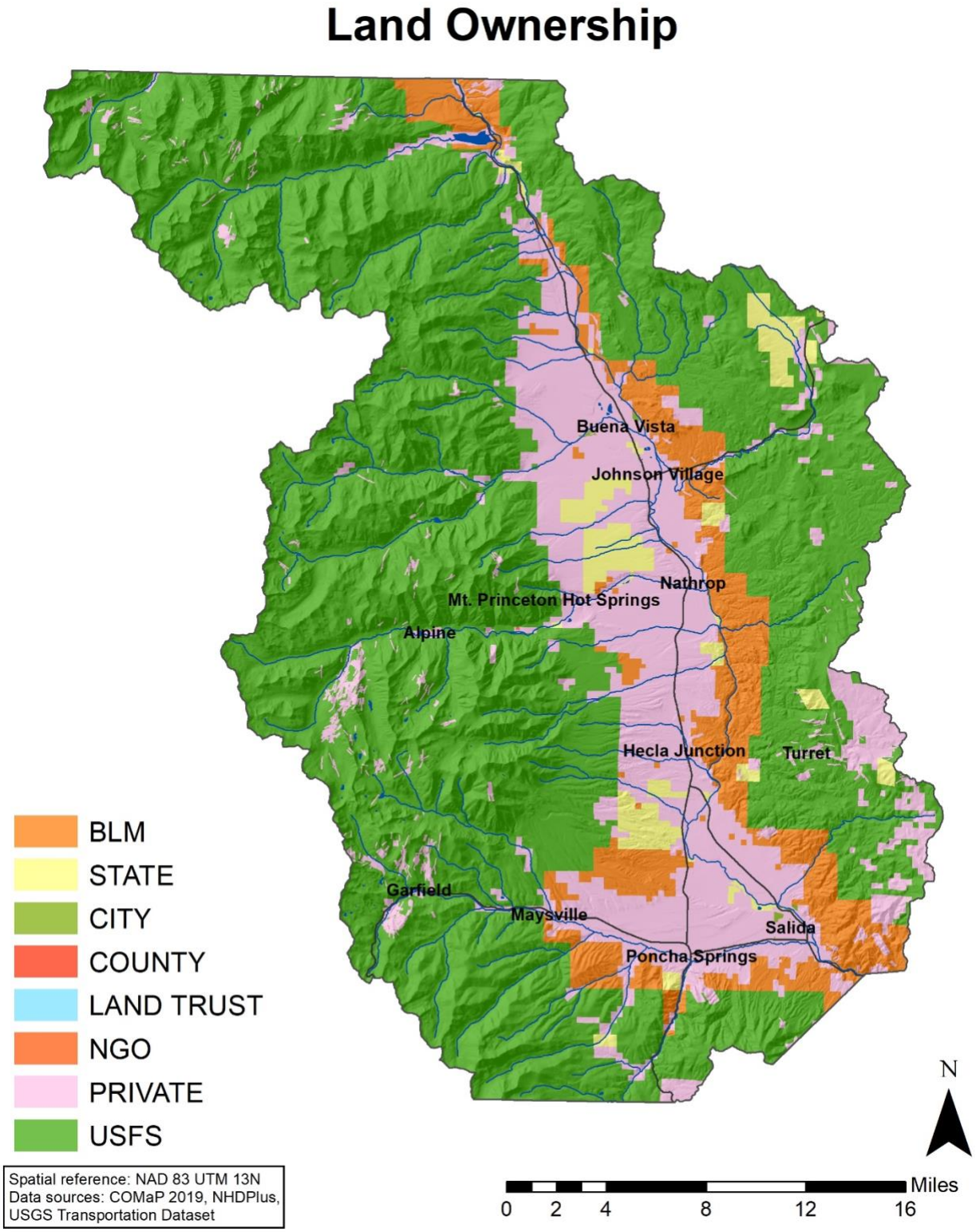


Figure III.4. Treatment Priority Map for Chaffee County. The map shows areas where fuel treatment can have the most impact in reducing the risk of wildfire to community assets.

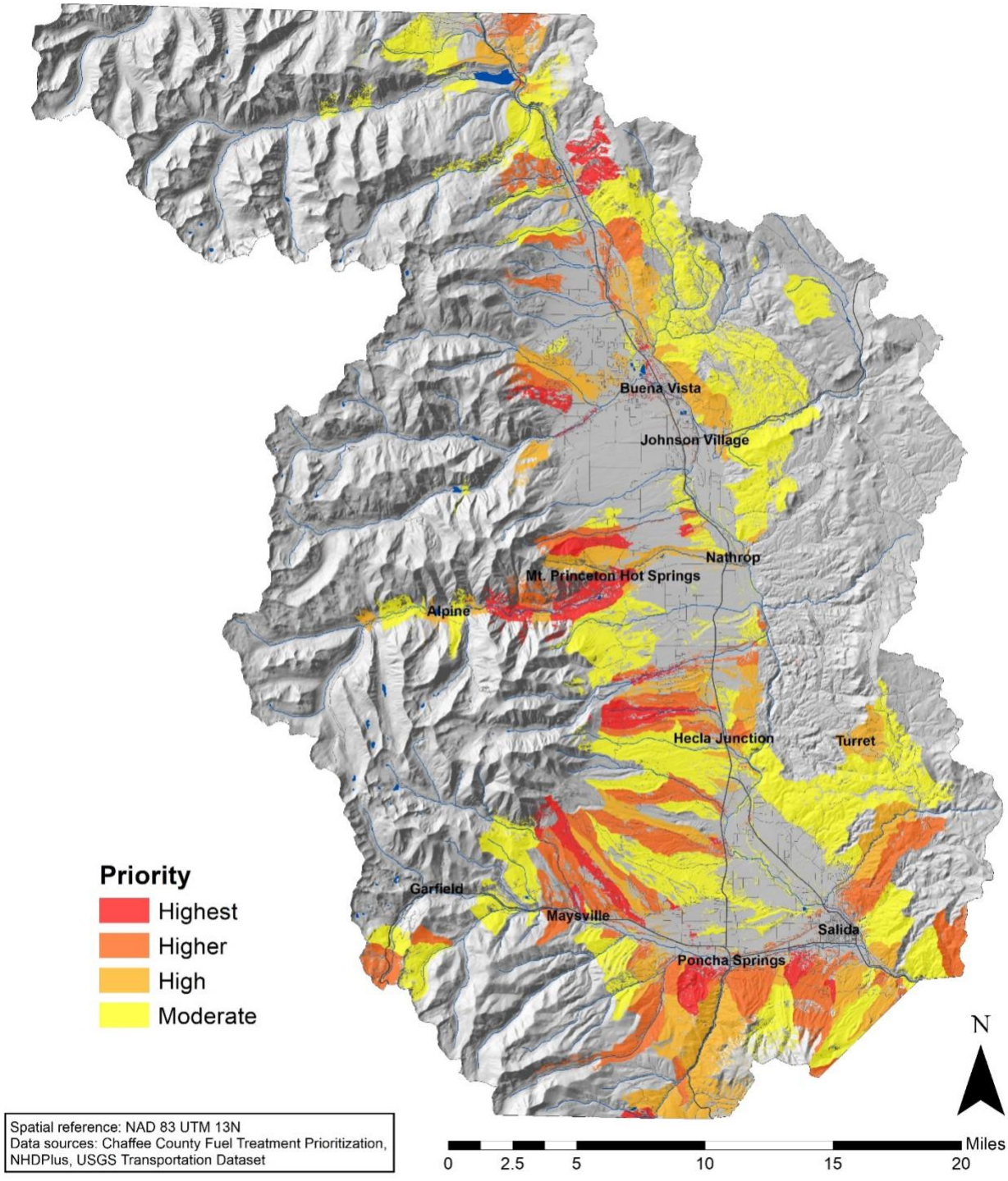
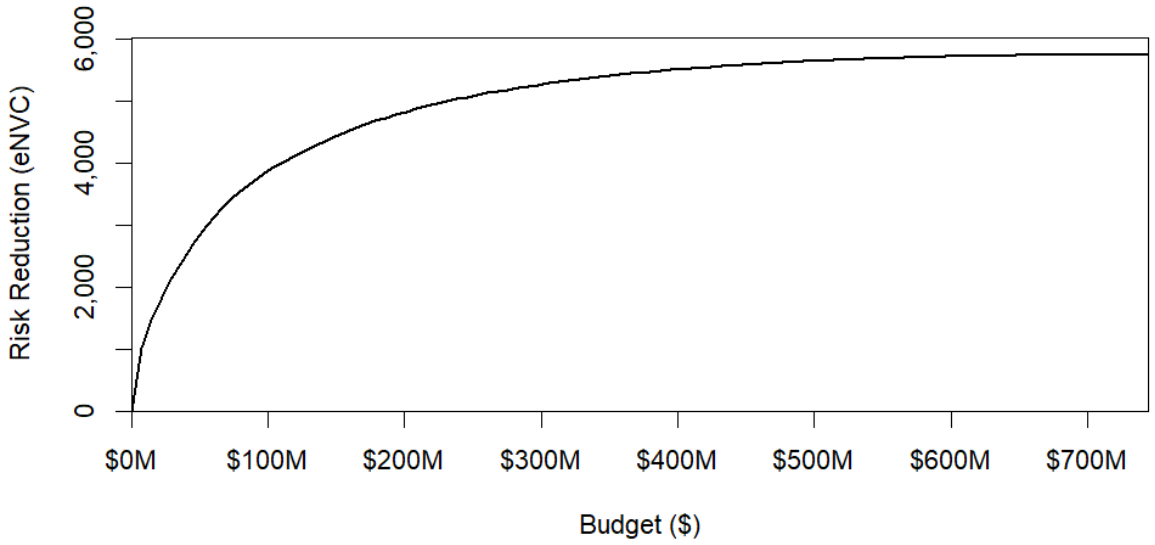


Figure III.5. Graph depicting the Treatment Priority Areas and demonstrating estimated risk reduction by funding level.



Chaffee County Next Generation Community Wildfire Protection Plan
Section IV: Community Wildfire Preparedness
Current Status and Structural Ignitability in the WUI

A. Overview

Community outreach conducted during the CWPP process indicates citizen preparedness is a concern, while community plans related to fire resilience are improving and the preparedness of local emergency management agencies is solid.

In terms of **citizen preparedness**, while residents expect a major fire to happen, many are not personally prepared. However, a strong majority of residents support land management activities to mitigate wildfire risks, and many think these activities are beneficial to wildlife. Community input also showed strong interest in new programs and incentives to address forest fuel conditions on private lands.

Community plans related to emergency management and fire resilience are improving. Chaffee County has a Comprehensive Plan update in progress that will dovetail with the Next Generation CWPP and offer opportunity to address gaps in county regulation and code related to fire resilience. Five subdivisions have more detailed CWPPs and there are three Firewise communities in the county. A Hazard Mitigation Plan was completed in 2016. Additional plans are in place to govern wildfire-related activities and post-fire recovery.

Emergency response preparedness is solid with the current Chaffee County Local Emergency Operations Plan (LEOP) and the Chaffee County Hazard Mitigation Plan in place. Fire Departments indicate training and equipment are adequate to address wildfire situations, although some mentioned the need for additional communication equipment, masks, and fire shelters.

B. Citizen Preparedness and the Chaffee Wildfire Survey

As noted in the Section II summary of Chaffee County Wildfire Survey data, community preparedness for a large wildfire event is a concern, with gaps in evacuation planning, reverse 911 signup, and home preparedness. The CWPP Leaders Team recommended more and better public outreach and coordinated communications between local, state, and federal land management regarding wildfire issues and resources, efforts that should be sustained over the long term.

Programs and incentives in other counties were reviewed by CWPP Leaders that assist or provide incentives to homeowners to address forest fuel conditions on their properties, such as slash hauling and community chipping days. Creating similar programs in Chaffee County was discussed in public meetings. Citizens indicated strong support for such programs, emphasizing the need for education to know what to do. In public meetings, citizens indicated that, of potential community services, trailers

to remove fuel treatment slash was the most desired followed by curbside chipping. Citizens also noted that the county has a high retiree population, with many citizens requiring some support for the physical labor involved in creating defensible space.

C. Community Planning Preparedness

Community comprehensive planning was identified as an area of concern by the Envision Chaffee County program in 2018, as key plan updates had lapsed for 10 to 20 years. The current county comprehensive plan was adopted in 2000 and includes limited references to wildfire and wildfire preparedness, only suggesting that more specific and up-to-date provisions be adopted to guide growth in wildfire-prone areas and to protect structures from fire damage. The current CWPP was adopted in 2009, and contains recommendations related to steep slopes and ridgeline setbacks to reduce visual impacts that were not implemented.

Local leaders are taking action, with updates to both of these critical plans in progress, and coordinated to capture opportunity for updates to regulations and codes.

The existing plans do offer some support to fire resilience. Current county regulations require that new subdivision access be reviewed during the planning review process, and that preliminary subdivision plans are reviewed by the Colorado State Forest Service. The Chaffee County Hazard Mitigation Plan recommends that electric transmission and distribution lines in new developments be placed underground to address several hazards, including wildfire. However, no provisions exist in current county building codes that specifically address structural ignitability.

The 2009 CWPP implemented a new model for consistently rating wildfire preparedness at the subdivision and individual lot level. The system includes: evaluation of ingress and egress, primary road widths, accessibility, the presence of dead ends, the presence of street signs, slope steepness, lot size, the extent of vegetation, defensible space around structures, firefighter response times, and presence of water for firefighting. Excellent progress has been made in completing this evaluation in prioritized subdivisions county-wide, with a focus on encouraging citizens to address defensible space and water sources that offer the greatest chances to improve wildfire safety.

In 2007, wildfire risk ratings were completed for 54 subdivisions by local experts. Information from the Chaffee County Assessor indicates that, since 2007, 135 subdivision filings have been added to the county, including 12 with more than 10 lots. In addition, 227 filings are in the top two Treatment Priority Areas. A full list of the current subdivisions in Chaffee County and filings in the highest and higher Treatment Priority Areas is provided in Appendix E. Given the degree of change and the updated prioritization in this plan, an update of subdivisions wildfire risk ratings is strongly recommended.

The county CWPP also serves as an umbrella document for other CWPPs that cover smaller areas and subdivisions within the county. The following communities have

CWPPs: Alpine-St. Elmo (2009), Game Trail (2008), Maysville-North Fork CWPP (2008), Mount Harvard Estates (2009), Poncha Springs (2009), and Trail West Association CWPP (2012). Given the age of most of these documents and the new information available in this CWPP, these CWPPs should be updated.

One concept that incorporates most of the best practices regarding structural ignitability and defensible space is **Firewise USA**. This program guides communities through a series of steps intended to reduce their vulnerabilities to wildfire, such as landscaping and fuel reduction, home construction and design, and neighborhood planning. This is a proactive process that develops a pre-fire strategy to reduce risk. CSFS and local fire departments assist with the Firewise program. Three Firewise communities are designated in Chaffee County—Maysville, Alpine, and St. Elmo.

In addition to the comprehensive plan and the CWPP, Chaffee County has a **Hazard Mitigation plan completed in 2016**. Wildfire-related recommendations in this plan include:

- continue to strengthen partnership between firefighters, planners, and law enforcement authorities concerning wildfires;
- make grant funds available to homeowners for fuel treatment projects;
- encourage wildfire fuel reduction projects through posting information on town websites, newspapers, the town posting boards, and inserts with water bills;
- conduct fuel management (projects), e.g., pruning and clearing dead vegetation and overgrowth, cutting high grass, and planting fire-resistant vegetation;
- incorporate a GIS layer for landownership parcels into emergency-response procedures for the county communication center;
- create evacuation plans (for) areas with high wildfire threat;
- work closely with state and federal (forest agencies) to educate the public, conduct risk and mitigation inspections and conduct mitigation efforts;
- use the county website, publications, and social media to education citizens of the natural hazards, and educate homeowners how to mitigate damages;
- increase wildfire risk awareness by providing education and outreach; and
- educate the public on the importance of “defensible space” around homes.

The Chaffee County Hazard Mitigation Plan also notes the need for better drainage at several locations around the county, indicating that new infrastructure such as culverts are needed to reduce the risks of post-fire flooding and debris flows. Conversations with the county road and bridge department indicated that most county roads are susceptible to impacts from debris flows, but it is difficult to anticipate where those impacts will occur.

The following **additional plans** govern federal wildfire-related activities in Chaffee County and the region:

- Upper Arkansas Valley Wildfire Annual Operating Plan, includes Chaffee and Lake Counties.

• Within the 2004 BLM Fire Management Plan, Chaffee County is managed as part of the Upper Arkansas Fire Management Unit, which also includes Lake County.
• The PSICC 2008 Fire Management Plan splits Chaffee County between two fire management units: The land south of U.S. Highway 50 and east of U.S. Highway 285 is in the Lower Arkansas Fire Management Unit, which also includes Costilla, Custer, Fremont, Huerfano, Las Animas, and Pueblo counties. The remainder of Chaffee County is in the Upper Arkansas Fire Management Unit with Lake County and a portion of Park County.

D. Emergency Response Preparedness

Agency preparedness for emergency response is solid. The **Chaffee County OEM** operates under the guidelines of Chaffee County Local Emergency Operations Plan (LEOP) and the Chaffee County Hazard Mitigation Plan. The LEOP is the general plan for managing incidents and describes the framework and processes used during emergencies in Chaffee County. Chaffee County operates an Emergency Operations Center (EOC), a command and control facility to provide emergency response, interagency communication, coordination and decision making.

The Chaffee County OEM conducts post-disaster damage assessment as part of larger recovery efforts. The Office is also the source of debris management plans that address debris removal after major incidents such as the 2019 Decker Fire. OEM also has created a sheltering plan for those displaced during severe events. The plan directs the county to identify the functional and access-needs population that may need assistance during events with items such as medication, oxygen, hydration, etc.

During emergencies requiring notification and potential evacuation of residents, the **county assessor** provides emergency personnel with computer files of taxable property with information regarding property owners and contact information within the affected area. However, this information may not reflect who is actually living in the house and what, if any, help they may need to react to the situation. David Henson, Director, Chaffee Department of Human Services (DHS), indicated that his department has some of this type of information, but only for those that are or have been involved in DHS programs. Privacy requirements may hinder sharing of such information between agencies. Henson also noted that DHS and the county Office of Emergency Management have initiated county recovery meetings after the 2019 Decker Fire to work together to develop more accurate information about the location and needs of these vulnerable populations.

Local fire departments indicated that training and equipment were currently adequate to address wildfire situations, although some mentioned the need for additional communication equipment, masks, and fire shelters. Conversations noted that local fire departments have been successful in the past in applying for grants to meet various needs, but that such funding is declining and, therefore, increasing competition for the remaining opportunities.

Local fire chiefs, CSFS officials and Office of Emergency personnel, as part of a February 2019 working session, indicated that the following are strengths of current emergency response programs:

- mutual aid agreements and MOUs ;
- monthly county emergency services council meetings ;
- county emergency operations plan adopted by all municipalities ;
- established CWPP operating plan CDFPC ;
- established county-wide public information officers ;
- wildland firefighter training ;
- community fire mitigation efforts through Firewise USA ;
- coordinate responses with U.S. Forest Service ;
- conduct response drone flights ; and
- homeowner outreach and smartphone-based “fire risk assessment maps” and related “tactical maps” planned for 2019/2020

The **Chaffee County Community Foundation** established a permanent Emergency Response Fund in 2019, to which individuals and businesses can contribute to emergency response expenses in the county. Use of the fund is coordinated with Chaffee County government officials, nonprofits and relief stakeholders.

E. Fire Response

Wildland Fire Management and Suppression Tactics: Suppression priorities for firefighters will vary based upon the capabilities, overall strategy and fire behavior. Firefighter safety is a priority, reinforced by the community as the most important “value at risk.” These priorities make it imperative that individual homeowners effectively treat the hope ignition zone around their structures to increase the likelihood of their structures surviving a wildfire.

Fire Response: In the event of a wildfire, provide safety for yourself and your family, and call 911 immediately.

Fire Equipment: For this CWPP, a high-level assessment of local fire suppression capacity only was completed, and is summarized below. Based on this information, Chaffee County fire equipment and personnel are considered above average for a county of our size and wildfire history, according to Chaffee County Fire Battalion Chief Kent Maxwell. The assessment did identify three gap areas for additional action as follow:

1) Considering that local personnel and equipment are also dispatched for national fires, a collaborative “drawdown” policy among local and federal agencies may be needed to ensure appropriate response is available considering current local conditions.
2) A plan to share staffing on local engines and tenders for local incidents would be helpful, for example increasing the number of ambulance personnel who are also wildland-firefighter qualified.

3) Assess if sufficient local agency wildfire module and/or hand crew are available to respond to a high-probability initial attack on a wildfire without equipment access.
4) Continuing an ongoing assessment of suppression capabilities to maximize the effectiveness of firefighting for our community.

The following firefighting equipment is available in Chaffee County:

City of Salida Capabilities

Personnel: 13 full-time career firefighters and 4 part-time reserve firefighters.
Apparatus: 2 pumpers, 1 aerial apparatus, 3 support vehicles.

South Arkansas Fire Protection District Capabilities

Personnel: 20 members on the Wildland Team.
Apparatus: 2 Type 3 tenders, 2 Type 6 Engines, 1 support vehicle.

Chaffee County Fire Protection District Capabilities

Personnel: 45 firefighters with varying wildland qualifications.
Apparatus: 3 Type 6 engines, 7 Type 7 engines, 3 Type 4 engines, 4 Type 1 engines, 3 Type 2 support tenders, 1 Type 1 tactical vehicles, multiple support and command vehicles.

Buena Vista Fire Department Capabilities

Personnel: Five full-time career firefighters, 6 volunteer firefighters, 1 local wildland program volunteer.
Apparatus: 2 Type 1 engines, 1 Type 6 engine, 1 rescue vehicle, 1 support vehicle, 1 hazmat vehicle.

Colorado Division of Fire Prevention and Control (DFPC)

In addition to the local assets above, DFPC has equipment listed below that can be ordered by the local incident commanders as needed and as available per state administrative policies.

Personnel: Hand crews, supervisory expertise and fire suppression module staffed with 7-10 firefighters located in Colorado Springs.
Apparatus: Engines and modules, overhead, Type 3 helicopter, Type 2 helicopter, Type 1 helicopter, single engine air tanker, large air tanker, very large air tanker, multi-mission aircraft, aerial supervision.

Currently, no auto-aid agreements in place but will be focus in 2020 for all local fire agencies within DFPC Pikes Peak Region.

F. Preparedness in the Wildland-Urban Interface—Structural Ignitability

The wildland-urban interface (WUI) is where human-made structures and other assets are located near or within undeveloped areas with flammable vegetation. Preparedness in the WUI addresses conditions in the home ignition zone, that is, vulnerabilities in homes and other buildings ("structural ignitability") and the surrounding landscape ("defensible space"). For this CWPP, the WUI in Chaffee County is defined as the area within a one-half-mile radius around mapped structures.

The Colorado State Forest Service is the key agency in providing education and developing/delivering treatment projects on private lands, with the exception of prescribed burns. Colorado Division of Fire Prevention and Control is the agency that implements prescribed burn program in Colorado. They offer a certification program that measures the level of skill knowledge and abilities. These competency-based standards provide a basis for a voluntary training and certification program for private landowners to safely and successfully plan, initiate and complete controlled fire treatments on private lands. In addition, DFPC's role in prescribed fire includes: Technical assistance in project design, planning, and assistance to state and other agencies with implementation of prescribed fire on state lands.

1. Human Life and Safety—Firefighter Access and Resident Evacuation

Structural ignitability, defensible space, and neighborhood development patterns directly affect human life and safety issues during wildfires. Extreme wildfire conditions can generate situations that overwhelm available firefighting resources—conditions that threaten both resident and firefighters. Issues for firefighters include:

- difficulties in accessing or escaping an area may prevent firefighters from approaching burning structures;
- the presence and extent of flammable vegetation near structures may also prevent or limit firefighter approach, deny them useful areas in which to work, or endanger them while fighting the fire; and
- the flammable nature of WUI structures may hinder effective fire control while also contributing to the spread of the fire.

The Boulder County CWPP (2011) noted that, "Only 7% (of Boulder County residents) thought that it was not likely the department would be able to save their home. However, the plan offered ten lessons from the county's experience with wildfires, one of which was "Firefighters cannot defend and save every house." The high winds and extreme conditions associated with Boulder County's catastrophic fires often severely limit firefighters' ability to save them. This lesson from Boulder County was echoed during CWPP Leaders Team discussions.

Similarly, for residents, narrow, steep driveways may hinder escape, while narrow, steep roads limit or deny two-way traffic during evacuations. Flammable vegetation adjacent to homes may hinder or prevent homeowners from addressing embers and small fires. The same may apply to the materials and features the home. Most of these

conditions in the WUI were noted during CWPP Leaders Team discussions and are represented by the first CWPP value at risk, Human Life and Safety, and are considered in this plan.

The increase in the size and number of houses in the WUI contributes to the rising costs of wildfire suppression, nor do prior wildfires in an area necessarily dissuade people from rebuilding their homes or others from building new homes in fire-prone areas. Evidence also indicates that trends toward more and larger fires across the West will continue. Some 80% of Colorado's WUI remains undeveloped and the number of WUI homes in the state is expected to increase 130% by 2030.

Protection of property and people in the WUI has been a major emphasis of federal firefighting legislation since the early 2000s. Major goals are reduction of forest fuels around homes, communities, and resources to slow or stop wildfires from threatening high-value areas. Twenty years later, protecting the WUI still remains the nation's fastest-growing firefighting expense.

Structure loss during wildfires occurs as a result of direct flame contact such as that from the moving flame front, and from radiant heat and embers ("firebrands"). A common misconception about home loss during wildfires is that it usually occurs as the main body of the fire passes through. However, the main flame front moves through an area in one to ten minutes, depending on the vegetation type. Instead, most homes are destroyed by fires started by spotting by flying embers, especially under windy conditions and with large wildfires. Under the right conditions, firebrands can create separate and widespread points of ignition beyond the main fire front and thereby expose a large number of structures in a short amount of time. Larger fires may then produce conditions that lead to more embers, including those generated by burning structures. When spotting becomes the dominant ignition source, established fire barriers and subsequent fire suppression efforts are quickly overwhelmed.

2. Treating WUI Vegetation—Creating Defensible Space

Fuel treatment on private land in Chaffee County is currently voluntary. Advice and additional resources are available from the local office of the Colorado State Forest Service and local fire department personnel.

(1) Home ignition zone. The home ignition zone refers to the characteristics and immediate surroundings of structures in the WUI. These characteristics—building materials and design—and surroundings—vegetation, outbuildings, and other elements—are the primary reason that homes survive wildfires—or not (Figure III.1). Building materials and design reflect "structural ignitability," which is discussed below. A home's surroundings represent its "defensible space." This space consists of three concentric zones around the house (Figure III.2).

- **Zone 1** extends 30 feet from the house and deck, and requires maximum wildfire hazard reduction. In the first five feet, there should be no plants and ground cover should be non-flammable, such as landscape gravel. Beyond five feet, most flammable vegetation is removed, except perhaps for a few low-growing

shrubs or fire-resistant plants. Grass should be cut to six inches or less. Dead branches, leaves, and similar debris should be removed from this zone as well as from the roof, deck and gutters.

- **Zone 2** extends from 30 to 100 feet. Fuels reduction in this zone is intended to diminish the intensity of an approaching wildfire. Dead or dying trees and bushes and ladder fuels should be removed. The spaces between tree crowns should be at least ten feet. A minimum of 30 feet should be maintained between planting groups. Propane tanks, firewood, and other fuel sources, such as wood outbuildings, should be located in this zone or beyond.

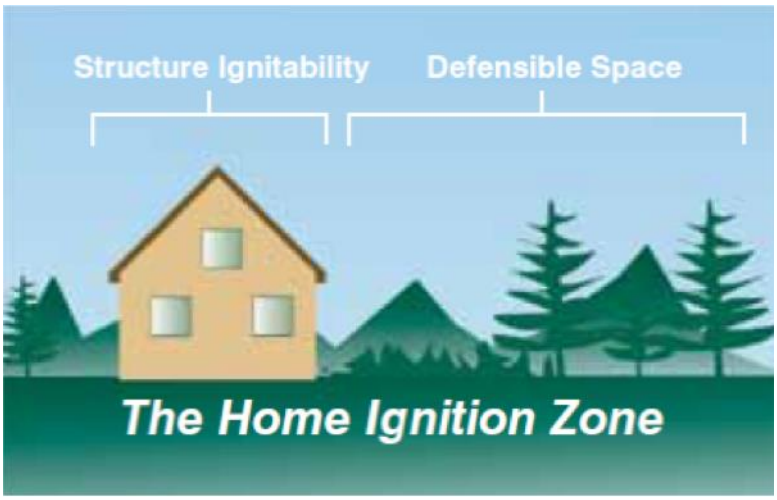


Figure III.1. Home Ignition Zone (Credit: CSFS).

- **Zone 3** lies beyond 100 feet. Ladder fuels should be removed. Slash treatments are acceptable, including piling and burning, chipping, and lop-and-scatter. Two to three snags per acre are allowed. This zone provides an opportunity to improve the forest through proper management, such as maintaining trees of multiple ages, sizes and species, and adequate growing room. Re-treatment of vegetation is almost always required to maintain reduced amounts of fuel. Treatment intervals range from several years to a few decades.

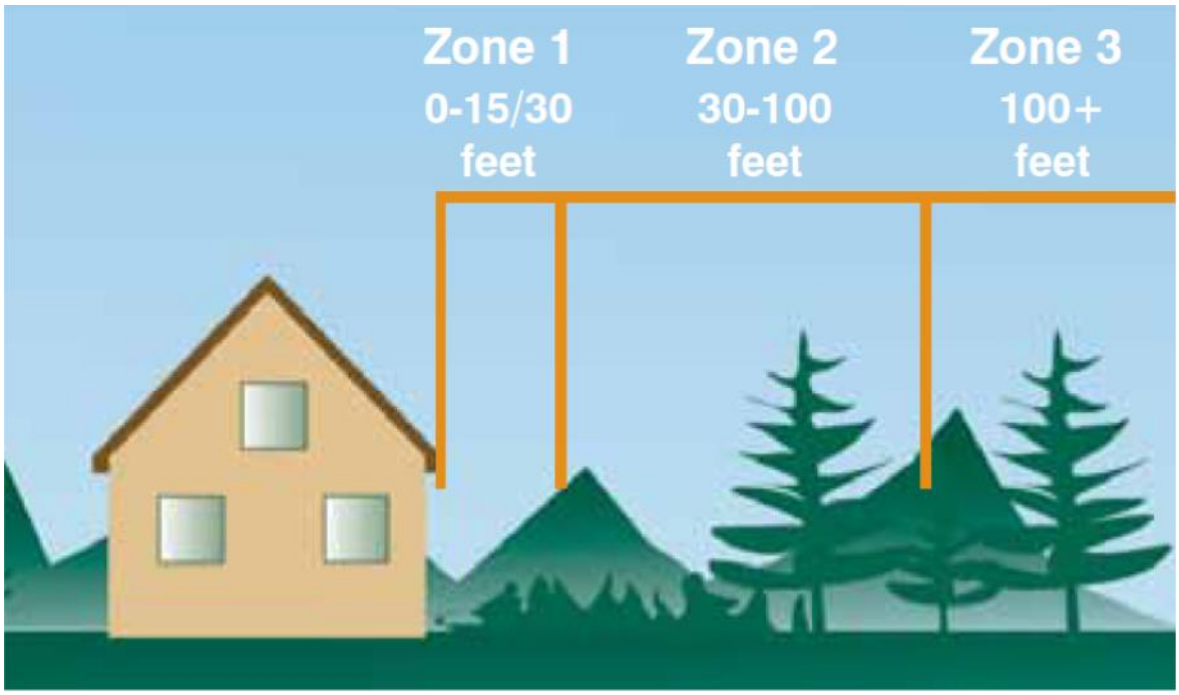


Figure III.2. Defensible Space Zones (Credit: CSFS).

(2) Construction materials and design. Whether a home ignites during a wildfire is determined by the characteristics of its exterior materials and design and the response of those materials and design to burning objects within the home ignition zone and to burning embers. Features that represent a structure's wildfire vulnerabilities include:

- roofs are large, relatively horizontal surfaces exposed to embers;
- window failure allows flame and embers to enter a structure;
- gutters are areas where debris can accumulate and potentially ignite;
- vents are avenues for embers and flames to enter a structure;
- decks and porches represent other large, flat surfaces exposed to embers; and
- exterior siding can burn if exposed to flame or radiant heat long enough, and embers can collect at the base of exterior walls, potentially igniting debris in the same area.

In terms of structure design,

- complex roof designs provide a number of horizontal-to-vertical intersections where debris can collect and embers can land;
- eaves and overhangs can collect wind-blown embers and increase the risk of igniting siding or nearby vegetation;
- flames can more easily penetrate lap siding compared to ship lap or tongue-and-groove designs; and

- the roof edge is vulnerable to wildfire when debris accumulates in adjacent gutters. Where construction creates gaps between the roof covering and the roof sheathing, embers and flame can enter.

(3) Home ignitability and firefighter efforts. Conditions in the home ignition zone also have a direct bearing on issues of human life and safety. Cohen (2010) suggested that, under extreme wildfire conditions, “reasonable levels of fire suppression cannot prevent these disasters.” One of ten lessons learned offered in Boulder County’s CWPP (2011) was “Firefighters cannot defend and save every house.” Discussions during the Chaffee County CWPP process similarly noted differences between the public’s expectations that firefighters will try to put fires out no matter what the circumstances. This contrasts with the firefighting community’s core value of firefighter safety and protecting human life first. Graham, et al. (2012) concluded: “minimizing home ignition potential enhances life safety and firefighter effectiveness especially during extreme burning conditions.”

(4) Summary. Fire protection agencies can predict when wildfire conditions are dangerous, but they cannot otherwise control them. Waiting for an announcement of such conditions to address ignitability issues is too late. Wildfire destruction within the WUI is largely independent of management of fuels in adjacent wildlands—based on construction materials, design, and immediate surroundings, a fire-resistant home can reside in a high-hazard area and survive high-intensity wildland fires. Conversely, a highly ignitable home in a low-hazard area can be destroyed during a lower-intensity fire. In other words, vegetation and structural issues must be considered together. The implications for planners, fire agencies, and homeowners include the need to: 1) define high-hazard areas, 2) identify which wildfire treatments are most appropriate *and necessary*, and 3) determine who is responsible for those treatments and the subsequent wildfire impacts. In most cases for WUI private property owners, evidence indicates that the burden is on the property owner (Cohen 2000, 2010; Syphard, et al. 2013).

Chaffee County Next Generation Community Wildfire Protection Plan
Section V: Community Action Plan

Overview

Considering the Wildfire Risk Assessment, treatment prioritization and community preparedness data, the CWPP Leaders Team worked with the community to develop a shared action plan. The plan considers deep community research on current best practices in community wildfire preparedness, available upon request to kim@envisionchaffeecounty.org.

Decades of fire suppression, drought and ensuing insect infestations have caused our forests to decline into very poor health. Fires are occurring more frequently and are more intense. The community strongly supports accelerated treatment. Through the Envision Chaffee County planning initiative, 1,500 citizens and more than 70 organizations prioritized a “vision” of healthy forests, waters and wildlife. Voters further took action in 2018 to support this vision by approving new public funds to support healthy forests, build a fire-ready future and protect our watersheds, wildlife habitat, agriculture, recreation areas and local economy. The community is ready to act.

Based on the above data, the CWPP Leaders Team is committed to action in this Next Generation CWPP. Focused on the goals and objectives outlined here and detailed in Section V, these goals build upon existing treatments and successes from the 2009 CWPP.

A. Goal 1, Fire-Resilient Forests and Productive Habitat

The top priority of the Next Generation CWPP and the Forest Health Council is to accelerate treatment activity across all jurisdictions in high Treatment Priority Areas to halve the risk wildfire poses to community values at risk while also (as practicable) enhancing watershed health, habitat and agricultural productivity. The goal has two objectives:

Objectives:

Goal 1, Objective A: Treating Together

Treat up to 30,000 acres by 2030 across jurisdictions, cutting the risk wildfire poses to community assets in half by focusing on the Treatment Priority Areas developed and agreed in this CWPP. Near-term measurable results for this key objective are:

- **Treat 10,000 to 15,000 acres by the end of 2025,** including all treatment types/areas and subject to funding and conditions.
- Complete **Early Win projects, treating 1,500 priority acres in 2020/2021**, including 100 acres on private lands and 1,400 acres on public lands, and including all treatment types and locations.
- **By the end of 2020, develop a pipeline with 4,000 acres of existing and new cross jurisdictional projects** in priority areas, with about 80% public and 20% private land activities. Deliver multiple benefits, such as fire resilience, forest

health, habitat and agricultural enhancement. Identify funding sources and advance collaborative requests to fund treatment. Increase the number of cross jurisdictional projects.

This is a challenging goal. It requires a substantial change in priorities and approach for agency personnel, and accelerated action—especially on private lands—and increased funding.

The risk assessment and treatment prioritization unanimously supported by the Leaders of this CWPP indicate the greatest impact toward reducing the risk that wildfire poses to community assets can be achieved by focusing treatment activity in Treatment Priority Areas—representing an estimated $100 million budget. In fact, data indicate treating 5 to 10% of the right acres across the total county landscape may decrease the risk wildfire poses to community assets by 50 to 70%. The data also suggest that treatment in lower priority areas may yield much lower return on invested dollars. The Treatment Priority Areas should not be considered as prescriptive, however. On-the-ground conditions, landowner willingness, continuity with fire breaks and pre-existing treatments and other factors may, in some cases, render treatment inside the zones impossible and treatment outside the zones prudent. It is recommended that this is at the discretion of local experts, but that the bias should always and strongly be toward activity in the Treatment Priority Areas.

The shift to treating the “right acres” at the targeted rate of roughly 3,000 acres each year, however, will not be simple for three reasons.

First, agency personnel may currently be evaluated and awarded based on acres treated rather than on the impact treatment work has in reducing the risk to community assets. Further, acceleration of treatment beyond current agency goals may not be rewarded. These agency priorities and policies are outside the influence of this CWPP, but will require attention from local and regional agency management. Local agencies have unanimously endorsed the Treatment Priority Areas in this plan but may face a headwind to change inside their organizations. The strategy for addressing this challenge is education, starting with this planning document.

Second, the Treating Together goal requires an increased pace of treatment on federal lands and an order of magnitude increase in the treatment rate on private and state lands. Acres within the $100 million budget priority areas are comprised of 65% federal, 30% private and 5% state land, and also include evacuation routes that may involve county and state rights-of-way. Priority federal lands are generally in lower-lying areas, and closer to community assets, potentially complicating action and requiring increased coordination with BLM, private landowners and community members. Treatment on private lands has historically been challenged by landowner willingness to treat. Success will require increased coordination, increased landowner outreach, additional human resources for project identification, planning and execution and increased funding. Parallel development of the Envision Forest Health Council and Treating

Together, Chaffee Chips and Envision Healthy Forests programs—and their funding—are integrated strategies to manage this challenge.

Third, additional funding will be required, as discussed under Goal 5.

Goal 1, Objective B: Envision Forest Health Council
Immediately develop the Envision Forest Health Council as a continuation and expansion of the CWPP Leaders Team.

Both the 2016 Hazard Mitigation Plan and work on the Next Generation CWPP indicate a need to continue strengthening partnerships between the land management agencies, local and federal government bodies, fire protection districts and nonprofit organizations most closely tied to fire resilience and forest/landscape health. During work on the CWPP revision, the CWPP Leaders team served as this body. Moving forward, the group unanimously agreed to continue the collaboration under the Envision Forest Health Council. The Council will deliver collaborative action to advance Next Generation CWPP goals and projects.

The Council will be facilitated by Envision Chaffee County, a partnership of County of Chaffee and the Central Colorado Conservancy in partnership with the Colorado State Forest Service. Council facilitation and coordination of the four priority projects from 2020 to 2022 are supported by $258,000 granted in the first funding cycle of Chaffee County Common Ground.

Common Ground invests a portion of sales tax revenues to strengthen forest health and reduce wildfire danger. Created by a 2018 sales tax initiative, the program supports collaborative programs and projects through a grant process that leverages revenues to achieve the highest impact. The Next Generation CWPP Treatment Priority Area map is strongly used to help prioritize funding results.

The 2020 Envision Forest Health Council members include 18 organizations and the current 29 participants listed below. The organizations are expected to remain stable over time, although participating members may change.

- Arkansas Headwaters Recreation Area Manager Rob White;
- Arkansas River Watershed Collaborative, Lead Forester Andy Lerch;
- Buena Vista Fire Department Chief Dixon Villers;
- BLM-Rocky Mountain District Manager Cathy Cook, Fire Mitigation Specialist Ed Skerjanec, Fire Management Officer Ty Webb, and John Markalunas, Assistant Fire Management Officer for the Front Range Fire Management Unit;
- Central Colorado Conservancy Executive Director Adam Beh;
- Chaffee County Commissioners Greg Felt and Keith Baker;
- Chaffee County Office of Emergency Management Director Richard Atkins;
- Chaffee County Fire Protection District Chief Robert Bertram and Battalion Chief Kent Maxwell (also Director of Colorado Firecamp);
- Colorado Parks and Wildlife Area Wildlife Manager Jim Aragon;

- Colorado Springs Utilities: Watershed Planning Supervisor Mark Shea and Forest Program Manager Eric Howell;
- Colorado State Forest Service: Southwest Area Manager Damon Lange, Supervisory Forester Adam Moore, Supervisory Forester Sam Pankratz and Forester J.T. Shaver;
- Envision Chaffee County Co-Leads: Commissioner Greg Felt (also Board of County Commission Chair) and Cindy Williams (Chair, Central Colorado Conservancy) and Envision Project Coordinator Kim Marquis;
- National Forest Foundation Vice President Marcus Selig;
- Natural Resources Conservation Service District Conservationist Bill Gardiner;
- Mesa Antero Water Association President Rick Hum;
- USFS: District Ranger Jim Pitts, Fire Management Officer Chris Naccarato and Mountain Zone Fuels Specialist Andrew White

Ongoing partnership with experts at the Colorado Forest Restoration Institute at Colorado State University (Director Tony Cheng, Assistant Director Brett Wolk and Spatial Analyst Benjamin Gannon) and the Rocky Mountain Research Station (Patty Champ and Hannah Brenker-Smith) will continue to support program success.

B. Goal 2, Fire-Adapted Communities

Build community engagement, understanding, preparedness, public support and realistic expectations for forest and fire management. This includes personal preparedness (such as evacuation plans), citizen action to decrease the risk wildfire poses to private lands and structures and continuing to build upon strong local support for accelerated treatment activities—or "social license to treat." The goal has two measurable objectives:

Goal 2, Objective A: Chaffee Chips

Develop and implement Chaffee Chips, a collaborative program designed to accelerate private land treatments by providing coordinated support to landowners in order to mitigate fuels by creating defensible spaces. The program will work to organize community treatment events in neighborhoods each year, as selected by the CWPP Treatment Priority Area Map and Forest Health Council prioritization. The service is organized by the CWPP Engagement Coordinator in a collaborative partnership with Colorado State Forest Service, Chaffee County Fire, Colorado Firecamp, County Office of Emergency Management, County Landfill and others. The program will include events in selected communities to accelerate treatment activities with focused education; collaborative work by citizens and neighbors to address hazards to structures; volunteer sawyers from Colorado Firecamp to fell larger trees; trailers to remove slash; the county tub grinder to reduce slash to chips; potential curbside chipping, and similar activities. The program will result in increased community action to create defensible space and may also result in larger-scale treatment opportunities in top-priority areas.

Three-year measures for the objective are:

- Provide organized community action in four neighborhoods prioritized by the Council: 1) Base of Mt Princeton/CR321, 2) Mesa Antero/Mesa Antero Estates, 3) Lower Chalk Creek Subdivisions, and 4) Methodist Mountain west of the Decker Fire scar.
- Engage 100 landowners to take an action to enhance defensibility or forest health.
- Celebrate acting community members with signage and recognition.
- Develop plans to add two to four new neighborhoods per year following 2020.
- Support disabled or less-able community members to take action, including a large and growing retiree population.
- Track results, including expanding Firewise communities, to support the effort.

Goal 2, Objective B: Collaborative Communications

Develop and implement **Envision Healthy Landscapes**, a program that will deliver coordinated communications that educate the public, increase awareness, maintain and improve support for forest treatments, encourage action and celebrate success. The program is focused on moving the needle in community preparedness and creating excitement about shared action. Three-year measures for the objective are:

- Reach 20% of the population with a consistent message about the big-picture issue/solution.
- Collaborate among ten organizations, including USFS, BLM, County of Chaffee, Colorado Parks and Wildlife, three fire protection districts, Office of Emergency Management, Central Colorado Conservancy, CSFS, and Arkansas River Watershed Collaborative to deliver news and information.
- Deliver ten news + eight education stories in 2020 = 1.5 “touches” every month, all year.
- Use social/traditional media, neighborhood meetings, work days and more to reach 4,000 people.
- Engage 200 citizens in forest health-related activities through work days and events.
- Create 100 instances of community support (e.g. Facebook posts, letters to editor, etc.).
- Develop a model of collaborative forest health engagement.
- Increase Firewise communities from two to five.

During CWPP development, the Leaders Team recognized the need to increase awareness about the importance of wildfire preparedness and educate the public about certain aspects of their work, such as how prescribed burns are planned and executed. They decided that more communications and better coordination in public outreach

efforts among the different agencies and departments was necessary to maintain and improve support for CWPP implementation and encourage action among landowners. They also wanted to measure and celebrate success with the community.

The CWPP Leaders Team agreed that promoting basic elements of the CWPP would help answer big-picture questions among the public, such as who is in charge of countywide wildfire mitigation efforts and what steps are being taken to achieve CWPP goals. Making the CWPP easy to understand helps a distracted and busy public to engage. To that end, a user-friendly, condensed and colorful version of the official CWPP was created (see Appendix B).

The Leaders also recognized that opportunities such as neighborhood meetings and work days offer actionable ways for community members to participate. Many times, action-oriented engagement is more meaningful for people than passive participation, such as reading an educational flyer.

Through facilitated exercises, the CWPP Leaders Team developed and agreed on a simple story context or public message that includes CWPP goals and steps to accomplish them. Council members unanimously endorsed the approach, and agreed to
include consistent context about shared county goals in all relevant public communication. The team also agreed to form a Communications Committee with representatives of each agency and department, so that outreach could be increased and coordinated in the future. The committee also will share assets such as educational stories, videos, pictures and flyers, and will make a concerted effort to provide simple and consistent
information to the public as well as plan celebratory events.

The need for increased community education and outreach with one shared message has been repeatedly identified. The Forest Health Council is taking an unprecedented approach: Agreeing to share one single message platform with one voice and to use the expertise and resources of all participating organizations to do so. As an example of what the program is working to achieve, goals and measurable outcomes for the first year of work in 2020 are included here:

C. Goal 3, Safe and Effective Wildfire Response

Enable safe and effective wildfire response, including collaborative preparedness for severe wildfires and evacuation events. The goal has one current objective:

Goal 3, Objective A: Zoning and Code

Update the regulatory environment by addressing early wins and longer-term strategic modifications to zoning and code that support community fire resilience. Measurable results for this program are:

- Ensure the Chaffee County Comprehensive Plan incorporates the CWPP and CWPP Leaders' prioritization regarding regulatory changes. Task County

government with synching other county programs to meet the CWPP goals, including land use code, emergency hazard and mitigation plans.

- Work with the County government and the Forest Health Council to address "early win" opportunities identified by the CWPP Leaders Team.

CWPP Leaders had multiple discussions about the need for regulatory environment changes to better support firefighter and community safety and to protect values at risk. Research based on other community successes shows there are likely many opportunities in Chaffee County to use these best practices here.

CWPP Leaders assessed and prioritized opportunities based on impact vs. political acceptability and "doability" in a facilitated session. The result was to prioritize potential changes into three categories: Early Wins (high potential impact and high acceptability); Next Wins (high impact but lower acceptability and therefore requiring extensive community engagement); and Others (lower impact and lower acceptability). The results are summarized in Table V.2 below.

Table V.1. CWPP Leaders' prioritization of regulatory changes relative to community acceptability and impact to life safety and fire resilience.

Early Wins – Do ASAP (High Impact, High Acceptability)	• Update requirements for driveway and road widths and steepness to better consider firefighter and community safety, especially in wildfire-vulnerable areas. • Require road and address signage in WUI neighborhoods that is reflective and non-combustible.
Next Wins – Consider in Comprehensive Plan Process (High Impact, Moderate Acceptability)	• Requirements for fire-resistant materials or design for new construction in areas with high wildfire risk • Increase coordination, education and enforcement regarding controlled burns and fire bans. • Requirements or incentives for defensible space and fire-resilient landscaping in new construction in high-risk areas • Requirements or incentives for defensible space in existing construction in high-risk areas • Connect defensible space and fire-resilient materials to county insurance providers and insurance costs/incentives. • Require sufficient water sources for fire protection in new subdivisions.

Others (High to Moderate impact, Low Acceptability)	• Requirements for fire-resistant materials in existing construction • Connect Fluvial Hazard Mapping (from CWCB) and debris-flow modeling to code. • Create wildfire overlay zones.

D. Goal 4, Effective Post-Fire Recovery

Develop proactive planning and projects for post-fire recovery, flood, and sediment management. The goal has one objective:

Goal 4, Objective A:
Build upon lessons learned from the Decker Fire recovery to identify and prioritize appropriate and proactive county-wide projects by December 2021, and consider as an update to this plan.

E. Goal 5, Strategic Funding for Healthy Forests

Develop collaborative funding to deliver on the goals and objectives outlined above. The biggest barrier for treatment on private lands and for accelerated treatment on federal lands is funding. The actions to address this challenge are in development and include a focus on collaborative funding development by leveraging the science-based work and community collaboration demonstrated in this plan; Chaffee Common Ground funds; and building on existing partnerships with business partners, including water providers. The goal has two objectives:

Goal 5, Objective A: Develop a roughly estimated $45 to $50 million over ten years (assuming a $1,500 per-acre average treatment cost and the cost of additional human resources to identify, develop and manage programs and projects).

Goal 5, Objective B: Leverage Chaffee Common Ground forest health funds to support strategic investments in forest health and as seed dollars to develop additional funding. Forest Health Council representatives will engage as "Subject Matter Experts" to inform Common Ground grant programs. Forest Health Council members will support development and prioritization of annual funding requests to Chaffee Common Ground.

Chaffee Common Ground. Ballot Issue 1A was approved by Chaffee County voters in November 2018. The measure added a 0.25% increment to the county sales tax, which is expected to raise $1.1 million annually. Common Ground funds are distributed as follows: 25% for strengthening forest health, 25% for conserving and supporting working lands, 5% for managing growth impacts to recreation, and 45% is discretionary. This means that roughly $275,000 to $750,000 per annum is available to plan, develop and execute treatment projects. Applications are reviewed by the Chaffee County Common Ground Advisory Committee. The Committee's recommendations are forwarded to the

Board of County Commissioners for approval (County Resolution 2018-46). The first round of applications was approved in December 2019—including $258,000 supporting a three-year implementation of this plan.

As part of its discussions, the CWPP Leaders Team considered how best to pursue project funding, especially with the goal of multiplying the impact of Common Ground funds. An initial task was producing a list of potential funding sources. Table V.1 summarizes those primary sources according to approved uses for potential funds. Beyond this list, continued and expanded partnerships with water providers and local business are included in the plan. Council members will work to further develop this strategy and to complete collaborative funding requests, with support available from CSFS with funding from Common Ground.

Table V.2. Summary of potential funding sources for forest health treatment activities

Purpose	Agency
Conservation Easements	CSFS (Forest Legacy Program), NRCS (Healthy Forests Reserve Program), GOCO
Fuels Treatments and Fire Mitigation	CSFS (FRWRM), BLM, USFS, SFA (State Fire Assistance), NFWF (National Fish Wildlife Foundation) ReStore, FEMA Wildfire Mitigation, GOCO Youth Corps Grants, CNCS State Commission – AmeriCorps NCCC Chainsaw Mitigation Crew, DFPC Wildfire Module, Juniper Valley SWIFT Crew (Sawyers in training)
Hazard Mitigation	FEMA (pre-, post-wildfire, flooding), NRCS (Emergency Watershed Protection, Joint Chiefs, TCP (Targeted Conservation Pool)); USFS (infrastructure cost share)
Planning, Design and Monitoring	CSFS (Forest Stewardship Program), BLM/USFS (Title III, Wildfire and WUI Community Fire Assistance programs), USFS/LOR (CPAW), BOR (watershed groups), CDHSEM (Emergency Management Performance Grant, disaster recovery), GOCO, DOLA
Habitat Restoration	NRCS (Joint Chiefs, TCP), USFS (Landscape Scale Restoration Program), CWCB (watersheds, healthy rivers), GOCO, CWRPDA (bonds), CPW Habitat Partnership Program, Rocky Mountain Elk Foundation, Mule Deer Foundation, Wild Turkey Federation, State Land Board Improvement Funds, NFWF ReStore, National Forest Foundation Matching Awards Program, CoCO/USFS HIM program
Capital Projects	USFS (infrastructure cost share), USDA (Community Facilities Direct Loan & Grant)

Equipment	FEMA (Assistance to Firefighters Grant), USFS (excess property), COCO AIM (Actions Implementation and Mitigation), CSFS (FRWRM)
Education, Training and Outreach	BLM (Rural Fire Asst.), USFS (Volunteer Fire Asst.), IAFC/AIGI (RSG Fuels Mitigation), USEPA, several NGOs, NFPA Firewise Wildfire Day of Service
Wood Products, Biomass	CSFS (CO Wood Utilization/Marketing), USFS (Wood Innovations Grant, Value Added Grant)
Wildlife, Aquatic Systems	CPW (Habitat Partnership Program, Colorado Wildlife Habitat Program), TU (Embrace-a-Stream), NFWF, Excel Energy Foundation, CWCB (CO Water Conservation Board)
Recreation	GOCO; Excel Energy Foundation
Water Related	USEPA/CDPHE (CWA §319, drinking water, Five Star), CWCB Colorado Water Plan Grants, CWCB Water Supply Reserve Fund Grants, CWBC Watershed Restoration Program

F. Action Plan

An initial action plan for the above goals and objectives is provided in Table V-1 below, and will be updated quarterly by the Envision Forest Health Council.

G. Monitoring and Next Steps

Funding has been established to advance the top priorities described above through the CSFS-Envision CWPP Implementation Project, funded for three years with $258,000 from Chaffee Common Ground. This will support facilitation and coordination of the work done by numerous agencies, government organizations, businesses and nonprofits. Envision and the CSFS will also provide high-level tracking, monitoring and transparent communication of progress and results. CFRI will remain involved to inform monitoring of progress toward risk reduction goals.

Identification, development, funding acquisition and execution of forest-health planning and treatment projects will be ongoing. It is recommended that the Next Generation CWPP be updated each five years to incorporate both progress and changing conditions.

H. Acknowledgements

The Next Generation CWPP was developed by the community. 1,500 citizens engaged in Envision planning, 1,035 citizens engaged in the Chaffee Wildfire Survey, and hundreds participated in community meetings. Top local and regional leaders from critical organizations provided over 1,500 hours—or 40 work weeks—of planning time and expertise to develop the plan. Special thanks are due to CFRI for providing uncounted hours and top-notch expertise in assessing risk and prioritizing action.

Chaffee County is a special community that has prioritized healthy forests, waters and wildlife as one of four key visions of the future. The community is working together to make that vision a reality.

Table V.3 Next Generation CWPP Action Plan

Goal	Action Item	Responsible Agency	**Completion Date** (Month-Year)
Goal 1, Fire-Resilient Forests and Productive Habitat			
Accelerate treatment activity to increase fire resilience across all jurisdictions in high Treatment Priority Areas			
Goal 1, Objective A: Treating Together. Treat 25,000 to 30,000 acres by 2030 across jurisdictions			
	Work will begin with a focus on five areas prioritized by the Council: Maxwell Park, Chalk Creek, Antero, Shavano Front and Poncha-Salida South, with the intent to: Complete Early Win projects treating 1,500 priority acres in 2020/2021(including 100 acres on private lands and 1,400 acres on public lands) and by end of 2020, to develop a pipeline with 4,000 acres of existing and new cross jurisdictional projects in priority areas, with about 80% public/20% private.	CSFS Lead (J.T. Shaver), Envision Lead (C. Williams), Chaffee Fire Lead (Kent Maxwell), Central Colorado Conservancy (Adam Beh) with Forest Health Council full support	December-20
	Include Envision Recreation in Balance Rapid Response priority areas for collaborative action to manage human caused fire risk in heavily used dispersed camping areas.	Envision Lead (C Williams), CSFS Leads (J.T. Shaver, Adam Moore)	
	Developed detailed action plans for the above areas with engagement by all Forest Health Council Members - review quarterly at council meetings to track progress on deliverables.	CSFS - J.T. Shaver	Ongoing
	Identify early-win projects for April Common Ground Funding request, and present to the Forest Health Council March Meeting	CSFS - J.T. Shaver with partner organizations	March-20
Goal 1, Objective B: Envision Forest Health Council.			
	Develop a 2020 Council schedule and send out invites for the year.	Envision (C. Williams)	Ongoing
	Develop 2020 Council agendas and facilitation plans. Execute meetings.	Envision (C. Williams) with CSFS (J.T. Shaver)	Ongoing
Goal 2, Fire-Adapted Communities			
Build community engagement, understanding, preparedness, public support and realistic expectations for forest and fire management			
Goal 2, Objective A: Chaffee Chips.			
	Engage partner organizations to develop the program services	CSFS (J.T. Shaver), Envision (K. Marquis, C. Williams), Chaffee Fire (K. Maxwell) and partners as needed	February-20
	Develop funding to purchase additional County trailers (if in progress CSFS grant is not successful, develop a backup plan)	CSFS (Adam Moore), Chaffee Fire (R. Bertram)	March-20
	Develop an action plan and a communications plan to provide organized community action in four neighborhoods prioritized by the Council: 1) Base of Mt Princeton/CR321, 2) Mesa Antero/Antero Estates, 3) Lower Chalk Creek Subdivisions, and 4) Methodist Mountain west of the Decker Fire Scar.	CSFS (J.T. Shaver), Envision (K. Marquis, C. Williams), Chaffee Fire (K. Maxwell) and partners as needed	March-20
	Engage with the Envision Recreation in Balance team to ensure that top priority dispersed camping impact areas (at Shavano, Clear Creek, Raspberry Gulch-Browns Creek, Fourmile, Burmac, Tunnle View and the Horn Fork Basin are considered in treatment that considers the risk of human caused fire.	As above	June-20
Goal 2, Objective B: Collaborative Communications.			
	Advance media pieces and collaborative inter-agency communications as planned, leveraging the Communications Committee	Envision (Kim Marquis) with Communications Committee	Ongoing
	Develop a consistent message about the big-picture issue/solution. Develop and execute a plan to reach 20% of the population with this plan, to include inserts in regional media regarding forest health and fire resilience	Envision (Kim Marquis) with Communications Committee	December-22
	Connect the 18 Envision Forest Health council members to deliver fire-resilience related news, information and education with the shared message platform above and leveraging each agencies events and outreach media.	Envision (Kim Marquis) with Communications Committee	Ongoing
	Deliver 10 news + 8 education stories in 2020 = 1.5 “touches” every month	Envision (Kim Marquis) with Communications Committee	Ongoing

Goal	Action Item	Responsible Agency	**Completion Date** (Month-Year)
	Use social/traditional media, neighborhood meetings, work days etc. to reach 4,000 people.	Envision (Kim Marquis) with Communications Committee	December-22
	Engage 200 citizens in forest health related activities through work days and events.	Envision (Kim Marquis) with Communications Committee	December-22
	Create 100 instances of community support (eg Facebook posts, letters to editor, etc.).	Envision (Kim Marquis) with Communications Committee	December-22
	Increase fire wise communities from 2 to 5	CSFS and Fire Chiefs	December-22
	Use drone video capabilities of local fire departments to create educational footage	Envision (Kim Marquis) with Communications Committee	December-22
	Engage with Realtors® of Central Colorado to help encourage and promote a fire resilience course for realtors®, developers, and insurers. Content to focus on wildfire risk assessment, wildfire-related aspects of planning, zoning, and building codes, and risk reduction techniques in the home ignition zone.	Envision (C Williams, K Marquis)	December-21
Goal 3, Safe and Effective Wildfire Response			
Goal 3, Objective A: Zoning and Code.			
	Ensure the Chaffee County Comprehensive Plan incorporates the Next Generation CWPP.	Commissioner Baker	December-20
	Provide NG CWPP Goals and Objectives to Comprehensive Plan consultant for inclusion in the Comp Plan summary Theme/Goal sheet	Envision Lead (C Williams)	February-20
	Provide NG CWPP immediate and longer term zoning/code recommendations to the Planning and Zoning Comission	Envision Lead (C Williams) coordinates with 3 Fire Chiefs	February-20
	Engage County government with synching other county programs to meet the CWPP goals, including land use code, emergency hazard and mitigation plans etc.	Commissioners Baker, Felt	December-20
	Work with the County government and the Council to address “early win” opportunities identified by the CWPP Leaders Team (Update requirements for driveway and road widths and steepness to better consider firefighter and community safety, especially in wildfire fire vulnerable areas, and require road and address signage in WUI neighborhoods that is reflective and non-combustible.	Commissioner Baker with Forest Health Council Leaders	December-20
Goal 3, General			
	Update the 2009 CWPP list of priority WUI Communities and develop an annual process to ensure that it remains current.	CSFS with the Envision Forest Health Council (EFHC)	October-20
	Consider the cost/benefit of updating the 2007-2008 risk assessment and make recommendations to the FHC.	CSFS with Chaffee Fire	October-20
	Develop a shared community contact list for HOAs and forest health leaders.	Envision (Kim Marquis) with EFHC Members	December-20
	The County CWPP serves as an umbrella for other CWPPs that cover smaller areas and subdivisions within the county. Update these plans to consider the Next Generation Chaffee County Community Wildfire Protection Plan.	CSFS, Fire Chiefs	December-21
	Identify needs for any equipment additions using the county-wide equipment summary in this CWPP, and develop funding to purchase.	CSFS, Fire Chiefs	December-20
	Clarify needs for additional communications equipment, masks and fire shelters, and purchase.	Fire Chiefs	December-21
	Incorporate a GIS layer for landownership parcels into emergency-response procedures for the county communication center; · create evacuation plans (for) areas with high wildfire threat.	Office of Emergency Management	December-20
	Develop a collaborative “drawdown” policy among local and federal agencies to ensure that appropriate response is available considering current local conditions and the fact that local personnel and equipment are also dispatched out for national fires,.	Kent Maxwell with Envision Forest Health Council	December-20
	Complte auto-aid agreement with DFPC.	Richard Atkins (OEM) with appropriate agency leads	December-20

Goal	Action Item	Responsible Agency	**Completion Date** (Month-Year)
	Develop a plan to share staffing on local engines and tenders for local incidents would be helpful, for example increasing the number of ambulance personnel who are also wildland firefighter qualified.	Kent Maxwell with Envision Forest Health Council	December-20
	Assess if sufficient local agency wildfire module and/or hand crew are available to respond to a high probability initial attack on a wildfire without equipment access and to address gaps if/as identified..	Kent Maxwell with Envision Forest Health Council	December-20
	Continuing an ongoing assessment of suppression capabilities to maximize the effectiveness of firefighting for our community.	Kent Maxwell with Envision Forest Health Council	December-20
Goal 4, Effective Post-Fire Recovery			
Develop pro-active planning and projects for post-fire recovery, flood, and sediment management.			
	Provide reporting on Decker Fire Recovery lessons learned and recommendations for county-wide action to Forest Health Council.	USFS (J. Pitts)	December-20
Goal 5, Strategic Funding for Healthy Forests			
Develop collaborative funding to deliver on the goals and objectives outlined above.			
Goal 5, Objective A: Develop a roughly estimated $45-50 million over 10 years			
	Advance efforts to develop program funding through the Rocky Mountain Restoration Initiative.	Envision (C. Williams), Commissioner Felt, USFS (J. Pitts), CSFS (D. Lang)	Ongoing
	Advance efforts to develop a 2020 Joint Chiefs Grant application	CSFS (J.T. Shaver), USFS (J. Pitts)	October-20
	Identify grant and partnership opportunities and support at least 5 applications	CSFS (Adam Moore)	December-20
	Develop a collaborative funding development plan including the sources in the CWPP Document	CSFS Lead (Adam Moore), Central Colorado Conservancy (Adam Beh), Envision (C. Williams)	October-20
Goal 5, Objective B: Leverage Chaffee Common Ground forest health funds.			
	Identify early-win projects for April Common Ground Funding request, and present to the Forest Health Council March Meeting	J.T. Shaver with Council Members	March-20
General			
	Share the Next Generation CWPP with the community, using it as a catalyst for education and engagement. Print 1,000 copies of the CWPP Community Summary and distribute. Distribute on all Forest Health Council member websites, social media etc.	Envision (Kim Marquis)	February-20
	Re-assess new information and the need for update to this CWPP every 2 years.	Envision Forest Health Council	December-21

Chaffee County Next Generation Wildfire Protection Plan

Appendix A: Chaffee County Wildfire Survey Report

Envision Chaffee County Community Wildfire Survey
April 2019 Executive Summary

The Chaffee Wildfire Survey collected data from 1,035 participants; 7% of Chaffee County residents over 18 years old. The survey population was opportunistic but is representative of all parts of the county; rural versus municipal areas, full- and part-time residents and home ownership. However, the data under-represents younger residents (18-34) and over-represents higher income residents, likely because older, wealthier property owners are more concerned about the impacts of wildfire to them and therefore, were more willing to engage in the survey.

Survey respondents are highly aware of the risk of wildfire, with 80% indicating that a major fire is likely to happen in Chaffee County in the next five years. Yet wildfire preparedness lags awareness. Forty percent of residents do not have an evacuation plan, 44% are not confident they can easily get information in the event of a wildfire, and 46% have not registered for the Everbridge reverse 911 system. Further, more than half of residents are unclear who to contact to learn how to decrease the risk of wildfire to their home or property. If the survey demographic is biased toward "more engaged" residents, these preparedness percentages may be low compared to the full population.

Private landowner respondents have little sense of urgency to act to remove vegetation or to change the characteristics of their home to protect their residences from wildfire. Nearly 90% indicate they have already taken some action, and the majority feel that removing vegetation or changing the characteristic of their structure will have only a small to moderate impact on risk. However, the top factor residents indicate would encourage them to act was "information about what to do," which is consistent with the lack of clarity about where to get such information noted above. This suggests an opportunity for education on why/how much private lands treatment matters and what fully effective treatment entails, in order to develop increased urgency for action (assuming additional work on private lands is generally warranted). Once that sense of need is established, the data suggest that support to do the work and to remove cleared vegetation, combined with ongoing encouragement, would increase execution.

Regarding new private land development, the survey data appear to indicate strong support for wildfire-related provisions in building codes.

On public lands, citizens perceive forest health to be fair, while professionals consider it to be poor. The advancing beetle kill epidemic, high forest density and fuel loads related to decades of fire suppression, and increasing drought/climate change are perceived by citizens as top threats to forest health. Survey responses also highlight very high concern about, and even animosity toward, growing recreation use by visitors to the county – cited as the second-highest threat to forest health (following insect infestations).

A strong majority of residents (80-86%) support land management activities to mitigate wildfire risks and about seven in ten think these activities are also beneficial to wildlife. For those expressing concerns about treatments, the top issues were: 1) lack of trust in public agencies to conduct the work cost-effectively and responsibly (without undue visual/environmental impacts), 2) concern that such efforts are too small to have meaningful impact, and 3) with regard to controlled burns, concerns about safety (losing control), impacts to air quality and the need for better notification. These challenges could be addressed through more transparent planning and prioritization of treatment activities, more effective communication around treatment activities (pre- and post-work), and education about how the safety and air quality impacts of controlled burns are managed.

County Ballot measure 1A, a sales tax increase passed in November 2018, provides funds to protect communities and water from severe wildfire and to enhance forest health and wildlife habitat. Consistent with community concerns about recreation use as a top threat to local forests, fire ban enforcement and education/enforcement of visitor behaviors ranked as the most important use of funds, followed by action to decrease risks on public lands. Funding action on private lands was seen as lower priority, although still important to very important.

The wildfire survey was intended to inform agency and community action to better manage wildfire risk. The results indicate opportunity to:

- Increase community wildfire preparedness;
- Help private landowners understand the value of/need for action to reduce risk to their homes, the work they need to do, and develop additional programs to support such actions;
- Update to building and land use codes to further address current wildfire risk; and
- Provide more transparent planning and prioritization of public and private land wildfire risk management activities, coupled with more effective communication about planned and completed work.

Leaders of county government and emergency management, local fire protection teams, and state and federal land and wildlife management agencies have and continue to work hard to protect the community from the risks of severe fire and to support forest health and fire resilience. We thank them for their service. Understanding that many factors have changed since the current Chaffee County Community Wildfire Protection Plan was completed a decade ago (population, recreation use, overall forest health), these leaders are working together to create a "Next Generation Wildfire Protection Plan." This plan will include transparent prioritization of current needs and collaborative action shared by agencies and the community. The Community Wildfire Survey is a first step in this process, helping to transparently assess current conditions, perceptions and opportunities. As a next step, wildfire survey findings will be shared with the Community Wildfire Protection Plan leadership team and with community members, with the intent to develop shared priorities and actions.

Survey Demographics

The Chaffee Wildfire Survey collected data from 1,035 participants; 7% of Chaffee County residents over 18 years old. The survey sample was opportunistic, with information and an online link widely distributed through local media (radio, newspaper) and shared through the contact lists of local fire departments, emergency management, federal and state land

management agencies, major local employers (Heart of the Rockies Regional Medical Center, Monarch Mountain), homeowner associations and non-profit organizations (many of which connect to both residents and part-time homeowners). The survey was in the field for 22 days, from 11 February to 04 March, 2019.

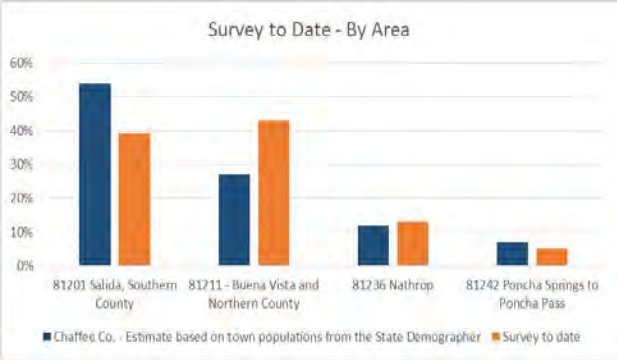


Figure 1

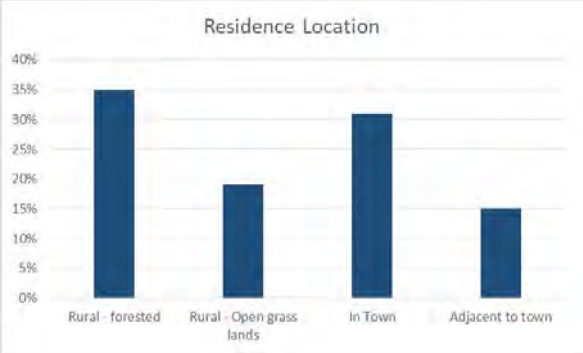


Figure 2

Survey demographics indicate a reasonably representative sample relative to homeownership, county-wide participation and location of residences in rural vs. municipal areas as follows:

- 84% of participants own their own home, compared to 77% of the county population.
- 81% of respondents are full-time residents; 5% live in Chaffee for 7 months a year or more, and 11% live here 6 months a year or less. If the 11% are considered "second homeowners" this compares reasonably well to 2014 census data that classified 7% of Chaffee County homes as secondary residences – especially considering likely growth in this segment since 2014.
- All zip codes are represented; however the Buena Vista code is over sampled (Figure 1).
- Roughly 50% of participants live in rural areas, which reflects the county distribution of 51% of residents living in the unincorporated areas (Figure 2).

The sample population also has some biases:

- Citizens aged 18 to 34 are under-represented (Figure 3).
- Citizens with lower incomes are strongly under-represented, while the highest incomes are strongly over-represented (Figure 4).

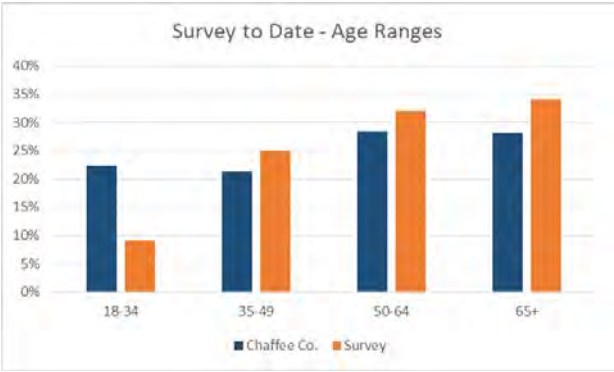


Figure 3

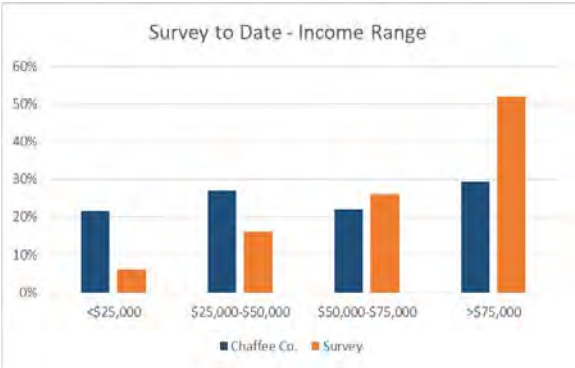


Figure 4

These trends are not surprising, given that those most concerned about wildfire (and therefore willing to engage in the survey) are likely to be older and wealthier residents who own property. This bias could result in over-estimation of engagement and ability to treat private lands.

Finally, 20% of respondents indicated that they were "professionals" with education or occupations related to health, emergency management, fire management or wildlife. This is generally consistent with 26% of residents holding bachelor or more advanced degrees.

Overall, the demographic data is reasonably representative and the biases are not seen as fatal flaws. Data from selected questions was assessed relative to the location of residents (rural vs. urban) and professional background. There remains opportunity for future analysis of data based on income, age and zip code.

Wildfire Risk Awareness

Chaffee County residents and homeowners are highly aware of wildfire risk. Roughly 80% of respondents believe a major wildfire in Chaffee County is very or extremely likely within the next 5 years [Question 4]. This opinion is shared fairly equally among all residential types. When considering if a major fire will occur near their residence, 85% of those living in rural forest areas indicate this is extremely to very likely, versus 34% of those living in town (Figure 5) [Question 5].

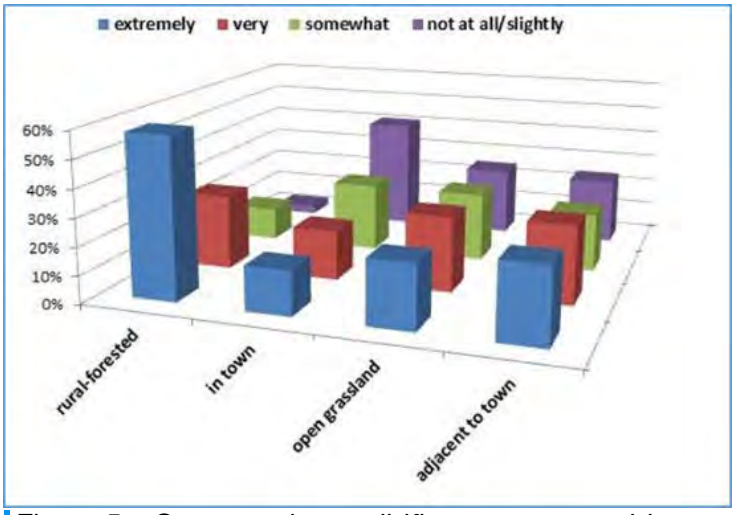


Figure 5 – Concern about wildfire near your residence

Responses also indicate that residents are highly aware of the potential for serious detrimental impacts to the community as a result of a large-scale wildfire. The overwhelming majority of respondents indicated it is "very" or "extremely" likely that a major fire would result in unhealthy air quality, threatened water supply, damaged river water/trout and impacts to local businesses. Rural residents generally thought it very to extremely likely that their property would be destroyed, with more urban residents indicating a lesser threat [Question 6].

When considering the most important things to protect in the case of a wildfire (or "Values at Risk") the community prioritized human life, and especially firefighter lives. This was followed by drinking water, infrastructure, homes and endangered species as the second tier. Recreation and views generally fell into a third-priority tier (see Figure 6, next page) [Question 11].

This ranking of priorities is generally consistent with the views and policy of local government, land management and fire protection leaders provided in an independent ranking. These leaders also included Post Fire Flood Control on a "tier 2" priority level with homes and infrastructure.

Wildfire Preparedness

Wildfire preparedness lags awareness. While 80% of residents believe a major fire is likely, only:

- 60% indicated that they currently have an evacuation plan "for people in their homes,"
- 55% have provisions for "important documents and medications,"
- 38% have provisions for "children home alone," and
- 35% have provisions for "pets or large livestock" [Question 7].

Percentages for all categories were higher for respondents in the rural-forested and rural-grassland categories (Figure 7), but there is opportunity for improvement in this area.

Question 11: Survey responses indicating relative degrees of importance for protection from wildfire and aftermath.

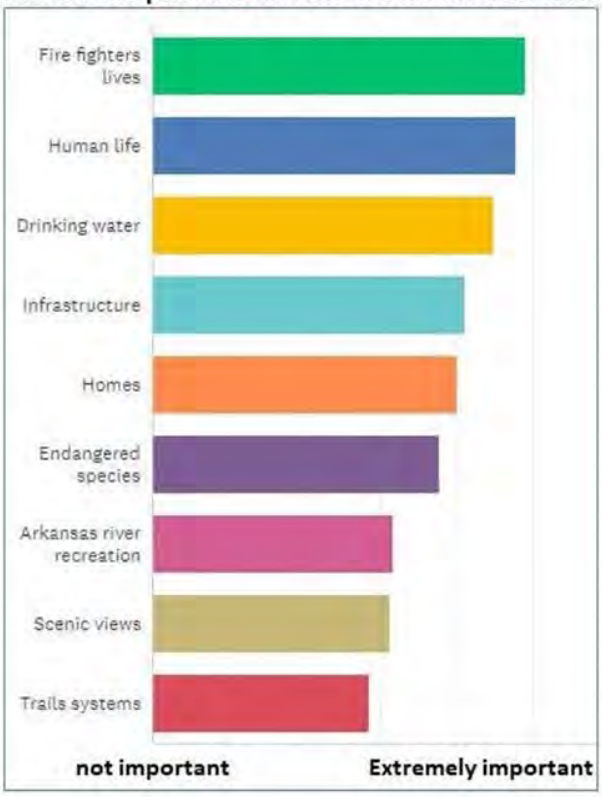


Figure 6

When considering communications in the event of a local wildfire, 66% of respondents are confident that they "can easily receive information" and 64% have signed up for the County's reverse 911 service [Questions 9 and 10].

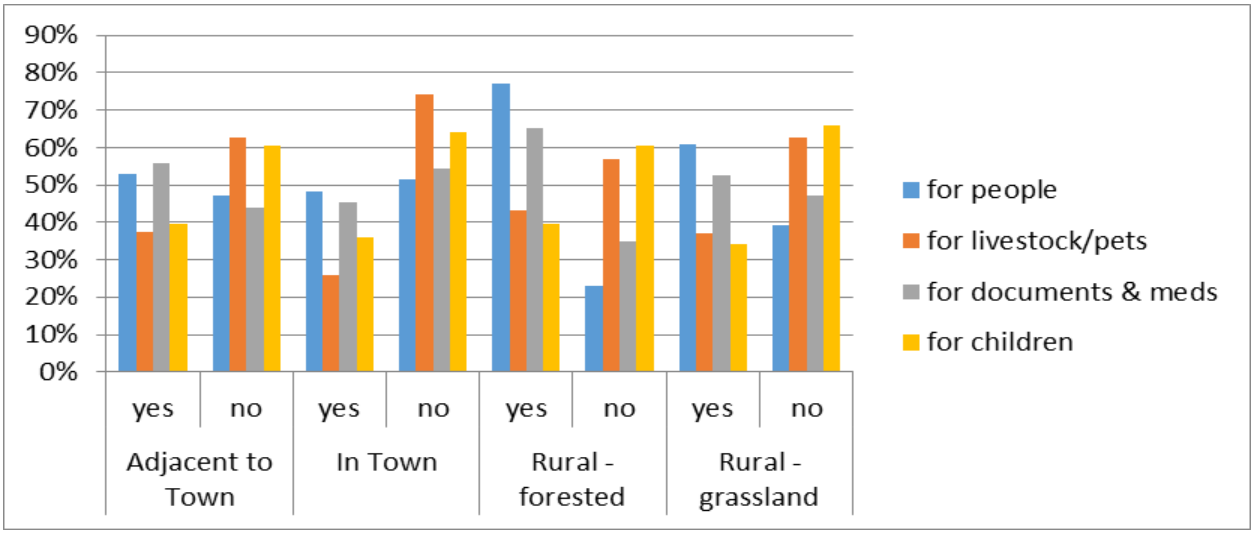


Figure 7

Respondents are unclear who to contact to learn how to decrease wildfire risk on their property [Question 8]. While 24% would contact one of the local fire departments and 23% would contact the USFS or Colorado State Forest Service (CSFS), the remaining 53% are unsure; 9% indicate they simply do not know, while 44% expressed more than 50 different ideas. Consistently, in Question 20 (discussed below) respondents indicated the top thing that would encourage them to complete mitigation treatments on their lands is information about what to do. This is clearly a high opportunity area.

Overall, there appears to be opportunity for actions to continue to increase community wildfire preparedness, especially considering that preparedness may also be over-estimated due to the survey demographic bias toward "more engaged" older and wealthier residents.

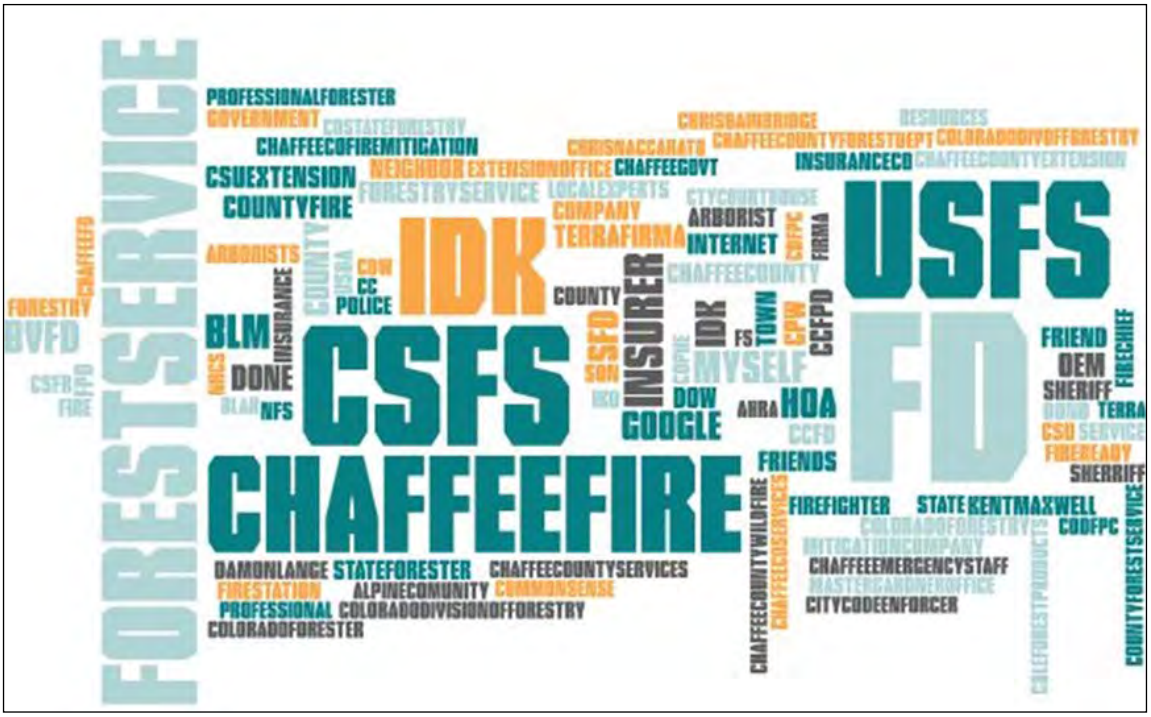


Figure 8. Word cloud showing who citizens would contact to learn how to decrease wildfire risk on their property. (IDK indicates "I don't know" response and FD indicates a Fire Department)

Private Landowner Action

This section focused on understanding homeowner awareness to personally take action to decrease risk of wildfire at their residences, and to gather data on potential barriers or incentives to such work.

As noted in previous sections, residents are highly aware of the risk of wildfire and the probability (especially for rural homeowners) of damage to their homes. When asked to rank factors that could contribute to wildfire damaging their homes [Question 18], respondents perceive that human activities on public lands and the need for vegetation management on public lands and neighbors' properties (with 927 people completing the ranking) are most important. Vegetation on their own property and the characteristics of their homes were seen as only small

to moderate contributors (Figure 9). This could suggest opportunity for education on why or how much these factors matter. The ratings could also be related to the belief that property owners have already addressed the risk on their own lands.

When asked to indicate what they have done to decrease wildfire risk on their property, almost 90% of respondents indicate some action as follows [Question 19]:

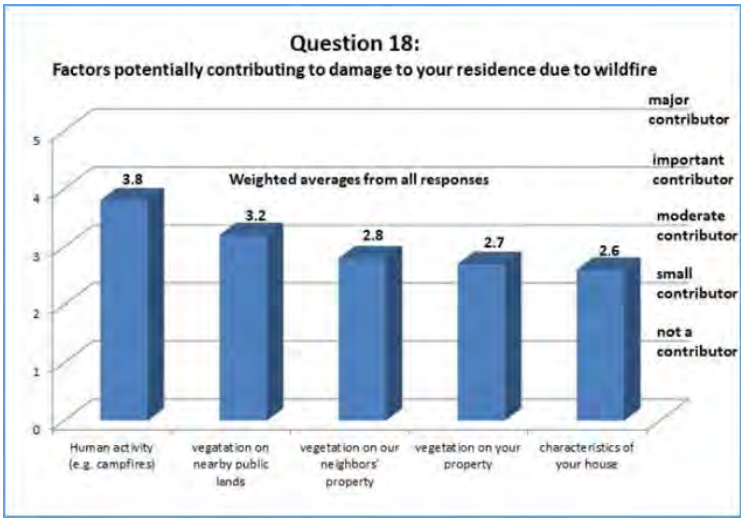


Figure 9

Cleared weeds, brush, trees	88%
Disposed of vegetation	82%
Mowed dead grass, moved wood	80%
Made residence more fire-resistant	53%
Provided input to community wildfire plan	31%
Helped neighbor clear vegetation	28%

This apparent level of effort and awareness is encouraging, although responses based on self-reporting can be misleading and information is not available on the quality/quantity of the work or the time since it was completed. This data may also be influenced by under-representation of lower income and younger residents, who may be less likely to treat. The data suggest opportunity around collaborative community wildfire risk management planning and around helping people who have treated help their neighbors to do so as well.

When asked what would encourage them to do more fire-related treatments, the top response was a need for information on what to do (Figure 10). This is consistent with data discussed above, showing that about half of the community is unsure who to contact to get this type of information. This is a clear area of opportunity. Support in removing cleared vegetation also ranked as

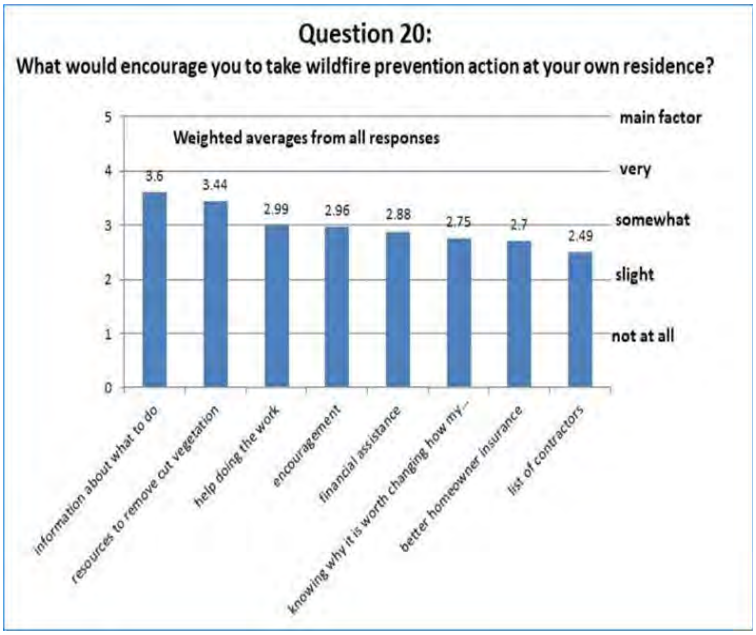


Figure 10

very important for a majority of respondents and at least moderate support was indicated for all options. The need for financial assistance may be underestimated by the survey's relatively wealthy population.

Finally, the current impact of insurance providers in encouraging wildfire risk reduction is small [Question 21], as follows:

- 22% of respondents have received information on reducing wildfire risk from their insurer,
- 6% have had policies cancelled due to wildfire risk,
- 19% have been charged a higher premium due to wildfire risk, and
- 7% have been offered a discount to decrease wildfire risk.

The data suggest opportunities for partnerships with insurance providers to influence risk reduction.

Overall, respondents do not express a sense of urgency in taking action to remove vegetation on their property or changing the characteristics of their home to protect their residences from wildfire. Nearly 90% indicate they have already taken some action, and may feel that they have completed the needed work. This is interesting, considering over half of respondents are unclear where to get information about how to decrease their risk, and that the top factor residents indicate would encourage action was "information about what to do." This suggest an opportunity for education in why private land treatment matters and what it entails, followed by support to treat and to remove vegetation, coupled with ongoing encouragement.

Land Use and Building Codes

Many communities have worked to address wildfire risk, especially in the wildland urban interface, by modifying building or land use codes. For instance, Douglas County adopted provisions of National Fire Protection Association Code 1144, "Standard for Reducing Structure Ignition Hazards from Wildland Fire" into its Uniform Building Code 24 years ago (1994). However, prior to the Hayman Fire (2002), Teller County did not have regulations related to reducing wildland-urban fire risks. The county added such regulations in 2007 (Section 6.5, "Wildfire Hazard Areas").

Survey participants were asked how strongly they agree with three statements regarding building codes [Question 22]. Responses are presented in the table below. The results appear to indicate strong support for wildfire-related provisions in building codes. The strong

Question	Agree, Strongly Agree	Disagree, Strongly Disagree
Building codes that require such things are fire-resistant roofs decrease community wildfire risk	75%	8%
I support building codes that encourage safe access for firefighters	90%	3%
I support additional building codes should make new developments more wildfire resistant	81%	7%

prioritization of protecting fire fighter lives also suggests support for changes to code to support that intent.

Perceptions of Forest Health

The survey explored citizens' perceptions of forest health (poor), threats to forest health (beetles, people) and support for treatment activities (strong), with the intent to understand the needs for public education and outreach.

In general, citizens perceive the forest to be in fair to poor health, while management professionals consider forest health to be poor. The words used to describe forest health are different between these groups (Figure 11, below), and suggest a communication gap.

Citizens **Professionals**

Figure 11. Word clouds showing responses to the question, "How would you characterize the health of Chaffee County Forests?" from general community members (left) versus professionals engaged in forest, wildfire or wildlife management.

There is high awareness of both the advancing beetle kill epidemic and of the growing issue of high fuel densities and the challenges related to decades of aggressive fire management. The survey results suggest general understanding of the key issues, that appear to support the need for management activities.

The other clear outcome is a strong sense of concern about the growing impacts of outdoor recreation use. Humans, tourism, irresponsible recreation and growing tourism are seen as the second-biggest threat to local forests, with hundreds of comments in this area. Beyond that, the tone of comments indicates a strong sense of animosity towards tourists and visitors (see Appendix A for details). This emphasizes the importance of the in-progress Envision Recreation in Balance program. Top forest health threats are perceived as:

- Beetle kill / insect infestation / disease (30%);
- Human activity (visitors, tourists, recreational impacts) (21%);
- High forest density, fuel loads and insufficient thinning and fire (19%); and
- Drought and climate change (19%).

Building on a good public understanding of the threats, the survey indicates strong public support for common fire-related land management activities. The percentages below reflect the degree to which respondents found the following land management activities "acceptable" or better [Question 14].

Tree, brush removal	86%
Burn piles	80%
Controlled burns	82%
Allow natural fire to burn	50%

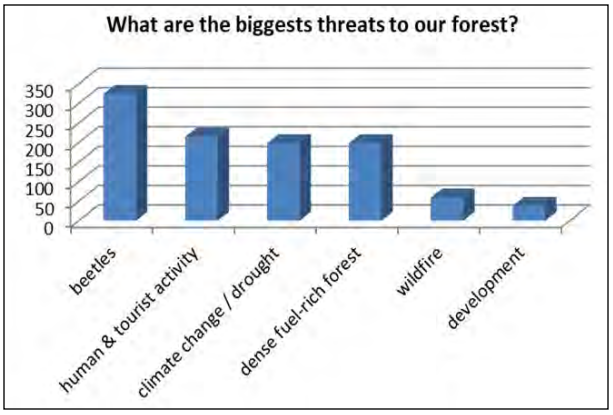


Figure 12. Perceived threats to forest health.

Regarding the lower level of acceptance of letting natural fires burn, an additional 40 percentage points of respondents found the approach "somewhat acceptable." Additional insights may be provided by the responses to Question 15 below.

Consistently, 84% of respondents indicated that they do not have concerns about land management agencies cutting and removing trees or brush on public lands [Question 15]. Of those who did have concerns, 50 submitted additional comments. This data indicates that key issues creating concern include:

- Lack of trust in public agencies (ability of agencies to conduct activities responsibly, cost-effectively and with public input).
- Concerns that such efforts are too small to have much impact or that decision makers' knowledge of what's best may not be correct.
- Potential detrimental environmental effects (visual impacts, impacts to wildlife).

Many of these concerns could be addressed through transparent, collaborative wildfire protection planning, such as the in-progress Chaffee County Next Generation Community Wildfire Protection Plan.

Regarding controlled burns, 76% of respondents indicate that they do not have concerns [Question 16]. For the remaining 24%, key issues include:

- Losing control of the burn,
- Resulting adverse impacts to air quality, and
- The need for better notification.

Finally, the majority of respondents perceive that treatment activities like those above are beneficial to wildlife as follows [Question 17]:

- Controlled burns help wildlife – 73% (agree + strongly agree); and
- Removing trees helps wildlife – 65% (agree + strongly agree).

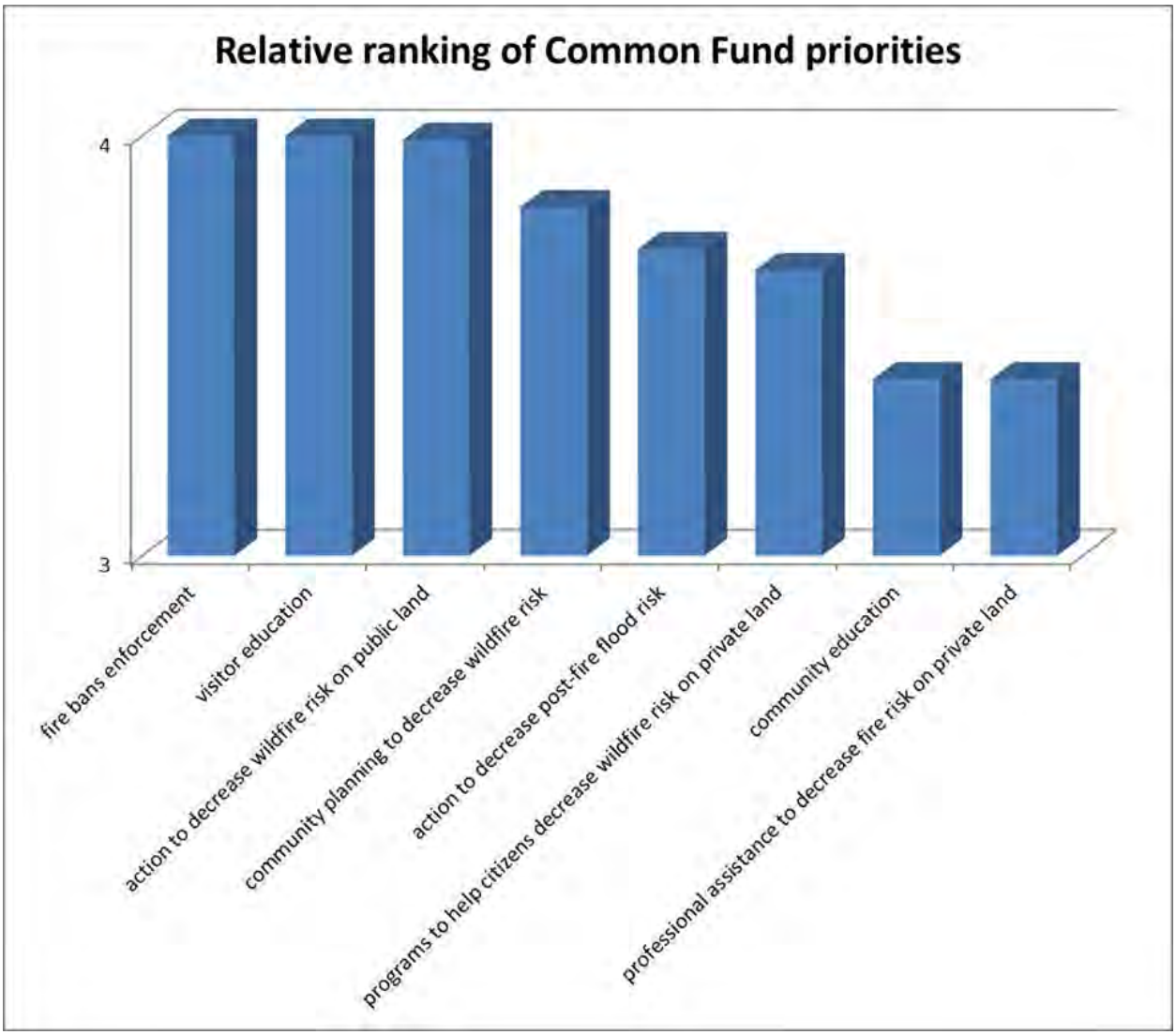
Overall, the community has a good understanding of forest health challenges. There is strong support for treatment activities and the opportunity to further strengthen support through: 1) transparent treatment planning and prioritization, 2) increased communication about treatment

activities (pre and post), 3) demonstrations of well-managed projects, 4) education about the safety and air quality controls for prescribed burns, and 5) better notification around controlled burn activities.

Community Priorities for Common Ground Funds

County Ballot measure 1A, a sales tax passed in November 2018, provides funds to protect communities and water from severe wildfire and to enhance forest health and wildlife habitat.

Survey respondents were asked to rank the importance of a given list of potential priorities from "not important" to "extremely important." Consistent with community concerns about recreation use as a top threat to local forests, fire ban enforcement and education/enforcement of visitor behaviors ranked highest. This is followed by actions to decrease risks on public lands, with funding to take action on private lands having the lowest priority. All of the proposed activities were rated, on average, as important to very important (level 3 to 4 on Figure 13, below).



Recommendations and Next Steps

Building on the work of agencies, fire departments, local government and citizens efforts to date, the survey data suggest opportunity for ongoing work to meet the Community Wildfire Protection Plan Goals as follows:

1. **Increase community wildfire preparedness**.
2. **Continue to decrease risks on private lands**, including helping landowners understand the value of/need for action to reduce risk to their homes and the work they need to do along with developing additional programs to support such actions.
3. **Update building and land use codes** to address current conditions and fully recognize firefighter safety as the top priority.
4. **Further increase strong community support for public land treatment work**, including transparent planning and prioritization of wildfire risk management activities on public and private land, coupled with more effective communication about planned and completed work.
5. **Address the challenges related to rapidly growing recreational use**, including aspects related to fire safety. Note: this work ties in closely with the in-progress Envision Recreation in Balance program.
6. **Communicate more effectively - together.** The number of topics for which the public may benefit from additional education and outreach suggests the need for long-term, collaborative and coordinated public engagement work including the community, agencies, local government, fire departments, etc. There may also be benefit in partnerships with realtors, insurance companies and local media. Such work could build on existing programs and efforts, adding new ideas and approaches, short educational videos featuring local projects, Envision-style community action planning, community events, community awards for action, coordinated activities with annual wildfire day/ week, etc.

In terms of next steps, the opinions above are those of the authors and need to be vetted, prioritized and then acted upon by both the CWPP Leadership and their teams and by the community. This work will begin with the CWPP Leadership team in a scheduled meeting on 15 April and will continue with the community at large and with the Envision Healthy Forest Action Team beginning in May and June 2019.

Our thanks to the many professionals who are working to manage forest health and community wildfire resilience, and are willing to engage together to learn and build on those efforts with new ideas and approaches. Thanks are also due to the 1,000+ community members who engaged in the survey. Chaffee County is a special place working to build a shared vision of the future - together.

Prepared by: Bill Goosmann, Brad Leach, Kim Marquis and Cindy Williams.

Appendix A - Raw Survey Data and Analysis by Question

Question 1: Do you own or rent your Chaffee County residence?

- 84% of respondents own and occupy
- 9% are renters
- 4% are landowners
- 2% own but rent out

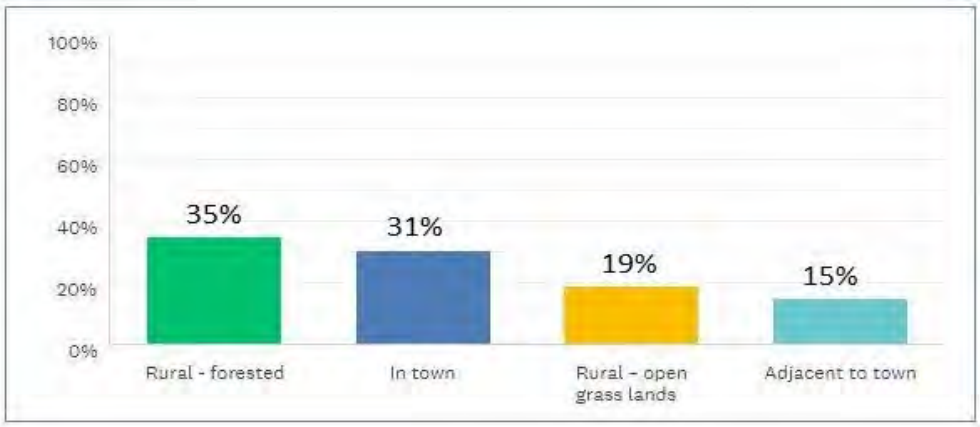
Question 2: How many months do you live at your Chaffee County residence?

The data shows that:

- 84% of respondents indicated full-time residence (12 months)
- 5% of respondents indicate they live here for more than half of the year (7 to 11 months), and
- 11% indicate they live here for 6 months a year or less.

This compares to 2014 Chaffee county census data showing 93% of residences reported as primary, versus 7% reported as second homes. If we consider respondents living in Chaffee County for 6 months a year or less as potential second home owners, and consider likely growth since 2014 in second home owners, this population is reasonably representative.

Question 3: How would you describe your Chaffee County residence (property)?



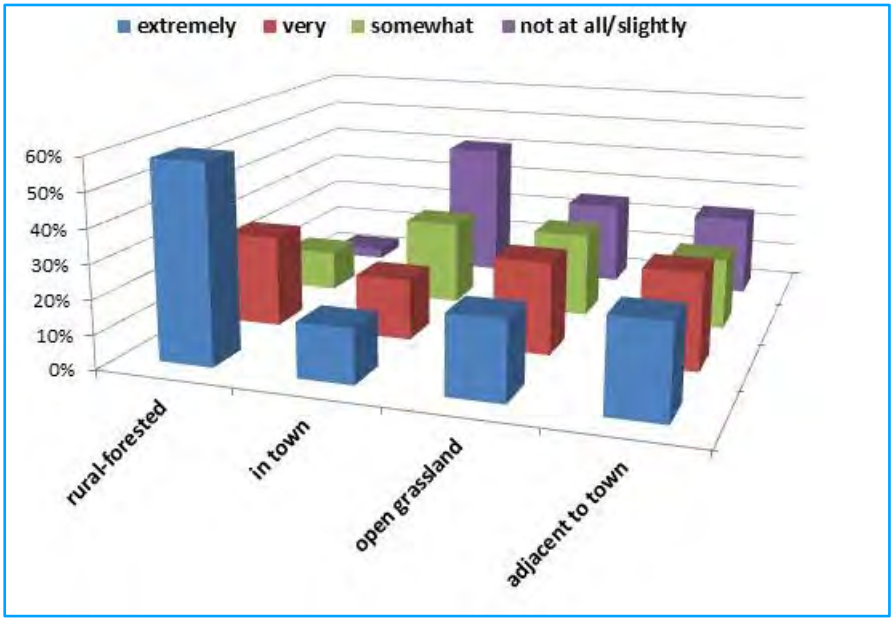
Question 4: How concerned are you about wildfire near your residence?

This was an open-ended question using a sliding scale of "not at all" to "extremely." Subdividing the scale into four ratings of "not at all, to slightly concerned," "somewhat concerned," "very concerned," and "extremely concerned" yields the following:

"extremely"	34%
"very"	24%
"not at all to slightly"	22%

"somewhat" 20%

Looking at the responses according to residence location (question 3) reveals the following:



Rural-forested:
"not at all to slightly" 3%
"somewhat" 12%
"very" 27%
"extremely" 58%

In town:
"not at all to slightly" 41%
"somewhat" 25%
"very" 18%
"extremely" 16%

Open grassland:
"not at all to slightly" 25%
"somewhat" 25%
"very" 27%
"extremely" 23%

Adjacent to town:
"not at all to slightly" 24%
"somewhat" 21%

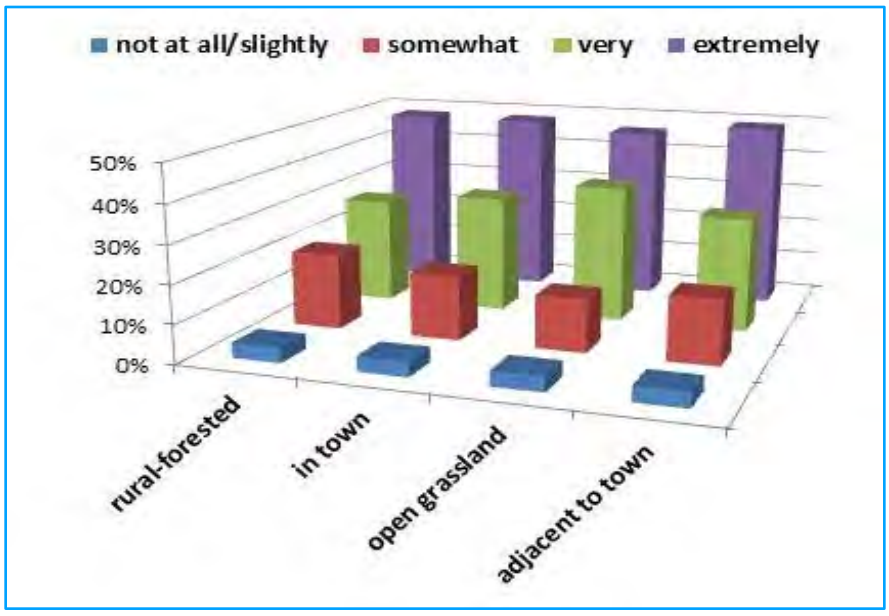
"very"	28%
"extremely"	27%

Question 5: How likely is it that a major wildfire will occur in Chaffee County in the next 5 years?

This question had the same sliding-scale format as question 4. Converting to four ratings of "not at all to slightly likely," "somewhat likely," "very likely," and "extremely likely" yields the following:

"extremely"	48%
"very"	31%
"somewhat"	18%
"not at all to slightly"	3%

Looking at the responses according to residence location (question 3) reveals the following:



Rural-forested:

"not at all to slightly"	4%
"somewhat"	20%
"very"	28%
"extremely"	48%

In town:

"not at all to slightly"	4%
"somewhat"	17%
"very"	31%
"extremely"	48%

Open grassland:

"not at all to slightly"	4%
"somewhat"	14%
"very"	36%
"extremely"	46%

Adjacent to town:

"not at all to slightly"	4%
"somewhat"	17%
"very"	30%
"extremely"	49%

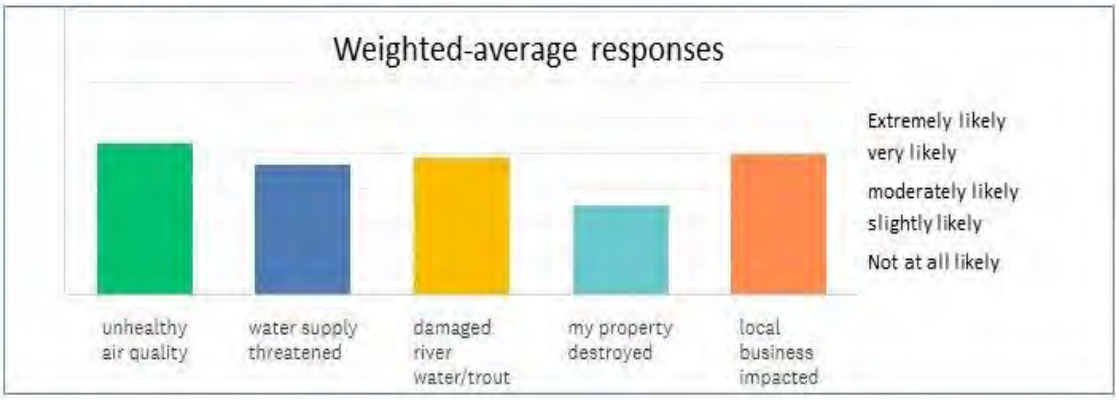
Chaffee County citizens' concern about the likelihood of a major wildfire in the county does not appear to be dependent on what type of residence they live in.

Overall, about 80% of respondents believe the chance of a major wildfire to be very or extremely likely within the next 5 years, but only 58% are very or extremely concerned about a fire near their residence, with a strong dependence on where their residence is located.

Additionally, Question 24 of the survey asks if respondents' education or occupation is related to forest health, wildlife health, emergency management or fire management. The survey responses to Question 5 were sorted according to the responses to that question. Using the scale of "no chance" = 0, to "100% certain" = 100, the average response of people not educated or employed in those fields was "73," which, surprisingly, was exactly the same (73) as the average for the 165 respondents whose occupation or education was in the fields of forest health, wildlife health, emergency management, or fire management.

Question 6: If there were a wildfire in Chaffee County, on the scale of the Hayden Pass or Weston Pass fires, how likely do you think it is that the following would occur?

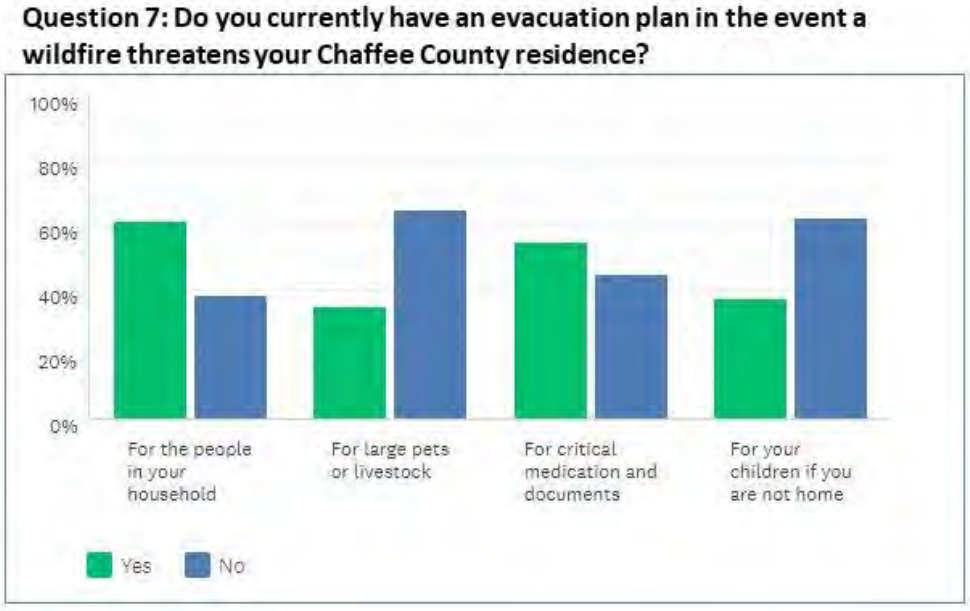
Responses to this question indicate that Chaffee County residents are aware of the potential for serious detrimental impacts to the community as a result of a large-scale wildfire. With the exception of "my property destroyed," the overwhelming majority of responses selected "very likely" or "extremely likely" for all the outcomes listed. Residents who live in town were the most likely to select lower-level risk responses for the "my property destroyed" option.



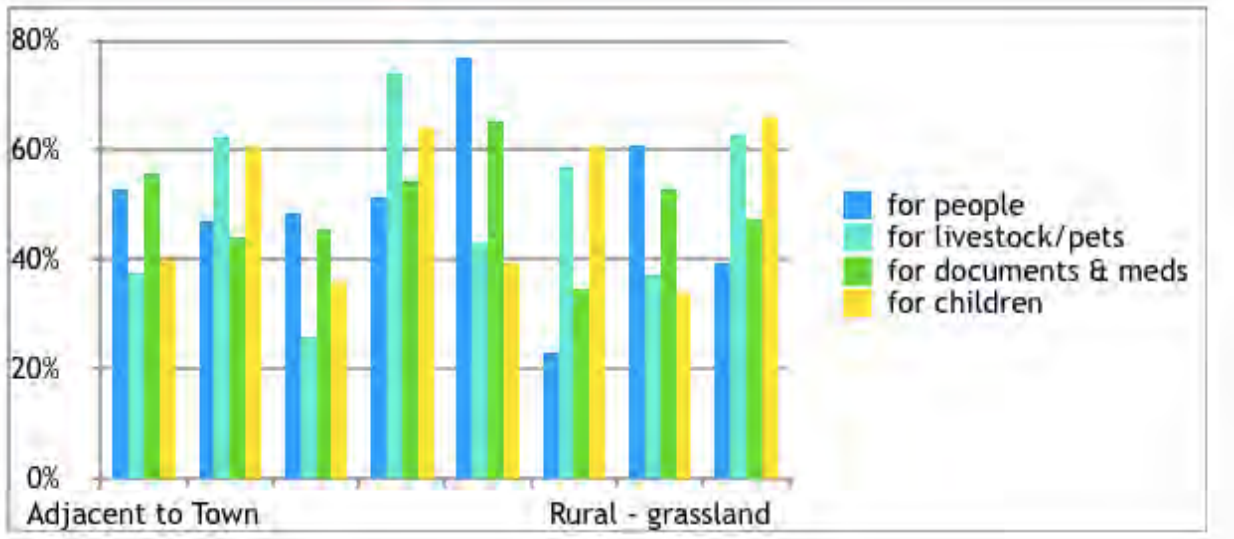
Question 6

Question 7: Do you currently have an evacuation plan in the event a wildfire threatens your Chaffee County residence?

Results from Question 5 showed that about 80% of survey participants believe the chance of a major wildfire here in the next five years is very or extremely likely. And yet just 60% of respondents indicated they currently have an evacuation plan for people in their homes, and their important documents and medications. The results were worse for pets/livestock, and children at home alone.



A closer look at the response data based on residence or property location (Question 3) indicates that people who have their residence or property in rural areas (forested "WUI" or open grassland) show a higher level of evacuation preparedness (next page).



Question 7

Question 8: Who would you contact to learn how to decrease wildfire risk to your home or property?

This was an open-ended question with a blank comments box and no pre-set answer suggestions. Data were sorted into categories. Responses are captured in the table below. It is apparent that citizens are not at all clear where to go to get information. The most common answer was some form of "I don't know" (18%), from "??" to "I could google it" to 95 responses with 52 different answers. There is general awareness of fire departments (24%) and the USFS, CSFS or "Forest Service" (23%) as potential sources of information. Word cloud of Question 8 responses, where the size of the word indicates the frequency of response. "FD" represents fire departments in general and IDK indicates some form of "I don't know" response.

Table summarizing Question 8 results. Who would you contact to decrease fire risk to your home?

Source	Number	Percent**
All "don't know"	193	18%
I Don't Know (IDK)	82	8%
Google it (also IDK)	16	1%
Other ideas with <5 responses (also IDK)*	95	9%
General Fire Dept	145	14%
CSFS	92	9%
Chaffee County Fire Dept	83	8%
USFS	83	8%
Forest Service or similar	64	6%
Insurance Company	23	2%
Neighbor/Friend	23	2%
County of Chaffee	20	2%
NA/Treatment Completed	17	2%
HOA	16	1%
BLM	15	1%
SFD	15	1%
BVFD	14	1%
Self/own knowledge	14	1%
CSU Extension Office	12	1%
Office of Emergency Mgt	10	1%
CPW	10	1%
Sherriff/Police	9	1%
Terra Firma	8	1%
Fire Camp	5	0%
Arborist	5	0%
* includes over 50 ideas such as: GARNA, AHRA, NRCS, Red Cross, State, USFWS, State, Town, City code enforcer, DFPC, GOVT, HRRMC, landscaper, some company etc.		Of 1,069 responses

Question 9: How confident are you that you can easily receive information in the event of a local wildfire?

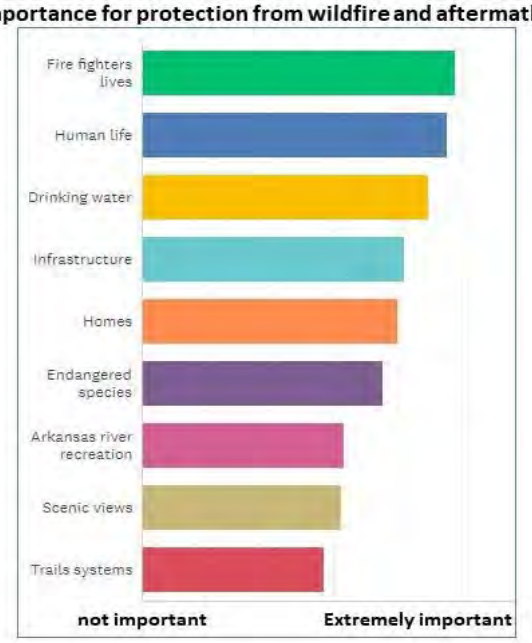
This question could be answered on a sliding scale from 0 to 100%. The average response was 66% confidence.

Question 10: Have you signed up for the Chaffee County EverBridge System that contacts you with a reverse 911 call in case of an emergency? 60% of respondents have signed up for "reverse 911" notification from the county, while 40% have not.

Question 11: How would you characterize the importance of protecting the following from the impacts of wildfire or post-wildfire flood events?

This question offered five response choices ranging from "not at all important," to "extremely important." For statistical purposes, the choices were given numerical values ranging from 1 to 5. The responses to this question indicate that all the listed choices are at least somewhat important for the community to protect in the event of wildfire and/or post fire flooding. Protecting human life (especially firefighters) ranked highest. Recreation assets ranked at the bottom of the list, but still averaged "3" or above which equates to "important." About 10% of survey respondents indicated that scenic views and trail systems are "not at all important" to protect.

Question 11: Survey responses indicating relative degrees of importance for protection from wildfire and aftermath.



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Question 12: In three words or less, how would you characterize the health of Chaffee County forests?

This was an open-format question with a comments box where respondents could type anything they wanted; there were no pre-set answer choices. In general, citizens see the forest health as "fair" while forest professionals tend to see it as "poor.":

Word cloud responses from citizens, excluding forest fire professionals.

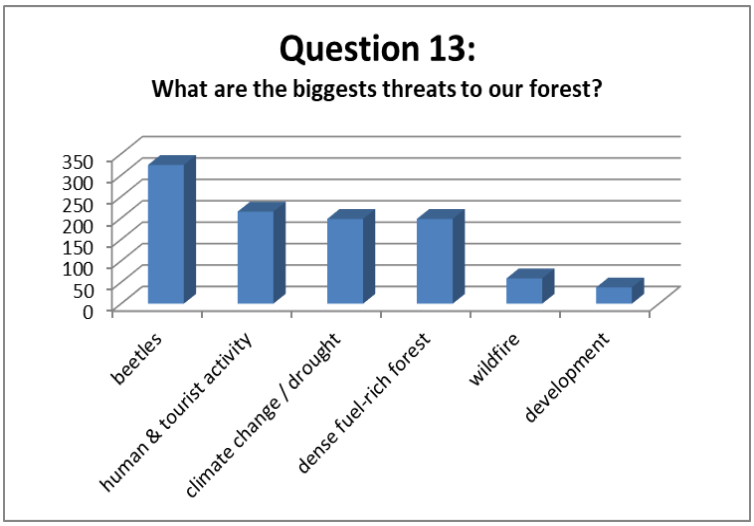
Word cloud responses to Question 12 from professionals (those who said yes on Question 24).

Question 13: What do you think is the greatest challenge to the health of Chaffee County forests?

This was also an open-format question with a comments box. Many respondents cited multiple threats. Although respondents were free to answer any way they saw fit, the vast majority of responses could be characterized into several common "bins" which allowed some basic analysis. Well over 1,000 individual responses were given, and the vast majority boiled down to one of the following:

Category	Number of responses
Beetle kill / insect infestation / disease:	324
Human activity overall	215
Human activity not specifically visitors/tourists:	165
Activities of visitors and tourists:	50
Dense forest with high fuel load, lack of thinning, etc:	198
Drought:	135
Climate change, unpredictable weather:	63
Natural wildfire (not campfire):	59
Development, sprawl:	38
Government policy, agency inaction, legal hurdles:	17

Further combining some of the similar and related categories yields the following chart:



Chaffee County residents and landowners are aware of the beetle epidemic that has resulted in significant areas of standing-dead trees, and that is reflected in the data. Some respondents who mentioned the beetles commented that the beetle kill in Chaffee County is better than other parts of the state. There is also strong awareness of high fuel loads, and the problems caused by

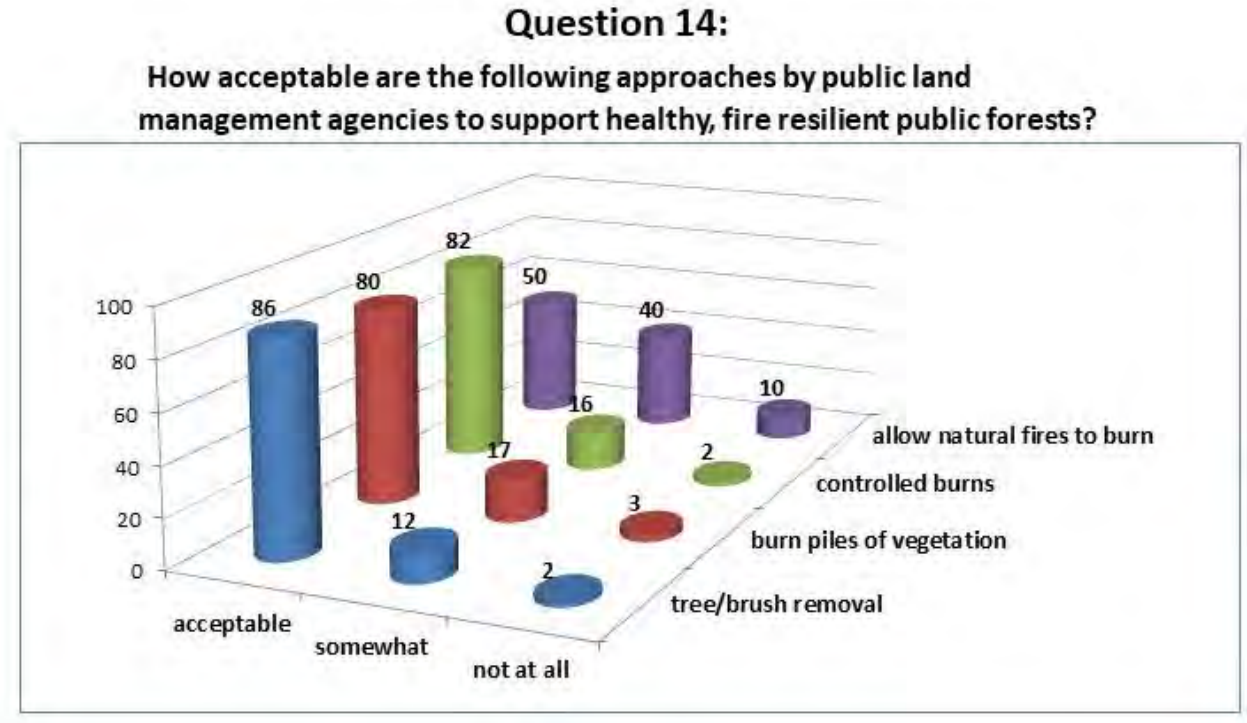
decades of aggressive fire management. **The survey results seem to indicate a relatively high degree of understanding of the issues, which would underpin support for management activities.** Only 59 responses (4% of total) specifically mentioned wildfire (other than man-made) as a big threat. It is possible that many respondents assumed that was obvious and, instead chose to mention the underlying ***causes*** of wildfire such as fuel loads, beetle kill, human carelessness, etc.

Another theme that stood out, especially in the written comments, **was a strong sense of animosity towards tourists and non-Chaffee County visitors**. Some of the language used was startlingly harsh. It may not represent a majority, but there is clearly an undercurrent of hostility towards our tourist visitors. Some examples of these comments are included in the table below for transparency.

Campers, hunters, forest users from out of the area who do not understand the extreme risk of fire on our public lands
visitors who do not know the safety rules. Unattended campfires and cigarettes, matches, etc...
Human encroachment and human carelessness
OHV's and general motorized misuse of public lands.
Careless human actions
Tourists / Tourism (many times)
Influx of more people
Human overuse and carelessness
Careless fire-makers
Recreational overuse and habitat disruption, watershed impact and pollution (from increased recreational usage and population/building boom).
Stupid people who don't/won't take care and use common sense.
recreation
Human destruction
Too many people
NONLOCALS
Disrespectful people
Motor bikes and others going off road.
Careless campers starting fires and leaving trash. Poachers.
Idiot, careless people (mostly tourists) that don't care cause they don't live here.
The public. Campfires, trash, overuse.
Ignorant humans
Visitors who don't understand wildfire dangers
Tourists leaving trash and not staying on trails.
Tourism, fires, drought
campers with campfires
The f'n idiots from Texas, Oklahoma, and Denver on 4-wheelers
Growth in outdoor recreation, especially campers on public lands and trail users (motorized even more than hikers)
impending suburban sprawl = environmental issues related to wildland urban interface growth
Public lack of understanding about campfires smoking etc. Overuse by ATVs and jeeps
Too many campers.
Public understanding and respect for the forests streams plants and animals. Over use/ abuse.
Some people want access and trails on every parcel of public land.
Improper use of public lands, I.e. squatters, illegal camping/dumping
People not doing their part to keep the areas as if no one has been there. Also 4 wheelers, most seem to have no respect!!
Careless/uneducated people doing stupid things in our forests.
Disrespectful recreational use
Campsites that were small see a wider impact as people stay longer periods of time. The site grows in circumference as the length increases. Campers act like it's their home and not like they are a guest of the forest like they should. Respect!
Tourists trashing it and lighting it on fire
The public living in the forests impacting the eco system and raising the risk of wild fire Also drought

Question 14: How acceptable to you are the following approaches by land management agencies to support healthy, fire-resilient forests?

This was a multiple-choice question designed to assess public support for four activities that land management agencies often employ as part of their fire prevention or fire resilience strategies. Respondents indicated their level of acceptability as either "not at all acceptable", "somewhat acceptable", or "acceptable." The first three activities, which involve removing available fuels, all enjoy broad levels of acceptability according to the survey. The fourth choice, however, which is to allow natural fires on public lands to burn without firefighting activity, is much less acceptable. The following chart illustrates the results.



Question 15: Do you have concerns about land management agencies cutting and removing trees or brush on public lands?

This was a simple "Yes / No" format question, with a box where respondents could post comments if desired. In general, the survey results indicate a high level of public support for cutting and brush/tree removal activities on public lands, as shown here:

"Yes" - 16% "No" - 84%

The comments, however, help illuminate some concerns and fears that do exist. About 50 respondents wrote comments in addition to the yes/no response, and several themes to their concerns emerged:

- Some comments reinforced general support for doing this activity
- Many comments expressed skepticism that this could be done on a scale that would prove effective – in other words they don't want money spent on something that doesn't do any good.

- Many comments raised "trust issues" – lack of trust in the agencies' ability to conduct the activity responsibly and cost-effectively, and transparently (with public input).
- A large number of comments expressed concerns about the activities' detrimental impacts on the environment, impacts to wildlife, and general "unsightly" impacts of heavy equipment in the forest. Concerns about "collateral damage" such as unsightly clear-cuts, new roads, slash piles not removed, loss of habitat trees, etc., were very common.
- A few comments expressed the desire to let commercial enterprise do the work so as to provide jobs and revenues. Other comments expressed the opposite concern; that the cutting would be done according to revenue needs instead of to help forest health.
- Another theme of concern was resistance to the idea that "man knows best." Some comments suggest that man's attempt to control nature never end well or are, at best, ineffective.

Question 16: Do you have concerns about land management agencies conducting controlled burns?

This was also a simple "Yes / No" format question, with box where respondents could post comments if desired. In general, the survey results indicate a high level of public support for controlled burn activities on public lands, but less support compared to cutting/thinning as shown here.

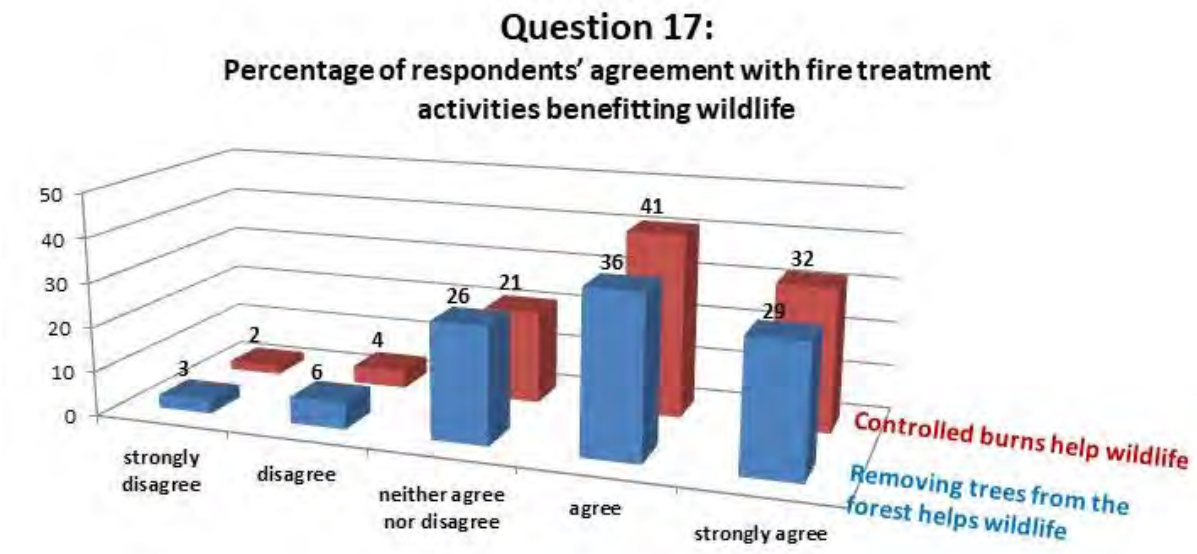
"Yes" - 24% "No" - 76%

Like the previous question, 50 respondents wrote comments in addition to their yes/no answers. Concerns tended to fall into just three categories:

- Far and away the biggest concern cited was the danger of losing control of the burn, especially due to unpredictable winds. Several comments mentioned specific, well-publicized examples of highly destructive past wildfires that originated from controlled burns.
- Another comment theme concerned degraded air quality as a result of the burn.
- The third comment theme was about the need to better advance notice and publicity to the public.

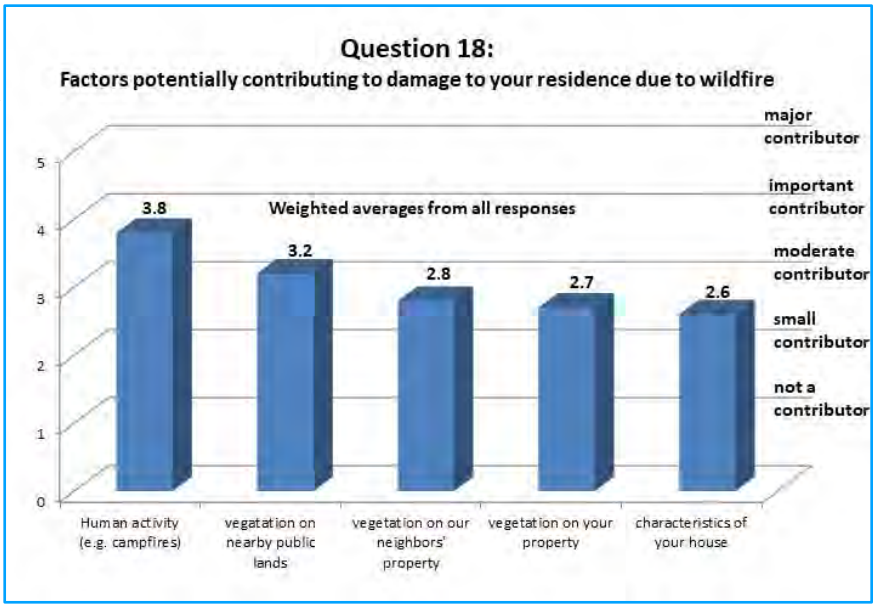
Question 17: How much do you agree or disagree with the following statements about treatment activities?

This question polled the publics' opinion about wildfire treatment activities and wildlife. In general survey respondents seem to feel that forest treatment activities such as thinning and controlled burns are neutral-to-beneficial for wildlife as shown by the following chart (next page).



The next few questions were designed to assess public opinion about activities on private lands as related to wildfire risk.

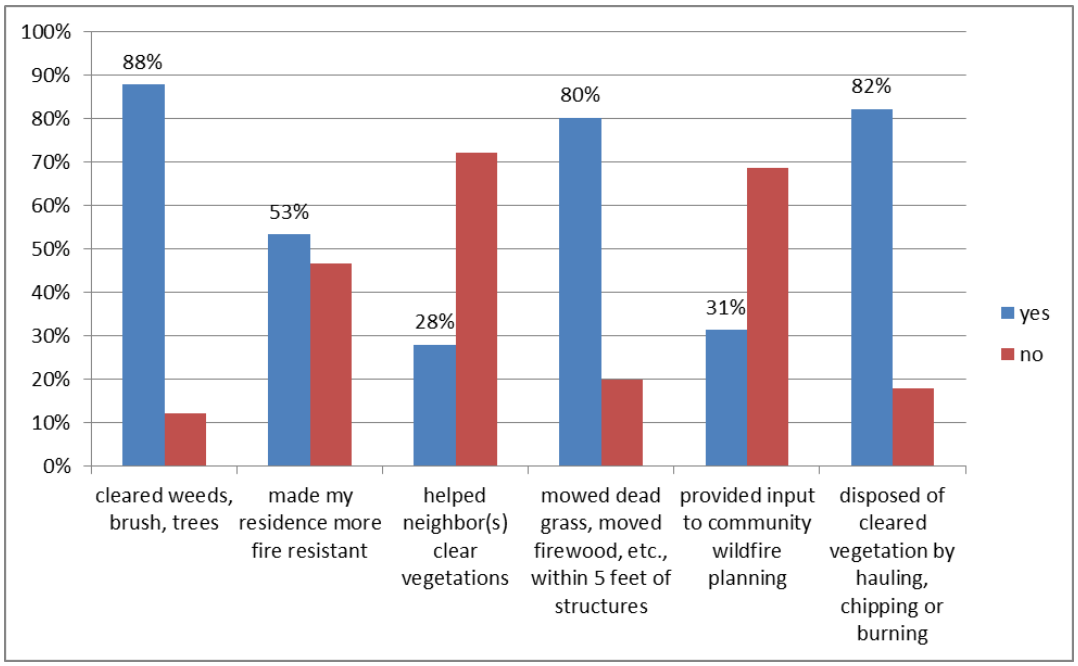
Question 18: In your opinion how much does each of the following factors contribute to the chance of a wildfire damaging your residence in the next 5 years?



Specifically concerning the risk of damage to residences as a result of wildfire, human activity emerged as the most concerning factor with an average of "important" contributor. Other choices concerning vegetation conditions all returned similar results ("moderate to important" contributor. Inherent characteristics of the residence such as roofing material, returned the lowest average, with a weight-averaged rating of "small to moderate" contributor. The following choices show the weighted average responses for the five potential contributing factors.

Question 19: Have you done any of the following to decrease wildfire risk on your primary Chaffee County residence?

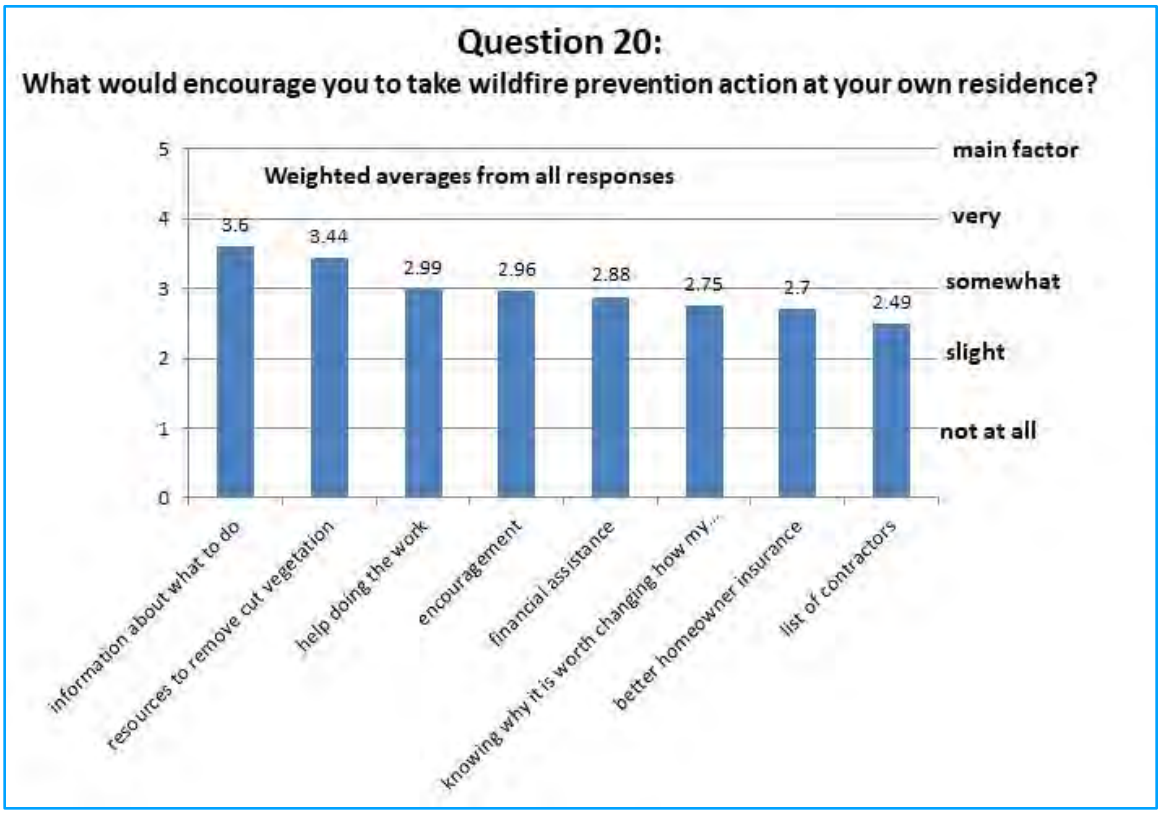
Around 15-20% of respondents selected "not applicable" to these questions asking what actions they had taken to reduce wildfire risk at their residence. Many of these were likely folks who live in the middle of town and don't worry too much about wildfire affecting their residence, and/or people who own vacant land only with no structures. Filtering out the "not applicable" responses yields the following results:



People are actively trying to reduce the amount of fuel around their structures, as shown by the >80% "Yes" responses to those questions. Only slightly better than half of respondents have tried to make their residence itself more fire resistant, and a low number of people appear to have engaged in collaborative "community cooperative" efforts to reduce wildfire risk.

Question 20: How much would any of the following encourage you to take action to reduce wildfire risk on your residence?

For this question, respondents were given a list of possible "incentives" to performing work to reduce wildfire risk at their own residence. Response options ranged from "not at all" to "main factor." Converting those response options to ranked numbers, and then calculating a weighted average response for potential "incentive" allowed the popularity of the incentives to be ranked as shown in the following chart. Information about what sort of work to do was the top-ranked response, and having a list of recommended contractors was the lowest-ranked. However, the survey data indicates that all of the potential incentives have merit.



Question 21: Please tell us about your experiences with your homeowners insurance for your Chaffee County residence. Has your insurance company ever:

Homeowner's insurance does not appear to have much, if any, linkage to wildfire risk in the county. Respondents noted very minimal negative (cancelled policies or higher premiums), or positive (providing information or offering better rates) wildfire risk impacts to their homeowner insurance policies.

Question 22: How strongly do you agree with the following statements regarding building codes?

"Building codes that require such things as fire-resistant roofs decrease community fire risk."
agree or strongly agree: 75%
disagree or strongly disagree: 8%

"I support building codes that encourage safe access for firefighters."
agree or strongly agree: 90%
disagree or strongly disagree: 3%

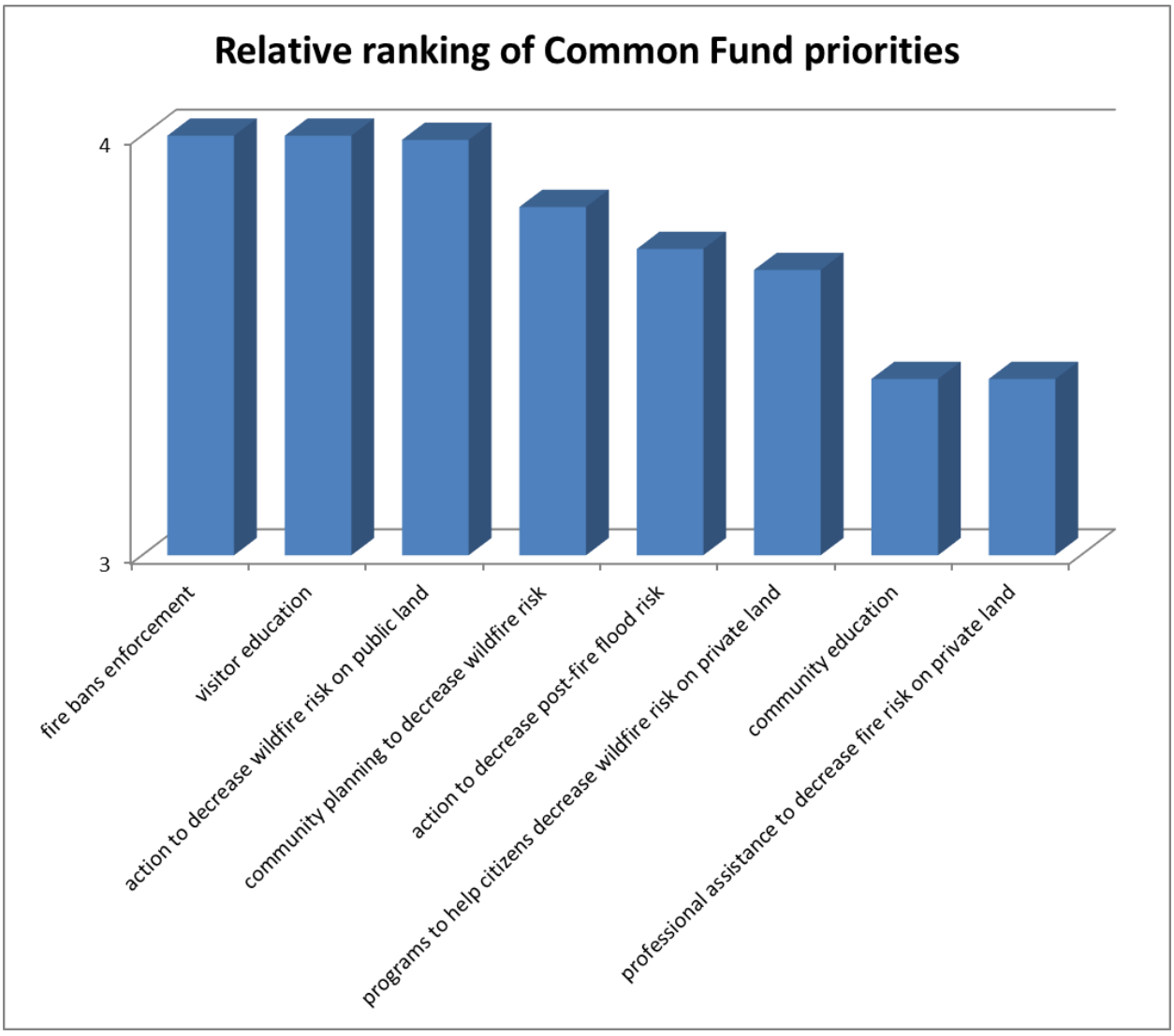
"I support additional building codes to make new developments more wildfire resistant."
agree or strongly agree: 81%
disagree or strongly disagree: 7%

These results indicate generally very strong support for making sure Chaffee County building codes are aligned with current best practices for wildfire resiliency.

Question 23: How important are the following potential uses of 1A tax funds to you?

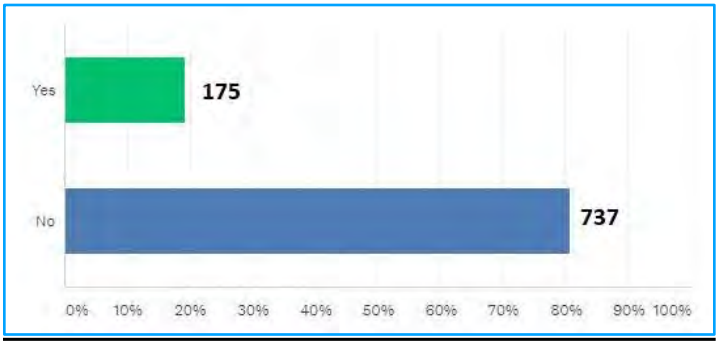
County ballot measure 1A, a sales tax passed in November 2018, provides funds to protect communities and water from sever wildfire and to enhance forest health and wildlife habitat. This question gathers information on how citizens prioritize the application of those funds. Participants were asked to rank the importance of a given list of potential priorities from "not important" to "extremely important". These rankings were converted to a numerical scale, and a weighted averages of the responses were calculated. All eight of the surveyed allocation options rated between 3.5 and 4.5 which equates to "important" to "very important." Relative rankings are shown in the graph below.

Consistent with community concerns about recreation use as a top threat to local forests, fire ban enforcement and education/enforcement of visitor behaviors ranked highest. This is followed by actions to decrease risks on public lands, with funding to take action on private lands generally ranked lower.



The final survey questions were designed to collect demographic data.

Question 24: Is your education or occupation related to forest health, wildlife health, emergency management, or fire management?



Some of the other questions in the survey were filtered by the two populations identified here; the forest health "professionals" and the general population.

Question 25: What is your household income?

< $25,000	6%
$25,000 – $49,999	16%
$50,000 - $74,999	26%
$75,000 or more	52%

Question 26: How old are you?

Under 18	<1%
18-35	9%
36-50	25%
51-65	32%
65 or over	34%

Question 27: What is your zip code?

81201	Salida and surrounding areas	39%
81211	Buena Vista and surrounding areas	43%
81227	Monarch	<1%
81228	Granite	<1%
81236	St Elmo, Nathrop	13%
81242	Poncha Springs	3%
Other		2%

Chaffee County Next Generation Wildfire Protection Plan

Appendix B: CWPP Community Summary Report

Next Generation Community Wildfire Protection Plan

Community Summary

ENVISION CHAFFEE CO.

A FUTURE BUILT ON COMMON GROUND

ENVISIONING A FIRE-READY FUTURE

Chaffee County typifies the new reality of wildfire in the West. Decades of fire suppression, drought and ensuing insect infestations have caused our forests to decline into very poor health. Fires are coming more frequently and they are more intense.

The risk is a top community concern highlighted by the Envision Chaffee County planning initiative. Through the participation of 1,500 citizens and more than 70 organizations since 2017, the community created a "vision" of healthy forests, waters and wildlife. Voters took action in 2018 to support this vision by approving new public funds to support healthy forests, build a fire-ready future and protect our watersheds, wildlife habitat, agriculture, recreation areas and local economy.

The Envision Forest Health Council developed the Next Generation Community Wildfire Protection Plan to harness community momentum and deliver solutions that reduce wildfire risk. We used the most current information and computer modeling technology to create Colorado's leading forest health action plan. The plan explains risk posed by severe wildfire, prioritizes action to decrease that risk, and sets a course to improve forest health. It also engages the community to act – together – to address one of the community's most serious and concerning challenges.

The plan guides us by mapping the level of risk to our most important assets and identifies areas where the risk can be addressed, or "treated" with the highest cost efficiency. The resulting action plan is to treat 5-10% of the total landscape for up to 70% reduction in fire risk to our most important assets.

PROTECTING OUR MOST IMPORTANT ASSETS

Chaffee County's natural resources support our quality of life and provide water to agriculture lands and millions of citizens who live downstream. In a 2019 Chaffee Wildfire Survey, 1,035 citizens prioritized the things they value that are at risk from severe wildfire including life, water, infrastructure, homes, wildlife, views and recreation.

All of these assets support local and regional economies that depend on tourism and outdoor recreation. Healthy forests support fishing, skiing, mountain biking, hiking, hunting, jeeping, rafting, kayaking, access to more 14ers than any other county in Colorado, gateway communities to the Colorado and Continental Divide Trail systems, and much more. Chaffee County has unusually rich natural resources that benefit residents, visitors and state-wide business. All of these resources are increasingly at risk from severe wildfire.

The forests of Chaffee County, and the upper Arkansas River basin, are the source for critical water supply for local towns, 1 million people living downstream and even the city of Aurora.The same water also provides 102 miles of Gold Medal trout waters and recreation on the most rafted river in America. Wildlife in eight counties, migrating from Breckenridge to Lake George to Westcliffe, rely on Chaffee County's abundant winter habitat, according to Colorado Parks and Wildlife deer collar data. In addition, fire threats to local infrastructure present far-reaching implications, including power lines that supply the San Luis Valley with electricity and Highway 50, one of the busiest east-west transportation routes in the US.

"The beetle kill epidemic will transform local forests from five standing dead trees per acre to 120 in less than a decade."

Jim Pitts, USFS District Ranger

WHAT IS THE RISK?

Decades of full fire suppression resulted in poor forest health across the West and in Chaffee County. Trees are standing too close together, they are all the same age, and they are being choked by dead wood also known as "fuel." These unhealthy forests are further being ravaged by insects, including a beetle epidemic that will likely result in up to 90% mortality of all the spruce in the county and a budworm impacting fir trees.

Wildfire serves a healthy forest ecosystem by acting as a "broom" that can sweep the forest clean of dead wood and debris. However, as forests become overly dense and fuels accumulate, wildfires can burn so hot that soils can become damaged or "baked," impeding vegetation regrowth for years and causing destructive post-fire mudslides, flooding and fish kills, like those created by the Hayden Pass Fire.

Wildfires can be classified by how they are managed on a scale of Type 5 (very small fires) to Type 1 (large, complex fires and natural disasters). Ten years ago, the Upper Arkansas River headwaters region in Chaffee and Lake counties had only experienced one Type 3 wildfire – ever. In the decade since, there have been two more Type 3's (Treasure and Lodgepole), our first Type 2 (Hayden Pass), and our first two Type 1's (Weston Pass and Decker). Action is urgently needed to reduce forest fuels by prescribed burns and tree thinning.

While lightning statistically causes the most forest fires, rapid growth in recreation use exacerbates the threat. In the Chaffee Wildfire Survey administered in 2019, citizens identified visitors as the second-biggest perceived threat to forest health, just after insects/fire.

The survey also shows that the community is not prepared for a wildfire emergency. More than 80% of respondents believe a major fire will happen in the next five years, yet 40% indicate they do not have an evacuation plan and more than half are unsure what to do to decrease risk on their property, or even where to go for information.

TAKING ACTION

The Next Generation Community Wildfire Protection Plan's Fuel Treatment Priority map (centralcoloradoconservancy.org/land/wp-content/uploads/FuelTrtPriority.jpg) shows where treatment activities can most effectively reduce the risk. The next step is to treat these areas, but it is not a simple task. Work spans public (65%), private (30%) and state (5%) lands, and evacuation routes involve county and state rights-of-way adjacent to many different private landowners. The cost is substantial at $50 to $100 million.

Funding from diverse partners will be needed to leverage federal and local dollars to complete treatment in the priority areas over 10-20 years. Chaffee Common Ground (chaffeecommonground.org) provided $258K over three years to begin this work. Leaders formed the Envision Forest Health Council to ensure four key elements of the plan are implemented:

> *"Fire intensity and frequency have fundamentally changed."*
>
> John Markalunas, Decker Fire Incident Commander

Treating Together identifies and develops projects to decrease wildfire risk and enhance forest health across land boundaries by connecting private landowners, land management agencies, non-profit organizations and funders. Working with wildlife managers and local ranchers offers further opportunity to leverage these activities to also enhance habitat and agricultural productivity.

Envision Healthy Landscapes promotes ongoing community engagement, education and preparedness. The goal is to empower citizens to feel in control of their own destiny even though they live in a wildfire zone. The program includes transparent tracking and annual reporting of progress toward decreasing risk to the community.

Chaffee Chips accelerates private land treatments by providing coordinated support to landowners to mitigate fuels, create defensible space around structures and improve forest health on their land. The service organizes events in Fuel Treatment Priority neighborhoods and supports landowners with education and services from the Colorado State Forest Service, Colorado Fire Camp, Fire Protection Districts, state and federal agencies and County of Chaffee.

Zoning and Code considers changes that other communities adopted after severe wildfire events and makes recommendations to the county to decrease risk.

THE PROCESS: ENGAGING COMMUNITY AND QUANTIFYING RISK

Fuel Treatment Priorities were created by first engaging the community and then quantifying risk with Geographic Information Systems mapping and modeling technology. More than 1,000 citizens provided input to the Chaffee Wildfire Survey, answering questions about awareness, preparedness and mitigation activities. Responses showed strong support for forest treatment, as 84% said they have "no concern" about land management activities such as thinning trees and 73% felt it would improve habitat for wildlife.

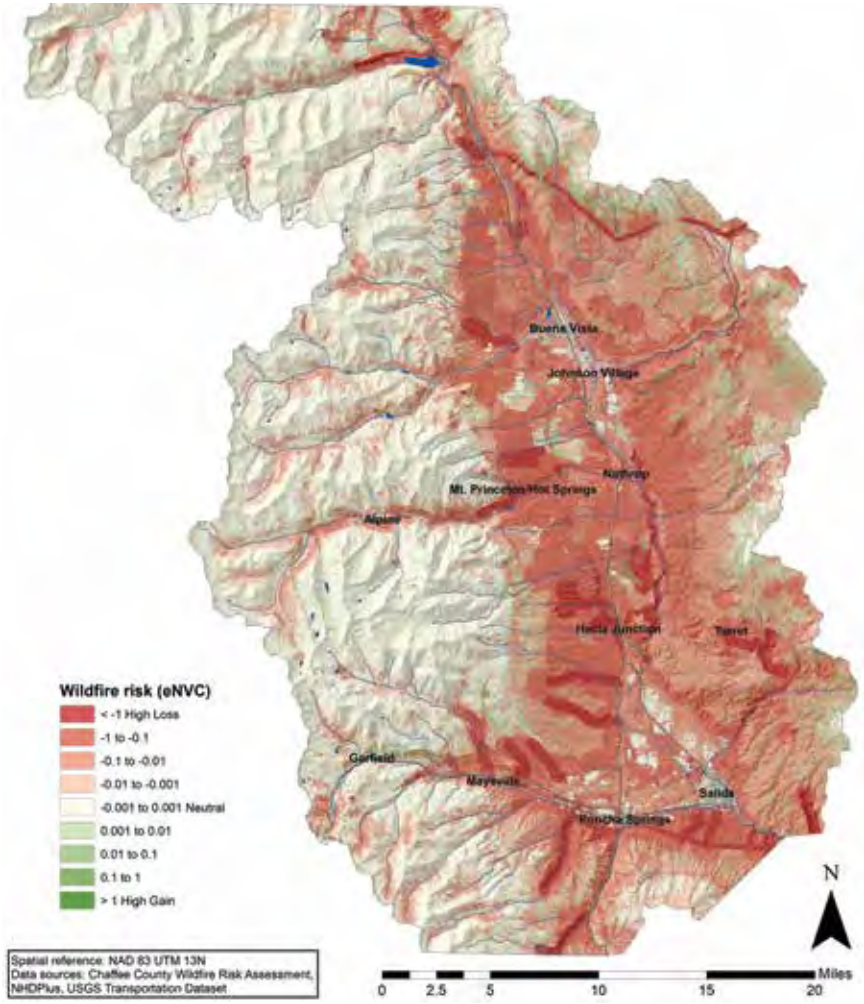
Public meetings were held throughout the process to collect additional input. All of the Next Generation maps described below were presented and about 140 citizens provided 220 written comments that were considered in the final plan.

The community also was asked to prioritize things they most want protected from severe fire and post-fire flooding. The seven assets, in order, are firefighter lives, human life, drinking water, infrastructure, homes, wildlife, Arkansas River recreation, scenic views and trail systems.

Wildfire Risk. Colorado Forest Restoration Institute at Colorado State University quantified and mapped risk to community priorities listed above and added a county-wide assessment of:

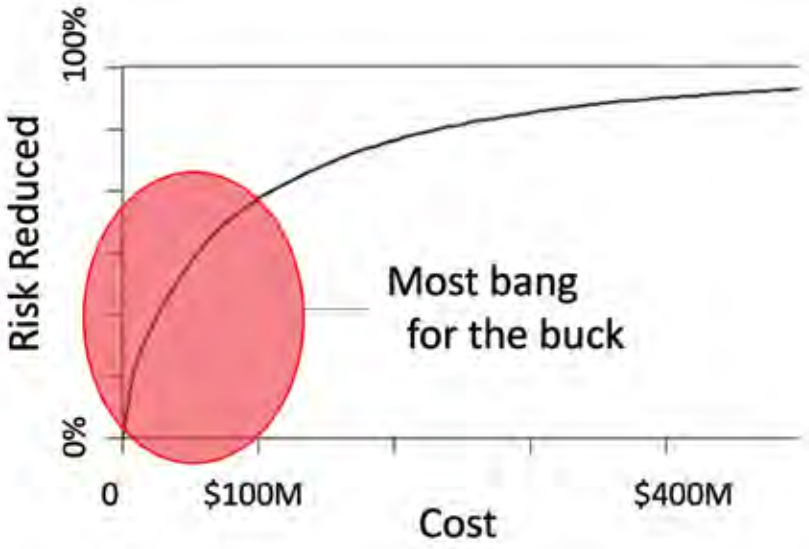
- **Asset locations**, such as power lines, evacuation routes, cell towers, water supply and infrastructure, critical bighorn sheep winter range, etc.
- **Burn probability**, or where fire is most likely to happen. Lower elevation forests that are dry during much of the year and areas impacted by insect epidemics show up on this map.
- **Fire Behavior**, or how intense fire is likely to be if it occurs, ranges from knee-high flames in grasslands to towering crown fires in various forest types depending on moisture levels, fuel types, slope, and other factors.

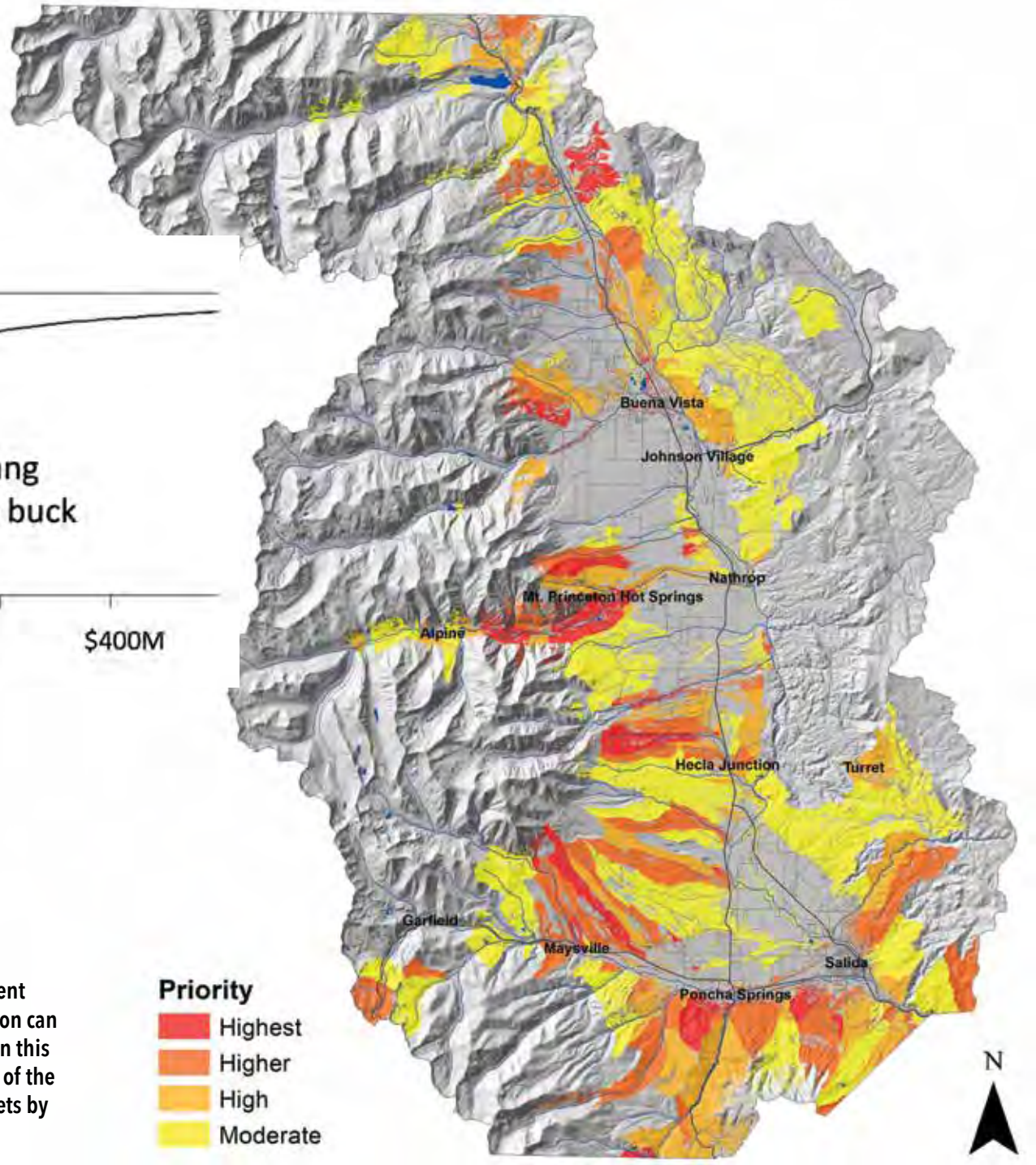
Composite Wildfire Risk



All of these factors combine to estimate Composite Wildfire Risk (above). This important map shows where the community's valued assets are at the highest risk from severe wildfire (red) and areas where moderate wildfire may be of net benefit (green).

Treatment Priority Area "Bang for the Buck" Map





The areas in Chaffee County where forest treatment such as thinning, controlled burns and mastication can have the biggest impact for the cost are shown on this map in red and orange. Treating the right 5-10% of the landscape could decrease risk to community assets by 50-70%, as shown by the graph above.

Mapping Treatment Priority Areas. Factoring cost to Composite Wildfire Risk identifies the locations where treatment can do the most to lower risk for the least amount of money. Referenced as the "Bang for the Buck" map. Options include thinning trees, prescribed fire, thinning to clean up slash, and mastication which is a patch-clearing method used in the piñon-juniper forest.

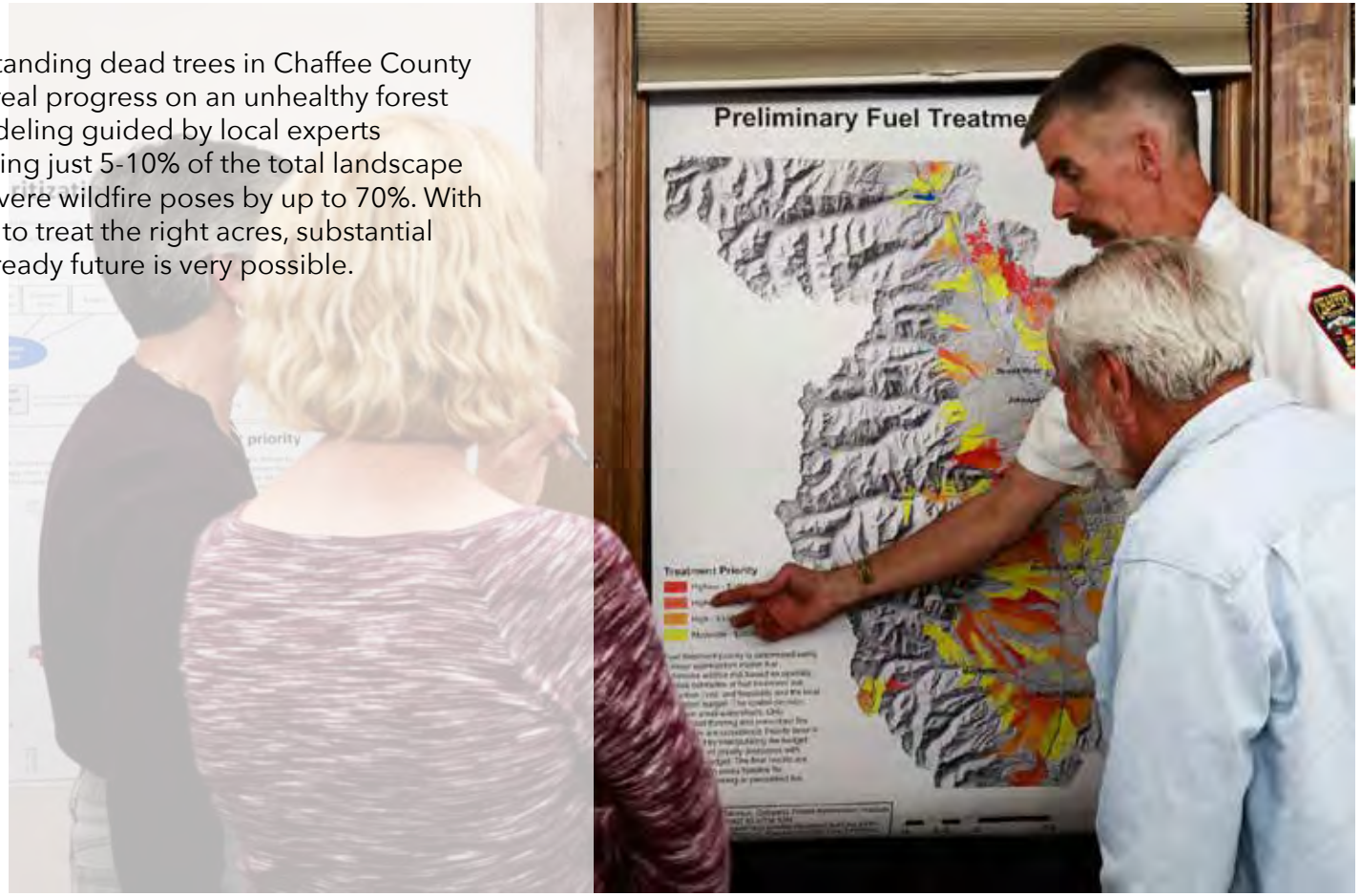
Fuel Treatment Priority areas are assigned by assessing the level of reduced risk and the cost and feasibility of each treatment type. Thinning is not possible in Wilderness or roadless areas, for example, and steeper terrain is more expensive to treat. The top priority areas are marked in red on page 7.

The quick increase of standing dead trees in Chaffee County may make it seem like real progress on an unhealthy forest is not possible. But modeling guided by local experts demonstrates that treating just 5-10% of the total landscape reduces the risk that severe wildfire poses by up to 70%. With a disciplined approach to treat the right acres, substantial progress toward a fire-ready future is very possible.

GET INVOLVED!

Chaffee County is a unique place and a special community. By engaging many community members, Envision Chaffee County and the Forest Health Council have helped set the stage for a better future through a leading-edge fire resiliency plan that will improve forest health and protect resources that millions rely on. We invite you to join the plan!

Contact envision@centralcoloradoconservancy.org



ACKNOWLEDGEMENTS

The plan was developed by the community. 1,035 citizens engaged in the wildfire survey, and hundreds in community meetings. Top local and regional leaders from critical organizations provided over 1,500 hours – or 40 work weeks – of planning time and expertise to develop the plan. These community heroes include: USFS - District Ranger Jim Pitts, Fire Management Officer Chris Naccarato and Mountain Zone Fuels Specialist Andrew White. BLM - Rocky Mountain District Manager Cathy Cook, Field Manager Keith Berger, Fire Mitigation Specialist Ed Skerjanec, Fire Management Officer Ty Webb, and John Markalunas, Assistant Fire Management Officer for the Front Range Fire Management Unit. Colorado State Forest Service – Southwest Area Manager Damon Lange, Supervisory Forester Adam Moore, Supervisory Forester Sam Pankratz and Forester J.T. Shaver. Colorado Springs Utilities – Watershed Planning Supervisor Mark Shea and Forest Program Manager Eric Howell. Chaffee County Commissioner Keith Baker. Chaffee County Office of Emergency Management Director Richard Atkins. Salida Fire Department and South Arkansas Fire Protection District Chief Doug Bess and Fire Inspector Kathy Rohrich. Chaffee County Fire Protection District Chief Robert Bertram and Battalion Chief Kent Maxwell (also Director of Colorado Firecamp). Buena Vista Fire

Department Chief Dixon Villers. Colorado Parks and Wildlife Area Wildlife Manager Jim Aragon. Arkansas Headwaters Recreation Area Manager Rob White. Arkansas River Watershed Collaborative Director Chelsey Nutter, Lead Forester Andy Lerch, Mesa Antero Water Association President Rick Hum, Central Colorado Conservancy Executive Director Adam Beh. Photography by Lea Frye, Eric Lind, Mark Fox and Zach Tucker.

Modeling and analysis was provided by experts at the Colorado Forest Restoration Institute at Colorado State University (Director Tony Cheng, Assistant Director Brett Wolk and Spatial Analyst Benjamin Gannon). The Rocky Mountain Research Station (Patty Champ and Hannah Brenker-Smith) provided invaluable support to community surveys.

Overall leadership and community facilitation was delivered by Envision Chaffee County; Co-Led by Greg Felt (Chair, Chaffee County Commission) and Cindy Williams (Board Chair Central Colorado Conservancy). The work was funded by County of Chaffee and the Department of Local Affairs (DOLA). Central Colorado Conservancy provided facilitation (Cindy Williams and Kim Smoyer), report preparation (Bill Goosmann), and community engagement (Kim Marquis).


© Photo Lea Frye

CHAFFEE COUNTY WILDFIRE PROTECTION PLAN LEADERS AND FUNDERS

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Chaffee County Next Generation Wildfire Protection Plan

Appendix C: Chaffee County Wildfire Risk Assessment

Appendix C: Chaffee County Wildfire Risk Assessment

Benjamin Gannon, Colorado Forest Restoration Institute, benjamin.gannon@colostate.edu
Version VI - 12.09.2019

Purpose and Scope

The purpose of this wildfire risk assessment is to inform a revision of the Chaffee County Community Wildfire Protection Plan (CWPP). The major focus of the risk assessment is incorporating local spatial data on highly valued resources and assets (HVRAs), expertise on HRVA response to wildfire, and relative importance values to create a locally relevant risk assessment for Chaffee County.

Methods

Risk is a term widely used in economics, engineering, and emergency management to describe the expected impact of an event with uncertain occurrence and magnitude. Risk is an expected measure because it weighs the potential consequences of an event by its probability of occurrence. Risk assessment is an appropriate framework for wildfire because wildfire has considerable spatial and temporal variability in occurrence and intensity over the typical multi-decade planning periods used in land and resource management. Wildfire risk assessment quantifies and maps expected net value change for a suite of HVRAs by combining spatial information on fire likelihood, fire intensity, and resource exposure and effects, which form the three legs of the wildfire risk triangle (Figure 1; Scott *et al.* 2013).

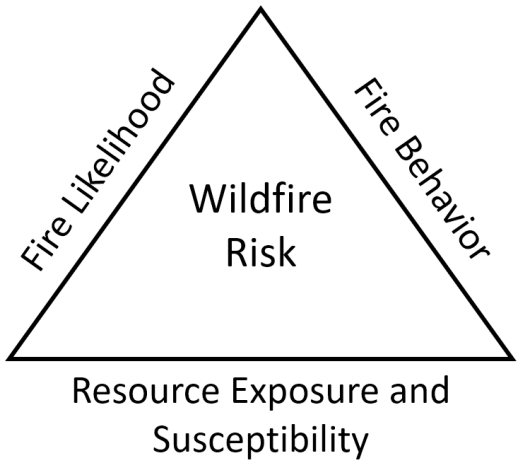

Figure 1: Wildfire risk triangle adapted from Scott et al. (2013).

Wildfire risk assessment requires extensive data and modeling to characterize the three legs of the risk triangle. Spatial wildfire simulation is used to estimate how wildfire likelihood and intensity vary across large landscapes based on fuels, topography, ignition sources, and climate.

The intent of this modeling is not to describe the behavior of a specific future wildfire, but rather the trends in fire occurrence and intensity over many potential future fire seasons. Wildfire consequences are captured with exposure and effects analyses that relate wildfire likelihood and intensity to HVRA expected Net Value Change (eNVC; Finney 2005). This requires consulting with local resource experts to map HVRAs, so a Geographic Information System (GIS) can be used to quantify their potential exposure to wildfire by intensity level, and to describe how HVRAs will respond to fire of varying intensity, so wildfire exposure can be translated to effects. Finally, local input on the relative importance of HVRAs to community well-being are applied as weights to quantify and map a composite risk measure. The following sections describe the mechanics of the Chaffee County Risk Assessment.

Risk Assessment Framework

The Chaffee County Risk Assessment applied the assessment framework from the Colorado Wildfire Risk Assessment (CO-WRA; Technosylva 2018) to locally-informed fire simulation products, HVRA spatial data and response functions, and relative importance weights (Figure 2). Fire behavior metrics, including flame lengths and crown fire activity were modeled in FlamMap 5 (Finney *et al.* 2015) for low, moderate, high, and extreme fire weather scenarios. Fire likelihood was quantified with an empirical model of burn probability by vegetation type. Fire behavior outputs were combined with local data on HVRA extent and stakeholder-informed response functions to calculate conditional Net Value Change (cNVC) for each HVRA and fire weather scenario. The multiple cNVC measures for each HVRA were combined with a weighted averaging that favored the high and extreme scenarios (Technosylva 2018). Lastly, the cNVC measures for each HVRA were combined with burn probability and relative importance weights to compute a composite eNVC ("risk") map for Chaffee County.

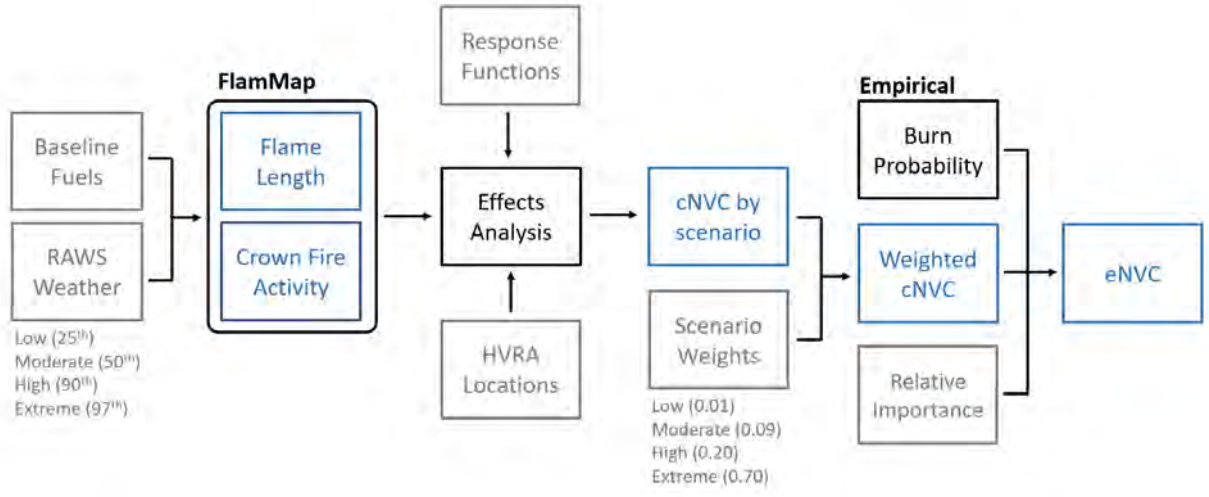

Figure 2: The Chaffee County Risk Assessment is based on the analysis framework from the Colorado Wildfire Risk Assessment (Technosylva 2018).

Fire Behavior Modeling

Two fire behavior metrics - flame length and crown fire activity - were modeled for low, moderate, high, and extreme fire weather scenarios using the FlamMap 5 spatial fire modeling system (Finney *et al.* 2015). Flame length is frequently used in wildfire risk assessment as an index of fireline intensity (rate of energy release from the fire front) because it is easily interpreted by non-fire resource specialists. Flame length and fireline intensity are directly related (Byram 1959). Crown fire activity was used as a proxy for soil burn severity as described in Gannon *et al.* (2019) to model post-fire watershed impacts. FlamMap requires fuels, topography, and weather information. Fuels were described with a combination of canopy attributes from LANDFIRE (2014) and surface fire behavior fuel attributes from CO-WRA (Technosylva 2018). Canopy fuels were updated to reflect recent fuel treatments. Slope steepness, slope aspect, and elevation came from LANDFIRE (2014). Fire weather scenarios were developed from historical Remote Automated Weather Station (RAWS) data from the six stations within 20 miles of Chaffee County (Jones Hill, Lodgepole Plats, Needle Creek, Red Deer, Salida Mini-RAWS, Taylor Park). Percent fuel moisture was computed for each category of dead and live fuels during a fire season defined as April 01 to October 31 using FireFamilyPlus 4.1 (Bradshaw and McCormick 2000). The 10-minute average RAWS wind speeds were converted to 1-minute average wind speeds for modeling (Crosby and Chandler 1966). Station statistics were aggregated to scenarios with weighted averaging based on the length of record at each station in years. The fire weather scenarios are described in Table 1. In FlamMap, wind direction was assumed to be upslope to represent a consistent worst-case scenario across aspects. The Scott and Reinhardt (2001) method was used for predicting crown fire activity. The flame length and crown fire activity predictions are available in Appendix I - Fire simulation products.

Table 1: Fire weather scenarios used for the risk assessment.

		Fuel Moisture (%)						
Scenario	**Percentile**	**1-hr**	**10-hr**	**100-hr**	**1000-hr**	**Herbaceous**	**Woody**	**Wind Speed 1-min (mph @ 20 ft)**
Low	25	8	11	15	17	82	110	9
Moderate	50	6	7	12	15	43	75	11
High	90	3	4	7	10	5	64	17
Extreme	97	2	3	6	9	3	64	21

Burn Probability Modeling

The original plan for the assessment was to use the CO-WRA burn probability product to represent wildfire likelihood, which is described in Technosylva (2018) and mapped in Appendix II – Burn probability. Based on feedback from both the Community Wildfire Protection Plan Working Group and community at large, we decided to use an empirical estimate of burn

probability by vegetation type based on historical fire observations in Chaffee County as further described in Appendix II – Burn probability. This spatial estimate of burn probability predicts more fire activity in mid- to high-elevation forests and less fire activity in the low-elevation woodland and non-forest vegetation types compared to CO-WRA. The Community Wildfire Protection Plan Working Group favored this product because it matched their experiences and expectations of fire occurrence in Chaffee County. The data sources, methods, and limitations of this approach are described in Appendix II – Burn probability.

Exposure and Effects Assessment

Local stakeholders including land, fire, water, and wildlife managers identified data sources to represent HVRAs related to human life safety, critical infrastructure, water supply, wildland-urban interface, wildlife, and recreation concerns in Chaffee County (Table 2). Spatial data were assembled in a geodatabase and re-projected to a common coordinate system for analysis.

Table 2: HVRAs included in the risk assessment by category. The spatial data type, buffer distance used to define an influence zone for wildfire around the HVRA, and the HVRA relative importance (%) to the category are specified.

Category	HVRA	Type	Influence zone (m)	Rel. Imp. (%)
Life safety	Evacuation routes	Polyline	400	100
Infrastructure	Aircraft Landing Facilities	Point	200	5
	Communication Facilities	Point	200	35
	Electric Power Transmission Lines	Polyline	200	35
	Emergency Service Stations	Point	200	15
	Schools	Point	200	10
Wildland Urban Interface	Low density WUI	Raster	0	47
	High density WUI	Raster	0	53
Water	Critical Water Supplies	Raster	0	65
	Surface diversions	Raster	0	3
	Ground diversions	Raster	0	2
	CSU Pipelines	Polyline	200	10
	CSU Buildings	Point	200	20
Wildlife	Bighorn Sheep Winter Range	Polygon	0	5
	Black Bear Fall Concentration	Polygon	0	10
	Elk Migration Corridors	Polygon	0	5
	Elk Winter Range	Polygon	0	10
	Aquatic Habitat	Raster	0	50
	Mule Deer Migration Corridors	Polygon	0	5
	Mule Deer Winter Range	Polygon	0	10
	Lynx	Polygon	0	5
Recreation	Tourism Businesses	Point	400	10
	Monarch Ski Area	Polygon	0	10
	USFS Recreation Opportunities	Point	400	20
	Trails	Polyline	100	25
	Arkansas Headwaters Recreation Area	Polygon	100	27
	Brown's Canyon National Monument	Polygon	0	3
	Dispersed camping	Polygon	0	5

A workshop was held on June 19, 2019 to collect input from local resource experts on HVRA response to fire by intensity level (Table 3). Relative HVRA response was quantified on a scale from -100 for total loss to +100 for radical gain to allow both negative and beneficial effects of fire. The response of watershed related HVRAs were quantified with a separate process described in Appendix III – Watershed related Conditional Net Value Change (cNVC). Methods to delineate the wildland urban interface and density classes are described in Appendix II – Spatial data processing.

Table 3: Relative response functions defined through a collaborative process using stakeholder input. HVRAs with NA were quantified using post-fire watershed modeling described in Appendix III – Watershed related Conditional Net Value Change (cNVC).

Category	HVRA	FIL1 0-2 ft	FIL2 2-4 ft	FIL3 4-6 ft	FIL4 6-8 ft	FIL5 8-12 ft	FIL6 > 12 ft
Life safety	Evacuation Routes	-20	-40	-80	-100	-100	-100
Infrastructure	Aircraft Landing Facilities	0	0	-10	-50	-80	-90
	Communication Facilities	0	0	0	-30	-100	-100
	Electric Power Transmission Lines	0	0	0	-30	-40	-40
	Emergency Service Stations	-10	-30	-60	-80	-100	-100
	Schools	-10	-30	-60	-80	-100	-100
Wildland Urban Interface	Low density WUI	-20	-40	-80	-100	-100	-100
	High density WUI	-40	-80	-100	-100	-100	-100
Water	Critical Water Supplies	NA	NA	NA	NA	NA	NA
	Surface diversions	NA	NA	NA	NA	NA	NA
	Ground diversions	NA	NA	NA	NA	NA	NA
	CSU Pipelines	0	-20	-50	-80	-100	-100
	CSU Buildings	-10	-20	-40	-100	-100	-100
Wildlife	Bighorn Sheep Winter Range	40	20	10	-10	-60	-80
	Black Bear Fall Concentration	40	20	10	-10	-60	-80
	Elk Migration Corridors	40	20	10	-10	-60	-80
	Elk Winter Range	40	20	10	-10	-60	-80
	Aquatic Habitat	NA	NA	NA	NA	NA	NA
	Mule Deer Migration Corridors	40	20	10	-10	-60	-80
	Mule Deer Winter Range	40	20	10	-10	-60	-80
	Lynx	0	-10	-20	-40	-80	-100
Recreation	Tourism Businesses	-10	-20	-40	-80	-100	-100
	Monarch Ski Area	0	-10	-10	-20	-50	-70
	USFS Recreation Opportunities	10	-10	-10	-20	-50	-70
	Trails	10	0	-10	-30	-40	-50
	Arkansas Headwaters Rec. Area	10	-10	-10	-30	-50	-70
	Brown's Canyon National Monument	40	20	10	-10	-10	-10
	Dispersed camping	10	0	-10	-30	-40	-50

cNVC rasters were developed for each HVRA by applying the response function to the predicted fire behavior within each HVRA's extent. This was done first by fire weather scenario and then scenarios were combined into a single cNVC raster per HVRA with weighted averaging (Figure 2). We used the same scenario weighting scheme as CO-WRA (Technosylva 2018), which reflects that the most area is expected to burn under high and extreme fire weather scenarios (Table 4), consistent with recent wildfire activity in Colorado (Graham *et al.* 2003; Haas *et al.* 2015).

Table 4: Probabilities for weighting cNVC calculated for each fire weather scenario.

Scenario	Percentile	Probability
Low	25th	0.01
Moderate	50th	0.09
High	90th	0.20
Extreme	97th	0.70

Relative Importance Weights

Relative importance weights were defined at two levels. For each HVRA, a relative importance weight was assigned to reflect its proportional contribution to an HVRA category (Table 2). These were assigned by resource experts through small group discussions and full group critique. The relative importance of HVRA categories to Chaffee County was informed by the Envision Chaffee County Community Wildfire Survey, which identified human life safety is the top concern followed by critical infrastructure, water, wildland urban interface, wildlife habitat, and recreation. Local stakeholders assigned relative importance weights based on the survey and small group discussion. These relative importance weights were then used to weight the contribution of each HVRA category to the composite risk map.

Table 5: Relative importance weights used for combining HVRA categories into a composite risk map.

Category	Rel. Imp.	Share of total (%)
Life safety	120	24.7
Infrastructure	100	20.6
Water	90	18.6
Wildland Urban Interface	80	16.5
Wildlife	50	10.3
Recreation	45	9.3

Results

The composite wildfire risk map shown in Figure 3 combines the category-level risk maps based on their relative importance to Chaffee County. Risk by HVRA category is mapped in Figures 4, 5, 6, 7, 8, and 9 and composite conditional Net Value Change is mapped in Figure 10.

Wildfire risk is predominantly concentrated in the low- to mid-elevation forests and woodlands where there is a convergence of HVRAs, hazardous fuel conditions, and high burn probability (Figure 11; Figure 12). Although burn probability is highest in the mid- to high-elevation forests (Appendix II – Burn probability), more risk is associated with pinyon-juniper woodlands because of the high concentration of fire sensitive HVRAs mapped in the foothills and valley bottoms. There are concentrated areas of high wildfire risk in higher elevation forests where they overlap life safety, infrastructure, and WUI HVRAs. It should be noted that some areas of the landscape are expected to benefit from wildfire (Figure 3) due to low predicted flame lengths that may enhance wildlife and recreation HVRAs (Figure 8; Figure 9).

Given the uncertainties associated with predicting future wildfire activity (see Appendix II – Burn probability), we also report a composite measure of conditional Net Value Change (cNVC; Figure 10), which does not factor in burn probability. The spatial distribution of composite cNVC is not too dissimilar from the composite risk map because both maps account for the overlap between hazardous fuel conditions and HVRAs. Accounting for burn probability shifts risk away from the lower elevation woodlands and non-forest vegetation to the mid- to high-elevation forests.

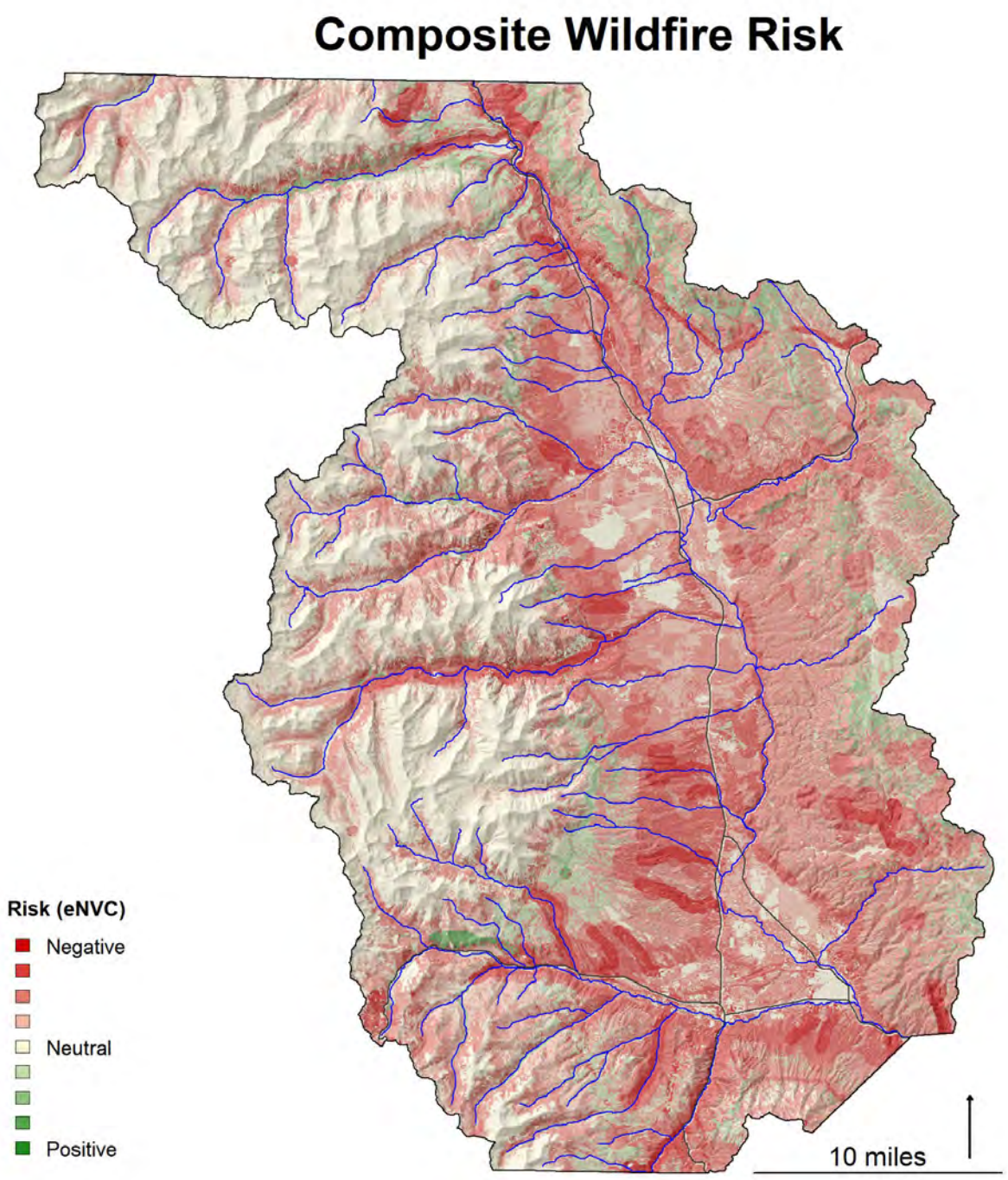

Figure 3: Composite wildfire risk map for Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire.

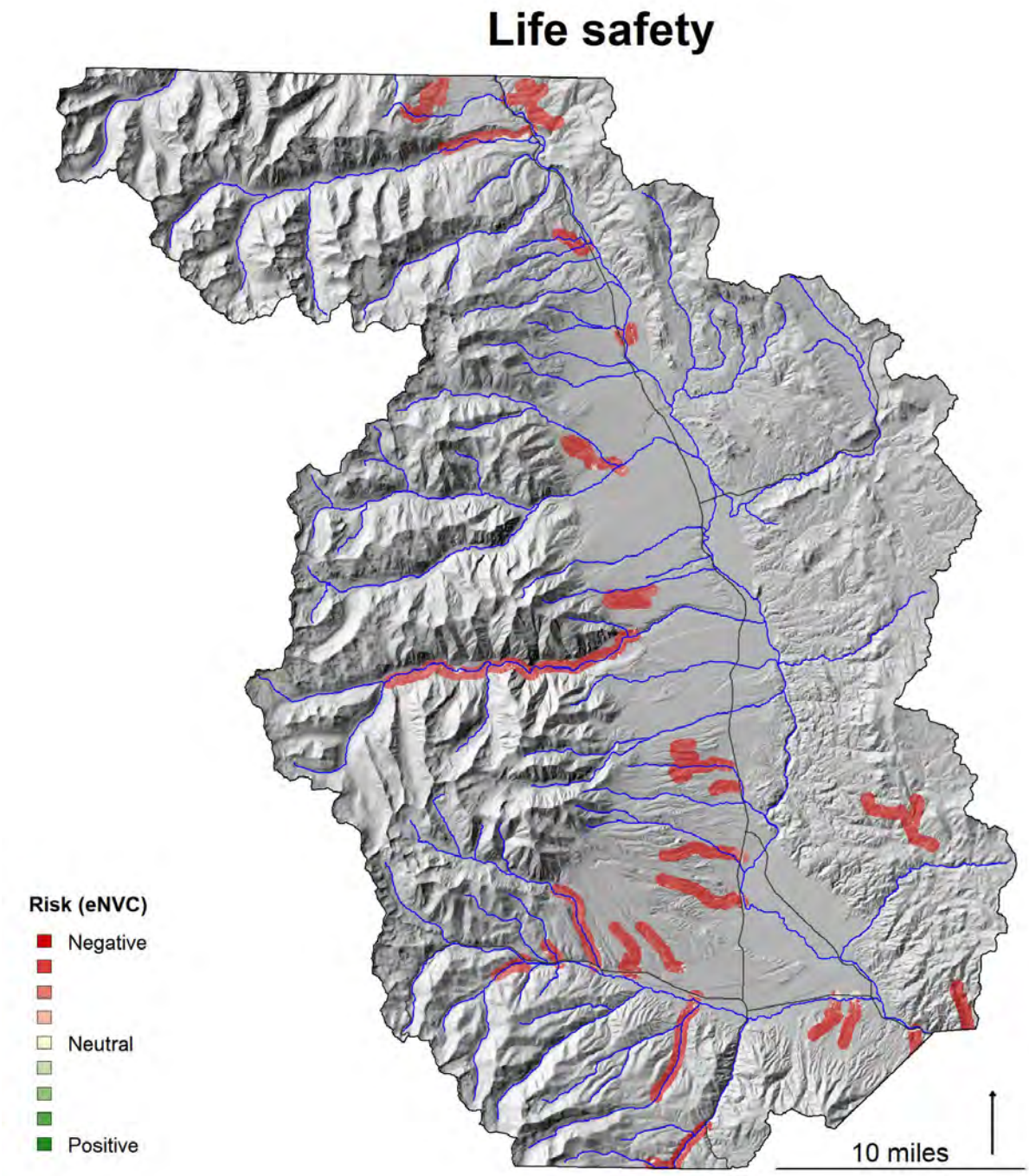

Figure 4: Wildfire risk to life safety in Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire.

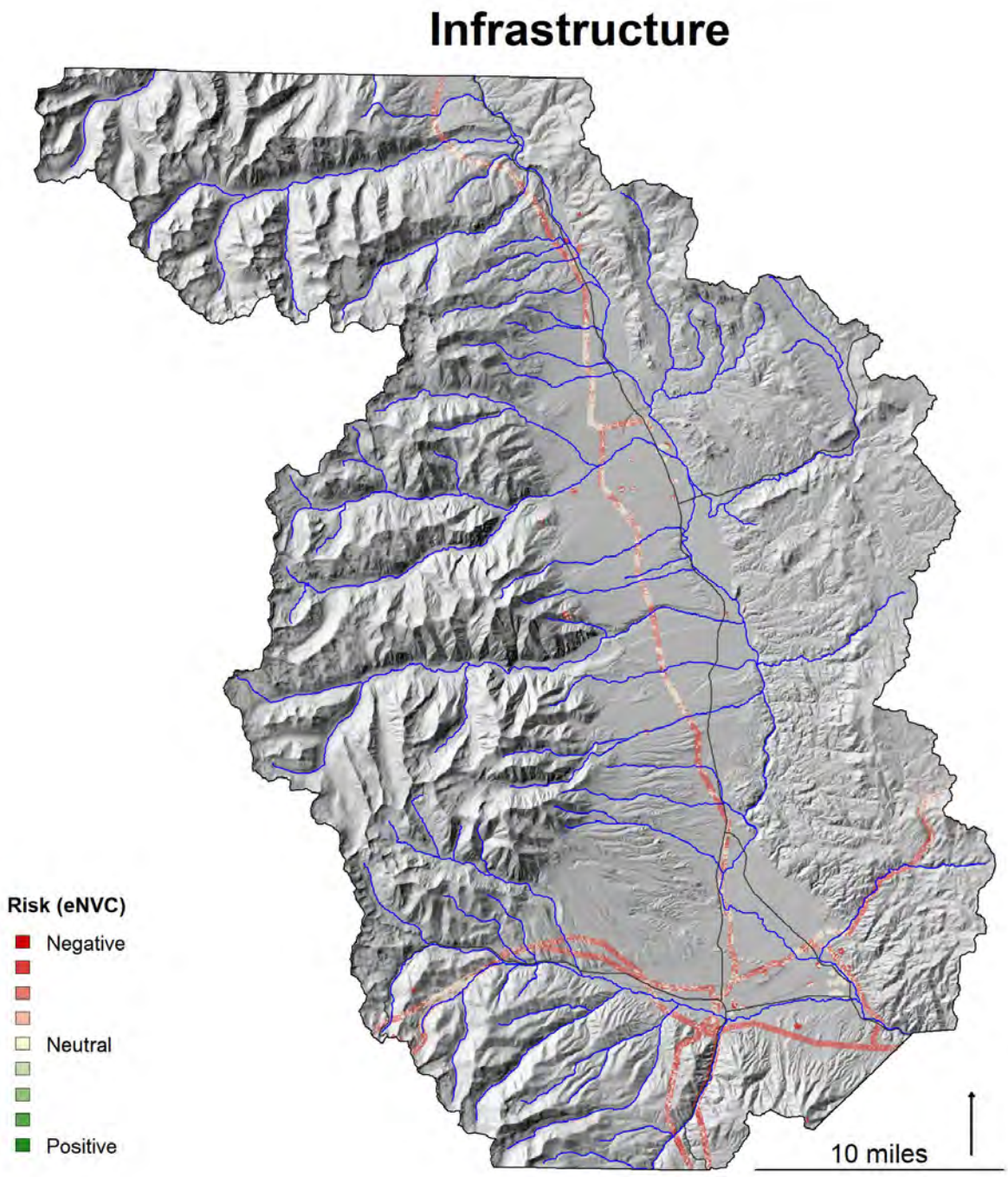

Figure 5: Wildfire risk to infrastructure in Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire.

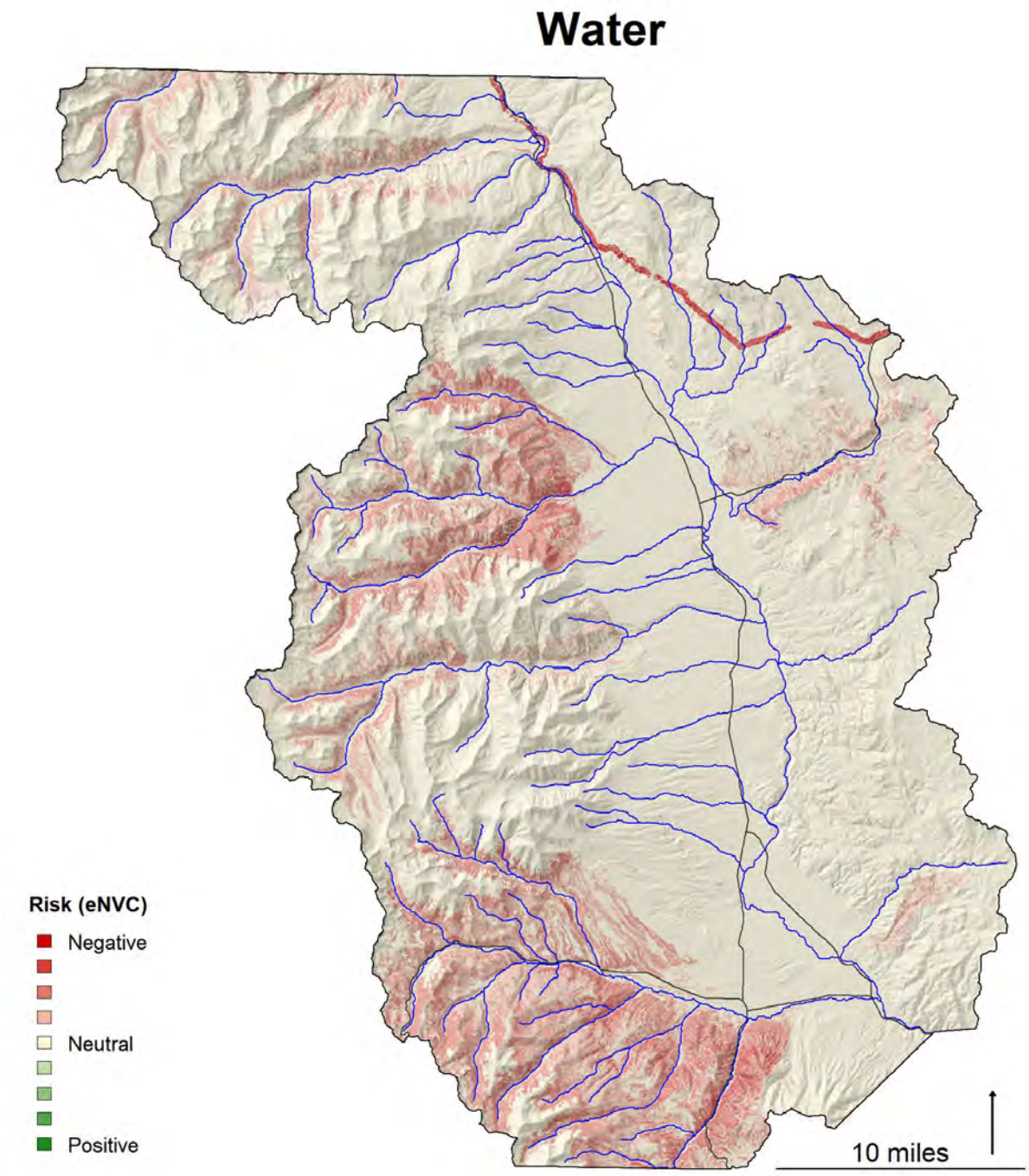

Figure 6: Wildfire risk to water in Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire.

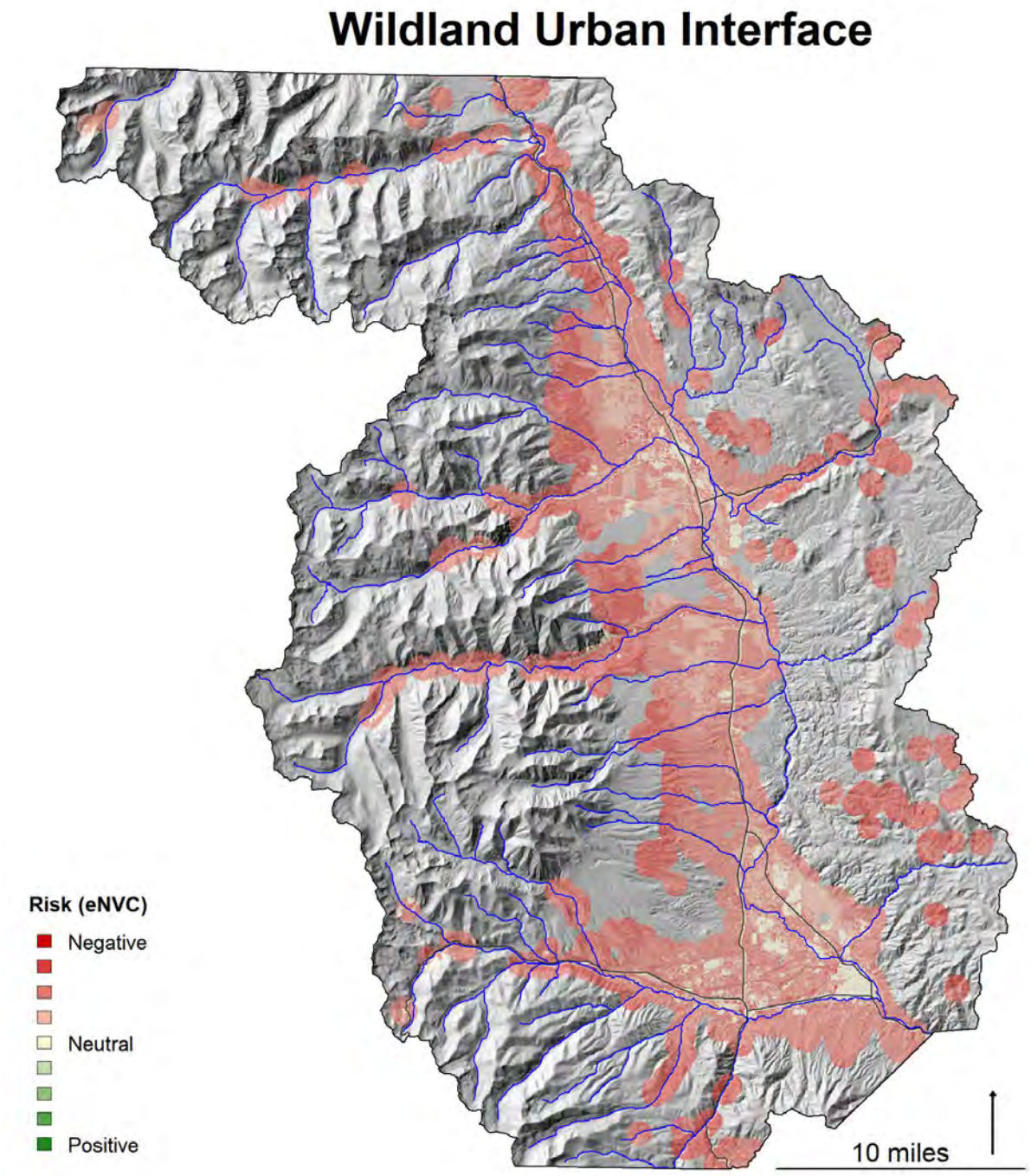

Figure 7: Wildfire risk to Wildland Urban Interface (WUI) in Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire. The WUI is where people live, work, shop, and go to school. WUI risk therefore represents the potential for wildfire to harm numerous human assets and to disrupt human lives. For more information on WUI mapping see Appendix II – Spatial data processing.

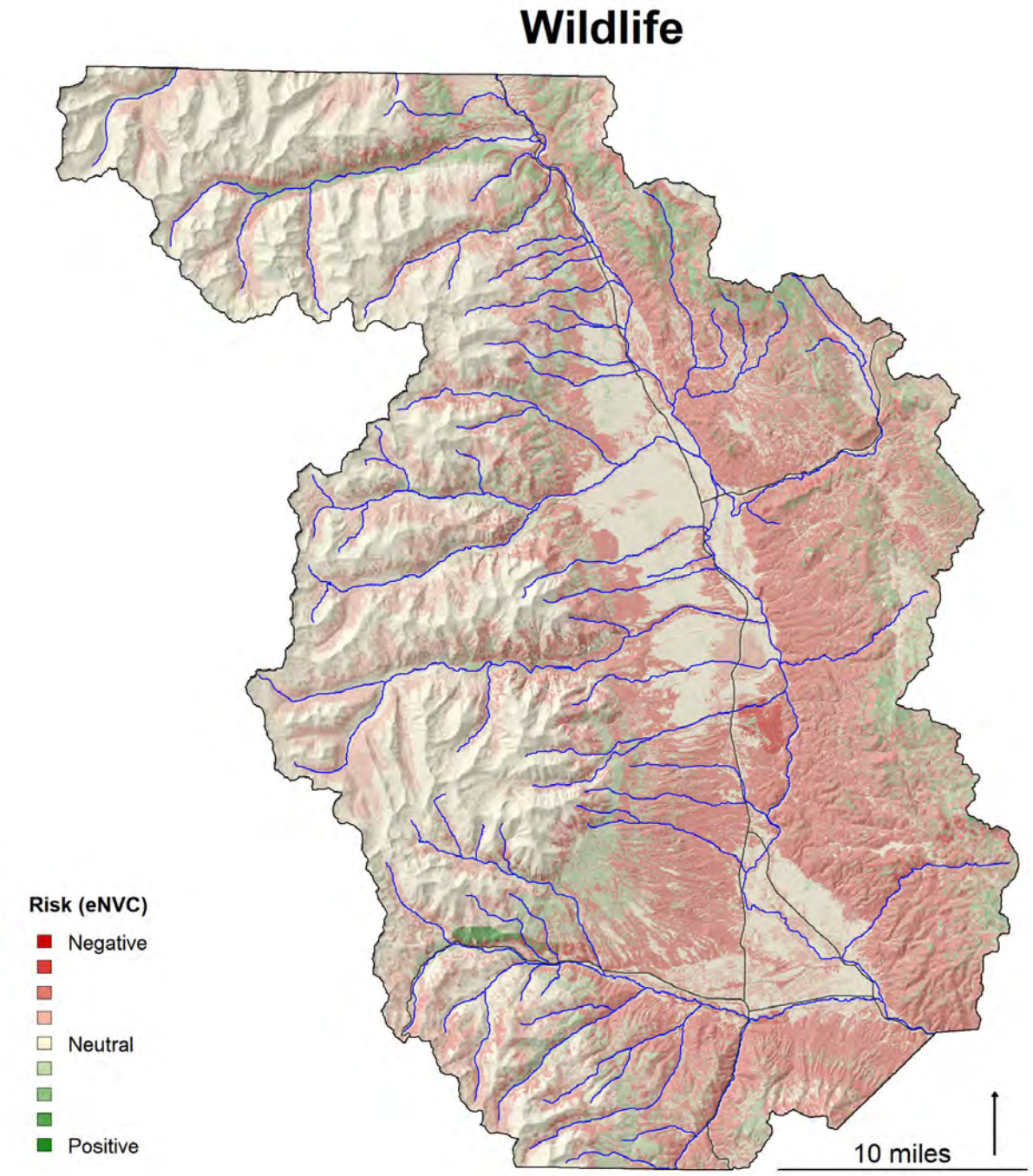

Figure 8: Wildfire risk to wildlife in Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire.

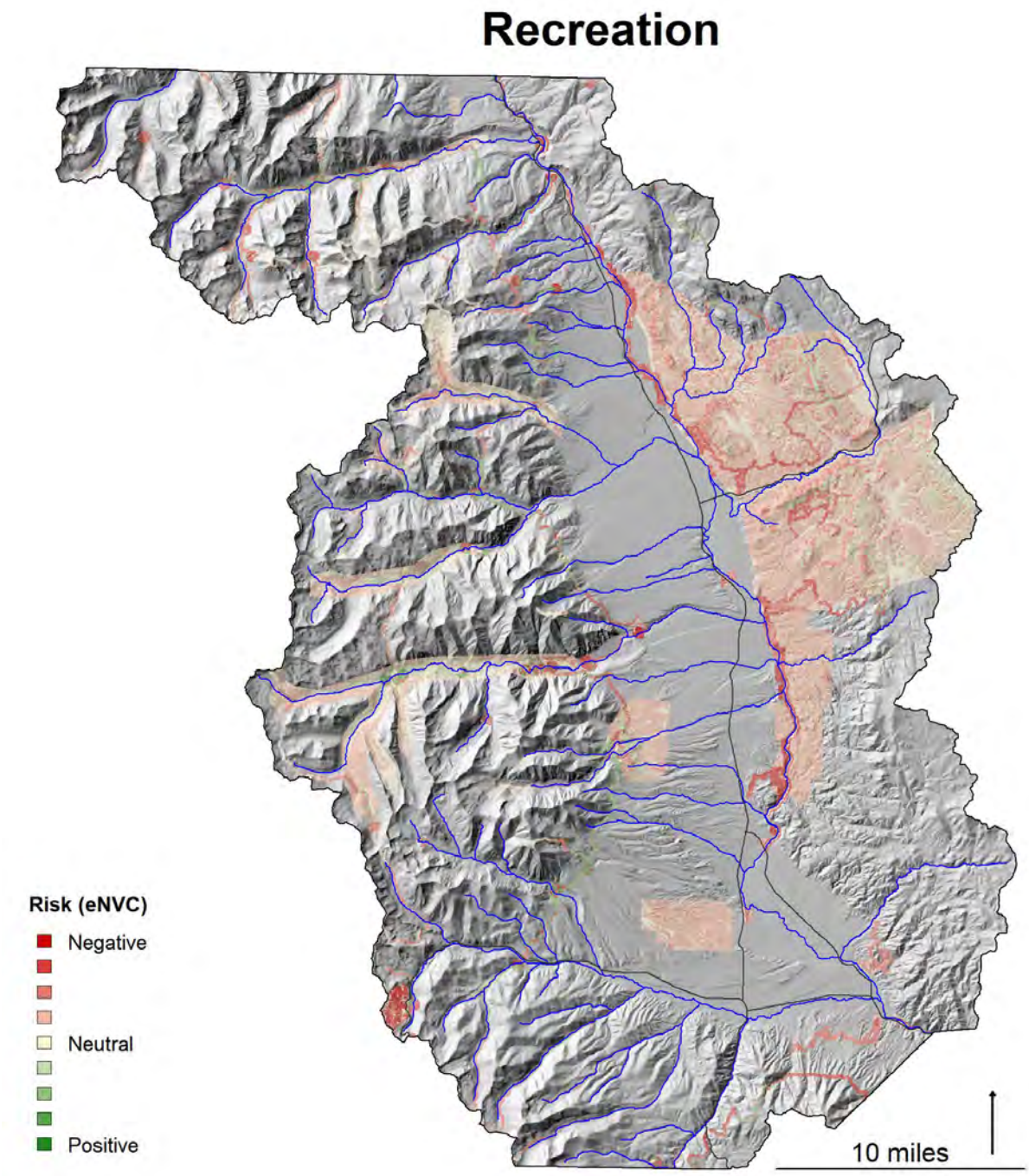

Figure 9: Wildfire risk to recreation in Chaffee County. Negative eNVC means high risk. Positive eNVC means there is an expected benefit from fire.

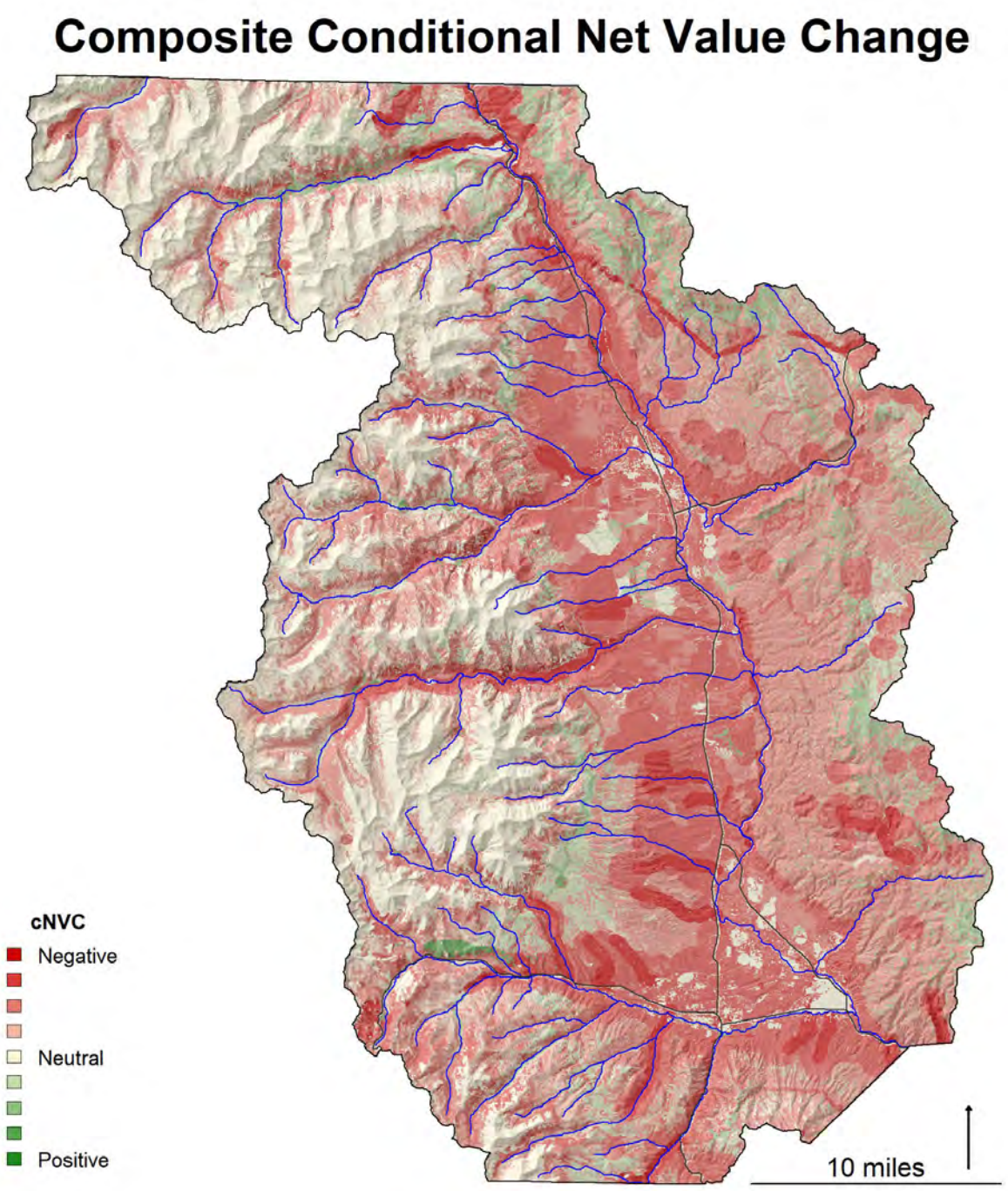

Figure 10: Composite conditional Net Value Change (cNVC) map for Chaffee County. Negative cNVC means net losses. Positive cNVC means net benefits.

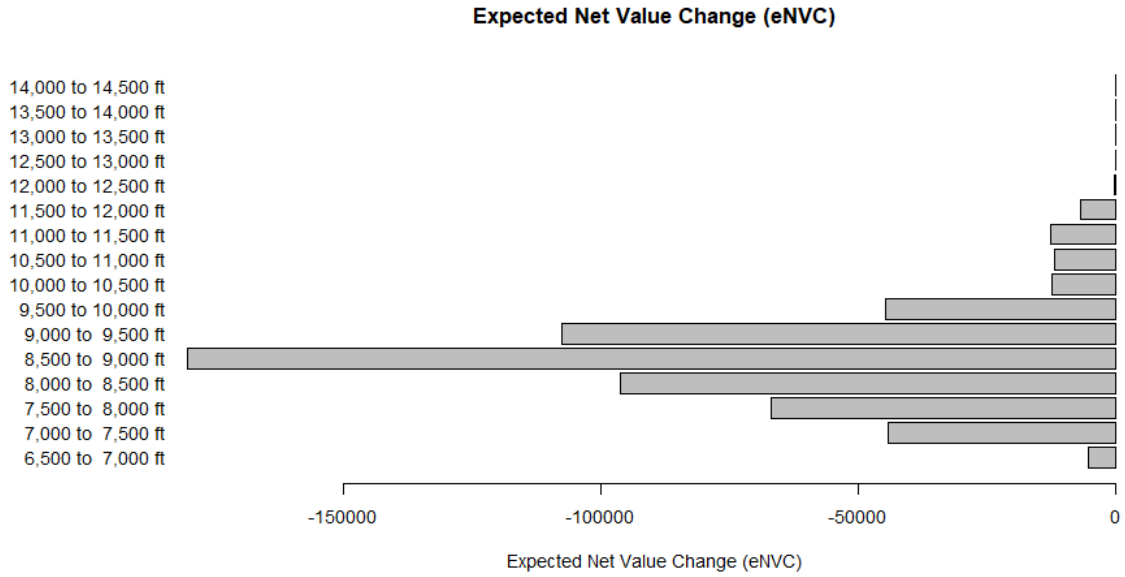

Figure 11: Risk (expected Net Value Change) distribution across elevation bins.

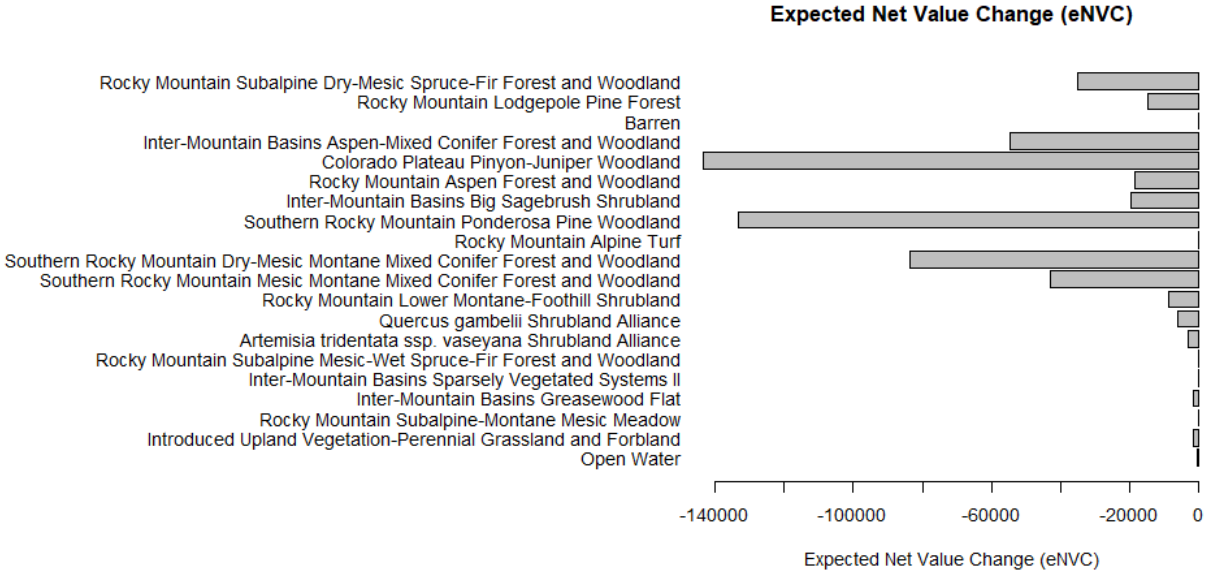

Figure 12: Risk (expected Net Value Change) by existing vegetation type from LANDFIRE (2014).

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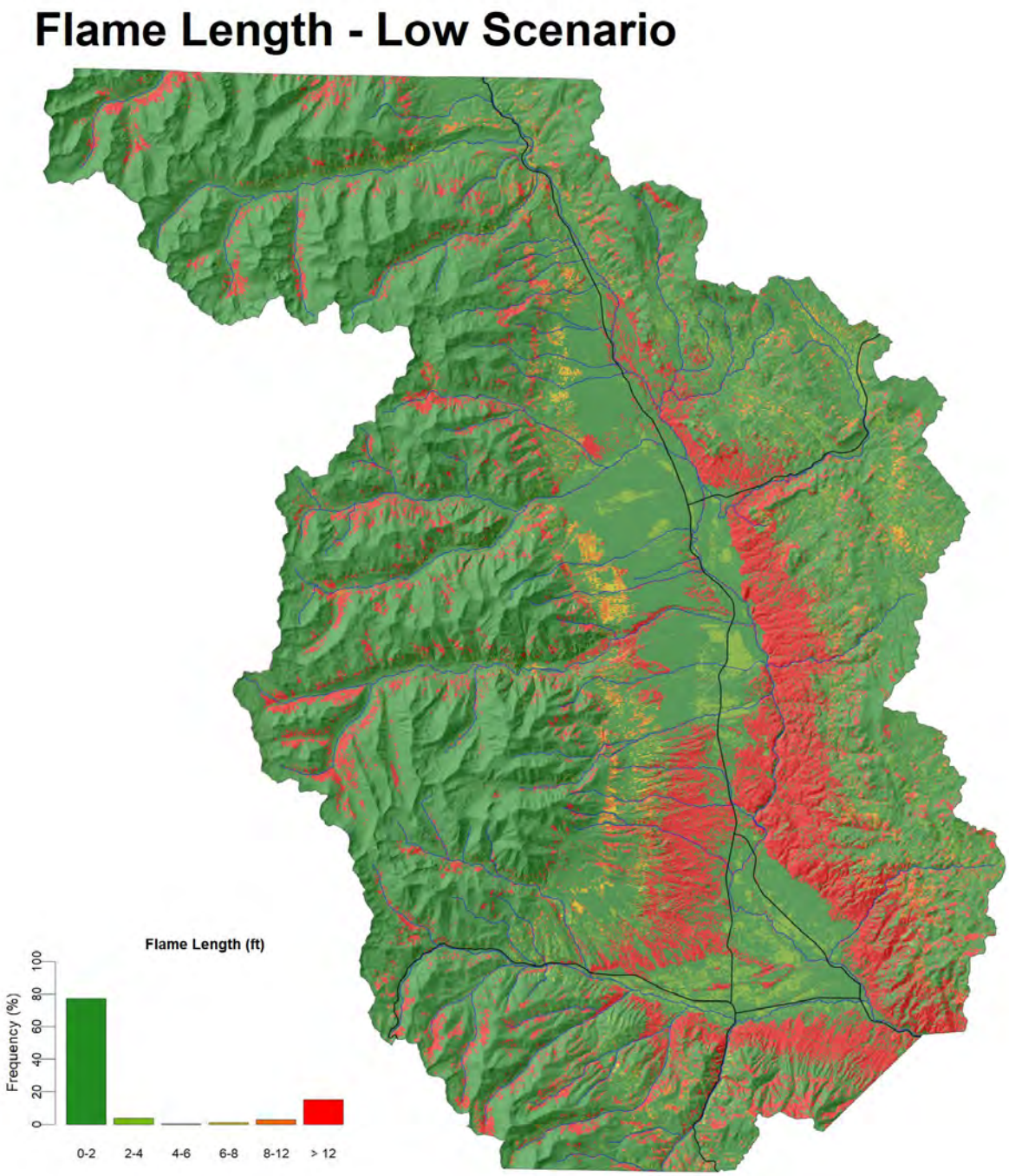
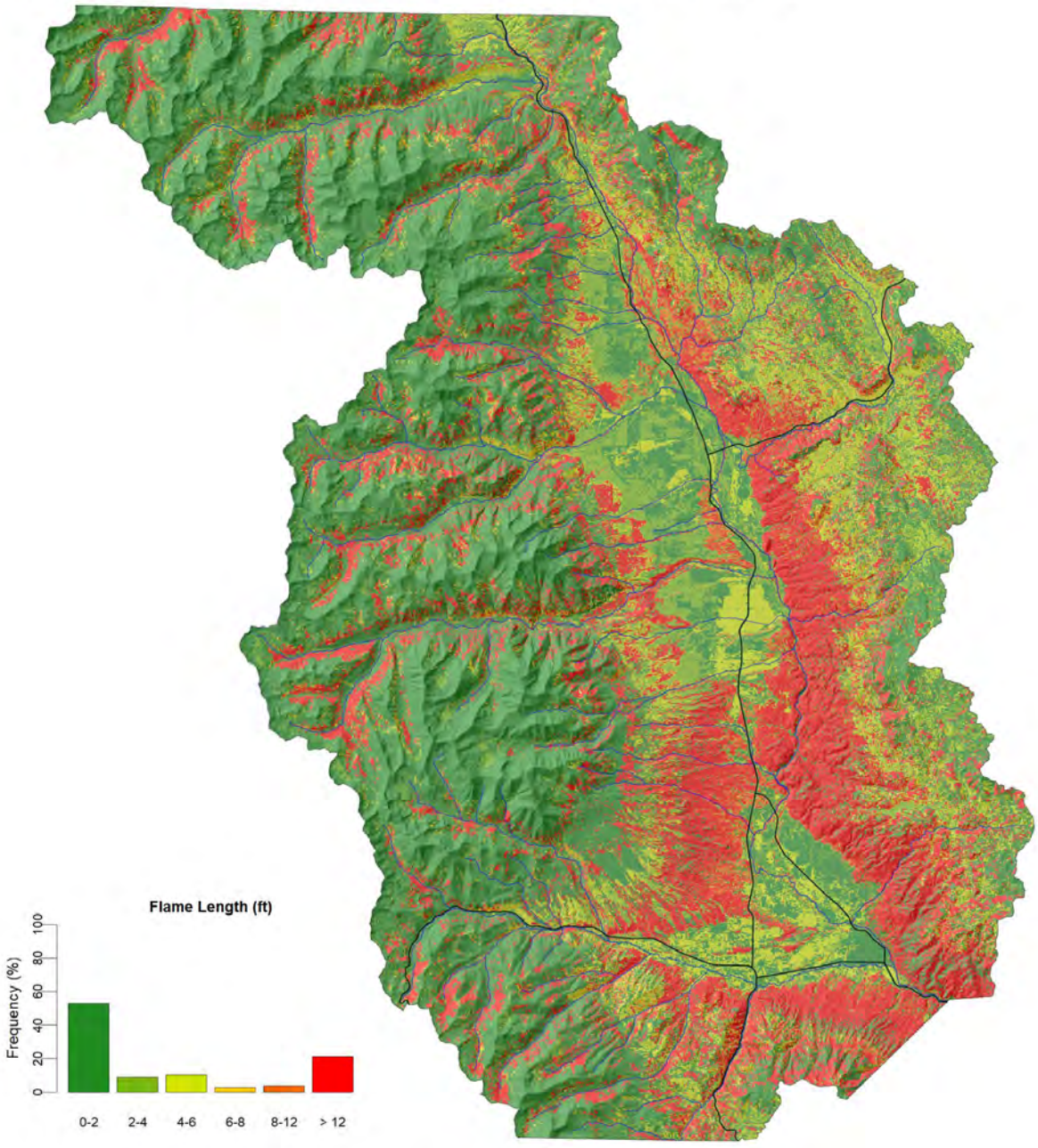
Appendix I - Fire simulation products



Flame Length - Moderate Scenario



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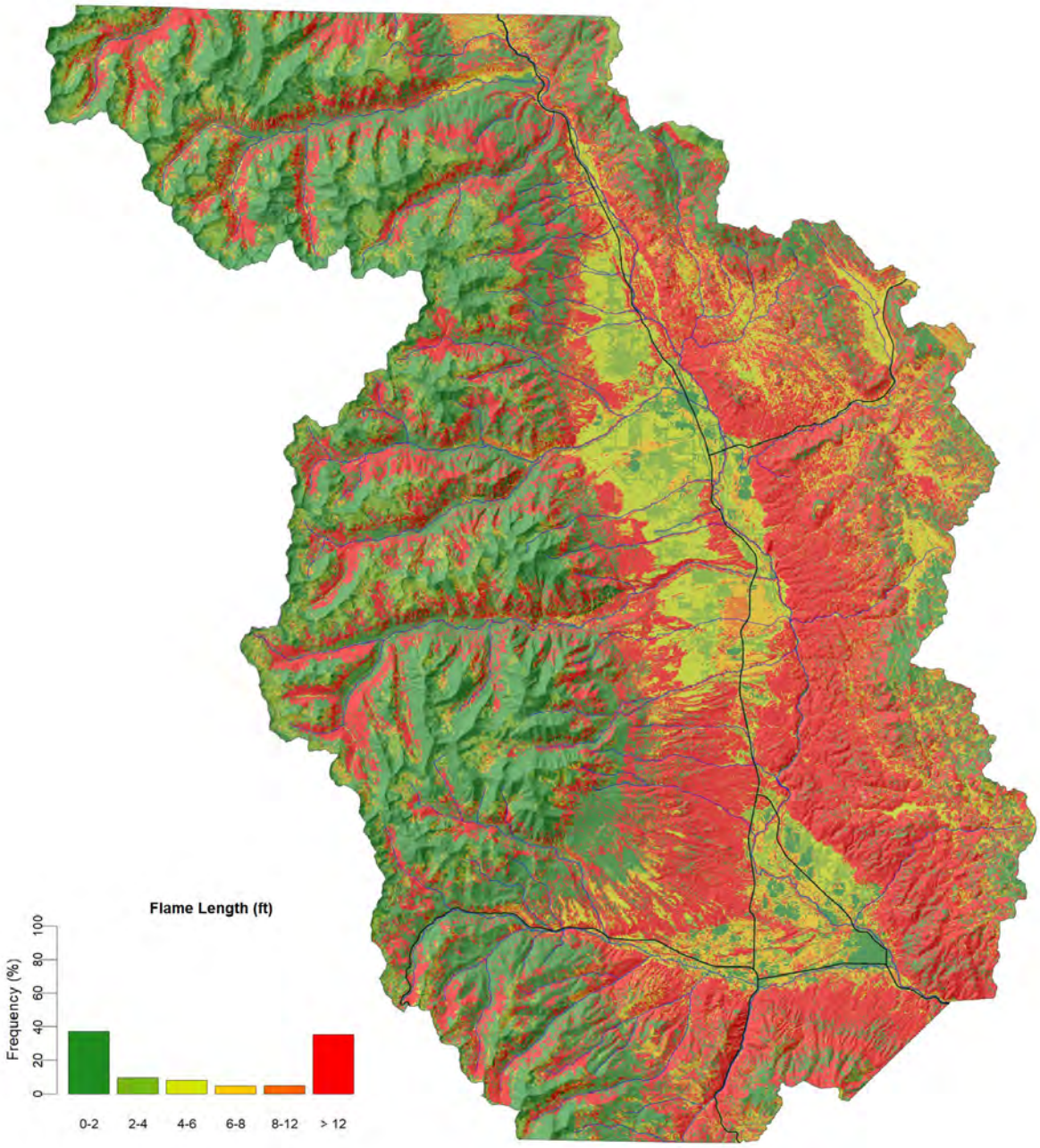
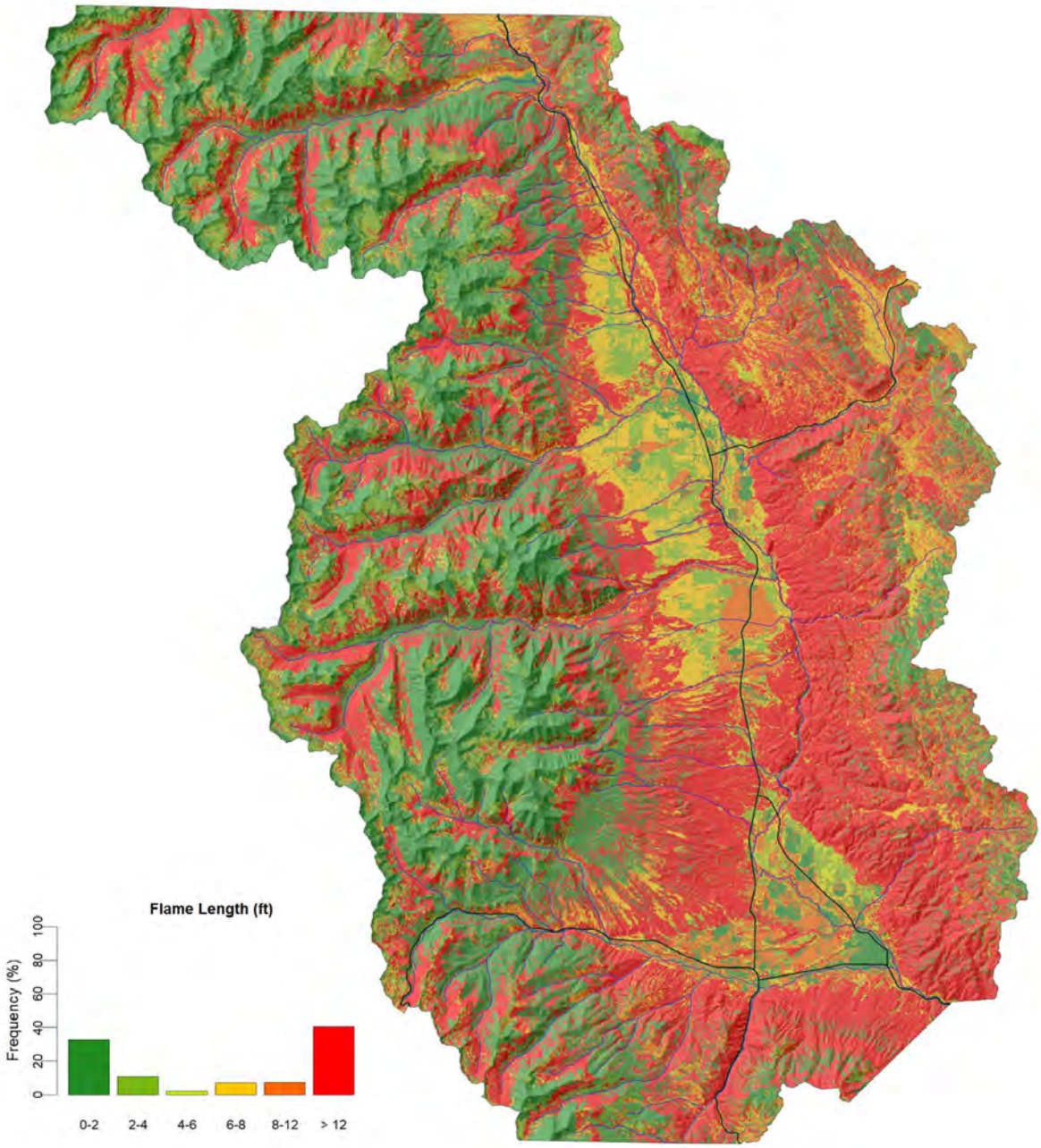
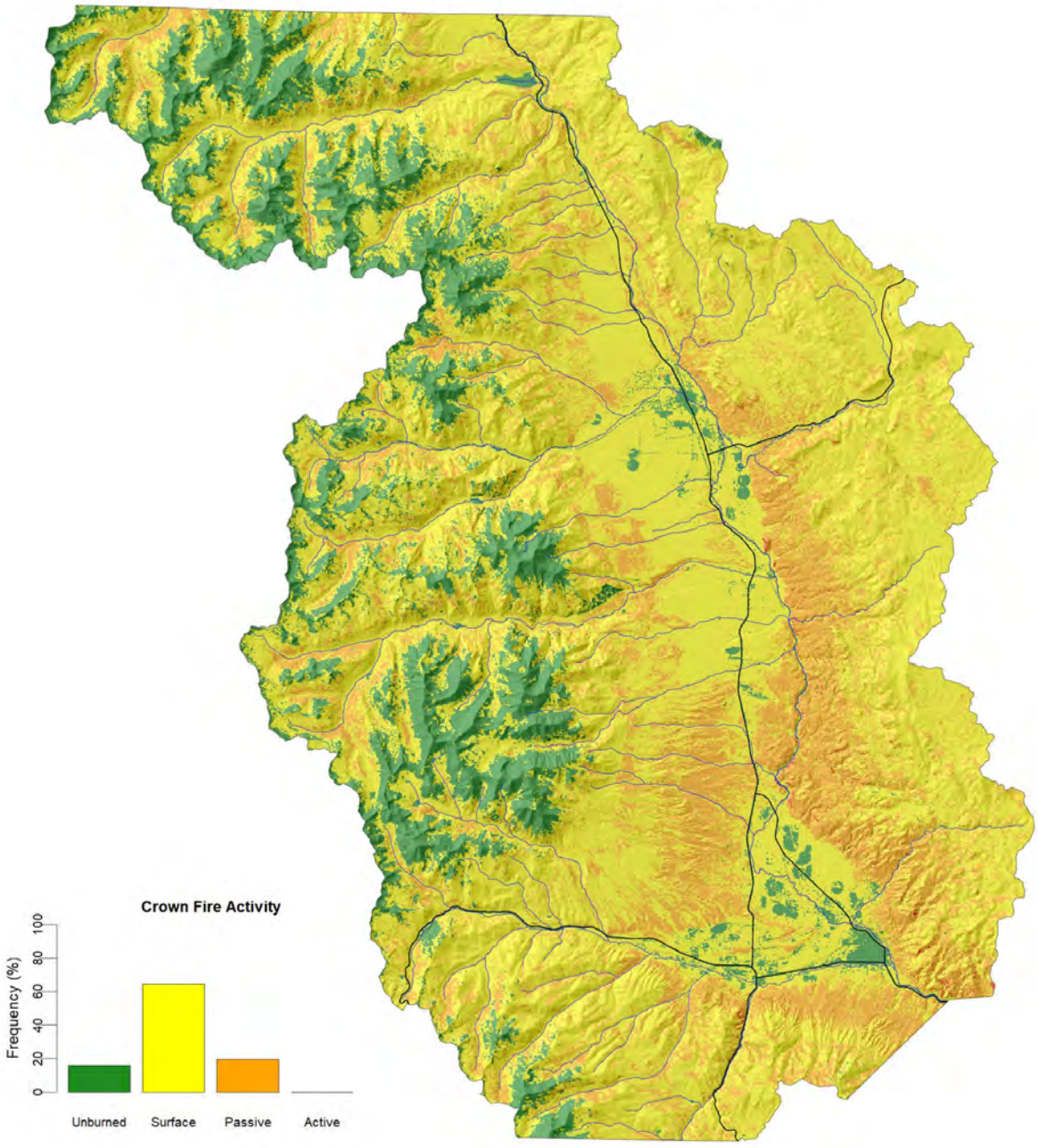


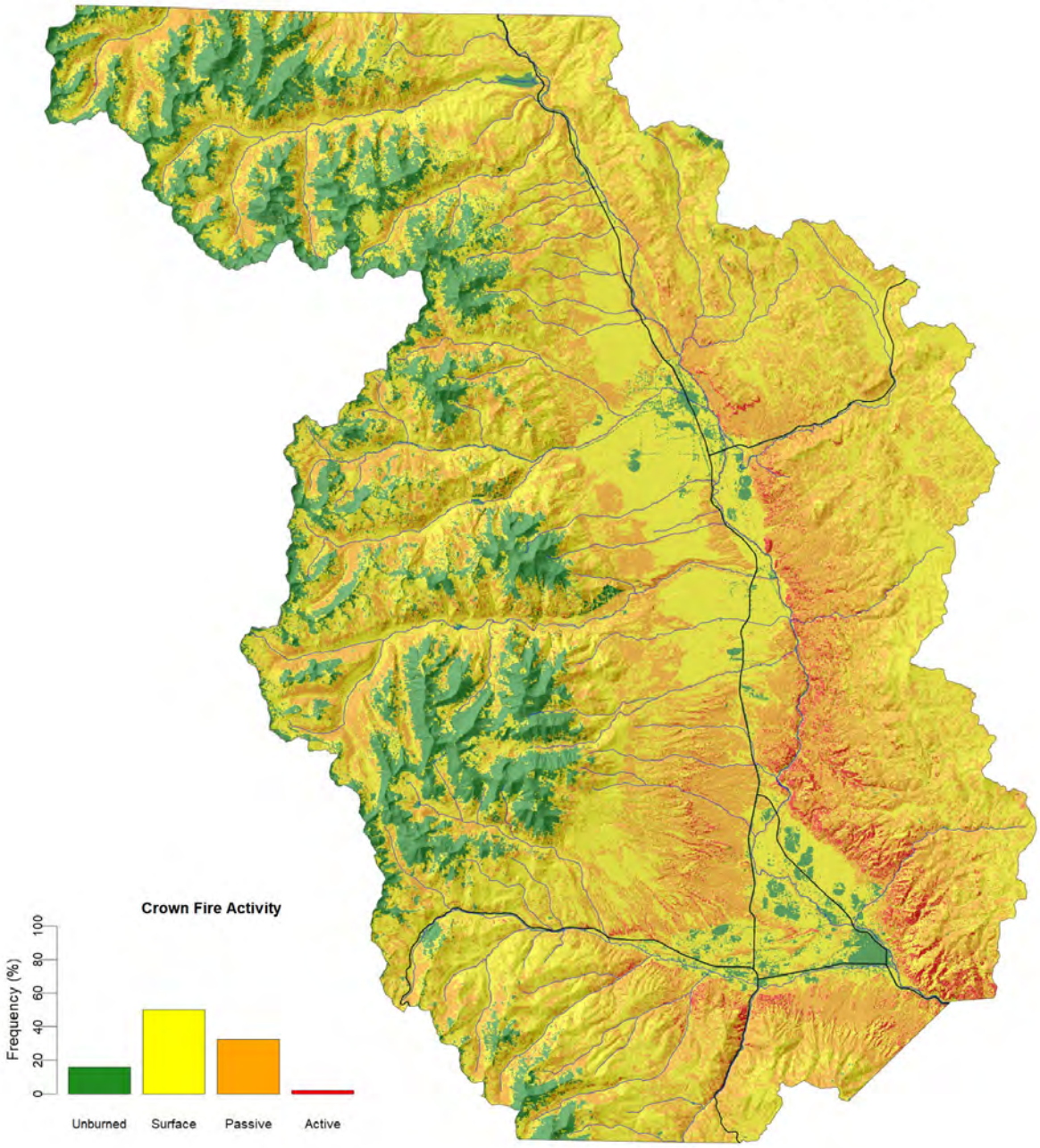
Flame Length - Extreme Scenario



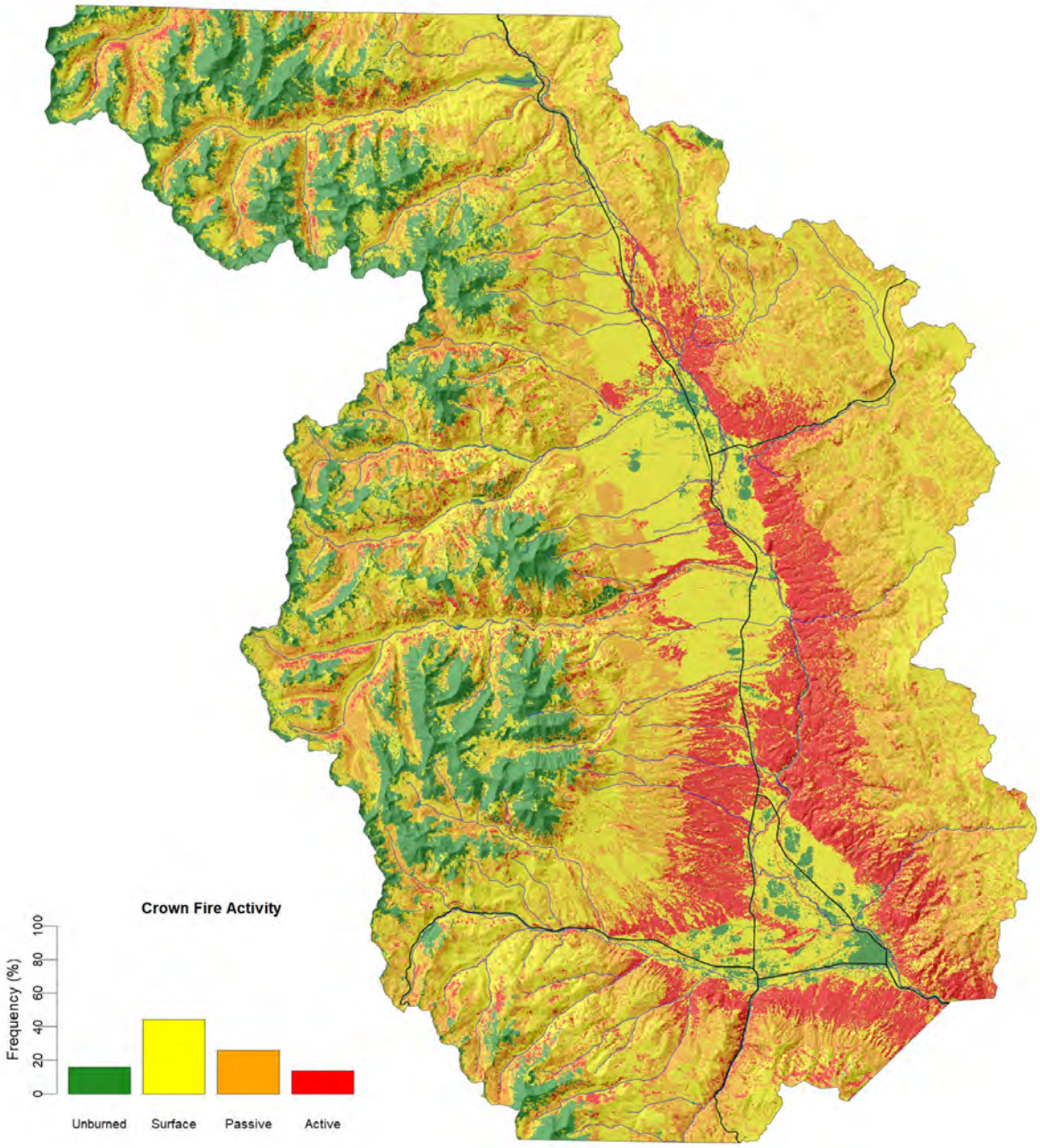
Crown Fire Activity - Low Scenario



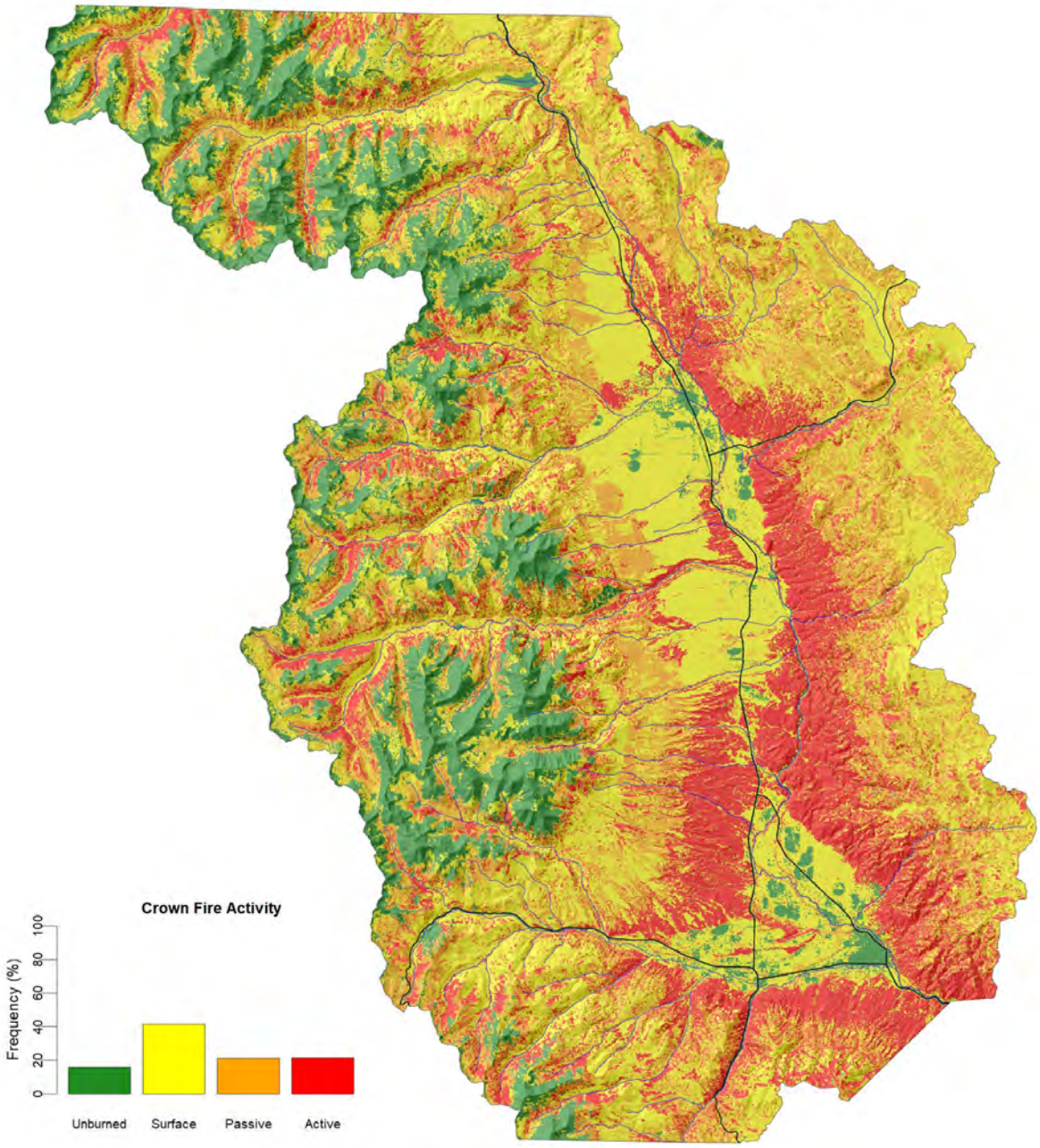
Crown Fire Activity - Moderate Scenario



Crown Fire Activity - High Scenario



Crown Fire Activity - Extreme Scenario



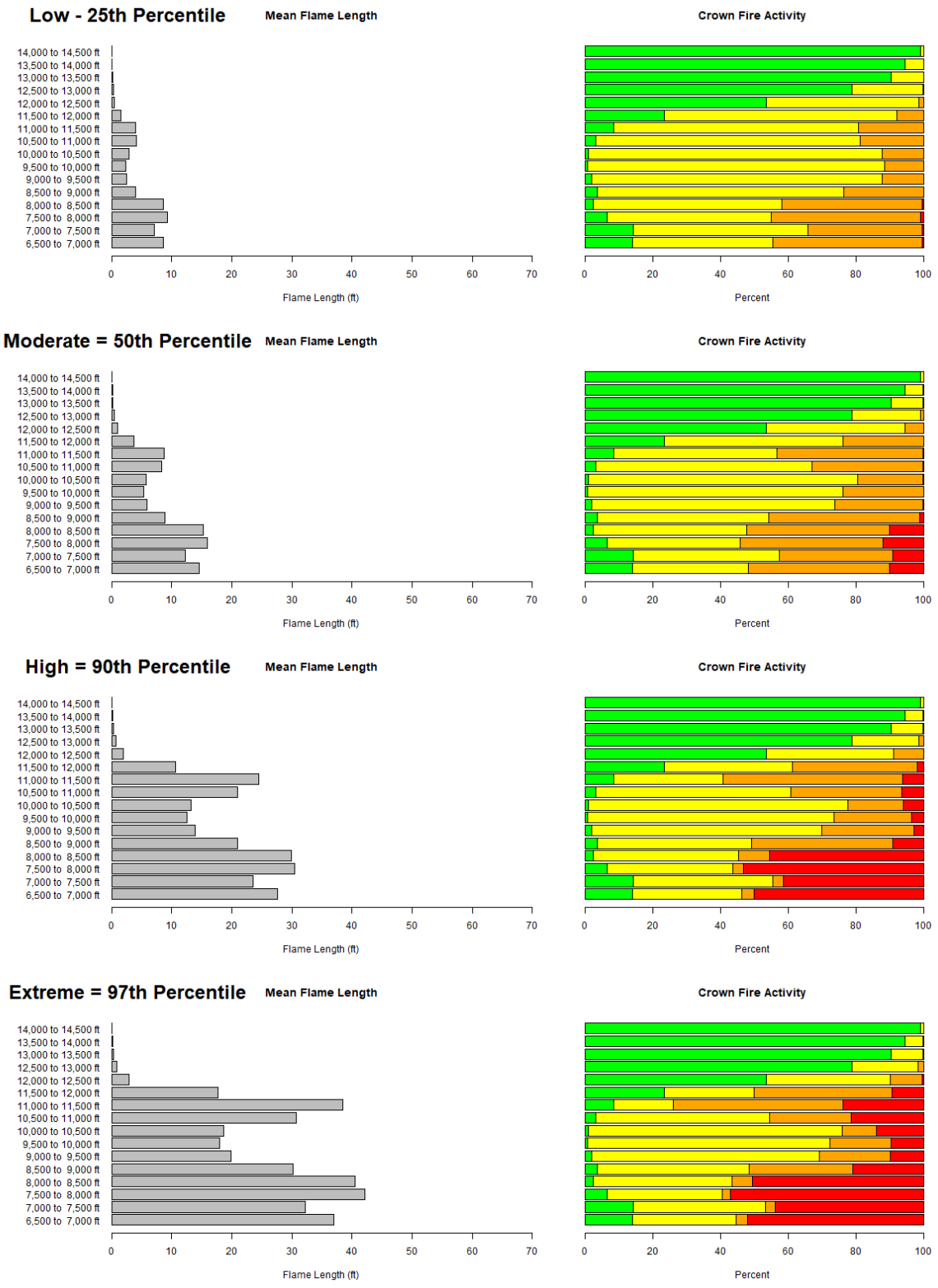


Figure 13: Summary of fire behavior by elevation. The stacked barplot color scheme is green = unburned, yellow = surface fire, orange = passive crown fire, and red = active crown fire.

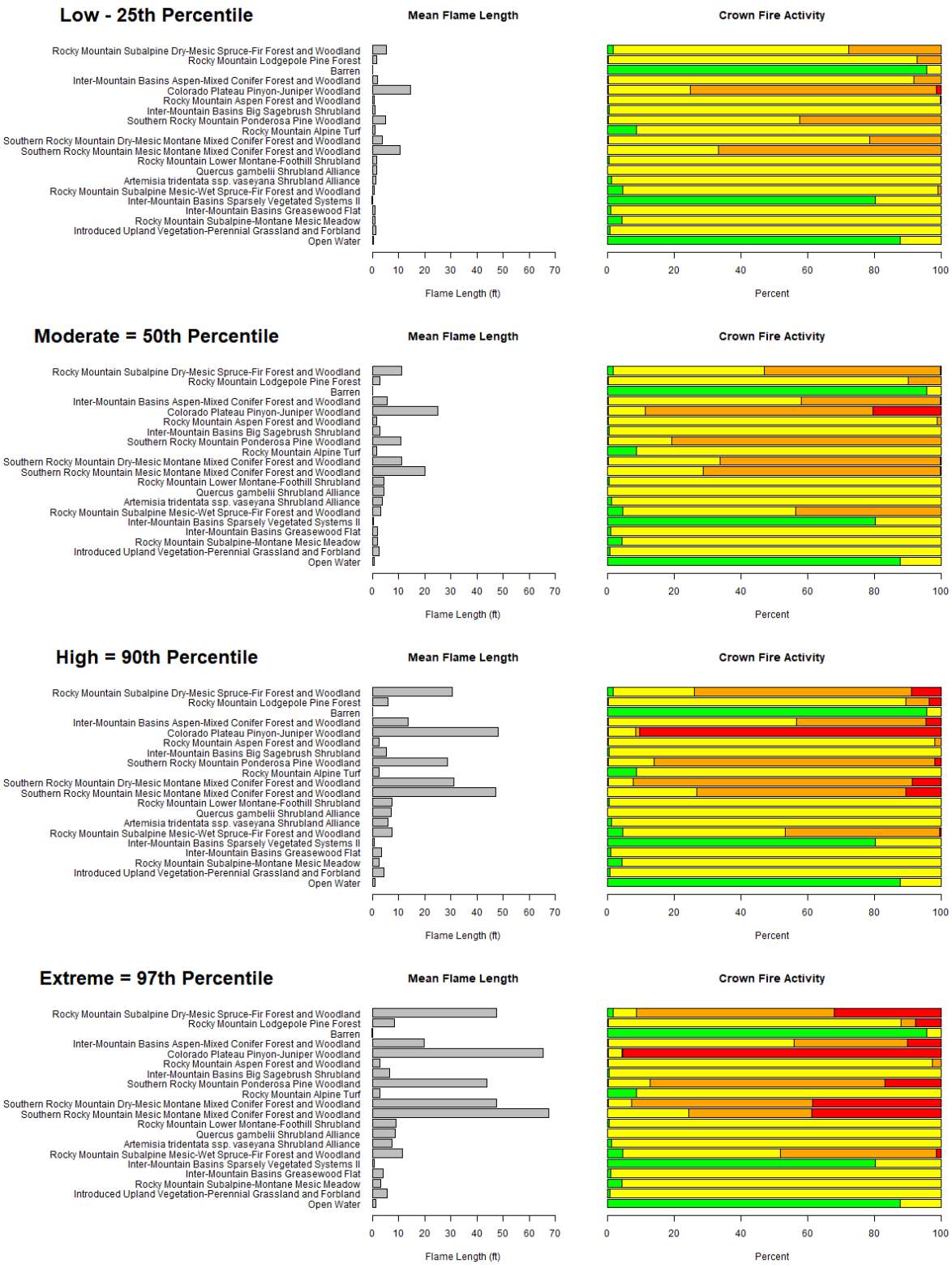


Figure 14: Summary of fire behavior by existing vegetation type from LANDFIRE (2014). The stacked barplot color scheme is green = unburned, yellow = surface fire, orange = passive crown fire, and red = active crown fire.

Appendix II – Burn probability

Burn probability is a spatially explicit estimate of fire likelihood often derived from simulation modeling of fire spread, which can incorporate information on fire ignition sources, fire weather, fuels, topography, and barriers to fire spread (Finney 2005; Miller and Ager 2013; Scott *et al.* 2013). The precise methods for burn probability modeling vary by project objectives, model function, and model data requirements.

Critique of existing products

The burn probability product originally chosen for this assessment came from the Colorado Wildfire Risk Assessment (CO-WRA) completed by Technosylva for the Colorado State Forest Service. Their methods involved a hybrid approach where:

1) fires were simulated from ignition points generated in a regular grid under high and extreme fire weather then processed to calculate burn probability as the number of times each pixel burned over the number of simulations; and
2) the resulting burn probability estimates were weighted based on a smoothed surface of historical ignition density (Technosylva 2018).

The results of this analysis are shown in Figure 15Figure 1. CO-WRA predicts much higher burn probability in the woodland, shrub, and grass vegetation types that dominate the low foothills and valley bottoms because these vegetation types are assigned fuel models with fast rates of spread. This simulation approach captures the shadowing effects of topography and barriers (rivers and highways) that oppose fire spread in the dominant wind directions (west and southwest). The National Large Fire Simulator (FSim) burn probability from Short *et al.* (2016) predicts similar burn probability patterns across vegetation types. The National FSim burn probability was deemed unsuitable for the assessment because the Arkansas Valley has a stark seamline through it from falling on the boundary between two fire modeling pyromes.

Both the Community Wildfire Protection Plan Working Group and members of the public expressed concern that the CO-WRA burn probability did not match their observations of recent fires or their expectations about fire occurrence across the County. CO-WRA predicts most fire activity will occur in low elevation pinyon pine and sagebrush vegetation (Figure 16; Figure 17), which conflicts with managers experience that large fires predominantly burn in mid- to high-elevation forests. A possible explanation for this discrepancy is that neither CO-WRA or National FSim account for initial attack success. Fire managers expressed that wildfire detection, accessibility, and resistance to control factors including fuel type and topography are the primary drivers of area burned. Fire managers expect greater potential for large fires in the timber fuel types, especially in spruce-fir forests affected by recent insect outbreaks, because of low accessibility and high resistance to control. In contrast, fires are quickly detected, accessed, and suppressed in the woodland, shrub, and grass vegetation types of the foothills and valley bottoms.

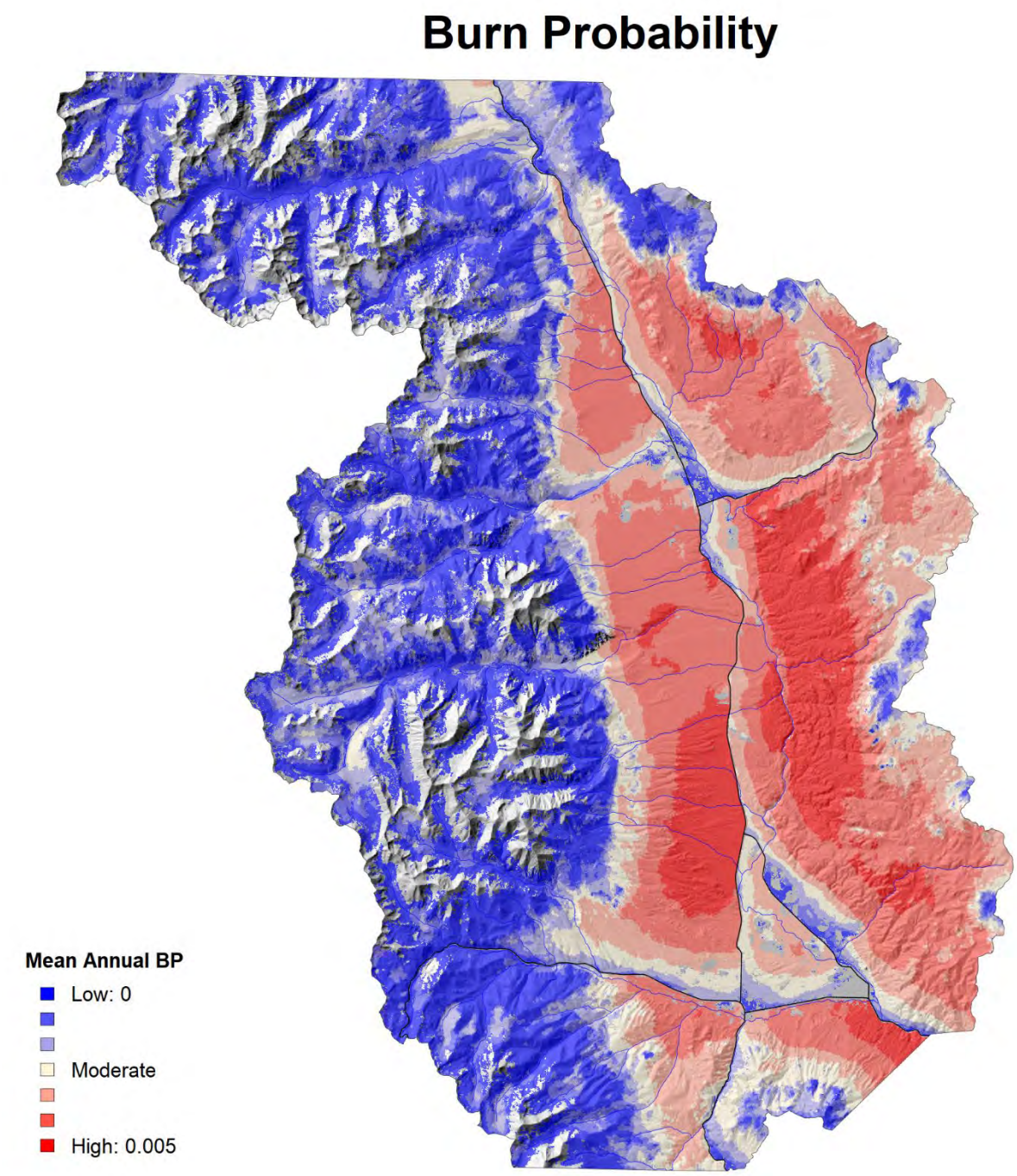


Figure 15: Burn probability from CO-WRA (Technosylva 2018). Note that values are binned into geometric intervals to enhance contrast.

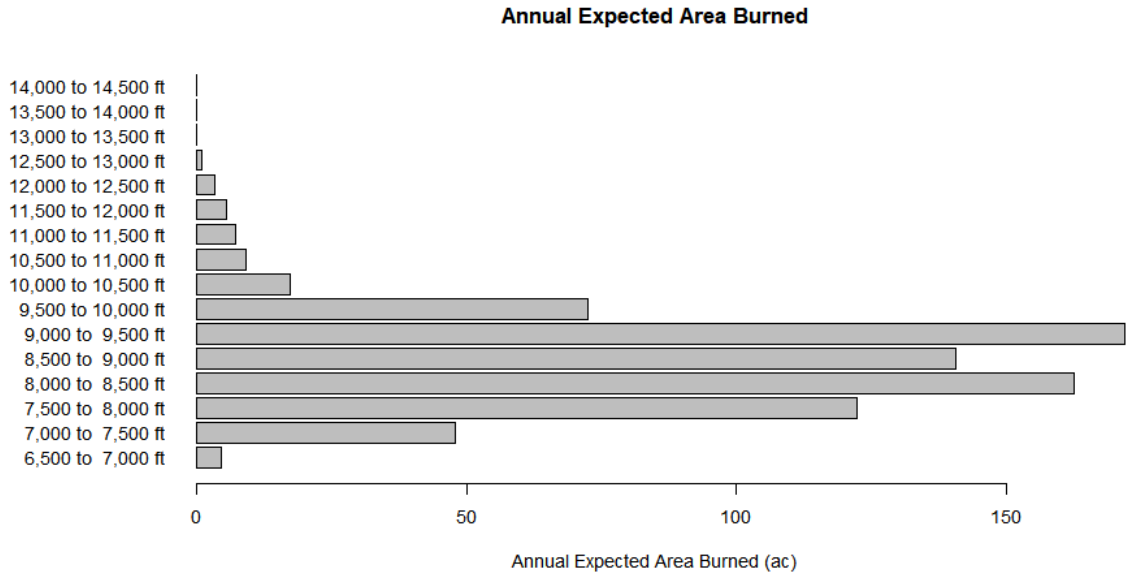


Figure 16: Expected area burned by elevation from the CO-WRA burn probability.

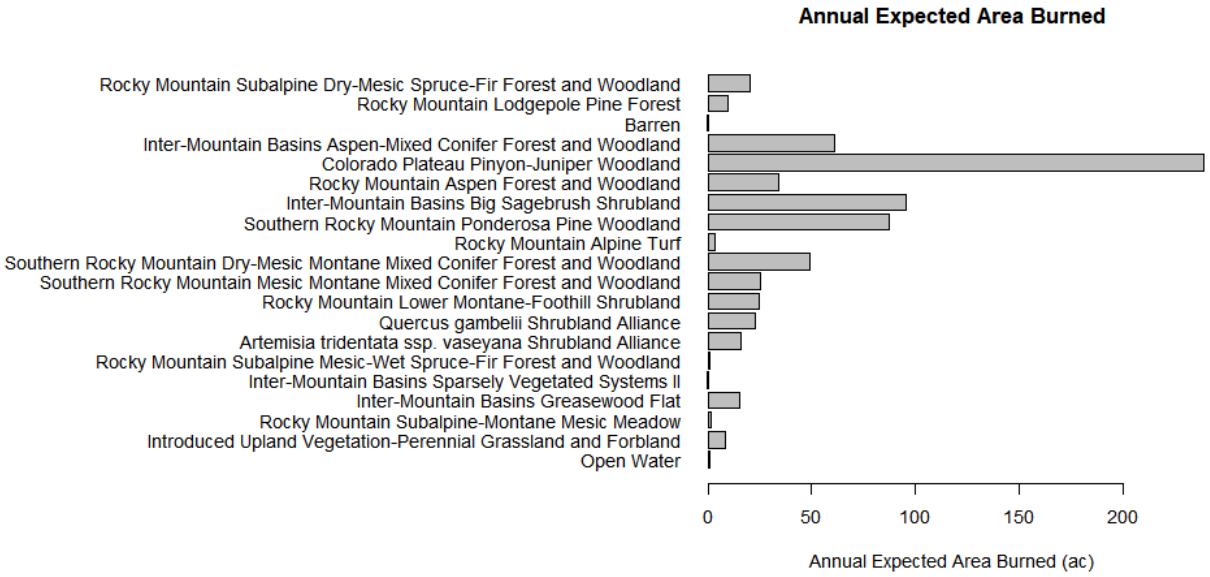


Figure 17: Expected area burned by LANDFIRE existing vegetation type from the CO-WRA burn probability.

Empirical burn probability alternative

We developed an empirical estimate of burn probability based on historical observations of area burned by vegetation type within an analysis area defined by a 20-mile buffer around Chaffee County. The 20-mile buffer was chosen as a reasonable compromise between increasing the number of fire observations and ensuring biophysical conditions and fire management within the analysis area are representative of Chaffee County. Vegetation type

was chosen as the foundation for burn probability because of the obvious connection to fuel conditions and its association with elevation and topography which influence accessibility and resistance to control.

We assembled fire history records from Monitoring Trends in Burn Severity (MTBS 2019), the Geospatial Multi-Agency Coordination (GeoMAC; 2019), and the Fire Occurrence Database (FOD; Short *et al.* 2017). The dataset characteristics are described in Table 6.

Table 6: Fire history sources used in the analysis.

Source	Format	Fire types	Time span (years)
MTBS	Final perimeter polygons	Large fires (> 1,000 ac)	1984-2017
GeoMAC	Daily perimeter polygons	Fires of significant concern (generally large fires)	2000-2019
FOD	Point	All available fire location data from multiple agencies	1992-2015

To make use of these three fire history datasets, we first standardized attributes and converted FOD points into polygons based on reported fire size assuming a circular fire shape. Most large fires are captured by MTBS and GeoMAC, so the assumption of circular shape has little influence on estimates of area burned by vegetation. The FOD point data were also dissolved by fire name and year to reduce the influence of duplicate reports. GeoMAC daily fire perimeters were dissolved by fire name and year to represent the final fire perimeters. The three datasets were then merged and manually critiqued to select the best representation of fires captured in multiple datasets and to remove any obvious duplicate records. The final fire history record included 954 fires, 16 of which came from GeoMAC and 938 of which came from the FOD (Figure 18). These fires collectively burned 50,524 acres of the 3,276,751 acre analysis extent. No MTBS fires were included in the analysis because all were documented with higher precision by GeoMAC.

Vegetation type was characterized with Existing Vegetation Type (EVT) from LANDFIRE (2014). A GIS was used to calculate the area burned by vegetation type for each fire. The records were then summarized to calculate the total area burned by vegetation type within the analysis area. Burn probability was then calculated for each vegetation type as the observed area burned divided by the total area of the vegetation type divided by the period of the fire history record (1992-2019). The resulting probabilities were then mapped to vegetation types using a GIS. Two modifications were made for logical consistency: 1) any areas mapped as non-burnable by LANDFIRE (2014) were reassigned zero burn probability, and 2) any areas mapped as burnable by LANDFIRE but without a history of fire were assigned the lower 5th percentile of non-zero burn probabilities. The empirical burn probability results are shown in Figure 19. The historical

records suggest that fire activity is more prevalent at in mid- to high-elevation forests and far less prevalent in pinyon pine woodlands than predicted by CO-WRAP (Figure 20; Figure 21).

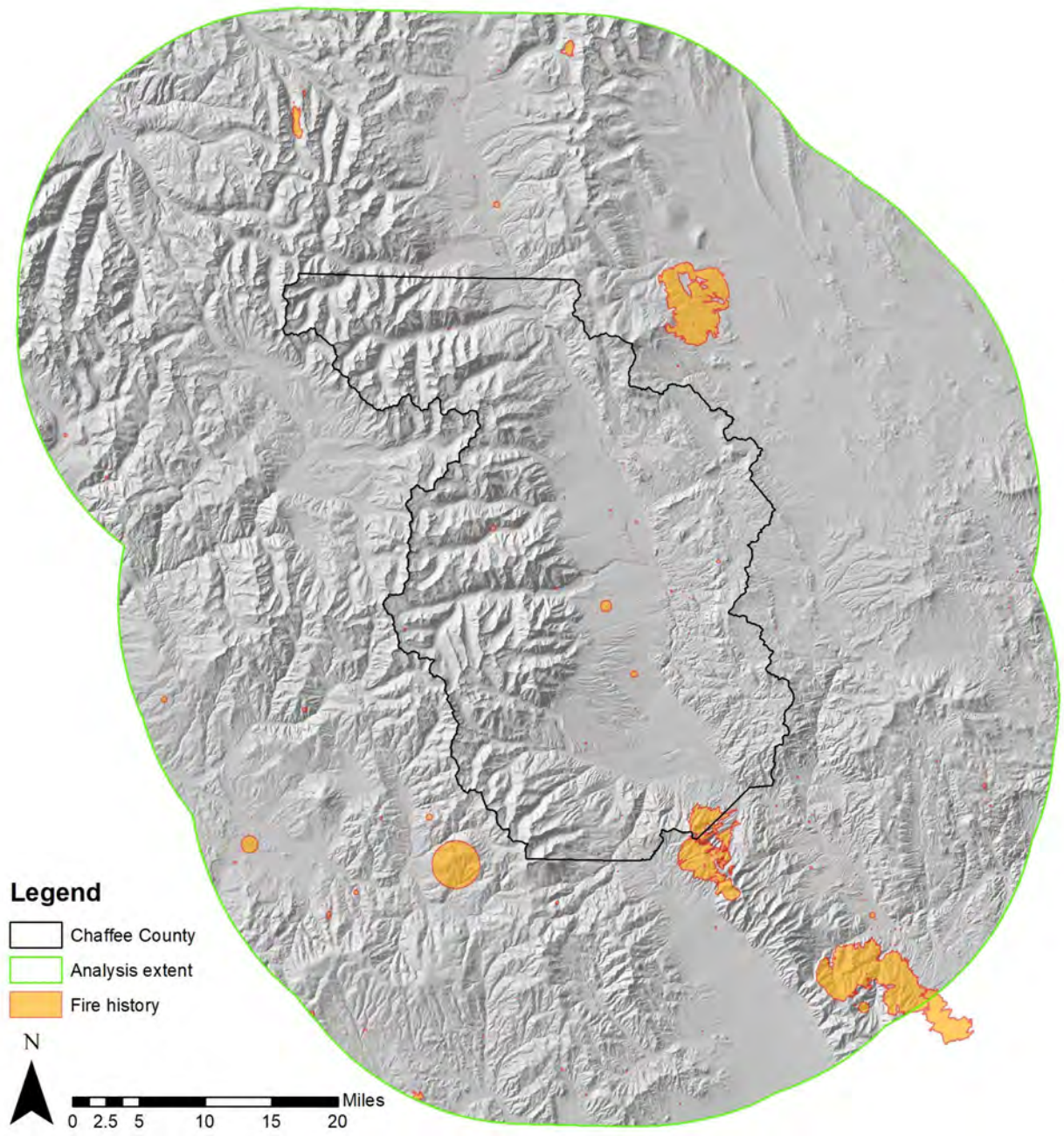


Figure 18: Fires used in the empirical burn probability analysis.

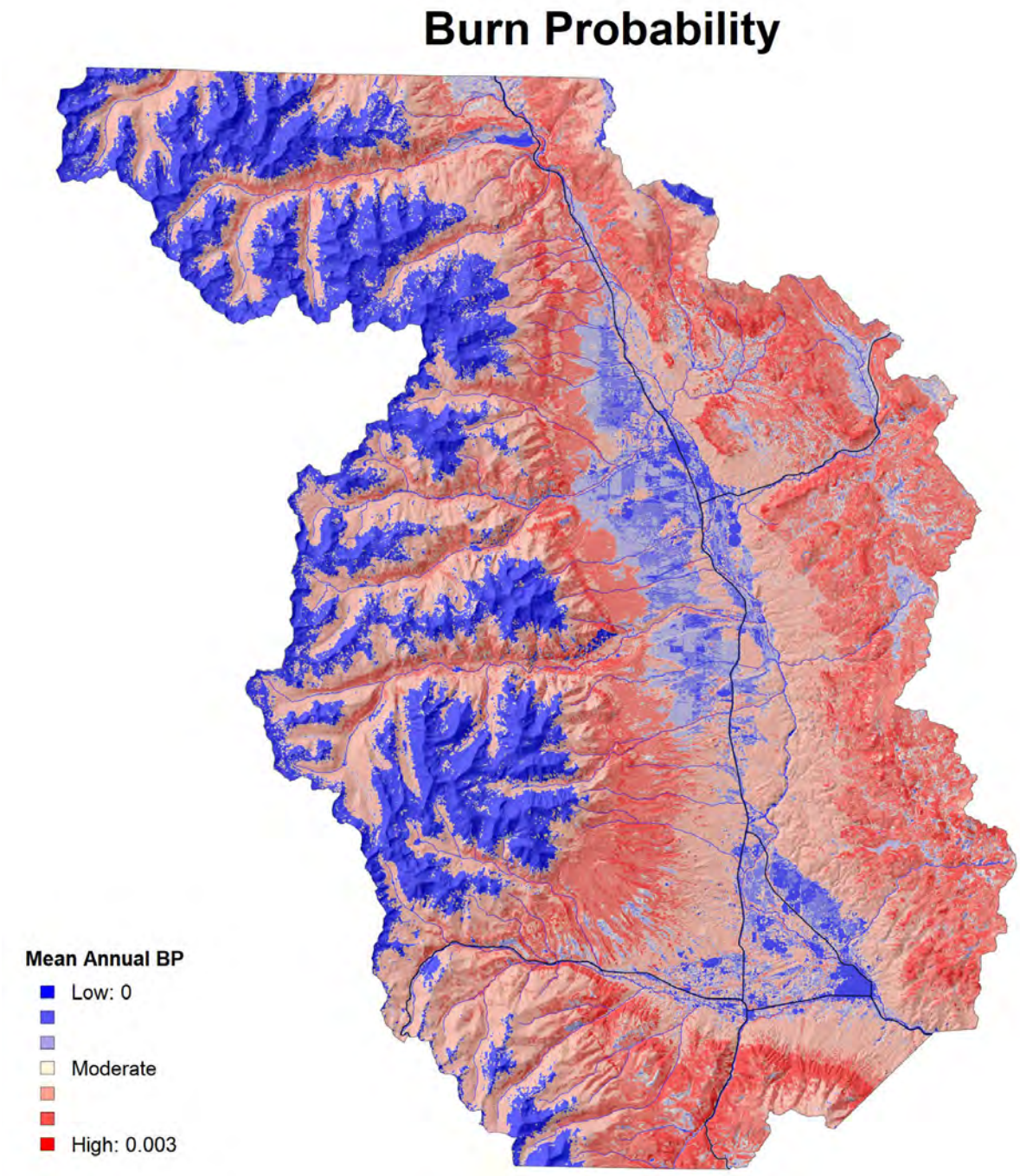


Figure 19: Empirical burn probability by vegetation type used for the Chaffee County Risk Assessment.

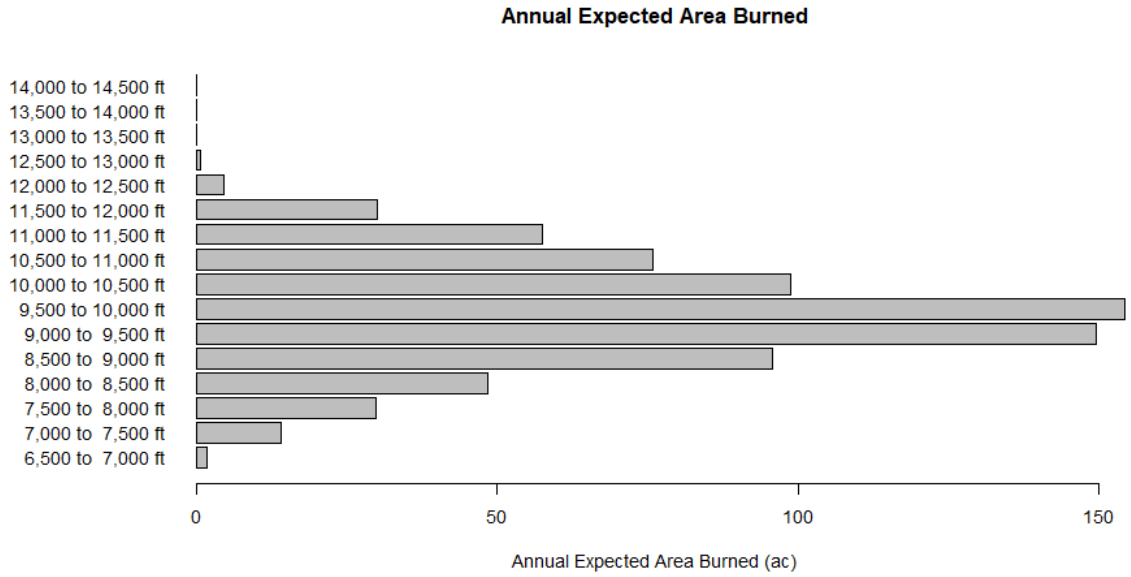


Figure 20: Expected area burned by elevation from the empirical burn probability estimates.

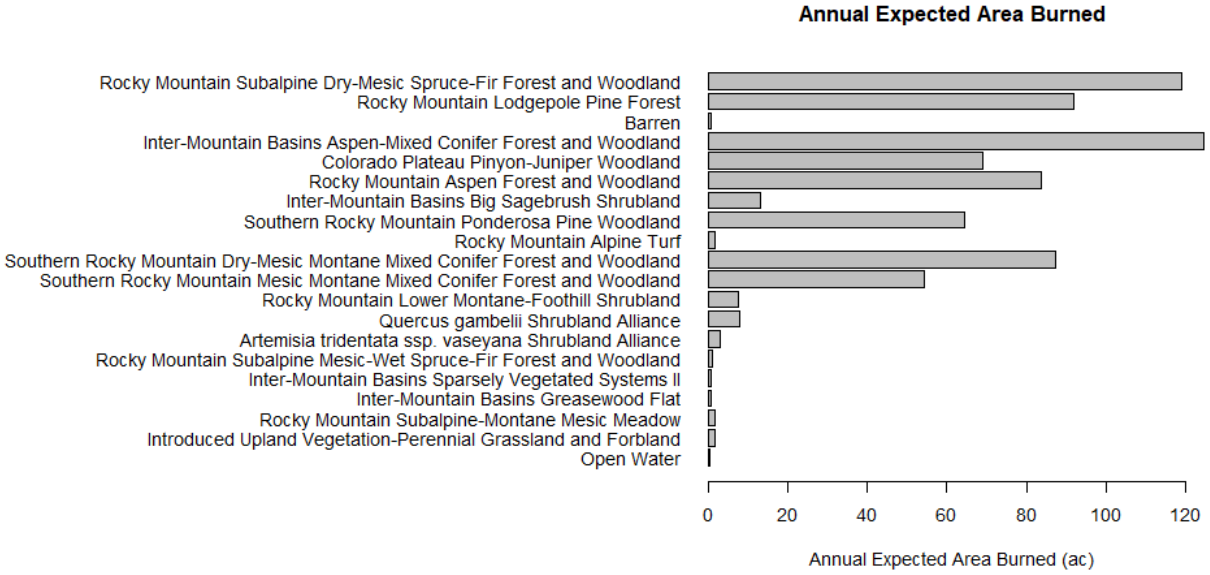


Figure 21: Expected area burned by LANDFIRE existing vegetation type from the CO-WRA burn probability.

Community Wildfire Protection Plan Working Group input

Forest and fire managers in the Community Wildfire Protection Plan Working Group expressed opinions that the empirical burn probability was a more accurate representation of fire likelihood than the CO-WRAP product and voted unanimously at the November 1st, 2019 meeting to use the empirical burn probability. The Colorado Forest Restoration Institute team

made it clear that using historical estimates of burn probability by vegetation type has several limitations including:

1. **Small sample size.** Just three fires account for 75% of the observed are burned and just five fires account for 90% of the area burned (Table 7).
2. **Space for time substitution.** We made a space for time substitution to increase the fire observation size, which can introduce error if biophysical conditions and fire management differ outside Chaffee County.
3. **Imperfect fire history and vegetation data.** The spatial precision of the fire occurrence data is imperfect and use of the FOD required the assumption of circular fires. Inaccuracies in the existing vegetation type from LANDFIRE (2014) or poor match between current vegetation and vegetation at the time of fire occurrence may contribute to errors in the analysis.
4. **No accounting of factors other than vegetation**. Burn probability can also vary across large landscapes due to spatial variation in ignition sources, climate, topography, barriers to fire spread, and fire management.
5. **No accounting of past fire effects on future burn probability**. Past fire occurrence can modify future fire spread, especially in recently burned areas. However, this is probably of minor concern given that only 1.5% of the analysis extent burned in the last 27 years.

Although there are limitations with this simple empirical approach, it is consistent with west-wide models of burn probability that account for additional factors. For example, Parisien *et al.* (2012) found that burn probability increases with measures of remoteness and topographic roughness, which are interpreted as proxies for fire suppression influence. They also found fire activity peaked at intermediate levels of gross primary productivity, which are associated with forested vegetation, and increase unimodally with the proportional coverage of burnable fuels, which decreases near agricultural and urban land uses. In fact, their maps show much lower burn probability in the grass and shrub dominated valleys of Colorado compared to forests, which agrees with our empirical estimates but conflicts with both CO-WRAP and National FSim models of burn probability. The trend of most area burning in mid- to high-elevation forests around Chaffee County is also consistent with changing perceptions of firefighter risk and appropriate suppression strategies in beetle impacted forests (Page *et al.* 2013; Moriarty *et al.* 2019). The shift towards indirect fire containment versus direct attack in forest with abundant snags and jack strawed logs implies that we may see more area burning in lodgepole pine and spruce-fir forests than we did in the past.

Table 7: Characteristics of fires that burned more than 100 acres in the analysis extent.

Name	Year	Source	Acres burned	Cum. Percent	Most abundant vegetation type	Second most abundant vegetation type
Hayden Pass	2016	GeoMAC	16,274	32.2	Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	Colorado Plateau Pinyon-Juniper Woodland
Weston Pass	2018	GeoMAC	13,035	58.0	Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	Southern Rocky Mountain Ponderosa Pine Woodland
Decker	2019	GeoMAC	8,900	75.6	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	Rocky Mountain Aspen Forest and Woodland
Mustang Creek	2000	FOD	6,495	88.5	Rocky Mountain Lodgepole Pine Forest	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
Ox Cart	2013	GeoMAC	1,153	90.8	Barren	Southern Rocky Mountain Montane-Subalpine Grassland
Doyleville	2012	FOD	801	92.3	Rocky Mountain Lower Montane-Foothill Shrubland	Western Cool Temperate Pasture and Hayland
Granite lake	2019	GeoMAC	722	93.8	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	Barren
Treasure	2012	GeoMAC	415	94.6	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	Southern Rocky Mountain Montane-Subalpine Grassland
Unnamed	2010	FOD	344	95.3	Colorado Plateau Pinyon-Juniper Woodland	Inter-Mountain Basins Big Sagebrush Shrubland
Duckett	2011	GeoMAC	327	95.9	Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	Inter-Mountain Basins Semi-Desert Grassland
Big Cottonwood	2007	FOD	295	96.5	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	Rocky Mountain Lodgepole Pine Forest
Trickle Mountain	2013	GeoMAC	205	96.9	Southern Rocky Mountain Montane-Subalpine Grassland	Southern Rocky Mountain Ponderosa Pine Woodland
Unnamed	1992	FOD	112	97.1	Rocky Mountain Lodgepole Pine Forest	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
Buck Park #2 WFU	2005	FOD	110	97.4	Colorado Plateau Pinyon-Juniper Woodland	Inter-Mountain Basins Big Sagebrush Shrubland

Appendix III – Watershed related Conditional Net Value Change (cNVC)

Wildfire risk to watershed related HVRAs was assessed with a separate process that modeled potential post-fire erosion and sediment transport to water supply diversions, reservoirs, and aquatic habitat following the methods in Gannon *et al.* (2019). Soil burn severity was predicted by mapping crown fire activity (Scott and Reinhardt 2001) categories of surface fire, passive crown fire, and active crown fire to low, moderate, and high severity respectively. Post-fire erosion was estimated with the Revised Universal Soil Loss Equation (Renard *et al.* 1997) using empirical observations of post-fire change in cover and soil erodibility by burn severity (Larsen and MacDonald 2007). Sediment transport to water supplies was estimated based on empirical models of hillslope and channel sediment delivery ratio (Wagenbrenner and Robichaud 2014; Frickel *et al.* 1975). This workflow supports pixel-level estimates of the sediment generated in each pixel that is delivered to downstream values at risk.

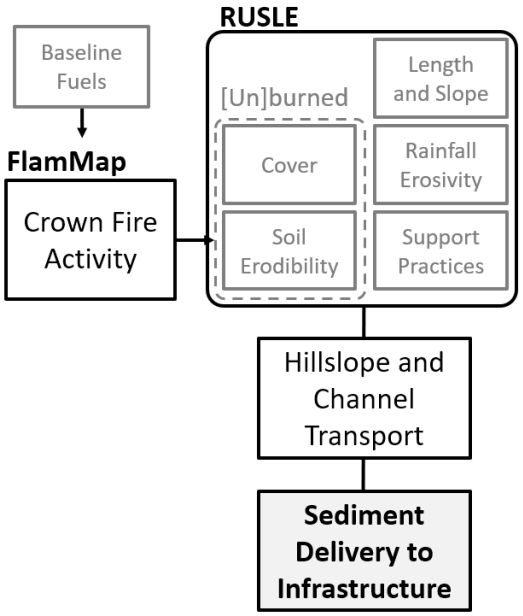


Figure 22: Workflow used to quantify potential post-fire sediment delivery to water infrastructure from each pixel of the landscape.

This framework was applied with slight modifications to quantify the conditional net value change of critical water supplies, surface diversions, ground diversions, and aquatic habitat. Like the regular cNVC calculations, these metrics were calculated for each fire weather scenario and then combined into a single cNVC raster by a weighting averaging using their probabilities of occurrence (Table 4). Local critique of the erosion outputs revealed that an area of erosion concern around the Chalk Cliffs was not represented in the soils data. We increased soil erodibility by a factor of five to account for the extreme erosion hazard in the zeolite alteration zone (Coe *et al.* 2010).

Critical Water Supplies

For critical water supplies, local stakeholder input was used to rank their relative importance on a scale from 0 for least important to 1 for most important. These ratings were applied as weights to express the importance (impact) of sediment delivered to each water supply. It was assumed that ≥ 50 Mg ha^{-1} of sediment delivery to infrastructure in the first post-fire year is a dramatic loss based on the reported sediment yield from hillslope erosion after the 1996 Buffalo Creek Fire (68 Mg ha^{-1}; Moody and Martin 2001). Therefore, the pixel-level estimates of sediment delivery to water infrastructure were linearly rescaled so that 0 to 50 Mg ha^{-1} corresponds to 0 to -100 percent value change. The final cNVC is mapped in Figure 23.

Table 8: Relative importance of critical water supplies as defined by local stakeholders.

Name	**Rel. Imp.**
Buena Vista Diversion	1
Salida Diversion	1
Cottonwood Lake	0.4
O'Haver Lake	0.4
North Fork Reservoir	0.2
Pasquale Springs	0.12
Boss Lake Reservoir	0.12
Rainbow Lake	0.12
Alpine Lake	0.12
Clear Creek Reservoir	0.12
Moltz Reservoir	0.12
Twin Lakes	0.12

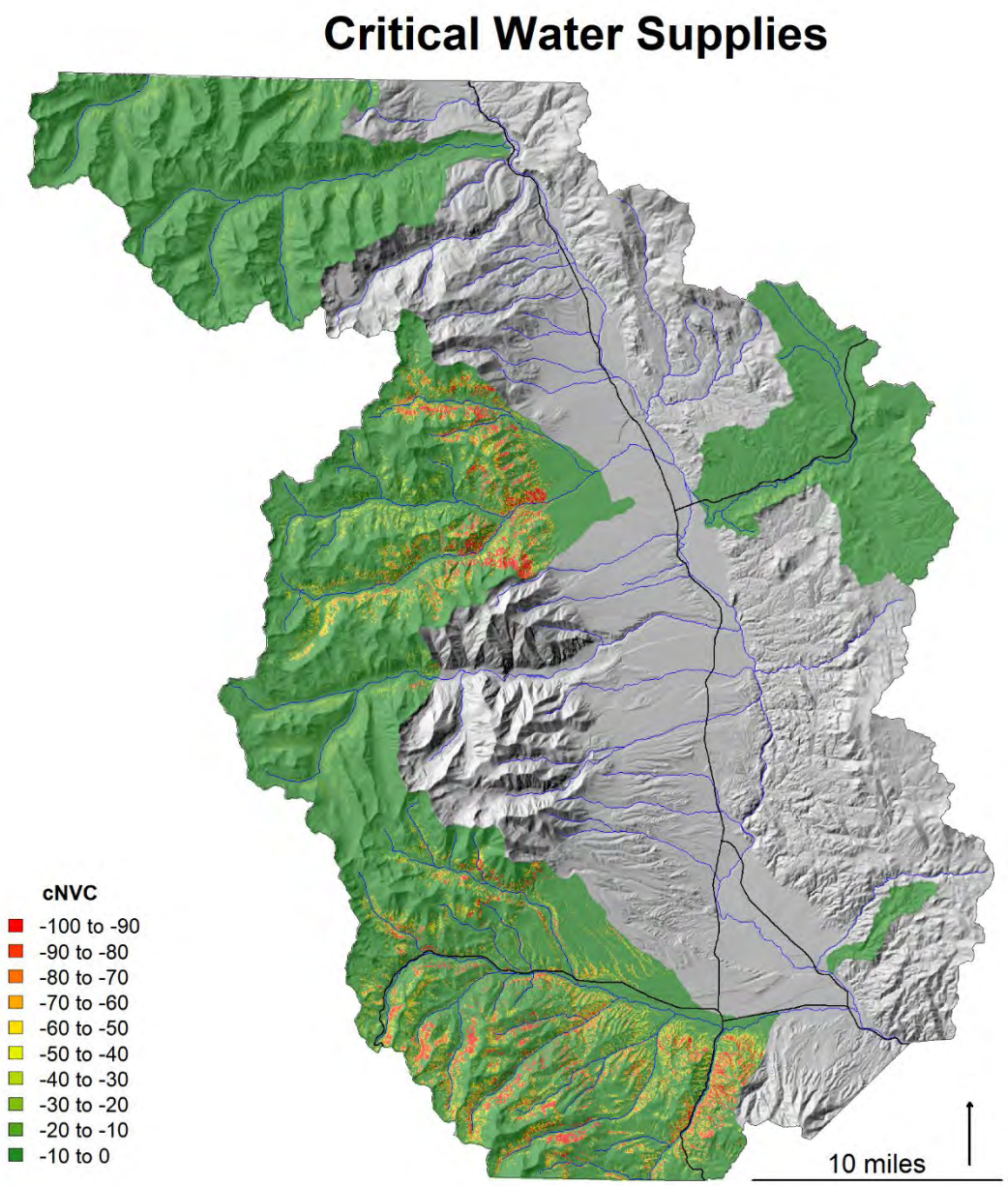


Figure 23: Critical water supplies conditional Net Value Change.

Surface Diversions

It was acknowledged that many small surface diversions exist for drinking and agricultural water. To capture these, we summed the total decreed diversion rate (in cfs) for ditches and pipelines in the Colorado Division of Water Resources (CODWR) structures database for each catchment. This measure was then normalized to a scale from 0 to 1 by dividing by the maximum catchment-level diversion rate (in cfs) and applied as weights to the sediment delivery predictions. It was assumed these structures have similar sensitivity as the critical water supplies. Therefore, the pixel-level estimates of sediment delivery to water infrastructure

were linearly rescaled so that 0 to 50 Mg ha^{-1} corresponds to 0 to -100 percent value change. The final cNVC is mapped in Figure 24.

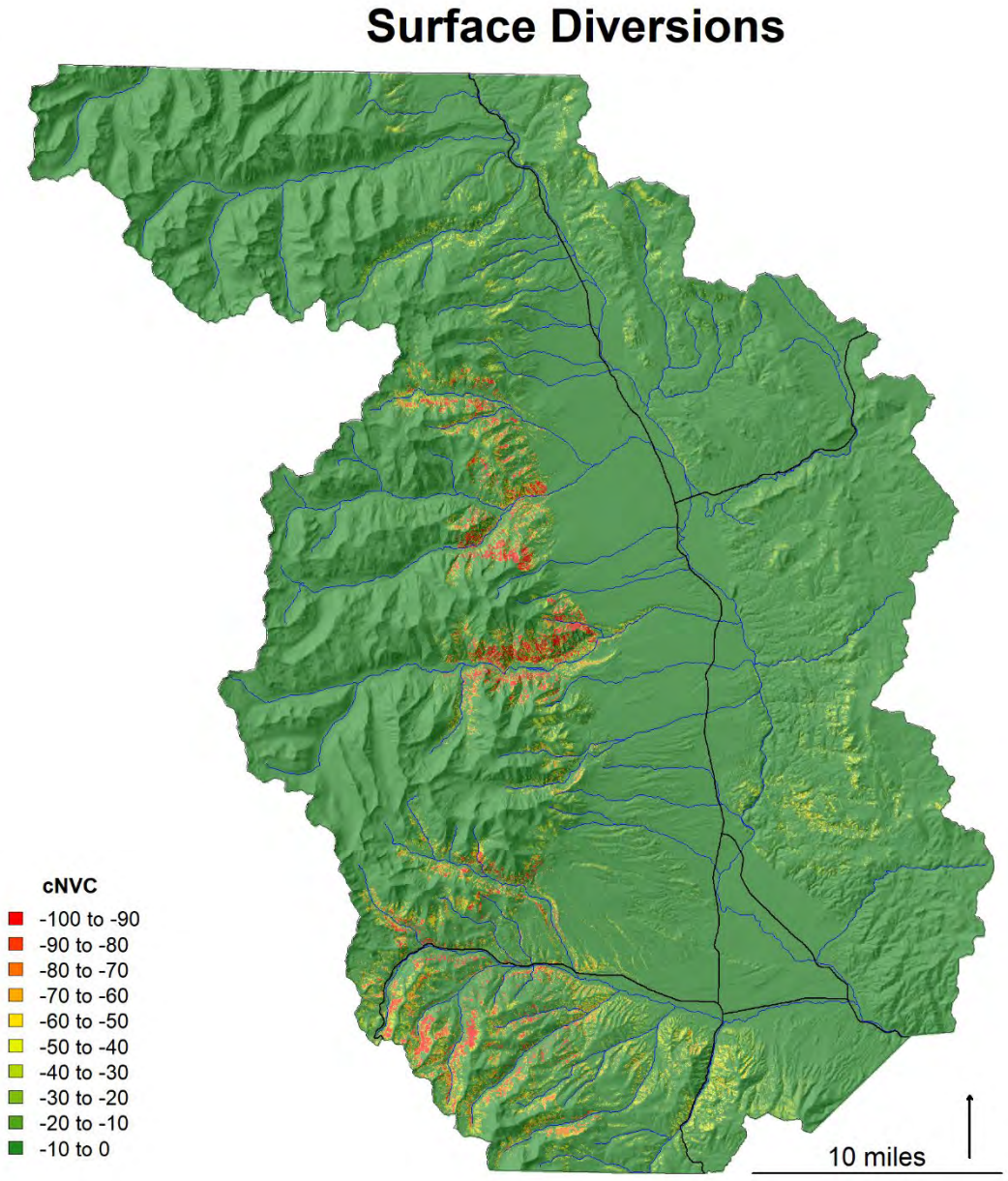


Figure 24: Surface diversions conditional Net Value Change.

Ground Diversions

Stakeholders noted that ground water sources are often impacted by local erosion and sediment deposition. Therefore, impacts to ground water sources including wells (and well groups), seeps, and springs were assumed to be proportional to the local hillslope erosion rate. Ground water use was quantified using the total decreed diversion rate (in cfs) for ground water sources in the Colorado

Division of Water Resources (CODWR) structures database within a 400 m circular radius around each pixel. This measure was then normalized to a scale from 0 to 1 by dividing by the maximum pixel-level diversion rate (in cfs) and applied as weights to the hillslope erosion predictions. Given that we don't expect the actual ground water sources to be impacted by fire, just the surface equipment, we linearly rescaled the hillslope erosion predictions so that 0 to 50 Mg ha^{-1} corresponds to 0 to -50 percent value change. The final cNVC is mapped in Figure 25.

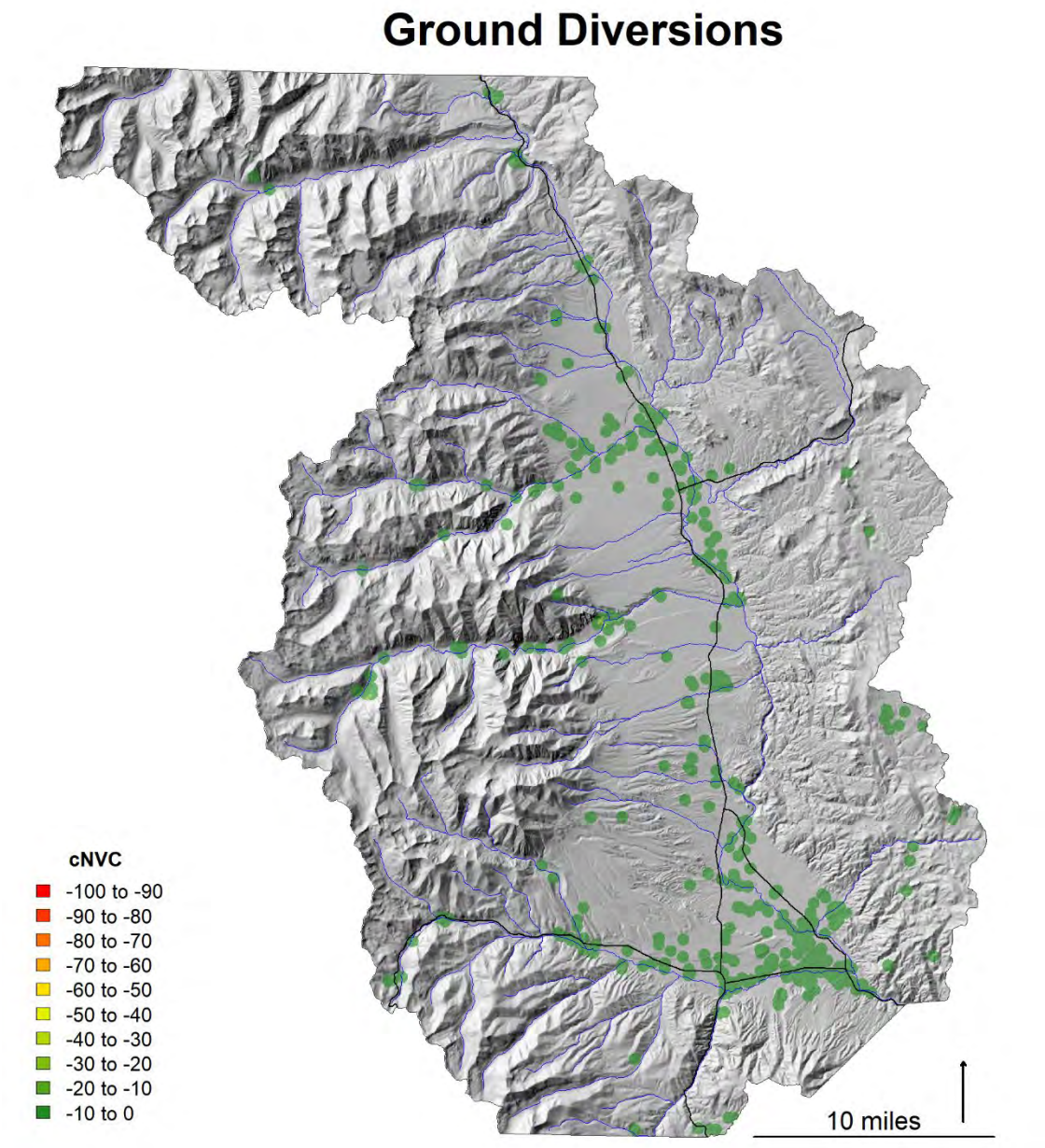


Figure 25: Ground diversions conditional Net Value Change.

Aquatic Habitat

The first draft of the risk assessment included the Gold Medal reaches of the Arkansas River with a quarter mile buffer around it to represent critical aquatic habitat. Feedback from stakeholders, especially Colorado Parks and Wildlife, suggested it was important to expand this to represent the importance of tributaries. To capture this, we predicted post-fire sediment delivery to the Gold Medal reaches of the Arkansas River. The pixel-level estimates of sediment delivery to Arkansas River were linearly rescaled so that 0 to 50 Mg ha^{-1} corresponds to 0 to -80 percent value change. The final cNVC is mapped in Figure 26.

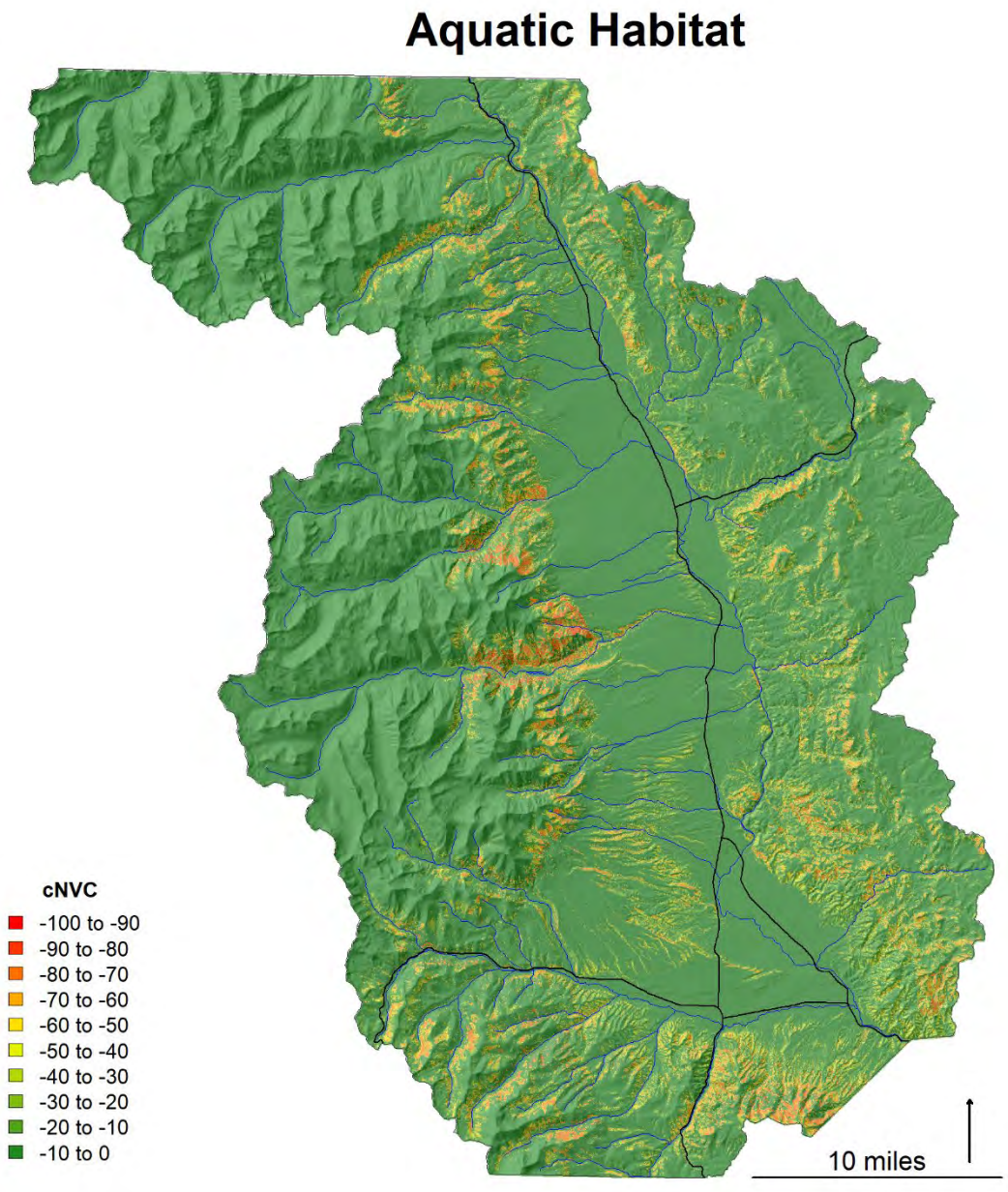


Figure 26: Aquatic habitat conditional Net Value Change.

Appendix II – Spatial data processing

Wildland Urban Interface

Wildland urban interface (WUI) was defined from two datasets that mapped structures using object based remote sensing image extraction methods (Caggiano *et al.* 2016; Microsoft 2018). These methods produce either point or polygon vector data representing individual structure centroids or footprints with high, but not perfect accuracy. We used the building point locations from Caggiano *et al.* (2016) as our base data for the analysis because of the known high overall accuracy (95%) of the building extraction process and its low omission (5%) and commission (3%) rates. The Microsoft (2018) building footprints were converted into points representing building centroids to supplement the primary data source.

Structure omission errors can lead to underestimating WUI extent, whereas structure commission errors can lead to overestimating WUI extent. We minimized the effect of these errors using two steps:

1) We manually reviewed the two data sources to remove false positives (structures that do not exist) to reduce the effect of commission errors.
2) We then merged the two data sources for the buffer analysis used to define WUI extent to reduce the effect of omission errors in each dataset.

Manual review of false positives

The manual review process focused primarily on WUI structures at the fringe because they have the strongest influence on WUI area. That is, a false positive does little to change WUI extent when located near a true positive, but it has a large effect on WUI extent when mapped far from the closest true positive. We first reviewed the Caggiano *et al.* (2016) data using recent reference imagery from multiple sources, parcel ownership information, road data, and topographic maps. Any mapped structures that could not be confirmed with imagery were deleted, as were structures associated with mining or communication infrastructure. Object based image extraction methods do not have the ability to discern if structures are permanent dwellings. The most common non-permanent dwelling structures captured in these datasets included large recreational vehicles, campground and trailhead outhouses, agricultural and ranching outbuildings, and historical homestead and mining structures. These methods also mistakenly mapped certain rock and vegetation features as structures. When non-dwelling structures could be identified from imagery, they were deleted. We then focused our quality control of the Microsoft (2018) data on points that fell outside a 200 m buffer around the cleaned Caggiano *et al.* (2016) data. The reasoning is that false positives within 200 m of mapped structures have little effect on WUI extent. The same deletion criteria were applied. The manual review process reduced the structures mapped in Chaffee County from 10,266 to 10,251 for the Caggiano *et al.* (2016) dataset and from 14,114 to 13,980 for the Microsoft (2018) dataset. Additional false positives were removed from adjacent counties. The final structures used to define WUI extent are mapped in Figure 27.

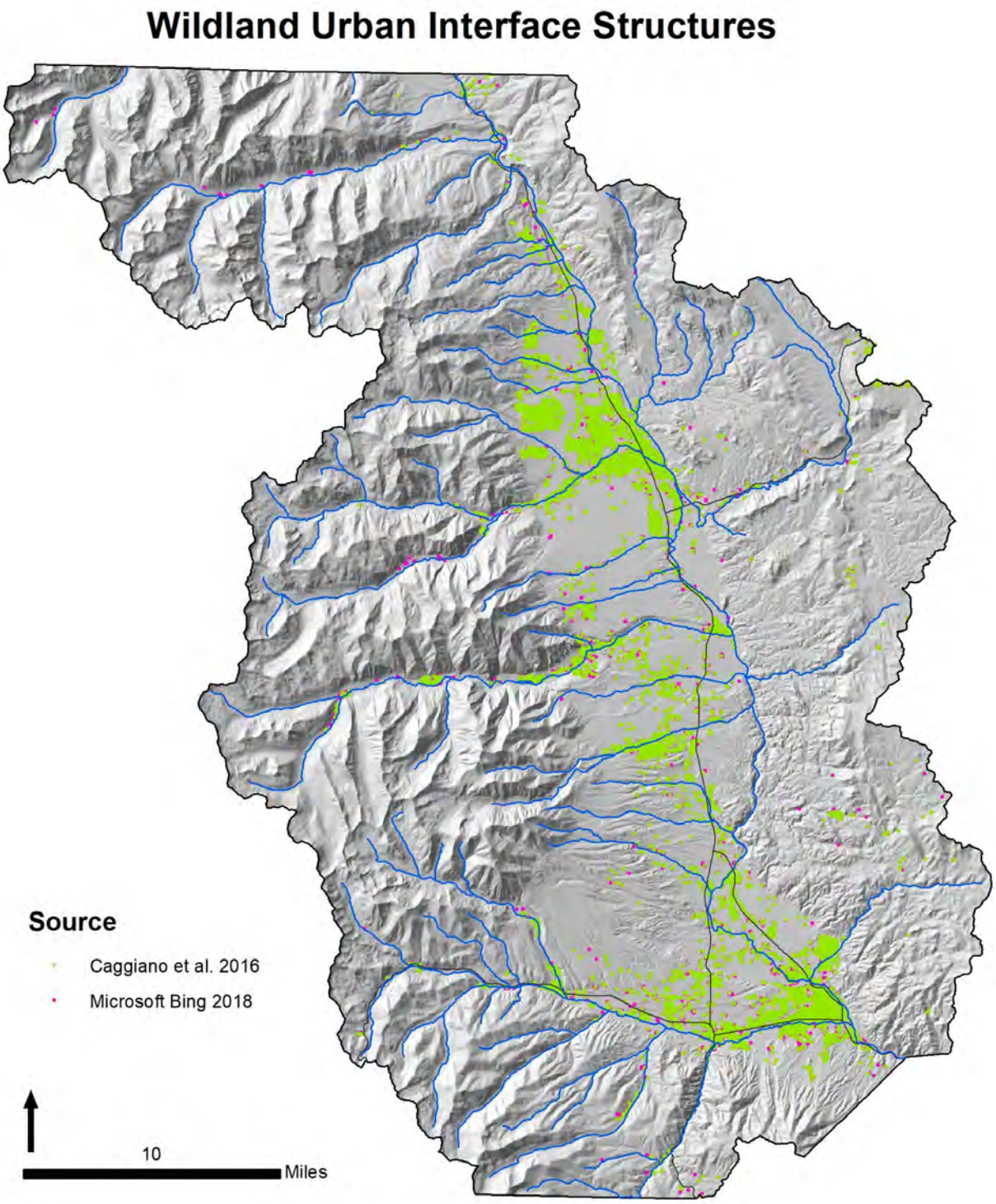


Figure 27: Structures included in the analysis to define wildland urban interface used in the risk assessment.

<u>WUI definition from the merged dataset</u>

WUI extent was then defined as any area within a 0.5-mile radius buffer around structures mapped in either dataset. The 0.5-mile radius buffer was chosen to be consistent with the 2009 risk assessment. WUI extent defined from the merged dataset differed by only 5-10% from WUI defined from either of the individual datasets.

WUI density

WUI was partitioned into low (< 1.5 structures/acre) and high density (≥ 1.5 structures/acre) classes based on local input that greater loss is expected in high density areas similar to observations from the Waldo Canyon Fire in Colorado Springs (Maranghides *et al.* 2015). High density was defined as areas with ≥ 1.5 structures/acre in either the Caggiano *et al.* (2016) or Microsoft (2018) datasets. Structure density was calculated at 30 m resolution using the *point density* tool in ArcGIS 10.3 with a 50 m circular neighborhood size. The high density WUI class was assigned a higher loss response function to reflect greater potential for structure-to-structure ignition. Relative importance weights were assigned based on relative frequency of structures within the low and high WUI density classes. Of the 24,231 WUI structures mapped in both datasets, 47% fall in the low density WUI zone and 53% fall in the high density zone. The final WUI extent is mapped by density class in Figure 28.

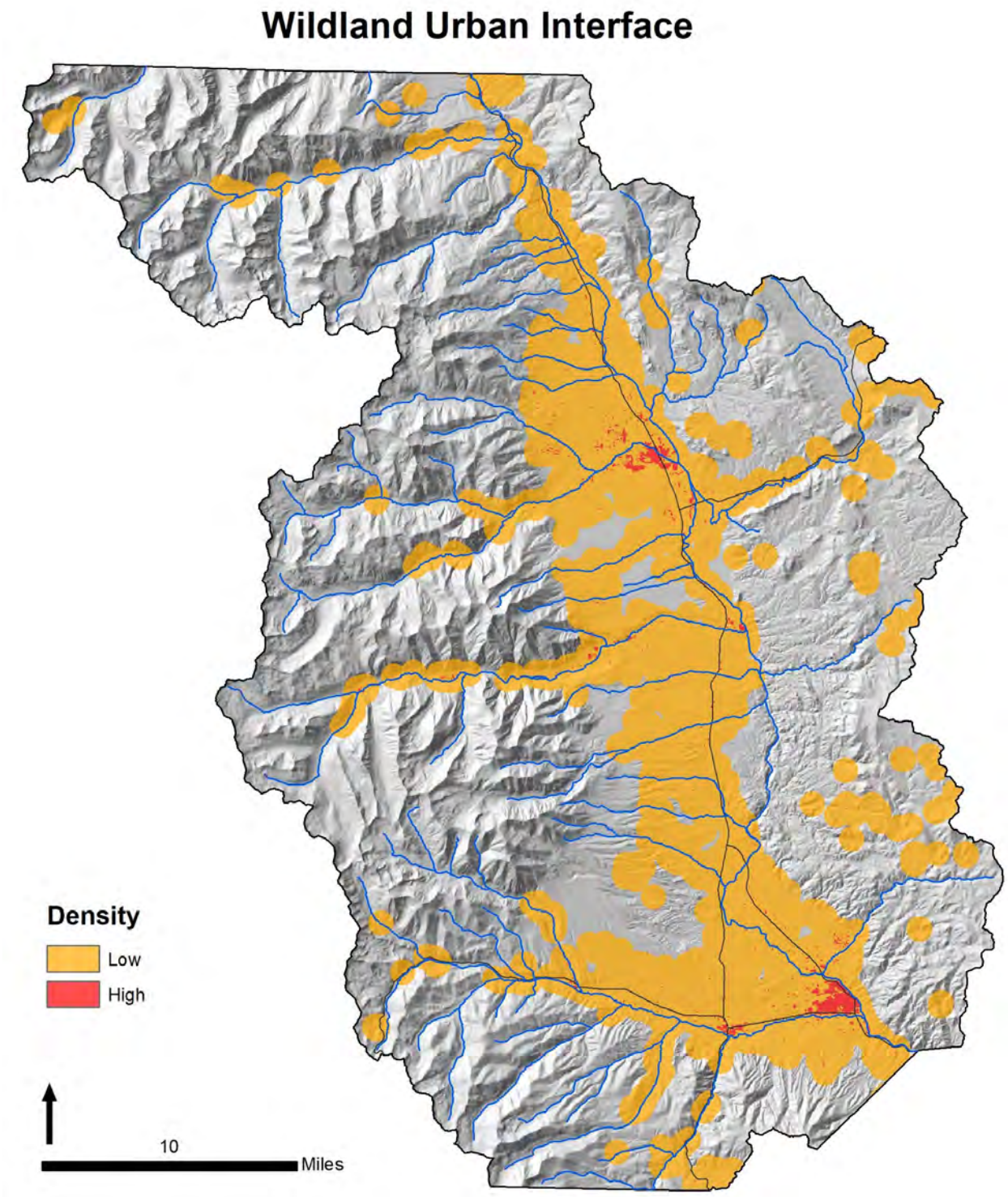


Figure 28: Wildland urban interface extent by density class used in the risk assessment.

Chaffee County Next Generation Wildfire Protection Plan

Appendix D: Chaffee County Fuel Treatment Prioritization

Appendix D: Chaffee County Fuel Treatment Prioritization

Benjamin Gannon, Colorado Forest Restoration Institute, benjamin.gannon@colostate.edu
Version IV – 12.09.2019

Purpose and Scope

The purpose of this fuel treatment prioritization is to inform a revision of the Chaffee County Community Wildfire Protection Plan (CWPP) and the Chaffee Common Grounds Initiative. The focus of the prioritization is identifying cost-effective treatment opportunities at the county scale using the results of the Chaffee County Wildfire Risk Assessment and available spatial data on treatment constraints.

Methods

The Colorado Forest Restoration Institute's Risk Assessment and Decision Support (RADS) model was used to prioritize fuel treatment type and location considering constraints on treatment feasibility and cost. RADS uses a generalized form of the linear programming optimization model described in Gannon *et al.* (2019) and Figure 1 to select treatment locations and types that maximize risk reduction for the available budget. Spatial treatment units are defined by the user at an appropriate scale for decision-making. Each treatment unit is attributed with the area feasible for treatment and the average risk reduction and treatment cost for each treatment type. Linear optimization is then used to identify the optimal treatment plan for the available budget (see Appendix I – Model formulation). The resulting treatment plan represents the most cost-effective means to reduce wildfire risk given the specified constraints.

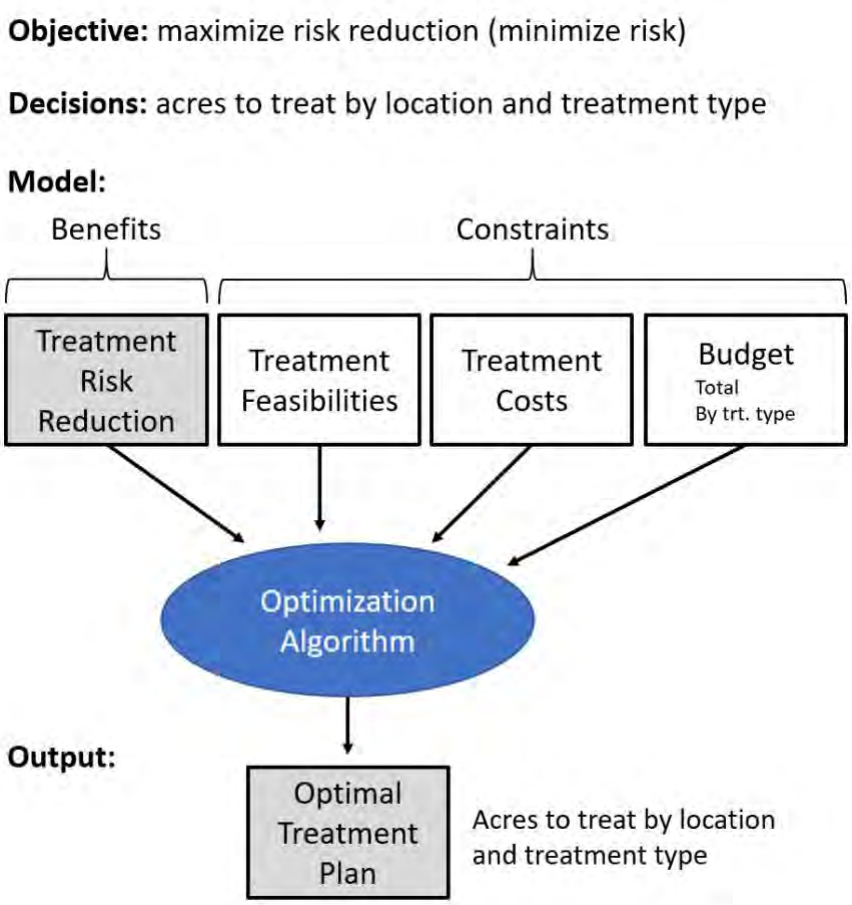


Figure 1: Conceptual diagram of the Risk Assessment and Decision Support (RADS) fuel treatment optimization model. Fuel treatment benefits and constraints are summarized for the feasible treatment area in each treatment unit. Linear optimization is then used to maximize risk reduction for the available budget. Budget is manipulated by the user to focus or expand priorities.

Treatment units

The Community Wildfire Protection Plan Working Group selected National Hydrography Dataset Plus (NHDPlus) catchments as treatment units for the prioritization (USEPA and USGS 2012). There are 830 catchments in Chaffee County. The median, mean, and maximum sizes are 510, 788, and 14,058 acres respectively.

Treatment types

This prioritization considered four treatment types: 1) thin only, 2) prescribed fire only, 3) complete (thin followed by prescribed fire), and 4) mastication.

Treatments are simulated in the baseline fuels data from LANDFIRE (2014) and CO-WRA (Technosylva 2018) by changing surface and canopy fuel attributes by the mean effect sizes for

hazardous fuels reduction and forest restoration projects in the western U.S. (Stephens and Moghaddas 2005; Stephens *et al.* 2009; Fulé *et al.* 2012; Ziegler *et al.* 2017) and mastication projects in the Arkansas Valley (Coop *et al.* 2016). Treatment effects on canopy attributes are applied as proportional adjustments to the pre-treatment data (Table 1). Treatment effects on surface fuels are represented by changing the fire behavior fuel model (Scott and Burgan 2005). For this assessment, it was assumed that the thin only treatment would not alter the fire behavior fuel model, except in the case where baseline conditions are mapped as slash blowdown; prescribed fire would shift the fire behavior fuel model to the least intense model in the same category; the complete treatment of thinning followed by prescribed fire would achieve the same effects as prescribed fire; and mastication would result in a uniform slash blowdown fuel model (Heinsch *et al.* 2018) (Table 2).

Table 1: Fuel reduction treatments are simulated with proportional adjustments to baseline canopy attributes using mean effect sizes from fuels reduction and forest restoration projects in the western U.S. (Stephens and Moghaddas 2005; Stephens et al. *2009; Fulé* et al. *2012; Ziegler* et al. *2017) and mastication projects in the Arkansas Valley (Coop et al. 2016).*

Parameter	Thin Only	Rx Fire Only	Complete	Mastication
Canopy base height	1.20	1.09	1.20	0.65
Canopy height	1.20	1.13	1.20	1.00
Canopy cover	0.70	0.95	0.75	0.15
Canopy bulk density	0.60	0.92	0.50	0.22

Table 2: The categorical fire behavior fuel model was not modified for thinning treatments except for slash blowdown models. The surface fuel reduction from prescribed fire is representing by transitioning fire behavior fuel models to the least intense fire behavior fuel model in the same category (e.g. grass shrub, timber litter from Scott and Burgan [2005]). Changes are highlighted with red text.

Category	Code	Current	Thin	Rx Fire	Complete	Mastication
Grass	GR1	101	101	101	101	201
	GR2	102	102	101	101	201
	GR3	103	103	101	101	201
	GR4	104	104	101	101	201
	GR5	105	105	101	101	201
	GR6	106	106	101	101	201
	GR7	107	107	101	101	201
	GR8	108	108	101	101	201
	GR9	109	109	101	101	201
Grass shrub	GS1	121	121	121	121	201
	GS2	122	122	121	121	201
	GS3	123	123	121	121	201
	GS4	124	124	121	121	201
Shrub	SH1	141	141	141	141	201
	SH2	142	142	141	141	201
	SH3	143	143	141	141	201
	SH4	144	144	141	141	201
	SH5	145	145	141	141	201
	SH6	146	146	141	141	201
	SH7	147	147	141	141	201
	SH8	148	148	141	141	201
	SH9	149	149	141	141	201
Timber understory	TU1	161	161	161	161	201
	TU2	162	162	161	161	201
	TU3	163	163	161	161	201
	TU4	164	164	161	161	201
	TU5	165	165	161	161	201
Timber litter	TL1	181	181	181	181	201
	TL2	182	182	181	181	201
	TL3	183	183	181	181	201
	TL4	184	184	181	181	201
	TL5	185	185	181	181	201
	TL6	186	186	181	181	201
	TL7	187	187	181	181	201
	TL8	188	188	181	181	201
	TL9	189	189	181	181	201
Slash blowdown	SB1	201	201	201	201	201
	SB2	202	201	201	201	201
	SB3	203	201	201	201	201
	SB4	204	201	201	201	201

Treatment feasibility

Hard constraints are captured in binary rasters representing whether each pixel is feasible (1) or infeasible (0) the target treatment type. Economic constraints are instead captured with variable treatment costs described in the

Treatment cost section.

Feasible locations for the **thin only** treatment were defined by the following constraints:

- Must have trees to cut (LANDFIRE canopy cover ≥ 10%)
- No treatment in wilderness
- No treatment in upper tier roadless
- No treatment in special designation areas (Browns Canyon)

Given these constraints, 242,215 acres or 37.3% of Chaffee County are considered feasible for the thinning only treatment (Figure 2).

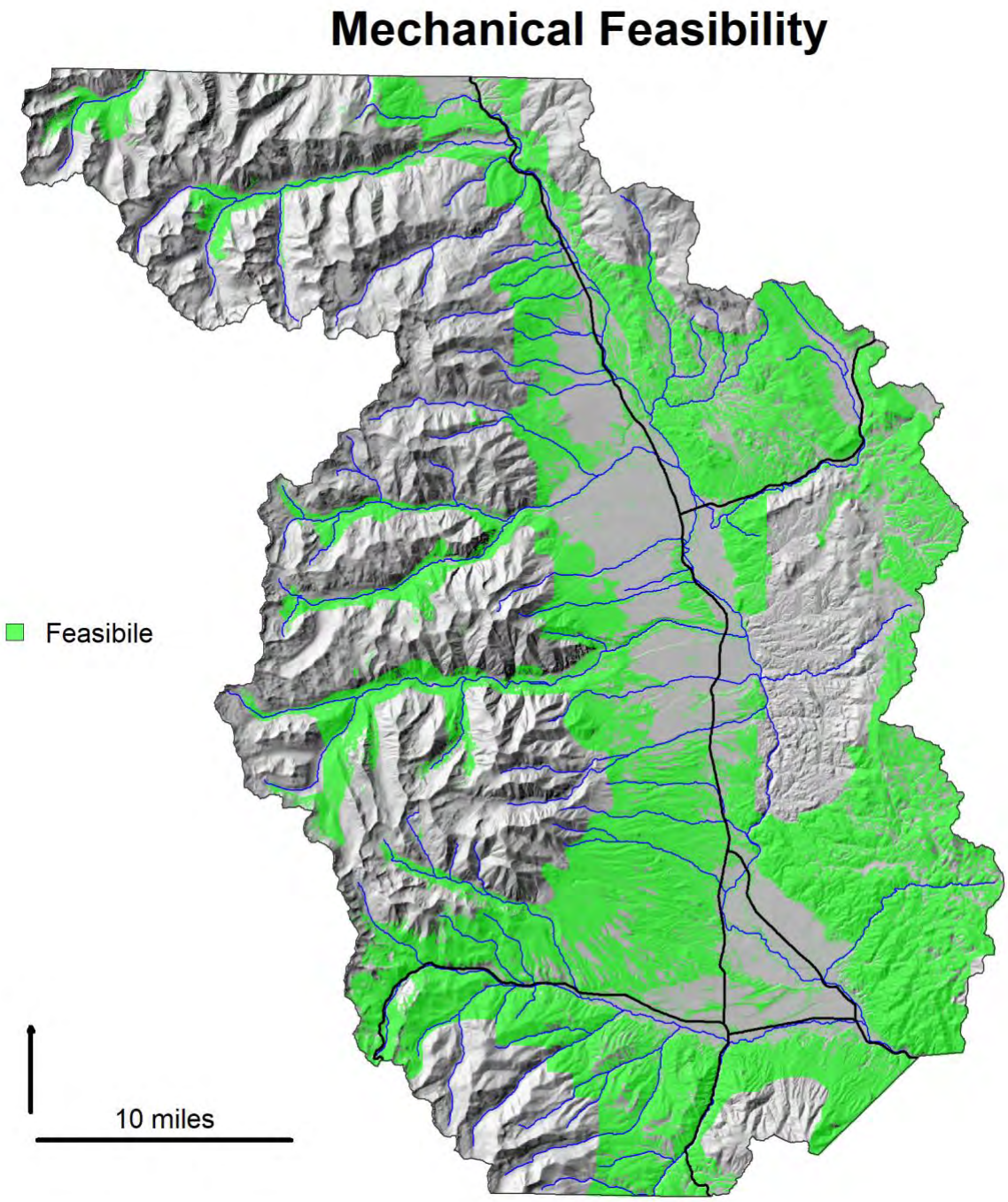


Figure 2: Feasible locations for the mechanical thinning treatment in Chaffee County.

Feasible locations for the **prescribed fire only** treatment were defined by the following constraints:

- No burning < 250 m from structures in the wildland urban interface (from Caggiano *et al.* 2016 and Microsoft 2018)
- Limited to "frequent" fire forest types that can be burned with prescribed fire as a first entry treatment - no high elevation forest types (lodgepole or spruce-fir) and no pinyon-juniper because of the need to rearrange fuels or burn under extreme weather conditions (Chris Naccarato, personal communication)

Given these constraints, 138,497 acres or 21.3% of Chaffee County are considered feasible for the prescribed fire only treatments (Figure 3).

Additionally, stakeholders expressed that prescribed fire use is constrained by the availability of personnel and to some degree smoke permitting and hunting impacts. To capture that it is unrealistic to drastically increase prescribed fire use in the short-term, an additional constraint was created to limit spending on prescribed fire to 30% of the total budget.

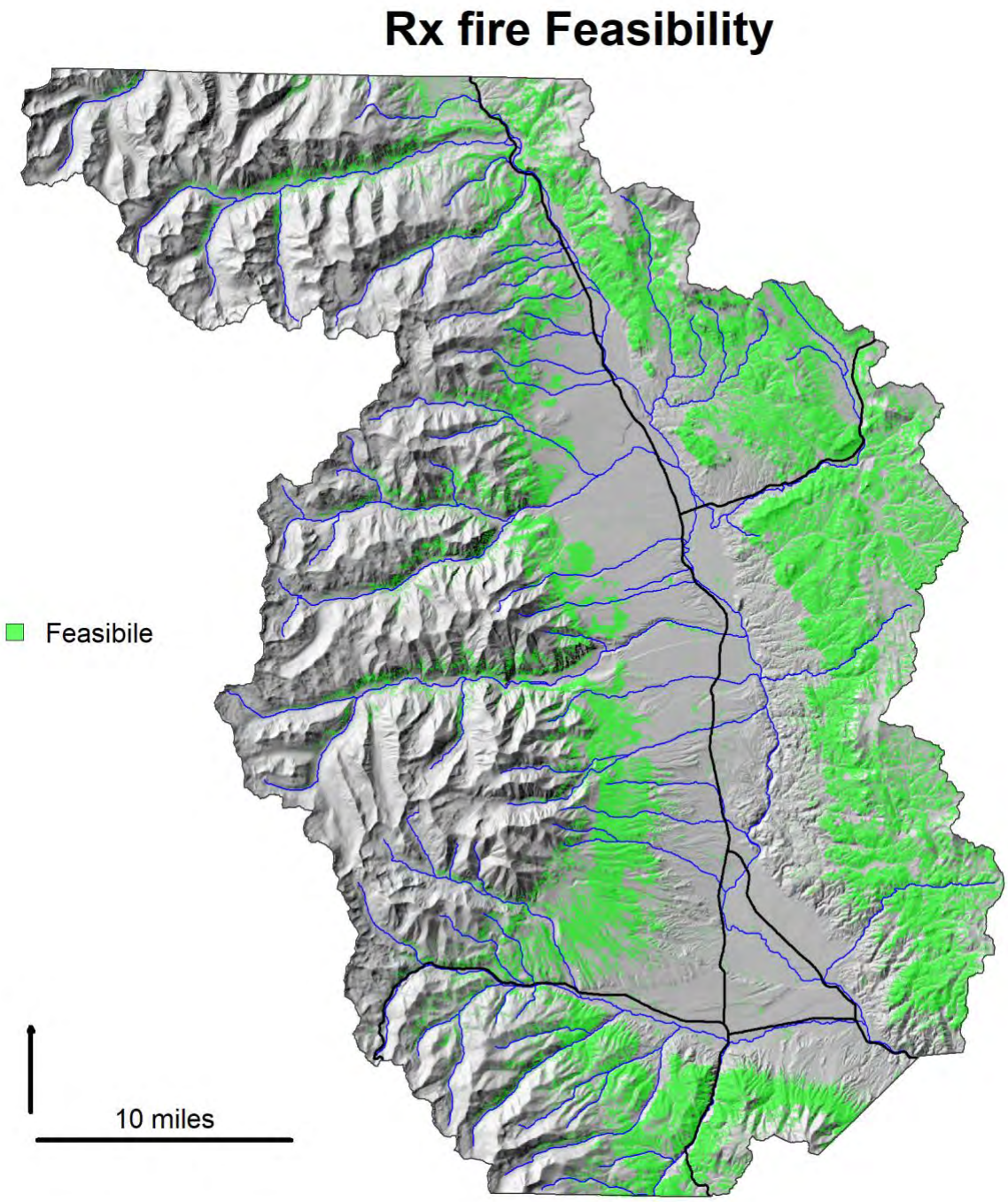


Figure 3: Feasible locations for the prescribed fire treatment in Chaffee County.

Feasible locations for the **complete** treatment were assumed to be the same as the thin only treatment:

- Must have trees to cut (LANDFIRE canopy cover ≥ 10%)
- No treatment in wilderness
- No treatment in upper tier roadless
- No treatment in special designation areas (Browns Canyon)

Given these constraints, 242,215 acres or 37.3% of Chaffee County are considered feasible for the complete treatment (Figure 4).

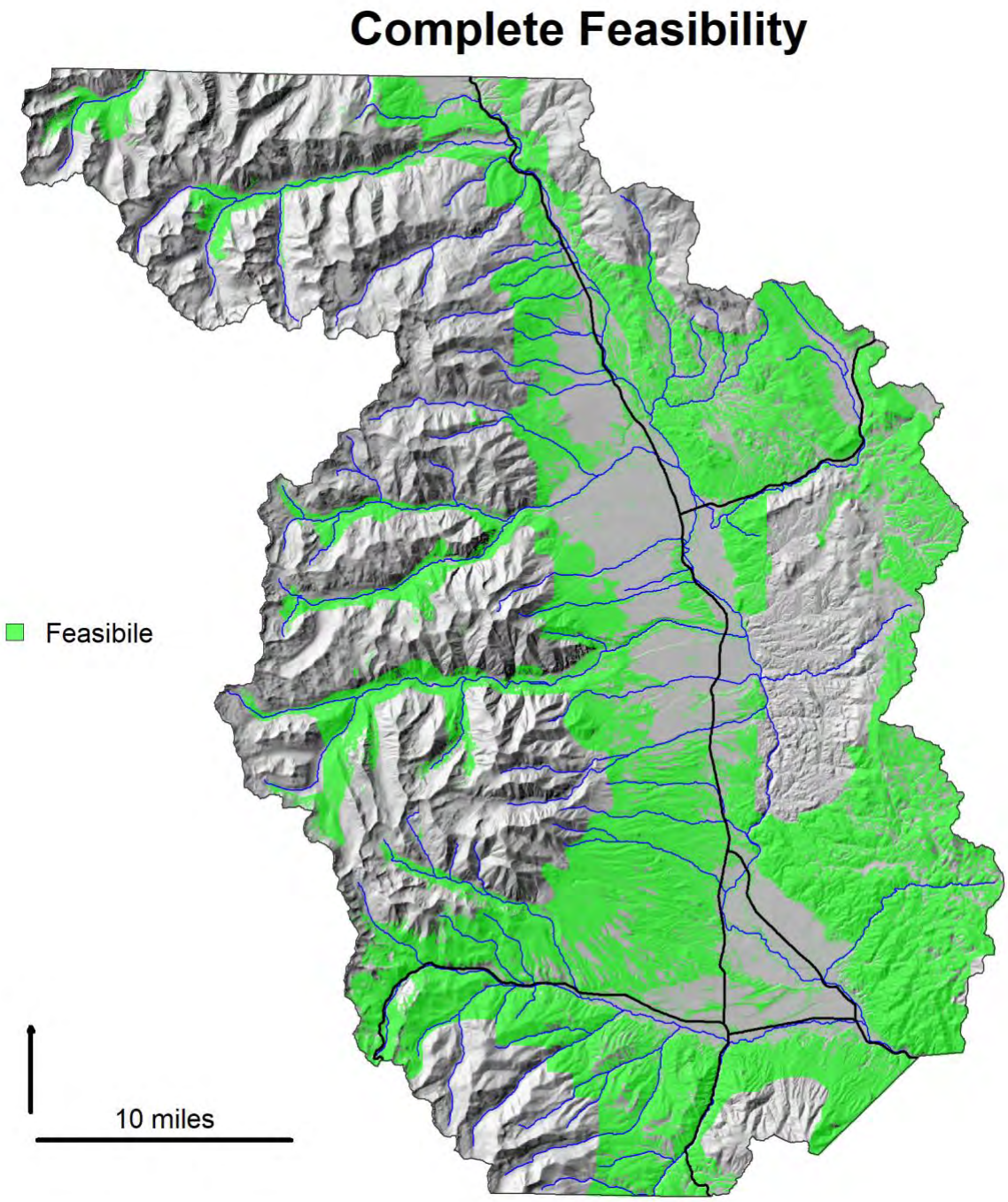


Figure 4: Feasible locations for the complete treatment in Chaffee County.

Feasible locations for the **mastication** treatment were defined by the following constraints:

- Must have trees to cut (LANDFIRE canopy cover ≥ 10%)
- Must be pinyon-juniper
- Must have slopes ≤ 40% (Jain *et al.* 2018; local feedback)
- No treatment in wilderness
- No treatment in upper tier roadless
- No treatment in special designation areas (Browns Canyon)

Given these constraints, 52,878 acres or 8.1% of Chaffee County are considered feasible for the mastication treatment (Figure 4).

Additionally, stakeholders expressed concern that widespread use of mastication in pinyon juniper could negatively impact ecological and scenic values. While mastication is often used to improve habitat for ungulates and other species that benefit from increased grass, forb, and shrub production, drastic reductions in pinyon juniper canopy cover over large portions of the landscape is expected to negatively impact species that depend on closed canopy habitats. To limit mastication treatment extent, an additional constraint was created to limit spending on mastication to 20% of the total budget.

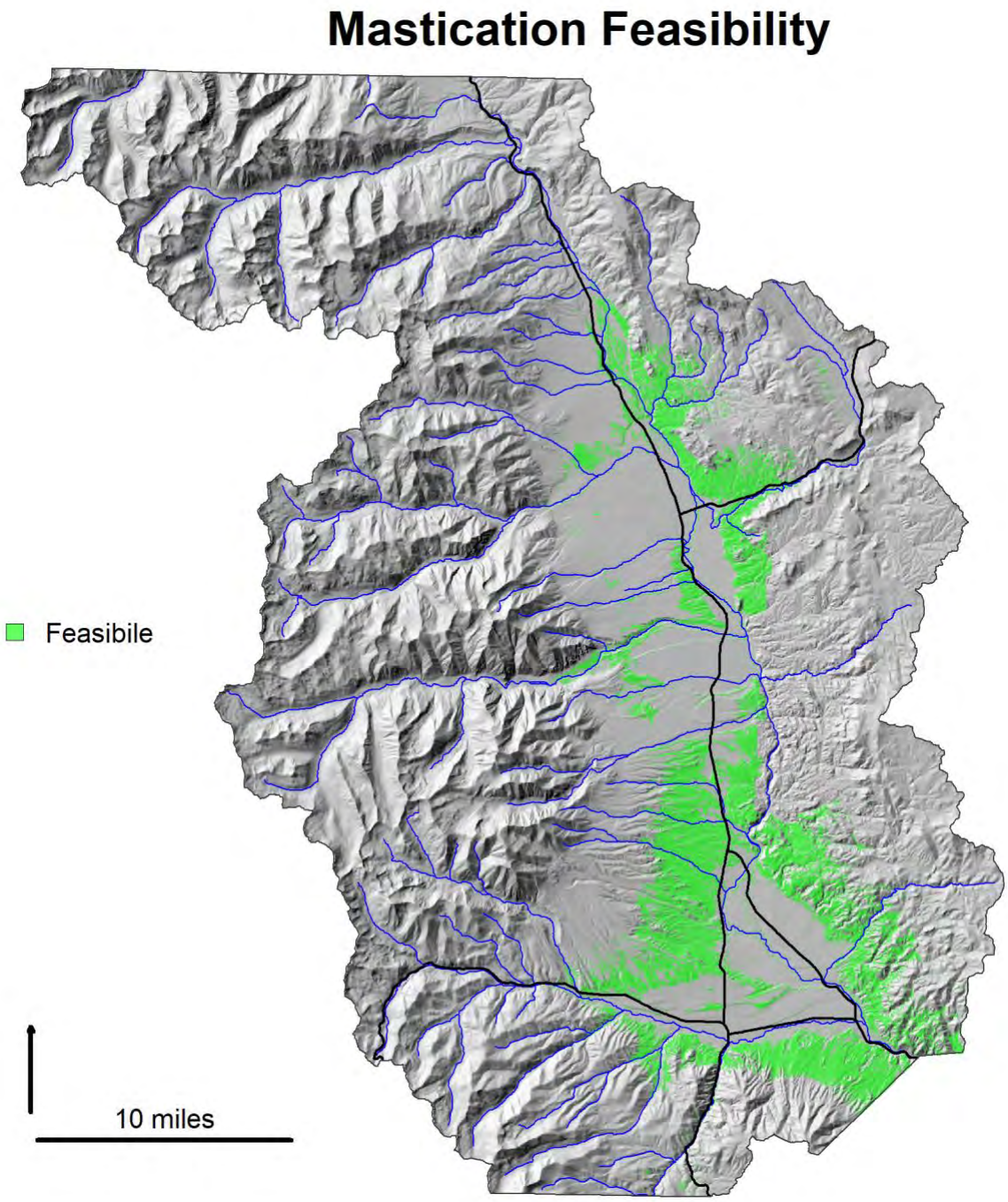


Figure 5: Feasible locations for the mastication treatment in Chaffee County.

Risk reduction

The risk reduction benefit of treatment is assessed on a per-pixel basis as the difference between current risk and simulated post-treatment risk using the Chaffee County CWPP Risk Assessment. The benefit of fuel treatment is only represented as changing fire behavior (flame lengths, crown fire activity) as modeled with FlamMap 5 (Finney *et al.* 2015), not burn probability. This approach is consistent with the primary objectives of fuel treatments (Reinhardt *et al.* 2008), but it could underestimate fuel treatment benefits where they are expected to reduce area burned (Thompson *et al.* 2013). Risk reduction estimates are mapped for each treatment type in Figure 6 through Figure 9.

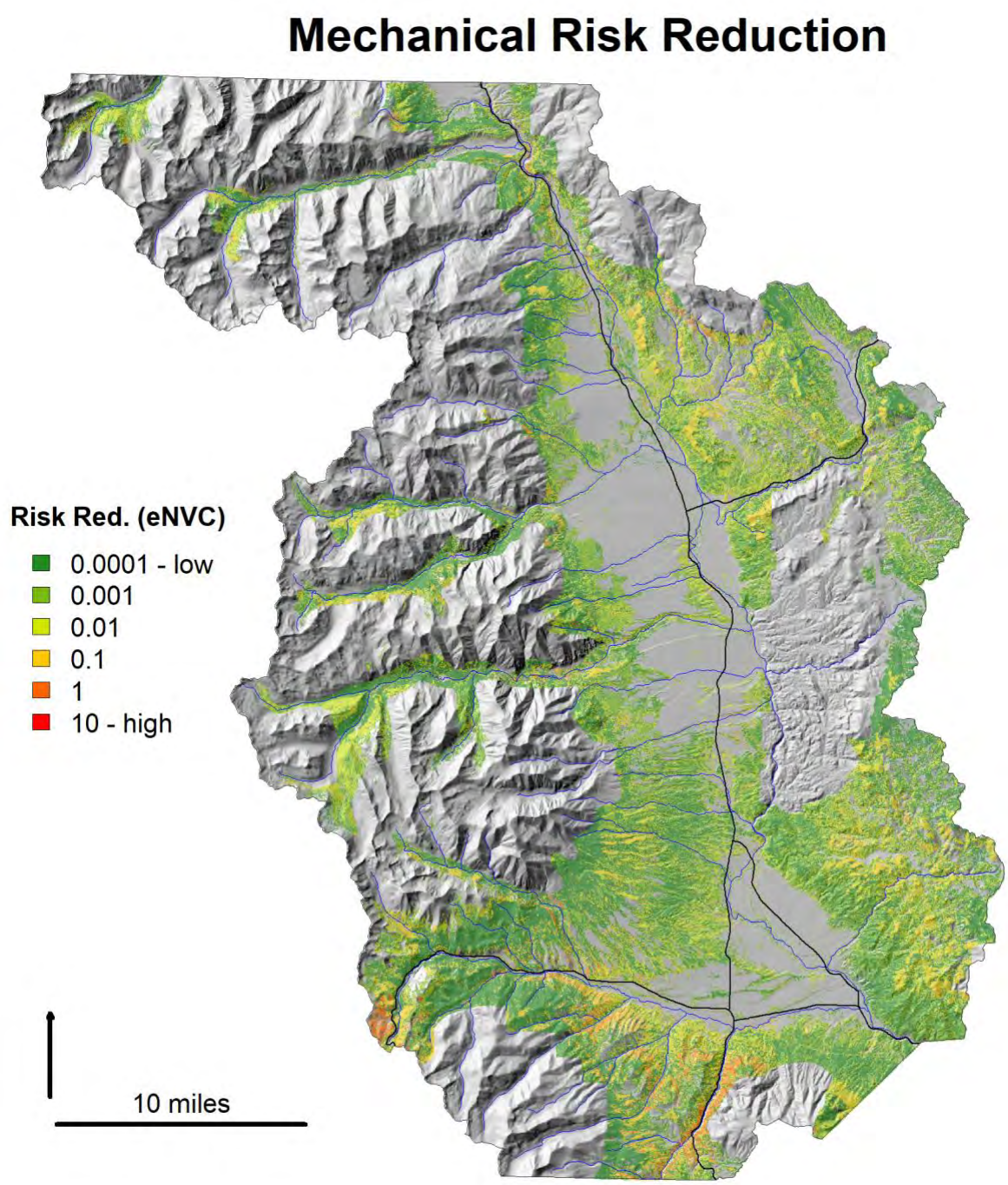


Figure 6: Estimated risk reduction for the mechanical thinning only treatment.

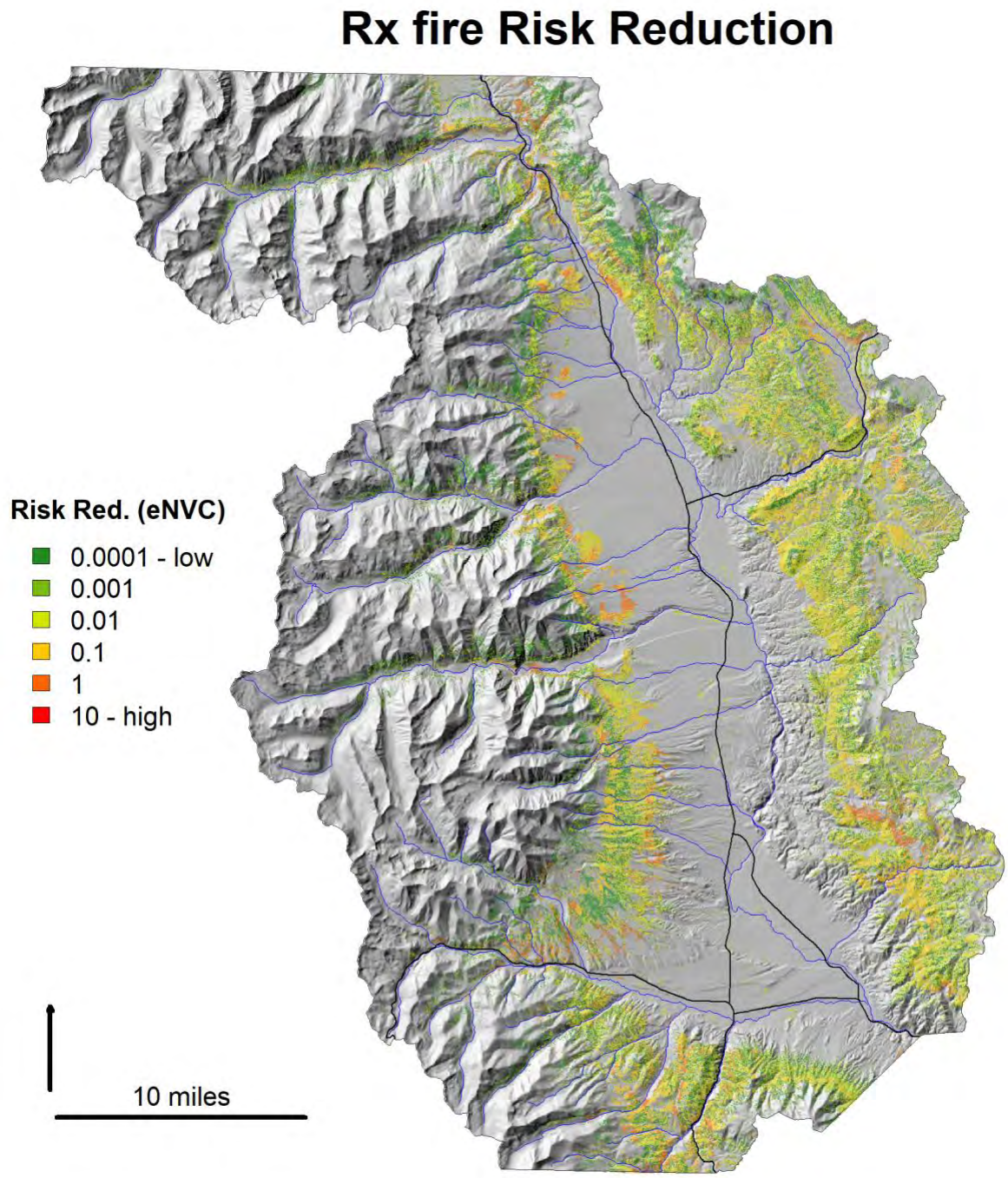


Figure 7: Estimated risk reduction for the prescribed fire only treatment.

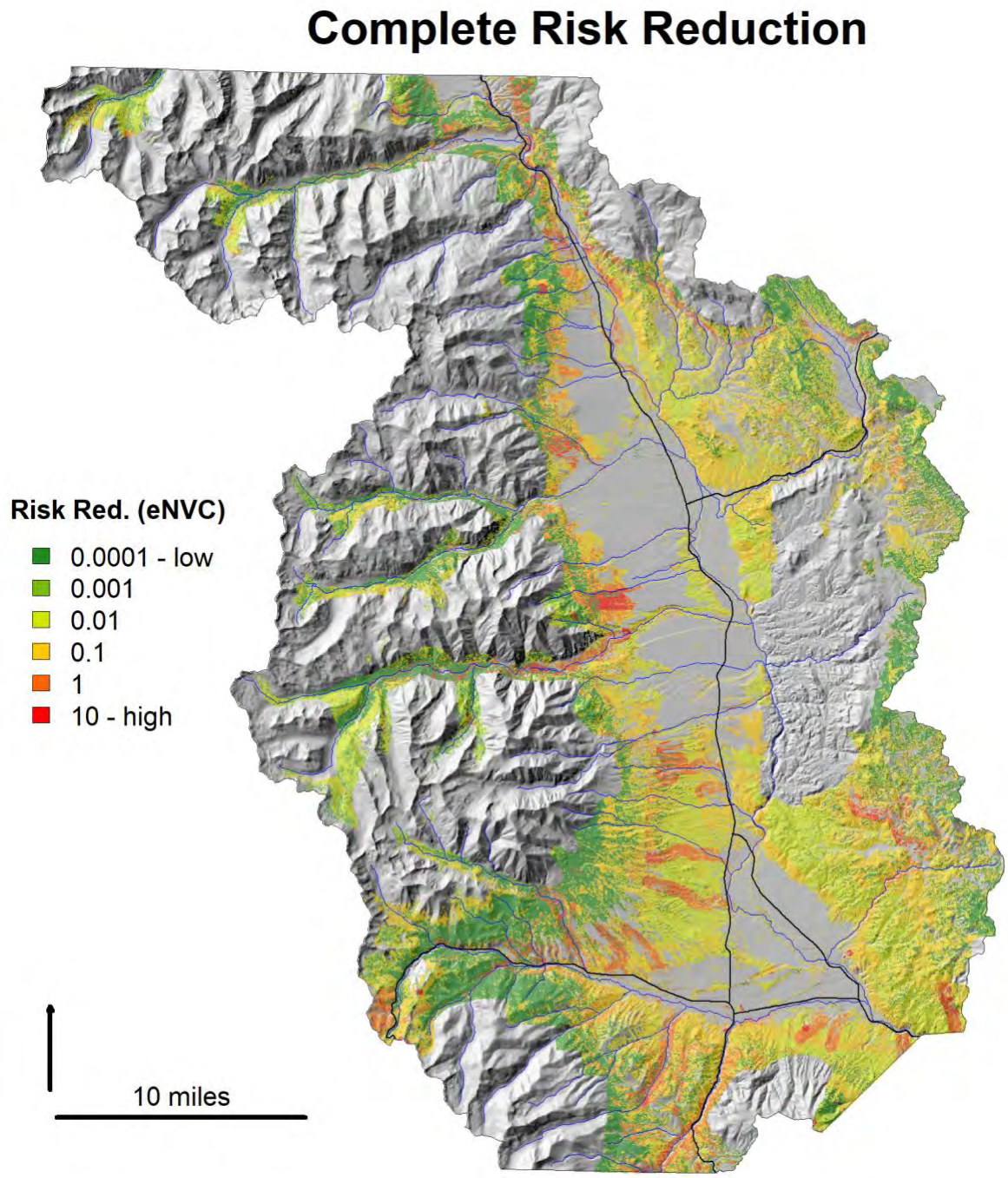


Figure 8: Estimated risk reduction for the complete treatment.

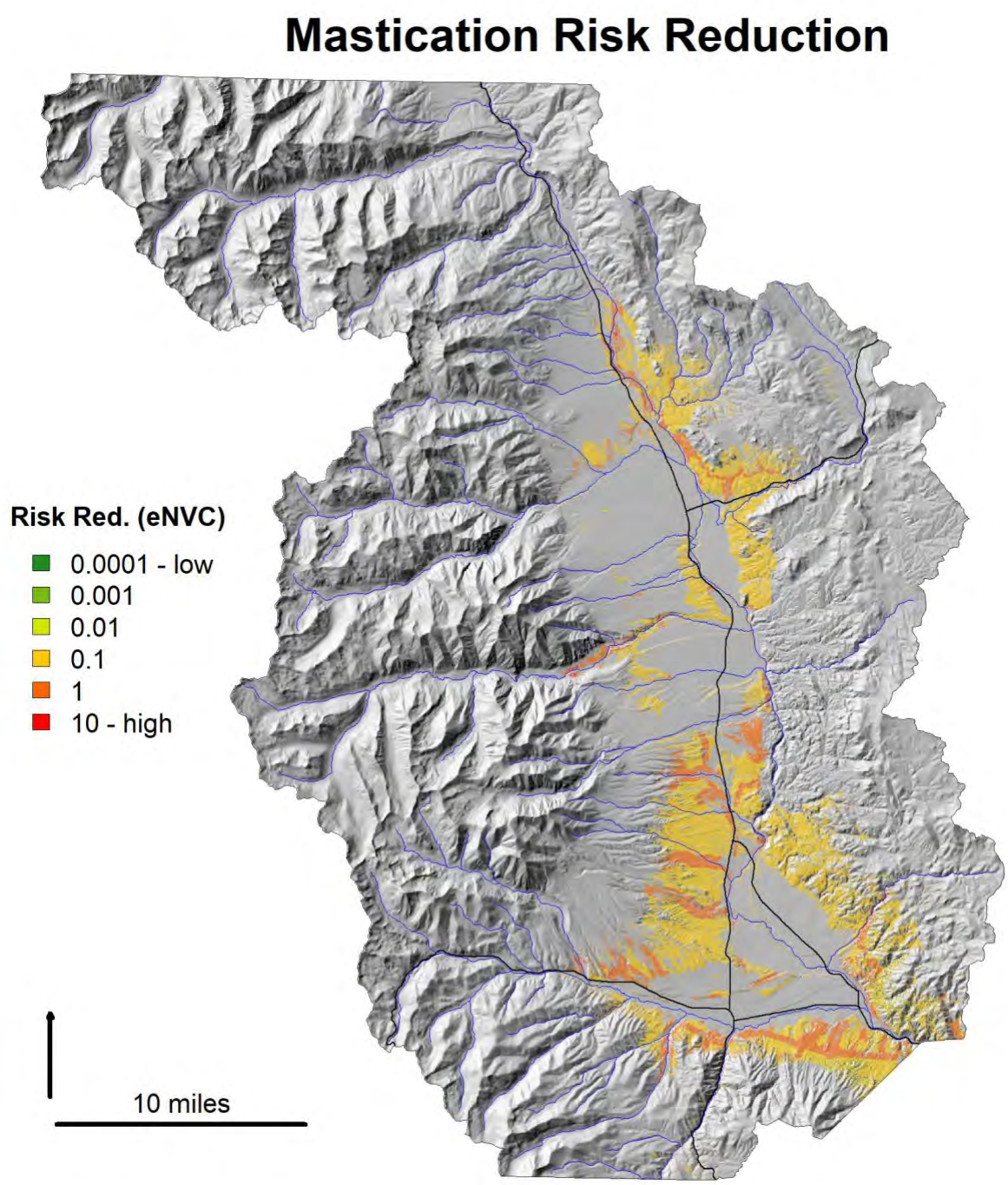


Figure 9: Estimated risk reduction for the mastication treatment.

Treatment cost

Treatment costs were based primarily on expert opinion because current treatment cost models either do not consider landscape-scale variation (Calkin and Gebert 2006) or require detailed data on stand conditions that are not available for most the landscape (Fight *et al.* 2006).

Per acre cost for the **thin only** treatment is approximated by adapting an expert model developed in northern Colorado (Gannon *et al.* 2019) for use in Chaffee County. Cost is considered a function of base treatment cost under ideal conditions ($1,800/ac) with adjustments for distance from roads (*Dcost*) and slope steepness (*Scost*) in Eqn 1.

$$Cost = 1{,}800 + Dcost + Scost \qquad \textbf{Equation 1}$$

Cost increases with distance from roads > 800 m as specified in Eqn 2 such that the total cost of treatment increases to $10,000/ac at four miles from the nearest road.

$$Dcost(x) = \begin{cases} 0, & x < 800\ m \\ 1.46 * (x - 800), & x \geq 800\ m \end{cases} \qquad \textbf{Equation 2}$$

Cost increases with slope > 35% as specified in Eqn 3 such that the total cost of treatment increases to $10,000/ac at 200% slope.

$$Scost(x) = \begin{cases} 0, & x < 35\ \% \\ 49.7 * (x - 35), & x \geq 35\ \% \end{cases} \qquad \textbf{Equation 3}$$

This formulation suggests the base cost applies anywhere within 800 m of roads and less than 35% slope. Total thinning costs were limited to a maximum of $10,000/ac if the combination of road distance and slope adjustments predicted costs in excess of $10,000/ac. The thin only treatment costs are shown in Figure 10.

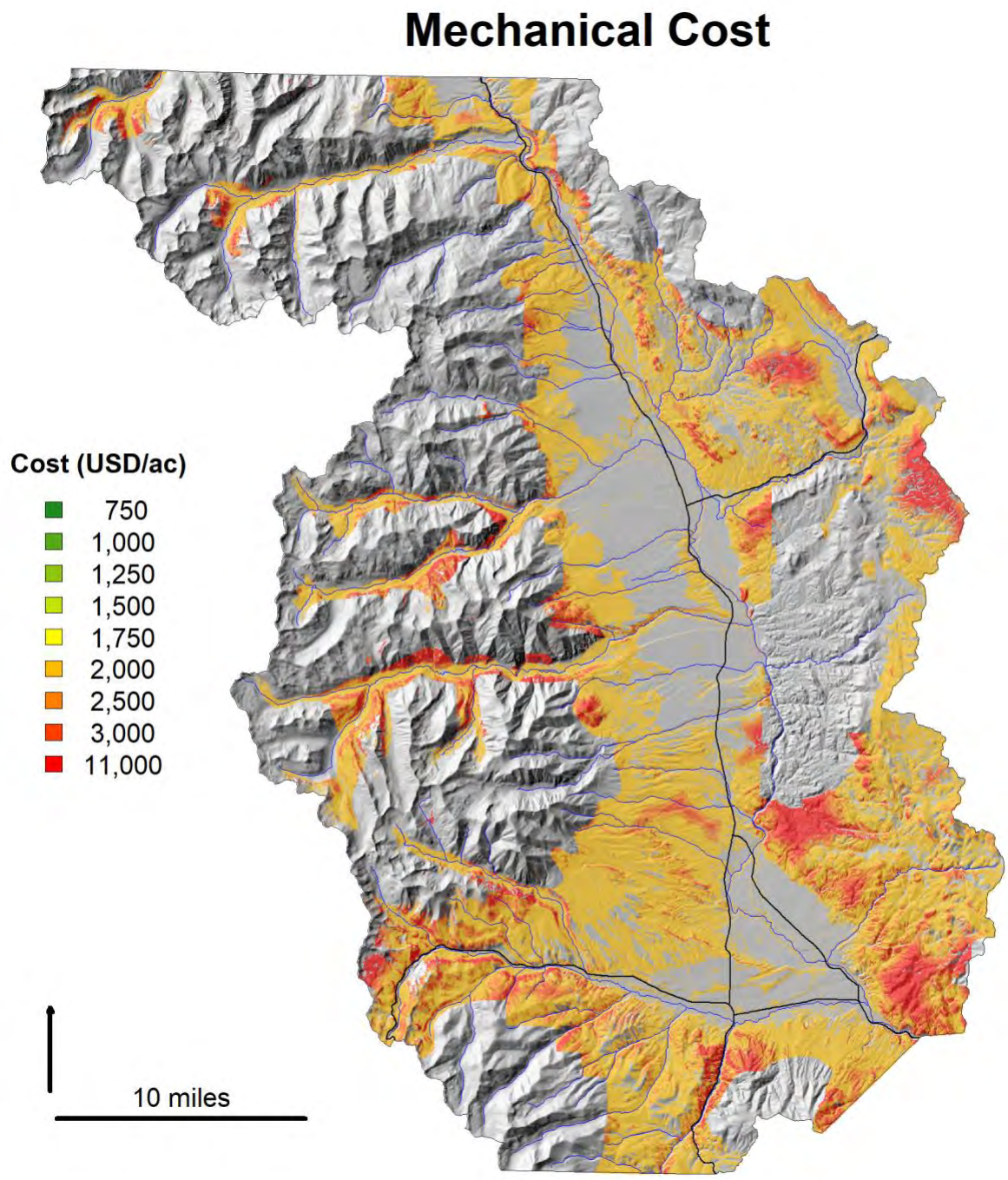


Figure 10: Mechanical thinning cost for Chaffee County estimated using distance from roads and slope steepness.

Per acre cost for the **prescribed fire only** treatment is assumed constant. While prescribed fire costs do vary widely, the causes of this variation are highly site and condition specific and therefore difficult to quantify with coarse spatial data. Prescribed fire costs are difficult to characterize in part because preparation costs are not consistently recorded. We therefore assumed a flat rate of $1,000/ac to cover both the preparation and day of costs. The prescribed fire only treatment costs are shown in Figure 11.

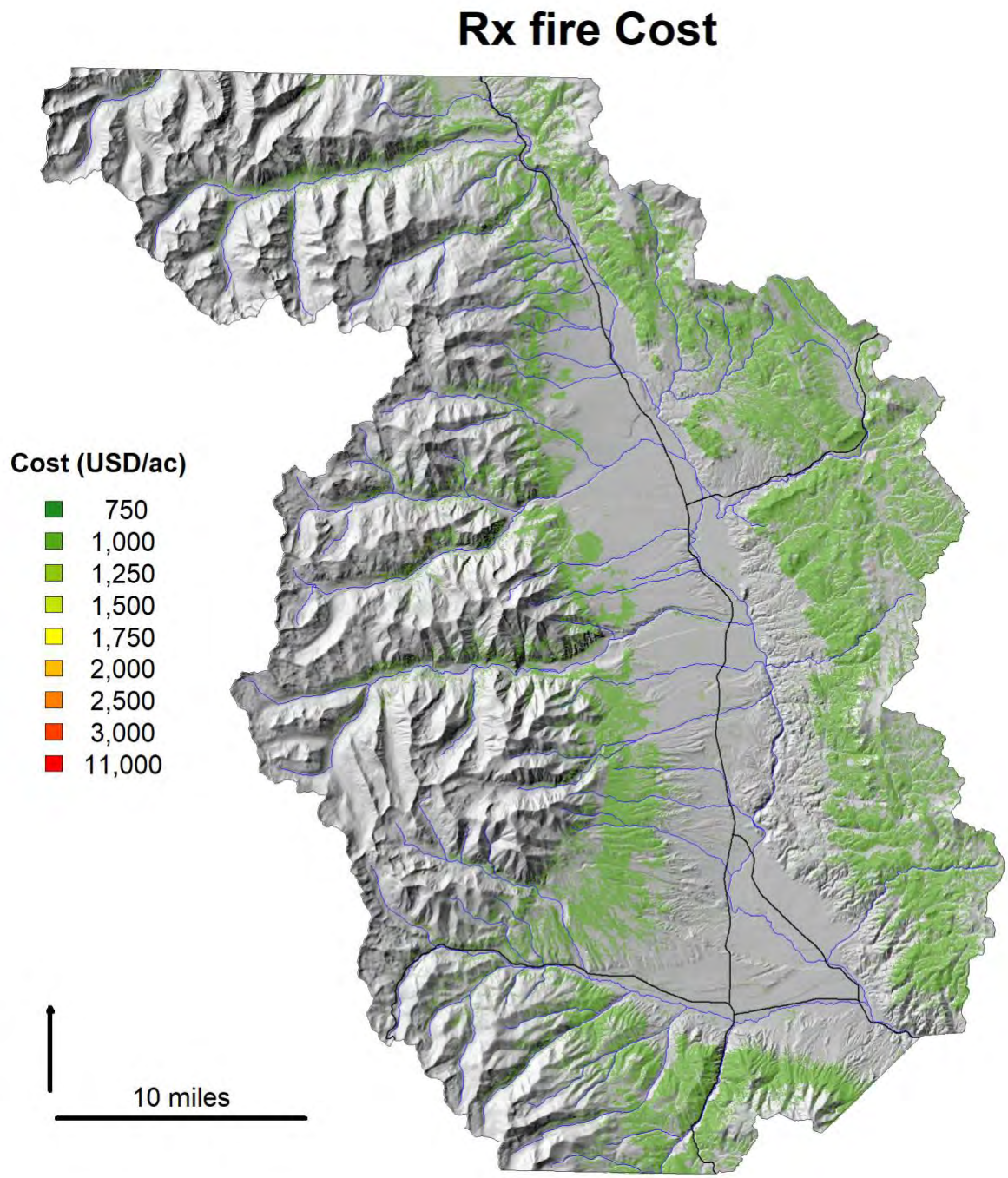


Figure 11: Prescribed fire cost for Chaffee County estimated as a constant value.

Per acre cost for the **complete** treatment is assumed to be the sum of the thinning and prescribed fire treatment costs. The Working Group discussed whether the thinning treatment would reduce the prescribed fire costs by eliminating preparation work. Fire and fuels planners said there is rarely a synergy. Previously thinned areas may require pile burns or other fuel manipulations before broadcast burning will achieve the desired effects. A similar effort is still required to prep control lines. The complete treatment costs are shown in Figure 11.

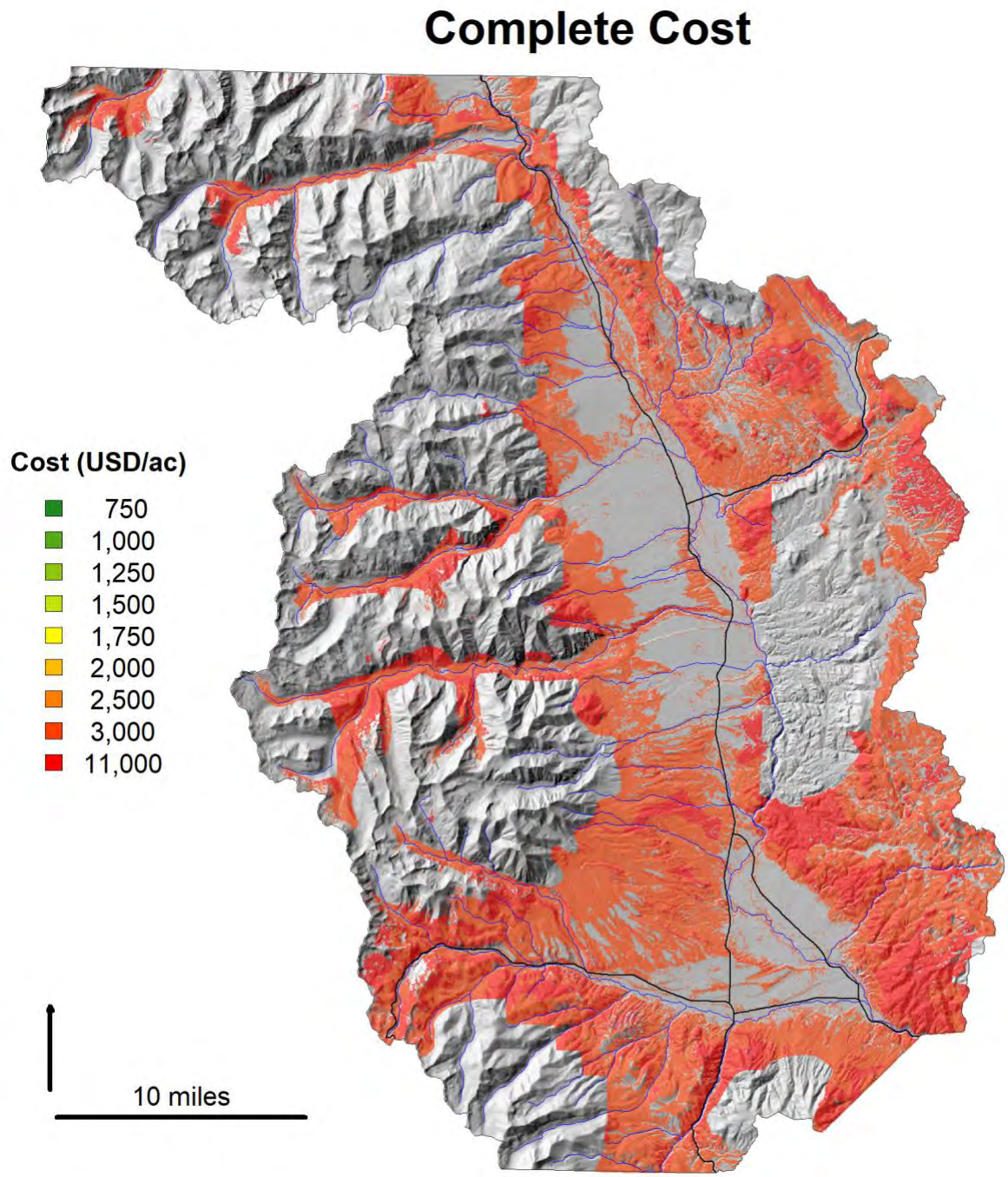


Figure 12: Complete treatment cost for Chaffee County estimated as the sum of thinning and prescribed fire costs.

Per acre cost for the **mastication** treatment is modeled similar to thinning. Cost is considered a function of base treatment cost under ideal conditions ($700/ac) with adjustments for distance from roads (*Dcost*) and slope steepness (*Scost*) in Eqn 4.

$$Cost = 700 + Dcost + Scost \quad \textbf{Equation 4}$$

Cost increases with distance from roads > 800 m as specified in Eqn 5 such that the total cost of treatment increases to $5,000/ac at four miles from the nearest road.

$$Dcost(x) = \begin{cases} 0, & x < 800\ m \\ 0.77 * (x - 800), & x \geq 800\ m \end{cases} \quad \textbf{Equation 5}$$

Cost increases with slope > 20% (Jain *et al.* 2018) as specified in Eqn 6 such that the total cost of treatment increases to $1,400/ac at 40% slope.

$$Scost(x) = \begin{cases} 0, & x < 20\ \% \\ 35 * (x - 20), & x \geq 20\ \% \end{cases} \quad \textbf{Equation 6}$$

This formulation suggests the base cost applies anywhere within 800 m of roads and less than 20% slope. Total mastication costs were limited to a maximum of $5,000/ac if the combination of road distance and slope adjustments predicted costs in excess of $5,000/ac. The mastication treatment costs are shown in Figure 13**.**

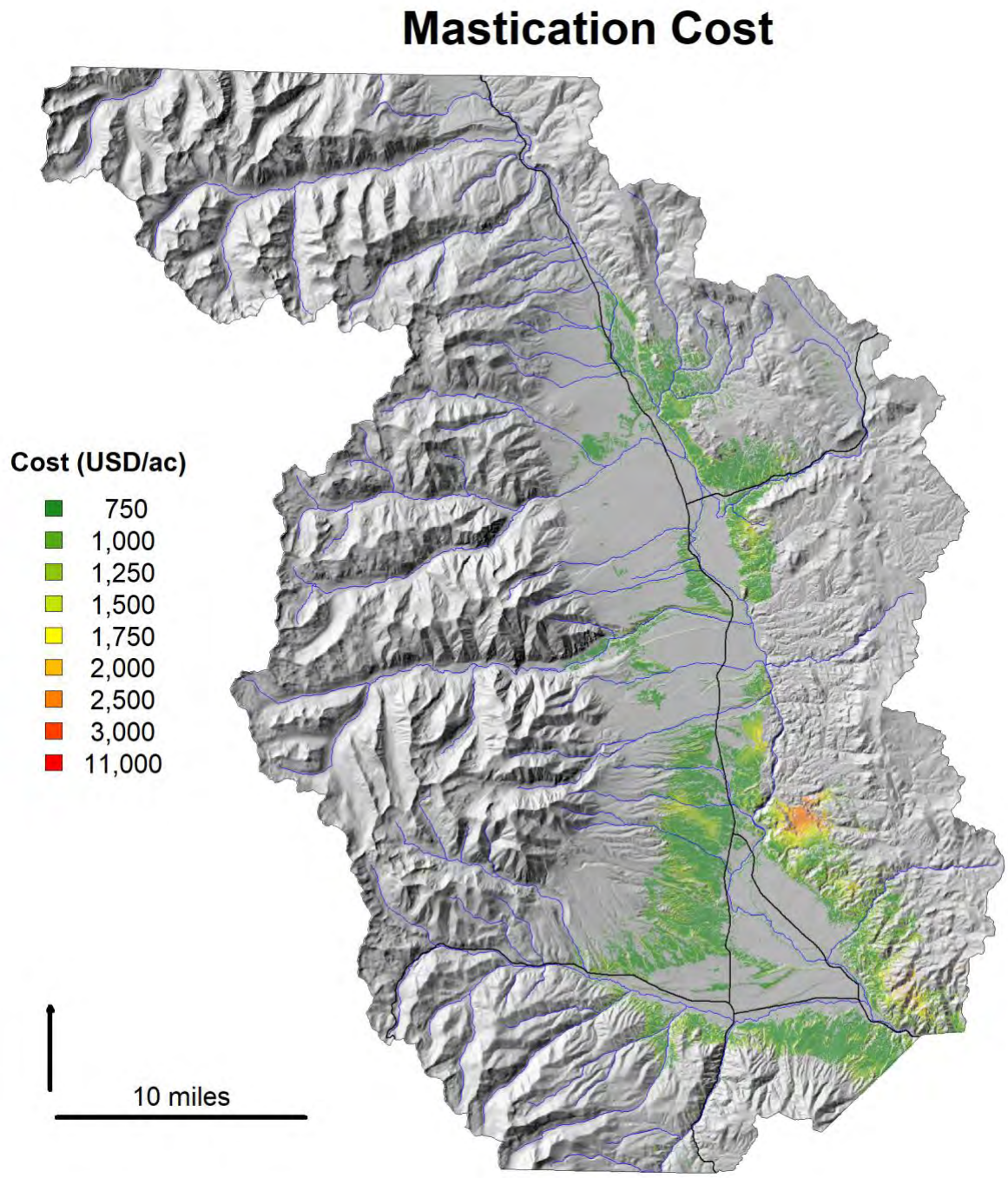


Figure 13: Mastication cost for Chaffee County estimated using distance from roads and slope steepness.

Prioritization

The RADS model is used for prioritization by identifying the optimal treatment locations and types for a wide range of budget levels – $10M, $50M, $100M, and $200M. Areas selected at a lower budget levels are more cost effective than those selected at higher budget levels.

Results

The RADS optimization model selected between 7,252 and 130,521 acres for treatment across the modeled budgets (Table 3). Budgets of $10M, $50M, $100M, and $200M correspond to selecting the top 2.5%, 12%, 22%, and 45% of treatment opportunities respectively. The draft fuel treatment priorities for Chaffee County are mapped in Figure 14.

Table 3: Budget summary of risk reduction achieved and treatment allocation.

Priority	Budget	Risk Reduction (eNVC)	Thin only (acres)	Rx fire only (acres)	Complete (acres)	Mastication (acres)	Total (acres)
Highest	$10M	1,184	174	3,000	1,484	2,593	7,252
Higher	$50M	2,848	141	13,652	8,565	12,361	34,719
High	$100M	3,873	141	22,180	18,816	24,524	65,661
Moderate	$200M	4,827	141	44,987	37,615	47,778	130,521

The model was also run across the full range of possible fuel treatment budgets (Figure 15). The top panel illustrates that although less than half the area available for treatment is selected at the $200M budget level, this treatment plan is expected to achieve most of the risk reduction that is possible with fuel treatment. The RADS model selects close to the maximum allowed use of prescribed fire and mastication (Table 3; Figure 15) because they are very cost-effective treatments (Appendix II – Cost-effectiveness results). Despite the cheaper cost of the thin only treatment, the model primarily choses the more expensive complete treatment because there is substantial benefit to managing the surface fuels. The dominant treatment type assigned to each catchment is mapped in Figure 16 for the $200M treatment plan to provide a general indication of what treatment types are most appropriate in which areas. This map is not meant to be prescriptive or to replace the need for field assessment of current conditions to identify the appropriate treatment type. The RADS model often allocates multiple treatment types within large catchments, so the map should be interpreted with caution; for example, 105 of the 258 catchments prioritized for treatment at the $200M budget level are assigned multiple treatment types. The spatial distribution of treatments is reflective of the current forest conditions and associated management practices: 1) mastication is assigned exclusively within the pinyon-juniper zone; 2) prescribed fire is targeted towards the ponderosa pine and dry mixed conifer zones; and 3) the complete treatment is assigned primarily to dense mid- to high-elevation forests.

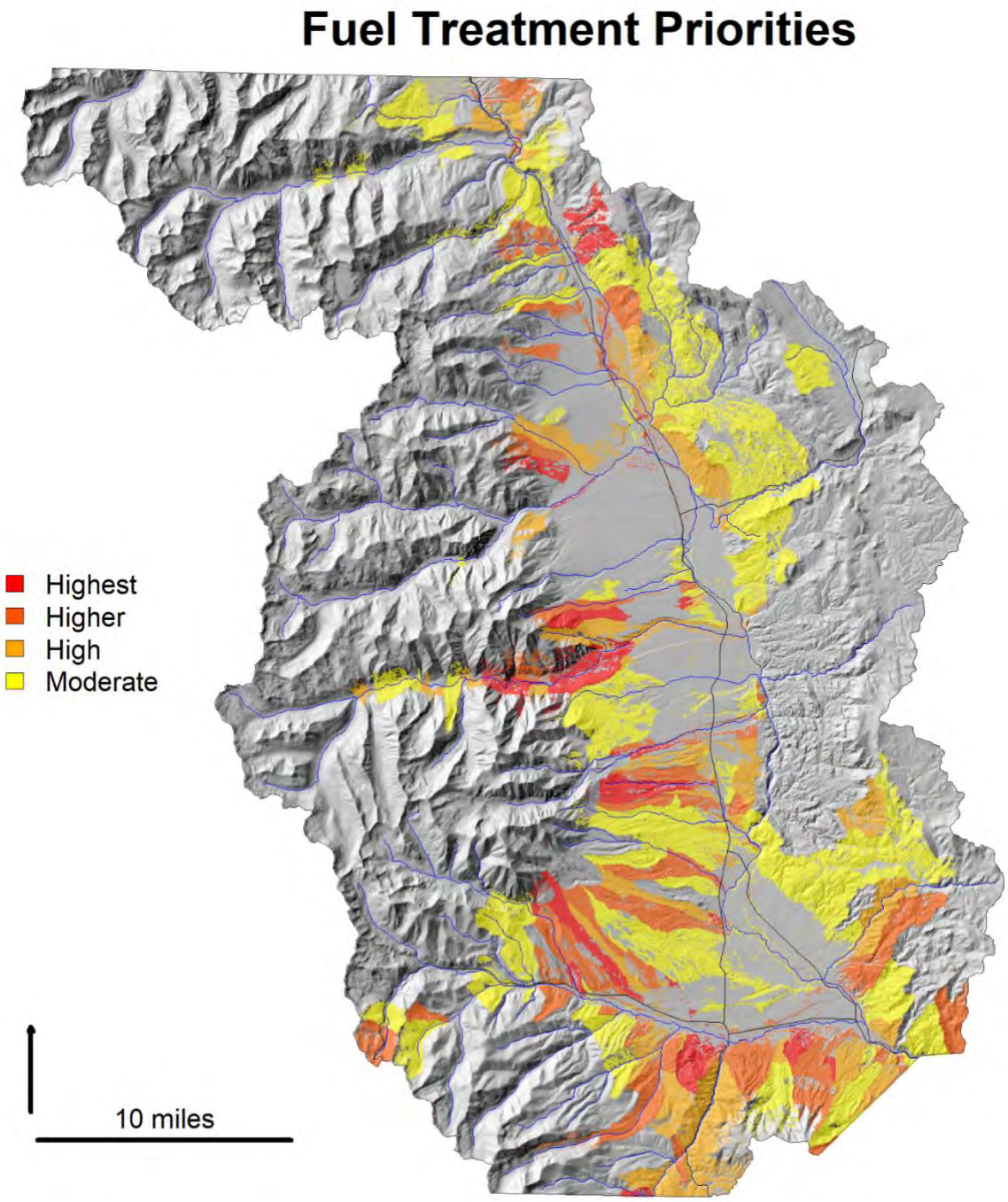


Figure 14: Fuel treatment prioritization for Chaffee County. Highest, higher, high, and moderate treatment priorities correspond to $10M, $50M, $100M, and $200M fuel treatment budgets.

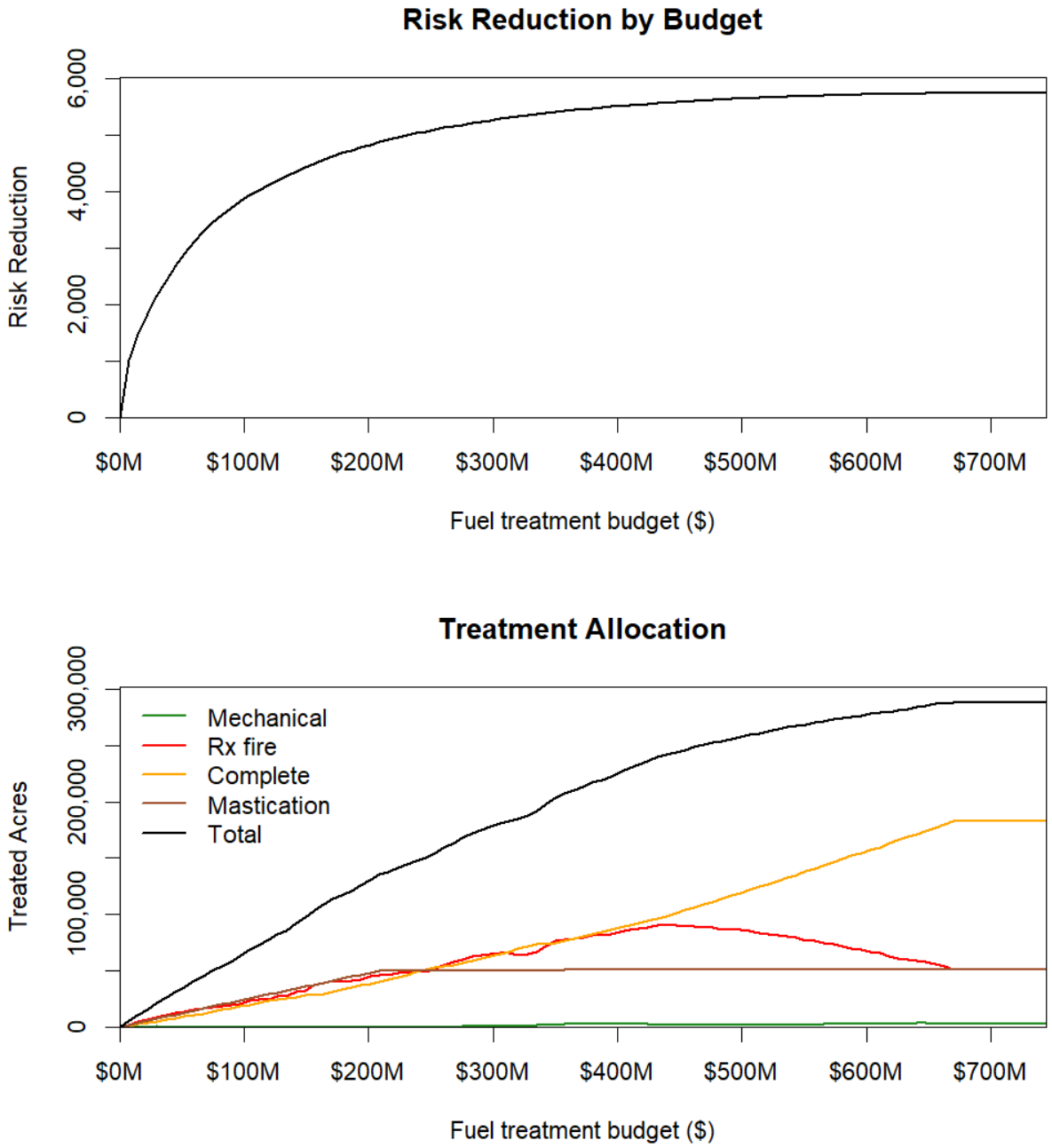


Figure 15: The avoided risk curve shows the level of risk reduction achieved across a wide range of fuel treatment budgets in the top panel. Treatment type allocations are tracked by budget level in the lower panel. Risk is unitless (or relative) measures of expected Net Value Change from the Chaffee County Wildfire Risk Assessment.

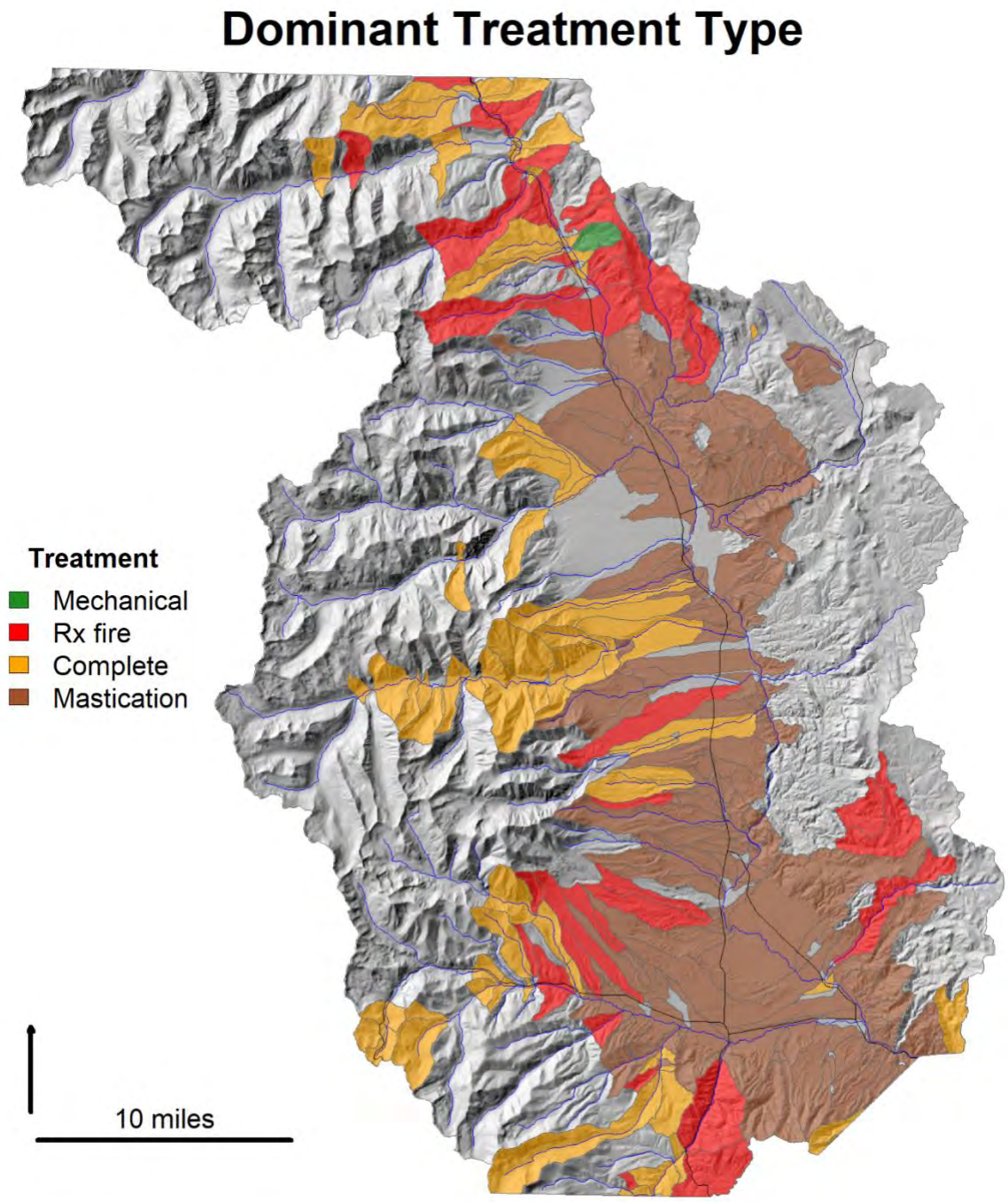


Figure 16: The RADS model can assign multiple treatment types within a catchment. This simplified map shows the dominant treatment type by acres in each catchment for the $200M treatment plan (moderate-highest priority areas). It does not imply that the mapped treatment type is applied across the entire catchment.

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Appendix I – Model formulation

Linear program formulation

Objective function:

$$\max Z = \sum_{i=1}^{N}\sum_{t=1}^{P} RR_{i,t} * x_{i,t}$$

Constraints:

$$x_{i,t} \leq F_{i,t} \qquad \forall\, i,t$$

$$\sum_{t=1}^{P} x_{i,t} \leq tF_i \qquad \forall\, i$$

$$x_{i,t} \geq 0 \qquad \forall\, i,t$$

$$\sum_{i=1}^{N}\sum_{t=1}^{P} TC_{i,t} * x_{i,t} \leq Budget * BP_t \qquad \forall\, i,t$$

$$\sum_{i=1}^{N}\sum_{t=1}^{P} TC_{i,t} * x_{i,t} \leq Budget$$

Subscript notation:

i is used to index treatment units from 1 to *N*

t is used to index treatment types from 1 to *P*

Decision variables:

$x_{i,t}$ is the area (ac) of treatment *t* assigned to treatment unit *i*

Parameters:

Z is the total risk reduction (unitless)

$RR_{i,t}$ is the risk reduction per acre of treatment *t* applied to treatment unit *i*

$F_{i,t}$ is the feasible area (ac) for treatment *t* in treatment unit *i*

tF_i is the total feasible area (ac) for any treatment in treatment unit *i*

$TC_{i,t}$ is the cost ($/ac) of applying treatment *t* in treatment unit *i*

Budget is the funding available for fuel treatment ($)

BP_t is the maximum budget proportion that can be allocated to treatment type *t*

Minimum and maximum treatment sizes (ac) are also imposed on the model by pre-processing decision units to eliminate those that fall under the minimum treatment size and by shrinking the feasible acres for those decision units that exceed the maximum treatment size.

Appendix II – Cost-effectiveness results

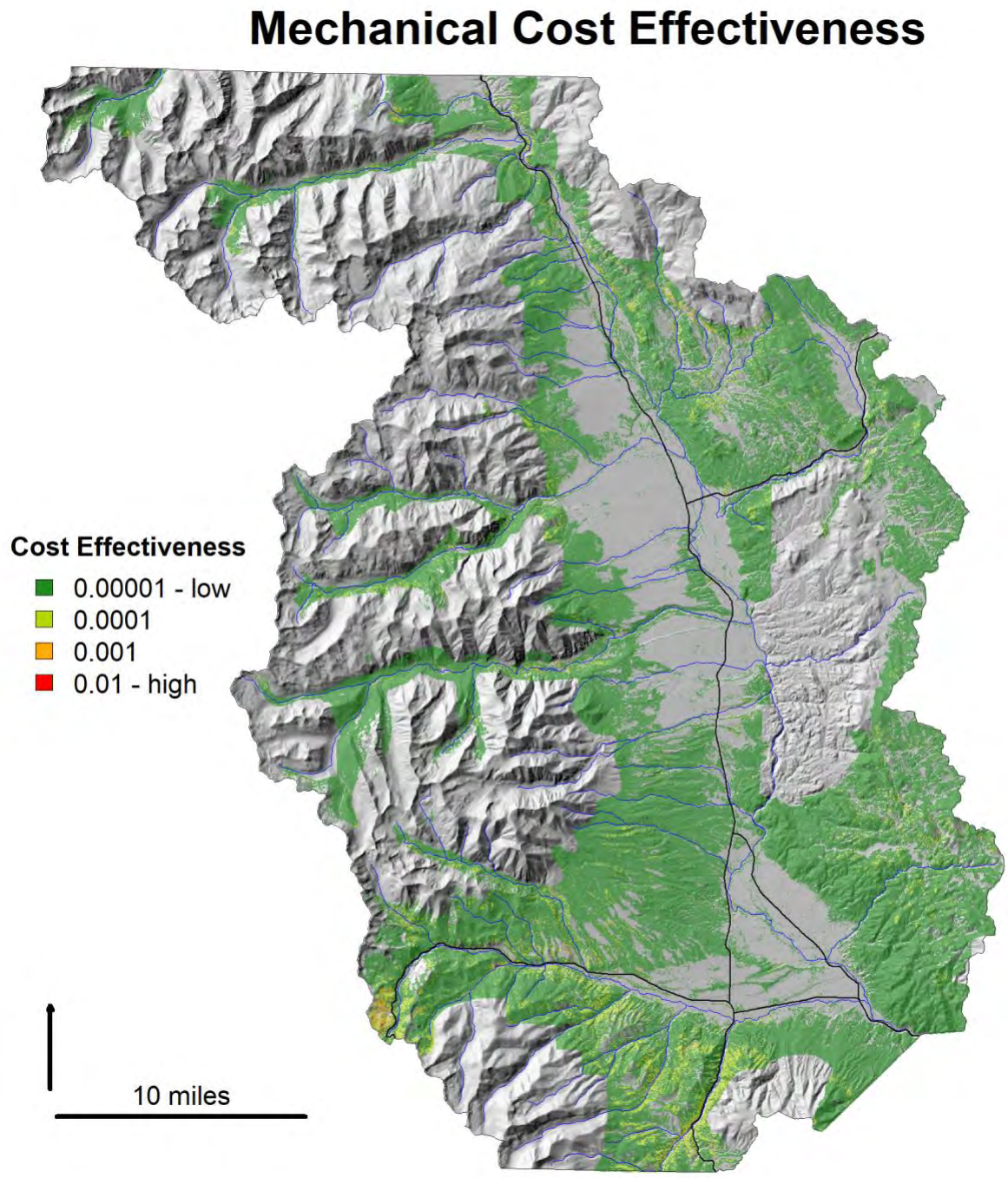

Figure 17: Cost-effectiveness (risk reduction/treatment cost) of the mechanical thinning only treatment.

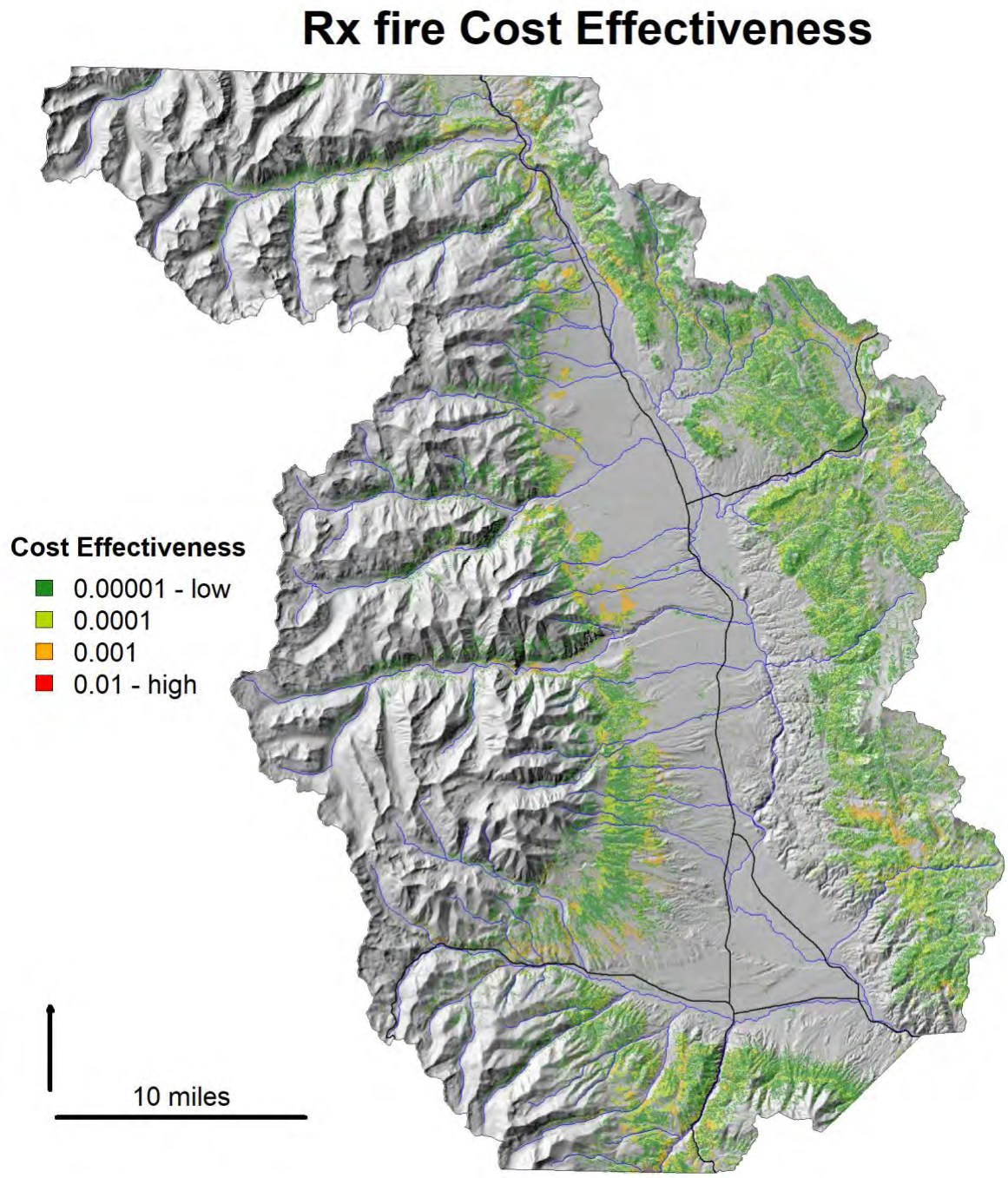

Figure 18: Cost-effectiveness (risk reduction/treatment cost) of the prescribed fire only treatment.

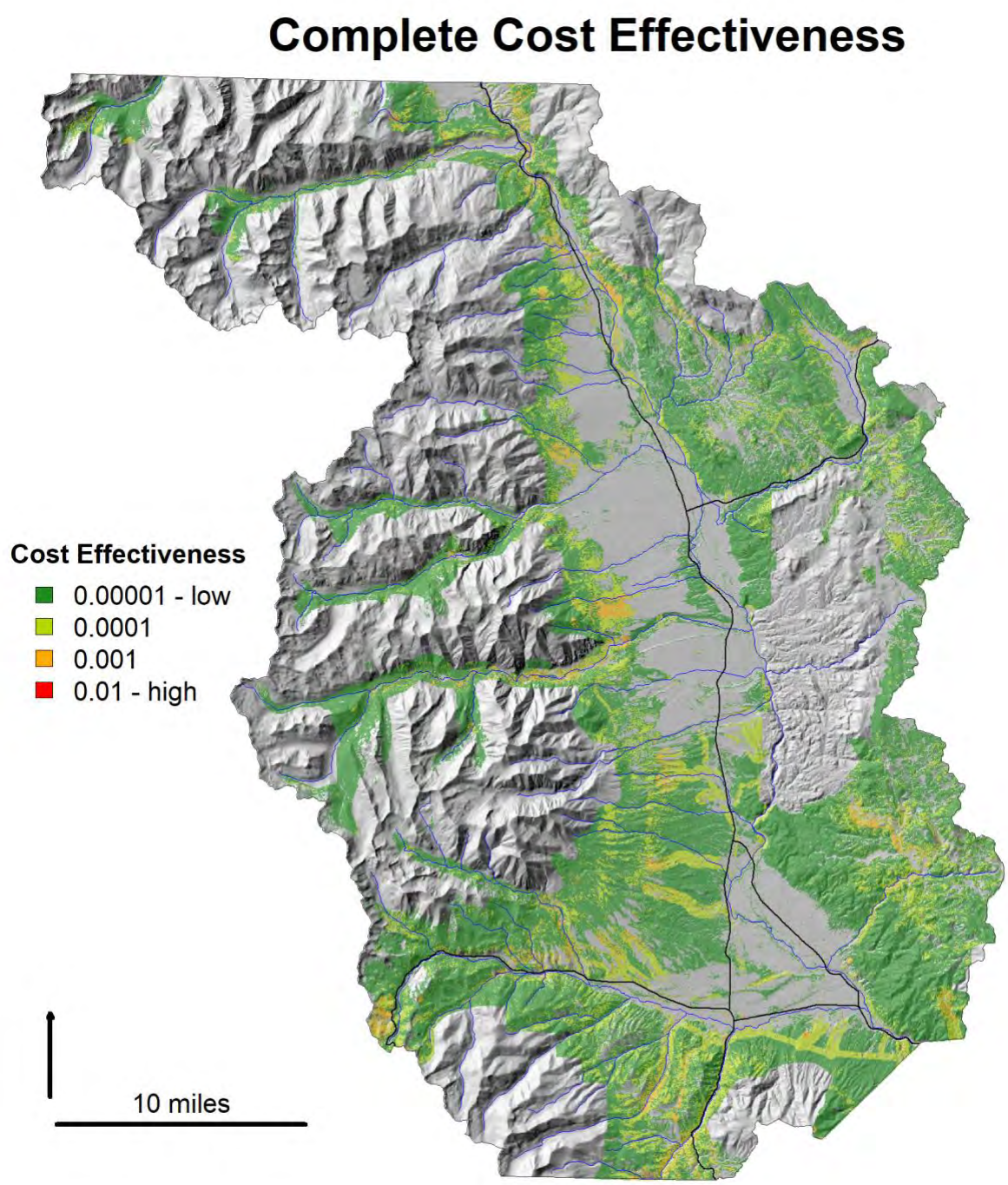

Figure 19: Cost-effectiveness (risk reduction/treatment cost) of the complete treatment.

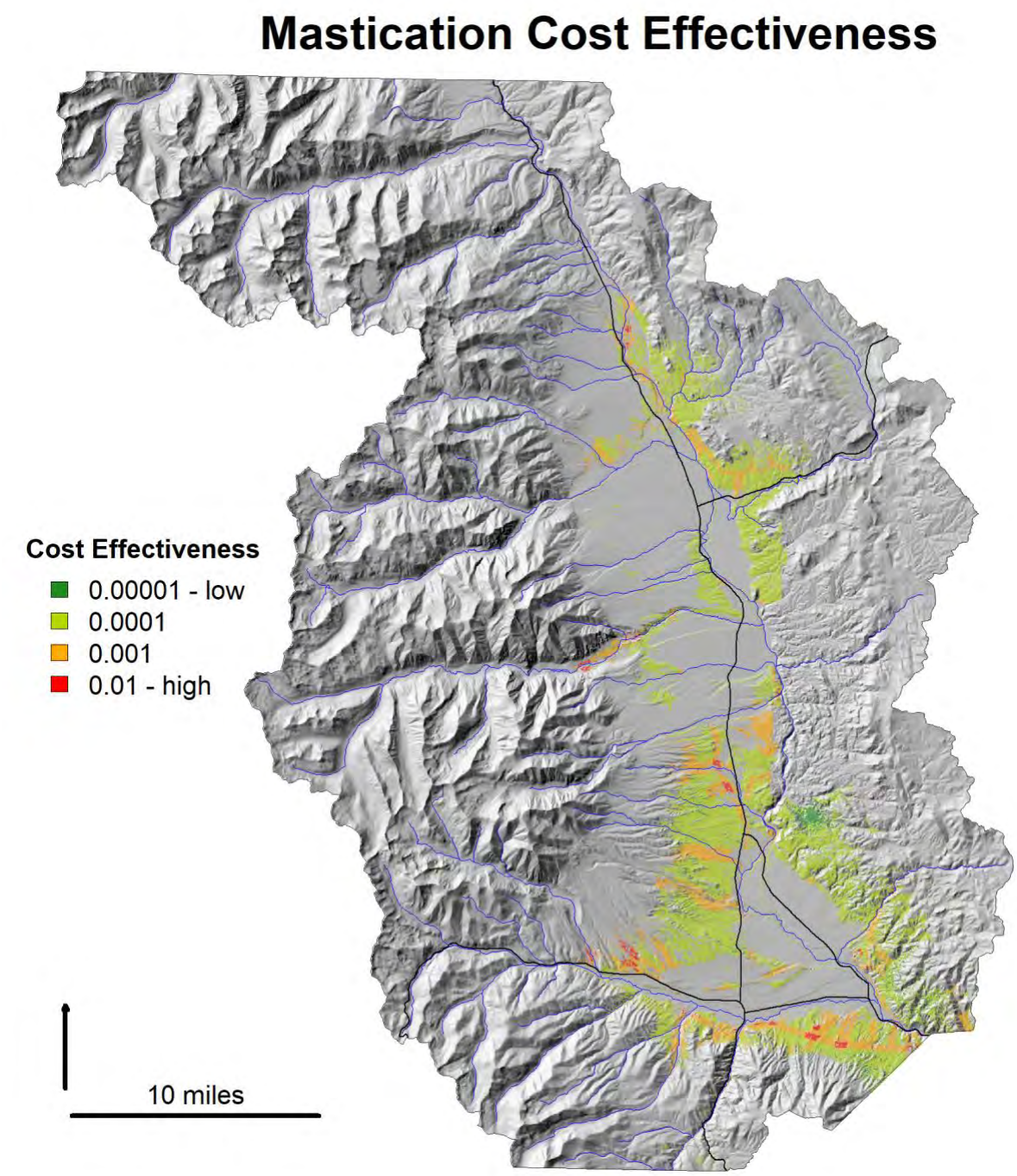

Figure 20: Cost-effectiveness (risk reduction/treatment cost) of the mastication treatment.

Chaffee County Next Generation Wildfire Protection Plan

Appendix E: WUI Communities

Appendix E – WUI Communities

A. Summary

Information from the Chaffee County Assessor on 1/23/2020 indicates there are a total of 404 subdivision filings in the county with more than 6,525 lots. Of those, at least 171 filings include more than 10 lots, with the caveat that county data on the number of lots is not complete for some filings.

Since 2007, 135 subdivision filings have been added to the county, and at least 12 of those have more than 10 lots (again, the data on the number of lots is not complete in all filings).

The 2009 CWPP included a 2007 risk assessment of 54 prioritized communities and subdivisions.

Considering the Next Generation CWPP Treatment Priority Areas, 227 subdivision filings and more than 1,400 lots fall within highest and higher priorities.

B. 2007 Prioritized Communities Risk Assessment

Fifty-four communities and major subdivisions were identified in the 2009 Chaffee County CWPP and prioritized by a 2007 risk assessment as follows (with community, risk rating (on 0 to 100 scale) and categories (Extreme, Severe, High, Moderate and Low) as listed below. When the risk ratings were completed in 2007, the county had 268 recorded subdivision filings with 5,943 lots. Of those, 60 had more than 30 lots and 159 had more than 10 lots. This data is provided in Table E-1.

C. 2020 List of all current Chaffee County Subdivision Filings

Information from the Chaffee County Assessor on 1/23/2020 indicates there are a total of 404 subdivisions in the county with more than 6,525 lots, and at least 171 include more than 10 lots (with the same data gaps as noted above). Since 2007, 135 subdivisions have been added to the county, and 12 of those have more than 10 lots.

All of these communities are considered in the Next Generation Community Wildfire Protection plan WUI community list. A full list is provided in Table E-2.

C. 2020 Subdivision Filings in Highest and Higher Treatment Priority Areas

A list of the roughly 227 subdivision filings and over 1,400 lots included in the top two treatment priority areas is provided in Table E-3. There may be some overlap in the highest and higher priority lists, as one subdivision may appear in both priority zones. Also, data on the number of lots for some of the filings is not complete in the county database.

Table E-1 2007-2008 Risk Assessment

Subdivision, Community, or Neighborhood	Fire District	Risk Rating	Hazard Class
Eagles Roost	CCFPD	87	Extreme
Angel Of Shavano	CCFPD	75	Extreme
Jo Love Ranch	CCFPD	67	Extreme
Mt. Princeton Hot Springs	CCFPD	62	Extreme
Rancho Antero Estates	CCFPD	62	Extreme
Silver Cliff Club	CCFPD	62	Extreme
Princeton Shadows	CCFPD	62	Extreme
Milne Subdivision	CCFPD	62	Extreme
Deer Valley Ranch	CCFPD	62	Extreme
Chalk Creek Acres	CCFPD	62	Extreme
Chalk Creek Estates	CCFPD	62	Extreme
Alpine	CCFPD	60	Extreme
Lost Creek Ranch	CCFPD	58	Severe
Trail West Village	CCFPD	58	Severe
Meadow Lake Mtn Estates	CCFPD	55	Severe
North Fork Acres	CCFPD	53	Severe
Mesa Antero Estates	CCFPD	50	Severe
St. Elmo	CCFPD	50	Severe
Whispering Pines	CCFPD	47	High
Trout Creek Meadows	CCFPD	47	High
Cochetopa Estates	CCFPD	46	High
The Canyons Rosi	CCFPD	46	High
Hidden Hills	CCFPD	45	High
Eureka Ranch	CCFPD	45	High
Methodist Meadow	SAFPD	45	High
Methodist Mountain	SAFPD	44	High
Wapiti	CCFPD	43	High
Four Elk Camp	CCFPD	43	High
Mt Harvard Addition	CCFPD	43	High
Mt Harvard Valley Estates	CCFPD	43	High
Mt Princeton View Estates	CCFPD	40	High
Game Trail	CCFPD	39	Moderate
Pinon Acres	CCFPD	38	Moderate
Saddle Ridge Ranch	CCFPD	37	Moderate
Weldon Creek	CCFPD	36	Moderate

Tenderfoot Business Park	SAFPD	36	Moderate
Cedar Gate Estates	CCFPD	35	Moderate
Maysville	CCFPD	34	Moderate
Maysville Meadows	CCFPD	34	Moderate
Boot Hill	SAFPD	34	Moderate
Mesa Antero	CCFPD	32	Moderate
Nicholas Hills	SAFPD	32	Moderate
Pinon Hills	SAFPD	30	Moderate
Ute Heights	SAFPD	29	Low
Webb Tracts	SAFPD	29	Low
Fawn Ridge	SAFPD	27	Low
Betty's Meadows	SAFPD	26	Low
Hacienda Village	CCFPD	26	Low
Shikoba Acres	SAFPD	26	Low
Hilton Subdivision	SAFPD	25	Low
Mt. Princeton View Estates	CCFPD	25	Low
Rancho Sawatch	CCFPD	25	Low
Martha's Court	CCFPD	24	Low
Rancho Caballeros	SAFPD	24	Low
The Reserve At Cottonwood Creek	CCFPD	24	Low
Pikul Subdivision	CCFPD	23	Low
River West	SAFPD	23	Low
Carpenter Industrial Air Park	CCFPD	22	Low
Chaparral	SAFPD	22	Low
Oro Vista	CCFPD	22	Low
Shavano Vista	SAFPD	22	Low
Vista Grande	SAFPD	22	Low
Windance	SAFPD	22	Low
Embry Estates (industrial)	SAFPD	21	Low
Pinon Pines	CCFPD	21	Low
Rainbow Ridge	SAFPD	21	Low
Cielo Vista	CCFPD	20	Low
Meadowlark Estates	SAFPD	20	Low
The Range ROSI	SAFPD	20	Low
Troy Kelly	CCFPD	18	Low
Princeton Estates	CCFPD	18	Low
Bear Trail Subdivision	CCFPD	18	Low
Smeltertown	SAFPD	16	Low
Glenview	CCFPD	15	Low
Westwinds Subdivision	CCFPD	15	Low

Table E-2. Subdivision filings in Chaffee County, according to Chaffee County Assessor data 1/23/20.

SUBNO	Name	Filing Number	Lots	Date Recorded
Subdivisions added 2007 to 2019 (sorted by number of lots)				
SUB388	The Estates at Mt Princeton	PHASE I	33	6/27/2012
SUB393	Eagle View at Mt Princeton	-	24	6/20/2013
MIS614	Broadview Rural Open Space Incentive	Phase I	18	6/8/2018
SUB413	Longhorn Ranch Subdivision	-	16	9/20/2017
SUB1735	Shikoba Acres	2	16	6/7/2011
MIS566	Arkansas Valley Business Park	PHASE 1	15	4/1/2016
50	Boot Hill	4	15	7/12/2008
SUB091	Casa Del Rio MHP	River Addition	13	7/28/2009
SUB400	Caballo Ranchero ROSI	-	11	7/31/2015
SUB398	Gold Medal River Estates	-	11	12/1/2014
MIS614	Broadview Rural Open Space Incentive	Phase II	10	7/17/2019
MIS472	High Lonesome	-	10	6/18/2010
sub356	GRAY HAWK SUB	-	9	1/20/2009
MIS431	Monarch River Estates III ROSI	-	9	1/4/2008
SUB438	Cactus Ranch Major Subdivision	-	8	12/23/2019
MIS497	Hutchinson Sub Exemption No 2	-	8	11/9/2011
SUB344	Betty's Meadows	-	8	3/25/2008
SUB408	Willows Subdivision	1	7	11/7/2016
SUB391	Vista del Rio Subdivision	-	7	7/25/2012
MIS435	RIVER VALLEY RANCH	-	7	3/27/2008
SUB341	Highlanders Retreat	-	7	1/8/2008
MIS634	Mountain Shadows Subdivision	-	6	12/20/2019
MIS631	Nestle Waters North America Inc./Jacobson Boundary Line Adjustment	-	6	7/16/2019
SUB423	Pintane Subdivision Exemption	-	6	7/31/2018
SUB396	Three Roads Subdivision	-	6	7/15/2014
MIS449	PONCHA CREEK ROSI	-	6	12/12/2008
MIS430	Monarch River Estates I ROSI	-	6	1/4/2008
MIS627	Uspenski-Brewer Boundary Line Adjustment	-	5	4/4/2019
SUB424	Hill Large Tract Subdivision No 1	-	5	8/27/2018
SUB422	Brady Minor Subdvision	-	5	7/16/2018
MIS595	Tabeguache Hills Large Tract Subdivision	-	5	7/20/2017
SUB409	Bos Minor Subdivision	-	5	11/15/2016
BV247	Southwinds Minor Subdivision	-	5	10/9/2015
MIS490	Habitat JV PUD	-	5	5/24/2011
MIS490	Habitat JV PUD	*	5	5/24/2011
MIS432	Shining Mountain ROSI	-	5	1/4/2008
MIS626	Project 2411 Ministries and Deer Valley Boundary Line Adjustment No 2	-	4	3/26/2019
SUB427	Kalivoda Heritage Water Subdivision Exemption	-	4	1/24/2019
SUB420	Pinon Grove Minor Subdivision	-	4	5/31/2018
MIS607	Project 2411 Ministries at Deer Valley Boundary Line Adjustment	-	4	3/21/2018
SUB411	Shanahan Minor Subdivision	-	4	3/29/2017
SUB348	SECURITY ACRES	-	4	5/29/2008
SUB347	SALIDA COUNTRY ESTATES	-	4	4/28/2008
SUB346	MARGIOTTA SUB	-	4	4/21/2008
SUB343	J.D. MINOR SUB	-	4	2/28/2008
MIS643	Rice-Sellers Boundary Line Adjustment	-	3	12/18/2019
MIS635	Kalivoda Rural Open Space Incentive	Phase 1	3	9/20/2019
MIS644	Thompson Boundary Line Adjustment	-	3	9/10/2019
SUB430	Temarctos Minor Subdivision	-	3	3/4/2019
SUB428	Lion Mountain Heritage Water Subdivision Exemption	-	3	2/28/2019

SUBNO	SUBNAME	FILINGNO	Lots	SUBFILINGDATERECORDED
Subdivisions added from 2007 to 2019 (sorted by number of lots)				
SUB426	141 Annex Minor Subdivision	-	3	1/4/2019
BV288	D & L Holdings Boundary Line Adjustment	-	3	8/2/2018
MIS608	SHURBET RANCH BOUNDARY LINE ADJUSTMENT	-	3	3/21/2018
SUB416	LANTZ SUBDIVISION EXEMPTION	-	3	12/13/2017
MIS602	Independence Boundary Line Adjustment	-	3	10/13/2017
MIS586	GUGLIELMO-WILLAMS BLA AND AGRICULTURAL SUBDIVISION EXEMPTION	-	3	2/23/2017
MIS564	Wooden Flume Minor Subdivision	-	3	3/28/2016
SUB404	Sunset Mesa Minor Subdivision	-	3	2/2/2016
SUB401	Triple T Minor Subdivision	-	3	11/30/2015
MIS554	Butala/Chermack/Chaffee County Boundary Line Adjustment	-	3	11/10/2015
MIS546	Starbuck Boundary Line Adjustment	-	3	9/14/2015
MIS544	Strother Parcels	-	3	7/31/2015
SUB399	Nachtrieb-DTS Ranch BLA and Nactrieb Ag Sub Exemption	-	3	4/22/2015
MIS527	Mt Princeton Hot Springs Resort Subdivision	-	3	4/23/2014
SUB373	Pinon Bough Minor Sub	.	3	4/20/2011
SUB365	MARTIN MINOR SUBDIVISION	-	3	1/12/2010
SUB357	SZYMANSKI MINOR SUB	-	3	5/12/2009
MIS450	WITTWER BLA	-	3	12/22/2008
MIS445	Maxwell Creek BLA	-	3	10/1/2008
MIS440	LOWRY-MARTIN REPLAT	-	3	7/15/2008
MIS642	Nola Minor Subdivision	-	2	12/18/2019
SUB437	Hunter Boundary Line Adjustment	-	2	11/27/2019
MIS639	Centerville Ranch Heritage Water Subdivision Exemption	-	2	10/18/2019
MIS637	McConaghy Heritage Water Subdivision Exemption	-	2	10/2/2019
PS99	JLS, LLC/Town of Poncha Springs Subdivision Exemption No 2	-	2	9/11/2019
SUB434	Melton Minor Subdivision	-	2	7/25/2019
MIS630	Van Deel Heritage Water Subivision Exemption	-	2	7/16/2019
SUB432	Wilson Minor Subdivision	-	2	6/21/2019
SUB431	MONARCH SHADOWS MINOR SUBDIVISION EXEMPTION	-	2	6/6/2019
SUB429	Crossroads Ranch Minor Subdivision	-	2	3/4/2019
MIS620	House Rock Minor Subdivision	-	2	12/7/2018
MIS619	DTS Ranch Agricultural Subdivision Exemption	-	2	12/4/2018
MIS646	Hayden Srpings Ranch Subdivision No 2	-	2	8/20/2018
SAL482	Cocovinis Plat #3	3	2	6/26/2018
MIS612	Baker Boundary Line Adjustment	-	2	5/31/2018
MIS609	Senter Agricultual Subdivision Exemption No 3	-	2	4/23/2018
MIS605	Adams Agricultural Subdivision Exemption	-	2	12/19/2017
SUB415	Fisher Subdivision Exemption	-	2	11/30/2017
SUB412	Chipeta Meadows Minor Subdivision	-	2	7/13/2017
MIS593	Arnett Agricultural Subdivision Exemption	-	2	6/8/2017
MIS589	Allen Minor Subdivision	-	2	5/2/2017
MIS587	Senter Agricultural Subdivision Exemption No 2	-	2	3/21/2017
PS79	JLS, LLC/Town of Poncha Springs Subdivision Exemption	-	2	3/14/2017
SUB410	Ruby Mountain Subdivision Exemption	-	2	2/10/2017
MIS581	Shurbet Ranch Minor Subdivision	-	2	9/2/2016

SUBNO	Name	Filing Number	Lots	Date Recorded
Subdivisions added 2007 to 2019 (sorted by number of lots)				
SUB407	Schwitzer Minor Subdivision	-	2	8/2/2016
SUB 406	Butler House Minor Subdivision	-	2	5/10/2016
MIS570	Ranch View Minor Subdivision	-	2	4/26/2016
MIS560	Waite Boundary Line Adjustment	-	2	3/2/2016
SUB403	Stark Minor Subdivision	-	2	12/10/2015
SUB402L	Linbloom Minor Subdivision	-	2	12/7/2015
MIS547	Klugh Boundary Line Adjustment	-	2	9/21/2015
BV245	Haarber Minor Subdivision	-	2	7/7/2015
MIS541	Chaffee County Subdivision Exemption	-	2	6/8/2015
MIS526	Lindstrom Boundary Line Adjustment	-	2	4/2/2014
SUB395	Horse Park Minor Subdivision	-	2	2/10/2014
MIS522	Daubenspeck BLA/LLE	-	2	10/25/2013
SUB392	Milk House Minor Subdivision	-	2	9/20/2012
SUB390	Rundell Tracts	-	2	7/25/2012
MIS503	Paddock BLA	-	2	2/3/2012
MIS502	McMurray Land & Livestock BLA 2	-	2	12/28/2011
MIS501	McMurray Land & Livestock Company, Inc BLA 1	-	2	12/28/2011
MIS500	McMurray Land & Livestock Subdivision Exemption	-	2	12/28/2011
SUB381	Holman Subdivision Exemption	-	2	8/16/2011
SUB375	COOK/JONES BLA	-	2	5/17/2011
SUB371	Lundberg Minor Subdivision	.	2	2/15/2011
SUB370	Wilken Minor Sub	.	2	1/26/2011
MIS476	MESTEL LOT LINE ADJUSTMENT	-	2	10/18/2010
MIS473	EDSON MIZELL BLA	-	2	6/29/2010
MIS468	PAPLOW BLA	MIS468	2	1/26/2010
MIS467	BARTON BLA & REPLAT	-	2	1/20/2010
MIS465	Lottinville/Cabe BLA	-	2	10/29/2009
MIS463	SITES BLA AND REPLAT TRACT 2 MCPHETRES SUB	-	2	9/14/2009
SUB361	WILMOTH SUB EXEMPTION	-	2	6/23/2009
SUB360	EMBRY LLA	-	2	6/3/2009
SUB358	CD SUBDIVISION	-	2	5/14/2009
SUB355	SPIRIT DANCER SUB EXEMPTION	-	2	12/8/2008
SUB354	ROCK RIDGE ESTATES ROSI	-	2	10/15/2008
MIS442	Monarch River Estates II	-	2	8/29/2008
MIS437	S. EGGLESTON BLA	-	2	5/29/2008
MIS434	HERMES REPLAT	-	2	3/12/2008
MIS433	Monarch Shadows-Cates BLA	-	2	2/20/2008
SUB327	The View at Chalk Creek Canyon	*	1	6/20/2013
MIS488	South Arkansas River Subdivision Exemption	0	1	4/28/2011
SUB364	RCC RANCH SUB EXEMPTION	-	1	11/5/2009
MIS460	POST-COX BLA	-	1	6/23/2009

Subdivisions filed in 2007 and earlier				
SUBNO	**Name**	**Filing Number**	**Lots**	**Date Recorded**
589	Mining Claims - Non Produ	1	695	
100	Chateau Chaparral	1	307	
600	Pinon Hills	1	222	
760	St. Elmo	1	117	
550	Nathrop	1	99	
582	Oro Vista	1	85	
370	Mesa Antero	4	83	
370	Mesa Antero	3	75	
280	Ivy League	1	71	
530	Mt Princeton Hot Springs	1	71	
350	Maysville	1	70	
813	Turret	1	69	
845	Weldon Creek	1	66	7/2/2002
410	Mesa Antero Estates	1	61	
340	Lost Creek Ranch	1	54	
370	Mesa Antero	2	54	
517	Severed Interest Minerals	1	54	
880	Yale Lakes Estates	1	51	
800	3 Elk Creek	1	50	
170	Eagles Roost	1	48	
215	Game Trail	1	47	
215	Game Trail	2	47	
648	The Reserve at Cottonwood Creek	1	45	12/17/2001
238	Glenview	2	45	3/9/2000
510	Monte Escondido	1	45	
SUB091	Casa Del Rio MHP	-	44	7/28/2005
270	Hidden Hills	1	43	
290	Jo Love Ranch	1	42	
520	Mt. Harvard Valley Estates	1	42	
780	Sunshine Acres	1	42	
215	Game Trail	12	41	
370	Mesa Antero	5	41	
336	Las Colinas	1	40	8/14/2002
238	Glenview	1	40	3/9/2000
420	Mesa View Estates	1	40	
560	North Cottonwood Estates	1	40	
590	Pinon Acres	1	39	
215	Game Trail	9	38	
808	Trout Creek Meadows	2	38	
92	The Canyons	ROSI	37	7/11/2002
89	Cameron Meadow Estates	1	36	1/13/2005
808	Trout Creek Meadows	1	36	
215	Game Trail	11	35	

Subdivisions filed in 2007 and earlier				
SUBNO	**Name**	**Filing Number**	**Lots**	**Date Recorded**
120	Colorado Midland	1	34	
351	Maysville Replat	1	34	
650	Rio Hondo	1	34	
215	Game Trail	14	33	10/19/1999
215	Game Trail	4	33	
999	Town of Kortz	0	33	
818	Ute Heights	1	33	
614	Maysville Meadows	1	31	12/6/2001
20	Alta Vista	1	31	
190	Four Elk Camp	1	31	
215	Game Trail	8	31	
SUB1079	Buffalo Hills	-	30	9/29/2005
169	Eagle Moon Ranch	1	30	9/8/2004
1875	Windmill Ranch Estates	ROSI	30	9/4/2004
790	3 Bar J Estates	1	30	
215	Game Trail	10	30	
360	Meadow Lakes Mountain Est	2	30	
840	Wapiti	1	29	
186	Fawn Ridge Subdivision	1	28	9/17/2002
702	Saddle Ridge Ranch	1	27	10/28/2002
215	Game Trail	7	26	
810	Troy Kelly	1	25	
95	Cedar Gate Estates	1	24	
160	Deer Valley	1	24	
215	Game Trail	13	24	
681	Riverside Subdivision	1	24	
362	Meadowlark Estates	-	23	3/16/2005
559	River Meadow Estates	1	23	12/8/2000
215	Game Trail	16	23	5/17/2000
360	Meadow Lakes Mountain Est	1	23	
559	River Meadow Estates	2	22	12/8/2000
8	Abernathy Tracts	1	22	
420	Mesa View Estates	3	22	
597	Pine Grove Estates	1	21	1/7/2003
420	Mesa View Estates	2	21	
827	Vista Farms	1	20	9/7/2004
315	Lakeside Estates	1	20	1/28/1963
697	Ruby Mountain Ranch	1	20	
SUB104	Cielo Vista	-	19	5/3/2005
185	Eureka Ranch	1	19	11/20/2000
215	Game Trail	15	19	
480	Methodist Mountain	1	19	
660	River Rim Estates	1	19	
370	Mesa Antero	1	18	
480	Methodist Mountain	2	18	
535	Mt. Princeton View Estates	3	18	
620	Princeton Plateau	1	18	
730	Shell-ter Homes	1	18	
820	Via Ponderosa	1	18	
32	Arroyo del Vista	1	17	4/15/2003
617	Princeton Estates	5	17	4/14/2000

Subdivisions filed in 2007 and earlier				
SUBNO	**Name**	**Filing Number**	**Lots**	**Date Recorded**
25	Angel Creek	1	17	
161	Dos Madres	1	17	
176	Elephant Rock Estates	1	17	
250	Hacienda Village	1	17	
535	Mt. Princeton View Estates	1	17	
570	North Fork Acres	1	17	
607	Pinon Pines	1	17	
761	St. Elmo - outlying	1	17	
MIS428	Lakeside Preserve	-	16	12/18/2007
865	Westwinds Subdivision	1	16	6/14/2002
86	Carpenter Industrial Air Park	1	16	11/19/2001
617	Princeton Estates	3	16	6/6/2000
165	Elk Crossing Ranch	3	16	
640	Rancho Antero Estates	1	16	
720	Shavano Vista	1	16	
865	Westwinds Subdivision	2	15	6/14/2002
865	Westwinds Subdivision	3	15	6/14/2002
97	Cedar Ridge Estates	1	15	7/30/1997
SUB1735	Shikoba Acres	-	14	7/28/2006
420	Mesa View Estates	4	14	
690	River West	1	14	
135	Country Meadows Estates	1	13	
260	Harvard Lakeside Estates	1	13	
750	Silver Cliff	1	13	
97	Cedar Ridge Estates	4	12	2/14/2006
42	Bear Trail	1	12	10/22/2003
99	Chaparral	1	12	11/19/2002
865	Westwinds Subdivision	4	12	6/14/2002
617	Princeton Estates	7	12	4/10/2002
591	Paradise Ranch	1	12	12/19/2001
215	Game Trail	17	12	1/17/2001
617	Princeton Estates	4	12	8/23/1999
31	Arkansas Wilderness Sub	1	12	
215	Game Trail	5	12	
215	Game Trail	6	12	
645	Rancho Caballeros	1	12	
643	Rancho Sawatch	1	12	
698	Rupp Placer	1	12	
830	Vista Meadows	1	12	
860	West Range	1	12	
860	West Range	2	12	
784	Talisman Subdivision	1	11	10/23/2002
103	Cherokee Heights	1	11	4/18/2002
617	Princeton Estates	6	11	4/10/2002
777	Sunnyside Estates	1	11	8/24/2000
274	Highland Estates	1	11	
367	Mear's Junction	1	11	
490	Milne Sub	1	11	

Subdivisions filed in 2007 and earlier				
SUBNO	**Name**	**Filing Number**	**Lots**	**Date Recorded**
500	Montana Terrace	1	11	
556	Nicholas Hills	1	11	
SUB321	Falcon's Reach ROSI	-	10	5/17/2007
648	The Reserve at Cottonwood Creek	Replat of II	10	8/4/2006
ROSI6081	Pinon Ridge Estates	-	10	12/9/2005
97	Cedar Ridge Estates	2	10	2/14/2005
131	Cottonwoods	1	10	8/23/2000
39	Big Sandy	1	10	
50	Boot Hill	1	10	
136	Country Meadow Ridge	1	10	
165	Elk Crossing Ranch	2	10	
165	Elk Crossing Ranch	4	10	
215	Game Trail	3	10	
470	Methodist Meadow	1	10	
82	NW Buena Vista	1	10	
658	Rio Vista	1	10	
816	Villa Vista	1	10	
SUB6081	Pinon Ridge Estates Sub	EAST	9	4/4/2006
841	Weaver Lane Estates	1	9	12/30/2003
559	River Meadow Estates	3	9	12/8/2000
802	356 Subdivision	1	9	
90	Chalk Creek Estates	1	9	
165	Elk Crossing Ranch	5	9	
210	Freegold Estates	1	9	
290	Jo Love Ranch	3	9	
617	Princeton Estates	2	9	
630	Princeton Shadows	1	9	
700	Rushing Waters	1	9	
83	SW Buena Vista	1	9	
876	Windance	1	9	
SUB1275	Hilton Subdivision	-	8	10/6/2006
SUB1774	Sunrise Ridge	-	8	8/2/2006
295	Journeys End	1	8	7/20/2004
549	Mountain View Farms	1	8	12/21/2001
114	Choctaw Heights	1	8	1/12/2000
87	Calarco	1	8	
130	Cottonwood Estates	1	8	
370	Mesa Antero	5A	8	
589	Mining Claims - Non Produ	GRANITE MD	8	
740	Sierra Vista	1	8	
50	Boot Hill	3	7	5/2/2007
648	The Reserve at Cottonwood Creek	III	7	8/4/2006
355	McMurray Tracts	1	7	5/10/2005
648	The Reserve at Cottonwood Creek	2	7	9/24/2004
276	High Mesa Estates	1	7	9/25/2002
783	Tenderfoot Business Park	1	7	8/14/2002
638	Rainbow Ridge	1	7	1/18/2000
177	Embry Estates	1	7	

Subdivisions filed in 2007 and earlier				
SUBNO	**Name**	**Filing Number**	**Lots**	**Date Recorded**
290	Jo Love Ranch	5	7	
580	Ocho Casa	1	7	
ROSI6081	Pinon Ridge Estates	South	6	3/21/2006
1042	The Bend	ROSI	6	7/12/2004
77	Buena Vista Ranch Estates	1	6	2/3/2000
88	Chalk Creek Acres	1	6	
290	Jo Love Ranch	2	6	
617	Princeton Estates	1	6	
828	Vista Grande	1	6	
870	Whispering Pines	1	6	
MIS423	Colorado Farm to Table Replat	-	5	10/16/2007
50	Boot Hill	2	5	5/2/2007
ROSI6075	Pinon Mesa Ranch ROSI	-	5	2/27/2006
ROSI1817	Two Trees ROSI	-	5	9/2/2005
1687	River's Edge ROSI	ROSI	5	3/19/2004
1646	The Range ROSI	ROSI	5	3/19/2004
1173	Eagles' View ROSI	1	5	11/6/2003
264	Hayden Springs Ranch	1	5	2/16/2001
SUB16	CRAIG SUBDIVISION	-	5	7/7/1964
36	Blackwell Parcels	1	5	
290	Jo Love Ranch	4	5	
692	Robinson-Lockett	1	5	
SUB324	Fuqua Minor Sub	-	4	6/5/2007
MSD3820	Wyatt Acres	-	4	11/28/2005
SUB1343	Lazy Daze	-	4	10/27/2005
MIS362	HummingBird Hill Ranch	-	4	12/28/2004
3078	Buena Vista Sanitation District BLA	1	4	5/21/2004
SUB259	CHALK VIEW SUBDIVISION	-	4	4/2/2004
92	The Canyons	1	4	8/27/2001
MIS426	Mt Shavano Ranch BLA	-	3	11/30/2007
SUB338	Crist-Couch Sub	-	3	11/19/2007
MIS424	Hill O'Connor & Scanga BLA	-	3	10/18/2007
SUB336	Williams-Dafoe BLA & Sub Exemption	-	3	9/13/2007
SUB333	Sand Creek Minor Sub	-	3	9/4/2007
MIS414	Ray's Ridge Minor Sub	-	3	1/22/2007
704	Sand Gulch Sub	1	3	7/13/2005
MIS213	Garatti Tracts	-	3	6/6/2000
MIS160	Coprio Exemption Plat #2	-	3	3/9/1999
MIS54	Marques Tracts	0	3	12/17/1996
70	Brown/Gold Estates	1	3	
256	Harrow Parcels	1	3	
255	Harrow Tracts	1	3	
338	Little Cochetopa Acres	1	3	
347	Marthas Court	1	3	
715	Severed Mineral Rights	1	3	
782	Swick Parcels	1	3	
842	Webb Tracts	1	3	
SUB340	Senter Sub Exemption	-	2	12/12/2007

Subdivisions filed in 2007 and earlier				
SUBNO	**Name**	**Filing Number**	**Lots**	**Date Recorded**
MIS427	Dallas BLA	-	2	12/4/2007
SUB337	Burkhart Sub	-	2	10/5/2007
MIS421	Young Life LLA	-	2	8/17/2007
SUB303	COWGIRL RANCH	-	2	8/29/2006
MIS398	LONG MINOR TRACT DIVISION NO 2	-	2	7/28/2006
97	Cedar Ridge Estates	3	2	3/11/2005
MIS323	Benton Minor Tract Division	-	2	12/16/2003
42	Bear Trail	2	2	10/22/2003
MIS289	Coleman LLA	-	2	8/8/2002
MIS217	Patton/Saston LLA	-	2	8/25/2000
MIS111	ZEIXET TRACTS	-	2	5/26/1998
165	Elk Crossing Ranch	1	2	
589	Mining Claims - Non Produ	CLEORA MD	2	
535	Mt. Princeton View Estates	2	2	
588	Oyler Tracts	1	2	
635	Princeton View Estates	1	2	
548	Mountain View Addition	2	1	6/15/2000
400	Mesa Antero 4	1	1	
589	Mining Claims - Non Produ	CAMERON MD	1	
589	Mining Claims - Non Produ	CHALK CREEK MD	1	
589	Mining Claims - Non Produ	COTTONWOOD MD	1	
589	Mining Claims - Non Produ	FREEGOLD MD	1	
589	Mining Claims - Non Produ	HOPE MD	1	
589	Mining Claims - Non Produ	LA PLATA MD	1	
589	Mining Claims - Non Produ	MONARCH MD	1	
589	Mining Claims - Non Produ	NORTH COTTONWOOD MD	1	
589	Mining Claims - Non Produ	RED MOUNTAIN MD	1	
589	Mining Claims - Non Produ	SOUTH COTTONWOOD MD	1	
589	Mining Claims - Non Produ	TURRET	1	
680	Riverside Addition	1	1	

Table E.3. Subdivision filings mapped as highest and higher treatment priorities, according to Chaffee County Assessor data 1/23/20.

SubNo	SUB	FILING	TREATMENT PRIORITY	LOTS	JURISDICTION
845	WELDON CREEK		HIGHEST	64	County
SUB109	STARBUCK SUB		HIGHEST	43	County
351	MAYSVILLE REPLAT		HIGHEST	33	County
790	3 BAR J ESTATES		HIGHEST	31	County
SUB1079	BUFFALO HILLS SUB		HIGHEST	27	County
SUB388	THE ESTATES AT MT PRINCETON	Phase 1	HIGHEST	27	County
186	FAWN RIDGE		HIGHEST	25	County
530	MT PRINCETON HOT SPRINGS	SECTION A	HIGHEST	22	County
SUB327	EAGLE VIEW AT MT PRINCETON		HIGHEST	19	County
340	LOST CREEK RANCH		HIGHEST	19	County
597	PINE GROVE ESTATES		HIGHEST	19	County
640	RANCHO ANTERO ESTATES		HIGHEST	17	County
25	ANGELCREEK SUBDIVISION		HIGHEST	16	County
176	ELEPHANT ROCK ESTATES		HIGHEST	16	County
MIS428	LAKESIDE ESTATES PRESERVE		HIGHEST	14	County
161	DOS MADRES		HIGHEST	13	County
690	RIVER WEST		HIGHEST	13	County
185	EUREKA RANCH		HIGHEST	12	County
260	HARVARD LAKESIDE ESTATES		HIGHEST	12	County
31	ARKANSAS WILDERNESS SUB		HIGHEST	11	County
MIS614	BROADVIEW ROSI PHASE I		HIGHEST	11	County
490	MILNE SUB		HIGHEST	11	County
8	ABERNATHY TRACTS		HIGHEST	10	County
135	COUNTRY MEADOW ESTATES		HIGHEST	10	County
556	NICHOLAS HILLS		HIGHEST	10	County
591	PARADISE RANCH		HIGHEST	10	County
90	CHALK CREEK ESTATES		HIGHEST	9	County
136	COUNTRY MEADOW RIDGE		HIGHEST	9	County
SUB16	CRAIG SUB		HIGHEST	9	County
210	FREEGOLD ESTATES		HIGHEST	9	County
658	RIO VISTA		HIGHEST	9	County
SUB6081	PINON RIDGE ESTATES EAST		HIGHEST	8	County
ROSI6081	PINON RIDGE ESTATES WEST AMEND		HIGHEST	8	County
630	PRINCETON SHADOWS		HIGHEST	8	County
131	COTTONWOODS		HIGHEST	7	County
295	JOURNEY'S END SUB		HIGHEST	7	County
SUB344	BETTY'S MEADOWS SUB		HIGHEST	6	County
88	CHALK CREEK ACRES		HIGHEST	6	County
177	EMBRY ESTATES		HIGHEST	6	County
MIS389	KROPP BLA NO 2		HIGHEST	6	County
692	ROBISON-LOCKETT		HIGHEST	6	County
SUB1774	SUNRISE RIDGE AMENDED		HIGHEST	6	County
870	WHISPERING PINES		HIGHEST	6	County
264	HAYDEN SPRINGS RANCH		HIGHEST	5	County
SUB409	BOS MINOR SUBDIVISION		HIGHEST	4	County
ROSI6081	PINON RIDGE ESTATES SOUTH		HIGHEST	4	County
SUB423	PINTANE SUBDIVISION EXEMPTION		HIGHEST	4	County
816	VILLA VISTA		HIGHEST	4	County
SUB186	BENTON-MULLINNEX SUB		HIGHEST	3	County
MIS178	BLITSTEIN TRACTS		HIGHEST	3	County
70	BROWN/GOLD ESTATES		HIGHEST	3	County
MIS93	CLARK TRACTS		HIGHEST	3	County
SUB338	CRIST-CROUCH SUB		HIGHEST	3	County
MIS90	GROY, SCHUTTE & GOETSCH		HIGHEST	3	County
MIS146	LOCKETT TRACTS		HIGHEST	3	County

SubNo	SUB	FILING	TREATMENT PRIORITY	LOTS	JURISDICTION
MIS207	LOWER BLACK FOREST		HIGHEST	3	County
MIS440	LOWRY-MARTIN REPLAT		HIGHEST	3	County
SUB346	MARGIOTTA SUB		HIGHEST	3	County
MIS143	MAURER TRACTS		HIGHEST	3	County
MIS527	MT PRINCETON HOT SPRINGS RESOR		HIGHEST	3	County
SUB295	OVERLOOK MINOR SUB		HIGHEST	3	County
MIS626	PROJECT 2411 MINISTRIES BLA 2		HIGHEST	3	County
MIS206	UPPER BLACK FOREST		HIGHEST	3	County
MIS470	VERBIC LUDWIG & DAVIS BLA		HIGHEST	3	County
SUB119	VINTON STANGE TRACTS		HIGHEST	3	County
MIS323	BENTON TRACTS		HIGHEST	2	County
SUB305	BUNJE SUB		HIGHEST	2	County
SUB375	COOK/JONES MINOR SUB		HIGHEST	2	County
SUR220	DANNY & DIANA WOOD		HIGHEST	2	County
MIS89	DEVERGER SUB EXEMPTION		HIGHEST	2	County
MIS473	EDSON MIZELL BLA		HIGHEST	2	County
SUR270	EDWARDS PARCEL		HIGHEST	2	County
SUB395	HORSE PARK MINOR SUB		HIGHEST	2	County
SUB437	HUNTER BLA		HIGHEST	2	County
MIS96	KLOSSNER SUB EXEMPTION		HIGHEST	2	County
MIS98	KOONTZ LANDS BLA		HIGHEST	2	County
MIS465	LOTTINVILLE/CABE BLA		HIGHEST	2	County
SUB371	LUNDBERG MINOR SUB		HIGHEST	2	County
MIS266	MARIANI LOT LINE ADJ		HIGHEST	2	County
SUB431	MONARCH SHADOWS MINOR SUB EX		HIGHEST	2	County
MIS433	MONARCH SHADOWS-CATES BLA		HIGHEST	2	County
MIS211	NICHOLS LLA		HIGHEST	2	County
MIS503	PADDOCK BLA		HIGHEST	2	County
MIS437	S. EGGLESTON BLA		HIGHEST	2	County
704	SAND GULCH SUB		HIGHEST	2	County
MIS412	SPINO BLA NO 2		HIGHEST	2	County
MIS316	WHARTON BLA		HIGHEST	2	County
SUB370	WILKEN MINOR SUB		HIGHEST	2	County
MIS61	CORTESE EXEMPTION TRACT B		HIGHEST	1	County
MIS115	ROLLINS PROPERTY		HIGHEST	1	County
MIS614	BROADVIEW ROSI		HIGHEST	data not entered	County
160	DEER VALLEY RANCH		HIGHEST	data not entered	County
170	EAGLES ROOST		HIGHEST	data not entered	County
280	IVY LEAGUE		HIGHEST	data not entered	County
290	JO LOVE RANCH	1	HIGHEST	data not entered	County
290	JO LOVE RANCH	2	HIGHEST	data not entered	County
290	JO LOVE RANCH	5	HIGHEST	data not entered	County
315	LAKESIDE ESTATES SUB		HIGHEST	data not entered	County
MIS268	LUDWIG MINOR TRACTS		HIGHEST	data not entered	County
350	MAYSVILLE		HIGHEST	data not entered	County
370	MESA ANTERO	2	HIGHEST	data not entered	County
370	MESA ANTERO	5A	HIGHEST	data not entered	County
370	MESA ANTERO	1	HIGHEST	data not entered	County
370	MESA ANTERO	3	HIGHEST	data not entered	County
370	MESA ANTERO	4	HIGHEST	data not entered	County
410	MESA ANTERO ESTATES		HIGHEST	data not entered	County
510	MONTE ESCONDIDO		HIGHEST	data not entered	County
530	MT PRINCETON HOT SPRINGS	SECTION B	HIGHEST	data not entered	County
570	NORTH FORK ACRES		HIGHEST	data not entered	County
MIS264	QUICK BOUNDARY LINE ADJ		HIGHEST	data not entered	County

SubNo	SUB	FILING	TREATMENT PRIORITY	LOTS	JURISDICTION
650	RIO HONDO		HIGHEST	data not entered	County
700	RUSHING WATERS		HIGHEST	data not entered	County
450	SILVER CLIFF CLUB		HIGHEST	data not entered	County
780	SUNSHINE ACRES		HIGHEST	data not entered	County
648	THE RESERVE AT COTTONWOOD CREE		HIGHEST	data not entered	County
	TRAIL WEST VILLAGE		HIGHEST	data not entered	County
PS47	FRIEND RANCH		HIGHER	225	Poncha Springs
PS704	LITTLE RIVER RANCH	I	HIGHER	84	Poncha Springs
PS704	LITTLE RIVER RANCH	II	HIGHER	73	Poncha Springs
845	WELDON CREEK		HIGHER	64	County
360	MEADOW LAKE MTN EST	2	HIGHER	50	County
800	3 ELK CREEK		HIGHER	48	County
SUB091	CASA DEL RIO MHP AMENDED		HIGHER	42	County
520	MT HARVARD VALLEY ESTATES		HIGHER	42	County
336	LAS COLINAS		HIGHER	39	County
480	METHODIST MTN ESTATES	1	HIGHER	36	County
120	COLORADO MIDLAND		HIGHER	34	County
351	MAYSVILLE REPLAT		HIGHER	33	County
614	MAYSVILLE MEADOWS		HIGHER	31	County
840	WAPITI		HIGHER	28	County
360	MEADOW LAKE MTN EST	1	HIGHER	27	County
818	UTE HEIGHTS		HIGHER	25	County
681	RIVERSIDE SUBDIVISION		HIGHER	24	County
340	LOST CREEK RANCH		HIGHER	19	County
480	METHODIST MTN ESTATES	2	HIGHER	19	County
597	PINE GROVE ESTATES		HIGHER	19	County
362	MEADOWLARK ESTATES		HIGHER	18	County
	ANGEL OF SHAVANO		HIGHER	16	County
50	BOOTHILL SUB	4	HIGHER	13	County
97	CEDAR RIDGE ESTATES	4	HIGHER	12	County
185	EUREKA RANCH		HIGHER	12	County
645	RANCHOS DE CABALLEROS		HIGHER	12	County
SUB091	CASA DEL RIO MHP		HIGHER	11	County
99	CHAPARRAL		HIGHER	11	County
470	METHODIST MEADOW		HIGHER	10	County
276	HIGHLAND ESTATES		HIGHER	9	County
740	SIERRA-VISTA		HIGHER	9	County
87	CALARCO TRACTS		HIGHER	8	County
SUR340	NACHTRIEB RANCHES		HIGHER	8	County
876	WINDANCE		HIGHER	8	County
97	CEDAR RIDGE ESTATES	1	HIGHER	7	County
MIS435	RIVER VALLEY RANCH		HIGHER	7	County
50	BOOTHILL SUB	1	HIGHER	6	County
SUB1275	HILTON SUBDIVISION		HIGHER	6	County
MIS389	KROPP BLA NO 2		HIGHER	6	County
638	RAINBOW RIDGE		HIGHER	6	County
SUB396	THREE ROADS SUBDIVISION		HIGHER	6	County
MIS341	FRIEND OPEN SPACE INCENTIVE AN		HIGHER	5	County
264	HAYDEN SPRINGS RANCH		HIGHER	5	County
783	TENDERFOOT BUSINESS PARK		HIGHER	5	County
SUB170	VISTA GRANDE		HIGHER	5	County
PS69	BAKER-KLEIN BLA		HIGHER	4	Poncha Springs
MIS469	BUTALA LOT OWNERS BLA		HIGHER	4	County
MIS343	BV SANITATION DIST BLA		HIGHER	4	County
MIS362	HUMMINGBIRD HILL RANCH		HIGHER	4	County

SubNo	SUB	FILING	TREATMENT PRIORITY	LOTS	JURISDICTION
ROSI6081	PINON RIDGE ESTATES SOUTH		HIGHER	4	County
SUB423	PINTANE SUBDIVISION EXEMPTION		HIGHER	4	County
1687	RIVER'S EDGE ROSI		HIGHER	4	County
1646	THE RANGE ROSI		HIGHER	4	County
MIS618	THIRD REPLAT OF SUNSHINE ACRES		HIGHER	4	County
MIS626	USPENSKI-BREWER BLA		HIGHER	4	County
MIS60	ALEXANDER PARCELS		HIGHER	3	County
50	BOOTHILL SUB	3	HIGHER	3	County
SUB2	BOOTHILL SUBDIVISION EXEMPT.		HIGHER	3	County
MIS79	BROOKS TRACTS		HIGHER	3	County
MIS93	CLARK TRACTS		HIGHER	3	County
MIS168	EAST LITTLE COCHETOPA ACRES		HIGHER	3	County
SUB221	HALL MINOR SUBDIVISION		HIGHER	3	County
MIS49	HOLSTROM PROPERTY		HIGHER	3	County
MIS356	HUTCHINSON SUB EXMT BLA		HIGHER	3	County
MIS91	JACOBS TRACTS		HIGHER	3	County
MIS101	KANE TRACTS		HIGHER	3	County
SUB1343	LAZY DAZE SUB		HIGHER	3	County
338	LITTLE COCHETOPA ACRES		HIGHER	3	County
MIS512	LOWRY-OTTMER/MOSBY/SARAI BLA		HIGHER	3	County
SUB346	MARGIOTTA SUB		HIGHER	3	County
MIS531	MOLITOR SPARKS TRAIL WEST BLA		HIGHER	3	County
MIS204	MT HARVARD ADDITION		HIGHER	3	County
SUB295	OVERLOOK MINOR SUB		HIGHER	3	County
SUB90	POTTER TRACTS		HIGHER	3	County
MIS119	S & W ACRES		HIGHER	3	County
SUB404	SUNSET MESA MINOR SUB		HIGHER	3	County
SUB357	SZYMANSKI MINOR SUB		HIGHER	3	County
MIS185	TN BAR TRACTS		HIGHER	3	County
<IS385	WAUGH/YEAGER BLA		HIGHER	3	County
SUB165	ALLAIRE TRACTS		HIGHER	2	County
MIS71	B&V LAWTON LLC SUB		HIGHER	2	County
MIS97	B&V LAWTON LLC SUB REPLAT		HIGHER	2	County
MIS104	B&V LAWTON LLC SUB REPLAT 2		HIGHER	2	County
MIS236	BARTON & HOWE MTD		HIGHER	2	County
MIS467	BARTON BLA & REPLAT		HIGHER	2	County
MIS190	BEETSMA TRACTS		HIGHER	2	County
SUB305	BUNJE SUB		HIGHER	2	County
	CEDAR RANCH PARCELS		HIGHER	2	County
97	CEDAR RIDGE ESTATES	3	HIGHER	2	County
SUB412	CHIPETA MEADOWS MINOR SUB		HIGHER	2	County
MIS55	CLOYD PROPERTY		HIGHER	2	County
MIS122	COUCH TRACTS A AND B		HIGHER	2	County
MIS399	CROFT BLA		HIGHER	2	County
MIS522	DAUBENSPECK BLA/LLE		HIGHER	2	County
MIS66	DODSWORTH TRACTS		HIGHER	2	County
MIS110	ELDER TRACTS		HIGHER	2	County
MIS69	FENLON PROPERTY		HIGHER	2	County
MIS215	FRIEND EXEMPTION PLAT		HIGHER	2	County
MIS 616	HAYDEN SPRINGS RANCH NO 2		HIGHER	2	County
MIS434	HERMES REPLAT		HIGHER	2	County
MIS375	HISER/McCONAGHY BLA		HIGHER	2	County
MIS305	HOFFMAN TRACTS		HIGHER	2	County
MIS175	HOLMES TRACTS		HIGHER	2	County
MIS355	JOHNSON & LUND MTD		HIGHER	2	County

SubNo	SUB	FILING	TREATMENT PRIORITY	LOTS	JURISDICTION
SUB320	JORDAN/THARP MINOR SUB		HIGHER	2	County
PS106	KENYON LOT SPLIT		HIGHER	2	Poncha Springs
MIS515	KERBS-FREY BLA		HIGHER	2	County
SUB38	KITTLEMAN TRACTS		HIGHER	2	County
PS51	KLEIN BLA		HIGHER	2	Poncha Springs
MIS96	KLOSSNER SUB EXEMPTION		HIGHER	2	County
SUB307	KNAUER SUB		HIGHER	2	County
MIS526	LINDSTROM BLA		HIGHER	2	County
MIS382	LOKEY STAYOVER-LODE BLA		HIGHER	2	County
MIS637	McCONAGHY HERITAGE WATER SUB		HIGHER	2	County
MIS63	MCCOY SUBDIVISION EXEMPTION		HIGHER	2	County
MIS63	MCCOY TRACTS		HIGHER	2	County
MIS84	MINNIS TRACTS		HIGHER	2	County
SUB431	MONARCH SHADOWS MINOR SUB EX		HIGHER	2	County
MIS509	MOSER BLA		HIGHER	2	County
MIS132	OVOTS LLC TRACTS		HIGHER	2	County
SUB177	PARADIS SUB EXEMPTION		HIGHER	2	County
SUB360	PONCHA ESTATES MINOR SUB		HIGHER	2	Poncha Springs
MIS448	ROORDA BLA		HIGHER	2	County
MIS349	SAIZ/SCANGA LLA		HIGHER	2	County
MIS587	SENTER AG SUB EXEMPTION NO 2		HIGHER	2	County
SUB340	SENTER SUB EXEMPT		HIGHER	2	County
MIS463	SITES LLA		HIGHER	2	County
MIS165	SMITH TRACTS		HIGHER	2	County
MIS116	SPENCER PROPERTY SUB EXEMPTION		HIGHER	2	County
MIS579	SUNSHINE ACRES REPLAT		HIGHER	2	County
SUB184	UTE SUBDIVISION EXEMPTION		HIGHER	2	County
PS56	WALMSLEY MINOR SUB		HIGHER	2	Poncha Springs
SUR189	WEST STAR/VERDELLI		HIGHER	2	County
MIS316	WHARTON BLA		HIGHER	2	County
MIS106	FRIEND 16.09 ACRE EXEMPTION		HIGHER	1	County
MIS83	PINTANE-HISER		HIGHER	1	County
20	ALTA VISTA		HIGHER	data not entered	County
50	BOOTHILL SUB	2	HIGHER	data not entered	County
SUB234	COLUMBIA RANCH		HIGHER	data not entered	County
MIS281	FOSTER LARGE PRCL SUB		HIGHER	data not entered	County
240	GRANITE		HIGHER	data not entered	County
270	HIDDEN HILLS		HIGHER	data not entered	County
MIS239	HILTON TRACTS		HIGHER	data not entered	County
SUB381	HOLMAN TRACTS		HIGHER	data not entered	County
290	JO LOVE RANCH	2	HIGHER	data not entered	County
290	JO LOVE RANCH	3	HIGHER	data not entered	County
290	JO LOVE RANCH	4	HIGHER	data not entered	County
290	JO LOVE RANCH	5	HIGHER	data not entered	County
MIS219	KIMBREL TRACTS		HIGHER	data not entered	County
SAL148	LUCERO TRACTS		HIGHER	data not entered	Salida
350	MAYSVILLE		HIGHER	data not entered	County
367	MEAR'S JUNCTION		HIGHER	data not entered	County
370	MESA ANTERO	2	HIGHER	data not entered	County
370	MESA ANTERO	5A	HIGHER	data not entered	County
370	MESA ANTERO	5	HIGHER	data not entered	County
370	MESA ANTERO	3	HIGHER	data not entered	County
370	MESA ANTERO	4	HIGHER	data not entered	County
410	MESA ANTERO ESTATES		HIGHER	data not entered	County
510	MONTE ESCONDIDO		HIGHER	data not entered	County

SubNo	SUB	FILING	TREATMENT PRIORITY	LOTS	JURISDICTION
570	NORTH FORK ACRES		HIGHER	data not entered	County
580	OCHO CASAS		HIGHER	data not entered	County
588	OYLER TRACTS		HIGHER	data not entered	County
650	RIO HONDO		HIGHER	data not entered	County
SUB333	SAND CREEK MINOR SUB		HIGHER	data not entered	County
SUB102	SANDERS TRACTS		HIGHER	data not entered	County
720	SHAVANO VISTA		HIGHER	data not entered	County
780	SUNSHINE ACRES		HIGHER	data not entered	County
MIS262	THE CANYONS LOT SPLIT		HIGHER	data not entered	County
92	THE CANYONS ROSI		HIGHER	data not entered	County
	TRAIL WEST VILLAGE		HIGHER	data not entered	County
820	VIA PONDEROSA		HIGHER	data not entered	County