

Boulder County Community Wildfire Protection Plan



Wildfire

+



Unprepared

=



Disaster



Management

+



Community

=



Protection



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Chapter 1 A Dynamic Plan



What catastrophe is most likely to strike Boulder County? The risk of flooding is high; earthquakes represent a moderate risk, and the odds of a nuclear crisis are low. The most likely natural disaster: Future wildfires are inevitable.

This is Boulder County's Community Wildfire Protection Plan to prepare for the inevitable.

Past wildfires — most notably the 2010 Fourmile Canyon Fire, which burned 6,181 acres and destroyed 169 homes — have dramatically changed the lives of hundreds of residents and fundamentally altered the fabric of numerous communities in Boulder County. People now are aware of the risks associated with wildfire.

This is Boulder County's plan for turning increased awareness into sustained action.

Our Vision:

By actively implementing this plan, residents, communities, and organizations in Boulder County will significantly increase and improve wildfire mitigation and preparedness efforts in advance of wildfires to accurately reflect the high risk and enormous costs associated with wildfire in the county.

Our Goals:

- Save lives
- Protect property
- Reduce risk
- Enhance the environment
- Promote community

Our Purpose:

- To reduce the number (prevention) and severity (mitigation) of future wildfires in Boulder County
- To save hundreds of millions of dollars in property losses, environmental damages, firefighting costs, restoration expenses, infrastructure costs, and other financial impacts associated with catastrophic wildfire
- To save thousands of residents the pain and suffering associated with losing their home; their possessions; their loved ones; and their sense of place, security, and community
- To help restore Boulder County forests to good health
- To effectively and efficiently support strong local Community Wildfire Protection Plans of individual fire protection districts
- To unite all communities of Boulder County — residents of the mountains and the plains — in a collaborative effort to reduce the negative impacts of wildfire

Why:

Why should the people and organizations of Boulder County care about and invest in wildfire mitigation and preparedness? This plan contains many arguments for and a great deal of information about community wildfire protection, but the simplest way to answer the question “why” is to employ proverbs. Proverbs contain traditional wisdom. They underline what everyone already knows. They explain the world in ways everyone can understand.

The following proverbs provide the fundamental rationale for this action plan:

- A stitch in time saves nine
- An ounce of prevention is worth a pound of cure
- Procrastination is the thief of time
- Don't be penny wise and pound foolish

The origins of these proverbs have been traced back to the 1200s. For centuries, people have recognized that it is best to head off a disaster beforehand than to deal with it after it occurs.

The concept is simple. The details are not.

Who:

Who is responsible for wildfire mitigation and preparedness? Traditionally, wildfire protection has been the responsibility of a few. Today, community wildfire protection is the responsibility of many — everyone connected to the wildland-urban interface — individuals, communities, and most levels of government. However, having everyone responsible for something often means that no one is. While widespread participation is essential, we also need strong leadership and a clear understanding of who does what and how everyone works together. With so many individuals and groups involved, communication, cooperation, and collaboration are keys to success of this plan. Identifying who is responsible for specific actions is a chief topic of concern that cuts across all aspects of this plan.

What:

Community Wildfire Protection Plans usually contain a long list of “what” needs to be done to protect the community in question. This plan is no exception.

However, instead of reproducing large quantities of information that already exists, this plan focuses on new ideas and new initiatives. The Fourmile Canyon Fire has led to many new insights that are, and will continue to be, incorporated into this plan. These new insights, coupled with increased community awareness and motivation, are what makes this plan different.

How:

While many plans cover “what” to do, few plans adequately address “how” to get things accomplished. In this plan, we focus on the question of “how,” specifically the strategic, programmatic, and policy questions of community wildfire protection. The details of “how” we propose to achieve the vision, goals, and purposes of the plan are discussed throughout this document. The overarching strategies of the plan include:

- think and act big picture
- work proactively based on sound, long-term strategies
- build trust and strong collaborative partnerships among all parties
- empower individual landowners and communities to take responsibility for mitigating wildfire risks on their property and within their boundaries
- significantly increase the quantity and quality of mitigation and preparedness efforts

- sustain these efforts over the long term, including the amount of funding and the number of organizations, staff, and volunteers dedicated to this work
- establish an effective organizational framework with clearly identified roles and responsibilities for all entities in Boulder County involved in wildfire protection (communities, organizations, and households)
- monitor the work conducted and track the performance of responsible entities

Many of these strategies may seem self-evident; however, they represent important changes in our approach, and the amount of effort required to put them in place should not be underestimated. Each one comes with significant implications, costs, and benefits that are discussed throughout this document.

What happens during the first month after a plan is completed is a good indicator of how aggressively a plan will be implemented. To strike when the ideas are fresh and the momentum is strong, the Boulder County Board of Commissioners will declare October Wildfire Awareness Month. The goal is to follow up the writing of this plan with an unprecedented amount of effort on the ground and engagement with county residents.

Accomplishments & Success Stories

Boulder County is among the nation’s leaders in the area of community wildfire protection. Individual residents, communities, and government agency have a long history of wildfire mitigation. This plan is full of stories highlighting the past and on-going work of community members. These stories provide examples that others can follow and lessons learned that everyone can understand.

In Chapter 2: *Boulder County’s Wildfire History*, links to videos that tell the powerful stories of four of the most significant fires in Boulder County history are provided. The devastating 1989 Black Tiger Fire is brought back to life by former Sugar Loaf Fire Chief Jim Hubbard and residents Betty Wall and Rolland Fischer who lost their home in the fire. Resident Ginger Grahm provides a vivid account of the 2000 Walker Ranch Fire and how

What is this Plan?

The Plan:

- Contains key ideas and useful information for multiple audiences
- Provides an Action Plan for the Boulder County Community Wildfire Protection Council to pursue
- Complements existing local Community Wildfire Protection Plans
- Meets all Healthy Forests Restoration Act and Colorado State Forest Service requirements

The Plan is Not:

- A regulatory document
- A scientific report
- A comprehensive report of all wildfire related issues
- A fire management plan; there is a separate plan that addresses the response to and suppression of wildfires

New Approaches

Too many government and community planning documents end up collecting dust on a shelf instead of being read by wide segments of the population. There are many reasons why residents do not read Community Wildfire Protection Plans. To bring the information in this plan to more people, we have

- Created entertaining and educational videos featuring county residents posted on YouTube
- Created an interactive Google map of fuels treatment projects in the county
- Created a website to improve access to the contents of the plan

Within the first few days of posting one of these videos on YouTube, it received over 400 hits. Another video received over 1,000 views in its first few weeks. All of this exposure occurred before the release of this plan without any promotional efforts. These videos will be incorporated into future wildfire mitigation programs and have already generated interest in creating more videos on additional subjects.

A long list of fuels treatment projects have been completed in Boulder County, but many residents are not aware of all the work that has been done. Information on

these projects may exist in Colorado State Forest Service databases and on the pages of Community Wildfire Protection Plan, but few people have actually seen this data. With today's technology, people are accustomed to starting up their computer, pulling up a Google map, and clicking on a red bubble to find additional information about what is happening in a specific location. Experimenting with this technology, our Google map allows people to see and learn about the projects that are being implemented (see Figures 9 & 10).

Anyone can go to the Colorado State Forest Service website, <http://csfs.colostate.edu/pages/CommunityWildfireProtectionPlans.html>, and download a pdf of any approved Community Wildfire Protection Plan in Colorado. However, it can be difficult to scroll through these plans and find specific pieces of information. Boulder County's Community Wildfire Protection Plan website, www.bouldercountycwpp.org, helps residents access popular parts of the plan more quickly and gives people the chance to explore the issues that capture their attention.

Today, people access information in new ways. Using YouTube, Google maps, and advanced website, we hope to transport this plan from the shelf into people's lives.

wildfire mitigation efforts helped save her home and those of her neighbors. Resident John Martyny revisits the 2009 Olde Stage Fire that crossed Highway 36 and threatened both mountain and plains communities north of Boulder. Finally, the 2010 Fourmile Canyon Fire is brought to life in a number of videos, including "The Saving of Gold Hill" told by several residents and firefighters including Steve and Pam Sherman, Peter Swift, Bob Mason, Lynn Walter, Dave Hitchcock, and Andrew Martinek.

Engaging Residents and Empowering Communities, Chapter 3, includes stories of both the Eldorado Springs and Coal Creek Canyon communities where Alan Brown, Bay Roberts, and Cesar Gellido have worked to help organize community-based chipping efforts.

In Chapter 4: *Boulder County's Local Community Wildfire Protection Plans*, the Lyons Fire Protection District's plan is discussed. After assessing most of the homes in their entire district, Lyons now offers free one-on-one wildfire mitigation consultations to all of its residents.

Preparing for Wildfire, Chapter 7, includes stories and videos about community preparedness efforts and insuring homes against wildfire. Town Council Member Debra Yeager and the Town of Gold Hill's efforts to create the **NeighborLink** program (Figure 5), a community-based communications network, is highlighted. Former Sunshine Fire Chief Bruce Honeyman describes the problem of underinsurance and the lessons he has learned in dealing with his insurance company after losing his home in the Fourmile Canyon Fire. Jack Thompson lost his home twice — in both the Black Tiger and Fourmile Canyon Fires. His story, how replacing his home for the second time is much more difficult because of the widespread problem of underinsurance, is a wake-up call for everyone.

Protecting Homes: Defensible Space, Chapter 8, contains stories, photos, and videos of the defensible space work completed by Doug Young and Dave Steinmann. Dave's story illustrates how creating defensible space is a long-term endeavor—his efforts over 15 years helped save his home and the homes of his neighbors during the Fourmile Canyon Fire.

Protecting Homes: Firewise Construction, Chapter 9, includes a link to a video where Sunshine resident Karen Simmons tells the story of how replacing her wood siding and single pane windows help save her home during the Fourmile Canyon Fire.

Recovering from Wildfire, Chapter 12, tells the story of how residents of the Sugar Loaf community came together and assisted with recovery efforts following the Fourmile Canyon Fire.

Funding Community Wildfire Protection, Chapter 13, salutes the Sunshine Fire Protection District's adoption of a tax increase dedicated to funding community wildfire mitigation projects.

Appendix A: *The Fourmile Canyon Fire* contains a poem by Marisha Evans, a Boulder High School student who lost her home in the fire.

Since this is a **Community** Wildfire Protection Plan, its stories and recommendations often focus on actions taken by and targeted at residents and communities. However, it is clear that actions by government agencies are also critical to the success of community wildfire protection efforts. In the final chapters of the plan (*Assessing Wildfire Risk* [14], *Project Identification and Prioritization* [15], and *Implementing and Sustaining the Boulder County Community Wildfire Protection Plan* [16]), instead of stories of exemplary action by Boulder County individuals and communities, the focus is on actions of various government agencies.

Boulder County government has a long list of accomplishment in community wildfire protection. Information on these efforts is

available in other published plans, reports, and accounts. Some of the most significant wildfire mitigation accomplishments have included:

- Requiring all new roofs to be class A fire retardant since 1990
- Initiating the Wildfire Hazard Identification and Mitigation System (WHIMS) in 1992
- Starting awarding grants as part of its Chipping Reimbursement Program in 1993
- Requiring a wildfire mitigation plan be approved before issuing a building permit in the mountains since 1993
- Creating its Wildfire Mitigation Coordinator position in 1994
- Adopting residential sprinkler requirements in 1995
- Beginning the installation of fire danger rating signs at the entrance of major canyons in 1996
- Beginning its prescribed burning program on Parks and Opens Space property in 1997

- Launching its Forest Health Initiative in 2007
- Creating the Forest Health Task Force and Forest Education and Outreach Coordinator position in 2008
- Opening the Community Forestry Sort Yards in Meeker Park in 2008 and Nederland in 2010
- Receiving approval of the Boulder County Multi-Hazard Mitigation Plan in 2009

Other key wildfire mitigation-related actions by other government agencies in the county are:

- Initiating the Front Range Vegetation Management Pilot Project in 1977
- Starting the Allenspark Cooperative Forest Management demonstration area in 1980
- Launching the Lefthand/St. Vrain Cooperative Forest Management Area in 1984
- Forming the Boulder County Fire Chiefs Association in 1988 (changed its name to the Boulder County Fire Fighters Association in 1999)

- Forming the Boulder County Wildfire Mitigation Group in 1989
- Establishing the Boulder County Wildland Fire Cooperators in 1990
- Initiating the Winiger Ridge Ecosystem Management Pilot Project in 1996 (the Boulder County Ecosystem Cooperative)
- Launching an air support program in 2001 (renamed Rocky Mountain Interagency Helitack and then Rocky Mountain Helitack)
- Forming the Front Range Fuels Treatment Partnership in 2002 (an interagency partnership)
- Convening the Front Range Fuels Treatment Partnership Roundtable in 2004 (a consortium of 30 organizations, both governmental and non-governmental)
- Completing the first local Community Wildfire Protection Plan in 2005 (Lefthand Fire Protection District)
- Publishing Living with Fire: Protecting Communities and Restoring Forest Health, Findings and Recommendations of the Front Range Fuels Treatment Partnership Roundtable in 2006
- Launching the Colorado Front Range Landscape Restoration Initiative in 2010 (the Front Range Roundtable)
- Forming the Western Boulder County Healthy Forest Initiative in 2011 (Sunshine, Boulder Rural, Gold Hill, and Lefthand Fire Protection Districts)
- Completing the first updated local Community Wildfire Protection Plan in 2011 (Lefthand Fire Protection District)

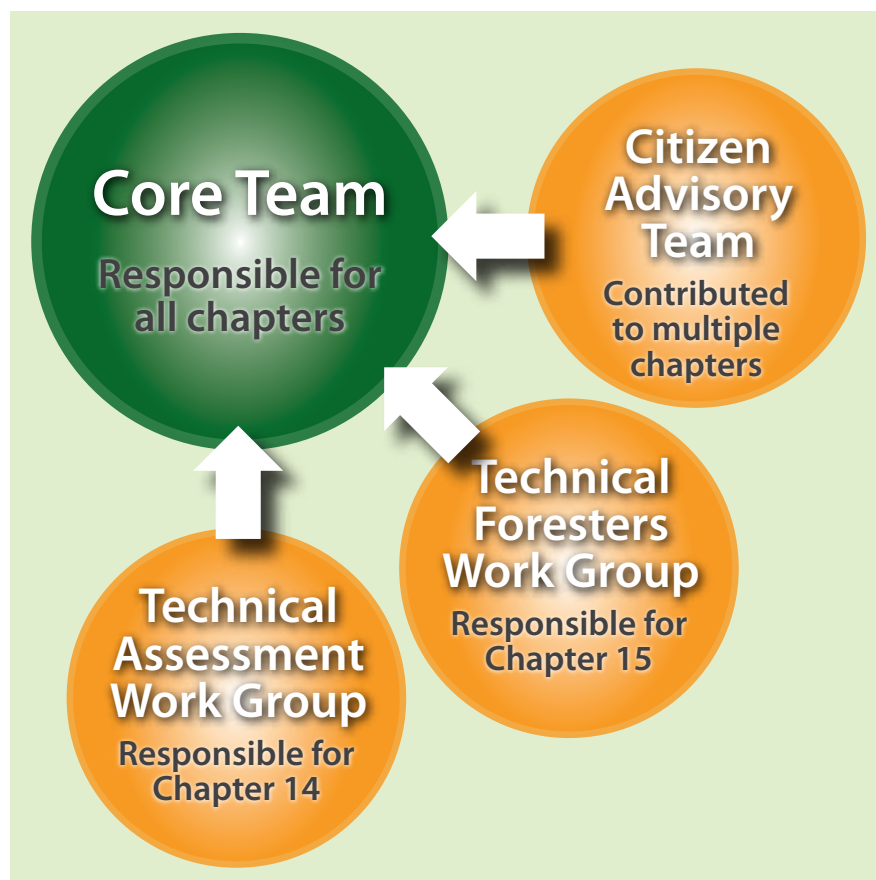


Figure 1: Community Wildfire Protection Plan Teams

To build on all these stories and accomplishment, Boulder County decided to develop and implement this countywide Community Wildfire Protection Plan. It received an American Recovery and Reinvestment Act grant administered by the Colorado State Forest Service to support this work.

Teams and Work Groups

The development of this plan is a product of the following teams and work groups (see Figure 1). The list of members for the Citizen Advisory Team can be found in Chapter 5 (see Table 7), the Assessment Work Group in Chapter 14, and the Foresters Work Group in Chapter 15. Some core team members participated in the work groups.

Core Team

This plan is the product of a collaborative effort represented first and foremost by its core team. As required, this plan’s core team includes representatives from local government, a local fire authority, and the Colorado State Forest Service. In addition, a representative from the US Forest Service participated. Individuals serving on the core team included:

<i>Bob Bundy</i>	<i>Colorado State Forest Service</i>
<i>Megan Davis</i>	<i>Boulder County Board of County Commissioners</i>
<i>Pete Fogg</i>	<i>Boulder County Land Use Department</i>
<i>Brett Haberstick</i>	<i>Sunshine Fire Protection District</i>
<i>Chad Julian</i>	<i>Boulder County Parks and Open Space Department</i>
<i>Ryan Ludlow</i>	<i>Boulder County Land Use Department</i>
<i>Brian Oliver</i>	<i>City of Boulder Fire and Rescue</i>
<i>Anita Riley</i>	<i>Boulder County Transportation Department</i>
<i>Jay Stalnacker</i>	<i>Boulder County Sheriff’s Office</i>
<i>Jim Webster</i>	<i>Boulder County Land Use Department</i>
<i>Kevin Zimlinghaus</i>	<i>US Forest Service</i>

New Format

Residents interested in wildfire protection are the primary audience for this plan. As a result, we have:

- Eliminated the use of acronyms and kept scientific terms to a minimum so the plan is easy to understand
- Included proverbs, poems, and stories from county residents so the issues are tangible and personal
- Included lots of pictures, maps, and ideas so people are not overloaded with data
- Divided the plan into stand-alone chapters so readers may select the topics they want
- Placed much of the detail in the appendices for individuals who want more information



Boulder County has a fascinating history of wildfire. Map 1 includes the location on many of the recent wildfires. To help everyone understand this history, we have produced videos of the Fourmile, Black Tiger, Olde Stage, Overland, and Walker Ranch Fires. These videos tell the stories of these fires from the point of view of county residents. To watch these videos, visit our website, www.bouldercountycwpp.org, and look for the video section (see boxes).

Everyone who watches these videos will take home a long list of lessons. Ten basic lessons that everyone needs to know related to the history of wildfire in Boulder County are highlighted here. Lessons about other aspects of community wildfire protection are located in other sections.

The history of wildfire in Boulder County teaches us that:

1. Wildfires take place at all times of year
2. The number, size and property damage associated with wildfires are increasing
3. Our most catastrophic fires have been human caused
4. Unhealthy forests lead to higher severity fires
5. The frequency of wildfire depends on where you live
6. Wildfires are also a risk to residents of the plains
7. High winds are a leading concern
8. Firefighters cannot defend and save every house
9. Fragmented land ownership, the mixture of public and private lands, makes interagency cooperation and partnerships necessary
10. History repeats itself

1. Wildfires take place at any time of year

Summer is fire season with most fires occurring in July. However, wildfires occur throughout the year. In 2011, Colorado experienced major fires in January and February and a total of 64 fires in March.

Dates of fires in the area demonstrate that wildfires occur year round.

Table 1: Dates of Fires

<i>January</i>	<i>2009 Olde Stage</i>	<i>3,008 acres</i>
<i>February</i>	<i>2006 Elk Mountain</i>	<i>600 acres</i>
<i>March</i>	<i>2011 Lefthand Canyon</i>	<i>622 acres</i>
<i>April</i>	<i>2011 Crystal (Larimer County)</i>	<i>3,200 acres</i>
<i>May</i>	<i>1964 Near Gold Hill</i>	<i>160 acres</i>
<i>June</i>	<i>2000 Bobcat Gulch (Larimer County)</i>	<i>10,599 acres</i>
<i>July</i>	<i>1989 Black Tiger</i>	<i>2,100 acres</i>
<i>August</i>	<i>1978 Ouzel</i>	<i>1,050 acres</i>
<i>September</i>	<i>2010 Fourmile</i>	<i>6,181 acres</i>
<i>October</i>	<i>2010 Dome</i>	<i>152 acres</i>
<i>November</i>	<i>1990 Olde Stage</i>	<i>3,000 acres</i>

2. The number, size, and property damage caused by wildfires are increasing

Statistics from the Colorado State Forest Service from 1960-2009 show increases in the number and size of wildfires for the last several decades. These numbers do not include the elevated number of wildfires in 2010 and the beginning of 2011.

Table 2: State and Private Fires by Decade

Decade	Average Number of Fires	Number of Acres Burned	Average Size of Fire
1960s	457	8,170	17.88
1970s	737	6,554	8.82
1980s	1,286	23,308	18.12
1990s	1,806	21,796	12.06
2000s	2,465	96,449	39.12

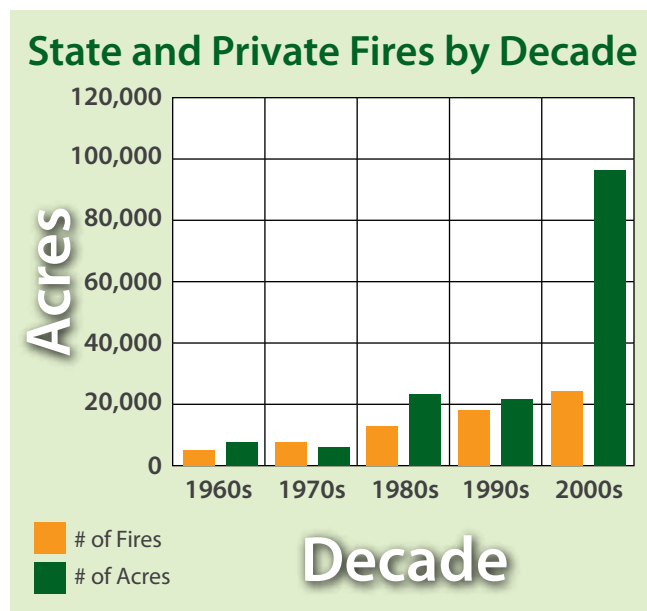


Figure 2: Fires by Decade Graph

A hotter and drier climate will increase the risk of wildfire. More people living in the wildland-urban interface and more expensive homes will also result in more damaging fires. At the time, Boulder County's Black Tiger Fire caused the greatest amount of property damage of any fire in the state. Currently, the Fourmile Canyon Fire is the state's most destructive in terms of the value of property destroyed.

3. Our most catastrophic fires have been human caused

Lightning is a natural cause of wildfire; however, in Boulder County most of our major fires have been caused by humans. These fires have been attributed to arson (1980 Pine Brook Hills), discarded smoking material (Black Tiger), poorly extinguished campfire (2000 Walker Ranch), fireplace ashes that had dumped outside of a mobile home (2006 Elk Mountain), and a residential fire pit (2010 Fourmile Canyon Fire).

The high percentage of human caused fires suggests wildfire prevention efforts may be able to reduce the number of ignitions and subsequent catastrophic fires.

4. Unhealthy forests cause more damaging fires

Low severity wildfires have many ecological benefits. However, fire suppression and other management practices over the last 100 years have resulted in forests that are much more dense than their natural state. With more fuel, we are experiencing more high severity wildfires. In addition to destroying homes, these higher severity fires have negative ecological consequence on wildlife, plants, soils, waterways, and entire ecosystems. More intense wildfires also increase the risk of subsequent flooding and the cost of restoration.

5. The frequency of wildfire depends on where you live

The frequency of wildfire in a specific location is known as the "fire return interval," (see Table 3). Some areas burn more frequently than other depending on their elevation, vegetation, aspect (north versus south-facing), and slope. Lower montane forests burn more frequently than upper montane forest which, in turn, burn more frequently than sub-alpine systems (see map of Boulder County life zones in Chapter 10). See Map 1 of recent Boulder County fires, to get a picture of how often wildfires have occurred in the past.

Table 3: Fire Return Intervals

Life Zone	Fire Return Interval (years)
Lower Montane	5-100
Upper Montane	10-250
Sub Alpine	150-700

6. Wildfires area a risk to residents of the plains

A lesson of the Olde Stage Fire as documented in the video (see box) is that plains residents are also at risk from wildfire. Homeowners living in various neighborhoods within the City of Boulder have been evacuated for a number of wildfires, including the October 2010 Dome Fire. A quick review of the Boulder County wildfire history map shows several fires extending into the plains.

7. High winds are a leading concern

Boulder County Sheriff Joe Pelle has spoken about the awesome power of fire and wind saying, “I don’t live well anymore with wind. I can tell you we talk a lot about fire, but wind is my enemy. It keeps me awake at night. It causes a lump in my throat and works on my ulcer. I had a full head of hair when I became Sheriff eight years ago and the wind has worked it away.”

The Black Tiger Fire Video

By Marisa McNatt & Beth Bartel



At the time, the 1989 Black Tiger Fire was the most destructive in Colorado history. “I watched it from about six miles up the road and you could just see houses just go up in an explosion, just burn all at once,” recalls resident Betty Wall. Twenty-one years later, residents and firefighters take a look back at what transpired that summer. In light of the neighboring Fourmile Canyon Fire, they discuss lessons they have learned rebuilding their homes and their lives following this devastating wildfire. “Once you have a fire like that, everyone’s aware of it and they become more conscious of it, but over

time though as the years go by and you don’t have another fire, they kind of forget it. New people come in, you know, oh that’s something I can do next year, and it doesn’t get done,” says Jim Hubbard, former Sugarloaf Fire Chief, describing one major challenge to wildfire prevention efforts.

Video can be found here:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

The Walker Ranch Fire Video

By Marisa McNatt & Beth Bartel



Resident Ginger Graham tells the story of the 2000 Walker Ranch Fire. Everyone in the community was talking about the possibility of a wildfire because of the extreme conditions. Ginger recalls, “It was the years of the droughts so we’re over 90 degrees for a month and a half, there’s no rain at all, the winds are high, the trees are screaming for moisture; it’s just terrible. There were signs up on the road about how dry and how

dangerous it was, you know, people were doing all kinds of things. Even neighbors were walking the trails trying to make sure that nobody was out here smoking and all of us were talking about it.”

Video can be found here:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

8. Under extreme conditions, firefighters cannot defend and save every house

Many people believe that the fire department will save their home if it is threatened by a wildfire. In a 2007 survey in fire-prone areas of Boulder County, residents were asked what they thought would occur if a wildfire was on their property: Only 7% thought that it was not likely the department would be able to save their home. This survey was repeated after the Fourmile Canyon Fire and only 4% of respondents in the evacuation area said that it was not likely the fire department would save their homes.

While most wildfires are indeed contained by firefighters before destroying homes, the high winds and extreme conditions associated with Boulder County’s catastrophic fires often severely limit firefighters ability to save them. Most of the homes are lost early in the life of these fires. Under extreme conditions, firefighters are focused on getting people out of harm’s way, not protecting homes.

Individual homeowners must take responsibility to mitigate their own wildfire risk and should not automatically assume that the fire department will save every home.

9. Wildfires do not conform to political boundaries

Boulder County’s highly fragmented land ownership patterns mean that a wildfire may start on private land and burn large tracks of public land and vice versa. These ownership patterns, combined with 23 separate fire protection districts, make interagency cooperation and partnerships necessary. A wildfire that starts in one fire district can easily spread to other districts. The same applies to county boundaries. Recent, large wildfires in Boulder County have not crossed county lines, but future fires could involve even more agencies than in the past if they cross county lines. Countywide planning and regional cooperation are needed to address the cross-boundary impacts of wildfire.

10. History repeats itself

Following the 1989 Black Tiger Fire, residents and agencies increased their collaborative wildfire mitigation efforts. Many of these efforts, however, were not sustained over time. The 2002 Hayman Fire also led to numerous initiatives and activities, some of which participants have struggled to maintain. The 2010 Fourmile Canyon Fire has again created a great deal of awareness and activity. The challenge will be to sustain these efforts for the long term because the question is when, not if, the next catastrophic wildfire will occur in Boulder County.

The 2009 Olde Stage Fire Video

By Elly Collins



"It wasn't just a home that we were protecting," shares Boulder County's Fire Management Officer Jay Stalnacker, "it was memories and that was important to all of us. And I think that's what drove us to succeed and work as hard as we did, each one of us as fathers and brothers and husbands and just homeowners." The January 2009 Olde Stage Fire jumped Highway 36 and threatened homes on the

plains of Boulder County. Just north of the City of Boulder, this video's dramatic footage shows the risk of wildfire is not limited to homes in the mountains. Large evacuations of residents and their animals just after the holiday season are hallmarks of this fire. The severe winds, however, stopped at an opportune time allowing firefighter to directly attack the fire and prevent the loss of any homes.

Video can be found here:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

Saving Gold Hill: A Story of the Fourmile Canyon Fire Video

By Marisa McNatt & Beth Bartel



The Fourmile Canyon Fire threatened the historic town of Gold Hill. "I left town, had a tear in my eye at the bottom of the canyon saying, 'Wow, we just lost our town'," recalls Dave Hitchcock.

Residents and firefighters tell this remarkable story of just how close they came to losing their homes and their historic community. One volunteer fire fighter, Andrew Martinek, describes the day air support arrived to help save Gold Hill, "All day we were waiting for air support, waiting for air support, and it was never coming. We thought Gold hill was going to burn. And then finally at the end of the day, number 54 bombed and dropped retardant up the back of all these houses right on the line. He dropped in low and painted all these houses red perfectly with retardant." The success story of Gold Hill has many heroes to thank and numerous lessons to learn for the next time wildfire threatens this county.

Video can be found here:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

Fourmile Canyon Fire Evacuation Video

By Elly Collins

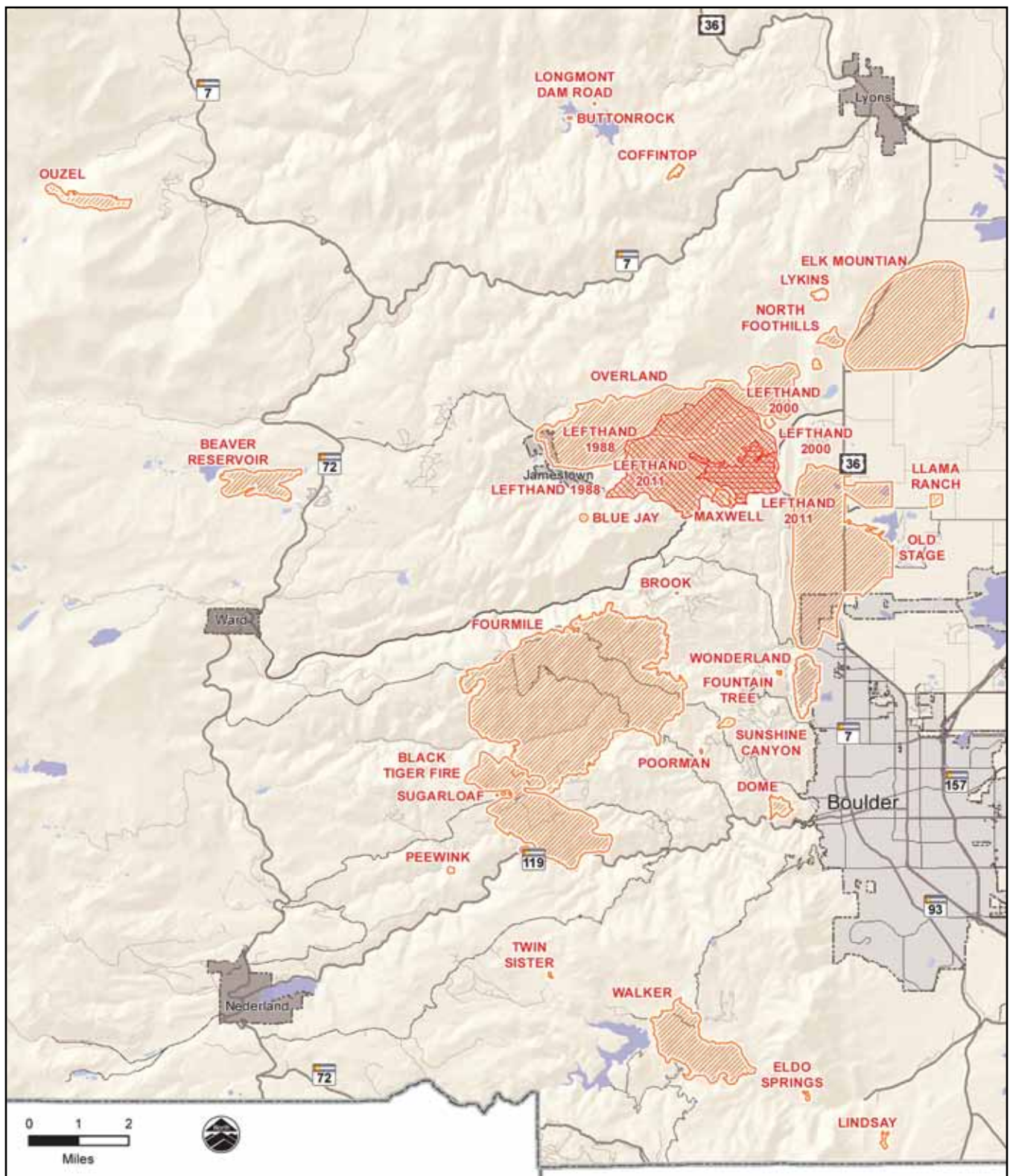


Boulder Heights resident John Martyny shares the story of his evacuation during the Fourmile Canyon Fire. "We looked out the side window and we could see that it was

just incredible, the cloud coming up the side of the house there," describes John, "and so we immediately went up to the ridge and at that time we could see flames coming up and smoke, which was essentially obliterating the sun, and ashes falling down all over the house all around here." Fortunately, John's home was untouched by the flames, surviving its third Boulder County wildfire.

Video can be found here:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>



Map 1: Boulder County Wildfire Recent History



A primary objective of this plan is to engage residents and empower communities in wildfire mitigation, preparedness, and recovery efforts. This entire plan is full of action items. These actions can be divided into specific categories based on the individuals or groups who are responsible for getting the work done.

1. Individuals taking action to protect their homes and their land (Chapter 7 — Preparing for Wildfire, Chapter 8 — Protecting Homes: Defensible Space, Chapter 9 — Protecting Homes: Firewise Construction)
2. Public land managers taking action on federal, state, county, and local lands (Chapter 10 — Healthy Forests and Chapter 15 — Project Identification and Prioritization)
3. Government agencies working to promote and support this individual action and sound land management (Chapter 6 — Collaboration, Chapter 14 — Assessing Wildfire Risk, and Chapter 16 — Implementing and Sustaining the Boulder County Community Wildfire Protection Plan)

However, it is not enough for individuals and government agencies to act. Community action is a key to success; after all, this is a community wildfire protection plan. A fourth target audience needs to be added to our list — communities, which in this plan includes groups of people living in a variety of geographic areas: neighborhoods, towns, fire districts, and counties.

4. Communities taking action to protect their futures (all chapters)

Action plans to engage residents and empower communities are common in the environmental, social service, and many other sectors. Community wildfire protection efforts can learn a great deal about how best to empower communities from these other sectors and from the history of community action.

Our American culture, mountain and western culture in particular, prides itself on individual liberty and personal

responsibility. However, we also have a strong community ethic and our Founding Fathers recognized the importance of community action to fight fires. Ben Franklin established the first volunteer fire department in Philadelphia in 1736. Instead of a “fire club” that protected the homes of its members, Franklin wanted organizations that would battle all fires within a community, regardless of whose property was burning.

While the need for community action to fight fires is widely recognized, the importance of community action in the area of wildfire mitigation and prevention receives much less attention. This community plans hopes to change this oversight. When it comes to wildfire protection, community action is essential to success. An individual Boulder County resident can do everything right — create the best possible defensible space on his or her property, use ignition resistant construction materials, update their insurance policy, and prepare for an evacuation — and still face significant risk.

Community action can help individuals coordinate their defensible space work with neighbors, create community fuel breaks, secure funding, and encourage nearby land owners to reduce hazardous fuels on their property. Residents who are out of town during an evacuation order need help from their community. Everyone who loses a home to a wildfire needs the assistance and support of a larger community to recover. The importance of community action is told and recounted in the stories contained in boxes throughout this document. It is these kinds of efforts that this plan wants to encourage and support.

Ideas for engaging residents and empowering communities in wildfire protection are contained throughout this plan. The examples contained in this chapter include: 1) A Community Chipping Program, 2) Wildfire Awareness Month, 3) Train the Trainer Programs and one-on-one technical assistance, and 4) the Community Forestry Sort Yards.

Community Chipping Programs



Eldorado Springs Slash and Debris Removal

In Eldorado Springs, residents have organized themselves to remove slash and debris from their community, improving this informal program over the years.

Original cleanup events had an individual resident rent a large dumpster, get friends to share the cost, and park the box in a central location for a summer week. News of the event was spread by word-of-mouth, email, and Post Office flyer. Neighbor participants brought slash and debris to the dumpster, and eventually the box was hauled to a landfill.

Another cleanup event happened when county and state partners made a heavy duty chipper available to residents for two summer weeks. The big chipper was sited at three or four different places around the community.

Recent cleanups, as always initiated by locals, have had the support of Eldorado Canyon State Park and Eldorado Artesian Springs Inc. Each provided dumpsters for trash. Volunteers did the chipping and firewood cutting, with the end products being used by the state park. Neighbors worked along South Boulder Creek, piling small trees for chipping and logs for firewood. Drinks appeared, and the day ended with a cookout.

As a result of these community-based efforts, residents have come together to reduce their risk of wildfire and build the capacity necessary for effective mitigation programs.

Coal Creek Canyon Saws and Slaws

Coal Creek Canyon's monthly "Saws and Slaws" program, short for chainsaws and coleslaws, is a great example of a community-based wildfire mitigation initiative.

With the large number of fires in the area, Cesar Gellido and members from a trio of community groups (The Environmental Group, the Coal Creek Canyon Park and Recreation District, and the Coal Creek Canyon Improvement Association) decided to organize the community woodcutting program in the spring of 2011.

One Sunday each month, up to two dozen neighbors come together to reduce hazardous fuel on two or three properties. After 4-5 hours of cutting and hauling logs and slash to a designated site for chipping, these volunteers enjoy a delicious potluck lunch hosted on an owner's property.

Saws and slaws has been likened to an Amish barn raising. "This is a great effort on the part of community members to meet and help each other clean up their properties in order to mitigate against potential wildfire damage due to recent losses exacerbated by pine beetle," says Gellido. The program brings together community members with different needs and talents to work toward these common goals. Community members pay the cost of renting and staffing the chipper.

With all the firewood produced at these events, volunteers and other members of the community have been able to take firewood home for their own stoves and bring the woodcutting coop to their neighborhood for the next round of wildfire mitigation work.

When it is all said and done, it is about neighbors helping neighbors that helps build community and leads to more effective wildfire protection.



Saws and Slaws Group

A Countywide Community Chipping Days Program

The Citizen Advisory Team (see Chapter 5) recommended the creation of a Rural Community Slash and Debris Removal Program modeled after the Eldorado Springs experience. The team's original recommendation is contained in Appendix D. The recommendation outlined here combines the advisory team's proposal and the experience of the Saws and Slaws program.

Based on the success of these two community chipping programs, the Boulder County Land Use Department should change the focus of its Chipping and Transportation Reimbursement Program to support community chipping days throughout the county.

The county's current program reimburses up to 40% of direct costs for chipping or biomass transportation. In 2011, the County allocated \$15,000 for this program with a maximum grant of \$4,000 per community. This program has been successful; however, changing its focus to the support of community chipping days is viewed as an improvement by the Core Team and county staff. Additional funders are interested in supporting this new focus.

Like in the Eldorado Springs and Coal Creek Canyon examples, the communities would be responsible for organizing, publicizing, and implement the work. The community pot-luck meal would remain the featured even. Funding from the County and its partners would help offset the cost of renting the chipper.

A community chipping days program has many advantages:

- Motivates rural communities to organize
- Leads to better defensible space
- Improves county wildfire preparedness
- More efficiently utilizes available resources and programs
- Contributes wood logs and chips to an emerging wood reuse industry
- Puts county staff and local fire districts in rural communities, collaborating with property owners
- Contributes to the goals of this plan
- Creates social capital



Saws and Slaws Group

Wildfire Awareness Month

This plan's Citizen Advisory Team also recommended designating October as Wildfire Awareness Month in Boulder County. An online resident recommendation suggested declaring Labor Day as Wildfire Mitigation Day in remembrance of the Fourmile Canyon Fire. The advisory team extended this proposal from a day to a month and moved it to October because this is when national fire prevention week is celebrated and it is a better time to perform mitigation in regards to mountain pine beetle.

The Boulder County Commissioners will declare October 2011 as the county's first Wildfire Awareness Month. A series of events are being planned to engage residents and empower communities, including community chipping days, volunteer projects, a poster contest, tours, keynote lectures, training, school visits, workshops, and the launching of this countywide Community Wildfire Protection Plan.

Expected partners include fire protection districts, wildfire mitigation contractors, the Colorado State Forest Service, the US Forest Service, the City of Boulder, the University of Colorado, the Sheriff's Office, and the Boulder County Land Use and Parks and Open Space Departments.

You can find more information about the events and activities taking place during Wildfire Awareness Month at www.bouldercountycwpp.org.

The month will be an annual initiative in Boulder County. The State of Colorado will be encouraged to follow suit and declare October as Wildfire Awareness Month statewide.

Train the Trainer Program and One-on-One Assistance

One of the most effective ways to educate homeowners about defensible space and other wildfire mitigation measures is through on-site, one-on-one technical assistance. Having a trained professional walk through a property together with a homeowner, offering specific recommendations and answering all the questions a homeowner wants to ask is an ideal way of providing education, training, and technical assistance.

In the Lyons Community Wildfire Protection Plan, the fire district describes its active program of homeowner assistance. Lyons Fire conducts free homeowners assessments and provides mitigation recommendations. The district has a wildfire mitigation team that will perform mitigation projects such as thinning, limbing, removal of hazard trees, and constructing fuel breaks for a fee. Lyons Fire plans to further develop and add personnel to its mitigation crew and continue training on mitigation practices.



As part of its plan, Lyons volunteer firefighters surveyed every home in the district with the exception of residences in the town of Lyons. They found that “much more work needs to be done throughout the district. A few newer houses have completed basic mitigation, but most need improvement in all zones. Many residences have combustible structures, firewood piles and other debris within 30 feet of homes.”

The Lyons Fire program fits well with a Train the Trainer Program recommended by this plan.

As part of a Wildfire Mitigation Train the Trainer Program, experts with the Colorado State Forest Service and Boulder County would train wildfire mitigation volunteers linked with local fire protection districts. These volunteers would then provide one-on-one technical assistance directly to homeowners.

This program would benefit many homeowners throughout the county. However, it is not designed to provide all the documentation necessary for a wildfire mitigation plan required to obtain a Boulder County Building Permit.

Boulder County’s Community Forestry Sort Yards



Community Forestry Sort Yard in Nederland

In 2008, Boulder County opened its first Community Forestry Sort Yard in Meeker Park. In 2010, a second yard was opened in Nederland. In 2010, the two sort yards combined operated for over 100 days and between 25 and 30 loads of wood were brought to the sort yards per day. In 2010, wildfire mitigation (56%) and mountain pine beetle (35%) were the two primary reasons why people brought slash and wood to the sort yards. While the majority of material is in the form of slash (almost 1200 tons in 2010), people bring large logs as well (300 tons). The Nederland sort yard saw a doubling of material from the fall of 2010 to the spring of 2011, from 444 tons of material to over 900 tons. The yards share an air curtain burner to dispose of the slash (see box).

Table 4: Community Forestry Sort Yard Statistics

<i>Year</i>	<i>Operational Days</i>	<i>Load Count</i>	<i>Daily Average</i>
2008	52	1,309	25.1
2009	130	2,991	23.0
2010	102	2,747	26.9

In addition to disposing a large volume of material, the sort yards help engage residents and empower communities to perform wildfire mitigation. It is a place where residents can discuss wildfire and forestry issues with county staff and each other — a kind of “Forestry Central.” In addition, a Community Forestry Sort Yard “Host” program was introduced at the Meeker Park yard in 2010 to improve operations. Four volunteer hosts took part in program, contributing 251 volunteer hours. Boulder County provides the Community Forestry Sort Yard program free of charge (no tip/disposal fees) to the residents and private contractors of Boulder, Gilpin, and Larimer Counties.

Private Initiative

Story from Wes Rutt and Tree Farmer Alert

In northern Larimer County, the beetle epidemic has inspired many more landowners to start forest management efforts on their own. The problem they faced is what to do with all the slash and infested logs.

A group of 47 forest landowners decided to take action into their own hands. They pooled their resources, raised \$150,000 in two months, created a limited partnership, and purchased an air curtain burner¹ to dispose of the wood.

Next steps include getting the required permits and developing a site to begin operations. By the middle of August 2011, they plan to accept the first loads of wood from landowners. For a reasonable fee to cover startup expenses and operational overhead, anyone can bring their slash and logs to be effectively and safely eliminated.

¹ The air curtain burner incinerates large volumes of wood at extremely hot temperatures. A curtain of air flows over the fire containing smoke and other particulates. Air curtain burners are being used successfully to reduce fuel loads in forests throughout Colorado. This may be the first time a group of private forest landowners, without government assistance, have attempted to purchase and operate one.



In Boulder County, local community wildfire protection plans, usually initiated by fire protection district, were completed well in advance of this countywide plan. There have been 13 plans, see tables below, completed between 2005 and 2011. The first plan by the Lefthand Fire Protection District (2005) is also the first and only plan that has been updated (2011).

These plans contain a wealth of important information and have resulted in an enormous amount of mitigation work by the districts, communities, partners, and individuals involved.

Residents who have not read their local fire protection district's plan should go to the Colorado State Forest Service website, <http://csfs.colostate.edu/pages/CommunityWildfireProtectionPlans.html>, to become familiar with them.

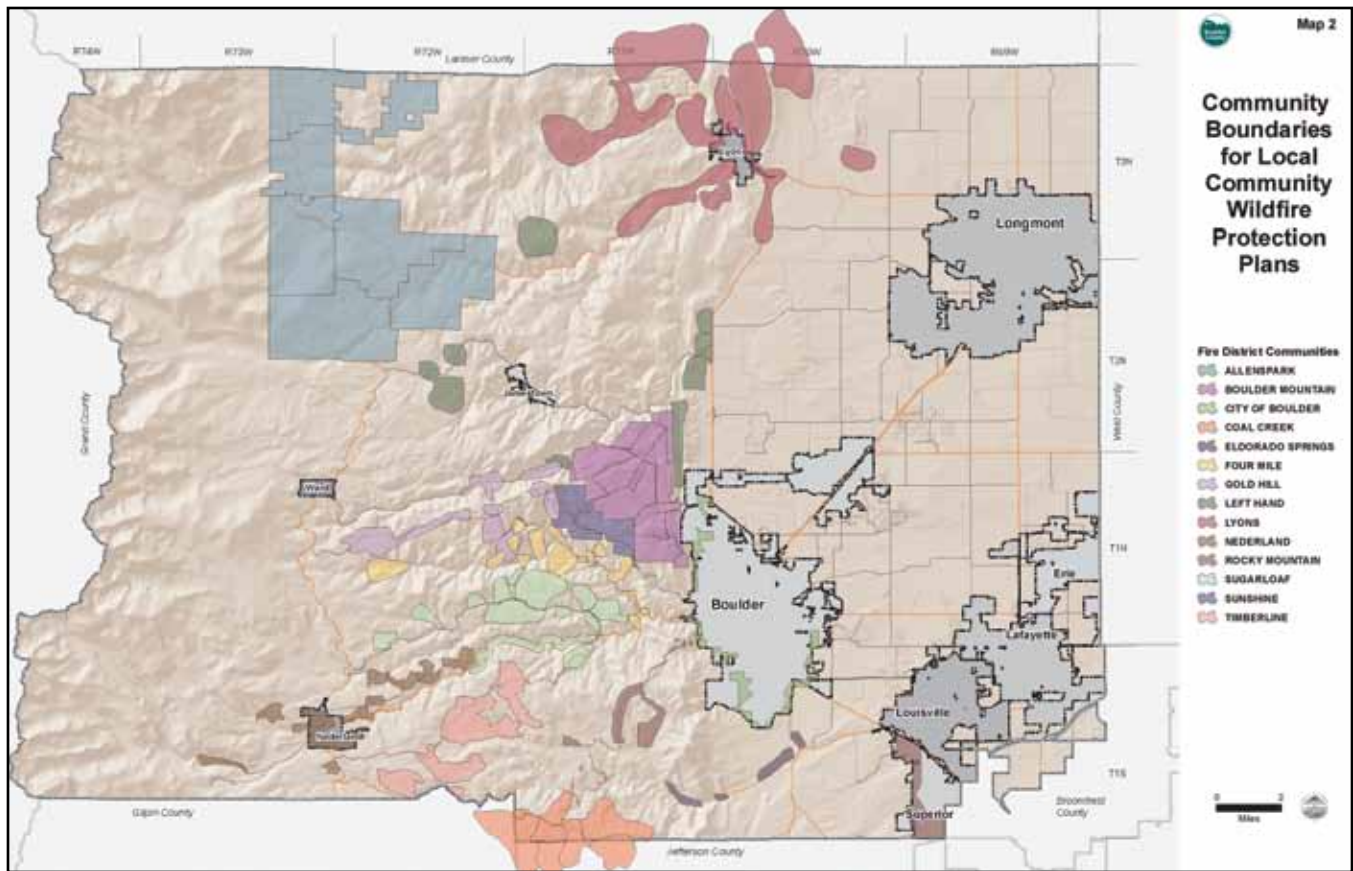
This countywide plan benefits greatly from all the hard work that went into these initiatives; it is designed to complement, not repeat, them. For example, the central feature of most local plans is the assessment of individual communities. They are not duplicated here.

Community Assessments

Most local plans define their communities and assign them a community hazard rating from “low” to “extreme.” The following tables were produced using information from the local plans. Map 2 shows the boundaries of all the communities contained in these tables. The map does not include any hazard ratings because individual plans used different methods for assessing their communities, and it is not appropriate to compare communities from different plans. When reading the following tables, you may compare communities within the same fire protection districts. You should not look at the relative hazard ratings of communities across districts.



2010 Fourmile Canyon Fire



Map 2: Community Boundaries for Local Community Wildfire Protection Plans

Allenspark Fire Protection District

Technical Assistance: Southern Rockies Conservation Alliance/
Ecosystem Project

Date of Plan: June 2009

Management Units

1	Allenspark
2	Dry Saint Vrain
3	Little Thompson*
4	Meeker Park
5	Middle Saint Vrain
6	Peaceful Valley
7	Tahosa Valley**
8	Wild Basin

*The community is in both Boulder and Larimer Counties

**The community is in Larimer County

Boulder Mountain Fire Protection District

Technical Assistance: Anchor Point Group, LLC

Date of Plan: July 2007

Community	Rating	Score*
9 Glendale	Extreme	2
10 Cutter	Extreme	4
11 East Boulder Heights	Extreme	5
12 Carriage Hills	Very High	7
13 West Boulder Heights	Very High	8
14 South Pine Brook Hills	Very High	8
15 Peakview	Very High	8
16 Buckingham Hills/Valley Lane	High	11
17 Reed Ranch	High	13
18 North Pine Brook Hills	High	13
19 Lower Lee Hill Road	High	15
20 North Cedar Brook	High	16
21 Wagon Wheel Gap	Moderate	29
22 South Cedar Brook	Moderate	29

*Scores read from graph.

Boulder Rural Fire Protection District

Technical Assistance: Anchor Point Group, LLC

Date of Plan: July 2007

<i>Community</i>	<i>Rating</i>	<i>Score*</i>
23 Poorman	Extreme	5
24 Upper Sunshine Canyon	Extreme	6
25 Old Stage	Extreme	9
26 Lower Sunshine Canyon	Very High	13
27 Spring Valley	Moderate	24
28 Orange Orchard	Low	31
29 Lake Valley/North Rim	Low	33
30 Valhalla	Low	35
31 Heatherwood	Low	35
32 Ouray	Low	37

*Scores read from graph.

City of Boulder

Technical Assistance: Anchor Point Group, LLC

Date of Plan: September 2007

<i>Community</i>	<i>Rating</i>	<i>Score</i>
33 Kohler Area	Very High	12
34 Upper University/Boulder Canyon Area	Very High	16
35 Shanahan West Area	Very High	19
36 Chautauqua	High	22
37 Upper Table Mesa Area	High	23
38 Dakota Ridge Area	High	24
39 Wonderland Lake Area	Moderate	27
40 Shanahan East Area	Moderate	28
41 East Side Area	Low	30
42 Lee Hill Area	Low	32

*Scores read from graph.

Coal Creek Canyon Fire Protection District

Technical Assistance: Walsh Environmental Scientists and Engineers, LLC

Date of Plan: August 2008

<i>Community</i>	<i>Rating</i>	<i>Score</i>
43 Burke	Extreme	112
44 Wondervu	Extreme	112
45 Nadm	High	109
46 Chute Road	High	107
47 Lyttle Dowdle	High	104
48 Camp Eden	High	96
49 Coal Creek Heights	High	96
50 Stanton	High	91
51 Crescent Park	High	85
52 Copperdale	High	82
53 Miramonte	High	81
54 Vonnie Claire	High	80
55 Hilltop	Moderate	68
56 Blue Mountain	Moderate	64

*The Coal Creek Canyon Fire Protection District is located in Boulder, Jefferson and Gilpin Counties.

Four Mile Fire Protection District

Technical Assistance: Anchor Point Group, LLC

Date of Plan: October 2006

<i>Community</i>	<i>Rating</i>	<i>Score</i>
57 Rim Road Area	Extreme	5
58 Logan Mill	Extreme	5
59 Wallstreet	Very High	8
60 Summerville	Very High	8
61 Emerson Gulch	Very High	9
62 Arroyo Chico	High	11
63 Sunset	High	13
64 Camino Bosque	High	13
65 Lower Four Mile Canyon	High	14
66 Melvina Hill	High	15
67 Canon Park	High	15
68 Salina	High	19
69 Canyonside	High	19
70 Red Lion Area	Moderate	20
71 Crisman	Moderate	21
72 Poorman	Moderate	27

*Scores read from graph.

Gold Hill Fire Protection District

Technical Assistance:

Date of Plan: December 2006

<i>Community</i>	<i>Rating</i>	<i>Score</i>
73 Town of Gold Hill	High	13
74 Gold Run Subdivision	High	13
75 Snowbound	High	12
76 Rowena	High	12
77 Rim Road	Medium	11
78 West of Gold Hill	Medium	11
79 Lefthand Area	Medium	10
80 Sunshine Area	Low	8

Lefthand Fire Protection District

Technical Assistance: Greenwood Sustainability, LLC

Date of Plan: 2011

<i>Community</i>	<i>Rating</i>	<i>Score</i>
81 Conifer Hill	Extreme	124
82 Nugget Hill	High	107
83 Bar-K Complex	High	105
84 Crestview Estates	High	90
85 Old Stage Road	High	74
86 Lake of the Pines	High	72
87 North Foothills Ranch	Moderate	69
88 Mountain Ridge	Moderate	64
89 Lower Lefthand Canyon	Moderate	58

Lyons Fire Protection District

Technical Assistance:

Date of Plan: 2011

<i>Community</i>	<i>Rating</i>	<i>Score</i>
90 North St Vrain	High	100.2
91 Lyons Park Estates	High	99.1
92 Spring Gulch*	High	94.3
93 Dakota Ridge*	High	89.6
94 X-Bar7/Blue Mountain**	High	88.2
95 Stone Canyon/Eagle Ridge*	High	86.6
96 Steamboat Valley	High	85.5
97 Town of Lyons (Central)	High	79.5
98 North Foothills/Ute Highway/ Rabbit Mountain	High	71.3
99 South St Vrain	Moderate	66.3
100 Apple Valley	Moderate	57.5
102 Town of Lyons (New Developments)	Moderate	41.4

*The community is in both Boulder and Larimer Counties

**The community is in Larimer County

Rocky Mountain Fire

Technical Assistance: Anchor Point Group, LLC

Date of Plan: December 2007; updated May 2010

<i>Community</i>	<i>Rating</i>	<i>Score</i>
102 Kneale Road	Extreme	10
103 Town of Eldorado Springs	Extreme	10
104 Pine Needle	Very High	14
105 Lakeshore Park	Very High	16
106 Flagstaff Road	High	20
107 Superior/Rock Creek	Moderate	29
108 Eldorado Springs Valley	Moderate	31
109 Town of Marshall	Moderate	31

Nederland Fire Protection District

Technical Assistance: Anchor Point Group, LLC

Date of Plan: 2011

<i>Community</i>	<i>Rating</i>
110 Big Springs	Very High
111 Bonanza	Very High
112 Cold Spring	Very High
113 Comforter Mountain	Very High
114 East Big Springs	Very High
115 Eldora	Very High
116 Five Points	Very High
117 Haul Road	Very High
118 St. Antons	Very High
119 St Antons West	Very High
120 Shady Hallow	Very High
121 Whispering Pines	Very High
122 Beaver Creek	High
123 Hurricane Hill	High
124 Indian Peaks/Caribou Ranch	High
125 North Nederland	High
126 Sunnyside	High
127 South Nederland	High

Sunshine Fire Protection District

Technical Assistance: Southern Rockies Ecosystem Project

Date of Plan: 2008

<i>Community</i>	<i>Rating</i>
128 Bald Mountain	High
129 Dry Gulch	High
130 Meadows	High
131 Town Site	High
132 Ingram	Moderate
133 Pilot	Moderate

Sugar Loaf Fire Protection District

Technical Assistance: Anchor Point Group, LLC

Date of Plan: August 2008

<i>Community</i>	<i>Rating</i>	<i>Score</i>
134 Old Whiskey/Magnolia	Extreme	4
135 Millionaire	Extreme	6
136 Tall Timbers	Very High	10
137 Swiss Peaks	Very High	11
138 Silver Springs	Very High	12
139 Betasso/Broken Fense	High	13
140 Coughlin Meadows	High	13
141 Mountain Meadows	High	18
142 Mountain King	High	19
143 Weaver	High	20
144 Boulder Canyon	High	21
145 Old Post Office	Moderate	23
146 Switzerland Park	Moderate	26
147 Silver Spruce	Moderate	27
148 Lost Angel	Low	31

Timberline Fire Protection District

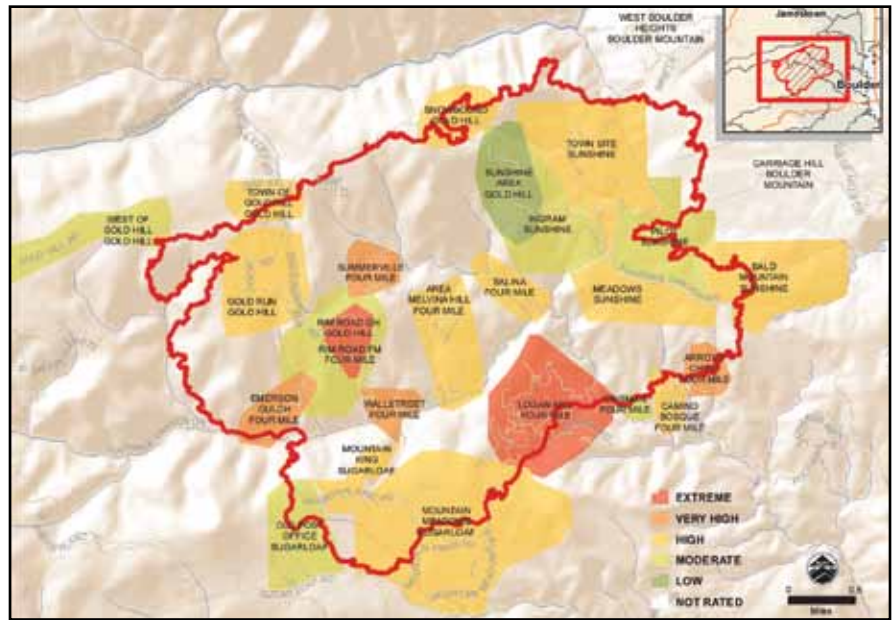
Technical Assistance: Anchor Point Group, LLC

Date of Plan: 2011

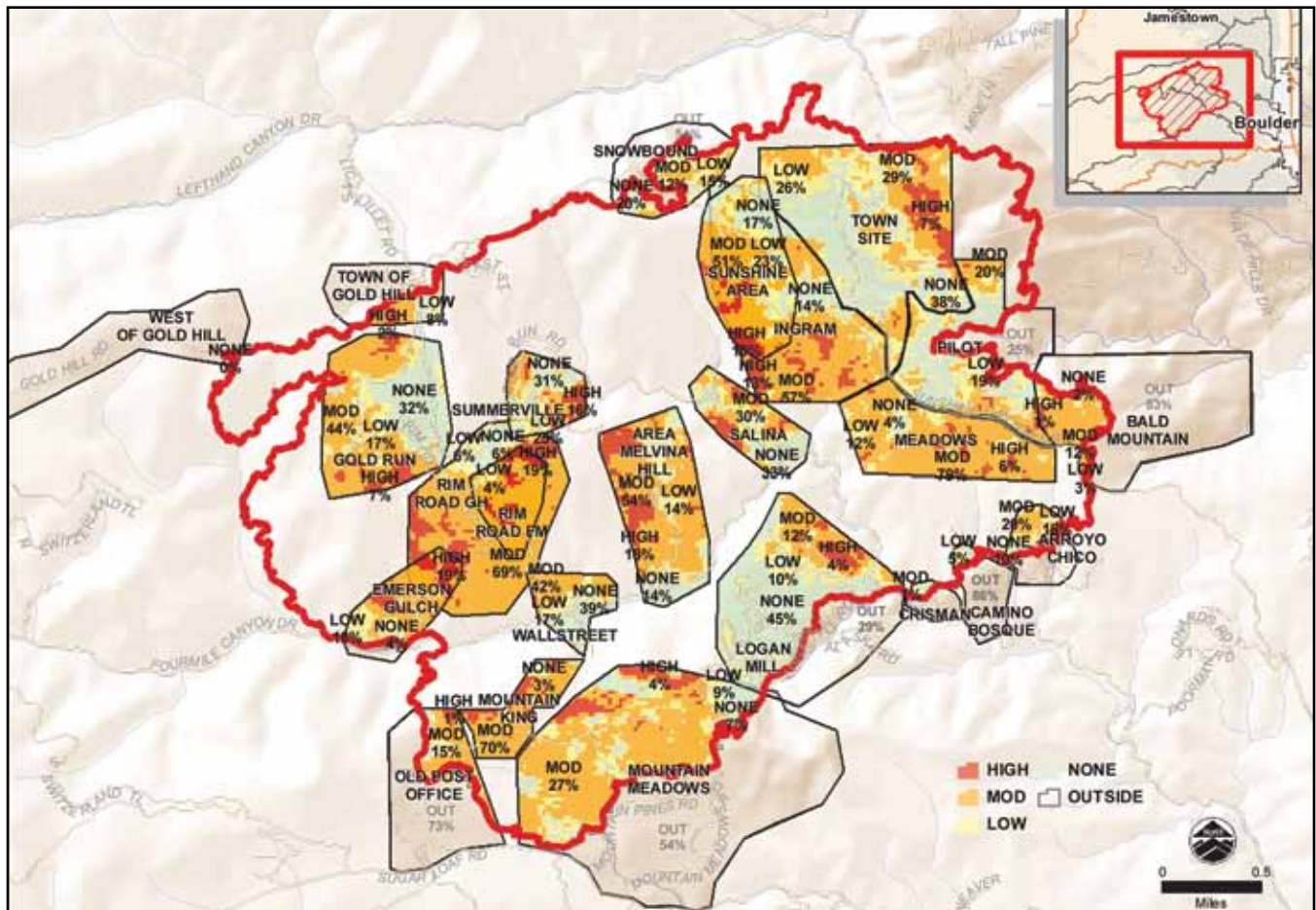
<i>Community</i>	<i>Rating</i>
149 CR 99/Beaver Creek Road	Extreme
150 Lazy Z	Very High
151 Pine Glade/Upper CR 68	Very High
152 Porter Ranch/Twin Sisters	Very High
153 Pinecliff	Unrated

Community Hazard Ratings and the Fourmile Canyon Fire

Community hazard ratings have many uses. To look at their utility in predicting the impacts of a catastrophic fire, we compared these rating with percentage and number of homes destroyed, acres burned, and acres severely burned in the Fourmile Canyon Fire burn perimeter. These numbers only include homes that were within community boundaries as defined by the local plans (see Map 3). A number of homes and a significant amount of land in the burn area were not included in these community assessments so the numbers in this analysis will not match those for the entire fire. For example, this analysis includes 119 destroyed homes out of a total of 169. The 119 homes are located in the colored portions of the maps; the additional 50 homes are located on the white portions of the maps.



Map 3: Community Rating From Local Community Wildfire Protection Plans



Map 4: Fourmile Canyon Fire Burn Severity by Community

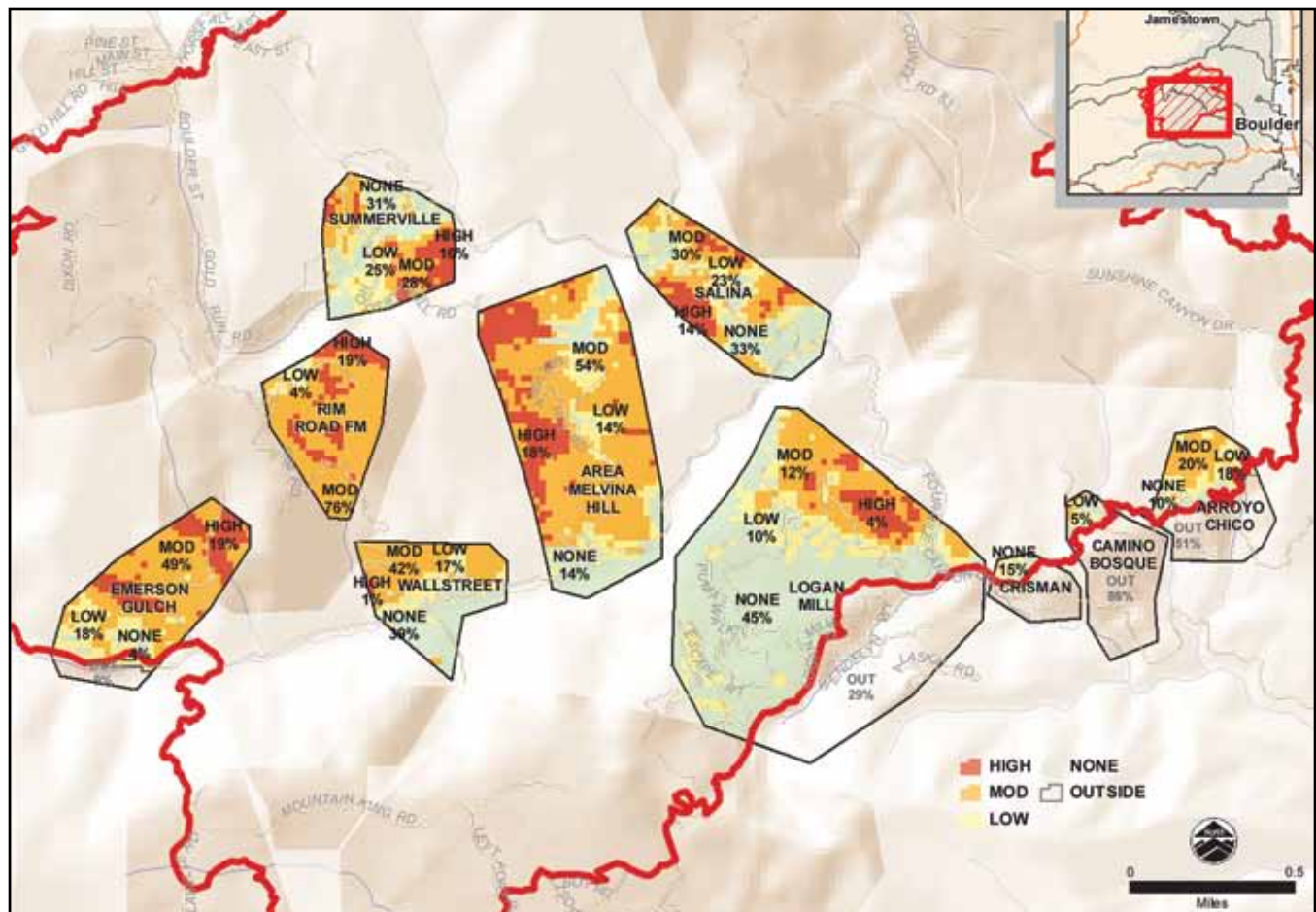
Four Mile Fire Protection District

Community	Rating	Acres	Acres Burned	% Acres Burned	High Burn Severity (Acres)	% High Severity #1	% High Severity #2	Homes*	Homes Destroyed	% Homes Destroyed
RIM ROAD FM	EXTREME	87.90	86.97	99%	16.90	19%	19%	4	4	100%
LOGAN MILL	EXTREME	430.00	110.61	26%	16.29	4%	15%	60	14	23%
SUMMERVILLE	VERY HIGH	88.79	61.44	69%	14.61	16%	24%	9	1	11%
EMERSON GULCH	VERY HIGH	120.69	104.52	87%	23.01	19%	22%	2	1	50%
WALLSTREET	VERY HIGH	75.09	45.26	60%	0.85	1%	2%	21	3	14%
ARROYO CHICO	VERY HIGH	72.27	28.01	39%	0.00	0%	0%	5	5	100%
AREA MELVINA HILL	HIGH	237.47	204.05	86%	41.74	18%	20%	10	10	100%
CAMINO BOSQUE	HIGH	64.45	3.87	6%	0.00	0%	0%	2	1	50%
SALINA	HIGH	107.30	71.79	67%	15.51	14%	22%	39	4	10%
CRISMAN	MODERATE	28.06	2.12	8%	0.00	0%	0%	4	2	50%

The % High Severity #1 is the number of acres that were severely burned divided by the total number of acres in the community.

The % High Severity #2 is the number of acres that were severely burned divided by the total number of acres that were burned.

*Homes that are both in the burn perimeter and within the community assessment area. There are many homes in these areas that fall just outside “community” boundaries or just outside the burn perimeter (see maps).



Map 5: Burn Severity: Fourmile Fire Protection District

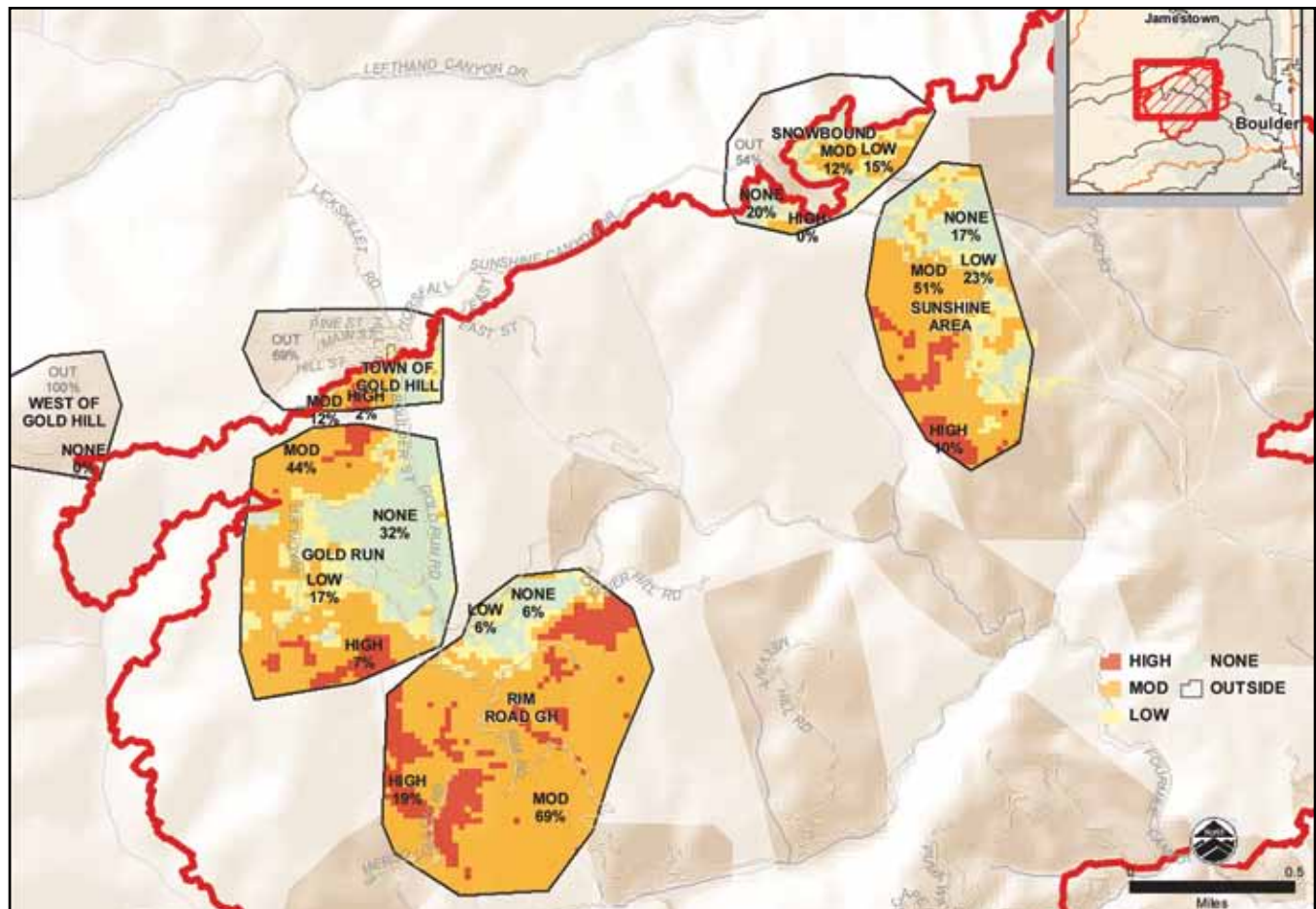
Gold Hill Fire Protection District

Community	Rating	Acres	Acres Burned	% Acres Burned	High Burn Severity (Acres)	% High Severity #1	% High Severity #2	Homes*	Homes Destroyed	% Homes Destroyed
TOWN OF GOLD HILL	HIGH	109.11	23.84	22%	2.64	2%	11%	4	0	0%
GOLD RUN	HIGH	291.09	198.49	68%	21.19	7%	11%	50	7	14%
SNOWBOUND	HIGH	140.53	37.49	27%	0.07	0%	0%	6	1	17%
RIM ROAD GH	MODERATE	373.80	349.77	94%	52.72	14%	15%	8	6	75%
SUNSHINE AREA	LOW	211.98	178.98	84%	21.72	10%	12%	18	5	28%

The % High Severity #1 is the number of acres that were severely burned divided by the total number of acres in the community.

The % High Severity #2 is the number of acres that were severely burned divided by the total number of acres that were burned.

*Homes that are both in the burn perimeter and within the community assessment area. There are many homes in these areas that fall just outside “community” boundaries or just outside the burn perimeter (see maps).



Map 6: Burn Severity: Gold Hill Fire Protection District

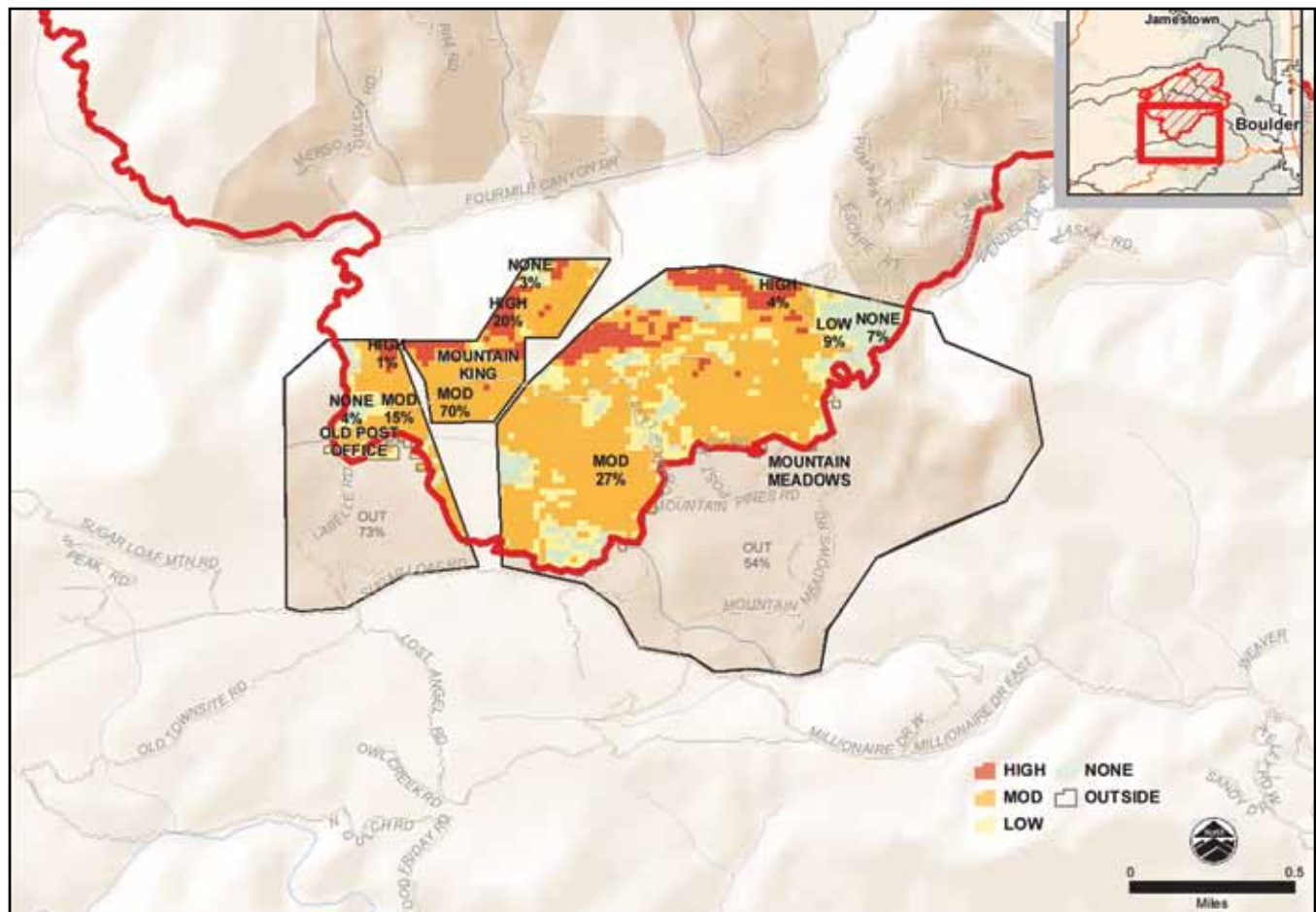
Sugar Loaf Fire Protection District

Community	Rating	Acres	Acres Burned	% Acres Burned	High Burn Severity (Acres)	% High Severity #1	% High Severity #2	Homes*	Homes Destroyed	% Homes Destroyed
MOUNTAIN KING	HIGH	84.88	82.43	97%	17.13	20%	21%	2	0	0%
MOUNTAIN MEADOWS	HIGH	888.92	351.06	39%	32.26	4%	9%	49	14	29%
OLD POST OFFICE	MODERATE	224.73	51.17	23%	2.98	1%	6%	3	0	0%

The % High Severity #1 is the number of acres that were severely burned divided by the total number of acres in the community.

The % High Severity #2 is the number of acres that were severely burned divided by the total number of acres that were burned.

*Homes that are both in the burn perimeter and within the community assessment area. There are many homes in these areas that fall just outside “community” boundaries or just outside the burn perimeter (see maps).



Map 7: Burn Severity: Sugarloaf Fire Protection District

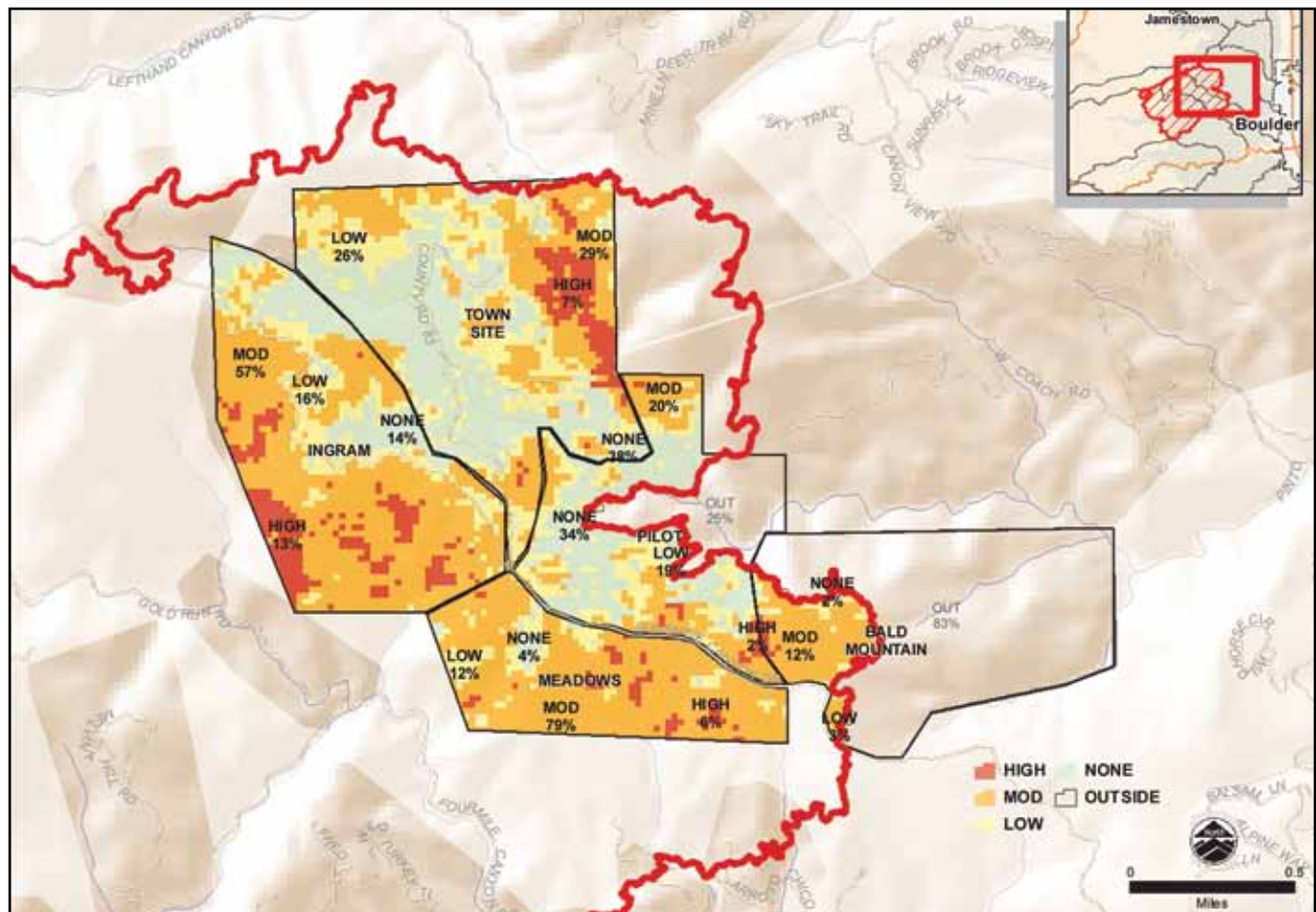
Sunshine Fire Protection District

Community	Rating	Acres	Acres Burned	% Acres Burned	High Burn Severity (Acres)	% High Severity #1	% High Severity #2	Homes*	Homes Destroyed	% Homes Destroyed
BALD MOUNTAIN	HIGH	365.90	56.58	15%	2.85	1%	5%	3	3	100%
MEADOWS	HIGH	215.94	208.29	96%	12.70	6%	6%	21	7	33%
TOWN SITE	HIGH	456.68	282.39	62%	32.73	7%	12%	78	14	18%
INGRAM	MODERATE	391.45	335.92	86%	50.16	13%	15%	34	12	35%
PILOT	MODERATE	284.30	116.58	41%	4.55	2%	4%	17	5	29%

The % High Severity #1 is the number of acres that were severely burned divided by the total number of acres in the community.

The % High Severity #2 is the number of acres that were severely burned divided by the total number of acres that were burned.

*Homes that are both in the burn perimeter and within the community assessment area. There are many homes in these areas that fall just outside “community” boundaries or just outside the burn perimeter (see maps).



Map 8: Burn Severity: Sunshine Fire Protection District

Chapter 5

Community Involvement & Citizen Advisory Team Recommendations



Colorado requires Community Wildfire Protection Plans to involve community members and exhibit diverse collaboration. This plan embodies the spirit, not just the letter, of this law. Boulder County's planning process was designed to empower county residents and make them partners in the development, and future implementation, of community wildfire protection projects and programs.

When it comes to wildfire mitigation, county residents have many tangible experiences and important insights to share. Instead of having residents read and react to a draft plan written by experts, this plan is built on the ideas originated and prioritized by county residents.

All county residents were encouraged to submit their ideas for inclusion in this plan via an online form. Individuals were free to submit as many recommendations as they wished. No ideas were discarded. Because resident submissions were anonymous, they were free to write any idea they believed would help better protect their community from wildfire.

Residents provided specific, well developed recommendations, not simple comments. The online form included the following fields: Title, Issue Area, Audience, People Impacted, Proposal Summary, Problem Addressed, Costs, Advantages, and Disadvantages. For the issue area and audience, residents selected from a pre-defined list of options.

A total of 44 recommendations were submitted by residents via the online form during the December 1, 2010-January 19, 2011 submission period. The most common subject of these recommendations was fire bans. Popular issue areas included community mitigation efforts, education, funding, and collaboration. Recommendations were targeted at all agencies involved in wildfire protection as well as communities and individual residents. These initial recommendations are included in Appendix C.

Instead of forwarding these community recommendations directly to agency staff for consideration, an advisory team was formed to study and prioritize these ideas. This advisory team was limited to members of the general public who reside in the county. Agency staff members were not allowed to participate on this team because we wanted the ideas and priorities from this effort to represent the perspective of community members.

Boulder County Community Wildfire Protection Plan Citizen Advisory Team

The Boulder County Community Wildfire Protection Plan Citizen Advisory Team was comprised of 16 residents from across the county. The team held monthly meetings from January to April 2011.

All interested members of the general public were encouraged to participate on this team. No previous wildfire experience was required. Members were asked to make a firm commitment to the process. Every individual who submitted an application was asked to serve on the team. The team included a diverse group of individuals from across the county:

The team was divided into six committees: Funding, Education and Outreach, Collaboration, Homeowner Mitigation, Public Lands Management, and Emergency Preparedness and Wildfire Prevention. Each member served on two committees.

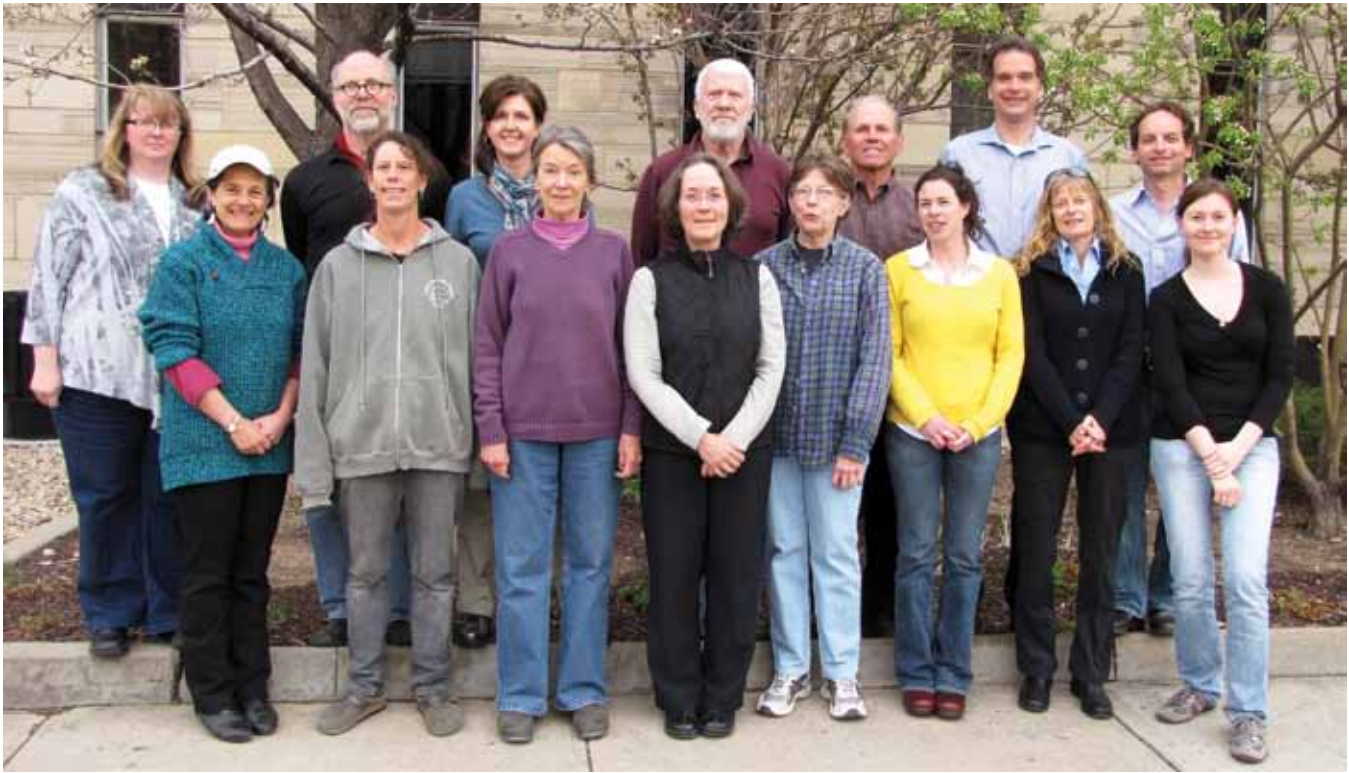


Table 7: Citizen Advisory Team Members

1	Alan Brown	Eldorado Springs	9	Gwen Jaques	Old Town Longmont
2	Matthew Cox	City of Boulder	10	Haydee Kuner	Sunshine Canyon
3	Edie Eilender	Gold Hill	11	Alison Layman	City of Boulder
4	Joyce Gellhorn	Boulder Heights	12	Mikii Schoech	Sunshine Canyon
5	Marca Hagenstad	Nederland	13	Pamela Sherman	Gold Hill
6	Susan Holley	Sugar Loaf	14	Abby Silver	Sunshine Canyon
7	Margaret Huntting	Allenspark	15	Patricia Stephen	Boulder Heights
8	Stan Huntting	Allenspark	16	Steve Szabo	Rural Longmont

Recommendations

Over the four month period, members of the advisory team worked with the recommendations residents submitted via the online form. They evaluated, researched, organized, added to, and revised these initial ideas. At the end of the process, they decided on 13 priority recommendations; two of the 13 were ranked as top priorities.

These citizen recommendations form the basis for many of the ideas and action items contained throughout this plan. The advisory team process was successful on many fronts; it is what helps make this plan unique. A short summary of these recommendations follows. The complete description of each of these priority recommendations is included in Appendix D.

Top Priorities:

Forest Improvement District

The Board of County Commissioners should enact a resolution and submit the question to voters to create a Forest Improvement District in Boulder County, as enabled by Colorado statute. If approved, the district would collect taxes to fund wildfire mitigation efforts.

Wildfire Education and Outreach Coordinator

Assign a current county employee to be the Community Wildfire Protection Plan Education and Outreach Coordinator for the County, or hire for this position. This position will coordinate a long list of programs, including an October Wildfire Awareness Month, and implement activities identified in this plan throughout the county.

Priorities:

Comprehensive Education and Outreach Strategy and Programs

Putting fire on the public's radar – and keeping it there - will require reaching out to Boulder County residents and providing opportunities for education and information sharing. By using varied approaches to interest, involve and educate residents, and partner organizations, the Boulder County Community Wildfire Protection Plan can increase public support for fire mitigation, promote the value of self-reliance, and strengthen existing fire-related networks and efforts within communities.

Rural Community Slash and Debris Removal Program

To improve defensible space within forested county townsites and other compact rural communities, and to remove combustible fuels from these areas, a seasonal slash and debris removal program is proposed. The goal is to have county staff facilitate community cleanup initiatives, and secure the necessary resources not available in each community, including wood sawing and chipping, and hauling of end products to some reuse site.

Disseminating Fire Education Event Information

Continue “The Fire Series” and help create “Fire Net.” The Fire Series is a program of ongoing, monthly community educational presentations on all aspects of wildland fire. Fire Net is envisioned to be a countywide, interagency, umbrella calendar/blog/group which serves as a clearinghouse for all the fire education going on in the county.

Landscape Scale Forest Restoration

Boulder County's Community Wildfire Protection Plan should prioritize projects that

1. Address wildfire protection at the landscape scale, and
2. Comply with forest restoration best practices.

Boulder County and Fire Protection Districts Data-Sharing and Mapping

The proposal would facilitate a data-sharing and mapping effort between Boulder County and fire protection districts within the county. This effort will allow districts, Incident Management Teams as well as other fire personnel to more easily access fire-related GIS data-sets to support the management of wildfire events throughout the county. In addition, the effort would be beneficial to districts for pre-fire planning.

Centralized Grant Processing

Create a central clearinghouse for private landowners and community groups, such as fire protection districts, neighborhoods, and homeowners associations, to access funding resources and grant programs for mitigation and forest restoration projects. Both funders and applicants would make use of this service.

Permanent Boulder County Community Wildfire Protection Plan Steering Committee & Implementation Team

Implementing and overseeing the projects outlined in the Community Wildfire Protection Plan requires the appointment of two groups:

1. An all-volunteer Steering Committee that will function as a “board of directors” and
2. A paid Implementation Team charged with administering and completing the projects identified by the Steering Committee.

Right-of-way Mitigation

The rights-of-way along public and private roads throughout Boulder County need to be mitigated to reduce fire hazards, to provide safe evacuation routes, to increase safety during fire suppression efforts, and to utilize opportunity to create fuel breaks along existing barriers.

Improved Communications

Many foothill and mountain residents do not have cell service. When the power and phone lines are down, communications via mobile/cell and land-lines are non-existent. Therefore residents need to get information and make contact via another reliable source. Agency communications devices appear to need upgrading.

Animal Evacuation Resources and Plan

There needs to be an animal evacuation plan in place to assist with coordinating rescues, evacuations, and helping residences plan ahead for emergencies.

Low-Interest Loan Program for Private Property Mitigation Efforts

This program would provide a resource to complement efforts to educate landowners about the individual and community-wide benefits of making fire safety improvements to their property. Landowners would be able to avail themselves of low-interest loans to fund improvements. The program could be modeled on the existing EnergySmart program that is being administered by the County.

Follow Up Action

These 13 recommendations were presented to Boulder County Commissioners in a May 2011 study session and reviewed and prioritized by the Core Team (Table 1). Since May, each of these recommendations has followed a unique path. Portions of recommendations were implemented within weeks of the study session. Some members of the Citizen Advisory Team continued to work on individual recommendations following their four month commitment. Many of these recommendations have been incorporated into chapters throughout this plan.

Chapter 6 Collaboration



Many organizations are involved in community wildfire protection in Boulder County, including a long list of federal, state, county, and local entities along with 23 separate fire districts. In addition, the county's land ownership patterns are highly fragmented. Boulder County's mining history has helped produce some odd looking parcels and some real challenges for wildfire mitigation (see Map 9 of land ownership in the Fourmile Canyon Fire burn perimeter as an example).

Given that so many organizations are involved and land ownership is so fragmented, interagency communication, cooperation, and collaboration is necessary for wildfire mitigation efforts to be successful.

There is a long history of collaboration in Boulder County. A great deal of what has been accomplished in the past is a result of organizations working together in partnerships. The need for organizations to effectively collaborate is widely recognized.

Collaboration, however, is something that is much easier to talk about than it is to put into practice. Just because multiple organizations working together can be beneficial, it does not follow that collaboration is always the most effective and efficient approach. It is essential to have a sophisticated, in-depth understanding of the advantages and the disadvantages of collaboration. For example, working with a partner or as part of a team can require more time and effort than working alone. In a period of budget cuts, smaller



Colorado State Forest Service Presentation

staffs, and limited volunteers, many organizations simply lack the capacity to be strong partners. Some organizations do not have enough staff or volunteers to attend all of the meetings that already take place — let alone participate in new groups. Recent initiatives in Boulder County have caused some to question the utility of collaborative efforts. For all of these reasons, it is essential that experts with relevant experience are involved in the design and implementation of all collaborative programs.

Collaboration is instinctive during and immediately after a crisis. An outcome of the Fourmile Canyon Fire was to bring individuals and groups together to create and strengthen friendships and partnerships above and beyond what existed prior to the fire. The community rallied to support evacuees and individuals who lost their homes. Mountain neighbors helped each other in ways they had not in the past. Boulder County staff built stronger relationships with the communities and fire protection districts within the burn perimeter as a result of numerous individual interactions, joint projects, and community meetings.

Building on this success, organizations involved in community wildfire protection must work to sustain these efforts. The following recommendations are initial ideas for strengthening collaborative efforts. This list identifies the parties involved in the proposed collaboration and an entity responsible for monitoring and reporting on the progress of these proposals.

Recommendations

1. Collaboration among all individuals and organizations interested in wildfire mitigation:

Create and participate in the Boulder County Community Wildfire Protection Council (see Chapter 16).

2. Collaboration among all individuals and organizations interested in wildfire mitigation:

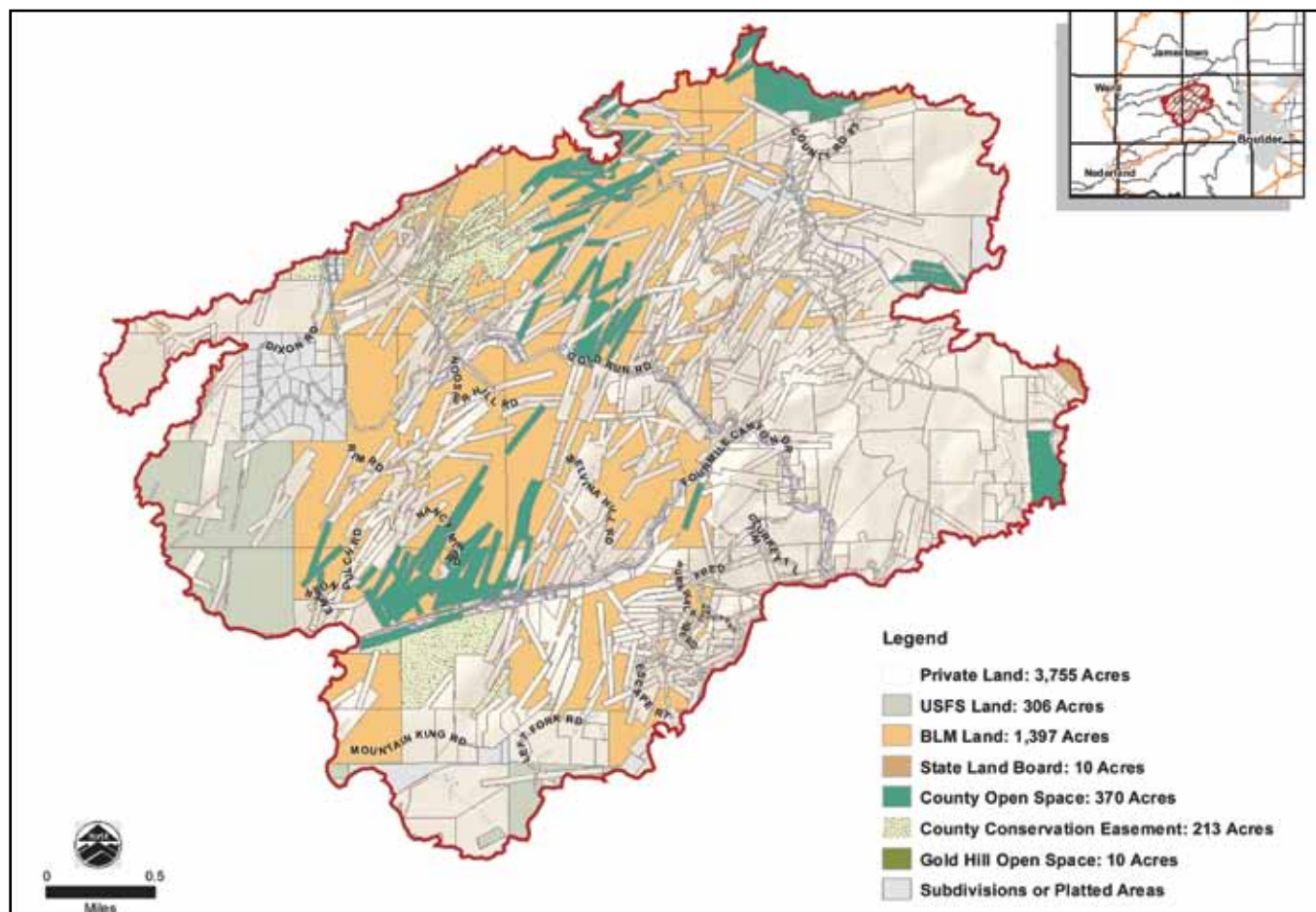
Promote and participate in Wildfire Awareness Month every October. Progress and lessons from this month should be tracked by the Boulder County Community Wildfire Protection Council.

3. Collaboration between the U.S. Forest Service and the Colorado State Forest Service:

Work together to improve the implementation of the Good Neighbor Policy. Annual reports on the number of acres treated through this policy and the progress made in improving implementation should be tracked by the Boulder County Community Wildfire Protection Council.

4. Collaboration between the Colorado State Forest Service, Boulder County Transportation Department, and Fire Protection Districts:

Implement the long-term, strategic fuelbreak plan (see Chapter 15). Specific indicators and milestones should be tracked by the Boulder County Community Wildfire Protection Council.



Map 9: Four Mile Canyon Fire Land Ownership Patterns

5. Collaboration between the InterMountain Alliance, Boulder County, and the City of Boulder:

The InterMountain Alliance (see Chapter 7), staff from the Office of Emergency Management (a joint city and county program) and the Sheriff's Office should work together as part of the update of Boulder County's Multi-Hazard Mitigation Plan to strengthen wildfire emergency preparedness programs. Ongoing efforts to prepare for potential flooding following the Fourmile Canyon Fire have been impressive. Momentum and lessons from these efforts should be captured for future wildfire preparedness initiatives. The implementation of this recommendation should be monitored by the Boulder County Community Wildfire Protection Council.

6. Collaboration between the U.S. Forest Service, Colorado State Forest Service, Boulder County, City of Boulder, Fire Protection Districts, and Water Providers:

Implement collaborative, landscape-scale forest restoration projects (see Chapter 15). Specific indicators and milestones will be included in any restoration project and should be tracked the Boulder County Community Wildfire Protection Council.

7. Collaboration between Boulder County and Fire Protection Districts:

Boulder County should support the Western Boulder County Healthy Forest Initiative (Sunshine, Boulder Rural, Gold Hill, and Lefthand Fire Protection Districts). The accountability and measures for this recommendation should be tracked by the Front Range Roundtable, a 10-county stakeholder group.

8. Collaboration among Fire Protection Districts:

Make the Western Boulder County Healthy Forest Initiative a model of fire district collaboration that other districts can emulate. Progress on this recommendation should be monitored by the Front Range Roundtable.

9. Collaboration among Foresters and Fire Behavior Experts:

Lessons learned from the Fourmile Canyon Fire should be incorporated into the design of future fuels treatment projects. The Boulder County Community Wildfire Protection Council should track the progress of this effort.

10. Collaboration between the Boulder County Community Wildfire Protection Council and the private sector:

The council should work with power companies to ensure that power easements are well maintained.

11. Collaboration across Boulder County Departments:

Boulder County core wildfire staff should strengthen ties. Progress should be monitored by the Boulder County Forest Health Task Force.

Chapter 7 Preparing for Wildfire



The Boulder Office of Emergency Management seeks to enable effective preparation for, efficient response to, and effective recovery from emergencies and disasters. Their website, boulderoem.com, contains invaluable information about how to prepare for a wildfire. At this site, a reader can find current emergency information, sign up for emergency messages, get an emergency kit check list, and download the *Emergency Preparedness Guide*.

Developing an emergency plan is an important task for all households. Being informed is the responsibility of every resident.

- Have you planned how your family will stay in contact if separated by a wildfire?
- Have you considered how you could help neighbors who have special needs, such as elderly or disabled persons?
- Have you planned where you would go if you were told to evacuate and communicated this plan with everyone in your household?
- Have you made arrangements ahead of time with relatives and friends you may be able to stay with during an evacuation?

Visit the Office of Emergency Management website and become informed before the next wildfire.

Making an Emergency Plan

Immediately after an emergency, essential services may be unavailable and local disaster relief and first responders may not be able to reach you. An emergency plan is essential to your survival and comfort.

Learn about the natural hazards and risks in your area, and talk to members of your household about what to do in each case.

Assemble disaster supplies for sheltering in place and in case of evacuation. Your emergency supplies should be individually tailored to meet the basic survival needs of your family for three days to a week. Many families store their shelter-in-place supplies in one location in the home, such as a 32-gallon trash can (can be portable if it has wheels), a footlocker or a cabinet. Others pack individual backpacks that can be easily carried if evacuation is necessary.

Plan how household members will stay in contact if separated. Identify at least two meeting places – the first near your home, the second away from your neighborhood in case you can't return home. Also, choose an out-of-town friend or relative as a single point of contact, and make sure each member of your household knows how to reach this person (a wallet-sized contact list for everyone to carry can be useful), by phone and by email.

Draw a floor plan of your home and designate two escape routes from each room.

- Post-emergency numbers by the phone.
- Teach children how and when to call 911.

Make sure everyone in your home knows how and when to shut off water, gas and electricity at the main switches. The decision to turn off your utilities will vary depending on the type of emergency. Consult with your local utilities if you have questions. Their phone numbers can usually be found on your monthly bill.

Determine in advance of an emergency what to do with your pets. Except for service animals, animals are not allowed in public shelters.

Practice your plan with your family regularly. Take the time to practice evacuating your home, and talk about “what if” scenarios with members of your household. Studies show that people who have thought about and practiced their emergency plans are much more likely to survive, and recover more quickly from disasters.

The Lesson of the Fourmile Canyon Fire: The Problem of Underinsurance

Thousands of community wildfire protection plans have been written throughout the country following passage of the federal Healthy Forests Restoration Act of 2003. These plans address important topics such as risk assessment, fuels reduction, defensible space, evacuation, and firefighting capabilities. Very few plans, however, address one of the key lessons learned from the Fourmile Canyon Fire — most homes are dramatically and systematically underinsured against wildfire.

A survey of individuals who lost their homes in the Fourmile Canyon Fire found that over 60% were underinsured by an average of more than \$160,000. This finding is not unique, in wildfire after wildfire throughout the country the same problem of underinsurance leads to untold financial hardship.

The common perception among members of the general public is, losing your home in a wildfire is tragic, but at least those impacted have insurance and will be able to rebuild. Most people are not aware of the financial hardships that ensue.

The biggest shock, however, comes to residents who lose their homes and learn that they are not adequately covered. They have been paying their insurance premiums for years and are satisfied with their insurance company only to learn that their policy only covers a fraction of their actual costs. Why does this problem persist? Unless you've lost your home to a wildfire, you probably are not aware of the issue.

However, homeowners who have not suffered such a loss can do something now. They can learn from their neighbors and take the necessary steps to fully insure their homes. Solving the problem of underinsurance does not require the investment of millions of dollars or the treatment of thousands of acres of forest.

To educate homeowners on the problem of underinsurance, the Boulder County Land Use Department produced the video, *Take Action to Properly Ensure Your Home Against Wildfire* (see box). It is available on Boulder County's YouTube site and can be accessed through the video section of the website, www.bouldercountycwpp.org.

Recommended Action

Educating homeowners about the problem of underinsurance may be the most cost effective wildfire protection initiative contained in this plan. The trauma and financial hardships associated with underinsurance can be avoided with successful education and outreach. Dissemination of the video and the information it presents should be a priority for future community wildfire protection efforts.

Take Action to Properly Insure Your Home Against Wildfire

By Elly Collins



Many homeowners assume their insurance coverage will allow them to rebuild if their home is destroyed by a wildfire. Bruce Honeyman, who lost his home in the Fourmile Canyon Fire, shares his experience. "Insurance companies choose estimating tools, Xactimate for example, to give the cost of a home. Our experience with our insurance company and their use of Xactimate was that it came in 50-60% of what the actual cost from our independent contractor was to rebuild the home." A survey following the Fourmile Fire found that over 60 percent of people who lost their homes were under-insured by an average amount of over \$160,000. Under-insurance is a

common problem in wildfire after wildfire across the country. This video contains vital information for homeowners so they can properly insure their home against wildfire.

Video can be found here:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

NeighborLink

There is a strong sense of community in the historic town of Gold Hill; it was the first mining district organized in the Nebraska Territory in 1859. The Gold Hill Town Meeting organizes community events and its committees work on a variety of topics, including wildfire protection. Wildfire has been an important community concern since a devastating wildfire ravaged the original town site in 1860. Gold Hill's Community Wildfire Protection Plan was completed in 2006 with strong participation from residents, who then completed a number of fuel treatment projects.

In September 2010, residents of Gold Hill were evacuated because of the Fourmile Canyon Fire. Communication among neighbors was often difficult. Everyone was desperate to know if their homes were still standing. Some needed help evacuating animals. The five, newly elected Town Council members were inundated with requests for information. Everyone in the community was looking for answers. Amy Hardy was receiving 500 to 600 emails a day from various organizations and Debra Yeager was constantly handling emails from community members with questions regarding their homes. Everyone was working to help the best they could, but the only system of communication in place was the town folk email list.

After the fire, Debra Yeager formed a committee and held meetings in her home to design a community communication system for emergency situations. They created a common form and revised it based on community input. The form includes cell phone numbers, email addresses, information about animals and important papers, and other important data (see Figure 5).

NeighborLink				
Family Name _____		Address _____		
Home Phone _____				
First Names	1	2	3	4
Age (21 and under)				
E mail address				
Cell Phone				
Work Phone				
Medications (location)				
Special Assistance				
Firefighter? Yes _____ No _____				
Extended Family Contact/Emergency Contact				
Phone				
Doctor's Name	Phone			
Source/location of additional water	Spa	Cistern		
Energy Source	Propane	Wood		
Animals (list type and names, if applicable)				
Location of food				
Veterinarian		Phone		
IMPORTANT PAPERS: Describe location and container.				
Close neighbors that would be your choice for a "circle of friends" or Pod in an emergency.				
Last Name/Address _____				
Last Name/Address _____				
Last Name/Address _____				
Last Name/Address _____				
Last Name/Address _____				
Reunification point with children from school _____				
Who is authorized to pick up your children from school in the event of an evacuation?				

Figure 5: NeighborLink Form

The committee divided the community into five pods and assigned a leader to each pod and a leader for the overall system. Each pod leader has three or four assistants, who in turn have three or four families who comprise a "circle of friends." Each pod leader has a complete set of forms and contact information for the entire community so that the system will work even if key individuals are out of town.

The Gold Hill communication system is called **NeighborLink**. It is a "phone tree" to quickly connect neighbors to share vital information during an emergency. It is a support network to quickly connect neighbors so that they are able to provide necessary assistance.

Approximately two-thirds of the Gold Hill community filled out the forms (electronically and hard copies) and are participating in this initiative. Gold Hill leaders have informed other mountain communities in Boulder County about **NeighborLink** and many expressed an interest in using a similar system in their community.

NeighborLink is in place because Gold Hill has engaged leaders, a strong sense of community, and effective networks and institutions. Gold Hill leaders saw a clear need and quickly moved to respond using local knowledge and resources. The community of Gold Hill possesses significant social capital, connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them. These connections are tremendous assets that help empower residents and the town and serve as the foundation of community wildfire protection.

Emergency Planning by Mountain Mayors and Community Leaders

Mayors and community leaders from Nederland, Gold Hill, Allenspark, Jamestown, Lyons, and Ward have come together to review and improve their emergency preparedness plans. Rebecca Lawrence, a mountain resident and volunteer victim advocate with the Sheriff's Office Victim Assistance Program, conceived the idea as a result of the Fourmile Canyon Fire.

Rebecca provided critical assistance to Gold Hill evacuees during the fire and when they returned to their homes. She realized that mountain communities needed to review their own wildfire and disaster preparedness plans. She proposed a joint effort among neighboring towns to foster relationships, share resources and ideas, and broaden the sense of community.

Starting in the Spring of 2011, the InterMountain Alliance has met monthly. It is considering a number of wildfire related efforts, including how best to support firefighter and their local fire districts, and how to facilitate the evacuation of large animals.

"We're all in it together," said Nederland Mayor Sumaya Abu-Haidar. "We're part of a larger community than just our own towns, and there's a strong connection between mountain folk."

"This group is meeting not because there is a deficiency in the emergency system," said Lyons Mayor Julie VanDemelen. "It's complementary to that and to the firefighters fighting fires and the Sheriff's Office handling evacuations."

This collaborative effort is a powerful example of the type of community-based initiative that is needed to prepare mountain towns for future wildfires.

Jack Thompson is Rebuilding his Home...

Jack Thompson has lost his home to wildfire, twice—in the Fourmile Canyon Fire and in the Black Tiger Fire. In 1989, he had a full replacement cost policy. When the final amount was tabulated for replacement of his home, the insurance company paid all of it. Jack's situation, however, is much different following the Fourmile Canyon Fire.

Full replacement cost policies have gone by the wayside following the enormous losses associated with the Oakland Hills fires in California and Hurricane Andrew in Florida.

After the Fourmile Canyon Fire, Thompson was surprised to learn that his insurance would not cover the full cost of rebuilding his home. He is not alone. Many people believed their insurance policies provided them adequate coverage and by paying their annual insurance premiums they have done their part in protecting their future. The lesson of the Fourmile Canyon Fire is, do not assume you are fully insured—understand your policy and update it annually.

Jack Thompson is rebuilding his home again, but this time he is not rebuilding the home he had. He can't afford it.

Chapter 8 Protecting Homes — Defensible Space



Defensible space is an area around a structure where fuels and vegetation are treated, cleared and/or reduced to slow the spread of wildfire towards the structure. Defensible space also reduces the chance of a structure fire moving from the building to the surrounding forest or other nearby homes. Defensible space provides room for firefighters to do their jobs.

A goal of virtually every Community Wildfire Protection Plan, including this one, is to encourage homeowners to create effective defensible space. Creating defensible space is often noted as one of—if not—the most important actions individuals can take to protect their home from wildfire.

Stories from the Fourmile Canyon Fire show that creating defensible space can help save your home from wildfire. Defensible space work, conducted over a 15-year period, was a key reason Dave Steinmann's home, and the homes of his neighbors, are still standing.

Map 10 illustrates the three zones that make up defensible space. Additional information on defensible space is available on the county's website mitigation website (<http://www.bouldercounty.org/live/environment/land/pages/wildfiremitigation.aspx>) and the Colorado State Forest Service website (<http://csfs.colostate.edu/pages/wildfire.html>).

Past programs have been successful in promoting defensible space. With all the recent wildfire activity, Boulder County residents are aware of the need to undertake this work. In a 2007 survey, 97% of county residents in fire prone areas reported taking action to create defensible space. Assessments from local Community Wildfire Protection Plans, however, show that many residents have much more work to do in order to create and maintain **effective** defensible space around their homes. The Fourmile Canyon Fire provides many important lessons for improving defensible space programs.

Acknowledging the enormous amount of work that has taken place to create defensible space, the challenge remains of how to get more people to take more effective action. This chapter does not document what is already being done; it focuses on how to improve existing programs.



Map 10: Sample Wildfire Mitigation Plan



2010 Fourmile Canyon Fire approaches Steinmann home



Defensible space work over 15 years helps save Steinmann home



Defensible space work by Steinmann credited with helping to save neighboring homes

Model Defensible Space Work

Residents creating defensible space and communities undertaking fuels reduction projects can help protect individual homes and entire neighborhoods from wildfire. The 2010 Fourmile Canyon Fire burned nearly every tree in Emerson Gulch until it hit Dave Steinmann's property. These three photos illustrate the benefits of Dave's 15 years of work creating effective defensible space, forest mitigation undertaken by the community of Gold Hill associated with its Community Wildfire Protection Plan, and other wildfire protection efforts used by Dave and his neighbors. Most of the homes below Dave's were destroyed by the fire. If he had not mitigated his property, the fire would have jumped the road, continued to burn through tall grasses and trees, and threatened many of his neighbors' homes.

Approaches for Promoting Defensible Space

There are many ways to encourage more homeowners to create and maintain defensible space. As part of this planning process, we are exploring four options: providing financial incentives, instituting additional defensible space requirements or regulations, education and outreach programs, and collecting and publicizing information as part of a wildfire hazard rating system. A detailed description of a wildfire rating systems follows because it serves as the basis of any defensible space initiative.

Wildfire Hazard Rating Systems

Across the country, many organizations have developed and implemented systems

for ranking or scoring wildfire hazard. The insurance industry, the National Fire Protection Association, Community Wildfire Protection Planning efforts, fire districts, and many others have their own surveys, formulas, and methods for assessing the relative wildfire hazard facing an individual home, a community, or larger geographic area.

The Boulder County Wildfire Hazard Identification and Mitigation System

In 1991, the Boulder County Wildfire Mitigation Group formed a technical team to develop a hazard rating system to identify and rate areas of Boulder County for their relative wildfire hazard. By 1992,

this system evolved into the Wildfire Hazard Identification and Mitigation System.

The overall goal of this program was to communicate information effectively to all interested parties and to ensure follow up with action programs. It was designed to:

- Collect site-specific fire hazard information
- Compile the information into a central database
- Display the information as various kinds of maps, tables, and other graphical outputs
- Get the information out to individuals to be used on the ground

The program had many different components, including:

- Educate and motivate homeowners and increase community involvement with wildfire awareness and preparation
- Assist land managers and planners in making appropriate decisions about land management and development in fire prone areas

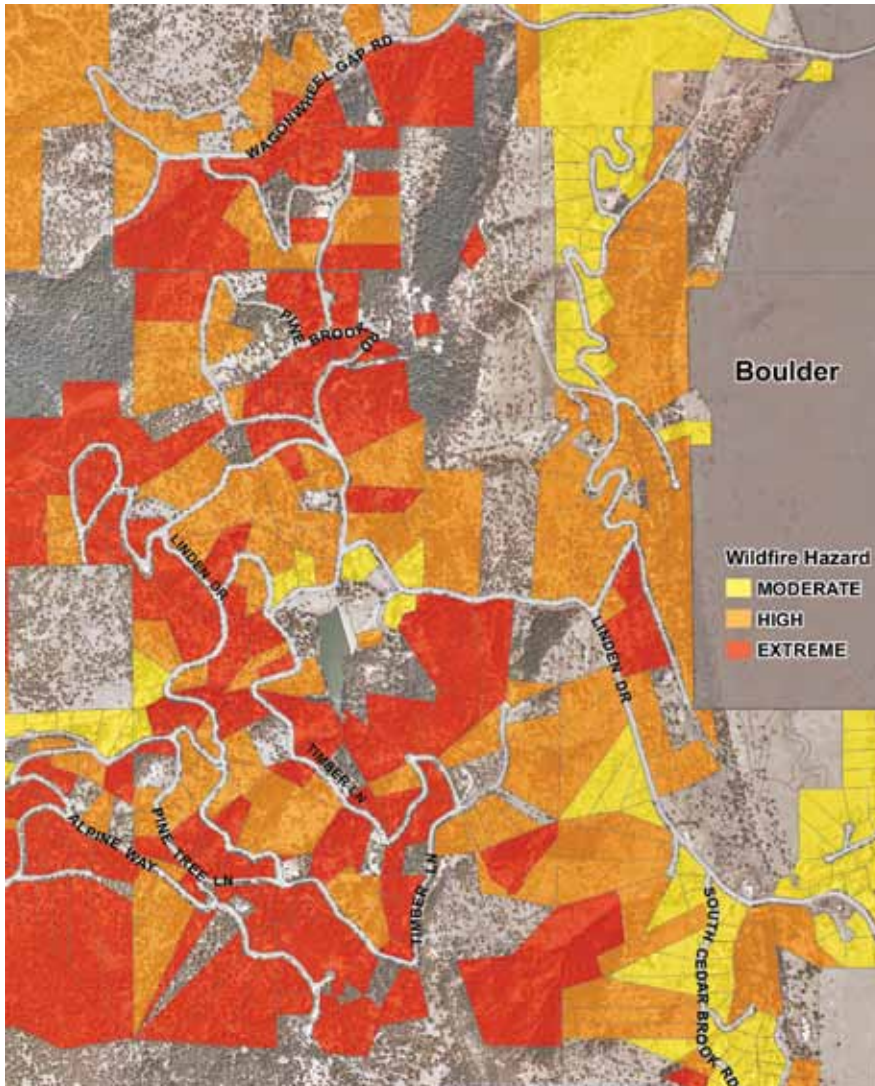
In the 1990s, the program generated a great deal of interest and excitement. It received national awards, and Boulder County was recognized as leader in the field with this innovative, cutting-edge program. An example map of individual parcels and their accompanying ratings shows an output of this system (see Map 11).

Colorado Springs

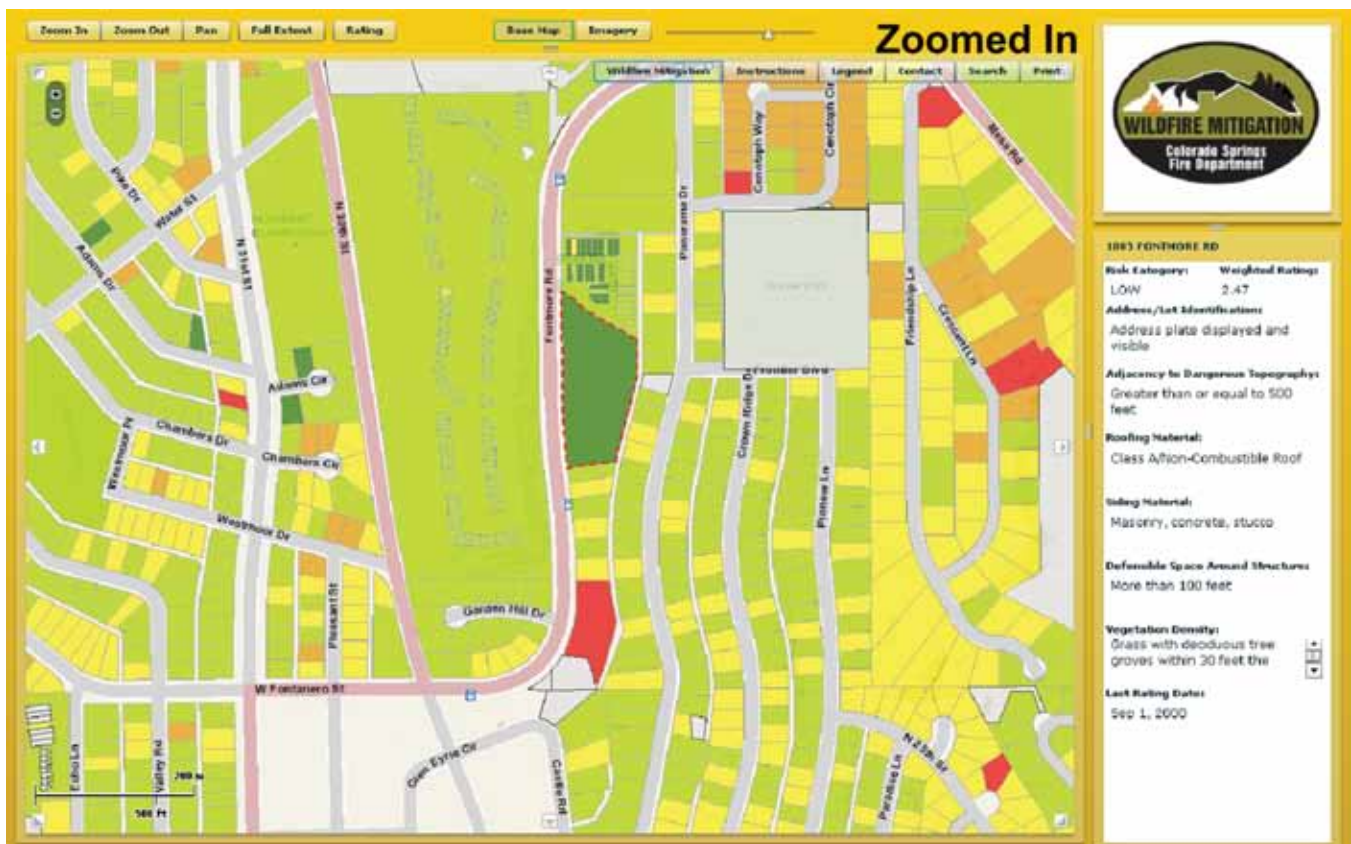
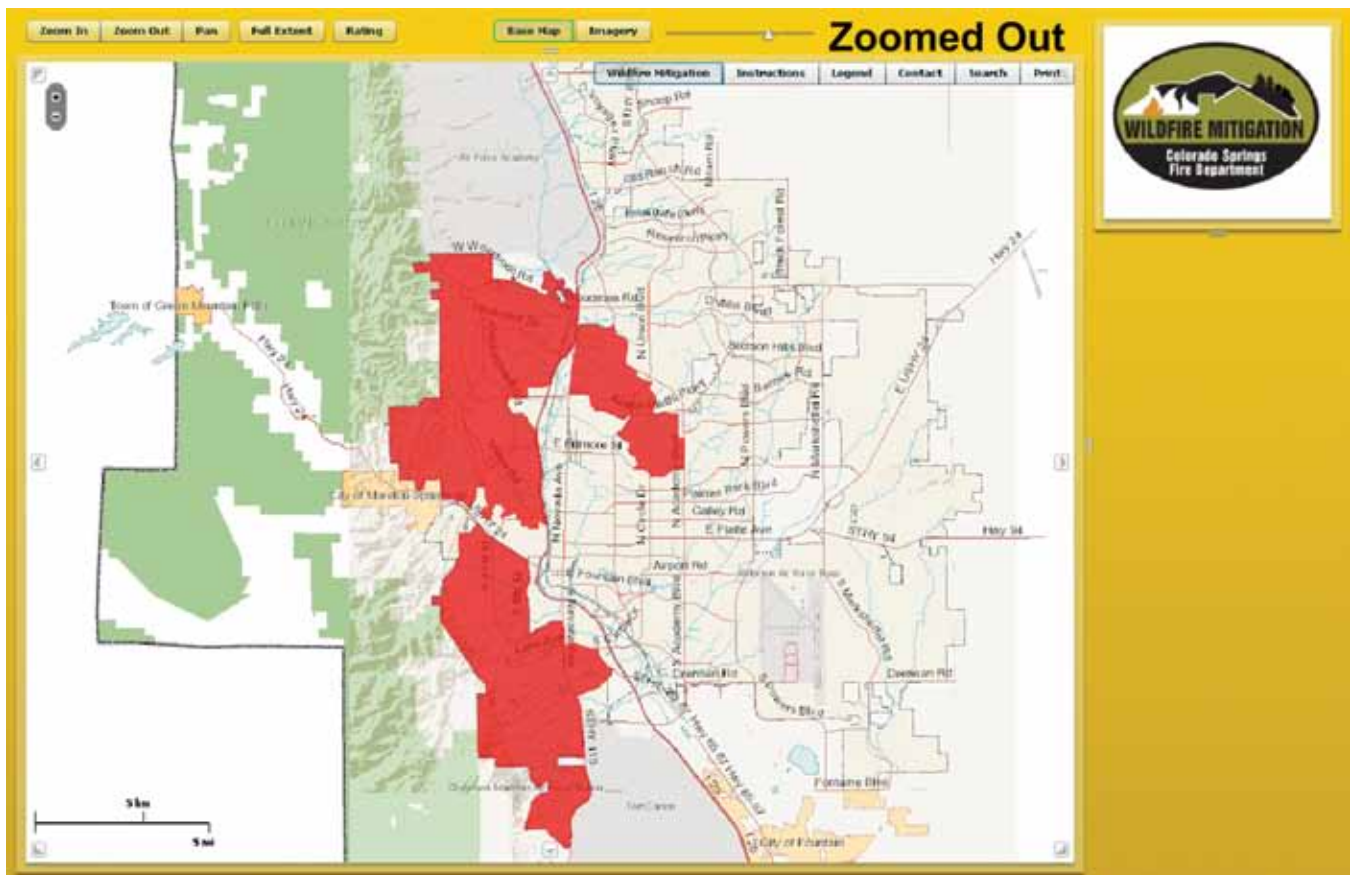
The Colorado Springs Fire Department also developed a wildfire ranking system. It includes an interactive map for homes in their district's wildland-urban interface. Residents can go online and receive their hazard rating — one of six categories, ranging from low to extreme — and see the ranking of all their neighbors (see Map 12 for example outputs of this system).

The Insurance Industry

Insurance companies use their own wildfire ranking systems. A number of insurance companies use the FireLine product to help underwrite new business and manage total wildfire exposure. In 2010 FireLine ranked the risk from three factors — fuel, slope, and access — as



Map 11: Wildfire Hazard Identification and Mitigation System



Map 12: Colorado Springs Fire Mitigation Maps

well as overall hazard ratings for specific properties known as the Brushfire Adjusted Rating Score or Brushfire ARS. This information is available for individual properties in nine western states, including Colorado. The score ranges from 0 to 30; the higher the score reflects the greater risk.

Lessons from Past Hazard Rating Systems and Similar Programs

The goal of many rating systems is to encourage homeowners to take action. The specific action addressed in this chapter is for homeowners to create effective defensible space. The lessons we have learned from past rating systems can help inform the development of a new and improved system. These lessons are discussed below.

1. It takes a great deal of money, time, and effort to collect, analyze, and display all the information included in most hazard rating systems

It is true that some communities have been able to develop wildfire hazard ratings systems. With the excitement surrounding a new program, counties and fire districts have been able to recruit and train volunteers, or pay staff, to perform individual assessments for every home (or multiple homes) in their jurisdiction. Regularly updating these assessments, however, has proven difficult.

The Boulder County program has had a number of successes and the information it collected is still used today. However, the program has never collected the necessary information (a detailed, six-page survey) for all the homes (hundreds) in the large target area (western Boulder County). In addition, it has not been able to update the information from the homes it has surveyed, and this information is not readily available to homeowners.

2. Rating systems need a simple and cost effective way to be updated

With more funding and a smaller geographic area, Colorado Springs completed assessments for homes within its areas of concern and the results are readily available via an online interactive map. The community must be applauded for all its efforts to make this program come to life. However, recruiting more volunteers (or paying staff) to regularly update the defensible space and vegetation density components as well as other elements of the scoring system present a significant challenge with no current solution.

Creating defensible space is not a one-time effort — it requires continual work over the long term. Any scoring system for defensible space must be designed so that it can be sustained.

Protect your Home from Wildfire

By Jon Hoover



A number of Doug Young's friends lost their homes in the Fourmile Canyon Fire. Instead of sticking his head in the sand, he is doing everything he can to avoid having to go through

the devastation his friends experienced. This video shows crews creating defensible space around Doug's home and discusses the need and lessons of wildfire mitigation efforts. "We have to imagine each one of these trees possibly engulfed and how do we feel about that," explains Doug, "and it really gave us a different perspective and that's when we started going through and saying we really have to take some drastic measures. A lot of people think that fire mitigation is just taking out every other tree and calling it good, but really you need a much more comprehensive plan. You really need to think about all the directions a fire can come from."

To view this video, go to the Boulder County YouTube Channel or go to www.bouldercountycwpp.org and look for the wildfire videos section.

3. Homeowners who take the recommended actions need to see a corresponding change in their score

Scores assigned by existing insurance company systems rarely change over time. Although FireLine includes a fuels component, it does not effectively capture the concept of defensible space. An individual homeowner could create the ideal defensible space around their home and his/her FireLine score would not change. This fact can be very discouraging to a homeowner who wants to do the right thing. Instead of helping encourage homeowners to remove vegetation, a scoring system where the number rarely changes can lead to apathy and inaction.

Any countywide assessment tool must reinforce and advance the educational message being delivered and help lead to direct actions by homeowners. Individuals who work to create better defensible space need to see an appropriate reduction in their assessment or score. Organizations — fire districts, county governments and insurance companies — looking to reward or acknowledge desired behavior also need a tool to accurately capture the work people perform.



Homes without defensible space

4. Results of scoring systems should be made available to neighbors

Some residents use their neighbors as an excuse for not creating defensible space. Surveys show people are quick to criticize the condition of their neighbors' properties. I am not the problem—it is the other guy. Some even justify their inaction with the thought, “My neighbor is not doing any mitigation so why should I?”

To determine who is doing good defensible space work — and who is not — we cannot rely on hearsay. We need a metric that is scientifically sound, uniformly calculated, easily communicated, readily available, regularly updated, and commonly used. With such a metric, more people will be motivated to take action, to assume responsibility for their own property, and to go beyond making superficial changes to actually removing the amounts of material necessary to help protect their homes from wildfire.

5. Peer pressure is an effective motivator

The simple disclosure of information and resulting peer pressure can change individual behavior and transform entire industries. For example, manufacturers are required to state the amounts of chemicals they release directly to air, land, or water (or transfer to off-site) as part of the Toxic Release

Inventory. The U.S. Environmental Protection Agency produces an annual inventory and makes the information available in a computerized database.

Armed with this data, communities have more power to hold companies accountable. The data often spurs companies to focus on their chemical management practices since they are being measured and made public. In addition, the data serves as a rough indicator of environmental progress over time.

The Toxic Release Inventory has been characterized as the most successful environmental regulation of the last ten years due to consistent decreases in the releases of reportable chemicals and the use of reported data by a broad spectrum of stakeholders. The decreases in the amounts of pollutant releases are surprisingly high, given that the program solely requires reporting without any performance requirements.

Companies releasing toxic chemical is not comparable to homeowners failing to reduce hazardous fuels on their property. However, gathering and disclosing information on the status of an individual homeowner's defensible space may be an effective and efficient way to motive individuals to action and help protect communities from wildfire.

A Defensible Space Scoring Pilot Study

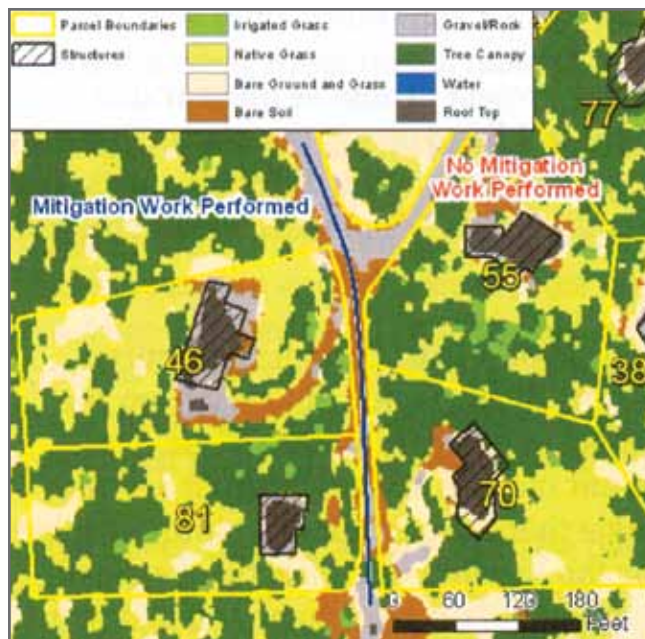
Based on the lesson of past wildfire hazard rating systems, a defensible space pilot study was designed by the Boulder County Land Use Department and completed by Riverside Technologies. The study's full, final report is contained in Appendix E.

The study was designed to research a method of using remote sensing and Geographic Information System analysis to create a score for the defensible space of individual properties. High-resolution satellite imagery from 2008 and 2010 was used so that these scores could be compared over time. A scoring system of 0 (good defensible space) to 100 (poor defensible space) was developed.

The scoring system tested in the pilot study produced measurable, repeatable, and customizable scores for the parcels tested. The score adjusts appropriately with differences in vegetative cover within the different zones. The cost of regularly calculating scores is not prohibitive. Examples of the study's methods and results are displayed in Maps 13 & 14.

While a defensible space scoring system has many advantages over current programs, it is important to note that this system only addresses a subset of all the actions individuals must take to protect their homes from wildfire. As a result, this score would not reflect all wildfire risks.

The pilot study's final report contains a number of recommendations. Based on the findings of this pilot study, the Land Use Department and its Geographic Information System staff should work to further develop and implement a defensible space scoring system in order to launch a new program. Grant funding to support the development of this innovative approach should be explored.



Map 13a: 2008 final parcel scores (land cover)



Map 14a: 2008 final parcel scores (image)



Map 13b: 2010 final parcel scores (land cover)



Map 14b: 2010 final parcel scores (image)



Boulder County has been a national leader in requiring the use of ignition-resistant building materials. For example, the County Commissioners passed a resolution requiring all new roofs in the high wildfire zone to be Class A — effective against severe fire exposure — in 1989. A comprehensive set of requirements ensure that new homes in this zone use appropriate FireWise construction (see figure 6).

With requirements in place for new construction, **improving the existing housing stock** is the most pressing issue facing this plan. The top priority for future action for these homes is the replacement of wood roofs. Additional programs, such as replacing wood decks, should follow after wood roof replacement goals have been met.

The Dangers of Wood Roofs

The roof is the most vulnerable part of a home to a wildfire. Firebrands can fall on a roof, landing in the nooks and crannies where a fire can easily start. If the roof ignites, chances are good that the home will be destroyed. Firebrands, burning material lifted by the wind, can come from several kilometers away — an ignition source even the best defensible space cannot eliminate.

Many studies document the dangers of wood roofs. One conducted of 1,850 Southern California homes involved in wildfires found that houses with untreated wood roofs were 2 to 21 times more likely to be destroyed by wildfire than those

with fire-resistant roofs. A study of 450 homes destroyed by wildfire in Australia concluded that the presence of wood shake roofs was the single most influential factor in reducing house survivability under a given fire intensity. In the Grainwood Way San Diego fire, there was a 100% correlation between having a wood roof and home destruction. Other studies have concluded that the most cost effective method of increasing house survivability during a wildfire event is the presence of a fire-resistant roof. Installing a fire-resistant roof does not guarantee your home will survive a wildfire; however, replacing your wood roof will significantly increase the odds your home will remain intact.

Replacing Wood Roofs

Like Boulder County, some jurisdictions have prohibited the construction of new wood roofs. Insurance companies have increased premiums, or in some cases, refused coverage for homes with wood roofs. The City of Boulder has taken one step further: It requires all residents replace their wood roofs by 2014. Boulder County is taking a different approach with this plan. Its preference is to facilitate, rather than require, the replacement of wood roofs.



Building with Ignition-Resistant Materials

PDF Available:

<http://www.bouldercounty.org/find/library/environment/w06ignitionresistmats.pdf>

Figure 6: Building with Ignition Resistant Materials

Low Interest Loans

To encourage homeowners to replace their wood roofs and undertake other fire safety improvements, the Citizen Advisory Team (see Chapter 6) recommended the establishment of a low-interest loan program. Education and a financial incentive (positive) will trigger some homeowners to take the appropriate action. As a result of this recommendation, the county's EnergySmart program expanded its micro-loan program to include the replacement of wood roofs. See www.EnergySmartYES.com for details.

Private Sector Options



Insurance companies are encouraging homeowners to replace their wood roofs. Higher insurance premiums, or denial of coverage, also provide a financial incentive (negative) that is pushing homeowners to act.

Results

Boulder County Community Wildfire Protection Council should adopt a goal of replacing all wood roofs in high hazard areas by a specific deadline. To help establish this deadline, the Boulder County Land Use Department should identify the number of homes with wood roofs in high wildfire hazard areas. The number of wood roof replacements should be tracked and reported on annually by the Building Division. Based on the findings of the annual reports, additional actions may be considered to ensure the wood roof replacement goal is met.

Colorado State Forest Service Publications

Many websites, including the Boulder County Land Use Department and the Colorado State Forest Service, have a wealth of information about FireWise construction. Colorado State Forest Service publications include:

- FireWise Construction: Design and Materials
- FireWise Decks
- FireWise Roofing Materials
- FireWise Siding
- FireWise Windows and Glass

Visit <http://www.bouldercounty.org/government/dept/pages/landusemain.aspx> and <http://csfs.colostate.edu>.

How Sunshine Resident Karen Simmons Helped Save Her Home from Wildfire

By Elly Collins



The Fourmile Canyon Fire came within two feet of Karen Simmons's generator house. "I'm grateful," says Karen, "grateful to the firefighters, to the mitigation and the work I had done on the house, I still have my house." The generator house and Karen's home are still standing because of valiant efforts of firefighters and the mitigation work done by Karen. This work included covering her cedar siding with ignition-resistant material, replacing her single pane windows with double pane glass, creating defensible space around her home, and supporting a larger fuel break that was used by slurry bombers to help contain the blaze. Karen explains just how visible the effectiveness of mitigation was on her property, "Where I had done the limbing,

the fire burned through the grass, but did not burn the trees, just burned the grass and kept going. But over here on this side where I had not done the limbing and where we have open space land, the grass caught the limbs and the limbs then tried to burn some of the trees and so it's pretty clear that this limbing really does a very good job." Boulder County's Fire Management Officer Jay Stalnacker also discusses the importance of wildfire mitigation measures in this video.

To view this video, go to: <http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

Chapter 10 Healthy Forests



Over 17,000 people call the forested foothills of Boulder County home. The forests that are present in the county are dynamic and ever-changing ecosystems that require periodic disturbances like fire, insect outbreak, and browsing animals to keep them healthy. They are living systems that have evolved with these disturbances and actually depend on them to stay healthy. Without periodic disturbances our forests become old, static, overgrown and susceptible to insect and disease outbreaks. With modern settlement of the West, many of the natural processes which once maintained our healthy forests have been altered or completely eliminated, leaving hillsides of stressed unhealthy forests that are in need of active forest management.

Fortunately, there are steps that public land management agencies and private landowners can take that mimic natural process and are based on current science. These steps can help restore our forests to a more natural forest (stand) density and structure. By actively managing our local forests, we can accomplish multiple objectives and not only restore the health of our altered forests but also make our communities located in the wildland urban interface safer from future wildfires and insect outbreaks.

Working on Public Land

Boulder County Parks and Open Space, City of Boulder Open Space and Mountain Parks, the Colorado State Forest Service, the United States Forest Service, the Bureau of Land Management and other land management agencies are responsible for managing large tracts of publicly owned land in the foothills of Boulder County. These land management agencies have the unique opportunity to be able to influence the health of our forests and future fire severity on a larger landscape scale than is usually possible on private land. By treating larger acreages of land it is possible to restore large chunks of forests, help protect nearby private lands, and influence the behavior of future wildfire events in the county.

Natural disturbances like fire and insect outbreaks that help maintain healthy forest ecosystems do not recognize property boundaries, which is why larger scale treatments on both public and private land are critically important. Land management agencies have the ability to design forestry harvest, thinning and prescribed fire treatments that meet multiple objectives including restoring the health of a forest and reducing the severity of future fires. Wildfires are a natural occurrence in our forests and it will never be possible to eliminate them. Larger fuelbreaks and restoration treatments slow fire spread and intensity as it moves from the wildland into developed areas, and provides firefighters an opportunity to more safely attack the fire.

As an example: Boulder County Parks and Open Space has been thinning large sections of forest at Mud Lake Open Space just to the north of Nederland. The treatments at Mud Lake help restore the health and structure of the local forests and also reduce the anticipated intensity of future wildland fire. The cutting projects at Mud Lake are great examples of how land management agencies can help make neighboring communities safer from future wildfire events.

Working on Private Land

You are the steward of your land and the action, or lack of action, that you take will have a significant influence over the future health of your and your neighbors' backyard forests. If you make the decision to become an active steward of your land, work with professional consulting foresters or the Colorado State Forest Service to create a management plan. The work you do enhances the work completed on nearby public or private lands. By actively managing your forests, you can leverage the treatments completed by others and not only increase the health and vigor of your trees but also begin creating entire forests that support increased plant and animal biodiversity and also protect our vital watersheds from wildfires. By aggressively reducing the number of trees, we can create healthier forests that are more resistant to insect and

disease outbreaks and resilient to wildfire. Trees that remain after a thinning project quickly respond and grow more vigorously and are more resistant to future insect and disease outbreaks

The future health of your forest is in your hands. It does not matter if you own 500 acres or .5 acres; everyone has a role to play. Treatments on public land can help firefighters gain an upper hand when battling the next blaze; however, if you don't take action to disrupt continuous fuels and thin trees around your home site, then the fire mitigation work on public land probably will not help your forest or individual home site. There will always be a need to have good zones of defensible space around your home site. Remember that it is not a question of if a wildland fire will occur, but when will that fire occur.

Neighbors working with neighbors and communities coming together to tackle shared forest issues is another crucial step in a community's ability to change future fire behavior and intensity. With the existing land use patterns in the county, it can often be challenging to modify enough fuels on our own property to effectively protect our home from future fire events. Neighbors and communities need to work together and build relationships with their local Fire Protection District and the Colorado State Forest Service in order to strategically plan fuelbreaks and to begin linking zones of defensible space in the neighborhood. The more engaged and active a community becomes the better results they will see when the next large fire event occurs. Pooling resources and leveraging the expertise found in the community will help lead to more trees hitting the ground and greater acreage of land treated. If we collectively manage all of our land to the best of our abilities, we will be able to make a positive impact on the health of our backyard forests and reduce the severity of future fire events.

Not All Forests Are the Same

As you rise in elevation from the plains to the Continental Divide, you pass through three distinct forest types that all require slightly different management strategies. Elevation, precipitation, slope, soils and other environmental factors have significant influence on what type of forest might grow on a section of land. By understanding the ecology that drives our forest ecosystems. We can do a better job of actively managing our forests to create a healthier ecosystem. See Figure 7 and Map 15.

Lower Montane Ponderosa Pine Ecology Life Zone

A majority of county forest landowners live in the lower foothills in forests dominated by ponderosa pine and Douglas-fir. These forests occupy the lower montane life zone (5,900-8,000 feet in elevation) and are dependent on frequent (every 10 to 30 years) low to moderately intense disturbances to stay healthy. Historically, very frequent and mainly low intensity fires burned during the hot, dry summers maintaining an open park like forest of mature well-spaced clumps of ponderosa pine trees, with Douglas-fir found mainly in moist drainages or on northerly slopes.

The Age of Fire Suppression and its Impacts

For more than 100 years, the United States has had a policy of aggressive fire suppression, putting out most natural or human caused wildland fires. This policy began when the United State Forest Service was in its infancy and saw fire as destructive to forests and dangerous to communities that were springing up in forests throughout the West. Most foresters of that time misunderstood the ecology of the forest and could not predict the long-term impacts of the policy would have. Foresters now realize the benefits of wildfire on the health of these forests. Our ponderosa pine forests depend on fire, or in the absence of fire, mechanical treatments to stay healthy.

Fire suppression has transformed the look, feel, and health of our ponderosa pine forests. Before fire suppression, our ponderosa forests were an open park like setting with as few as 10-30 mostly mature trees per acre. In addition, perhaps one third of the landscape had numerous openings, most of which were less than five acres in size, but some were quite large. Grasses, flowers and shrubs dominated the forest floor and frequent fires helped to prevent young trees from invading



Upper montane forest in Nederland



Healthy lower montane forest , Bald Mountain Open Space



Densely packed lower montane forest, Heil Valley Ranch

the openings and park like landscape. Wildfires were very frequent, but variable across the landscape and over time. Most were not very intense and rarely killed mature trees.

In the 21st century, our forests look and feel much different than in the past. We now have hillsides of young, densely packed trees with anywhere from 200-3,000 trees per acre. These trees are overcrowded and stressed from competition. Forests require the limited resources of water, sunlight, and

nutrients from the soil. Today, hundreds if not thousands of trees are competing with one another for the same resources that the 10-30 large trees did. This competition is directly responsible for the unhealthy state of the forest and is leading to a multitude of problems. These forests are often unhealthy with diseases like dwarf mistletoe that weaken and stunt their growth. Insect outbreaks, disease and risk of catastrophic wildfire are all on the rise.

Upper Montane Life Zone

As you continue to rise in elevation you transition into a new life zone known as the upper montane (7,500-9,200 feet in elevation). The ecotone (transition line) between these life zones is blurry, jagged and not perfectly aligned to a specific elevation. Instead, environmental factors such as aspect, slope, soil type and past fire history all influence where this transition occurs in the county. Forests outside of Nederland, Ward, Gold Hill and Allenspark are good examples of our upper montane forests.

Boulder County's upper montane forests are some of the most diverse forests present in the county with ponderosa pine, Douglas-fir, aspen, lodgepole pine, and limber pine dominating the landscape at the lowest elevation and Engelmann spruce and subalpine fir mixing into these forests on north slopes and at the highest elevation. The intense Colorado sun has a great influence on the species of tree that grow on certain aspects. For instance, in the upper montane life zone you would expect to find dense patches of nearly pure lodgepole pine growing on steep north facing slopes. In contrast southern facing slopes in the upper montane are often more open with sun loving ponderosa pine dotting the landscape. The upper montane forest is also commonly referred to as the mixed conifer life zone.

Wildfire Frequency and Severity

Upper montane forests are dependent on less frequent (every 50-300 years) mixed severity disturbances to stay healthy. These forests have evolved with wildfire and just like the lower montane ponderosa pine forests depend on disturbances to stay healthy. However, when fire occurs in these forests, it is much more intense with the potential to kill entire hillsides of trees. These natural fires occur much less frequently with intervals between fires anywhere from 100 to 300 years or more. The likelihood of a fire spreading

and growing in intensity is directly related to long periods of hot, dry weather. Much of the time these climatic triggers are not reached and larger fires just don't occur. But, when conditions align and fires do occur the forest has evolved to respond to fire with plant life that quickly begins to capitalize on the changed, burned environment. Lodgepole pines are text book examples of a tree species that depends on fire to reproduce. These pines mostly have serotinous cones that open and spread their seeds on the forest floor after a large fire occurs. The 1988 Yellowstone National Park fires, though likely too large in scale, are great examples of the beneficial ecological effects fire can have on our upper montane forests.

Active Forest Management

Upper montane forests in Boulder County are reaching the age when natural fire would be expected on the landscape. Large swaths of forest range anywhere from 80 to 130-plus years in age. These forests are becoming old and decadent with a need for natural fire or active forest management to sustain them. The forests are now highly susceptible to other disturbances like insect and disease outbreaks that are often a precursor to

fire. It is only a matter of time before some type of disturbance starts the forests new again.

Active forest management becomes complicated in these forests because homes and entire communities now exist in these fire dependent ecosystems. When fires occur today, it has the potential to greatly impact entire communities and the ecological benefits the forest gains from that fire are overshadowed by the destruction of the human-occupied environment. This complication is why communities and individual home owners must become stewards of their land and learn about actions they can take to protect their homes from future fire events. Private landowners and public land management agencies need to work collaboratively to strategically plan forest management projects which mimic fire and help make communities become more defensible from future fires. Fires will continue to occur, but with proper planning the ecological benefits of fire can still be gained for the forest without as much devastation to built communities.

Upper montane forest management is highly diverse. Patch cuts, ponderosa pine restoration, aspen enhancement, thinning and well-planned clearcuts are all types of management techniques that have their appropriate use.

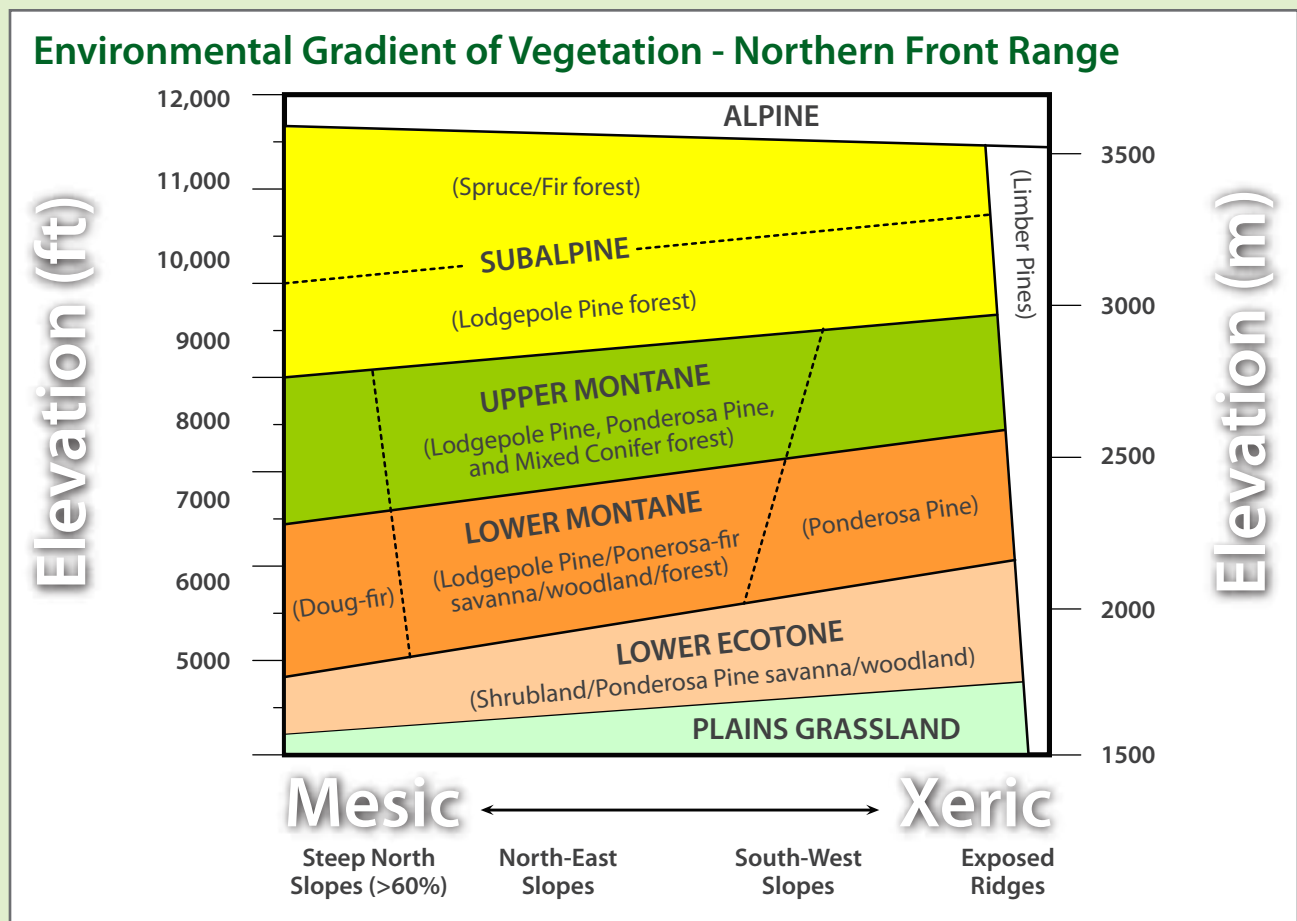


Figure 7: Environmental Gradient of Vegetation

Citation: Kaufmann, Merrill R., Thomas T. Veblen, and William H. Romme. 2006. Historical fire regimes in ponderosa pine forests of the Colorado Front Range, and recommendations for ecological restoration and fuels management. Front Range Fuels Treatment Partnership Roundtable, findings of the Ecology Workgroup. www.frftp.org/roundtable/pipo.pdf.

Depending on the location and proximity to a community, the best ecological treatment for a section of land could be very aggressive with nearly all trees being removed to little or no action being taken.

As an example, patch cuts are one of the more visually aggressive management options, but they provide communities the most protection from future fires. The ecological goals of patch cuts are to mimic fire and to open up small 1 to 40 acre sections of forest. In these patches, nearly all of the old decadent trees are removed to leave room for a future forest to spring up in its place. The cut patches of land are quickly colonized by early successional species like aspen and lodgepole pine and over decades these young trees compete with one another to become the next future forest. Patch cutting is a longer term forest management practice that helps create age and species diversity in our forest and actually makes our future forests more resistant to insect and disease outbreaks.

Wildfires in the upper montane zone can burn intensely and drop firebrands well-ahead of the main fire front. So a good way for private forest landowners to think about forest management in the upper montane is to ask themselves, "How close am I willing to let a wildfire come to my home and property?" Wherever that fire line is drawn is where there is a need to intervene with mechanical treatment.

Subalpine Life Zone

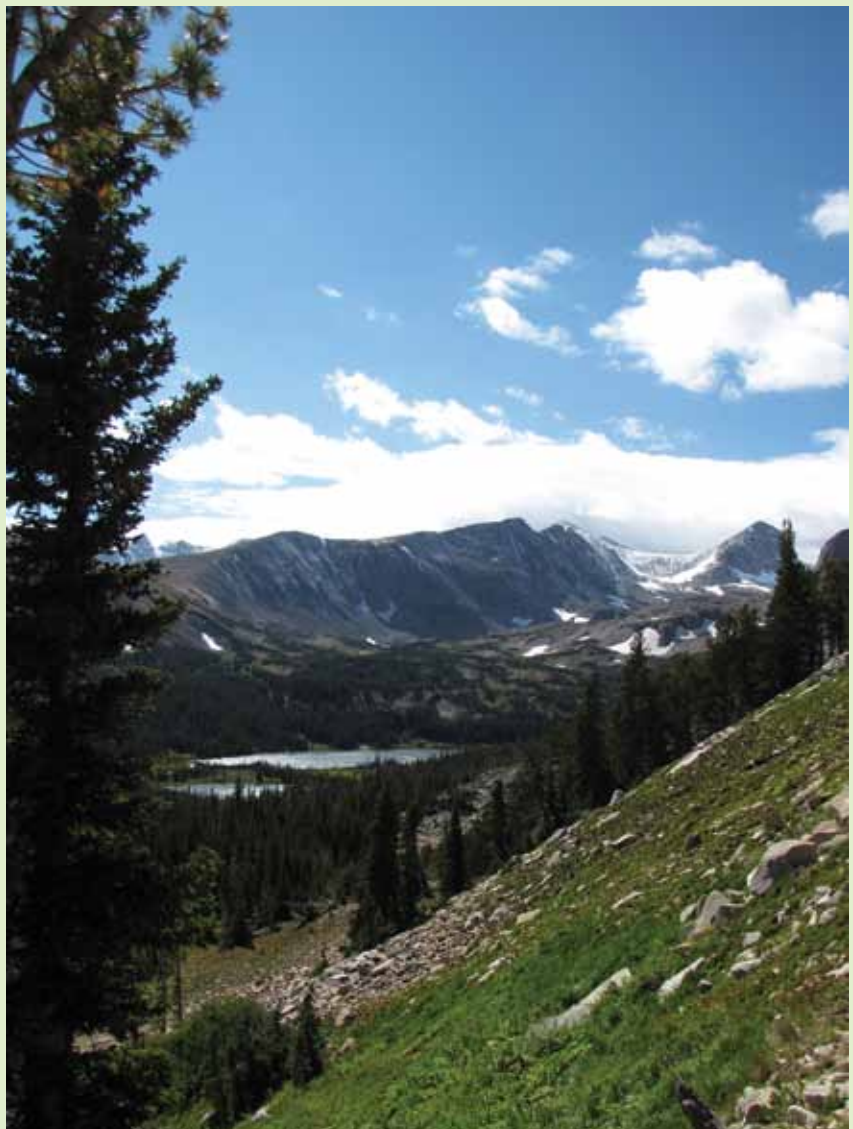
The highest elevation life zone, occurring from 9,000-11,500 feet, is known as the subalpine life zone. Like the other life zones in the county,

subalpine forests also depend on disturbances to stay healthy. Wildland fire is once again the major disturbance that shapes this life zone with very infrequent but extremely intense fires occurring every 300 to 500 plus years.

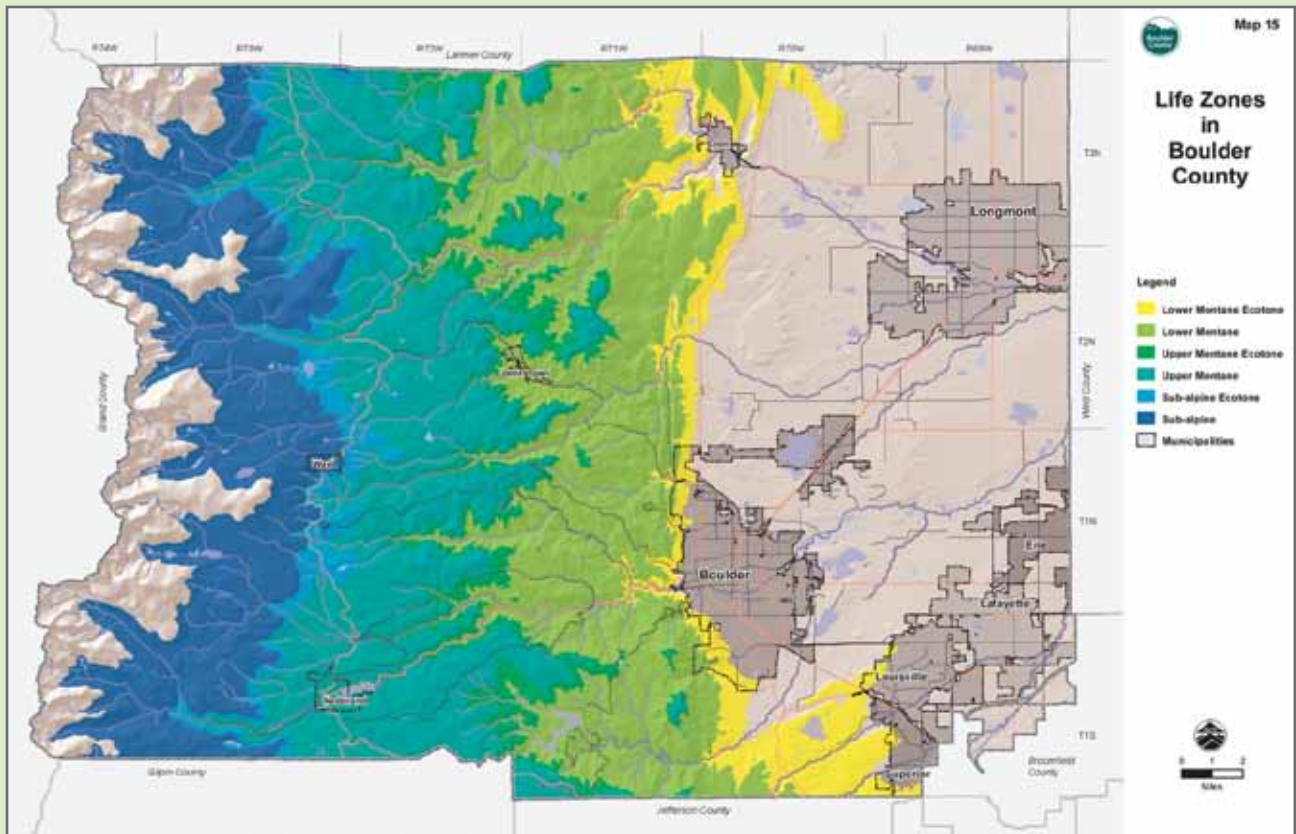
Subalpine forests have large patches of even aged lodgepole pine prominent in the lower portion of the elevation range, and even larger sections of spruce/fir forest in the higher reaches. Aspen is also a common tree found in this life zone. These forests brush the continental divide with the highest elevation line forming the area known as "treeline." Treeline is the environmental line where it becomes too harsh for even the hardiest of trees to continue to grow. Subalpine forests

grow in incredibly harsh climates with heavy snowpack, battering winds and tremendous cold temperatures. Large swaths of the Indian Peaks Wilderness area are good example of the subalpine life zone.

The age of fire suppression has had the least effect on the overall health of the subalpine life zone. At this time, there is not a great need for ecological restoration because overall the life zone is still functioning naturally. However, if the policy of fire suppression continues there will eventually become a need for more intensive forest management in these areas as well. Lastly, the lack of homes and communities in this life zone decreases the need for wildfire mitigation in this area.



Subalpine forest in the Indian Peaks Wilderness



Map 15: Life Zones in Boulder County

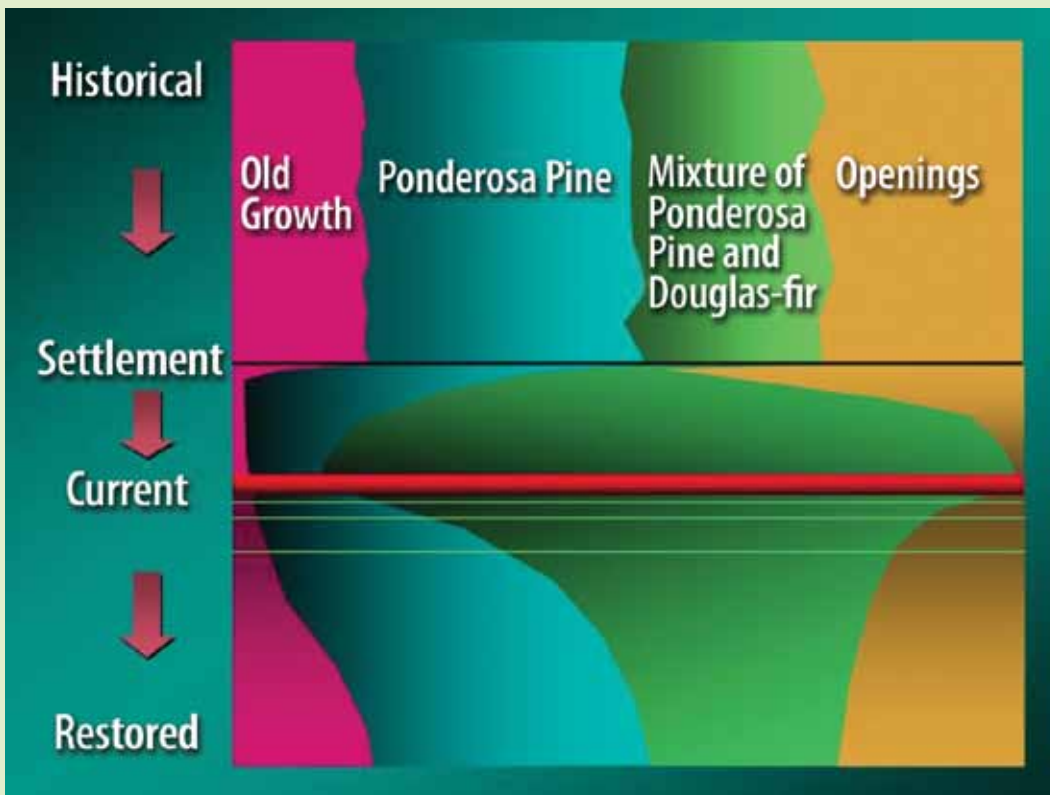


Figure 8: Changes in landscape components before and after Euro-American settlement and recommended during restoration.



Fire-starved forests can often be returned to some semblance of health with 1) prescribed fire or 2) multiple objectives fire if the treatment occurs before the forest degrades too far from its natural state. Due to fire exclusion, many forests have already degraded to a point where the reintroduction of fire is no longer an option. Information in this chapter only applies to those forests in the appropriate condition.

Prescribed Fire

Prescribed burns, or planned ignitions, are critical to improving the health of Colorado's forests. Benefits from these treatments include reducing fuel build-up, preparing the land for new growth, promoting the germination of certain plants and trees, naturally thinning overly dense forests and creating wildlife habitat diversity.

Prescribed fire is the controlled application of fire to the land to accomplish goals, such as clearing fuel, assisting the spread of tree seeds, or reducing the amount of woody materials in overcrowded and unhealthy forests. These fires may be human-caused or naturally occurring events. They are conducted by trained management professionals who use special fire control techniques to ensure the safety of the burn crew, nearby residents and property.

Living, working or recreating near an active prescribed burn may be frightening to people. The smoke and smell may cause some concern for safety of life and property. But, it is important to remember that prescribed burns have been carefully planned and are executed by highly trained professionals who have taken into account your safety and the well-being of your property prior to initiating a burn.

Opportunities do exist throughout Boulder County for the implementation of prescribed fire because of the collaborative forest restoration effort between private landowners and public land management agencies. This plan helps continue this work and promotes prescribed fire as a tool to reintroduce fire into the ecosystem.

Benefits of a Prescribed Burn

Following is a list of benefits that are gained from successfully executing a prescribed burn.

Reduces fuel build-up: A prescribed fire may be ignited to reduce fuel build-up that has accumulated over many years. Dead wood, overcrowded trees and thick layers of pine needles can all contribute to catastrophic wildfires.

Prepare the land for new growth: The majority of the nutrients in a forest are in the trees and shrubs, rather than in the soil. When excessive vegetation or needle layers are burned off, these vital nutrients are released into the soil and become available for new plants to grow. This is an effective way to improve the health of a forest.

Help certain plants and trees germinate: Lodgepole pine and other fire-dependent species sometimes require fire to assist in germination or seed dispersal. A prescribed fire can spread the seeds of these species, allowing them to reproduce in ways that may not have been possible for many years.

Naturally thins overcrowded forests: Historically, fires thinned Colorado's forests. Thinned forests recover faster and are more resistant to insect and disease attacks. Currently, most of Colorado's mature forests are overcrowded and will remain unhealthy unless and until land managers intervene with prescribed fires.

Creates diversity needed by wildlife: Fire creates varied vegetation patterns, resulting in diverse habitats for plants and animals. Wildlife benefit from grazing on new plant growth; shrubs and tree seedlings produce edible leaves when resprouting after a fire.

What to Expect During and After a Prescribed Burn

Smoke: Fire management professionals make great efforts to reduce smoke impacts; however, some smoke will be unavoidable.

Smell: A campfire smell may be present for several days after the burn.

Scorching: Some scorching of lower tree branches is to be expected. After the fire, some needles will turn orange and eventually drop from the tree.

Weeds: Weeds commonly invade disturbed areas and can be expected at burn sites.

Barren Look: Immediately after a burn, the treated site may appear charred and lifeless. This temporary condition will be replaced by the resprouting of grasses, shrubs, forbs and seedling trees.

Multiple Objectives Fire

The response to a wildland fire is based on an evaluation of the risks to firefighters and public safety and the circumstances under which the fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values to be protected.

Two management responses have been identified for the management of natural, unplanned ignitions on Boulder County Parks and Open Space land: full suppression and multiple objectives management. All initial attack and human-caused fires will be managed with a full suppression objective. Once an incident moves into extended attack mode, a multiple objectives management strategy will be considered.

Full Suppression

Full suppression is defined as employing available and appropriate resources to their fullest extent to extinguish an unplanned wildland ignition. Suppression is accomplished as quickly as possible with the intent to limit the fire perimeter to the greatest degree possible and prudent given the existing conditions and circumstances.

Multiple Objectives Management

Multiple objectives management is defined as any suitable action to meet the fire management unit objectives. Typically, these objectives range from full suppression to allowing a natural fire to burn within a unit. The first requirement of designating a multiple objective management strategy for a parcel of land is the ability to do it safely, without threatening life or property.

Unplanned, natural ignitions may be managed to achieve land and resource management plan objectives when risk is within acceptable limits. Various properties may be candidates for a multiple objectives suppression plan, given a set of conditions and indices are met and/or present at the time of the unplanned ignition. Because fire exclusion has deteriorated the health of many forested land, multiple objectives fire management provides a means of safely reintroducing fire into areas that desperately need it. A naturally occurring fire is always preferable to a planned ignition operation because it occurs at a time and in conditions natural for the ecosystem to experience fire.

Benefits of Multiple Objectives Management:

- Reintroduces fire to the ecosystem in a safe and healthy way
- Increases health of ecosystem
- Decreases potential for high intensity, unmanageable fire
- Decreases fuel loads
- Decreases spread of noxious and non-native species
- Often prevents construction of handline
- Often prevents foot and vehicle traffic into sensitive areas



Prescribed Burn on Betasso Preserve Open Space

Chapter 12 Recovering from Wildfire



Most Community Wildfire Protection Plans spend very little time discussing a community's recovery from a wildfire. There are many valid reasons for this fact: Minimum requirements do not mention recovery efforts, plans focus on mitigating risk before a wildfire occurs, and public land management agencies, like the US Forest Service, often take the lead on restoration efforts.

In the aftermath of the Fourmile Canyon Fire, it became obvious to all those involved that recovering from a wildfire requires planning as well. Many questions emerged. What is the role of government agencies in the restoration of private land? How do you organize recovery efforts? What will individual insurance policies cover? How do you facilitate responsible rebuilding? How do you restore the land and prepare for and respond to an increased risk of flooding?

The cost of recovering from a wildfire can be enormous. These costs once again point to the importance of taking action to mitigate wildfire risk before a catastrophic fire occurs.

Recovering from the Fourmile Canyon Fire, Boulder County is learning a great deal about all of these questions. These lessons learned will be invaluable for future fires both within and outside of the county. When many of the recovery efforts have been completed or begin to

slow down, Boulder County's experience with the Fourmile Canyon Fire recovery should be written up and incorporated into this plan. These lessons should be made widely available to other communities who experience a catastrophic wildfire.

Community-based initiatives are a key to successful recovery. To give readers a glimpse of the enormous amount of time and energy individuals, organizations, and agencies spent assisting with recovery effort, the story of the Sugar Loaf community and Boulder County led volunteer restoration efforts are highlighted.

Sugar Loaf Community

Following the Fourmile Canyon Fire, Susan Hofer and Kit McChesney, residents of the Sugar Loaf community, organized a land rehabilitation project to help their neighbors restore their properties. The project involved the procurement of straw mulch and seed, and the purchase and planting of tree seedlings in areas burned in the fire. Working with local attorneys affiliated with the American Bar Association's "Million Trees Project,"



Volunteer Efforts

Susan and Kit helped organize a tree-planting effort that eventually encompassed all four districts in the burn area — Sugar Loaf, Fourmile, Sunshine, and Gold Hill. The attorney volunteers raised more than \$4,000 to purchase 3,500 tree seedlings, which were planted the last weekend in April by neighbor and community volunteers. Agencies and organizations that provided support for the project included Volunteers for Outdoor Colorado, the Colorado State Forest Service, Boulder County Land Use, and the Natural Resources Conservation Service. Boulder County Land Use Department staff members were instrumental in encouraging the development of the project.

Perhaps the most dramatic expression of appreciation came from one landowner whose home was barely spared; the fire stopped only feet from her back porch, but burned many acres of vegetation and trees. Following the day of tree-planting, she said, “I thought it was completely magic and I am sure I will think of your tremendous efforts for the rest of my life. The generosity of spirit that the community generated was extraordinary and has helped to shape the way I perceived the events related to this fire I am so very grateful. The team was fantastic, everyone working together so beautifully and with such enthusiasm, completely ignoring the cold and wind. It was just such a wonderful memory.”

This is a story about how a group of community members can make a difference in the lives of their neighbors. It is also a story about how a community that is organized, with strong formal and informal networks, can help turn ideas into reality. The Sugar Loaf Community, Inc., was created following the Black Tiger Fire in 1989. The organization meets bimonthly, coordinates a variety of community projects, and for more than forty years has published a community newsletter mailed to more than 600 residences in the Sugar Loaf community.

Neighboring communities who have witnessed the benefits that this type of organization offers have been inspired to create their own neighborhood groups.

Rehabilitation after the Fourmile Canyon Fire

By Jon Hoover



Debby Martin is very aware of the danger of living in the wildland-urban interface. “I kind of expected a fire at some point in living up there,”

she said. Debby’s house was the third or fourth to burn in the Fourmile Canyon Fire, but the garage, which is less than a hundred feet away, survived. She is now studying the impacts of the fire on erosion, flooding, and water quality.

To view this video, go to:

<http://www.youtube.com/user/BoulderCounty#g/c/466B051AC3E3C8BE>

Engaging more individuals like Susan Hofer and Kit McChesney and empowering more organization like Sugar Loaf Community Inc. is a primary objective of this plan.

The Fourmile Canyon Fire Recovery Center

Following the fire, Boulder County created the Fourmile Canyon Fire Recovery Center and website to assist all residents who lost a home or structure in the fire. The center and website, <http://www.bouldercounty.org/live/environment/land/pages/fourmilefire.aspx>, help address questions around:

- Asbestos/ash debris removal and inspection
- Erosion control and revegetation
- Flood and debris flow preparation (emergency preparedness)
- Rebuilding
- Transportation (roads and potential flooding)
- Other issues as they arise

The center is staffed by a recovery manager who serves as the single point of contact to help coordinate recovery and rebuilding efforts and refer clients to other services as needed. Weekly meetings of county department heads are held to address issues, provide updates, coordinate activities and provide policy recommendations to the county commissioners.

An example of policy changes includes amending the Land Use Code regulations and processes to help streamline the building review process. The Land Use Department established a case manager approach for all property owners interested in rebuilding to be the point person for all of their questions. In addition, staff have provided technical resources to fire survivors who want to exceed the green building regulations and build netzero energy homes.

Boulder Mountain Resources: Rebuilding Our Lives, Rebuilding Our Communities

The Foothills United Way hired a Fourmile Recovery Resource Coordinator and created a website, www.bouldermountainresources.org, to provide a dynamic place for

those affected by the Fourmile Canyon Fire to learn about local initiatives supporting the re-growth of families and communities. Resources range from the mental health voucher program to discounts provided by local vendors for those rebuilding their homes to a calendar of monthly events to emergency updates. In addition, they are working with people to establish a bulk purchasing co-op.

Land Rehabilitation

The Boulder County Parks and Open Space Department is the sponsoring agency for the \$2.8 million Emergency Watershed Protection funds for emergency stabilization treatments to reduce post-fire erosion, flooding, and debris flows. The County coordinated the collection of the Emergency Watershed Protection permission forms which enables the County to perform reseeding along roads and aerial mulching of nearly 2,000 acres. The treatments include seeding along roads to prevent noxious weed invasion and aerial mulching to reduce erosion.

Boulder County Volunteer Projects

In an effort to combat weeds after the Fourmile Canyon Fire, Boulder County Parks and Open Space seeded over 450 acres in early 2011 using volunteers. Volunteers recruited and organized by Volunteers for Outdoor Colorado and Wildlands Restoration Volunteers hand broadcasted and raked seed in areas moderately to severely burned within 100 feet of roads or driveways. Though implemented by Boulder County Parks and Open Space, many other land management agencies were involved in the planning processes, including the Bureau of Land Management, US Forest Service, and Natural Resources Conservation Service. In total, volunteers spread approximately 12,000 pounds of seed over more than 450 acres. Ten projects occurred and approximately 850 volunteers participated, contributing over 5,800 hours of service. One volunteer noted: "It felt good to know we had done something to help revegetate the area and hopefully get some grass to grow before the spring rains and keep some of the soil from eroding."



Volunteer Efforts



AmeriCorps Volunteers

Chapter 13 Funding Community Wildfire Protection



How do we fund the new community wildfire protection initiatives contained in this plan? This plan proposes to significantly increase the quantity and quality of wildfire mitigation and preparedness efforts and sustain them over the long term. As a result, securing new funding will be critical to this plan's success. The plan's funding strategy includes three main components: 1) grants, 2) local tax dollars, and 3) using existing resources more efficiently. In addition, we recommend improving the Colorado State Forest Service's grant making process.

Grant Funding

Grant programs like to fund ideas that are innovative, collaborative, and/or community-based. Boulder County has an excellent track record in obtaining grants for a long list of programs. The biomass heating system at the Boulder County Jail is one example (see box). The jail system received \$315,000 from the State of Colorado's Department of Local Affairs, \$125,000 from

The Colorado State Forest Service Assessment and Strategy

The Colorado State Forest Service recently completed a statewide forest resource assessment and strategy to help focus their efforts. They compiled 11 data layers, including a wildfire susceptibility index, a wildfire intensity index, and potential for post-fire erosion risk in watersheds of importance for drinking water, and wildland-urban interface. The final map, an aggregate of all theme inputs, shows Boulder County as one — if not the — most important counties for forest resources in the state.

Based on the state's assessment and strategy, Boulder County should be a high priority for future funding.

the US Forest Service's Woody Biomass Utilization grant program, and \$175,000 from the Energy Efficiency and Conservation Block Grants from the US Department of Energy. The County matched those funds with \$210,000 and the purchase of an unused burner from the Town of Nederland.

Economic conditions and budget cuts have reduced the amount of grant dollars available. Competition for these funds is growing. New grant sources should be pursued (see box on insurance industry grants), and more time needs to be devoted to developing stronger grant proposals.

At the same time, a number of factors increase Boulder County's chance of winning grants, including the recent Fourmile Canyon Fire and recent statewide forest resource assessment and strategy developed by the Colorado State Forest Service. The assessment's final map, an aggregate of all theme inputs, shows Boulder County as one — if not the — most important counties for forest resources in the state (visit <http://csfs.colostate.edu/pages/statewide-forest-assessment.html>).

Several ideas in this plan lend themselves to grant funding. Many grant opportunities, however, are missed because no one is aware of the grant opportunity or no one is available to write the proposal before the application deadline. A grant writer is needed to locate grant opportunities and develop project proposals associated with this plan. The investment to support a staff member responsible for grant writing will pay for itself many times over.

Matching Funds

Most grants for wildfire mitigation and fuels treatment projects require the recipient to contribute their own funding or "match" the grant dollars. Match requirements vary by grant programs. For example, many of the grant programs administered by the Colorado State Forest Service provide 50% of the total budget and require the other 50% to come from local matching funds.

Many communities are unable to access grant dollars because they are unable to come up with the required match. The lack of local matching funds is a significant obstacle to implementing mitigation work on the ground that requires more attention.

Communities or organizations administering their first grant face a number of challenges and a steep learning curve. This can lead to frustration, burn-out, and the decision not to apply for future grants or conduct any additional wildfire mitigation projects. Communities and groups that are well organized, have the necessary capacity, and are committed for the long-term have the greatest chance for implementing successful grant programs and producing the necessary match. However, even these communities and groups require help with the match. Local taxes are one option for producing matching funds for wildfire mitigation grants.

Local Taxes

The county's Citizen Advisory Team has recommended the creation of a Forest Improvement District in Boulder County to fund the wildfire mitigation efforts. The Board of County Commissioners enacted a resolution in August 2011 and submitted the question to voters on the November 1, 2011 ballot to create the Boulder County Mountains Forest Improvement District. If approved, a Board of Directors will be appointed to govern the

district. It is up to the Board of Directors to propose how to fund the district and any tax questions would be submitted to voters at a future election.

The Forest Improvement District Act from 2007 lists the types of project that may be funded. They include:

- Forest improvement projects to reduce hazardous fuels
- Forest improvement projects to protect communities
- Incentives for private landowners
- Incentives for local wood products industries
- Support for bioheating conversions and biomass collection/delivery infrastructure
- Assistance for planning, education and outreach

The state act requires the Board of Directors to include representatives from the county, the Colorado State Forest Service, an environmental organization, the conservation district, the water conservancy district, and a federal agency. The County Commissioners added seats for residents and representatives of local fire protection districts.

The advisory team noted that the lack of funding is a major obstacle to undertaking wildfire mitigation efforts. They recognize that another local funding source is needed to complement

Biomass-heating at the Boulder County Jail and Parks and Open Space Facility

When Boulder County set out to build a new Parks and Open Space facility in Longmont, the Commissioners wanted it to reflect the County's environmentally sustainable practices. Rather than using traditional gas or electric heating, the new facility was constructed to utilize biomass fuel for heat.

A state-of-the-art biomass furnace burns wood chips collected from forest thinning projects on the County's 30,000 acres of forested open space lands. Using this renewable resource for heat reduces utility costs and makes use of the abundant wood chips collated on public lands. Recently the County has also used wood collected from private lands through the Community Forestry Sort Yards.

Chipping the slash generated by the county's forest thinning efforts and using it to fuel boilers reduces the amount of air pollution generated by burning fewer slash piles in the forest. Moreover, the small volume of waste ash created by a wood chip boiler can easily be disposed of in the trash or incorporated in soil.

The first system has been operating for over five years and was so successful that the County installed a second biomass burner to heat the Boulder County Jail. This system will start up in the fall of 2011. The boiler will burn 1,000 or more tons of woody material a year heating the jail, which houses an average of 450 people on any given day. The cost of the installations is expected to be recuperated in about 15 years through savings on natural gas.



Chips from Boulder County's fuel treatment projects



Biomass furnace that burns chips and heats county facility

resources from individuals, the private sector, and federal and state government sources.

Efficiency Gains

In addition to securing new funding, it is critical to use existing resources more effectively and efficiently.

The Colorado State Tax Subtraction Program (see box) was enacted to support wildfire mitigation efforts, but it is not widely used. The state does not even keep records of the number of people or the amount of money involved in the program because it combines this tax subtraction with others in its records. Existing programs like this tax subtraction should be evaluated and improved.

Lessons from the Fourmile Canyon Fire should be incorporated into future wildfire mitigation efforts. Projects and programs that proved to be most effective should be continued and expanded; those that were found to be less effective should be modified appropriately. Since the Fourmile Canyon Fire Assessment took place at the same time this plan was developed, these lessons are not included in this version of the plan. They will be added in future updates.

The Boulder County Community Wildfire Protection Council should examine proposals for improving the efficiency of current projects and programs based on the Fourmile Canyon Fire Assessment.

Centralized Grant Processing

The Citizen Advisory Team has submitted a recommendation to create a central grant processing clearinghouse for private landowners and community groups (such as fire protection districts, neighborhoods, and homeowners' associations) to access funding for mitigation and forest restoration projects. Both funders and applicants would make use of this service.

The clearinghouse would build on existing informational websites such as Rocky Mountain Wildland Fire Information. Ideas for the clearinghouse include one location for all fuels treatment grant applications, use of a common application, technical review of applications, and individual assistance for applicants. The advisory team recommendation states:

There are numerous grants and cost-sharing programs available to help fund fire mitigation and forest restoration projects, but it is often difficult to identify and apply for this assistance since it comes from so many different sources.

*A number of fire mitigation projects involving fuels reduction, forest restoration, watershed improvements, and firebreaks are on public lands. In order to achieve a consistent level of treatment throughout the county, encouraging participation by private landowners and community groups is necessary. Treatment projects are invariably costly to carry out, sometimes beyond the means of property owners. The Front Range Roundtable report, *Living with Fire: Protecting Communities and Restoring Forests*, states that "subsidizing private treatments benefits the public since wildfires, watersheds, habitats, and airsheds cross ownership boundaries."*

Insurance Industry Grants

There are two ways to approach obtaining money from the insurance industry:

1. Applying for grants through corporate foundations, or
2. Approaching local agents for volunteer time, and/or donations

Corporate Foundations

Every major insurance carrier that operates in the Boulder County area has a Foundation to distribute their charitable donations. The application is fairly simple, and the grants are typically awarded twice a year when the board meets. Of course, there are limited funds allocated, so it is best to apply early in the year. Foundations of Allstate, State Farm, American Family, and Farmer's Insurance companies all have similar processes, and each company has their favorite areas of focus. Each of the companies also wants to support safe and vital communities, addressing catastrophic response and neighborhood revitalization. All of these companies have a vested interest in the expansion of homeowner mitigation for their own clients - and others in the community, in addition to expanding education for wildfire awareness.

Local Agencies

Another avenue to explore for funding is through local Boulder County Insurance Agents. Boulder, Longmont, Louisville, Lafayette, and Erie agents all insure at least some homes in the mountains, and there is a lot of rural and agricultural property that is also at risk to wildfire. Many of these agents operate under the umbrella of the large insurance corporations mentioned above. The involvement of local agents could have a large impact on citizen awareness due to "people I know" being involved, along with instilling more legitimacy in projects for those prone to cynicism. Corporate policies encourage their agents to volunteer in meaningful projects within their community - and some will give community grants to programs their agents volunteer in. These grants are separate from the foundation grants described above. Generally, as long as an agent has developed a relationship volunteering within a program, the agent can apply for a grant through the foundation to be given on the agent's behalf. Some companies will give up to \$1,000 per agent, which if multiplied by several agents, could make a difference in a programs' budget. The grants are generally limited in number, and by region, and must meet the same qualifying guidelines as the foundation grants.

There are grants and cost-sharing programs for mitigation projects available from the Federal, State, and Local Governments, as well as from private foundations. A centralized location to coordinate funding opportunities would simplify the process of accessing available funding, and thus increase the rate of treatment on private land. There should be a facilitator to research and write grants, as well as to assist private landowners and community groups in identifying and applying for appropriate financial assistance. Similar services have in the past been offered by the Colorado State Forest Service, although it might have been limited to government grants. The current status of this service should be determined and then a decision made on the appropriate agency to offer this more comprehensive service.

State of Colorado Tax Subtraction

As authorized by §39-22-104(4)(n), Colorado Revised Statutes, for income tax years 2009 through 2013 individuals, estates and trusts may subtract from federal taxable income 50% of the costs incurred in performing wildfire mitigation measures that meet the following qualifications and limitations:

- The taxpayer must own the property upon which the wildfire mitigation measures are performed.
- Property must be located in Colorado.
- Property must be located in a wild land-urban interface area.
- The wildfire mitigation measures must be authorized by a community wildfire protection plan adopted by a local government within the interface area.
- The total amount of the subtraction may not exceed \$2,500.

For more information, call your tax preparer. Or go to **www.taxcolorado.com** and search for “wildfire mitigation measures subtraction.” Call the Colorado Department of Revenue Taxpayer Service Division at (303) 238-SERV (7378).

Chapter 14 Assessing Risk



Community wildfire protection is important throughout the wildland-urban interface. However, public resources for mitigation are limited. As a result, it makes sense to target resources in “Areas of Concern” where human values intersect with areas likely to experience future high severity wildfires. While we cannot predict exactly where the next Fourmile Canyon Fire will take place, the numerous maps and analyses from this risk assessment provide invaluable information to wildfire experts for planning future mitigation programs and projects.

Prior to the current assessment, Boulder County’s most recent countywide risk assessment was completed in May 2000. Results from the fire behavior model BEHAVE were combined with a structure density map to produce the Wildfire Areas of Concern Map 2000. This map identifies six levels of concern ranging from extreme concern to no concern (see Map 16).

The current risk assessment produced a new, countywide Wildfire Areas of Concern Map 2011 (see Map 30). This map combines a large amount of information that is derived from a series of individual maps. Each map contains different pieces of information that can be combined to assess overall wildfire risk. For the purpose of this publication, wildfire risk is calculated as a combination of the likelihood of a fire event, the anticipated fire behavior, and the human values at risk.

The following maps are the products of the Risk Assessment Work Group comprised of the following members:

<i>Bob Bundy</i>	<i>Colorado State Forest Service</i>
<i>David Haines</i>	<i>Boulder County Land Use Department</i>
<i>Chad Julian</i>	<i>Boulder County Parks and Open Space Department</i>
<i>Kevin Krasnow</i>	<i>Forest Fuels and Wildfire Simulation Specialist</i>
<i>Eric Philips</i>	<i>Boulder County Land Use Department</i>
<i>John Staight</i>	<i>Boulder County Parks and Open Space Department</i>
<i>Chris Wanner</i>	<i>City of Boulder Open Space and Mountain Parks Department</i>
<i>Amy Weaver</i>	<i>Boulder County Land Use Department</i>
<i>Kevin Zimlinghaus</i>	<i>U.S. Forest Service</i>
<i>Jim Webster</i>	<i>Boulder County Land Use Department (facilitator)</i>

Fire Modeling

FlamMap is a fire behavior mapping and analysis program that was used to compute potential fire behavior characteristics (flame length and crown fire potential) across Boulder County. Inputs for FlamMap are maps of fuels (surface, ladder, and canopy) and topography (slope, aspect, and elevation). Wind, weather and fuel moistures are also required for fire simulation. FlamMap was also employed to model wildfire conditional burn probability across the county.

Accurate fuel maps are essential to the assessment process. Many previous assessments at the state, regional, and local levels rely on data from LANDFIRE (Landscape Fire and Resource Management Planning Tools), an interagency mapping program that covers the entire United States. LANDFIRE is widely used because it produces free, easily accessible, and consistent information. However, the drawbacks of the LANDFIRE fuel maps are the large scale at which they were implemented (the entire United States) and the lack of sufficient field plots with information that has been ground-truthed.

In an effort to use the most accurate and locally validated fuel maps, the Risk Assessment Work Group chose to use fuel maps recently created at the University of Colorado, Boulder which were derived from 196 field plots and pre-existing vegetation maps (Krasnow et al. 2009, see Appendix F). At each plot, measurements were made of surface fuels, ladder fuels, canopy characteristics, and a complete tree census was taken. Through detailed comparisons of modeled fire behavior and effects of two past wildfires (Overland Fire of 2003 and Walker Ranch Fire of 2000) these fuel maps were shown to outperform LANDFIRE Maps for wildfire simulation accuracy.

Fuel maps are notoriously difficult and costly to create. The fuel maps used in this assessment are a significant improvement over existing maps and have helped produced more reliable fire behavior outputs. However, forests are constantly changing and future refinements to these maps will likely be necessary to incorporate natural or human caused changes to forest fuels.

Weather

In this assessment, the wind and weather were modeled using the actual conditions that existed during the Fourmile Canyon Fire of 2010. In the past, FlamMap models have been run using select weather data based on a percentile conditions from historical weather records (for example 90th or 97th percentile: the higher the percentage, the more extreme the weather). For this assessment, the “problem fire” was defined as one similar to the Fourmile Canyon Fire that occurs during extremely dry conditions with warm Chinook winds from the west (see Appendix F). These extreme fire events have historically caused catastrophic damage in Boulder Country and it is these events that this assessment is intended to mitigate.

Results

This risk assessment includes three primary components: wildfire intensity (highlighting areas where a wildfire is predicted to burn the hottest), wildfire occurrence (where wildfires are most likely to burn), and community values at risk (where wildfires are most likely to cause the most damage). Each of these indices contributes 33 percent of the weighting in the final Areas of Concern 2011 map. For a more detailed discussion of methodology (see Appendix F).

1) Wildfire Intensity

When possible, this assessment uses existing measures instead of creating new ones. The Wildland Fire Intensity Index was developed by the U.S. Forest Service and used by the Colorado

State Forest Service in the Colorado Statewide Forest Resource Assessment to capture areas with significant potential for high intensity fires. The index is created by combining two outputs from the FlamMap model: Crown fire potential (65%) and flame length (35%). This map represents the results of our own wildfire modeling using the same protocol for fire intensity calculation as was used for the state wide assessment. See Map 19.

2) Wildfire Occurrence

The Wildfire Intensity Index relays information about how fire would behave across the county but does not indicate where wildfires are most likely to occur. Since some areas are more prone to wildfire than others, it is also necessary to map the probability of a wildfire occurring in different locations across the county. The Colorado Statewide Forest Resource Assessment also includes a Wildland Fire Susceptibility Index. The Risk Assessment Work Group decided not to include this index in their analysis because the index is based on a complex formula that is strongly influenced by the location of past fires (these areas show up as having the highest fire susceptibility index) yet was calculated with only five years of historic fire data. Additionally, the results of the index for Boulder County in the state assessment did not match the county’s fire history or the expected results of our assessment team.

To map the likelihood of wildfire occurrence, we mapped the conditional burn probability. This map represents the probability that a given area would burn, given 10,000 random ignitions on the landscape allowed to burn for 10 hours each under conditions similar to the Fourmile Canyon Fire. See Map 20.

3) Community Values At Risk

In the past Boulder County assessment, structure density was the only value at risk that was included. In this assessment five more values have been incorporated into the values at risk map: Homes, water supply zones, historical sites, key ecological areas, and roads and railroads. See Maps 23, 24, 25, 26, & 27. Instead of weighting each of these six values equally, like many community wildfire protection plans, we surveyed staff, work group and team members to determine the relative importance of each of these values. We found that homes and “communities” (defined as areas with a structure density greater than 64 structures per square mile) were the most important of these values. Out of total of 100 points, the following weighting was assigned to each value to produce the values at risk map (see Maps 21 & 22).

<i>“Communities”</i>	25
<i>Homes</i>	18
<i>Water Supply Zones</i>	17
<i>Priority Historical Sites</i>	15
<i>Key Ecological Areas</i>	14
<i>Roads and Railroads</i>	11

4) Wildfire Hazard

The Wildfire Hazard map is a combination of the likelihood of wildfire occurrence and the anticipated fire intensity across the county. This map does not include values at risk. This map is one tool used by the Boulder County Land Use Department to assess wildfire hazard (see Map 28).

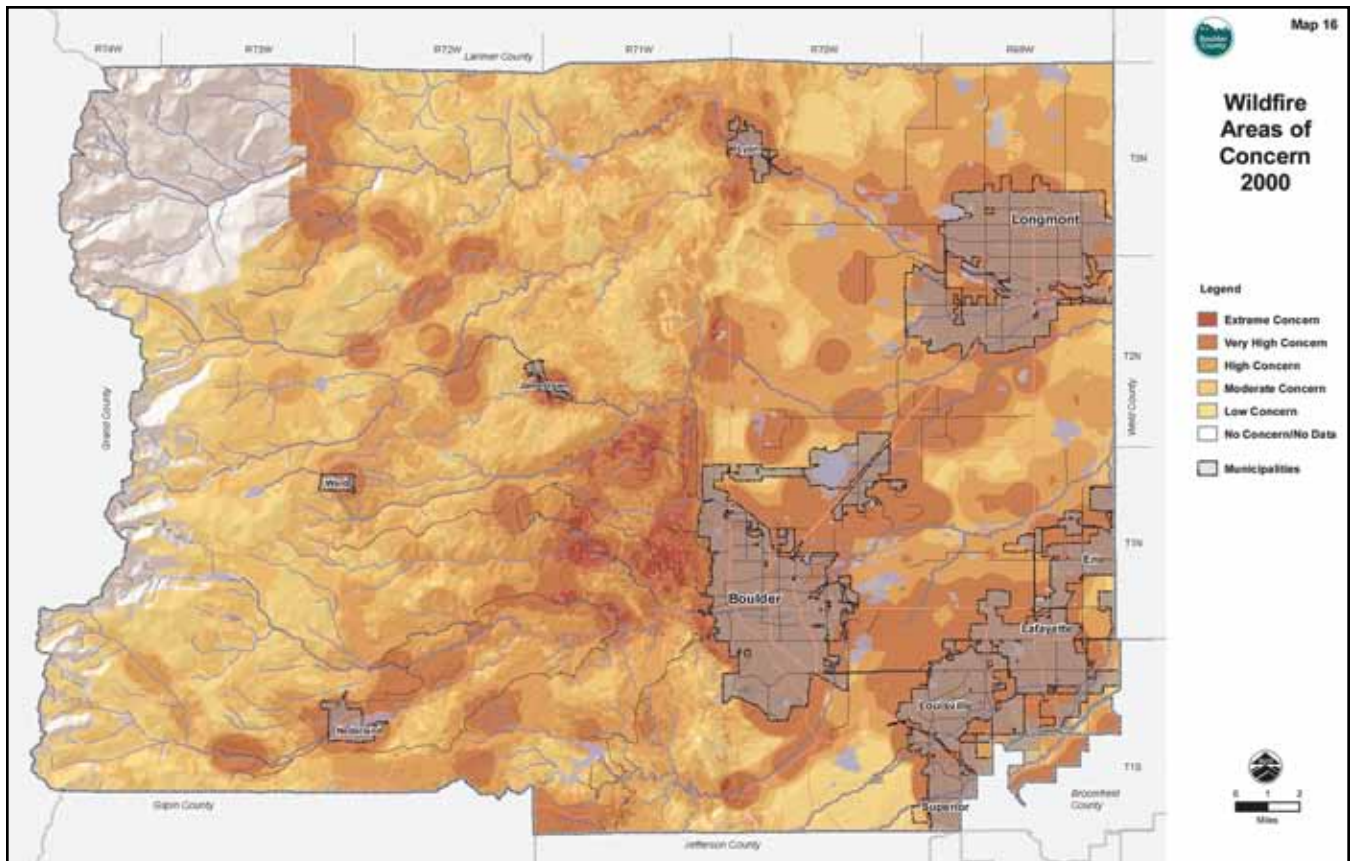
5) Major Fire Paths Map

This map was created by tracking the movement of the fire-front in a modeled fire burning across the entire county from west to east. The major paths represent the areas of the landscape that were important corridors for fire growth. The major fire paths map is information that is useful in locating fuels treatment projects (see Chapter 15). Fuels treatments designed to interrupt major fire corridors are more effective than those located at the end of a path or in an area that is not likely to be a major fire vector. The map was produced as part of this assessment, but it was not used to identify Wildfire Areas of Concern (see Map 29).

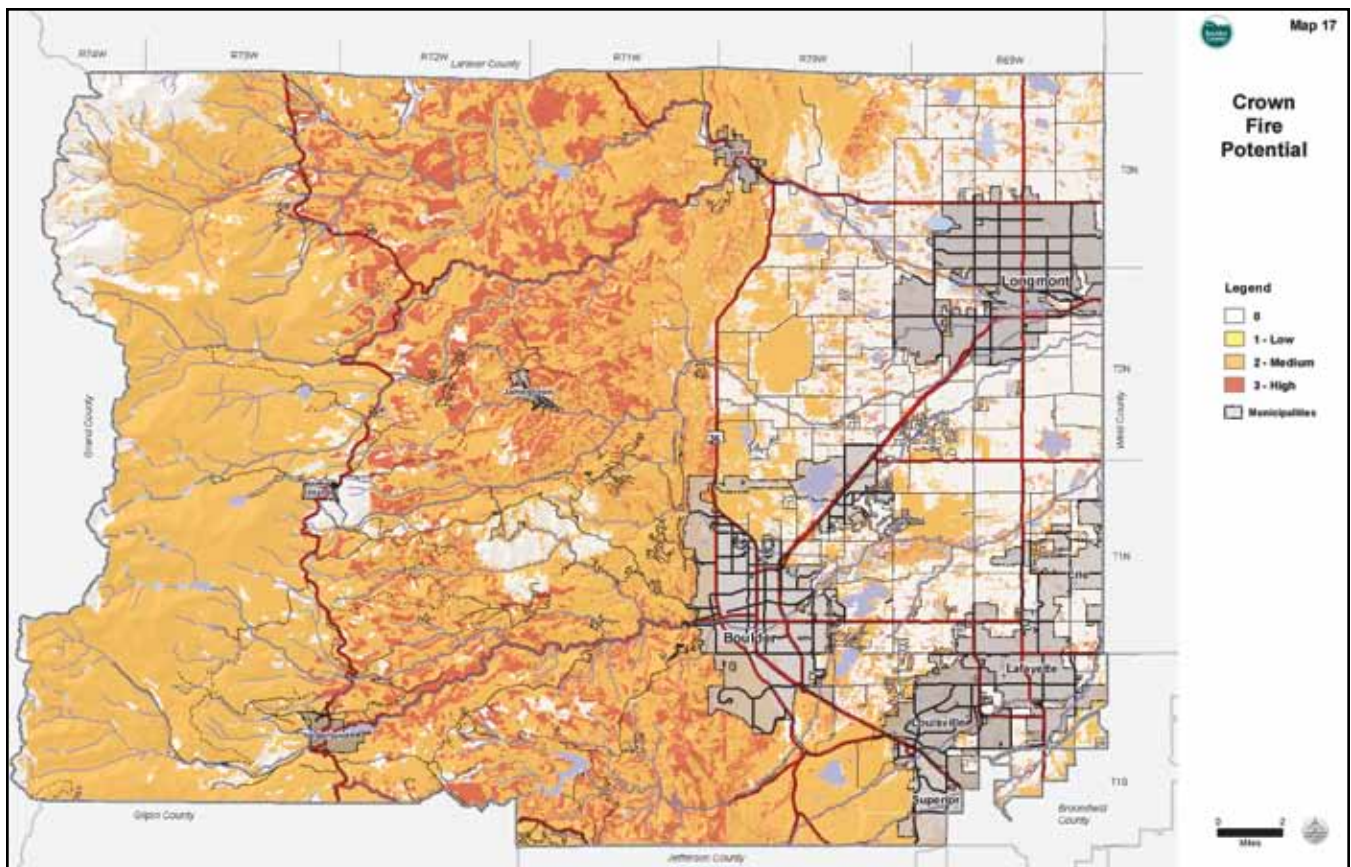
6) Wildfire Areas of Concern

Several other wildfire risk assessments have been conducted in Boulder County. These past assessments have produced a number of maps with risk categories ranging from three levels (high, medium, low) in the Gold Hill Community Wildfire Protection Plans all the way to 14 different levels of risk in a U.S. Forest Service's assessment. Our new Areas of Concern Map 2011 includes four

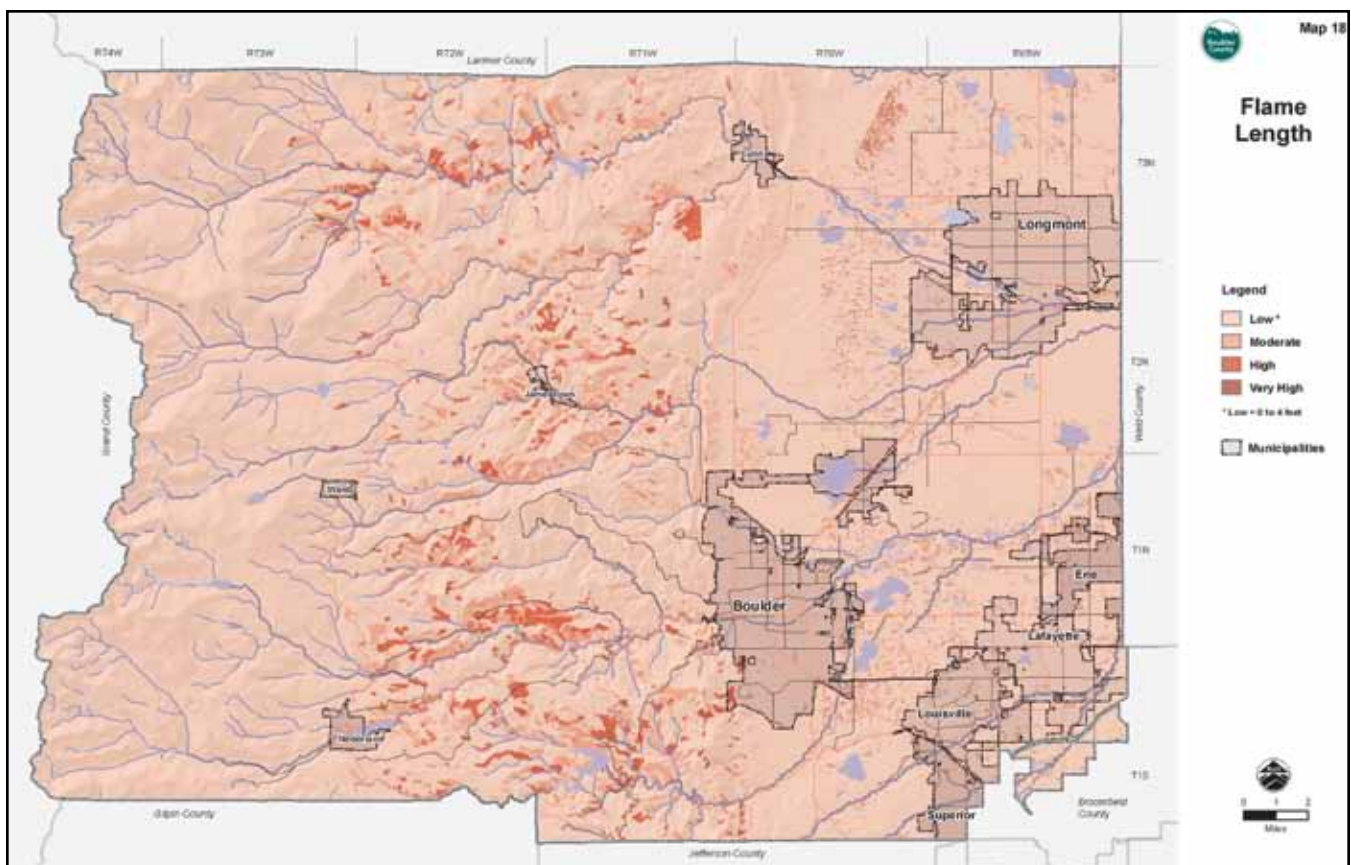
categories: extreme, high, moderate, and low. This map was created by combining information about the likelihood of fire occurrence, the anticipated fire intensity, and the values at risk across the entire county (see Map 30).



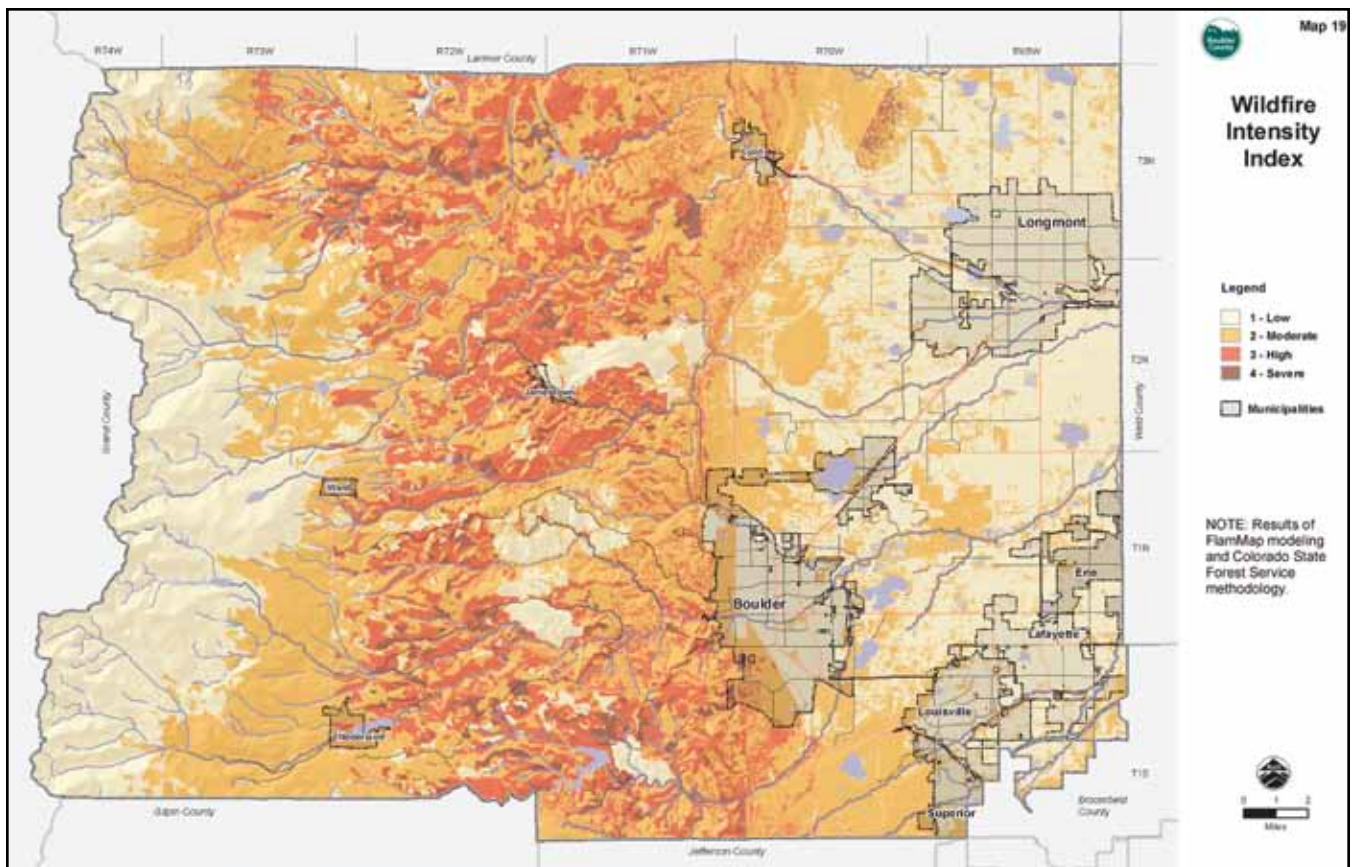
Map 16: Wildfire Areas of Concern 2000



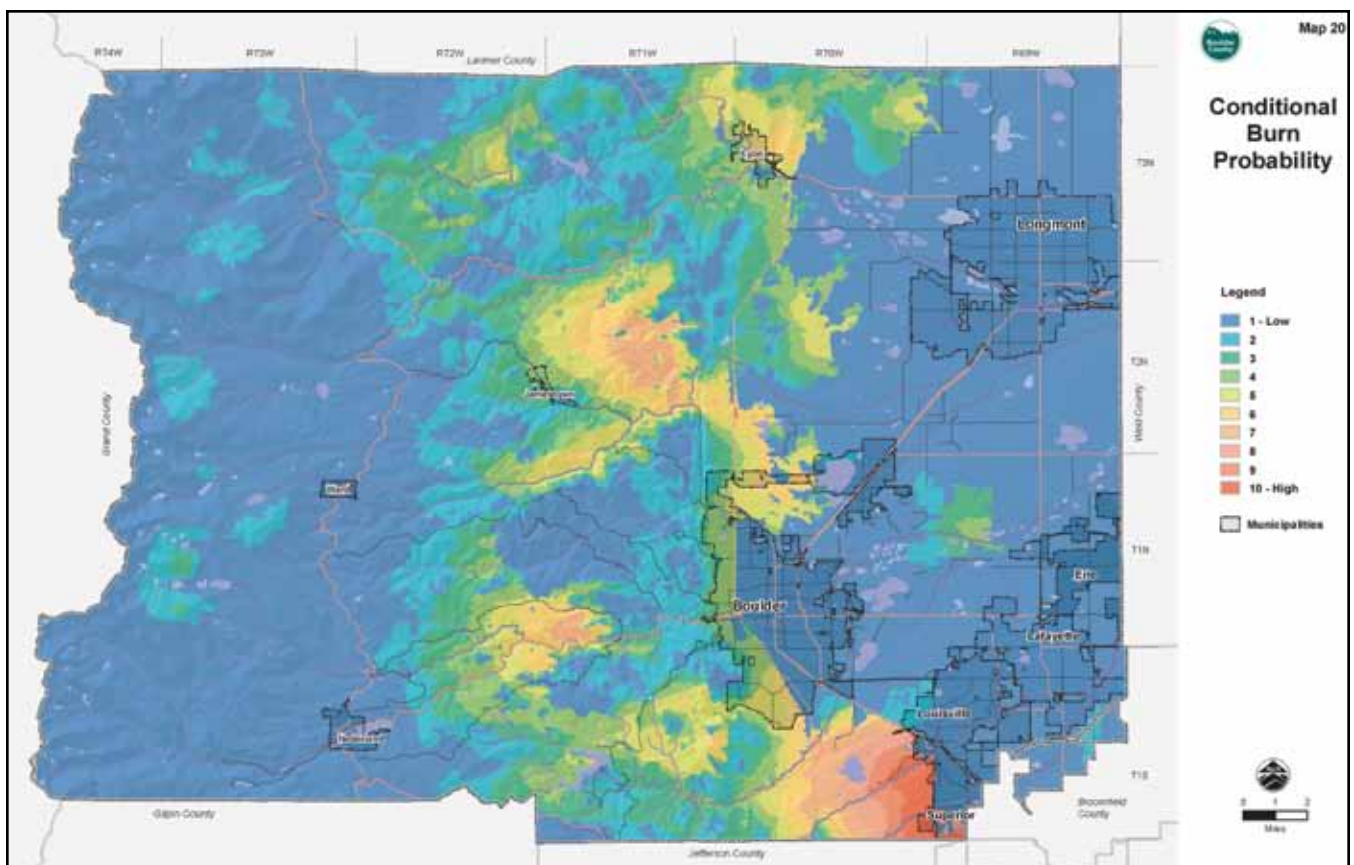
Map 17: Crown Fire Potential



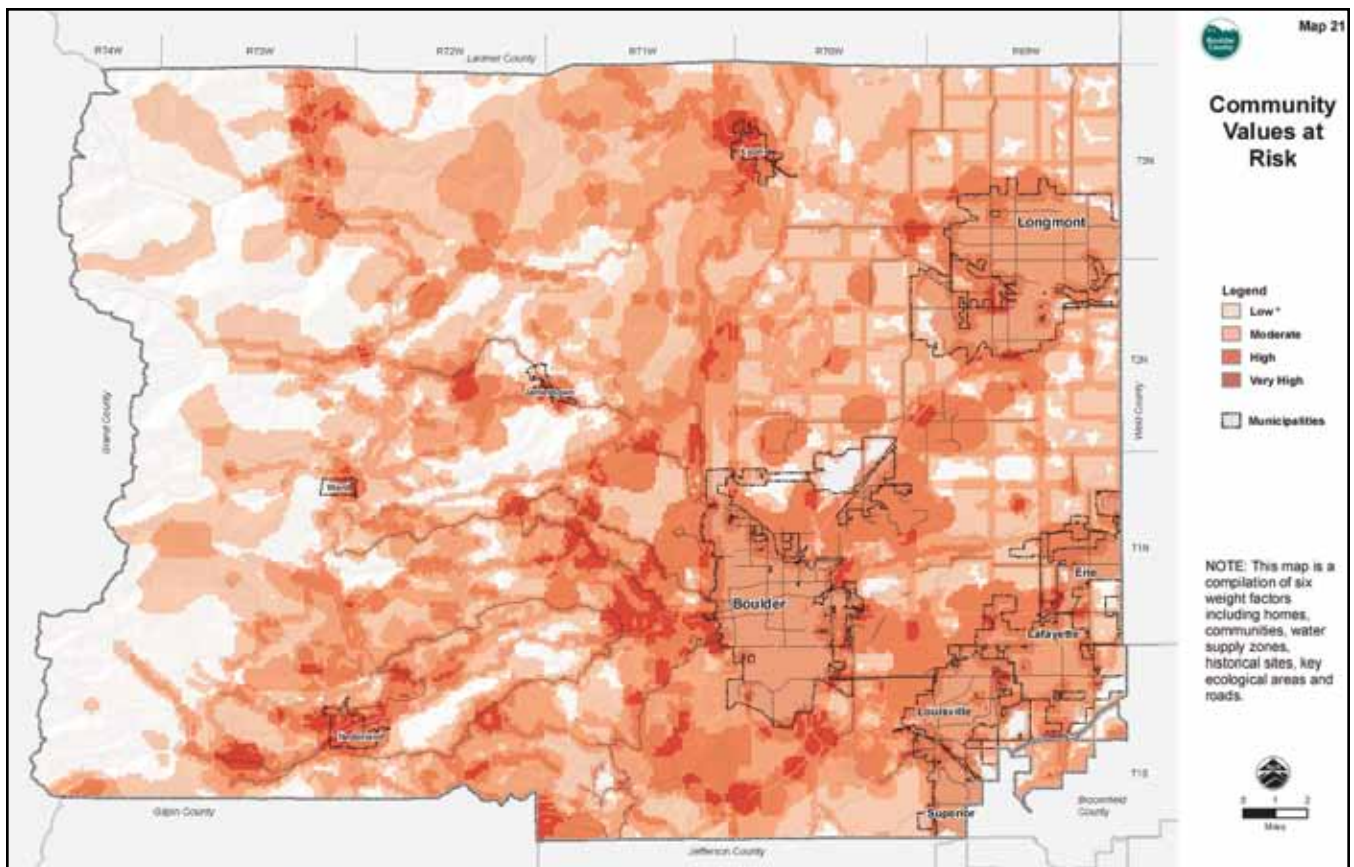
Map 18: Flame Length



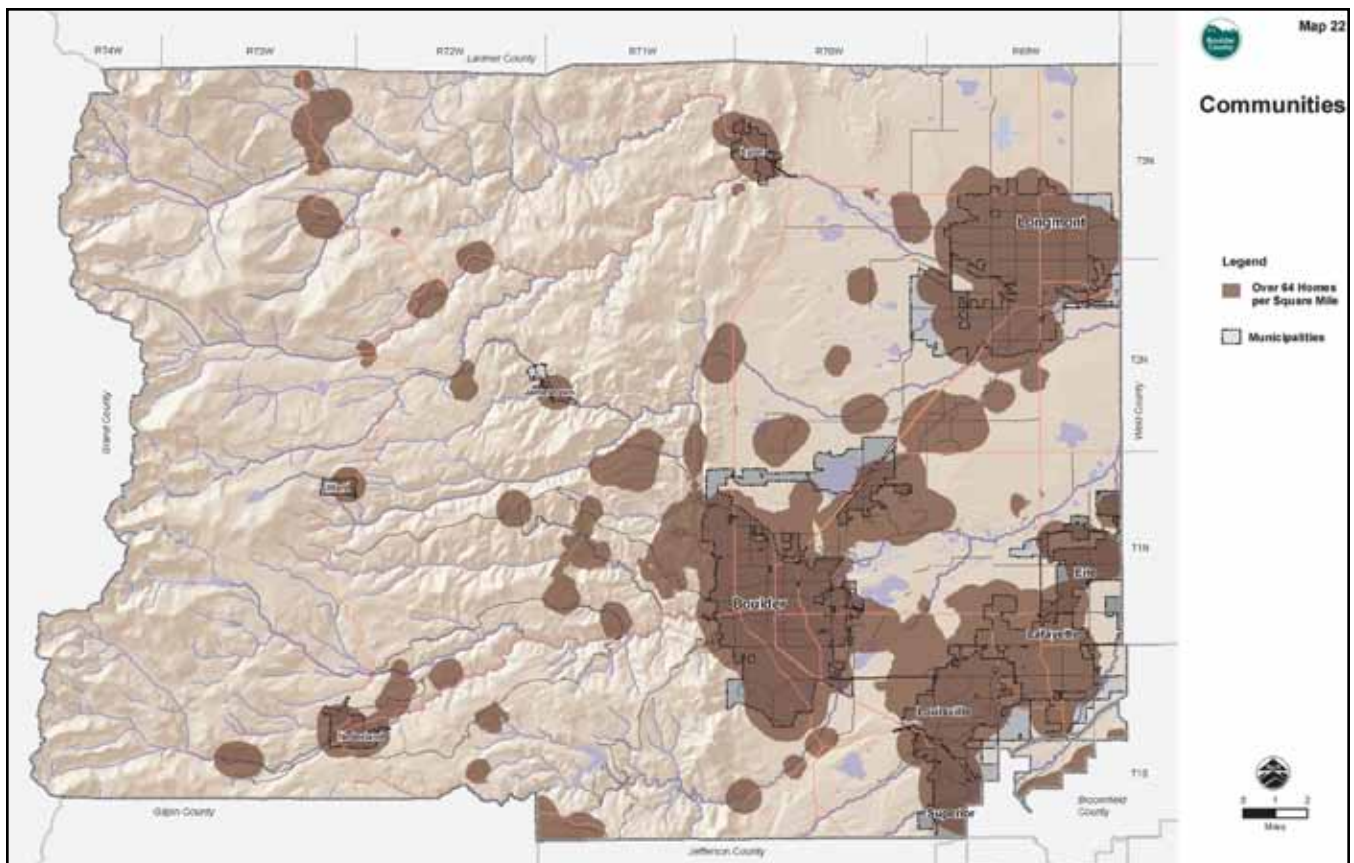
Map 19: Wildfire Intensity Index



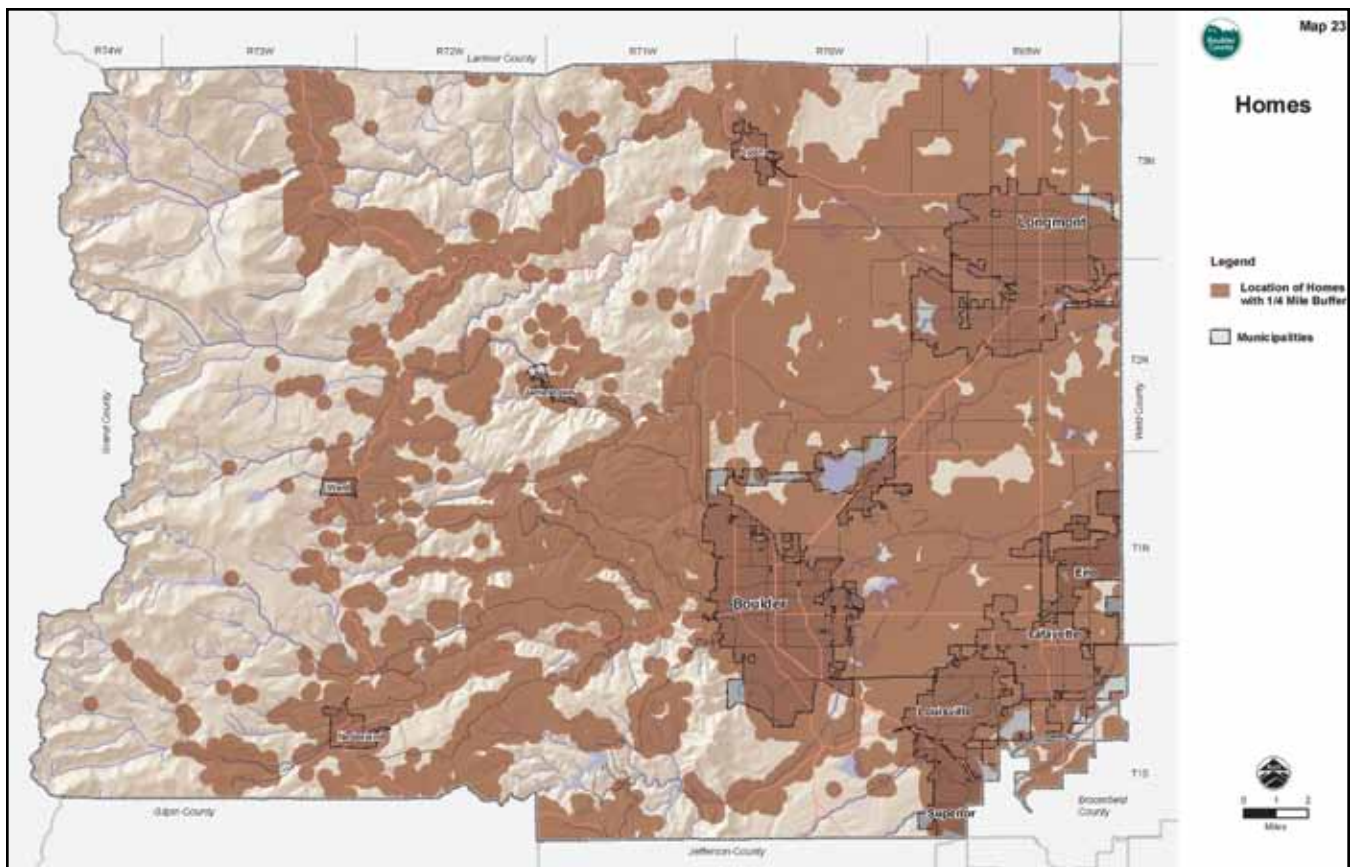
Map 20: Conditional Burn Probability



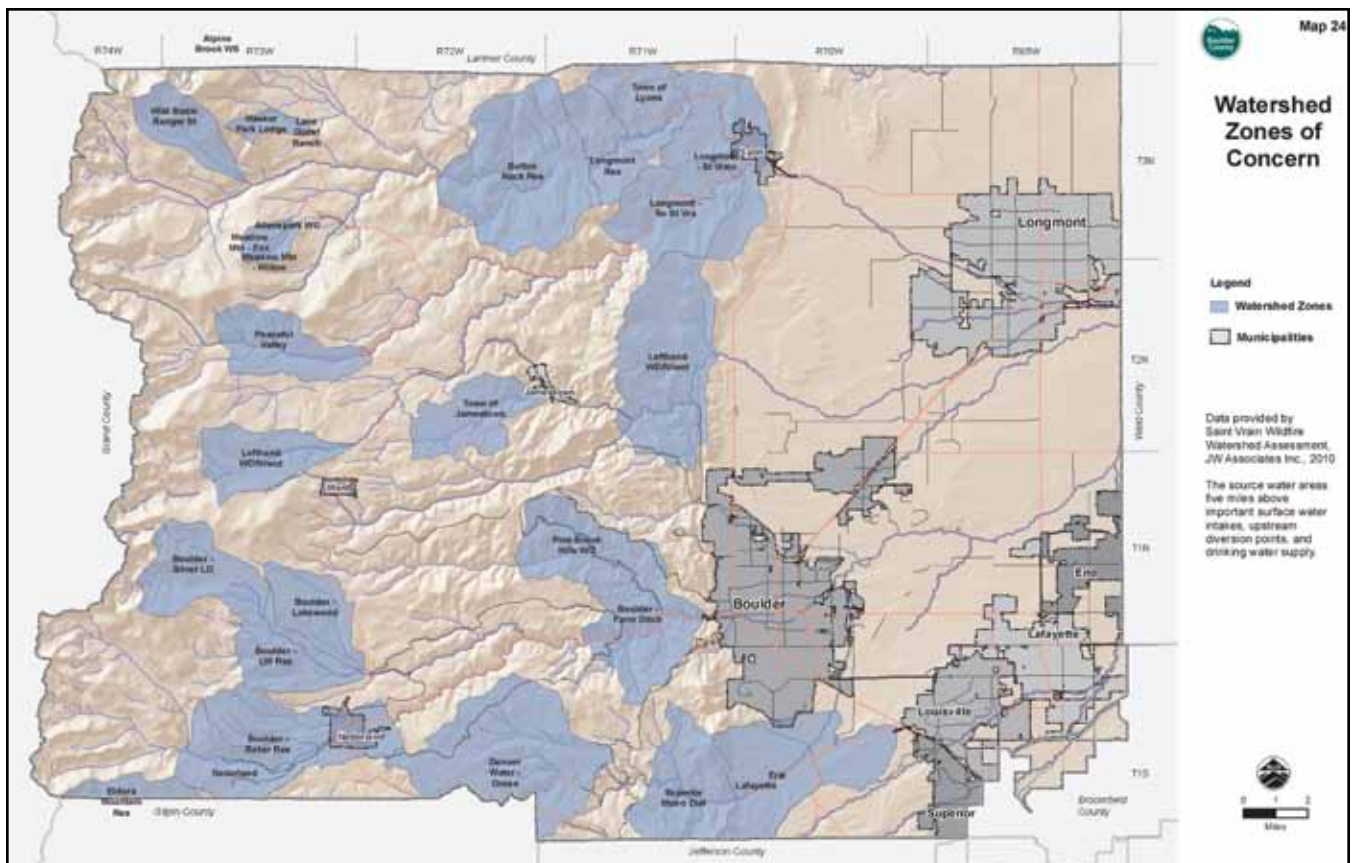
Map 21: Community Values at Risk



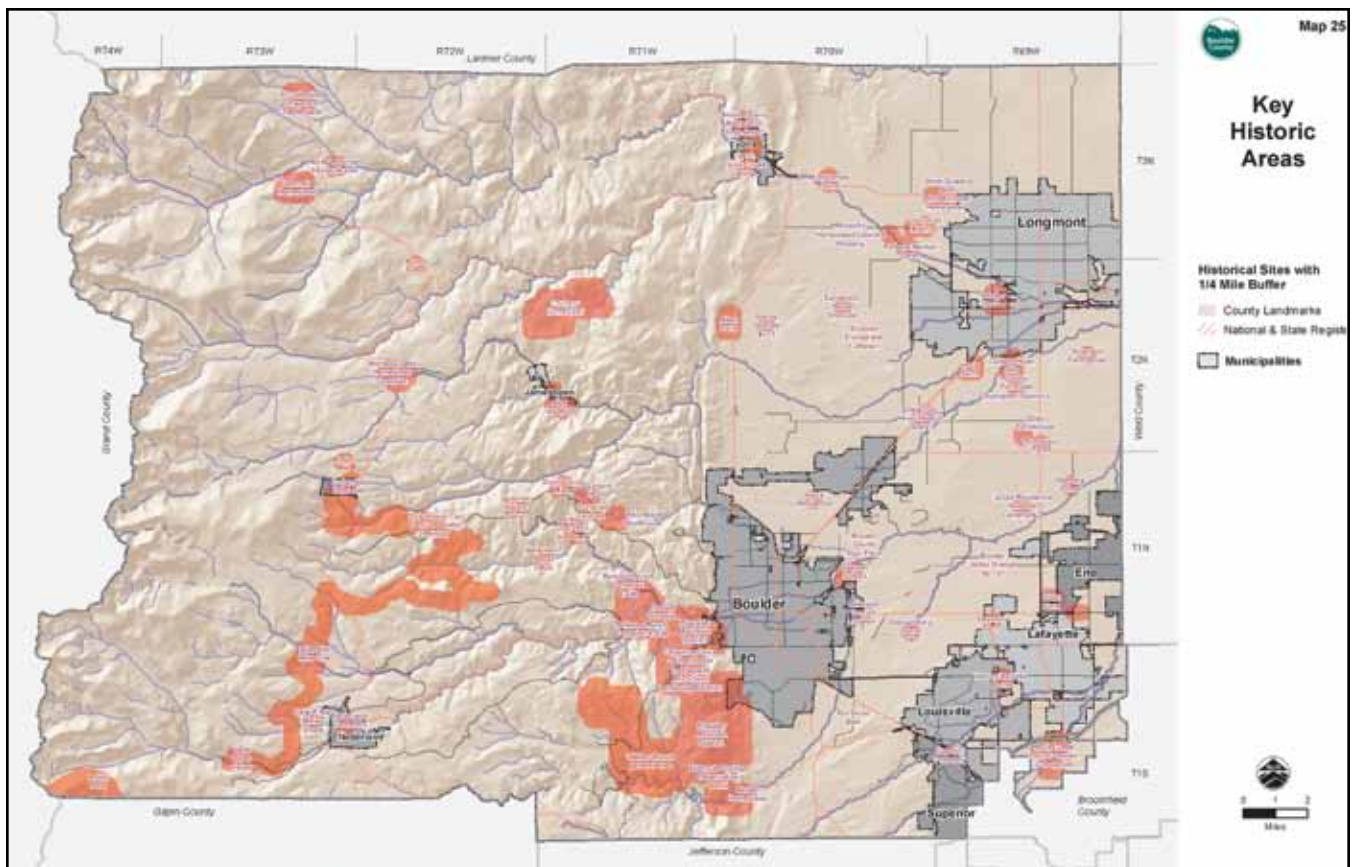
Map 22: Communities



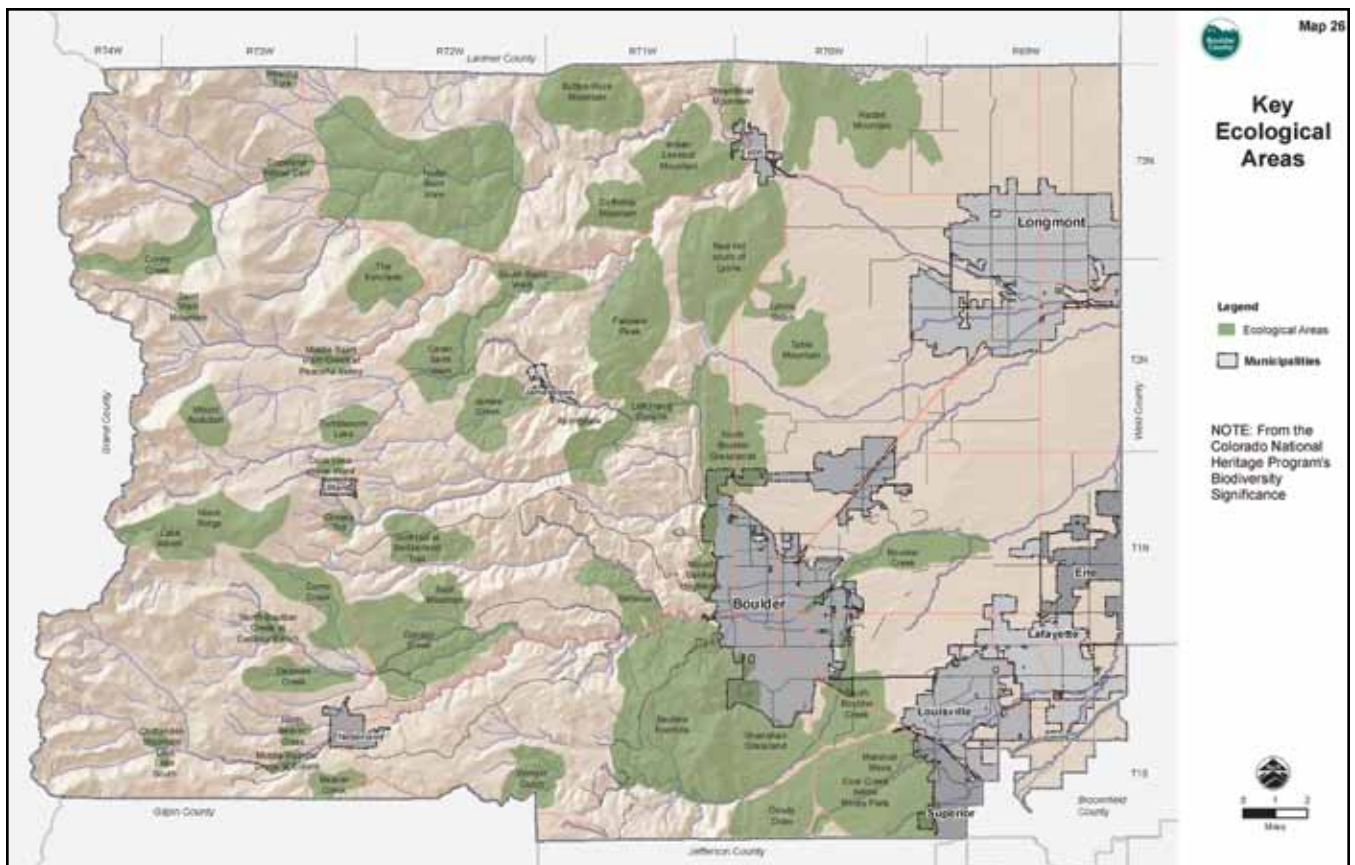
Map 23: Homes



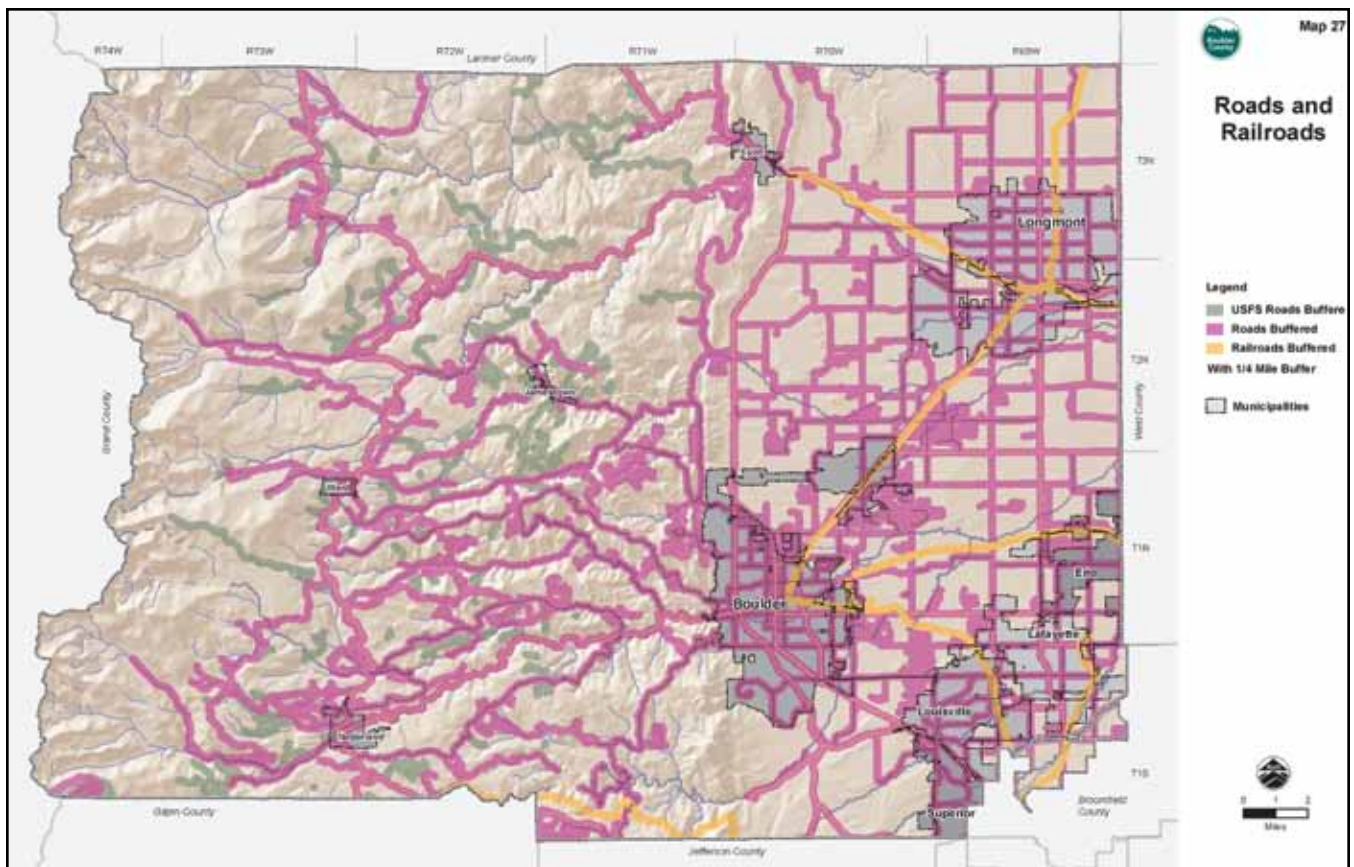
Map 24: Watershed



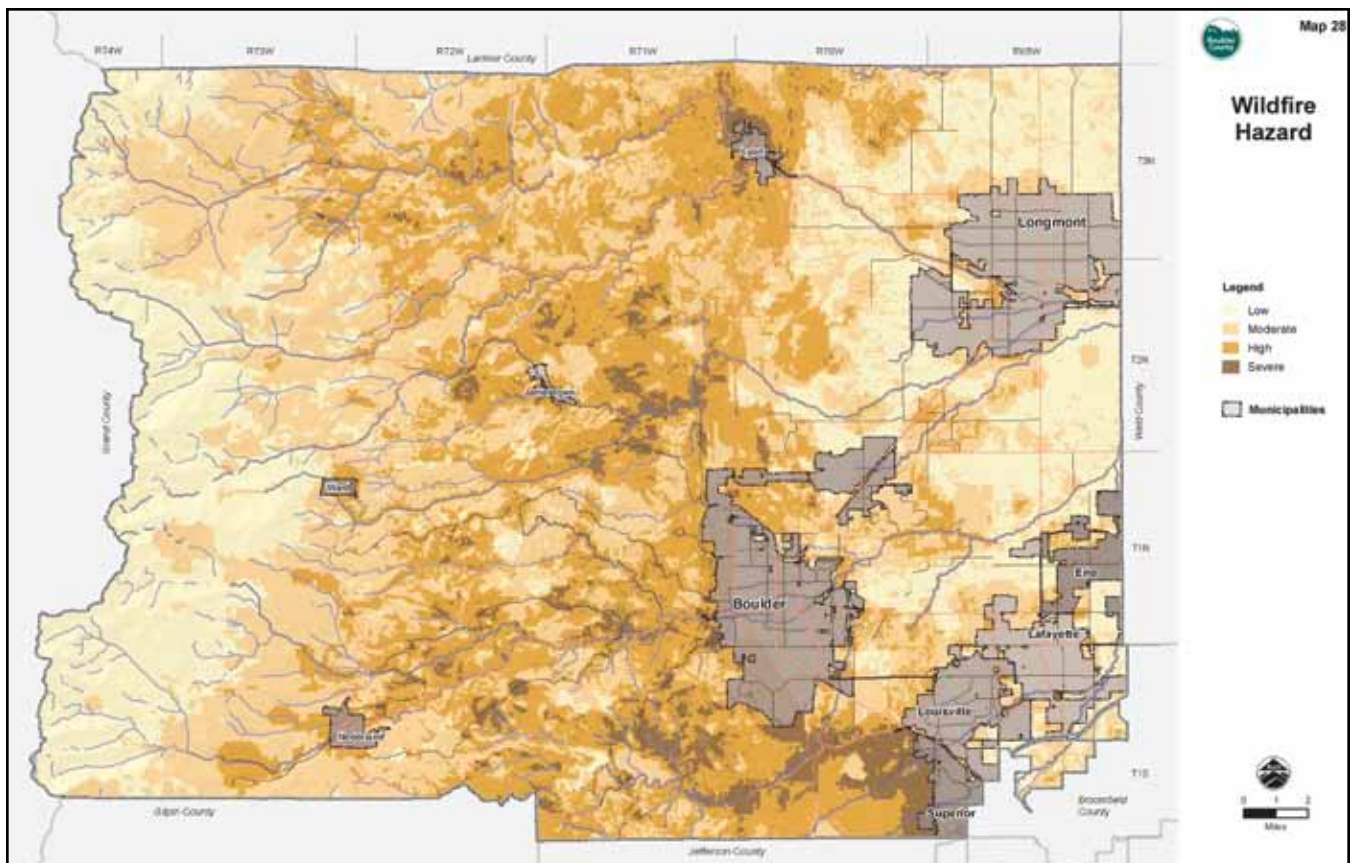
Map 25: Key Historic Areas



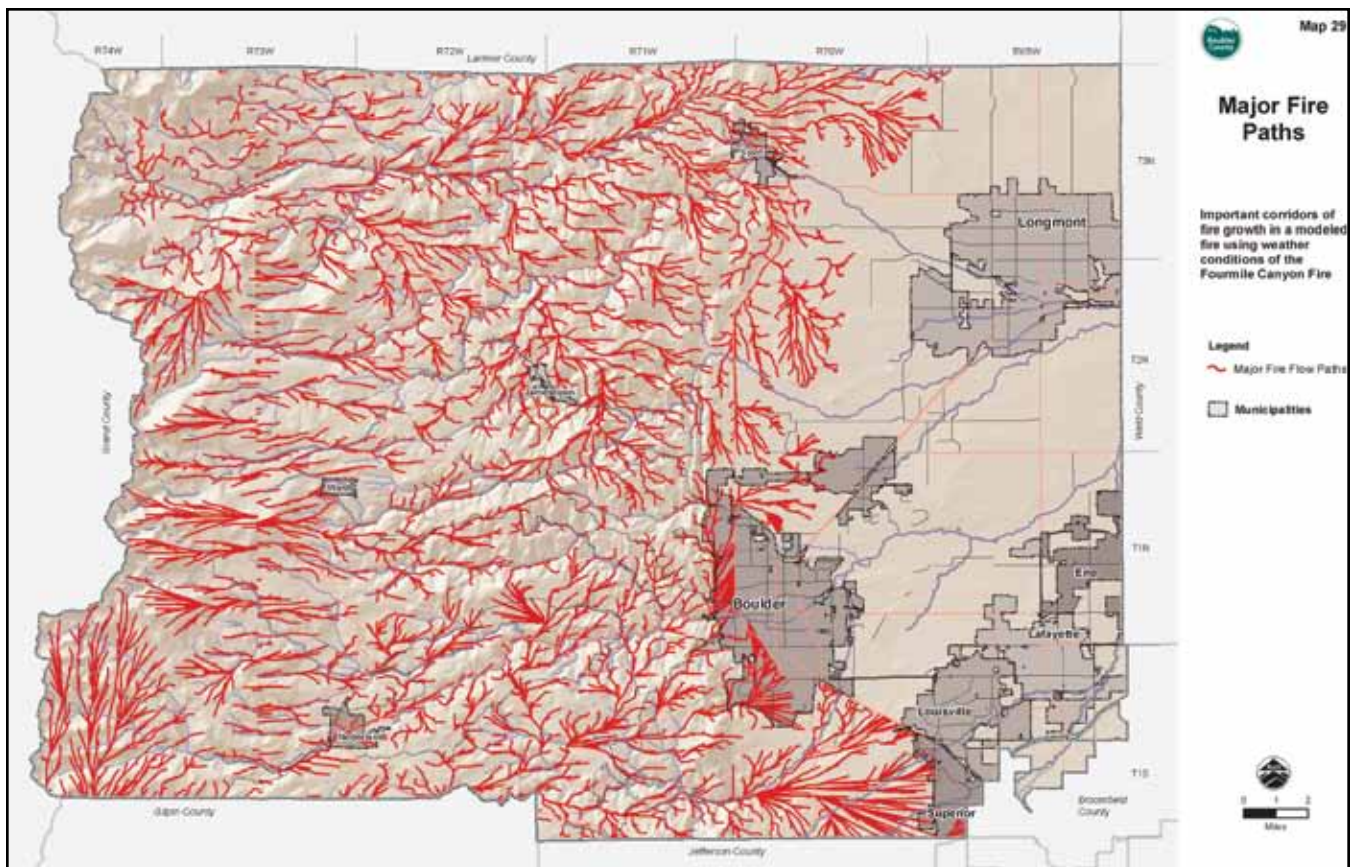
Map 26: Key Ecological Areas



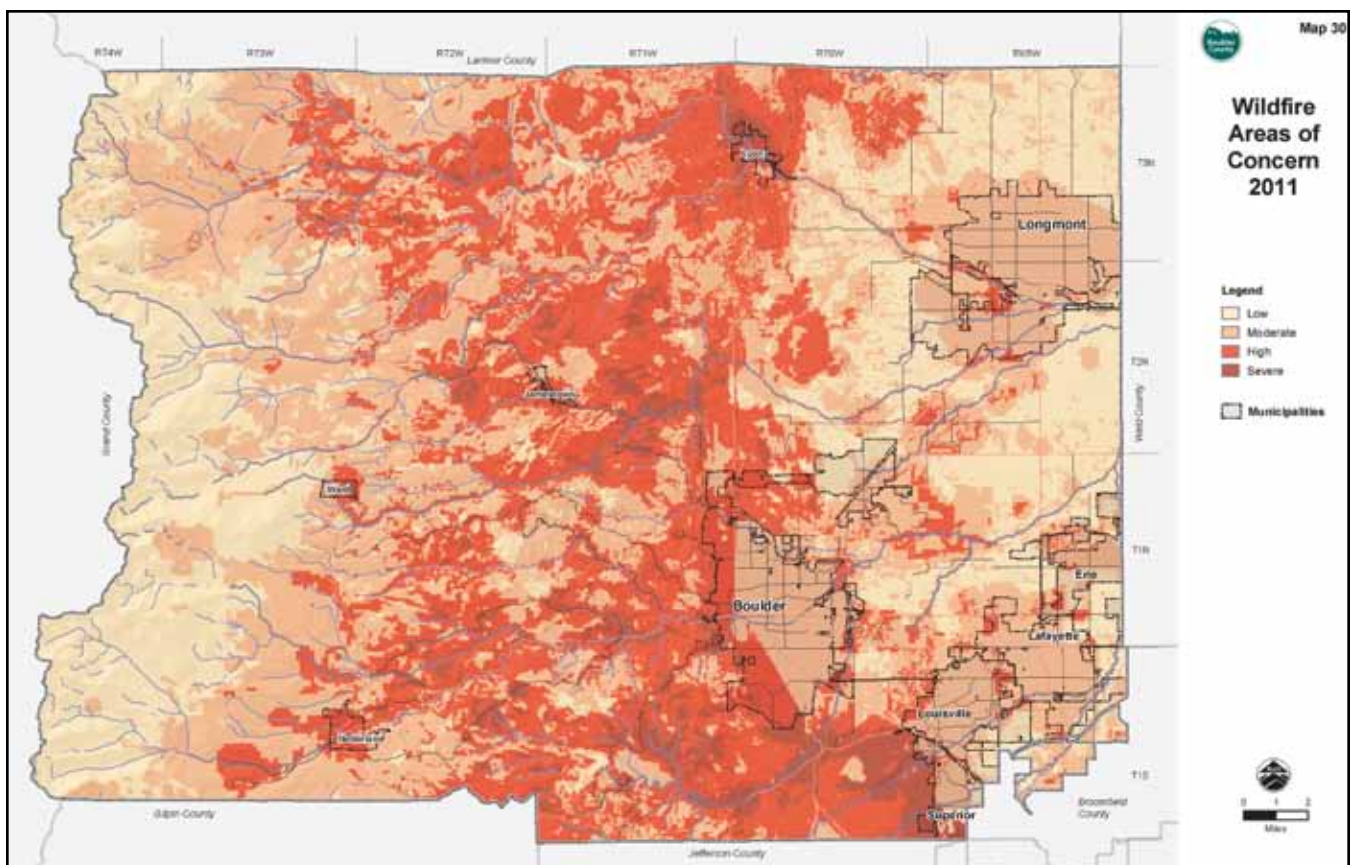
Map 27: Roads and Railroads



Map 28: Wildfire Hazard



Map 29: Major Fire Paths



Map 30: Areas of Concern 2011

Chapter 15 Project Identification and Prioritization



Community wildfire protection plans are required to identify, map, and prioritize fuels treatment projects. For several reasons, it is best to develop plans that are compliant with standards listed in the federal Healthy Forests Restoration Act and as further defined by the Colorado State Forest Service. One requirement is a prioritized treatment plan with specific project details. Before completing this task, it was essential to take a step back and develop a process, a strategy, a plan, and planning procedures for these projects, as well as describe the types of fuels treatment projects (see box) and review the opportunities and constraints involved in fuels treatment projects (see Appendix G). Lists, maps, and descriptions of the projects, along with a discussion of effectiveness, follow. This chapter is the first step in the project planning process. A number of additional steps are required before any project can be implemented.

Foresters Work Group

In order to identify and prioritize fuels treatment projects, we organized a Foresters Work Group comprised of ten of the leading forestry experts in the area. The group met monthly, starting in January 2011. Members of the group included:

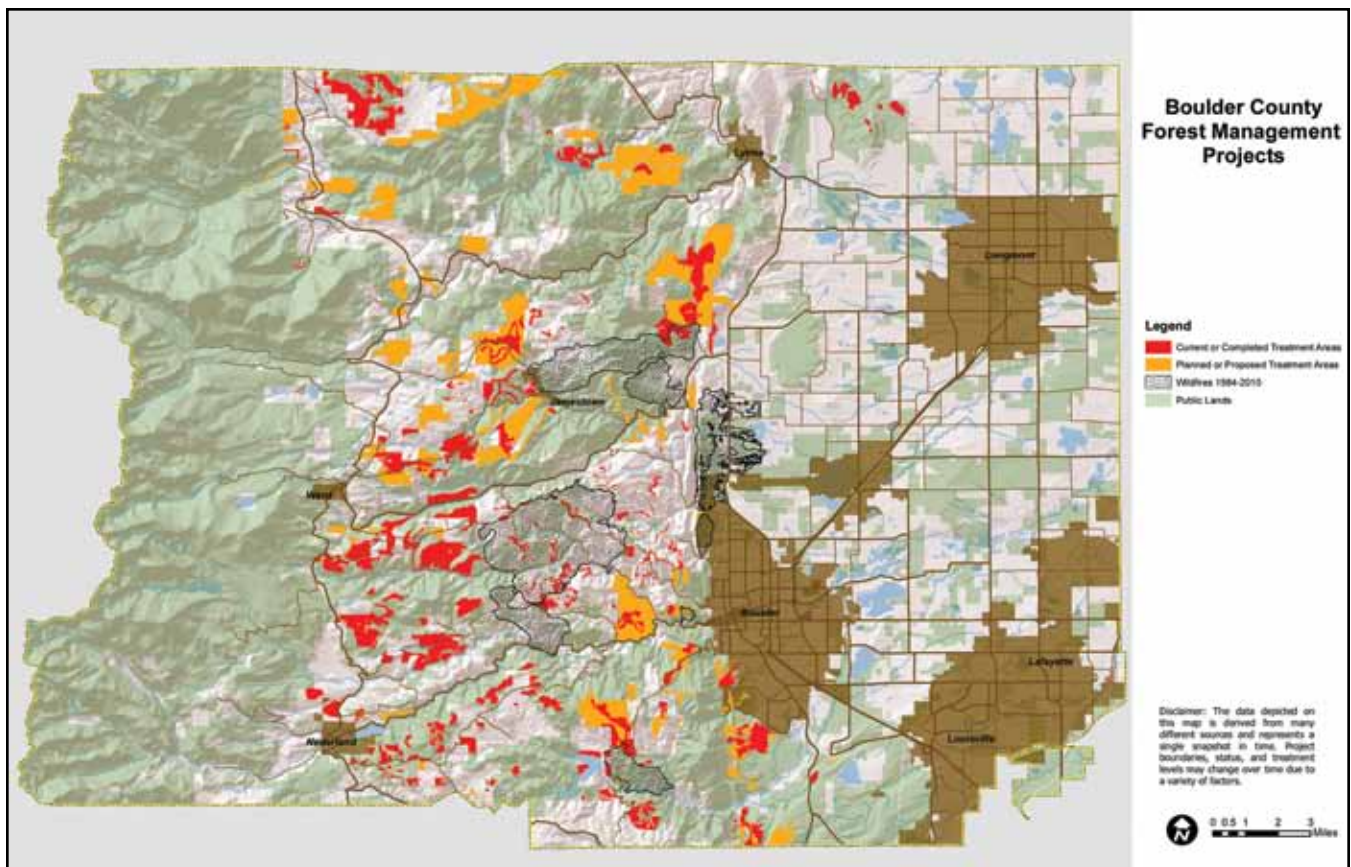
<i>Bob Bundy</i>	<i>Colorado State Forest Service</i>
<i>Chuck Dennis</i>	<i>Private Consultant, Forest Restoration Solutions, former Colorado State Forest Service</i>
<i>Craig Jones</i>	<i>Private Consultant, Biomass Specialist, former Colorado State Forest Service</i>
<i>Chad Julian</i>	<i>Boulder County Parks and Open Space Department</i>
<i>Brian Oliver</i>	<i>City of Boulder Fire and Rescue</i>
<i>Allen Owen</i>	<i>Colorado State Forest Service</i>
<i>Ben Pfohl</i>	<i>Colorado State Forest Service</i>
<i>Eric Philips</i>	<i>Boulder County Land Use Department</i>
<i>Chris Wanner</i>	<i>City of Boulder Open Space and Mountain Parks Department</i>
<i>Kevin Zimlinghaus</i>	<i>U.S. Forest Service</i>
<i>Jim Webster</i>	<i>Boulder County Land Use Department (facilitator)</i>

This experts group brought an incredible wealth of information and invaluable experience to the process. This collective expertise, along with their hard work and dedication, helped produce a product that no single individual, organization, or community could have delivered.

Past, Current and Planned Projects

A large number of fuels treatment project have already been completed in Boulder County by several different land management agencies. Many additional fuels treatment projects are in various stages of planning, development, and implementation, some of which are included in existing local community wildfire protection plans. The Foresters Work Group started off studying past, current, and planned projects before it identified any new initiatives. The group's philosophy was to build on existing and planned projects wherever possible.

The map of completed and planned forest management projects was produced for the Northern Front Range Mountain Pine Beetle Working Group and updated by the Foresters Work Group (see Map 31). Members of the work group had a strong working knowledge of the map because they were personally involved in the funding, design, and implementation



Boulder County Forest Management Projects

of most of these projects. Not only were they familiar with current projects, they knew the history of past forestry projects in Boulder County as well.

In addition to this map, the group reviewed all projects identified in local community wildfire protection plans. All roadside fuels treatment projects identified in completed plans were combined into a common map (see Map 32). Plans

completed after this analysis (Nederland, Lyons, and Lefthand) are not included on this map. Roadside projects were selected because they were relatively simple to map using the existing plans. For non-roadside treatment projects, the group looked at the individual plans.

In addition, the Boulder County Land Use Department produced an interactive Google map of all forest treatment projects

taking place in 2010. This map is available to the public on the county's website and serves as an effective tool for planning future mitigation projects (see box).

With a solid understanding of completed and planned projects in the county (including projects proposed in local community wildfire protection plans), the Foresters Work Group developed its fuels treatment strategy.



Bald Mountain forest before treatment (2006)



Same Bald Mountain forest after treatment (2009)

Fuels Treatment Strategy

In Colorado, wildfire suppression response is tiered based upon many factors, such as location, weather, fire size and complexity, actual and expected fire behavior, and the capabilities and resources of the responding agencies. When a fire starts within a fire protection district on private land, that district is responsible for suppression activities and management of the incident. If the fire escapes initial attack, mutual aid resources are brought in from surrounding fire protection districts. If the fire continues to grow, county resources and management activities begin. And finally, if the fire still exceeds local and county capabilities, fire management is transferred to the state.

This progression of responsibility is a helpful model for integrating local and countywide community wildfire protection plans.

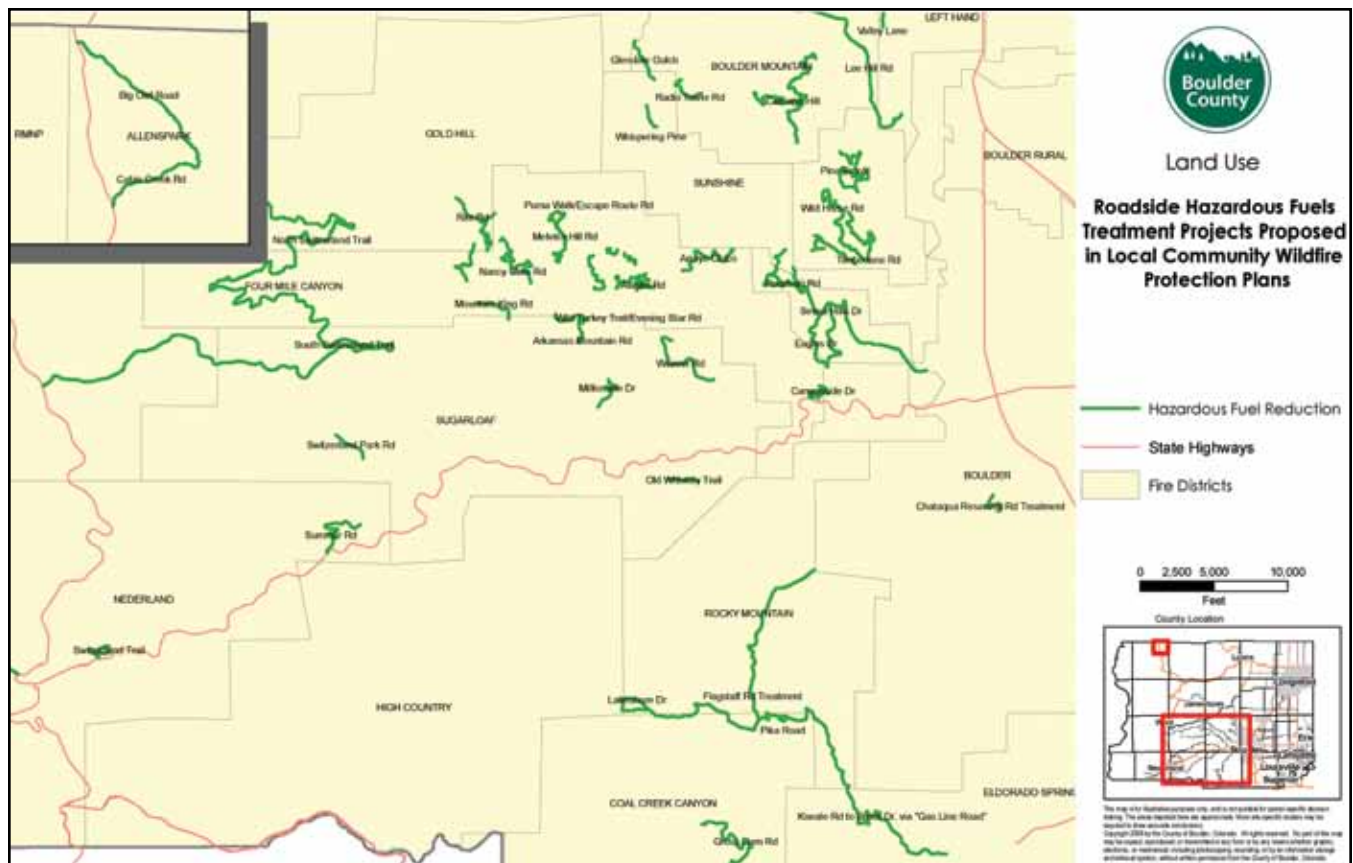
Local fire protection districts, along with their residents and homeowner groups, have the primary responsibility for developing community wildfire protection plans for and within their district boundaries. Keeping this responsibility at the lowest level possible empowers and gives ownership of these plans to those with the greatest interest in seeing that they are fully implemented. Such implementation projects help protect improvements and residents within that district by slowing fire spread, reducing intensities, and by providing locations from which defensive and suppression activities can be taken.

Unfortunately, fire spread typically is not influenced by political boundaries and can readily move from one fire protection district to another, or from state and private lands to federal lands, and the like.

Using the fire suppression responsibility model, this countywide plan is responsible for activities, treatments, and projects that will come into play when fires grow rapidly or exceed local suppression capabilities.

- These should be larger scale, strategic activities that will likely cross fire protection district and land ownership boundaries.
- These should be activities that provide “fall back” positions from which defensive and suppression activities may be taken in the event of escaped wildfires.
- These should be activities that provide landscape-scale treatments that are of sufficient scale to actually alter fire spread and behavior, and not be overwhelmed by large fire.
- These should also include activities that are within the county’s purview and common to all ownerships within the county that can contribute to a more FireWise environment.

Just as in large fire suppression efforts, local resources are considered, and utilized and incorporated into suppression efforts. The Boulder County Community Wildfire Protection Plan acknowledges, supports, incorporates, and builds on local activities that coincide and contribute to countywide efforts.



Map 32: Roadside CWPP Projects

Descriptions of Various Forest Treatments

Clearcut: a forest treatment where all or nearly all trees within a given area are felled. This is an important treatment method used to regenerate lodgepole pine forests and to create openings and develop landscape diversity in any forest type. Creating openings using clearcuts is a critical element in restoring historical characteristics to ponderosa pine and lodgepole pine forests. Clearcuts are larger than patch cuts, which may be up to 2-acres in size.

Community Protection Treatments: usually a combination of cultural and prescribed fire treatments implemented within, adjacent to and around communities or subdivisions to help protect them from wildfire. There is an array of treatment types possible depending upon forest types, terrain, typical wind patterns and more. The intent of community protection treatments is to keep fire from reaching a community/subdivision or to change fire's behavior and to slow it and reduce intensities as it moves towards and through an area.

Defensible Space: an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. Defensible space provides room for firefighters to do their jobs more safely. Defensible space helps protect structures from wildfires but also helps protect the forest from structure fires. See Colorado State Forest Service Fact Sheet 6.302.

Forest Restoration: cultural treatments applied to a forest to recreate conditions or characteristics found in historic forests. In Colorado, most often applied to ponderosa pine. Reference conditions for treatments in ponderosa are typically those found prior to settlement by Americans of European descent, around 1860-70. The concept behind forest restoration in ponderosa pine is that historically fires burned through forests on a periodic basis, usually without causing excessive damage over large areas. From an ecological basis, forest restoration provides the greatest chance for creating sustainable conditions over large areas of the forest.

Fuelbreak: a natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled. Fuelbreaks are strategically located for fighting anticipated fires, where the native vegetation has been permanently modified or replaced. Fuelbreaks divide fire-prone areas into smaller areas for easier fire control and to provide access for firefighting.

Fuelbreak vs Firebreak: Although the term fuelbreak is widely used in Colorado, it is often confused with firebreak. The two are entirely separate, and aesthetically different, forms of forest fuel modification and treatment:

- A firebreak is strip of land, 20 to 30 feet wide (or more), in which all vegetation is removed down to bare, mineral soil each year prior to fire season.

- A fuelbreak (or shaded fuelbreak) is an easily accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced, thus improving fire control opportunities. The stand is thinned, and remaining trees are pruned to remove ladder fuels. Brush, heavy ground fuels, snags, and dead trees are disposed of and an open, park-like appearance is established.

Fuelbreak System: a series of modified strips or blocks tied together to form continuous strategically located fuelbreaks around subdivisions or land units. In Boulder County two types of fuelbreaks are proposed:

- Ridgetop Fuelbreaks – Ridgetops are excellent locations for fuelbreaks as there are often changes in factors that may help change or at least slow fire behavior and spread. These include changes in fuel types, aspect, slope and more.
- Roadside Fuelbreaks – Roadside fuelbreaks may be developed along roads found at bottoms, top or at mid-slope. While fuelbreaks located at the bottom or at mid-slope are not ideal, all have the advantage of having road access which can provide an existing surface from which burnouts of fuels can quickly be done to strengthen the fuelbreak; or from which other defensive actions can be taken to help suppress the wildfire.

Fuelbreak Limitations: Fuelbreaks provide quick access for wildfire suppression. Control activities can be conducted more safely due to low fuel volumes. Strategically located, they break up large, continuous tracts of dense timber, thus limiting uncontrolled spread of wildfire.

Fuelbreaks can aid firefighters greatly by slowing fire spread under normal burning conditions. However, under extreme conditions, even the best fuelbreaks stand little chance of arresting a large fire, regardless of firefighting efforts. Such fires, in a phenomenon called "spotting," can drop firebrands 1/8-mile or more ahead of the main fire, causing very rapid fire spread. These types of large fires may continue until there is a major change in weather conditions, topography, or fuel type. It is critical to understand: A fuelbreak is the line of defense. The area (including any homes and developments) between it and the fire may remain vulnerable.

Fuel Treatment/Modification: manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control. In regards to slash (limbs, branches and small stems) it can include lopping, chipping, crushing, piling and burning, or other treatments. Also known as Fuel Reduction.

Group Selection: removing entire groups or clumps of trees. This is an important technique used in forest restoration treatments in ponderosa pine and in thinning lodgepole pine and spruce/fir where windfirmness is a concern.

Improvement Cutting: the removal of less desirable trees of any species in a stand of poles or larger trees, primarily to improve composition and quality. An important part of improvement cutting is the removal of ladder fuels and dead, or dying trees with insects and/or diseases.

Individual Tree Selection: the removal of single mature trees to allow for growing space for new regeneration to take place. ITM can also include the marking of any sized trees when the intent is to manage stands on an uneven-aged basis or for forest restoration purposes in ponderosa pine.

Intermediate trees: trees shorter than codominant and dominant trees, which receive little direct light from the top and none from the sides. Intermediate trees are often removed when thinning from below, improvement cuts and other silvicultural treatments.

Ladder Fuels: vegetative materials with vertical continuity that allows fire to burn from the ground level up to the branches and crowns of trees.

Minimally Operable: an area where normal mechanized forest management activities are difficult due to access, slopes, rocky outcrops, or dangerous situations. These areas may not be accessible for product harvesting and growth, but may receive some minor (pruning, felling, removal of insect and disease trees, removal of ladder fuels 3" or less) forest management activities using hand crews. Minimally operable slopes are often defined in excess of 40%, but in some instances ground-based equipment can operate on slopes in excess of 55%.

Meadow Enhancement: treatments to restore or maintain natural or man-made openings in the forest. Treatments can include removal of encroaching conifers or hardwood trees, prescribed burning, mowing, carefully controlled grazing and others. Openings in the forest are important for biological diversity, but they also help slow fire spread during crown fires. Research has shown that openings were a very critical part of the historic ponderosa pine landscape. Openings comprised up to 30% or more of these landscapes; a characteristic largely missing in ponderosa pine forests today.

Overtopped or Suppressed Trees: trees with crowns entirely below the general level of the crown cover and receiving no direct light from above or from the sides. Such trees are often part of the ladder fuel continuum and are important to remove to reduce the chances of a surface fire moving into the tree crowns.

Patch Cut: Cutting all trees in a small part of a stand or forest. By definition patch cuts can be up to 2-acres in size but usually much smaller.

Prescribed Fire: a planned and intentionally lit fire allowed to burn within the requirements of federal, state or county laws, regulations, or permits. A prescribed fire is also termed prescribed or controlled burn. Such a fire is under known conditions of fuel, weather, and topography to achieve specific objectives. Prescribed fire is defined as the application of fire, under specified conditions, in a designated area to achieve specific resource management objectives. A written, approved Prescribed Fire Plan must exist.

Stand: a contiguous group of trees sufficiently uniform in age-class distribution, composition and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit.

Thinning: any cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality.

Uneven-Aged Stand: a stand composed of multiple age classes.

Watershed Protection Treatments: An array of cultural treatments, usually implemented at the stand or landscape levels, and designed to reduce wildfire spread and reduce fire intensities. The intent of such treatments beyond modifying wildfire behavior and intensities is to reduce damage to soils and the subsequent risk of sedimentation and debris flows into streams, rivers and reservoirs.

Windfirm: trees able to withstand strong winds and resist windthrow. Open-grown trees tend to grow more slowly and develop deep root systems whereas some species grow within a stand, where the surrounding trees act as a buffer to winds. Thinning in this second type needs to be completed in stages over time to allow the remaining trees to increase their windfirmness. This is a very important factor to consider when treating species like lodgepole pine and spruce/fir.

Fuels Treatment Plan

To implement the above strategy, the Boulder County fuels treatment plan includes two primary components:

1. Develop a long-term, countywide plan for strategic fuelbreaks (“Defensive Actions”)
2. Identify priority areas where significant landscape-scale treatments (“Offensive Actions”) should take place

1) Defensive Actions

The placement, design, scale, and maintenance of fuelbreaks are important factors in their success. In researching other community wildfire protection plans, we did not find a single example of a comprehensive, long-term, strategic plan where individual fuelbreaks were tied together across the entire scope of the planning area. Small, stand-alone fuelbreaks may be useful under certain conditions; however, an entire system or network of fuelbreaks designed as a whole and strategically located across the county is a more effective approach. Putting in place a comprehensive network of fuelbreaks will take more time and resources than completing individual projects. As a result, this is a long-term plan. Individual projects will be completed as funding and partners become available. However, these projects will all eventually be linked together. The plan represents a vision that is contained in a map to let everyone know where we are going and how we are going to get there because, as Yogi Berra said, “If you don’t know where you are going, you might wind up someplace else.” As he also supposedly said, while driving to a ball game with Phil Rizutto who noted that they were lost, “Yeah, but we’re making great time.”

The large-scale system of strategic fuelbreaks is located along roadways, ridgetops, and other appropriate areas. Fuelbreaks will incorporate, wherever possible, natural impediments to fire spread such as large rock outcroppings, large meadows, and old fire scars. Elsewhere, fuelbreaks will be developed by modifying fuels structure and organization through forest thinning and other techniques appropriate to the species of trees and

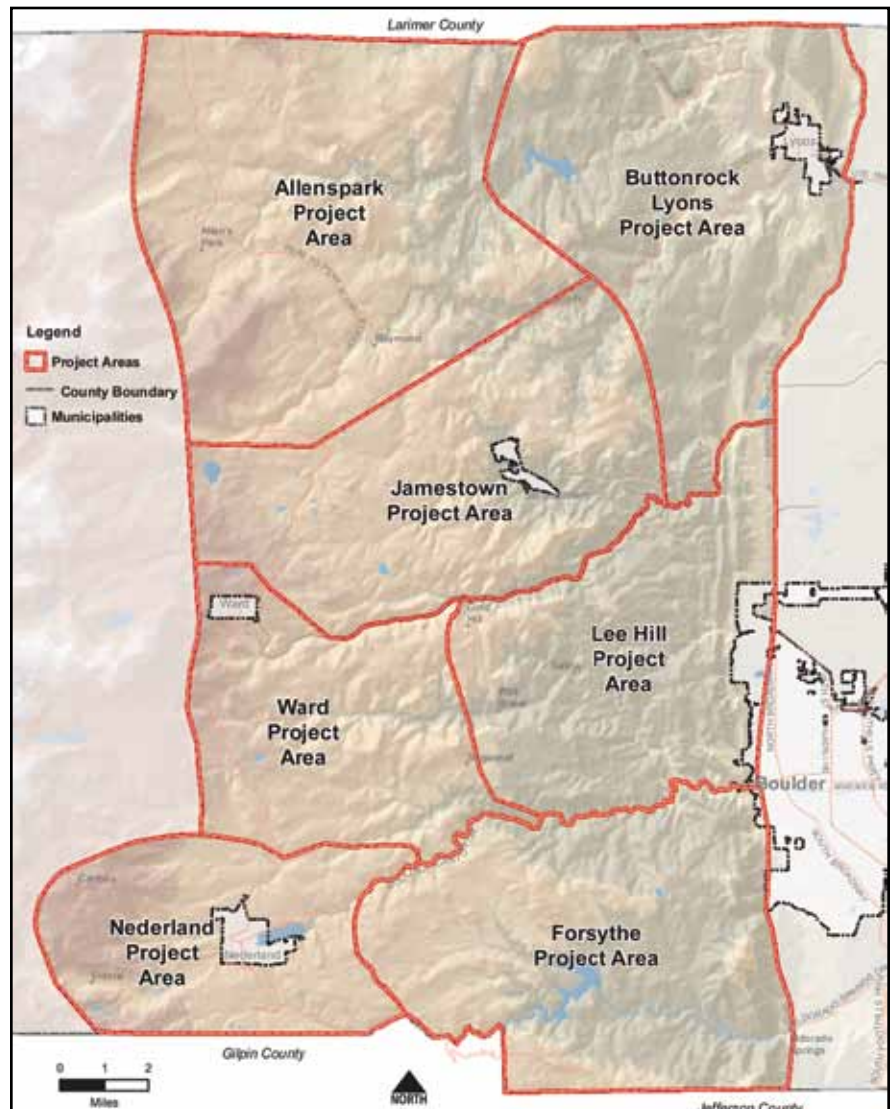
vegetation being managed. Treatments will be of sufficient size that an alteration of fire behavior can be expected, and that defensive and suppression actions can be undertaken with a reasonable margin of safety and expectation of success.

2) Offensive Actions

The Foresters Work Group identified seven project areas within the county where conditions, ownership patterns or other factors exist that provide the opportunity to plan and implement stylized treatments of a significant scale and in patterns where fire spread and intensities will be reduced. Landscapes are based on natural and political boundaries around which large-

scale, collaborative fuels treatment projects will occur (see Map 33).

In these areas, project participants will identify, plan, and implement activities that provide landscape-scale treatments which can actually alter fire spread and behavior, and not be overwhelmed by large fire. Such treatment areas will be of significant size and will most likely occur on city, county, Denver Water, state, federal and other large ownerships. Priority landscapes where significant opportunity for offensive actions exists will require subsequent project-level planning and include projects from local community wildfire protection plans.



Map 33: Priority Landscapes

Fuels Treatment Projects: Opportunities, Constraints, and Planning Procedures

This chapter provides a summary of fuels treatment projects. It is important to stress, however, that conducting a fuels treatment project is a critically significant and very challenging undertaking. An in-depth discussion of the general opportunities and constraints involved in these projects is included in Appendix G. The issues of ownership, access, slopes, and vegetation are reviewed. The potential effects of fire in Mountain Pine Beetle-infested areas are also discussed.

Fuels treatment planning procedures are included in Appendix H. For each landscape-scale project, these procedures are recommended. It is imperative to realize that this differs significantly from a traditional single-component project or even a larger multi-component project.

The Projects: Long-Term Strategic FuelBreak Plan

The county's long-term strategic fuelbreak plan is displayed in Map 34. This plan includes 86 roadside fuelbreaks that are identified in three maps: the northern portion of the county (Map 35), central (Map 36), and south (Map 37). These 86 projects have been prioritized into three levels: very high priorities (red), high priorities (yellow), and moderate priorities (green). The map and township columns in the tables are intended to help readers locate the projects on the three maps.

The Foresters Work Group based these priorities on a long list of criteria, including wildfire hazard, values at risk, north/south alignment (which provides a blocking action to the historic pattern of fire spread), ingress/egress, size of road, and feasibility.

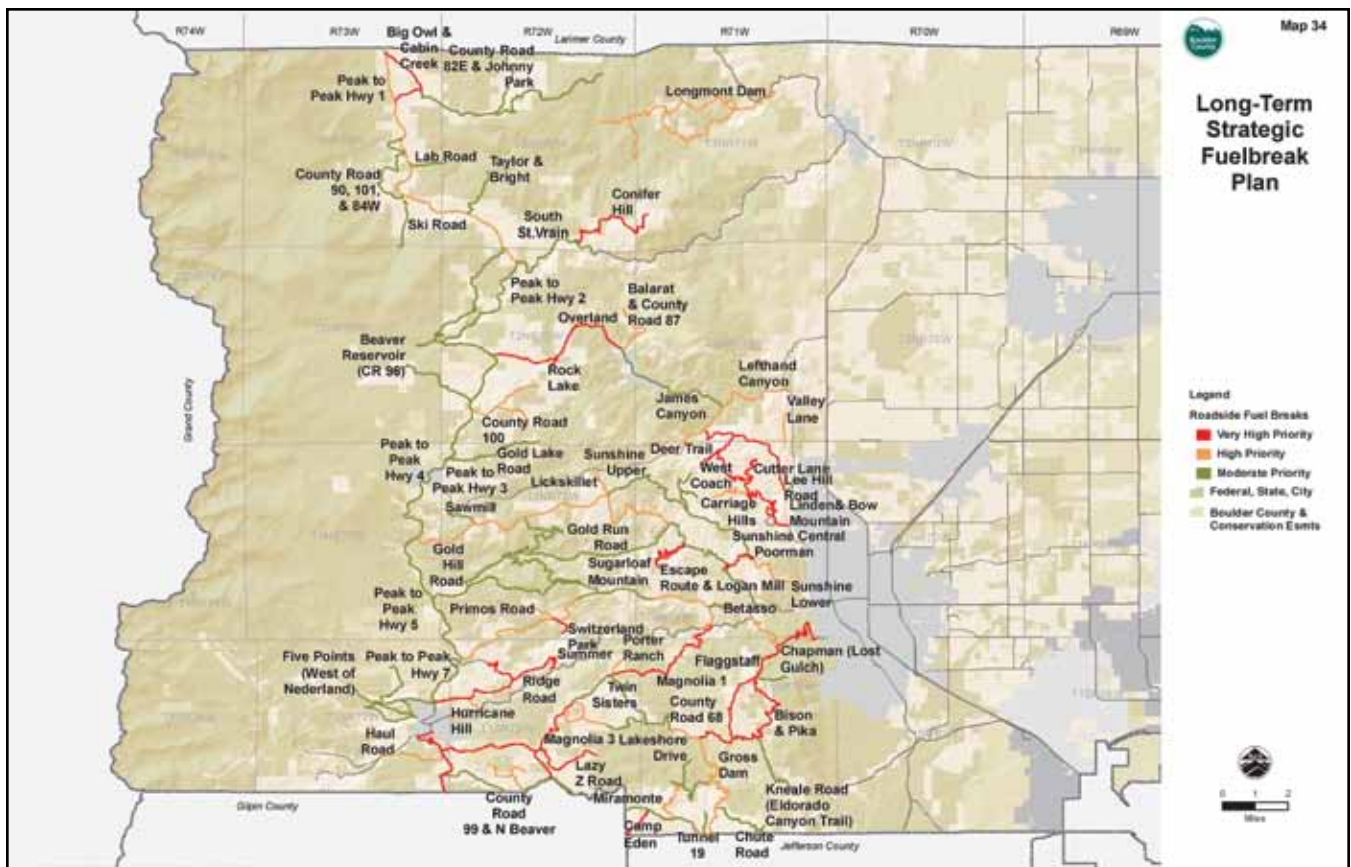
Roadside projects in the fuelbreak plan total 10,277 acres. This equals 7,786 football fields or 16 square miles. These totals are realistic for a 20 year plan. Approximately 500 acres can be treated per year with the necessary commitment and support. Partial treatments have already been completed along some of these roads.

The fuelbreak plan in Map 34 and Table 8 also includes ridgetop fuelbreaks. These projects have been identified, but they have not been named or prioritized. Because they are more effective, the work group decided to focus on the roadside projects. Ridgetop fuelbreaks will be added into planning efforts as appropriate over time.

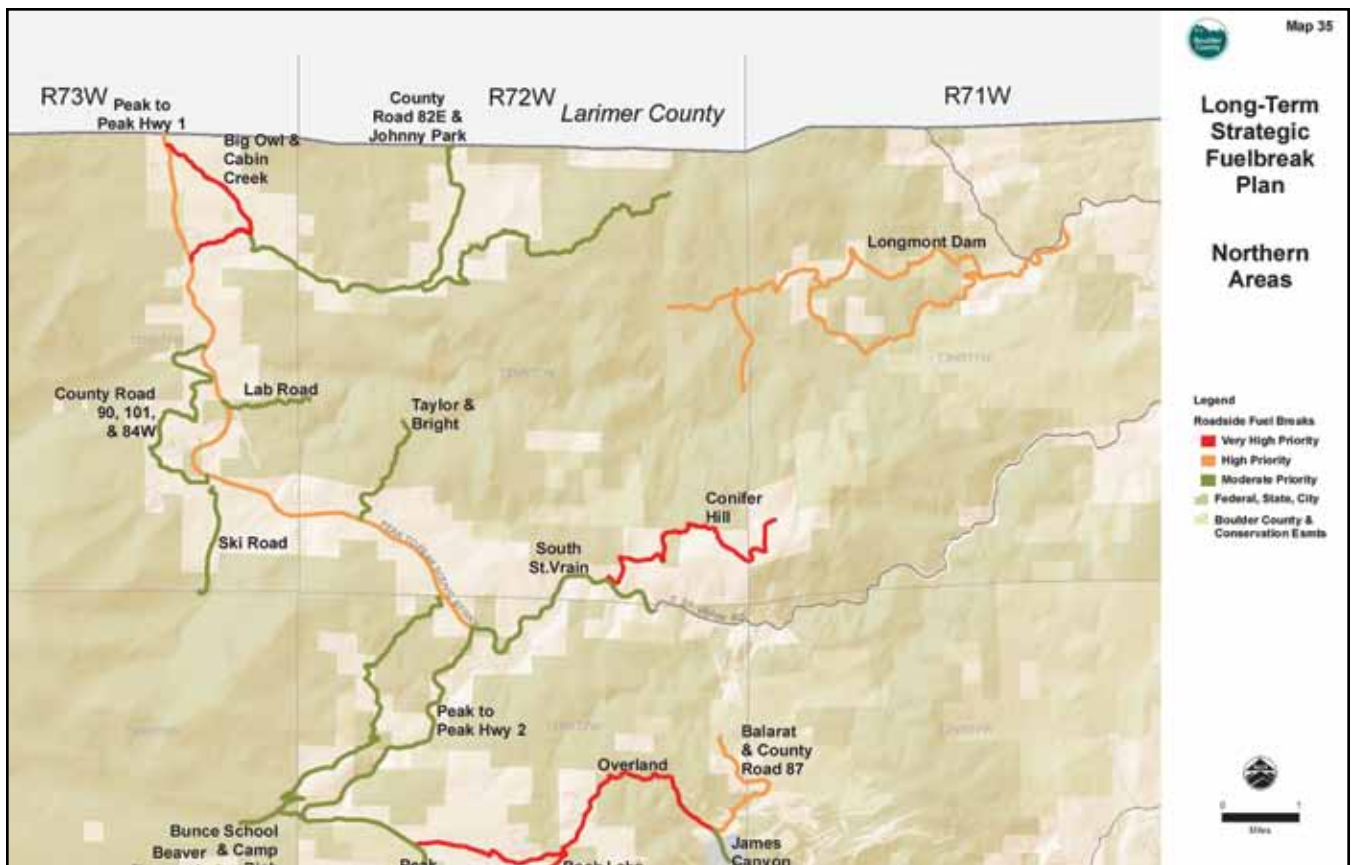
Table 8: Long-term Strategic Fuelbreak Plan Priorities

Very High Priorities (Red)

<i>Project Name</i>	<i>Distance (Miles)</i>	<i>Estimated Acreage</i>	<i>Map</i>	<i>Township</i>
<i>Big Owl & Cabin Creek</i>	2.68	97	<i>North</i>	<i>T3N R73W</i>
<i>Bison & Pika</i>	5.13	186	<i>South</i>	<i>T1S R71W</i>
<i>Camp Eden</i>	1.24	45	<i>South</i>	<i>T1S R71W</i>
<i>Carriage Hills</i>	3.55	129	<i>Central</i>	<i>T1N R71W</i>
<i>Conifer Hill</i>	3.97	144	<i>North</i>	<i>T3N R72W</i>
<i>County Road 97</i>	1.08	39	<i>South</i>	<i>T1S R72W</i>
<i>Cutter Lane</i>	1.18	43	<i>Central</i>	<i>T1N R71W</i>
<i>Deer Trail</i>	1.62	59	<i>Central</i>	<i>T1N R71W</i>
<i>Escape Route & Logan Mill</i>	2.99	109	<i>Central</i>	<i>T1N R71W</i>
<i>Flagstaff</i>	8.61	313	<i>South</i>	<i>T1S R71W</i>
<i>Lazy Z Road</i>	2.43	88	<i>South</i>	<i>T1S R72W</i>
<i>Lee Hill Road</i>	4.00	145	<i>Central</i>	<i>T1N R71W</i>
<i>Linden & Bow Mountain</i>	2.50	91	<i>Central</i>	<i>T1N R71W</i>
<i>Magnolia 1</i>	5.04	183	<i>South</i>	<i>T1S R72W</i>
<i>Magnolia 3</i>	5.44	198	<i>South</i>	<i>T1S R71W</i>
<i>Overland</i>	5.29	192	<i>North</i>	<i>T2N R72W</i>
<i>Peak to Peak Hwy 2</i>	5.64	205	<i>North</i>	<i>T3N R73W</i>
<i>Poorman</i>	1.51	55	<i>Central</i>	<i>T1N R71W</i>
<i>Ridge Road</i>	4.24	154	<i>South</i>	<i>T1S R72W</i>
<i>Rock Lake</i>	0.41	15	<i>North</i>	<i>T2N R72W</i>
<i>Sherwood</i>	1.22	44	<i>South</i>	<i>T1S R72W</i>
<i>Sky Trail & Brook</i>	1.15	42	<i>Central</i>	<i>T1N R71W</i>
<i>Summer</i>	0.69	25	<i>South</i>	<i>T1S R72W</i>
<i>Switzerland Park</i>	0.74	27	<i>South</i>	<i>T1N R72W</i>
Total	72.34	2630.17		



Map 34: Fuel Break Plan



Map 35: Fuel Break Plan North

High Priorities (Yellow)

Project Name	Distance (Miles)	Estimated Acreage	Map	Township
Aspen Meadows & Pine Glade	2.56	93	South	T1S R72W
Balarat & County Road 87	2.29	83	North	T2N R72W
Chapman (Lost Gulch)	2.36	86	South	T1N R71W
County Road 100	3.96	144	Central	T2N R72W
County Road 83	2.40	87	Central	T1N R71W
County Road 99 & N Beaver	2.40	87	South	T1S R72W
Gold Hill Road	6.90	251	Central	T1N R72W
Gold Run Road	3.89	141	Central	T1N R72W
Gross Dam	6.46	235	South	T1S R71W
Haul Road	2.37	86	South	T1S R73W
Hurricane Hill	0.71	26	South	T1S R72W
Lakeshore Drive	1.04	38	South	T1S R71W
Lefthand Canyon	4.83	175	Central	T2N R71W
Licksillet	1.03	37	Central	T1N R72W
Longmont Dam	13.08	475	North	T3N R71W
Miramonte	2.29	83	South	T1S R71W
Peak to Peak Hwy 4	3.49	127	South	T1S R73W
Porter Ranch	0.61	22	South	T1S R72W
Primos Road	0.77	28	Central	T1N R72W
Sugarloaf Road 2	2.84	103	Central	T1N R71W
Sugarloaf Road 3	3.60	131	South	T1N R72W
Sugarloaf Road 4	1.34	49	Central	T1N R72W
Sunshine Lower	2.27	83	Central	T1N R71W
Valley Lane	1.24	45	Central	T2N R71W
West Coach	1.76	64	Central	T1N R71W
Total	76.47	2,780		

Moderate Priorities (Green)

Project Name	Distance (Miles)	Estimated Acreage	Map	Township
Beaver Reservoir	3.13	114	Central	T2N R72W
Betasso	0.95	35	Central	T1N R71W
Bunce School & Camp Dick	6.24	227	North	T2N R72W
Chute Road	2.22	81	South	T1S R71W
Coal Creek Canyon	6.26	228	South	T1S R72W
County Road 68	3.05	111	South	T1S R71W
County Road 82E & Johnny Park	9.95	362	North	T3N R72W
County Road 90, 101, & 84W	4.01	146	North	T3N R73W
Five Points	9.13	332	South	T1S R73W
Four Mile Canyon East	4.85	176	Central	T1N R71W
Four Mile Canyon West	5.70	207	Central	T1N R72W
Gold Lake Road	3.25	118	Central	T1N R72W
Green Mountain	1.06	38	South	T1S R71W
Gross Dam & South Shore	3.04	111	South	T1S R71W
James Canyon	4.25	154	Central	T2N R71W
Kneale Road	2.73	99	South	T1S R71W
Lab Road	1.36	50	North	T3N R73W
Magnolia 2	1.47	53	South	T1S R72W
Peak to Peak Hwy 1	9.48	345	Central	T1N R73W
Peak to Peak Hwy 3	4.21	153	Central	T1N R73W
Peak to Peak Hwy 5	2.55	93	Central	T2N R72W
Peak to Peak Hwy 6	2.42	88	South	T1S R73W
Peak to Peak Hwy 7	2.38	87	South	T1N R72W
Peak to Peak Hwy 8	3.52	128	North	T2N R72W
Pennsylvania Gulch	1.61	59	Central	T1N R72W
South St.Vrain	3.55	129	North	T3N R72W
Sawmill	1.07	39	Central	T1N R72W
Ski Road	1.60	58	North	T3N R73W
Sugarloaf Mountain	0.76	28	Central	T1N R72W
Sugarloaf Road 1	2.55	93	Central	T1N R72W
Sunshine Central	3.05	111	Central	T1N R71W
Sunshine Upper	3.78	138	Central	T1N R71W
Switzerland Trail North	4.58	167	Central	T1N R72W
Switzerland Trail South	4.02	146	Central	T1N R72W
Switzerland Trail West	5.36	195	Central	T1N R72W
Taylor & Bright	1.80	66	North	T3N R72W
Tunnel 19	0.73	26	South	T1S R71W
Twin Sisters	2.17	79	South	T1S R72W
Total	133.83	4866.17		



Map 36: Fuel Break Plan Central



Map 37: Fuel Break Plan South

The Projects: Landscape-Scale, Collaborative Forest Management

The Foresters Work Group identified three priority areas to pursue landscape-scale, collaborative forest management projects: 1) Forsythe, 2) Lee Hill, and 3) Buttonrock/Lyons. These areas were selected because of their forest type, ready or established partnerships, watersheds, fire behavior, and values at risk.

Forests: All three areas selected are located in the lower montane ecosystem. Wildfires occur most frequently in the lower montane (see Chapter 2 on wildfire history and the map of past wildfires in the county). The lower montane is also a focus area for both forest restoration and wildfire mitigation (see Chapter 11 on forest health). The Front Range Roundtable, a ten county stakeholder group, has also targeted the lower montane for these reasons.

Partners: The three project areas were also selected because they have the greatest opportunity for success by building on planned projects with strong partners. The US Forest Service, the agency that treats the largest number of acres each year, is planning future activities in the Forsythe area and will serve as a strong anchor for this landscape initiative. The Western Boulder County Healthy Forest Initiative and the Front Range Roundtable are working on the landscape-scale in the Lee Hill area (see Chapter 6). The Boulder County Parks and Opens Space Department is actively managing its Heil Valley Ranch and Hall Ranch properties in the Buttonrock/Lyons area.

Watersheds: The Saint Vrain Wildfire/Watershed Assessment identified and prioritized watersheds based upon their hazards of generating flooding, debris flows and increased sediment yields following wildfires that could have impacts on water supply. The highest priority watersheds in this assessment have the greatest amount of overlap with the three selected priority areas. In addition, watershed values were a primary reason for selecting the three priority areas that include both Gross and Buttonrock Reservoirs and the Fourmile Creek and Boulder Creek Canyon watersheds.

Fire Behavior: The Risk Assessment Work Group mapped wildfire hazard throughout the county (see Chapter 14). The percentage of land and total acres that

was classified as extreme and high wildfire hazard for each landscape area is listed below (see Table 9). The Forsythe Landscape has the highest percentage of land with elevated wildfire hazard (69%) and the second highest number of acres in this category (23,240 acres). The Buttonrock/Lyons Landscape has the second highest percentage of land with elevated wildfire hazard (65%) and the largest amount of total acres in this category (23,953). The Lee Hill Landscape contains the fifth highest percentage of land (43%) and total acres (11,884). Wildfire hazard in the Lee Hill Landscape is lower as a consequence of the Fourmile Canyon Fire (less fuel).

Table 9: Landscape Area Ranking by Wildfire Hazard

<i>Landscape</i>	<i>Total Acres</i>	<i>Percentage of Land with an Extreme & High Wildfire Hazard</i>	<i>Rank</i>	<i>Total Acres with an Extreme & High Wildfire Hazard</i>	<i>Rank</i>
<i>Forsythe</i>	33,452	69%	1	23,240	2
<i>Buttonrock/Lyons</i>	36,839	65%	2	23,953	1
<i>Jamestown</i>	32,624	64%	3	20,745	4
<i>Allenspark</i>	44,615	47%	4	20,875	3
<i>Lee Hill</i>	27,337	43%	5	11,884	5
<i>Ward</i>	21,681	35%	6	10,274	6
<i>Nederland</i>	19,905	15%	7	3,082	7

Community Values at Risk: The Risk Assessment Work Group also mapped community values at risk from wildfire (see Chapter 14). The Lee Hill Landscape contains the highest percentage of land that is assessed as having moderate, high and exceptional values (83%) and the third highest number of total acres in this category (25,000 acres). The Forsythe Landscape has the second highest percentage of higher value land (75%) and the second largest amount of total acres in this category (25,000). The Buttonrock/Lyons Landscape is tied for the third largest percentage of higher value land (71%) and the largest amount of total acres in this category (26,134).

Table 10: Landscape Area Ranking by Values at Risk

<i>Landscape</i>	<i>Total Acres</i>	<i>Percentage of Land with an Extreme & High Wildfire Hazard</i>	<i>Rank</i>	<i>Total Acres with an Extreme & High Wildfire Hazard</i>	<i>Rank</i>
<i>Lee Hill</i>	27,337	83%	1	22,581	3
<i>Forsythe</i>	33,452	75%	2	25,000	2
<i>Buttonrock/Lyons</i>	36,839	71%	3	26,134	1
<i>Nederland</i>	19,905	71%	3	14,171	6
<i>Ward</i>	21,681	62%	5	13,555	7
<i>Jamestown</i>	32,624	45%	6	14,672	5
<i>Allenspark</i>	44,615	37%	7	16,729	4

Maps of the three priority landscapes are displayed in Map 38 (Forsythe), Map 39 (Lee Hill), and Map 40 (Buttonrock/Lyons). In addition to the roadside and ridgetop fuelbreaks, these maps include potential watershed treatment areas, meadow enhancement projects, and the communities identified in local community wildfire protection plans. These maps, combined with the completed and planned treatments map (Map 31), will be used to help produce detailed project plans for landscape-scale, collaborative forest management initiatives.

1) Forsythe Landscape Project Area Description

The Forsythe Landscape Project lies in the southern portion of Boulder County. It runs from the foothills area just west of Boulder (elevation 5,400 ft.) west to a line running from Middle Boulder Creek/ Boulder Canyon southward to the Boulder County line roughly at South Boulder Creek. The elevation along this west boundary ranges from 8,000 feet to 8,800 feet. This west boundary runs through and includes a portion of the Reynolds Ranch county open space property. The south boundary is the Boulder County line. The north boundary is Boulder Canyon. This landscape is predominantly in the lower montane consisting of ponderosa pine, Douglas-fir on the north facing slopes and mixed conifer. The western portion of the project area encompasses the lower montane/middle montane ecotone and where lodgepole pine becomes a dominant species, particularly above 8,000 feet elevation. Meadows are interspersed throughout the area.

This area is of particular importance due to its watershed components. Gross

Reservoir (part of the Denver Water Board system) and Kossler Lake (part of the Boulder watershed system) are within the landscape boundaries. Barker Reservoir is approximately one mile west of the project boundary. Besides Middle and South Boulder Creeks, numerous gulches and drainages add to the watershed system. Some of the primary intermittent streams include:

- Johnson & Martin Gulch
- Long & Gregory Canyon
- Hawkin & Keystone Gulch
- North & Dowdy Draw
- Calhoun Gulch
- Retallack Gulch
- Tom Davis Gulch
- Forsythe gulch
- Winiger Gulch

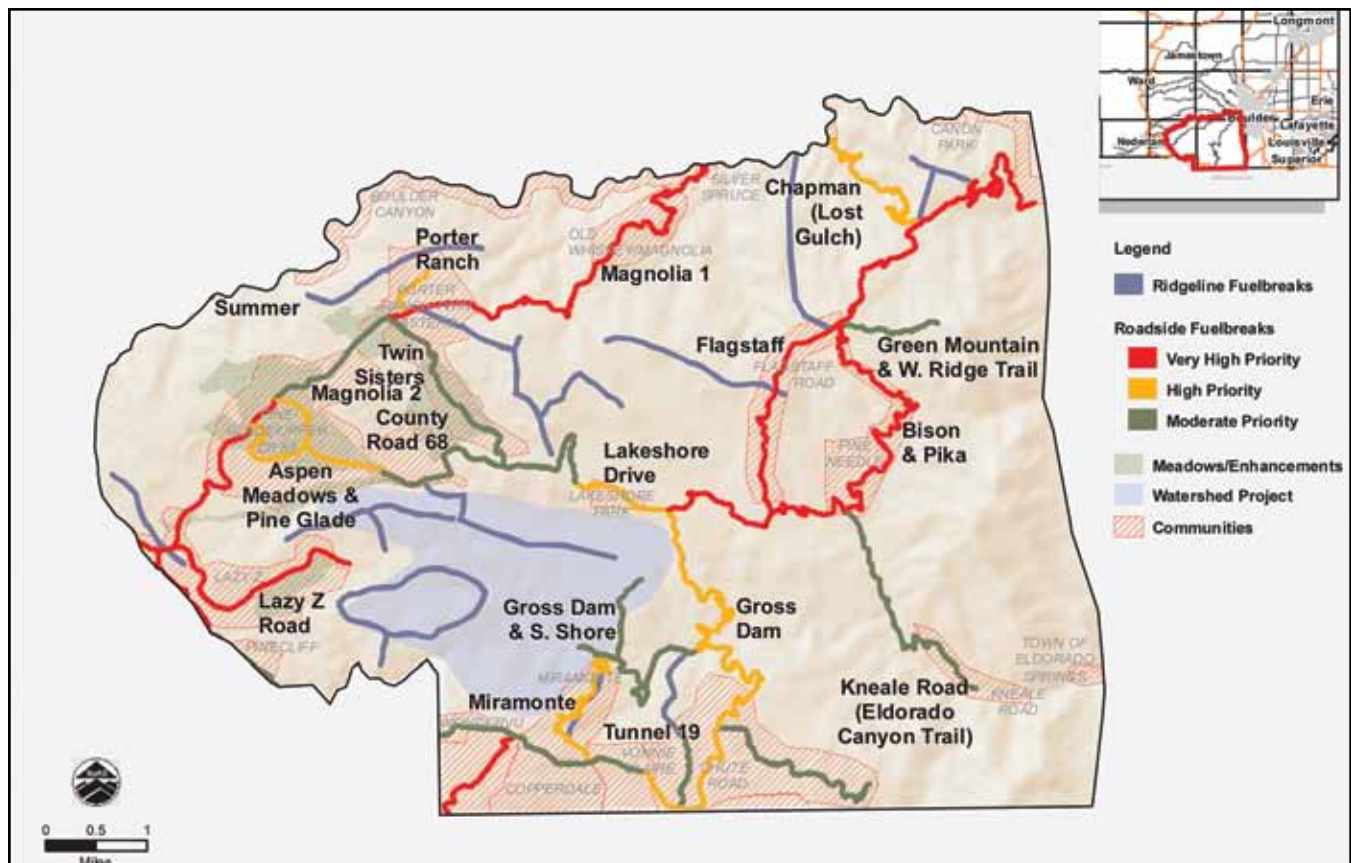
Prominent features within this landscape include:

- Green Mountain, Bear Peak & South Boulder Peak

- Eldorado Mountain
- Tram Hill
- Twin Sisters Peak
- Forsythe Rock
- Castle Rock
- Tungsten Mountain, at just over 9,000 feet, lies a mile west of the project boundary

Historical and Social

There are numerous historical and social components to this landscape. For more information and detail see the US Forest Service National Environmental Policy Act document for the Winiger Ridge Project and the soon to be completed Forsythe Geographic Area document. Additional information on historical and recreational use is available in the Boulder County management plans for Walker and Reynolds Ranch, the City of Boulder's management plan for Boulder Mountain Parks (Chautauqua/Mesa Trail/Flatiron complex), Eldorado State



Map 38: Forsythe Landscape

Park's Management and Visitor Use Plan, and the Arapahoe and Roosevelt National Forest Plan.

Mining and historic logging has drastically altered this landscape area. European settlement at the turn of the century utilized the forest resources in ways that still impact the overall forest health, condition and structure today. Mining occurred in the Magnolia area in particular, a mining district established in the late 1800's.

Recreation use in this landscape is of major importance. Key recreational areas include:

- Boulder Mountain Parks (hiking, some biking, equestrian, climbing, birding)
- Walker Ranch (hiking, biking, equestrian)
- Eldorado Canyon State Park (Day use, hiking, fishing, climbing)
- Gross Reservoir (fishing, hiking, biking along Gross Dam Road)
- U.S. Forest Service area just west of Gross Reservoir (Winiger Gulch/County Road 68)
- Boulder Canyon (fishing, climbing, sight-seeing)
- Boy Scout Area (Section 16)
- Numerous other hiking trails, mountain bike trails and equestrian trails run throughout the area.

Communities

Community is loosely defined for the purpose of this plan. A community can be a cluster of homes or a number of homes along a given road or a platted subdivision with a Home Owner Association. Small incorporated towns and unincorporated areas under the county's governance are also considered communities for this purpose.

The primary communities located with the landscape boundary are:

- Eldorado Springs
- Pine Needle Notch
- Lakeshore
- Crescent Village
- Wondervu
- Mountain Meadows
- Porter Ranch Twin Sisters Road
- County Road 99
- Lazy Z
- Pinecliffe & the Pinecliffe Association
- Whisky Hill/Lower Magnolia Road

Past Forest Management Treatments

Forest management has been occurring in the area since the mid 1970's. Prior to this time, some Civilian Conservation Corps work was done in the Magnolia Road area near the current junction with the Lazy Z or Winiger Gulch Road. Specific management efforts occurring over the past 40 years include:

- 1977 – 1981: Front Range Vegetative Management Pilot Project
- 1977 – current: Ongoing implementation of the Walker Ranch Forest Management Plan
- 1997 – current: Implementation of the Gross Reservoir Management Plan
- 1998 – current: Ongoing forest management work at Eldorado Canyon State Park
- 2006 – current: Implementation of the Reynolds Ranch Forest Management Plan
- 1976 – current: Forest improvement, fuels reduction and prescribed burning on City of Boulder Mountain Parks land
- 1997 – 2004: Winiger Ridge Stewardship Contracting Pilot Project and Interagency Ecosystem Management Project
- 1998 – current: Fuels reduction work through Boulder Fire Authority's mitigation crew (Flagstaff Road area/Pine Needle Notch)
- Individual private land management through Colorado State Forest Service (numerous individual parcels, tree farmers, Forest Agriculture Tax participants)
- 1998 – 2002: Forest management activities at the Camp Patiya facility on Flagstaff Road
- 1984 – 1988: Salvage of Western Spruce Budworm killed Douglas-fir (throughout the area including three sections along Colorado Highway 119/Boulder Canyon
- 1970 – current: "Stand alone" treatments by the US Forest Service

Project Partners

This landscape lends itself to collaboration with numerous partners. This has been true since the initial Front Range Vegetative Management Pilot Project (1977 – 1981). That project was a response to the Mountain Pine Beetle epidemic of that time and was furthered by landowner "request for action" after the Comforter Mountain Fire (1976). Many of the partners during that project are still working today on efforts of mutual interest – fuels reduction, insect/disease, overall forest improvement, watershed protection and forest restoration. These include:

- Private landowners
- US Forest Service
- Boulder County
- City of Boulder
- Denver Water
- Eldorado Canyon State Park
- Local Fire Protection Districts
- Home Owner Associations
- Non-Governmental Organizations
- Colorado Department of Transportation

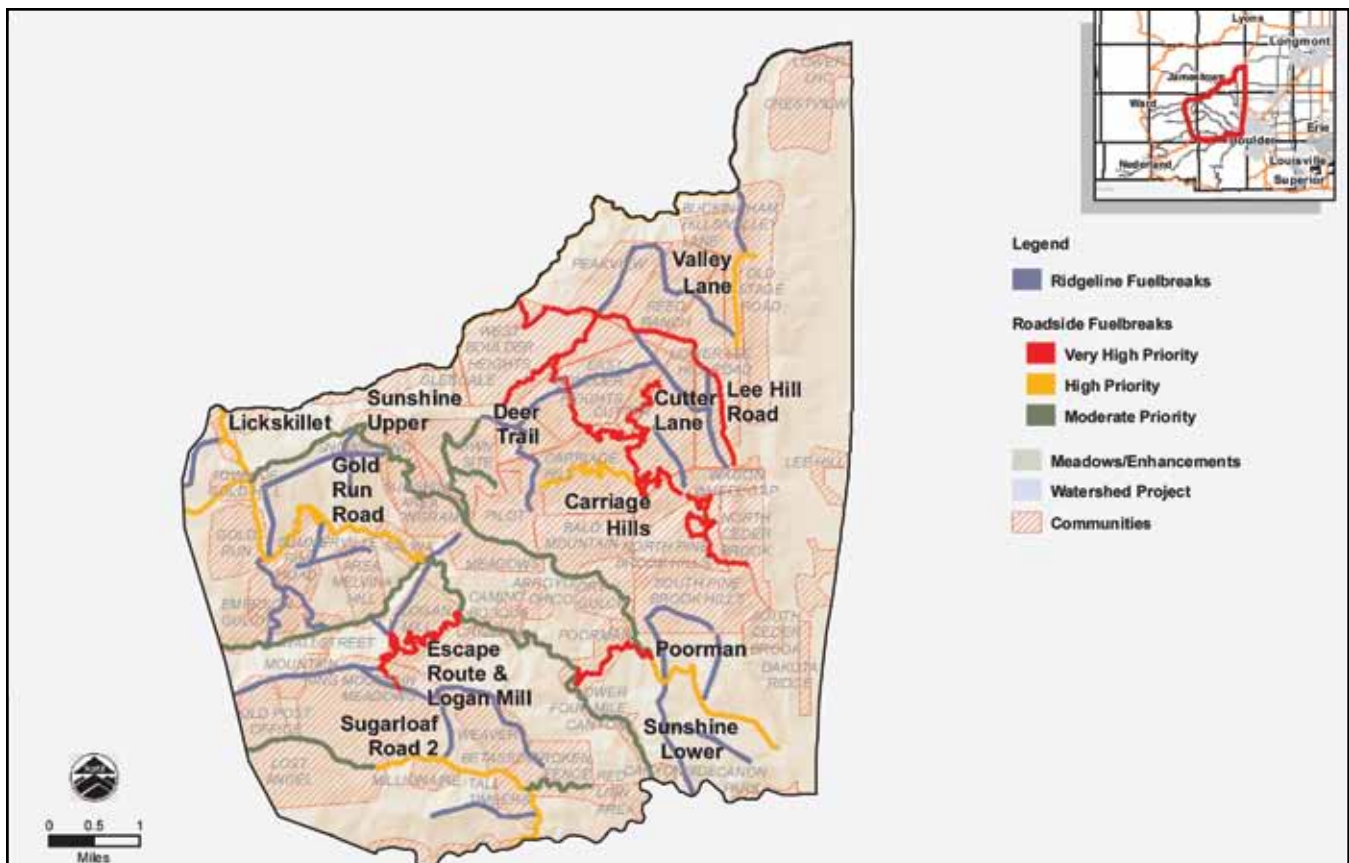
2) Lee Hill Landscape Project Area Description

The Lee Hill Landscape Project lies in the central portion of Boulder County. It runs from the foothills just west of Boulder (elevation 5,400 feet) north along US Highway 36/North Foothills Highway to Lefthand Canyon. The southern boundary is Boulder Canyon/Colorado Highway 119. The boundary then runs northward from Boulder Creek just past Boulder Falls and follows topographic features including Comforter Mountain and Sugarloaf Mountain before dropping into Fourmile Creek. It continues northward following ridgetops and secondary drainages to just west of Gold Hill. It again drops down into Lefthand Creek and James Creek before ending at the primary ridge above South Saint Vrain Creek. The northern boundary then runs east through the CalWood Ranch Outdoor Environmental Center above Jamestown and follows topographic features connecting Fairview Peak, finally ending in lower Lefthand Canyon. This landscape connects the Forsythe Landscape area and the Buttonrock/Lyons Landscape, creating a series of three large areas from the Boulder/Jefferson county line on the south to nearly the Boulder/Larimer county line on the north. This landscape is almost entirely within the lower montane zone consisting of ponderosa pine, Douglas-fir on the north facing slopes and mixed conifer. The western portion of the project area contains the lower montane/middle montane ecotone where lodgepole pine becomes present, but not as a dominant species. The elevation ranges within the project boundary from 5,400 feet to 8,200/8,600 feet along the western boundary. Meadows are interspersed throughout the area with some of the

meadow complexes being extensive in size and important to the overall landscape.

While no larger reservoirs or municipal water infrastructures occur in this landscape, it certainly encloses important watershed components. Besides Middle Boulder Creek, Fourmile Creek, Lefthand Creek, and James Creek, numerous gulches and drainages add to the watershed system. Some of the primary intermittent streams include:

- Bummers Gulch
- Sixmile Creek
- Packer/Arkansas/Sunbeam/Sand Gulches
- Black Tiger
- Melvina/Schoolhouse/Emerson Gulches
- Gold Run
- Gillespie/Slaughterhouse/Moorhead Gulches
- Castle/Porphrey/Spruce Gulches
- Long/Central Gulches



Map 39: Lee Hill Landscape

Prominent features within this landscape include:

- Arkansas Mountain
- Comforter Mountain
- Sugarloaf Mountain
- Bald Mountain
- Emancipation/Melvina/Monument Hills
- Lee Hill
- Bighorn Mountain
- Golden Age Hill/Porphyry Mountain
- Fairview Peak
- Sunshine Saddle

Historical and Social

There are numerous historical and social components to this landscape. For more information and detail, see the US Forest Service National Environmental Policy Act document for the James Creek and Sugarloaf Geographic Area. Additional information on historical and recreational use is available in the Boulder County Comprehensive Plan and the Arapahoe and Roosevelt National Forest Plan.

Mining and historic logging have drastically altered this landscape. European settlers at the turn of the century utilized the forest resources, and that heavy use still impacts the overall forest health, condition and structure today. Mining occurred in the Gold Hill, Sugarloaf, Sunshine and Jamestown areas in particular and were recognized mining districts in the late 1800's.

A number of recent fires have impacted this landscape, including

- Black Tiger Fire
- Lefthand Canyon fires (3)
- Overland Fire
- Fourmile Canyon Fire
- Dome Fire
- Numerous smaller fires have occurred in this area since the mid-1970's (Gold Hill Fire, Boulder Canyon Fire, Sunshine Fire, Comforter Mountain Fire (2))

Recreation use in this landscape is of major importance. Key recreational areas include:

- Boulder Canyon and Lefthand Canyon (fishing, climbing day use)
- Bald Mountain (hiking)
- Sunshine Canyon Road/Lefthand Canyon Road/Boulder Canyon (biking)
- Gold Hill Road (biking, equestrian)
- Numerous other hiking trails, mountain bike trails and equestrian trails run throughout the area

In addition to these recreational areas, several outdoor environmental camps lie within this landscape. These include:

- CalWood Outdoor Environmental Education Center
- Balarat (Denver Public School's environmental education center)
- Trojan Ranch (west of Gold Hill)

Communities

Communities located with the landscape boundary include:

- West Boulder
- Seven Hills
- Pinebrook Hills
- Sugarloaf/Mountain Meadows/Mountain Pines/Tall Timbers
- Old Stage/Back Valley Lane
- Boulder Heights/Carriage Hills
- Orodell/Silver Spruce/Wheelman/Sunnyside (in Boulder Canyon)
- Town of Jamestown and Springdale
- Sunshine
- Upper Sunshine Canyon
- Gold Hill
- Salina/Wallstreet/Summerville
- Rowena/Glendale

Past Forest Management Treatments

Forest management has been occurring in the area since the mid 1970's.

- 1977 – 1981: Front Range Vegetative Management Pilot Project in the Sugarloaf area

- 1976 – current: Forest improvement work on City of Boulder Mountain Parks land (Sunshine area)
- Individual private land management through Colorado State Forest Service (numerous individual parcels, tree farmers, Forest Agriculture Tax participants)
- 2004 – current: Fuels reduction work through Colorado State Forest Service grant programs/ Fire Protection District fire crews and contractors
- Fuels reduction work on Bureau of Land Management lands near Gold Hill through Colorado State Forest Service and local community involvement
- 2002 – current: Implementation of fuels reduction and forest improvement work on National Forest Service lands in the Sugarloaf area, Gold Hill area and James Creek area
- 1970 – current: “Stand alone” treatments by the US Forest Service not associated with efforts above

Project Partners

This landscape lends itself to significant collaboration with many partners. This is particularly true due to the number of communities located within the landscape boundary. These include:

- Western Boulder County Healthy Forest Initiative
- Front Range Roundtable
- Private landowners (through Colorado State Forest Service)
- US Forest Service
- Boulder County
- City of Boulder
- Town of Jamestown
- Gold Hill
- Local Fire Protection Districts
- Home Owner Associations
- Non-Governmental Organizations
- Colorado Department of Transportation

3) Buttonrock/Lyons Landscape Project Area Description

The Buttonrock/Lyons Landscape Project lies in the northern portion of Boulder County. It runs from the foothills area just west of U.S. Highway 36/North Foothills (elevation 5,400 ft.) from Lefthand Canyon to Lyons. The west boundary is the Cook Mountain/Coulson Gulch ridgetop/Four Wheel Drive road west of Buttonrock Reservoir then curling east and south towards Deadman Gulch and the Little Narrows (South Saint Vrain Highway/ Colorado Highway 7) southward along a series of ridgetops connecting Fairview Peak, Spruce Gulch and down to Lefthand Canyon. This landscape is completely in the lower montane forest type consisting of ponderosa pine, Douglas-fir on the north facing slopes and mixed conifer. Meadows are interspersed throughout the area. Particularly important meadow complexes for wildlife habitat include:

- Antelope Park
- Western portions of Hall Ranch
- Elk Mountain area (elk migration route)

This area is of importance due to its watershed components, recreational use and proximity to the town of Lyons. Buttonrock Reservoir (part of the Longmont system) and Allens Lake are within the landscape boundaries. Lower portions of North Saint Vrain and South Saint Vrain Creeks are important watershed components. A small lower portion of Lefthand Creek is also within the project boundary. Numerous gulches are part of the watershed systems. Some of the primary intermittent streams include:

- Rattlesnake
- Bear/Coulson Gulch
- Long & Coffintop Gulch
- Plumely & Geer Canyons
- Spruce Gulch

Prominent features within this landscape include:

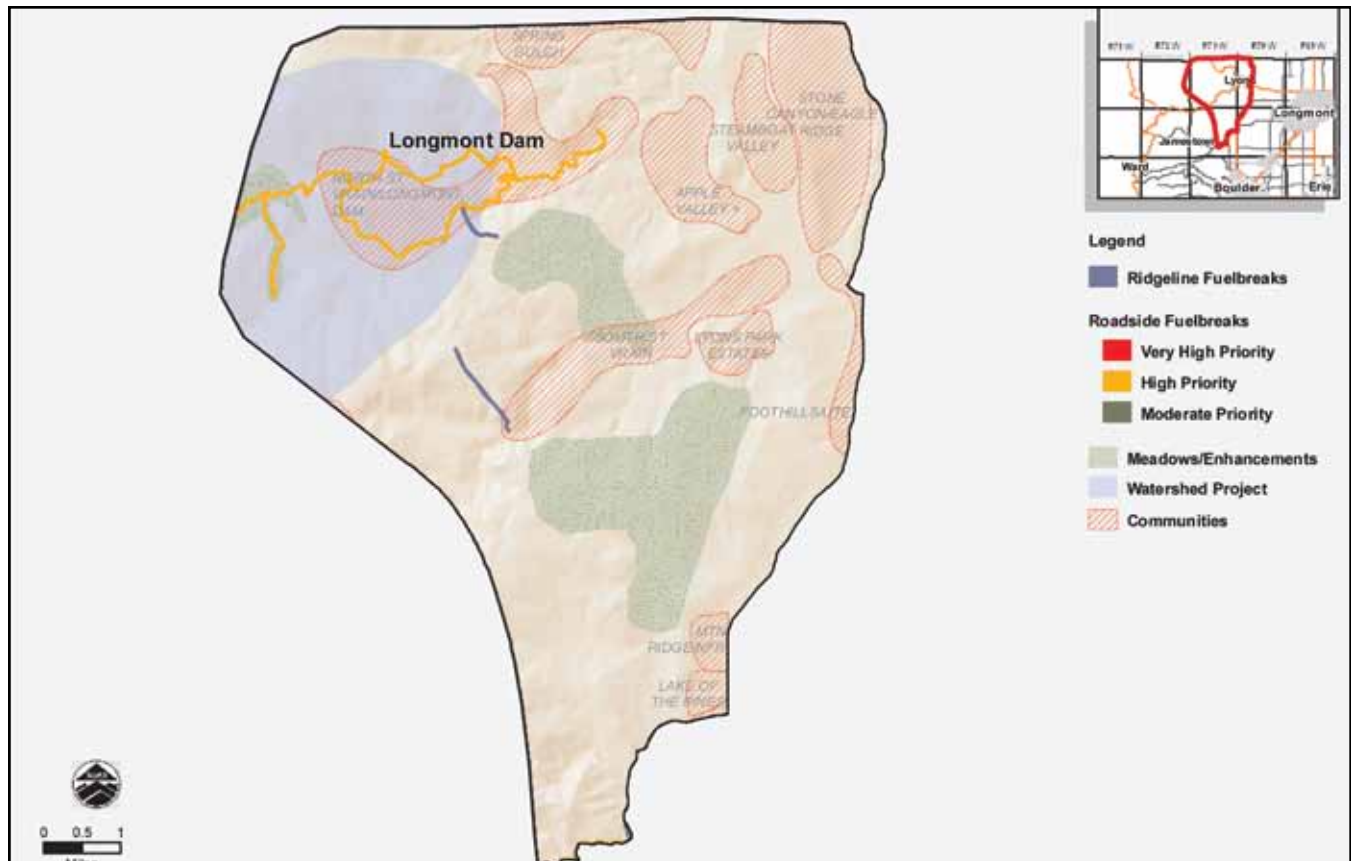
- Smithy Mountain
- Indian Lookout Mountain
- Coffintop Mountain (7,800 feet) at the north end of the project and Fairview

Peak (8,500 feet) at the south end of the project area lie just west of the landscape boundary.

Historical and Social

There are numerous historical and social components to this landscape. Information on historical and recreational use is available in the Boulder County management plans for Hall Ranch and Heil Valley Ranch and the Arapahoe and Roosevelt National Forest Plan.

Mining (most notably quarrying) and logging have drastically altered this landscape area. Mining occurred in the Lyons area in particular, and it is still an active location today for flagstone and andesite rock. European settlers at the turn of the century utilized the forest resources; its consequences still impact the overall forest health, condition and structure today.



Map 40: Buttonrock/Lyons Landscape

Recreation use in this landscape is of major importance. Key recreational areas include:

- Heil Valley and Hall Ranch (hiking, biking, equestrian)
- North and South Saint Vrain Creeks (fishing, day use)

Communities

The primary communities located with the landscape boundary are:

- Town of Lyons
- Lake of the Pines
- Mountain Ridge
- Lower Lefthand Canyon

Past Forest Management Treatments

Forest management has been occurring to some degree in the area since the mid 1970's. Individual private land management through Colorado State Forest Service (individual landowners, Tree Farmers, Forest Agriculture Tax participants) and work on Heil Ranch and Hall Ranch comprise most of the past practices in this landscape. Prior to the purchase of these two ranches by Boulder County, cattle ranching, hay operations, quarrying and logging occurred. Both ranches had small sawmill operations during the 1970's and 1980's. Very little National Forest System lands occur in this landscape area. Opportunities are thus limited on USFS lands due to access and terrain. In 2002, the City of Longmont began conducting forest management activities on the Buttonrock Reservoir property in response to several record wildfire seasons (1996 – 2002).

Project Partners

Project partners include:

- Private landowners (through Colorado State Forest Service)
- US Forest Service
- Boulder County
- Town of Lyons
- City of Longmont
- Local Fire Protection Districts
- Home Owner Associations
- Colorado Department of Transportation

Google Map

In April 2010, groups treating hazardous fuels met to discuss and map their projects in Boulder County. Communication and information exchange is essentially among forestry and wildfire professionals working in adjacent areas and is an important component of developing this plan. Maps and project descriptions, however, are important pieces of information that should also be shared with members of the general public as well as project implementers.

To make this information readily available, we built an interactive Google map of forest management projects and posted it on our community wildfire protection plan website, www.bouldercountycwpp.org.

The purpose of this map is to provide information on current forest treatments in the county. Many different agencies and organizations are treating forests in Boulder County, including the U.S. Forest Service, the Colorado State Forest Service, Boulder County, the City of Boulder, the City of Longmont, Denver Water, private consulting firms, and individual fire protection districts. This map is intended to include information relating to projects from all these agencies in one location. Only projects that are greater than five acres are included on this map. See Figure 9.

In addition to the location of projects on a map, important project information is included. To complete many of these fields, implementers simply select from a drop down list of standardized responses. As an example of the information collected for each project, the City of Boulder's Watertank-Shanahan Ridge Project is highlighted in Figure 10.

The Google map is currently in draft form. Not all projects have completed all fields in the database like the Watertank-Shanahan project. Including up-to-date and accurate information from a large number of agencies in one place is a complicated task. Information changes frequently. The simple counting of the number of acres treated is difficult because different agencies have different methods of counting.

However, the advantages of having complete records in one location are numerous. For example, after the Fourmile Canyon Fire many people requested this type of information—how much money had been spent; how many acres had been treated? With a complete, common database, all kinds of detailed reports could be quickly generated to respond to these legitimate requests.

Another meeting was held in June 2011 to discuss new projects. Completing and updating the Google map with this information is underway. This task will be another key component of implementing this plan.

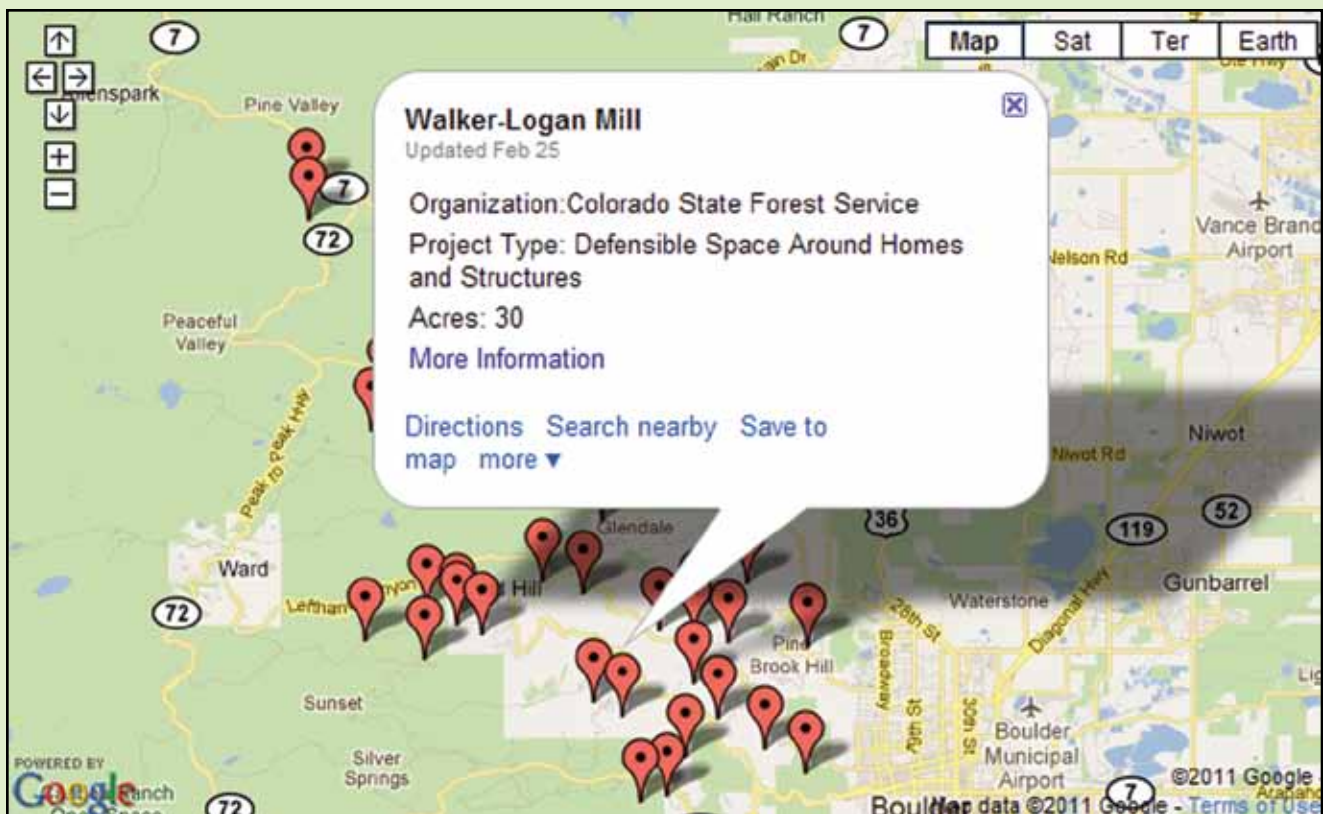
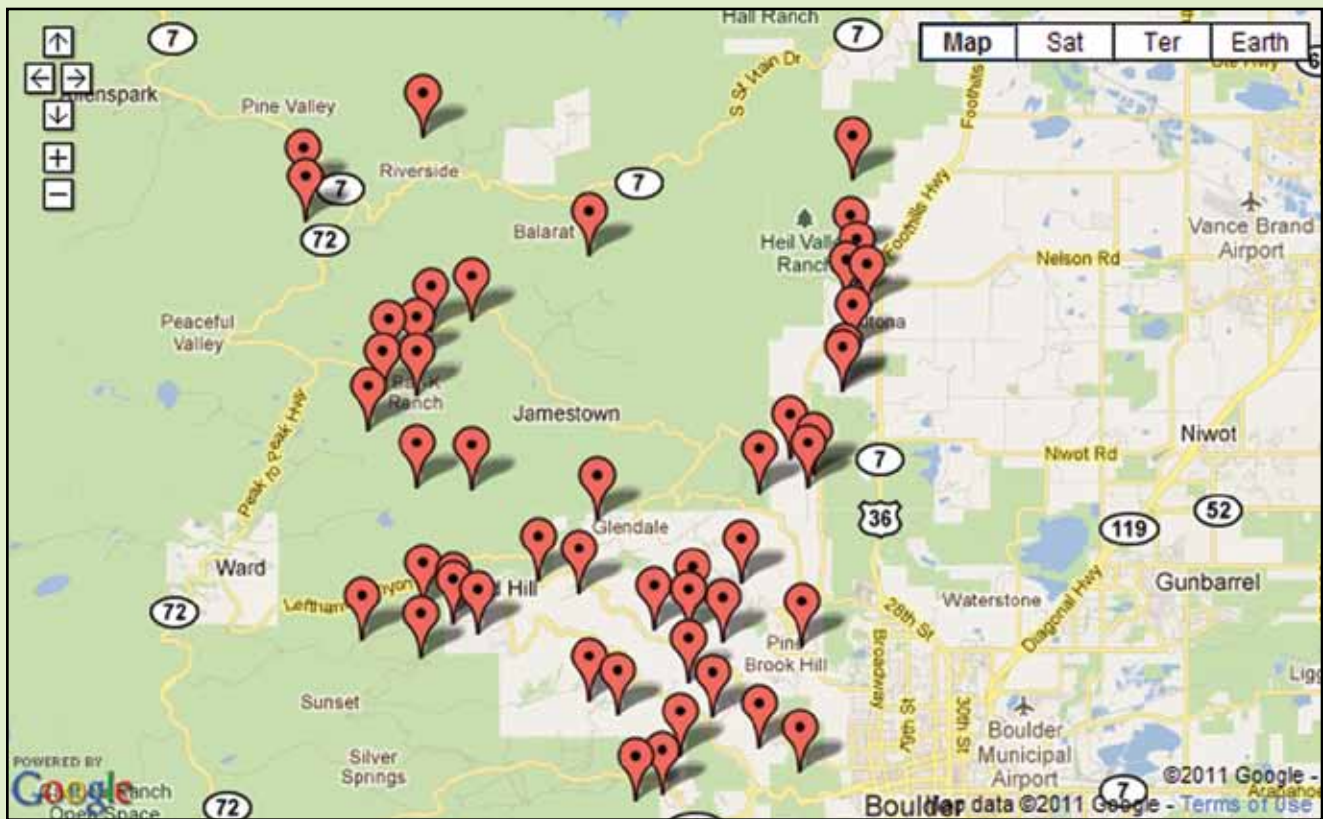


Figure 9: Google Map of Forest Management Projects

Watertank-Shanahan Ridge

Project Type: Landscape Scale Treatment

Lead Organization: City of Boulder Open Space

Partner Organizations: City of Boulder Fire Department,
Colorado State Forest Service

Treatment Method: Hand Crew

Land Ownership: City Park and Open Space

Funding Sources: City of Boulder Open Space and Mountain
Parks, Federal Emergency Supplemental Funding

Start Date: 06/14/2010

Total Acres Treated – Proposed: 85

Total Project Costs – Proposed: \$81,000

Cost Per Acre – Proposed: \$953

End Date: 12/31/2010

Total Acres Treated – Actual: 90

Total Project Costs – Actual: \$80,000

Actual Project Costs – Grants: \$39,950

Actual Project Costs – Match: \$40,050

Costs Per Acre - Actual: \$889

Project Description:

Watertank-Shanahan Ridge: This project is part of the implementation of the City of Boulder's Forest Ecosystem Management Plan (FEMP) and Community Wildfire Protection Plan (CWPP). Both plans are focused on protecting the community of Boulder and restoring more natural and healthy conditions to the forests managed by the City of Boulder Open Space and Mountain Parks department. This project involves thinning approximately 85 acres of low elevation ponderosa pine forest on public land immediately adjacent to the City of Boulder.

The project area is located south of the City approximately half a mile SW of Lehigh St. The area is dominated by young ponderosa pine at the forest/grassland ecotone. Thinning will focus on removing a large portion of small to medium diameter trees and creating an open stand structure. Overall, basal area will be decreased by approx. 40%. The overall goals of the project are to build on work already complete in the area and create a more fire resistant landscape immediately adjacent to the city. The project will also create a forest structure that more closely resembles historic conditions and is less susceptible to insects and disease and improves habitat for native wildlife and plant species.



Monitoring and Evaluation

To maximize their effectiveness, all fuels treatments projects will build on the lessons learned from past projects such as the Winiger Ridge Project, the Upper South Platte Project, the Woodland Park Landscape Project, and larger community wildfire protection plan implementation throughout Colorado.

A common indicator for tracking fuels treatment projects is the number of acres treated. While this is an important number, it only tells part of the story. The most important measure for treatments included in a community wildfire protection plan is how they affect fire behavior.

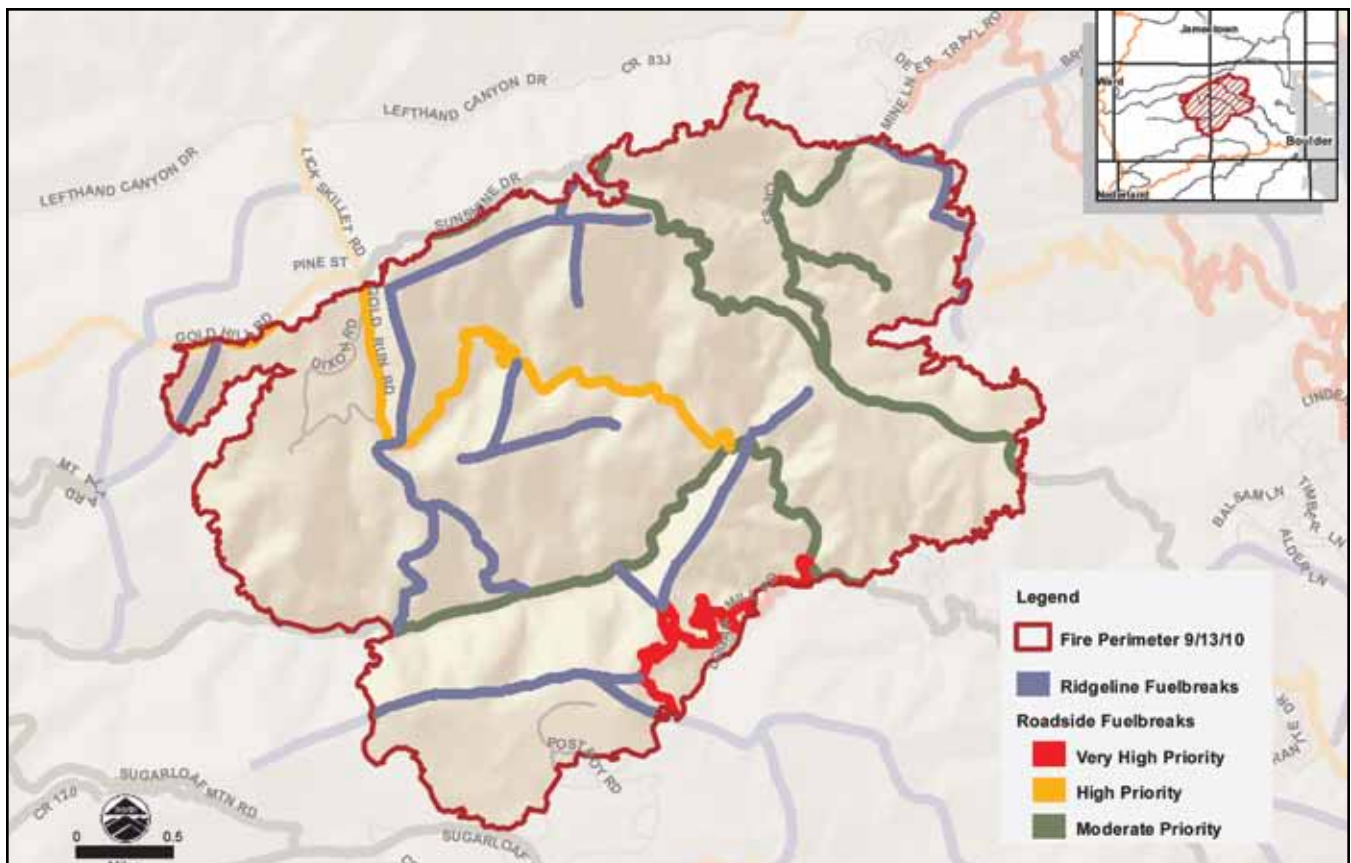
The Fourmile Canyon Fire tested the effectiveness of a number of fuels treatment and community wildfire protection projects. Members of the Foresters Work Group were involved in the design, implementation, funding, and evaluation of many of these projects. Members of the work group were able to incorporate a variety of lessons they learned from the Fourmile Canyon Fire into this planning process.

Members of the Foresters Work Group were among the most important sources of information for the Fourmile Canyon Fire Assessment. However, the results of this assessment were not available to the work group because both efforts were taking place at the same time. The findings from the assessment will be incorporated into the design and prescriptions of the projects identified in this plan when they become available.

The Long-term, Strategic Fuelbreak Plan and the Fourmile Canyon Fire

After the fuelbreak plan was designed, we wanted to see how it related to past wildfires so we analyzed the fuelbreaks proposed within the Fourmile Canyon Fire burn perimeter (see Map 41). Fully implemented the plan would include 12 fuelbreak projects within the burn area totaling 27.85 miles. If we take out the ridgetop fuelbreaks (11.42 miles), the roadside projects equal 16.43 miles. Each of these fuelbreaks would serve as potential locations for locating suppression efforts and attempts to slow the growth of a fire. Since wildfires burn up hill and the blue lines represent fuelbreaks along ridgelines, these projects are good place to take defensive action even though they may not be connected and it might appear on a two-dimensional map that it would be easy for a wildfire to go around these treatments.

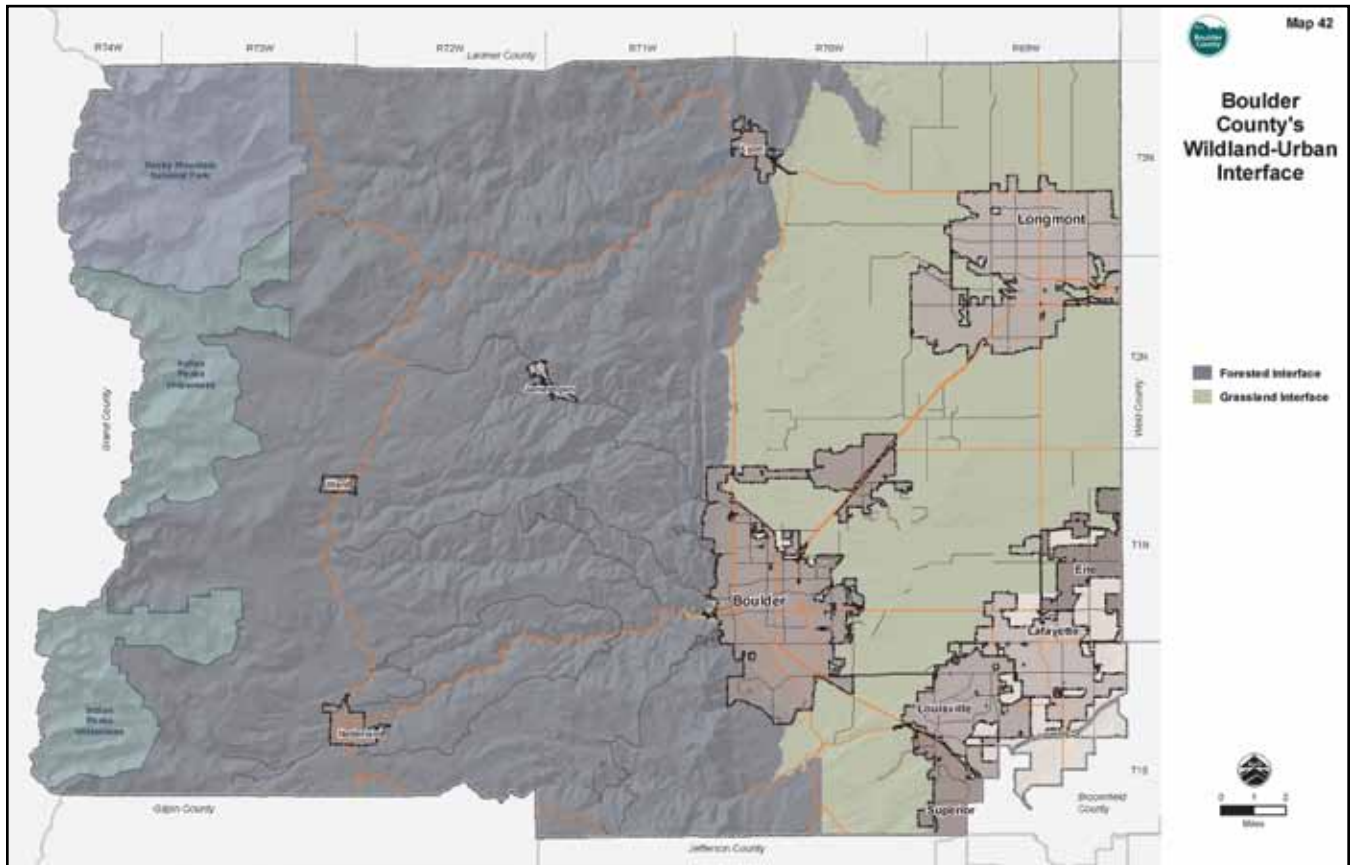
Combined with landscape-scale forest treatments (our offensive strategy), the fuelbreak plan is the key to our strategy for limiting the spread of future wildfires. Under extreme conditions, some fuelbreaks will not hold. This is why we need a comprehensive network of fuelbreaks, designed as a whole system, so there are multiple opportunities to contain wildfires at the places that have the best chances of success.



Map 41: Fuelbreak Plan and the Fourmile Canyon Fire

Definition of the Wildland-Urban Interface

The wildland-urban interface is the area where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. As required, the Core Team defined the wildland-urban interface for the county (see Map 42). Because of past wildfires on the plains, the team identified both a forested wildland-urban interface and a grassland wildland-urban interface. Extending the interface on to the plains will help reinforce the purpose of this plan to unite all communities of Boulder County in a collaborative effort to reduce the negative impacts of wildfire.



Map 42: Boulder County's Wildland-Urban Interface

Chapter 16

Implementing and Sustaining the Boulder County Community Wildfire Protection Plan



This plan is a blue print for action. To help ensure that this plan produces results that are sustained over the long-term, a permanent structure is needed. Effectively implementing a plan is more important than writing it. It is not enough to have a large number of individuals and groups involved in developing the plan—we need to create a structure that will oversee a much larger number of individuals and groups that work to implement the plan’s recommendations.

Community Wildfire Protection Plans are required to be collaborative because so many individuals and organizations are involved. It is impossible to assign the responsibility of implementing this plan to only one agency—it must be a collective effort.

Calling for government agencies to come together and protect communities from wildfire is not an effective strategy. If this is truly going to be a Community wildfire protection plan, community representatives and individual residents must be fully engaged and empowered to take action. With this goal, the permanent structure proposed in this chapter is designed to promote community involvement and action.

The Boulder County Community Wildfire Protection Council

Mission:

- Oversee the implementation of the entire plan
- Track progress toward goals and measures
- Hold responsible parties accountable for their programs and projects
- Oversees annual update process

Membership:

Members will include residents of Boulder County and leaders from wildfire-related organizations such as United States Forest Service, Colorado State Forest Service, Boulder County, municipal governments, fire protection districts, environmental organizations, and community groups. There will be a formal appointment and application process with staggered five-year terms. Members will elect a chair.

Meetings: Quarterly

Meetings will include presentations from experts, an annual field trip, the annual update of the plan, and the annual report card that measures progress in implementing the plan.

Implementation Teams and Responsible Organizations

Because this plan covers many different subjects, involves numerous agencies, and builds on existing efforts, more than one implementation team is required. These teams (and responsible organizations) are divided by themes. Each team will have its own mission, membership, objectives, and measures.

Wildfire Awareness Month Team

Members: Community leaders, educators, and mitigation professionals

Fuels Reduction and Forest Management

Lead: The Boulder County Wildfire Mitigation Group (see below)

The Boulder County Wildfire Mitigation Group I

The Boulder County Wildfire Mitigation Group was formed in 1989 in response to the Black Tiger Fire. The group's mission was to determine and coordinate actions that could help minimize loss of life and property from wildfires. The group met from 1990 to 2007.

Representatives from the following departments, agencies, and groups participated in the mitigation group.

- County Commissioners
- Land Use
- Parks and Open Space
- Sheriff Office Fire Management Program
- Colorado State Forest Service
- USDA Forest Service
- National Park Service
- Various local Fire Protection Districts
- City of Boulder Fire Department
- American Red Cross
- Representatives from the insurance, real estate, and forest industry
- Private citizens

Programs and Projects

The group and its various committees and work teams took on numerous projects, such as:

- Development of a Wildfire Hazard Identification and Mitigation System for mapping fire hazards
- Support for Boulder County Ecosystem Cooperative and fire mitigation and forest health projects such as the Winiger Ridge Ecosystem Pilot Project
- Developing mitigation grants to assist homeowner associations and fire districts with their fire mitigation efforts
- Creation of the Boulder County Chipping Reimbursement Program to subsidize costs of chipping and to aid in slash collection and disposal
- Coordinating prescribed fire programs amongst the various fire management entities within Boulder County
- Education and outreach programs, including sponsoring Student Conservation Association Fire Education Corps Teams
- Developing brochures and information videos and having displays for the Boulder County Fair and other events
- Encouraging participation in wildfire-related conferences, workshops and symposia such as Colorado Mitigation and Wildfire Conference and the Boulder Wildland Fire Symposium
- Supporting fuel reduction work through the use of fire mitigation crews and AmeriCorps crews
- Assisting in Land Use Reviews and Urban/Wildland Interface Code development to encourage FireWise development
- Installation of fire danger rating signs at the entrance of major canyons

FireWise Construction

Lead: The Boulder County Land Use Department, Building Division (existing programs)

Community Preparedness

Leads: The Boulder Office of Emergency Management, The Boulder County Sheriff's Office, The Boulder County Fire Fighters Association, The InterMountain Alliance (existing programs)

Boulder County Forest Health

Lead: The Boulder County Forest Health Task Force (existing programs)

Response (Not the focus of the Community Wildfire Protection Plan, it is addressed in Boulder County's Fire Management Plan)

Lead: Boulder County Sheriff's Office and The Boulder County Fire Fighters Association (existing programs)

The Boulder County Wildfire Mitigation Group II

The Boulder County Wildfire Mitigation Group was originally created in 1989; it last met in 2007 (see box). We recommended reinstituting this group with a revised mission and membership.

The Mission:

- Implement the long-term strategic fuel break plan and landscape-scale forest restoration projects described in this document (see Chapter 15)
- Ensure that the lessons learned from the Fourmile Canyon Fire are incorporated into future forest management projects in Boulder County
- Map and disseminate information on all forest management projects occurring in Boulder County (see box about Google map in Chapter 15)

Membership:

Based on the Boulder County Community Wildfire Protection Plan's Foresters Work Group, this team will include foresters and wildfire professionals from the public land management agencies in the county and other forestry and wildfire professionals. Leaders of this group should come from the United States Forest Service, the Colorado State Forest Service, and Boulder County. Members of this group would be appointed by the leadership.

Forest Improvement District

If a Forest Improvement District is created within Boulder County, state law requires it to have its own, specific organizational structure. The groups and teams outlined in this chapter may need to modify their structures and activities programs if this district comes into existence .

Community Wildfire Protection Coordinator

Staff is needed to coordinate the implementation of this plan. Support for the Council, the Mitigation Group, Wildfire Awareness Month, and potential Forest Improvement District are examples of recommendations that require staffing.

Online Resources

Boulder County maintains and updates the Boulder County Community Wildfire Protection Plan online at **www.bouldercountycwpp.org**, where you can view and download PDF versions of the Plan and Appendices. Please contact the Boulder County Land Use Department for further assistance.

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Jim Webster, coordinator and author
Jeff Davis, graphic designer

Contributors:

Nils Babel
Erica Christensen
Chuck Dennis
Therese Glowacki
Susan Hofer
Craig Jones
Kevin Krasnow
Ryan Ludlow
Veronica Martinez
Jay Stalnacker

Mapping:

David Besley
Bob Bundy
Mark Gorsuch
David Haines
Kevin Krasnow
Molly Molter
Debra Rice
John Staight
Nick Stremel
Chris Wanner
Amy Weaver

Photography:

Joe Amon
Beth Bartel
Erica Christensen
Elly Collins
Ashley Garrison
Cesar Gellido
Jon Hoover
Chad Julian
Ryan Ludlow
Marisa McNatt
Mary Olson
David Steinmann
Chris Wanner



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