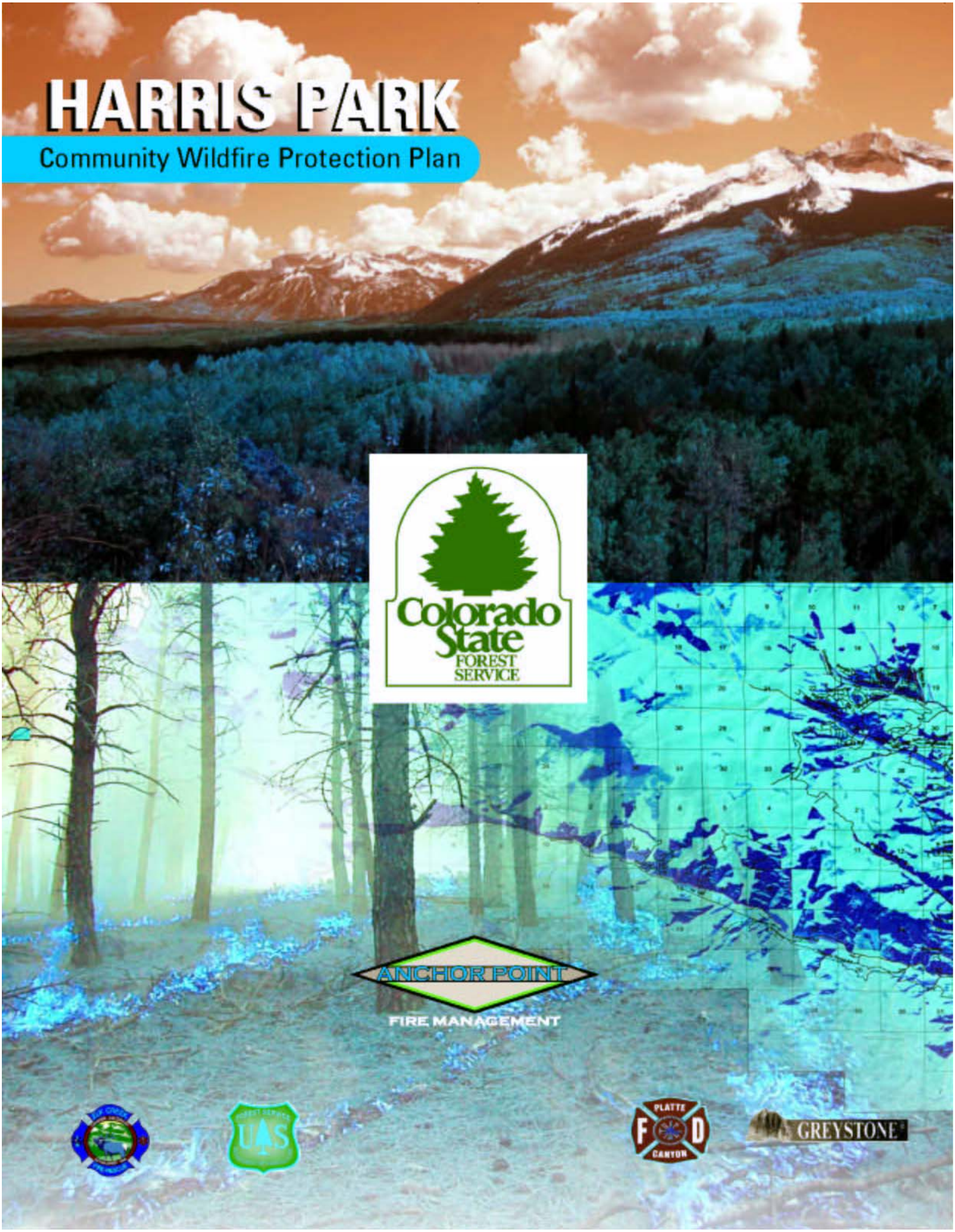
HARRIS PARK

Community Wildfire Protection Plan



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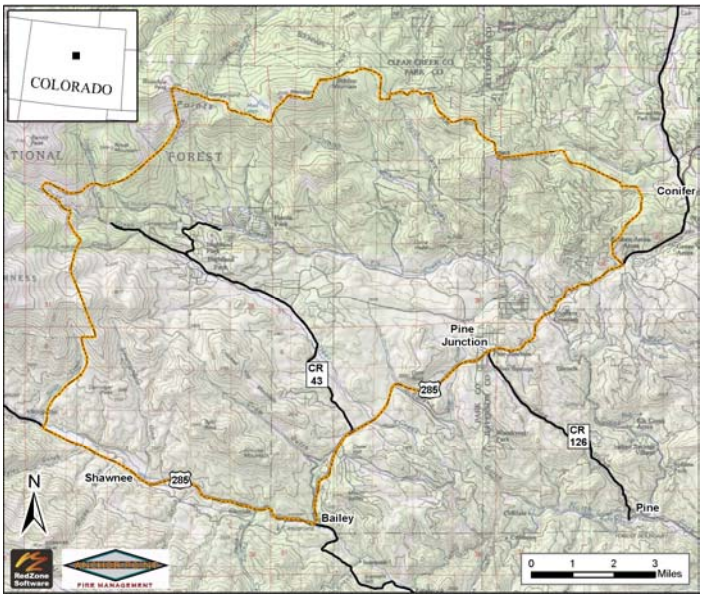
INTRODUCTION

Harris Park Community Wildfire Protection Plan

May 2005

The Harris Park Project begins the important work of cross-boundary fuels reduction by bringing together private landowners, the United States Forest Service, the Colorado State Forest Service and local fire officials to create a comprehensive treatment strategy. This Community Wildfire Protection Plan (CWPP) encompasses two fire protection districts, Platte Canyon and Elk Creek. The study includes 22 communities, 20 in Platte Canyon and two in Elk Creek.

Figure 1. Harris Park CWPP Project Area



The project area is in and around the Pike National Forest southwest of Denver, Colorado. One of the most difficult issues in implementing and maintaining fuel reduction treatments is securing cooperation and participation of landowners, land managers and a diverse group of stakeholders. The treatment strategy resulting from the Harris Park Project overcomes the issue of inefficient, fragmented treatment efforts. Areas of concern and potential treatment polygons have been identified and agreed upon for the entire project area without significant regard for ownership and jurisdictional boundaries. Future implementation funding will be leveraged to its greatest efficiency in response to this landscape scale strategy.

The initial study area included only the 20 communities in the Platte Canyon FPD. At the first stakeholder meeting, the committee decided to include two additional communities in the Elk Creek FPD. This decision was solely based on the utility of the location of the communities. It simply made sense to include these communities, from a fire behavior standpoint, and to develop a more logical project boundary. This decision was the first in many that blurred the lines of jurisdiction with the intent to produce a more functional and logical project.

This initiative has been ongoing for over a year, working on the analysis, details and organization of this plan. Committee meetings, email communication, a public forum, and multiple public outreach events all took place in 2004 and the early part of 2005.

The effort and time put forth on this plan has been extraordinary. Even more remarkable has been the collaboration among this diverse group of stakeholders.

The Harris Park project is more than a fuels treatment strategy. It is a powerful educational tool that places the role of individual landowners and land managers, in achieving a safer Wildland-Urban interface, in the context of the larger landscape. It is an approach that fosters and defines a shared responsibility.

Understanding This Document

This plan incorporates many existing documents relating to wildfire in the study area in an attempt to create a single resource for citizens, policy makers, and public agencies. Because of the variation in format, language, and subject matter in these auxiliary documents, they are included in their entirety in the appendix. This approach makes the front end of the actual plan more readable while establishing a reference source for documents related to wildfire planning and forest management.

Maps referenced in text are displayed on the same or next page for quick viewing. Larger 11X17 fold-out maps in the appendix correlate to the text. The reader can fold out these more detailed maps while reading the text see a more detailed map.

The Harris Park Community Wildfire Protection Plan (CWPP) is the result of community wide fire protection planning and the compilation of project documents developed by the various stakeholders. This plan was compiled in the spring of 2005 in response to the federal Healthy Forests Restoration Act of 2003 (HFRA).

The CWPP meets the requirements of HFRA by:

1) Proposing coordinated locations and methods of treatments on federal land in the study area;
2) Identifying fuels reduction across the landscape;
3) Addressing structural ignition; and
4) Working with Colorado State Forest Service, US Forest Service, and local fire officials.

Many components of this plan existed prior to 2004 and were coalesced into this work.

The National Fire Plan

In 2000, more than 8 million acres burned across the United States, marking one of the most impacting wildfire seasons in American history. In one high-profile incident, the Cerro Grande fire at Los Alamos, NM, destroyed more than 235 structures and threatened the DOE's nuclear research facility.

Two reports addressing federal wildland fire management were initiated after the 2000 fire season. The first was a document prepared by a federal interagency group entitled "Review and Update of the 1995 Federal Wildland Fire Management Policy" (2001), which concluded among other points that the condition of America's forests has continued to deteriorate.

The second report issued by the Bureau of Land Management (BLM) and the United States Department of Agriculture Forest Service (USDA FS) - "Managing the Impacts of Wildfire on Communities and the Environment: A Report to the President in Response to the Wildfires of 2000" - would become known as the National Fire Plan. That report, and the ensuing congressional appropriations, ultimately required actions to:

- Respond to severe fires.
- Reduce the impacts of fire on rural communities and the environment.
- Ensure sufficient firefighting resources.

Congress increased its specific appropriations to accomplish these goals.

The following year – 2002 – was another severe season, with more than 1,200 homes destroyed and 7 million acres burned. In response to public pressure, congress and the Bush administration continued to obligate funds for specific actionable items, such as preparedness and suppression. That same year, the Bush administration announced the "Healthy Forests: An Initiative for Wildlife and Stronger Communities," which enhanced measures to restore forest and rangeland health and reduce the risk of catastrophic wildfires. In 2003, that act was initiated.

Through these watershed pieces of legislation, Congress continues to appropriate specific funding to address five main sub-categories: preparedness, suppression, reduction of hazardous fuels, burned-area rehabilitation and state and local assistance. The general concepts of the National Fire Plan blended well with the established need for community wildfire protection in the study area. The spirit of the NFP is keenly reflected in the focus of the Harris Park project.

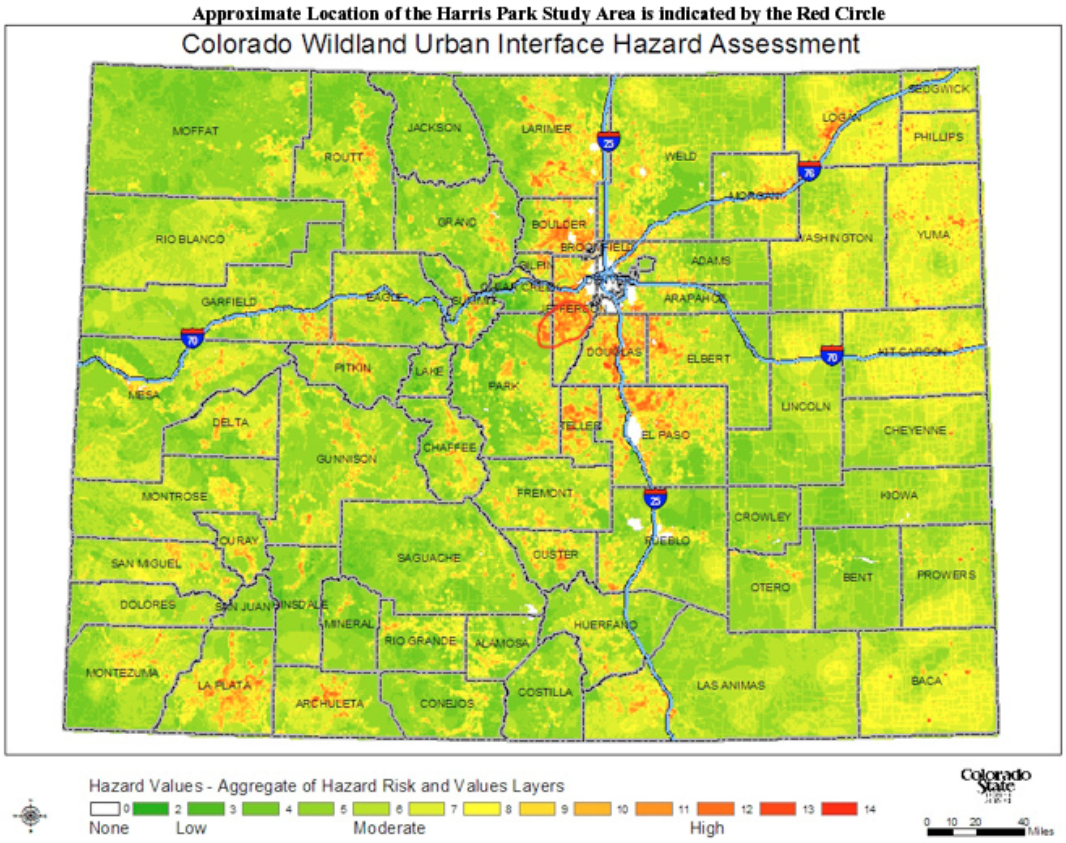
Federal Register

The majority of the project area is at high risk for WUI fires. The towns of Bailey, Pine, Grant and Pine Junction are listed in the Federal Register as communities at high risk from wildfire (see http://www.fireplan.gov/reports/351-358-en.pdf). A significant portion of the Harris Park Project area is shown on the Colorado State Forest Service's Wildland Urban Interface Hazard Assessment map as an area of high hazard values. This rating is derived from an aggregate hazard, risk and values layers.

Colorado State Forest Service Red Zone Study

In 1990 the Colorado State Forest Service conducted a study that concluded that over 1.5 million acres of urban/suburban development in the state bordered on “highly flammable wildlands”. Since that time residential construction in this zone, known as the “Red Zone” in Colorado or the "wildland-urban interface (WUI)," has increased dramatically. Simply put, this means that thousands of Colorado homes are at risk. The jurisdictions covered through this CWPP were all within the “high” category of the Colorado WUI Hazard Assessment. This was one of several broad scope planning elements which heightened local awareness, and identified the need for a comprehensive fire plan.

Figure 2. Colorado State Forest Service Red Zone Study Map



Current Risk Situation and Fire History

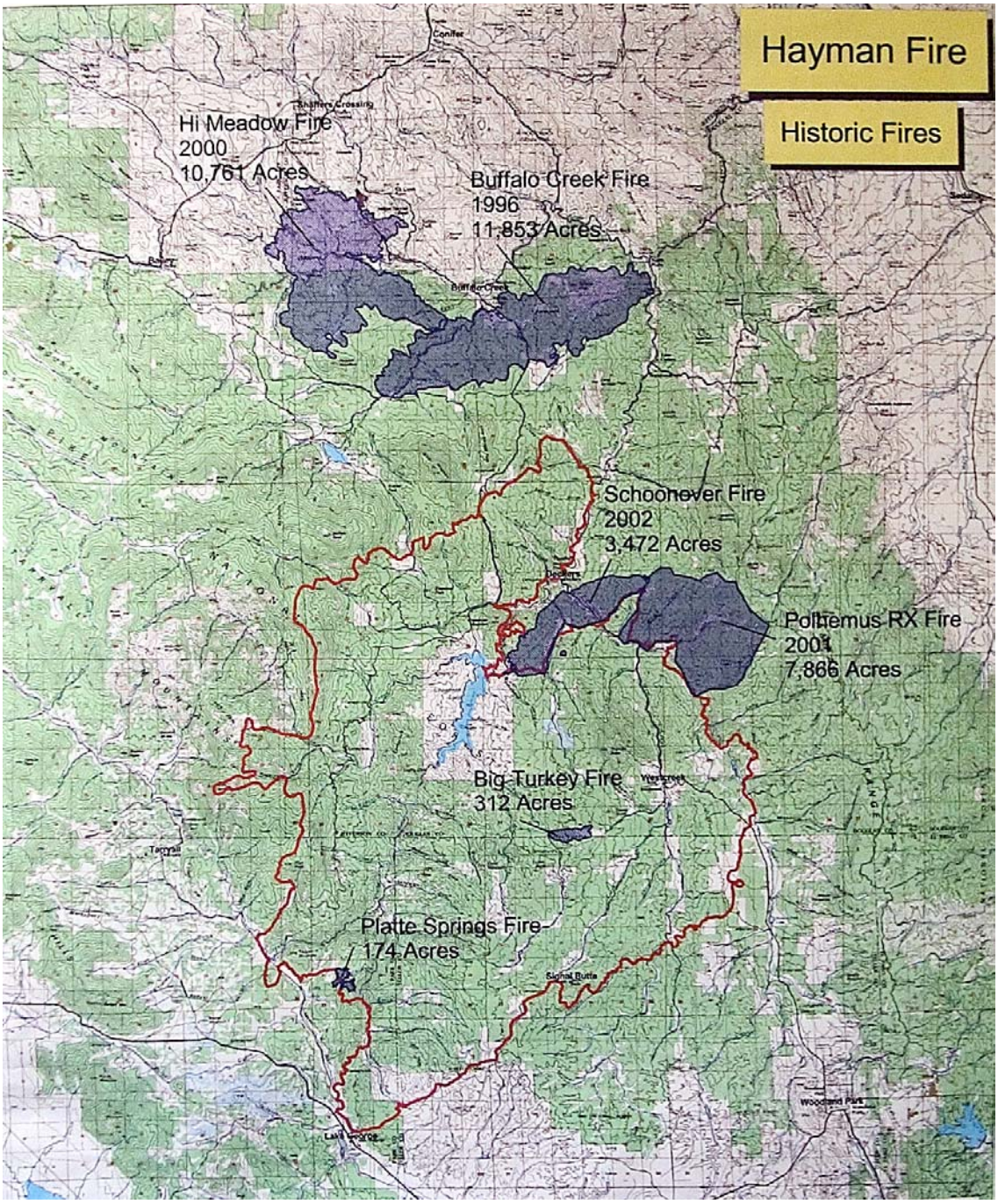
For the purposes of this report:

> **Risk** will be considered to be the likelihood of an ignition occurrence that results in a significant fire event. This is primarily determined by the fire history of the area.
>
> **Hazard** is the combination of the wildfire hazard ratings of the WUI communities and the fire behavior potential as modeled from the fuels, weather and topography of the study area.

This area has a significant fire history. Major fires in or near the district since 1998 include the Buffalo Creek, Hi Meadow, Schoonover, Snaking, Black Mountain and Hayman fires. The Platte Canyon Fire Protection District, the largest provider of suppression services for the study area, responds to approximately 60 smoke reports per-year. Annually, about 6 of these reports result in fires requiring suppression resources.

There are over 5,000 homes in the project area. Highway 285, a major transportation corridor, runs through this area as well. In addition to homes and transportation, the project area is a recreation destination with many forest service campgrounds and open space parks. The heavy human activity the study area receives during the peak months for wildfire potential exacerbates the natural risk factors already existing in this area. The opening of Staunton State Park to the public will significantly increase the amount of human activity, and wildfire ignition potential, in a notable portion of the project area. While most of the historic large fires have resulted from natural causes (Hi Meadow, Schoonover and others), the frequency of major fires caused by human activity, such as Black Mountain, Snaking and Hayman, has experienced a sharp rise in recent years. This disturbing trend of increasing potential for human caused fires is likely to continue in the foreseeable future.

Figure 3. Recent Large Fires



See Appendix B for Larger Scale Map
(MAP 1. Historic Fires)

The Need for a CWPP

In response to the Healthy Forest Restoration Act (HFRA) and in an effort to create incentives, Congress directed interface communities to prepare a Community Wildfire Protection Plan (CWPP). Once completed, a CWPP provides statutory incentives for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects.

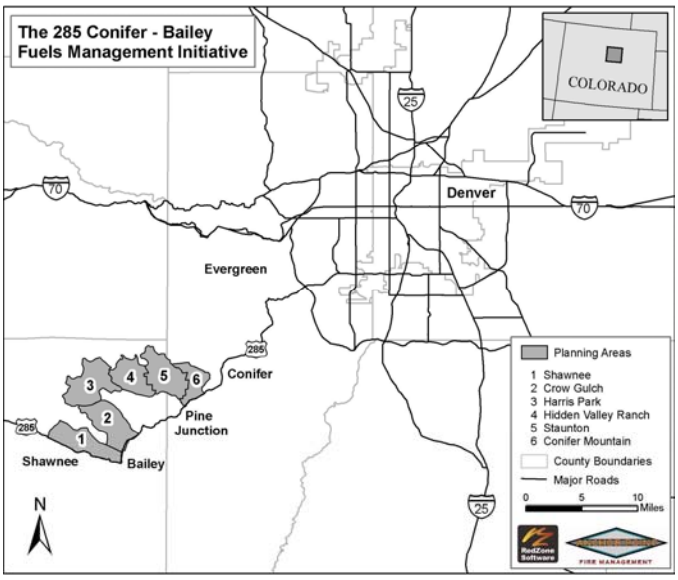
CWPPs can take a variety of forms, based on the needs of the people involved in their development. CWPPs may address issues such as wildfire response, hazard mitigation, community preparedness, structure protection or all of the above.
The minimum requirements for a CWPP are:

- Collaboration between local and state government representatives, in consultation with federal agencies and other interested parties.
- Prioritized fuel reduction in identified areas as well as recommendations for the type and methods of treatments
- Recommendations and treatment measures for homeowners and communities to reduce the ignitability of those structures in the project area.

Harris Park Community Wildfire Protection Plan (HPCWPP)

In February 2004, in response to the Healthy Forests Restoration Act, and a strong local, grass roots awareness toward wildfire, members of the South Platte Ranger District and the Colorado State Forest Service convened a partner meeting to initiate the development of the Harris Park Community Wildfire Protection Plan for "at-risk" communities located in/around the South Platte Ranger District of the Pike National Forest and within Park and Jefferson counties. In addressing the plan, it became clear that this ongoing collaboration would enable the unified partners to leverage the existing efforts by individual partners, coordinate fuels management projects across boundaries, and most importantly, coordinate and leverage future efforts and funding to increase the efficiency and scale of all projects. Additionally, speaking with a unified voice to local residents about proposed fuels treatments on federal and non-federal lands has added credibility to the partnerships being fostered within this effort. The Harris Park CWPP project was born. From this initial planning process, a broader scale, more encompassing initiative was conceived; the 285 Conifer-Bailey Fuels Management initiative. This project is an extension of the Harris Park CWPP. It is the logical continuation of this initial work extending beyond the Harris Park project boundaries to the entire HW 285 Corridor. The Harris Park CWPP is now being viewed, as the catalysis and the pilot project for a much larger geographic area contiguous to the Pike San Isabel National Forest.

Figure 4. The 285 Conifer - Bailey Fuels Management Initiative



Goals and Objectives of the Initiative

- Enhance Life Safety for Residents and Responders.
- Mitigate Undesirable Fire Outcomes to Property and Infrastructure.
- Mitigate Undesirable Fire Outcomes to the Environment and Quality of Life.
- Establish a synergistic planning effort between the citizens and local fire protection jurisdictions, the Colorado State Forest Service and the Pike San Isabel National Forest.

In order to accomplish these goals the following objectives have been identified:

- Create a Community Wildfire Protection Plan that is consistent with the purposes, goals, objectives and policies of *Preparing a Community Wildfire Protection Plan - A Handbook for Wildland-Urban Interface Communities* (methodology designated in the Healthy Forests Restoration Act, and endorsed by the Western Governors Association and the National Fire Plan).
- Establish an approximate level of risk (the likelihood of an ignition occurrence) for the study area.
- Provide a scientific analysis of the fire behavior potential of the study area.
- Group values-at-risk into "communities" that represent relatively homogenous hazard factors.
- Identify and quantify factors that limit (mitigate) undesirable fire effects to the values-at-risk.
- Recommend actions to minimize environmental impacts such as deterioration of water quality, air quality, wildlife habitat, scenic and other natural resources in the event of a wildfire.
- Recommend actions designed to improve the ability of emergency response providers to gain access and work safer throughout the study area.
- Recommend actions designed to enhance the ability of homes to withstand a fast moving wildfire without firefighter intervention.

Other Desired Outcomes

- **Promote community awareness:**

  Quantification of the community's hazard and risk from wildfire will facilitate public awareness and assist in creating public action to mitigate defined hazards.

- **Improve wildfire prevention through education**:

  Awareness, combined with education, will help to reduce unplanned human ignitions.

- **Facilitate appropriate hazardous fuel reduction:**

  The prioritization of Community Protection Zones (CPZ) and Treatment Units can assist land managers in focusing future efforts towards the areas of highest concern from both an ecological and fire management perspective.

- **Promote improved levels of response:**

  The identification of areas of concern will improve the accuracy of pre-planning, and facilitate the implementation of cross-boundary, multi-jurisdictional projects, thus providing a safer more effective working environment for responding fire resources.

COMMUNITIES

Communities at Risk

The Harris Park Community Wildfire Protection Plan encompasses 22 wildland-urban interface communities in Platte Canyon Fire Protection District and Elk Creek Fire Protection District. Of the 20 communities identified in the Platte Canyon FPD, three were found to represent an extreme hazard; four were rated as high hazard, twelve as moderate hazard and one as low hazard. The two communities located in Elk Creek FPD that fall within the boundaries of this project are currently under study as part of the Elk Creek Hazard and Risk Assessment. Although that study is not complete, the preliminary work suggests that these two communities will be rated as either extreme or very high hazard in the final analysis.

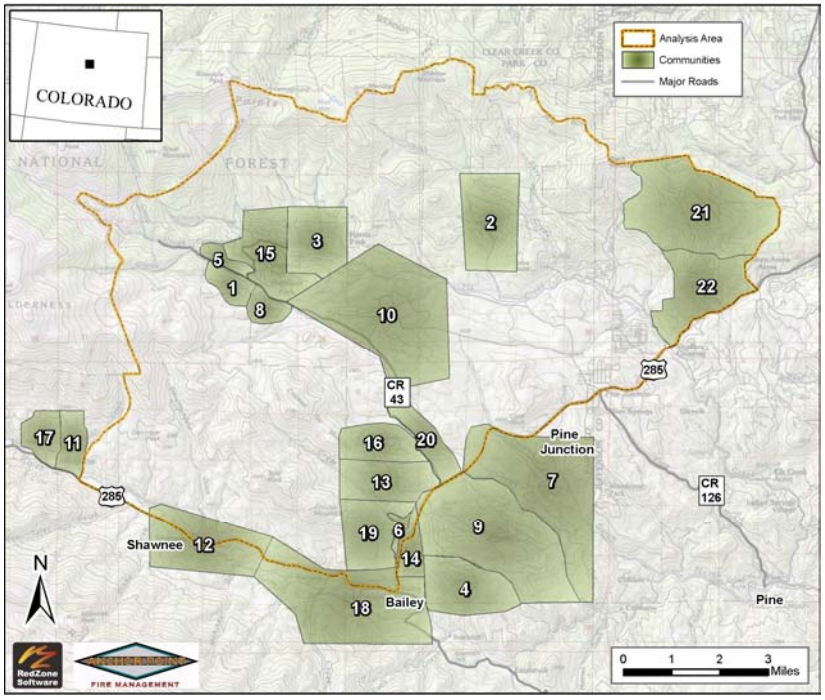
The methodology for the hazard rating of these communities uses a rating scale known as the Wildfire Hazard Rating (WHR). WHR was developed specifically to evaluate communities within the wildland-urban interface (WUI) for their relative wildfire hazard. The WHR model combines physical infrastructure such as structure density and roads and fire behavior components like fuels and topography, with the field experience and knowledge of wildland fire experts. It has been proven and refined by use in rating over 1,400 neighborhoods throughout the United States.

The rating system assigns up to a maximum of 50 points based on six categories: average lot size, slope, primary aspect, dominant fuel type, fuel continuity and surface fuel loading. The higher the community scores, the lower its wildfire hazard. For example, a community with an average lot size of less than 1 acre and slopes of greater than 30% would receive 0 points for those factors whereas a community with an average lot size of 5 acres and slopes of less than 15% would receive 16 points for the same factors. Additional hazards are then subtracted from the subtotal of points earned in the six categories to give a final numeric value. The final value is then used to group communities into one of five hazard ratings: Extreme, Very High, High, Moderate or Low.

It is important to note that not all groupings occur in every geographic region. There are some areas with no low hazard communities, just as there are some areas with no extreme communities. The rankings are also related to what is customary for the area. That is to say a high hazard area on the plains of Kansas may not look like a high hazard area on the western slope of Colorado. The system creates a relative ranking of community hazard rating in relation to the other communities in the study area. It is designed to be used by experienced wildland firefighters who have a familiarity with structural triage operations and fire behavior in the interface.

A summary of the twenty communities rated in the Hazard and Risk assessment portion of this CWPP are presented below. Information on the communities under study in the Elk Creek Hazard and Risk Assessment will be incorporated in this document when that information becomes public.

Figure 5. Community Hazard Ratings Map



See Appendix B for Larger Scale Map
(MAP 2. Communities)

1. Upper Deer Creek	**12. Shawnee**
2. Hidden Valley	**13. Ravenswood**
3. Harris Park Estates	**14. Park**
4. Bailey Mountain	**15. Elk Creek**
5. Royal	**16. Friendship Ranch**
6. Horseshoe	**17. Bellford**
7. Roland Valley	**18. Bailey**
8. KZ Ranch	**19. Bailey Estates**
9. Burland	**20. Mill Iron D Estates**
10. Ranchos	**21. North Conifer Mountain (unrated)**
11. Singleton	**22. South Conifer Mountain (unrated)**

Hazard Rating = Extreme High Moderate Low

The following community summaries are designed to describe each community's general Hazard and Risk condition. Comments and Mitigation recommendations are generalized for the community as a whole. Specific recommendations are detailed in the body of the Hazard and Risk Assessment report.

Upper Deer Creek

Hazard Rating: Extreme

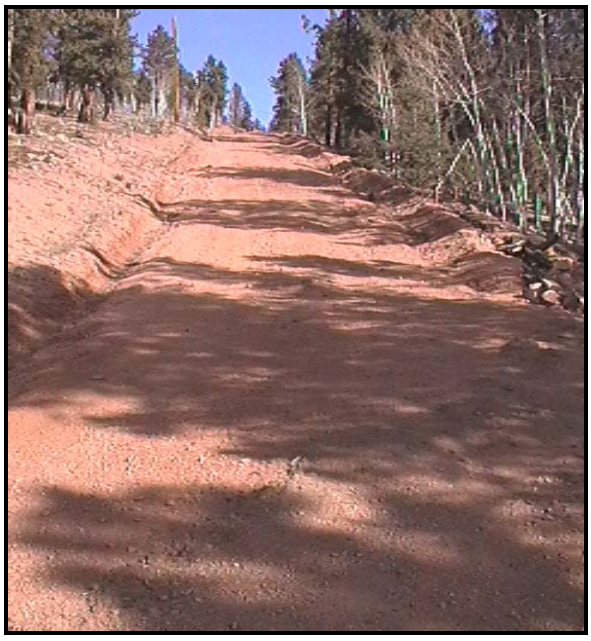
Description:

This neighborhood has narrow roads with no turnarounds. Access and egress could be difficult in fire conditions. Address and street signage both need improvement. There are homes built on the top of steep slopes. There is a continuous heavy fuel load, with appreciable quantities of slash and ladder fuels. Some yards are in need of clean up.

Comments & Mitigation Notes:

Reduce ladder fuels. Clean up dead and down material in yards. Improve roads, signage, and turnarounds. Although draft water is available in the Elk Creek neighborhood, it may be advisable to add a dry hydrant along Deer Creek (see Water Supply FMZ in the Hazard and Risk Assessment). Some houses need defensible space, especially houses located at the top of steep hills. A parcel level analysis of this neighborhood is recommended.

Hidden Valley



Hazard Rating: Extreme

Description:

This area has steep, narrow roads with no turnarounds. Many driveways are inaccessible or dangerous for emergency vehicle access. There are no street signs. There is a heavy fuel load and a continuous canopy with ladder fuels. There are many parcels with trees touching the structures.

Comments & Mitigation Notes:

See the water supply recommendations in the main report. Thin conifers and reduce ladder fuels. Clean up dead and down material. Add reflective street and address signage. Thin trees along roadways. Improve roads and turnarounds, especially on dead end roads. It may be possible to create dual access by improving the jeep trail between Tincup and Hidden Valley Road. This would be worth pursuing. All homes in this area need defensible space. A parcel level analysis of this neighborhood is recommended.

Harris Park Estates

Hazard Rating: Extreme

Description:

The roads in the northeast half of this community are very steep. Some areas have a high fuel load. Most of the yards are cluttered with man-made hazards such as woodpiles. Many homes have openings in the eves and trees touching and overhanging the structure. There are many man-made ponds that could be used for draft water. The pond in the SE corner is 16 feet deep at the dam and would be useful as a helicopter dip site.

Comments & Mitigation Notes:

Access could be improved by adding a new bridge below the dam on the southeast corner. Forest Service and private roads to the north and east could be improved as a fuelbreak. Ponds should be mapped and included in pre-attack plans. See the water supply recommendations in the main report. Many homes are in need of better signage. Yards clean up is highly recommended. Fuels should be thinned and trees limbed throughout this community. Many homes need defensible space and flammable vegetation should be cleared to at least a distance of 15 feet from the structure. Needle cast should be cleared from roofs and gutters. A parcel level assessment is recommended for this community.

Bailey Mountain

Hazard Rating: High

Description:

This neighborhood is a long way from main roads with only single access. An emergency water supply would be difficult and time consuming to establish. The nearest water supply would be the dry hydrant on Chickadee and HW72. There are heavy fuel loads downhill from homes, and many homes have trees touching the structure. There are moderate loads of slash and ladder fuels in this area.

Comments & Mitigation Notes:

See the water supply recommendations in the main report. A possible secondary access could be established to Forest Service Road 543 (See Escape Routes FMZ in the Platte Canyon Hazard and Risk Assessment). Many homes need defensible space. Fuel breaks and thinning downhill of homes, homes in ravines, should be a priority. A parcel level analysis of this neighborhood is recommended.

Royal

Hazard Rating: High

Description:

This neighborhood has homes located at the top of steep hills with heavy fuel loads and ladder fuels below. The roads are generally good, and draft water is available. Some homes have trees touching the structure. The nearest water source is the pond on Elk Creek Drive.

Comments & Mitigation Notes:

See the water supply recommendations in the Hazard and Risk Assessment. Fuels reduction should be done downhill of homes and along some roads. Some homes need defensible space. A parcel level analysis is recommended.

Horseshoe

Hazard Rating: High

Description:

This neighborhood has one-lane roads with no turnarounds. The nearest water supply is in the Town of Bailey or the dry hydrant on CR43. Fuel loads are generally moderate, however some homes have combustible materials and man-made hazards near the structure.

Comments & Mitigation Notes:

Improve road access and add turnarounds. See the water supply recommendations in the Hazard and Risk Assessment. Homes need defensible space and yard clean up. A parcel level analysis is recommended.

Roland Valley

Hazard Rating: High

Description:

Fuel loads are moderate; however some homes have combustible materials and man-made hazards near the structure. Some houses have trees touching the structure. The Hi Meadow fire burned part of this area and there are a significant number of snags. Fire-weakened timber may be subject to further damage from insects. Weakened timber may represent a threat to safe access and working environments.

Comments & Mitigation Notes:

Homes need defensible space and yard clean up. Thin dead and diseased vegetation. Cut weakened timber that may fall across roads and driveways. A parcel level analysis is recommended.

KZ Ranch

Hazard Rating: Moderate

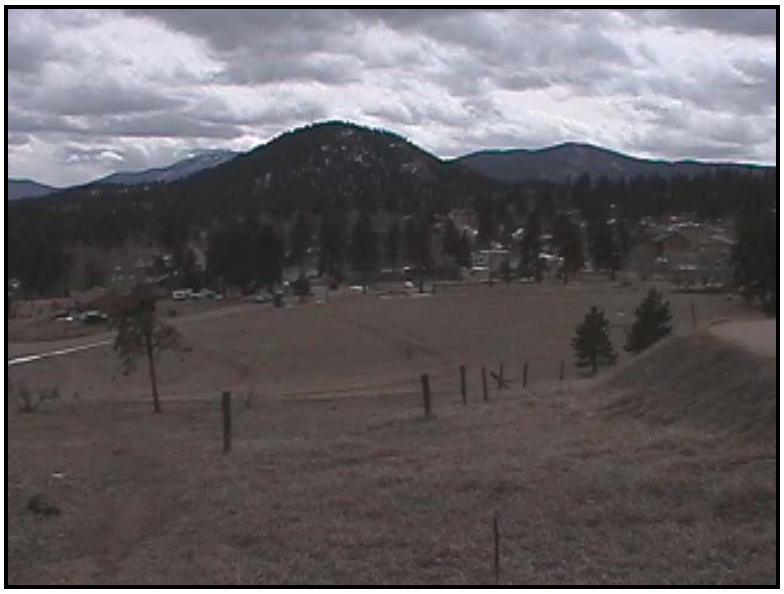
Description:

This neighborhood is mostly flat. The primary fuel is grass. Trees occur in patches, and some are very close to structures. This area is bordered by national forest containing heavy fuel loads in fuel model 8. Access is mostly good, but some roads are narrow in spots. Some homes need defensible space.

Comments & Mitigation Notes:

Improve narrow portions of roads. Thin trees near structures and provide defensible space.

Burland



Hazard Rating: Moderate

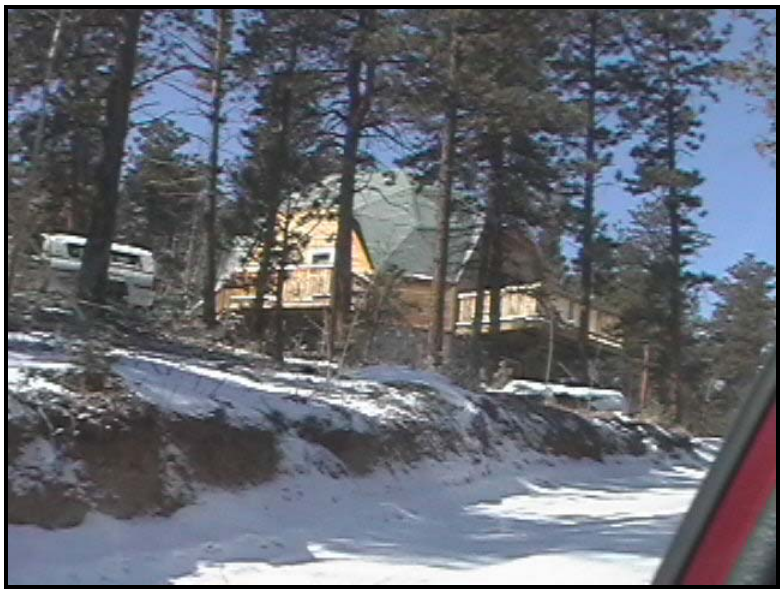
Description:

The dominant fuel in this area is grass mixed with discontinuous pockets of conifers. There is moderate fuel loading in the form of slash and ladder fuels. Some yards need clean up and defensible space. Old US Hwy 285, which is now closed, may make a good alternate access route with some grading. Similar to the Roland Valley community, this area has snags and fire weakened timber from old fires that may represent a threat to safe access and working environments.

Comments & Mitigation Notes:

Clean up yards. Thinning and limbing in the areas with heavy loads of conifer fuels is recommended, especially near structures. Thin dead and diseased vegetation. Cut weakened timber that may fall across roads and driveways. Some homes in this area need defensible space.

Ranchos



Hazard Rating: Moderate

Description:

This neighborhood has good roads and generally good construction type and materials. Some homeowners have good defensible spaces. There is moderate to heavy fuel loading in fuel models 8 and 9. The terrain varies from flat, to greater than 15% slope. Some ponds in the neighborhood may be functional for drafting; however the primary water supply would be from the dry hydrant on CR 43.

Comments & Mitigation Notes:

Continue to limb and thin near homes. Develop and publicize “protect in place” areas. See the water supply recommendations in the Hazard and Risk Assessment.

Singleton

Hazard Rating: Moderate

Description:

This neighborhood has clean yards and homes with ignition resistant construction types and materials. Many homeowners have limbed and removed slash. The roads are steep, but are wide and well maintained. There is an alternate access from Gildry Rd. via a jeep road running through Long Meadow Ranch. There is a good draft site at the south end of the neighborhood that could also support a type 3 helicopter dip site.

Comments & Mitigation Notes:

Steep terrain is the biggest problem here. Consider locating a cistern at the north (uphill) side of this neighborhood (see water supply recommendations in the Hazard and Risk Assessment). Working to improve the jeep trail access on the north side is strongly recommended.

Shawnee

Hazard Rating: Moderate

Description:

This neighborhood has mostly north aspects with slopes of <15%. The vegetation and ladder fuel loads are generally low. There are parcels with flammable materials and man-made hazards near structures. There are also trees touching structures, and homes with holes in and under buildings that would catch embers.

Comments & Mitigation Notes:

Clean up around structures, and seal holes in and under buildings. Remove or limb trees touching structures. Improve roads and post clear signage of roads and addresses. Most homes in this area need defensible space. A parcel level analysis of this neighborhood is recommended.

Ravenswood

Hazard Rating: Moderate

Description:

This neighborhood has moderate to high fuel loading in fuel models 8 and 9. Construction types and materials are generally good. Roads are steep in spots, but otherwise good. Most slopes are below 15%. The nearest water supply is the dry hydrant on CR43.

Comments & Mitigation Notes:

See the water supply recommendations in the Platte Canyon Hazard and Risk Assessment. Thin vegetation on slopes below homes. Some homes in this area may need defensible space.

Parkview

Hazard Rating: Moderate

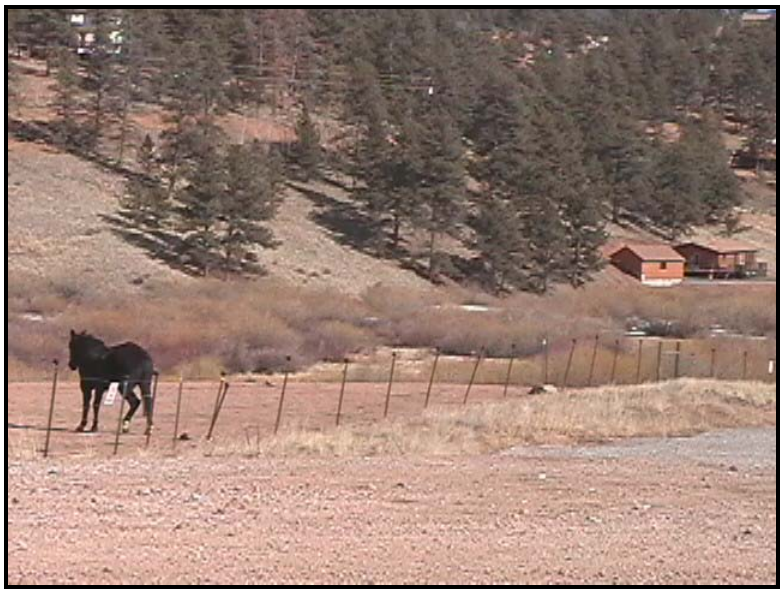
Description:

This neighborhood has slopes up to 30% with moderate loads in primarily fuel model 8. Construction types and materials are generally good (ignition resistant). Roads are steep, but otherwise good. There are some parcels with trees touching structures.

Comments & Mitigation Notes:

A cistern could be added to assist in providing water supply and reducing tender travel distance (the nearest water would be Bailey or the hydrant on CR43). See the water supply recommendations in the Hazard and Risk Assessment. Cut trees away from homes and thin downhill of homes. Some homes in this area need defensible space. There are many power lines with heavy fuels underneath. Thinning under critical power lines is highly recommended.

Elk Creek



Hazard Rating: Moderate

Description:

This area has moderate fuel loading in primarily fuel models 8 and 2, with approximately 20% of the area in fuel models 1 and 5. Slopes are mostly less than 15%. Access roads are good except for some dead ends on the south end that need turnarounds. There are ponds in the area that would be good dry hydrant sites. Some parcels have tall grasses against structures.

Comments & Mitigation Notes:

One or more dry hydrants could be added to the ponds. Ponds also need to be named or numbered and marked on maps as draft sites. See the water supply recommendations in the Hazard and Risk Assessment. Some roads in the south end need to be improved and turnarounds added. Grass needs to be mowed in close proximity to all structures.

Friendship Ranch

Hazard Rating: Moderate

Description:

This neighborhood has moderate fuel loading in fuel model 8. Some roads and driveways are steep. The nearest water supply is the hydrant on CR43. High voltage power lines cross the only access to this community, but the height is adequate for apparatus clearance. Some structures have trees touching them, and some parcels need yard clean up.

Comments & Mitigation Notes:

See the water supply recommendations in the Hazard and Risk Assessment. Cut trees in close proximity to structures. Some homes in this area need defensible space and yard clean up.

Bellford

Hazard Rating: Moderate

Description:

This community has low fuel loading in predominantly fuel models 1 and 8. Roads are generally good, but there are a few narrow and steep spots. There is one low power line (low voltage cable and phone at 12 feet) on Whiteford Road. There is a good draft water source at Road B-6. There are flammable materials and other man-made hazards near some homes. Some yards need tree limbing.

Comments & Mitigation Notes:

Relocate the low power line. Clean up hazards around structures. Some homes in this area need defensible space.

Bailey

Hazard Rating: Moderate

Description:

The town of Bailey has moderate fuel loading in fuel model 8 on all sides, even though vegetation and ladder fuel loads in town are low. The town of Bailey has a hydrant system that is not functional according to PCFD. Although there is a fill site near the post office, it would be highly desirable to have a functioning hydrant system considering the fire history and hazard levels of the surrounding areas. Power lines on the east side of the river may be too low for some apparatus. The feed store and the lumber yard have a large quantity of combustible materials against and between buildings.

Comments & Mitigation Notes:

Repair of the hydrant system should be considered. Thinning vegetation near homes on the north and south edges of town would reduce the hazard. A shaded fuel break on the south side of town, where private land borders the Pike National Forest, should be considered. Combustible materials should be moved away from buildings and covered or otherwise sealed from possible ember cast.

Bailey Estates

Hazard Rating: Moderate

Description:

This area is made up of predominantly large ranches on the edge of the Snaking fire perimeter. As a result of the fire, a lot of clean up has already been done, however many existing trees are in marginal health from drought and heat damage. The nearest water supply is the town of Bailey.

Comments & Mitigation Notes:

Thin dead and diseased vegetation, and monitor for additional insect infestation.

Mill Iron D Estates

Hazard Rating: Low

Description:

This neighborhood has low fuel loading in fuel models 1 and 8. Houses are on large lots and are mostly well mitigated. The topography is flat to low slope. There is a secondary egress route via a bulldozer road to US Hwy 285 that is currently locked. Water is available from two hydrants on CR 43.

Comments & Mitigation Notes:

This community has a library and a church that may be suitable for a citizen evacuation center. Check with the landowner about permission to use the bulldozer road during emergencies.

General Recommendations

A combination of access, ignition resistant construction, and fuels reduction should create a safer environment for emergency service personnel and provide reasonable protection to structures from a wildfire. These techniques should also significantly reduce the chances of a structure fire becoming an ignition source to the surrounding wildlands.

In addition to the suggested mitigations listed for the individual communities, several general measures can be taken to improve fire safety. The following recommendations should be noted and practiced by all who live in the Wildland-Urban Interface:

1. Be aware of the current fire danger in the area.
2. Clean roof and gutters at least 2 times a year, especially during cure up in the autumn, after strong winds, and also in the spring before fire season.
3. Stack the majority of the firewood uphill or on a side contour, at least 30 feet away from structures.
4. Don't store combustibles or firewood under decks.
5. Maintain and clean spark arresters on chimneys. Chimneys of wood burning fireplaces should be cleaned annually.
6. Screen off any openings in attics, eves, siding and foundations to reduce the likelihood of embers and firebrands entering them.
7. When possible, maintain an irrigated greenbelt around the home.
8. Connect, and have available, a minimum of 50 feet of garden hose.
9. Post reflective lot and/or house numbers so that they are clearly visible from the main road. There should also be reflective numbers on the structure itself.
10. Trees along driveways should be limbed and thinned as necessary to maintain a minimum 14' vertical clearance for emergency vehicle access.
11. Maintain defensible space.
    - Mow grass and weeds to a low height (4”-6”)
    - Remove any branches overhanging the roof or chimney.
    - Remove all hazards, debris and cuttings from the defensible space.

Fire Regime and Condition Class

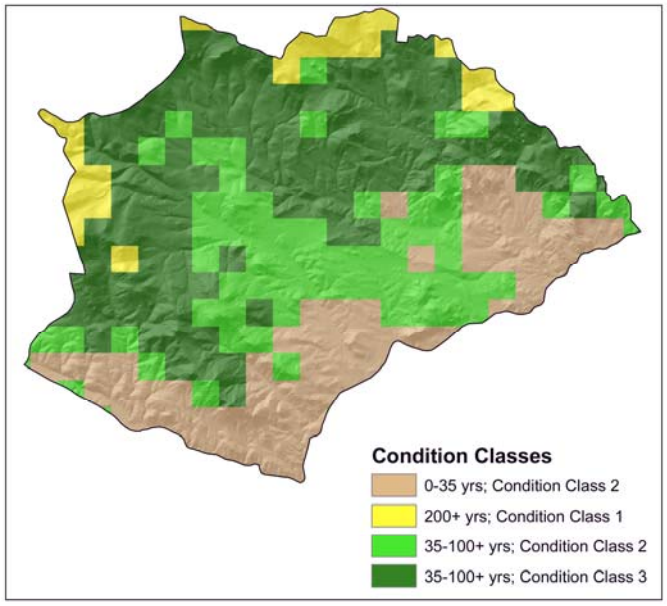
Once the communities within the project have been analyzed, it becomes necessary to look at them within the context of the landscape. The Fire Regime and Condition Class is a historic, landscape evaluation of expected fire behavior as it relates to the departure from

historic norms. This is not to be confused with BEHAVE and FLAMMAP fire behavior as detailed in the fire behavior section, which provides functional fire behavior analysis for expected flame length, potential crown fire, how fast the fire would spread, etc.

The fire-regime condition class (FRCC) is an expression of the departure of the current condition from the historical fire regime. It is used as a proxy for the probability of severe fire effects (e.g., the loss of key ecosystem components - soil, vegetation structure, species; or alteration of key ecosystem processes - nutrient cycles, hydrologic regimes). Consequently, FRCC is an index of risk to the status of many components (e.g., water quality, fish status, wildlife habitats, etc.). Figure 6 displays graphically the return interval and condition class of the study area.

Deriving fire-regime condition class entails comparing current conditions to some estimate of the historical range that existed prior to substantial settlement by Euro-Americans. The departure of the current condition from the historical base line serves as a proxy to likely ecosystem effects. In applying the condition class concept, it is assumed that historical fire regimes represent the conditions under which the ecosystem components within fire-adapted ecosystems evolved and have been maintained over time. Thus, if it is projected that fire intervals and/or fire severity has changed from the historical conditions, then it would be expect that fire size, intensity, and burn patterns would also be subsequently altered if a fire occurred.

Figure 6. Condition Classes Map



See Appendix B for Larger Scale Map (MAP 3. Condition Class)

Furthermore, it is assumed that if these basic fire characteristics have changed, then it is likely that there would be subsequent effects to those ecosystem components that had adapted to the historical fire regimes. As used here, the potential of ecosystem effects reflect the probability that key ecosystem components may be lost should a fire occur. Furthermore, a key ecosystem component can represent virtually any attribute of an ecosystem (for example, soil productivity, water quality, floral and faunal species, large-diameter trees, snags, etc.).

The following categories of condition class are used to qualitatively rank the potential of effects to key ecosystem components:

Condition Class	***Condition Class Description***
1	Fire regimes are within their historical range and the risk of losing key ecosystem components as a result of wildfire is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. Fire effects would be similar to those expected during historical times.
2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components as a result of wildfire is moderate. Fire frequencies have changed by one or more fire-return intervals (either increased or decreased). Vegetation attributes have been moderately altered from their historical range. Consequently, wildfires would likely be larger, more intense, more severe, and have altered burn patterns than that expected during historical times.
3	Fire regimes have changed substantially from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have changed by two or more fire-return intervals. Vegetation attributes have been significantly altered from their historical range. Consequently, wildfires would likely be larger, more intense, more severe, and have altered burn patterns than that expected during historical times.

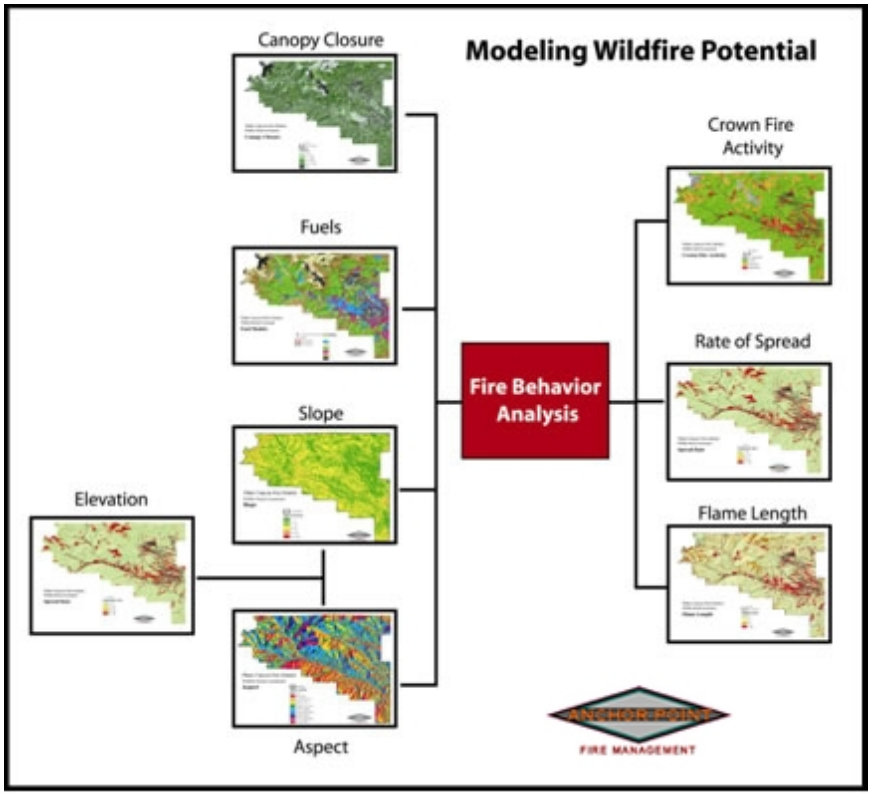
Table 1. Condition Class Descriptions

The study area is dominantly classified under condition class 2 and 3. By definition, historic fire regimes have been moderately to substantially changed. Consequently, wildfires would likely be larger, more intense, more severe, and have altered burn patterns than that expected during historical times.

Fire Behavior

Figure 7 shows a flow chart of the methodology used to estimate the fire behavior potential of the study area. Fuels, weather and topography constitute the main inputs.

Figure 7. Model Description



The fire behavior potential analysis represents a relative ranking of locations based upon expected surface fire intensity. The model inputs for surface fire behavior include aspect, slope, elevation, canopy cover and fuel type. The hazard level is determined using **FlamMap** which models wildfire behavior potential. Calculations are based on the USDA Forest Service's fire behavior model **BEHAVE**. **BEHAVE** is a nationally recognized set of calculations to estimate a fire's intensity and rate of spread given certain conditions of topography, fuels and weather.

FlamMap

The fire behavior prediction maps produced for this study were produced using **FlamMap**. **FlamMap** was developed by Systems for Environmental Management (Missoula, Montana) and the Fire Sciences Laboratory of the Rocky Mountain Research Station (USDA Forest Service, Missoula, Montana) to evaluate the potential fire conditions in the study area. The Harris Park study area encompasses approximately

60,400 acres, which were broken down into 10 meter (m) grids. Using **FlamMap**'s spatial analysis capabilities, each 10 meter square (sq) grid was queried for its elevation, slope, aspect and fuel type. These values are input into **FlamMap,** along with reference weather information. The outputs of **FlamMap** include the estimated Rate of Spread (ROS), Flame Length (FL) (from **BEHAVE**) and Crown Fire Activity for a fire in that 10m sq grid. The model computes these values for each grid cell in the study area.

BEHAVE Modeling

The **BEHAVE** modeling system has been used for a variety of applications including prediction of an ongoing fire, prescribed fire planning, fuel hazard assessment, initial attack dispatch and fire prevention planning and training. Predictions of wildland fire behavior are made for a single point in time and space given simple user-defined fuels, weather and topography.

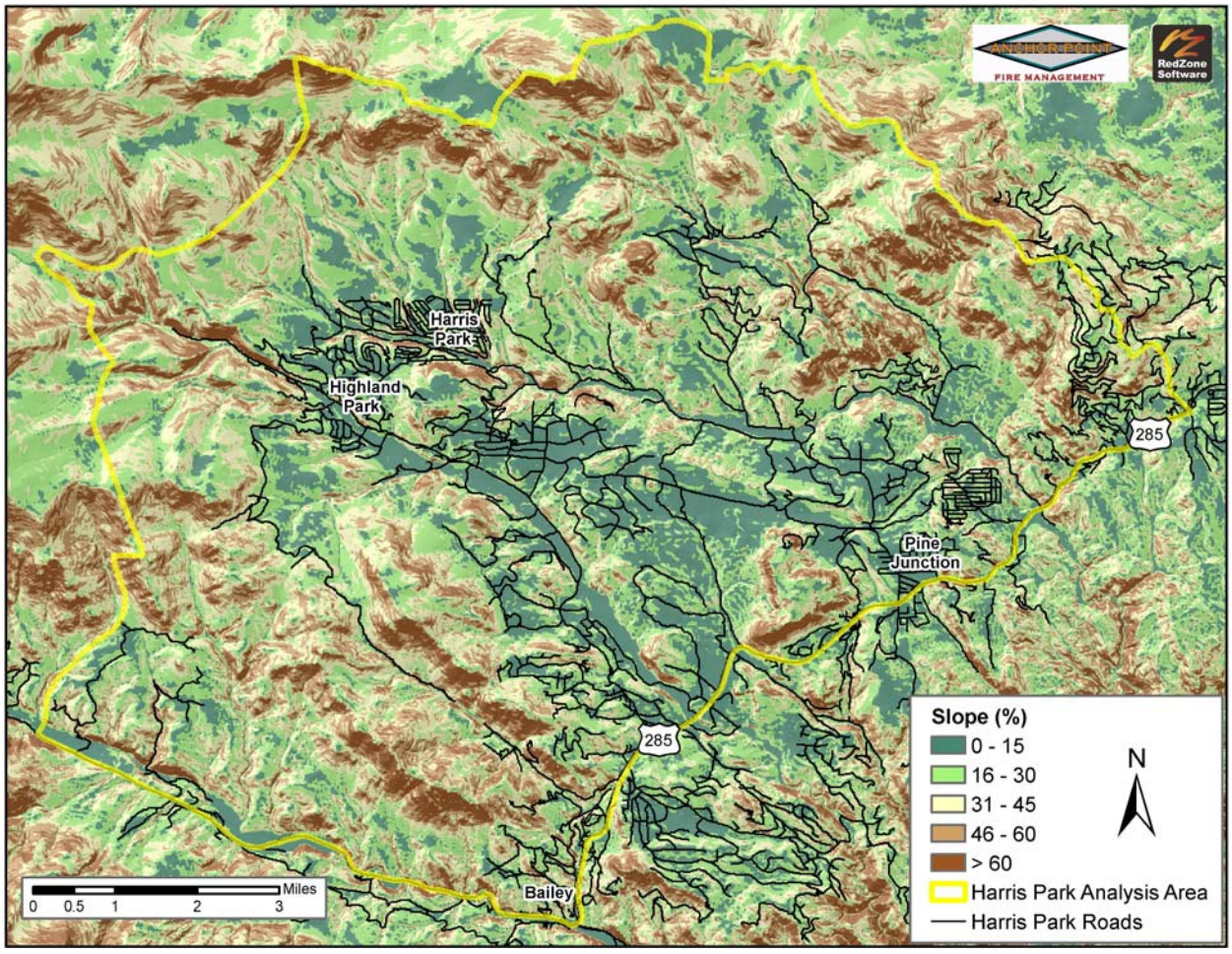
Assumptions of **BEHAVE**

- Fire is predicted at the flaming front
- Fire is free burning
- Behavior is heavily weighted towards the fine fuels
- Continuous and uniform fuels
- Surface fires

Fire Behavior Inputs

Fire behavior is dependant upon slope, aspect, elevation, canopy cover and fuel type. The following pages contain an explanation of each.

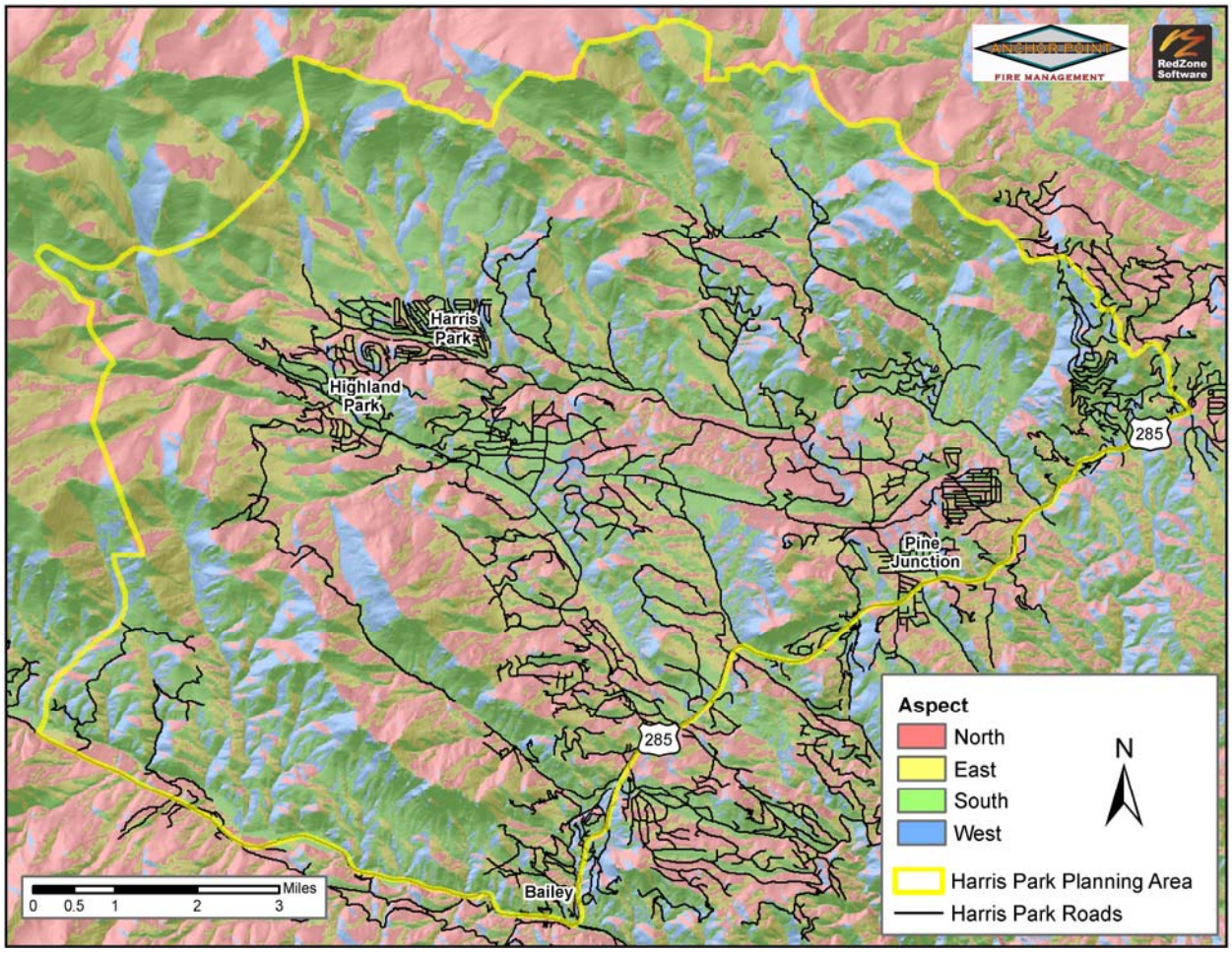
Figure 8. Slope



See Appendix B for Larger Scale Map
(MAP 8. Slope)

Slopes are shown here as percent (rise/run x100). Steeper slopes intensify fire behavior and thus will contribute to a high wildfire hazard rating. Rates of spread for a slope of 30% are typically double those of flat terrain when all other influences are equal.

Figure 9. Aspect

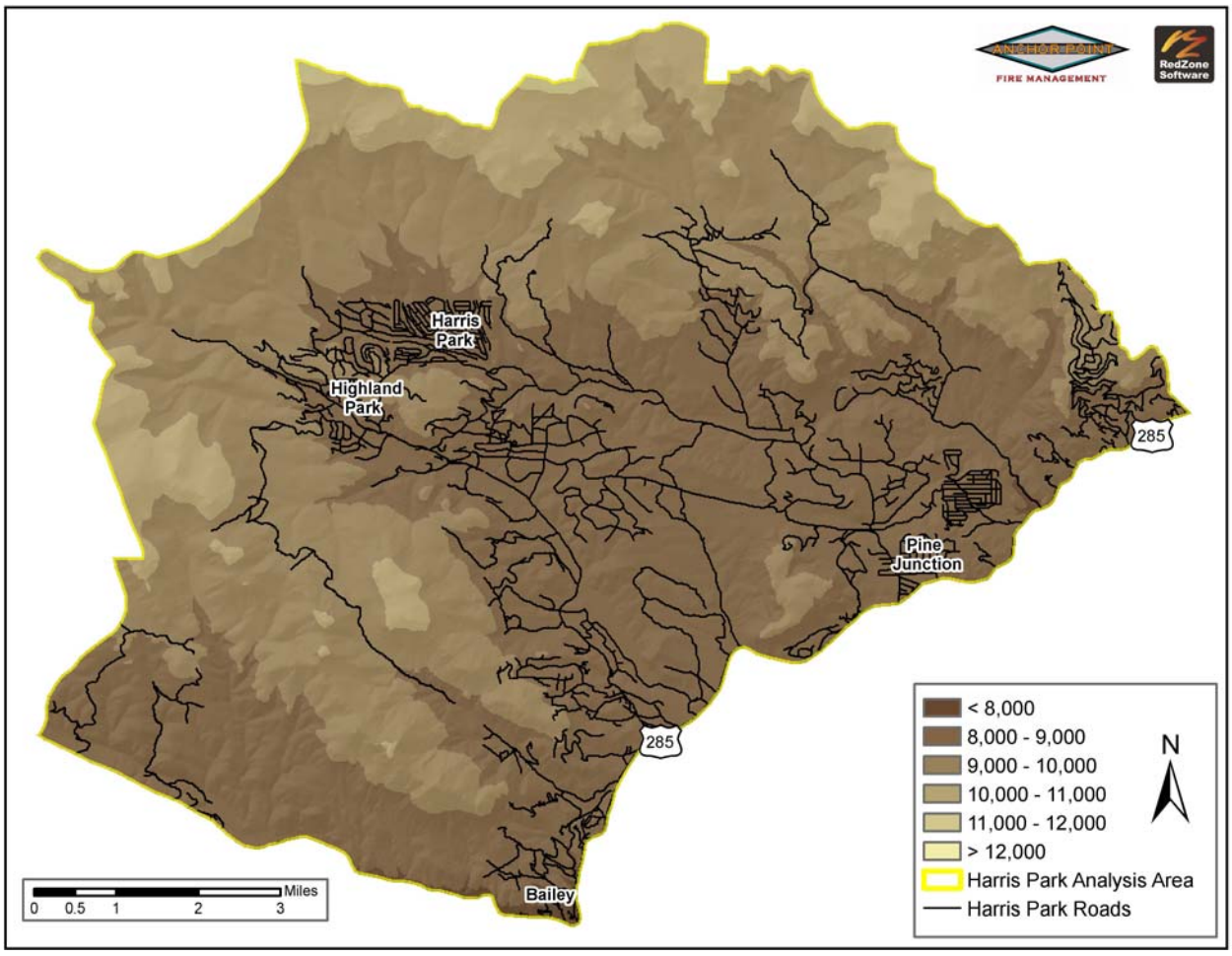


See Appendix B for Larger Scale Map
(MAP 9. Aspect)

Aspects are shown as degrees from North ranging from 0 to 360 according to their orientation. Aspects are influential in the type and quantity of vegetative fuels. Fuels on south facing slopes tend to be drier and less dense than fuels on north facing slopes when all other influences are equal. Aspect also has an influence on species dominance.

Classification	North	East	South	West
Range	315-45	45-135	135-225	225-315

Figure 10. Elevations



See Appendix B for Larger Scale Map
(MAP 10. Elevations)

Elevations within the Harris Park study area vary from approximately 6,000 feet to over 12,000 feet. As elevation increases, fuel loading and available oxygen for combustion change. Above tree line, fuels become sparse and the natural burn interval is measured in centuries.

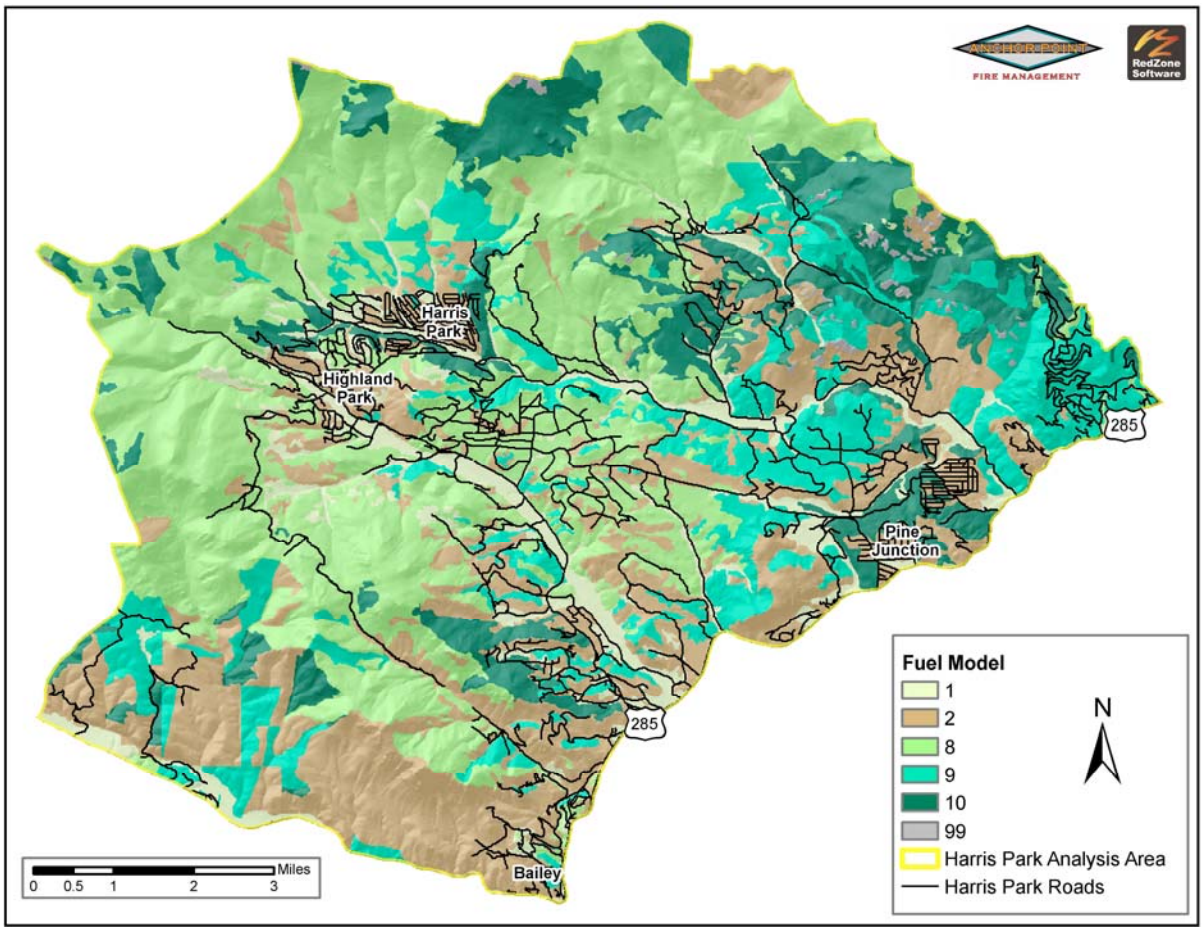
Fuel Models and Fire Behavior

Fuel models are a set of numbers that describe the fuel in terms that a fire spread model can use. There are seven characteristics that are used to categorize fuel models.

1. Fuel Loading, 2.Size and Shape, 3.Compactness, 4.Horizontal Continuity, 5.Vertical Arrangement, 6.Moisture Content and 7.Chemical Content.

The study area is represented primarily by five fuel models (FM): FM 1, 2, 8, 9 and 10 (Anderson, 1982). Other fuel models exist, but not in enough quantity to significantly influence fire behavior in the Wildland-Urban Interface. Each of the major fuel types present are described below with a table showing a range of fire behavior based on the **BEHAVE** system. Fuel Model 99 represents a noncombustible surface. Figure 11 displays the fuel types graphically for the study area.

Figure 11. Fuel Models



See Appendix B for Larger Scale Map
(MAP 11. Fuel Models)

The **BEHAVE** Fire Behavior Prediction and Fuel Modeling System was utilized to help determine the wildfire hazard for this study. Predictions of wildland fire behavior are made for a single point in time and space given simple user-defined fuels, weather, and topography. Requested values depend on the modeling choices made by the user. For example, fuel model, fuel moisture, wind speed and direction, terrain and slope are used to calculate rate of spread, flame length and intensity.

The project fuel model map is available in Appendix B for review while examining the following fuel model details.

FUEL MODEL 1[1]

Figure 12. Fuel Model 1 – Short Grasses

Characteristics

Grasslands and savanna are represented along with stubble, grass-tundra and grass-shrub combinations.

Common Types/Species

Annual and perennial grasses are included in this fuel model.

Fire Behavior

Fire spread is governed by the fine, very porous and continuous herbaceous fuels that have cured or are nearly cured. Fires in this fuel model are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area.

[1] Hal Anderson, "Aids to Determining Fuel Models for Estimating Fire Behavior" (Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station 22 p. [NFES 1574], 1982).

Rate of spread in chains/hour (1 chain=66 ft)

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	28.8	92.9	203.6	362.4	570.1	665.6
4.0	22.0	71.1	155.7	277.0	345.1	345.1
6.0	19.4	62.4	136.8	243.4	270.1	270.1
8.0	16.7	53.9	118.1	198.7	198.7	198.7
10.0	11.0	35.6	64.8	64.8	64.8	64.8

10 hr fuel=5%, 100 hr fuel=6%, herbaceous fuel moisture=100%, slope=10%

Flame Length in Feet

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	3.0	5.1	7.3	9.6	11.8	12.7
4.0	2.4	4.1	5.9	7.8	8.6	8.6
6.0	2.2	3.8	5.5	7.1	7.5	7.5
8.0	2.0	3.4	4.9	6.3	6.3	6.3
10.0	1.4	2.4	3.2	3.2	3.2	3.2

FUEL MODEL 2[2]


Figure 13. Fuel Model 2 – Timber with Grass Understory

Characteristics

This type consists of open grown pine stands. Trees are widely spaced with few understory shrubs or regeneration. Ground cover consists of mountain grasses/and or needles and small woody litter. This model occurs in open-grown and mature ponderosa pine stands in the Foothill to Montane zones. Open shrub lands and pine stands or scrub oak stands that cover one-third to two-thirds of the area may generally fit this model; such stands may include clumps of fuels that generate higher intensities and that may produce firebrands. Scattered sage within grasslands and some pinyon-juniper may be in this model.

Common Species/Species

The dominant tree species is ponderosa pine. This type may include some scattered Douglas-fir. Other tree and shrub species include common and Rocky Mountain juniper, buckbrush, sage, bitter brush, and mountain mahogany. Mountain grasses are included in this model.

Fire Behavior

Fire spread is primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, in addition to litter and dead-down stem wood from the open shrub or timber overstory, contribute to the fire intensity.

[2] Hal Anderson, "Aids to Determining Fuel Models for Estimating Fire Behavior" (Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station 22 p. [NFES 1574], 1982).

Rate of spread in chains/hour (1 chain=66 ft)

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	12.4	34.2	67.5	111.6	166.0	230.2
4.0	10.2	28.0	55.3	91.4	135.9	188.5
6.0	9.0	24.9	49.1	81.2	120.8	167.6
8.0	8.3	22.9	45.3	74.9	111.3	154.4
12.0	7.4	20.5	40.5	67.0	99.7	138.3

10 hr fuel=5%, 100 hr fuel=6%, herbaceous fuel moisture=100%, slope=10%

Flame Length in Feet

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	4.3	6.9	9.4	11.8	14.2	16.5
4.0	3.7	5.8	8.0	10.1	12.1	14.0
6.0	3.4	5.4	7.3	9.2	11.1	12.9
8.0	3.2	5.1	6.9	8.7	10.5	12.2
10.0	2.9	4.7	6.4	8.1	9.7	11.2

FUEL MODEL 8[3]

Figure 14. Fuel Model 8 - Timer Litter, Light Fuel Load

Characteristics

Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Amounts of needle and woody litter are also low. This fuel model occurs at higher elevations in the Montane zone.

Common Types/Species

Representative conifer types are white pine, lodgepole pine, spruce, fir, and larch but ponderosa pine can also be included. Closed stand of birch-aspen with leaf litter compacted and western hemlock stands are also representative. There are little or no understory plants.

Fire Behavior

Fires in this fuel model are slow burning, low intensity fires burning in surface fuels. Fuels are mainly needles and woody litter. Heavier fuel loadings can cause flare-ups. Heavier fuel loads have the potential to develop crown fires in extreme burning conditions.

[3] Hal Anderson, "Aids to Determining Fuel Models for Estimating Fire Behavior" (Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station 22 p. [NFES 1574], 1982).

Rate of spread in chains/hour (1 chain=66 ft)

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	1.1	2.3	3.9	5.7	7.8	10.1
4.0	0.9	1.9	3.2	4.7	6.4	6.9
6.0	0.7	1.6	2.6	3.9	4.9	4.9
8.0	0.6	1.4	2.3	3.4	3.8	3.8
10.0	0.6	1.2	2.0	3.0	3.1	3.1
12.0	0.5	1.1	1.8	2.7	2.7	2.7

10 hr fuel=5%, 100 hr fuel=6%, herbaceous fuel moisture=100%, slope=10%

Flame Length in Feet

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	0.9	1.3	1.7	2.0	2.3	2.6
4.0	0.8	1.1	1.4	1.7	2.0	2.0
6.0	0.7	1.0	1.2	1.5	1.7	1.7
8.0	0.6	0.9	1.1	1.3	1.4	1.4
10.0	0.6	0.8	1.0	1.2	1.3	1.3
12.0	0.6	0.8	1.0	1.2	1.3	1.3

FUEL MODEL 9[4]


Figure 15. Fuel Model 9 - Timber Litter - Heavier Surface Fuel & Understory Plants

Characteristics

Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting and crowning.

Common Types/Species

Closed stands of long-needled pine like ponderosa, Jeffrey, and red pines, or southern pine plantations are grouped in this fuel model.

Fire Behavior

Fires in this fuel model run through the surface litter faster than model 8 and have longer flame height. Fall fires in hardwoods are predictable, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves.

[4] Hal Anderson, "Aids to Determining Fuel Models for Estimating Fire Behavior" (Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station 22 p. [NFES 1574], 1982).

Rate of spread in chains/hour (1 chain=66 ft)

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	4.0	9.8	18.1	28.7	41.5	56.2
4.0	3.2	7.7	14.3	22.7	32.7	44.4
6.0	2.6	6.4	11.8	18.8	27.1	36.7
8.0	2.3	5.5	10.2	16.3	23.5	31.8
10.0	2.0	5.0	9.2	14.7	21.2	28.7
12.0	1.9	4.6	8.5	13.5	19.5	26.5

10 hr fuel=5%, 100 hr fuel=6%, herbaceous fuel moisture=100%, slope=10%

Flame Length in Feet

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	2.3	3.5	4.7	5.8	6.8	7.9
4.0	1.9	2.9	3.9	4.8	5.7	6.6
6.0	1.7	2.5	3.4	4.2	5.0	5.7
8.0	1.5	2.3	3.1	3.8	4.5	5.2
10.0	1.4	2.2	2.9	3.5	4.2	4.8
12.0	1.4	2.1	2.7	3.4	4.0	4.6

FUEL MODEL 10[5]

Figure 16. Fuel Model 10 - Heavy Timber Litter in Mature Lodgepole Stands

Characteristics

This model is represented by dense stands of over-mature ponderosa pine, lodgepole pine, mixed conifer and continuous stands of Douglas-fir. In all stand types, heavy down material is present. There is also a large amount of dead, down woody fuels. Reproduction may be present, acting as ladder fuels. This model includes stands of budworm killed Douglas-fir, closed stands of ponderosa pine with large amounts of ladder and surface fuels. Stands of lodgepole pine with heavy loadings of downed trees. This model can occur from the foothills through the sub-alpine zone.

Common Types/Species

All types of vegetation can occur in this model, but primary species are, Douglas-fir, ponderosa pine, and lodgepole pine.

Fire Behavior

Fire intensities can be moderate to extreme. Fire moves through dead, down woody material. Torching and spotting are more frequent. Crown fires are quite possible.

[5] Hal Anderson, "Aids to Determining Fuel Models for Estimating Fire Behavior" (Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station 22 p. [NFES 1574], 1982).

Rate of spread in chains/hour (1 chain=66 ft)

Fine Dead Fuel moisture	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	3.8	8.2	13.7	20.1	27.3	35.1
4.0	3.3	7.2	12.1	17.8	24.1	31.0
6.0	3.0	6.6	11.0	16.1	21.8	28.0
8.0	2.8	6.1	10.2	14.9	20.2	26.0
10.0	2.6	5.7	9.6	14.1	19.1	24.5
12.0	2.5	5.5	9.2	13.4	18.2	23.4

10 hr fuel 5%, 100= 6%, woody fuel moisture= 100%, slope 10%

Flame Length in Feet

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	3.8	5.5	7.0	8.3	9.5	10.7
4.0	3.5	5.0	6.3	7.5	8.6	9.7
6.0	3.2	4.6	5.8	6.9	7.9	8.9
8.0	3.0	4.3	5.5	6.5	7.5	8.4
10.0	2.9	4.1	5.2	6.2	7.2	8.0
12.0	2.8	4.0	5.1	6.0	6.9	7.8

Reference Weather Used in the Wildfire Hazard Evaluation

The Wildfire Hazard classification represents a relative ranking of locations based upon expected surface fire intensity. The weather inputs for **FlamMap** were created by using weather data collected at Bailey.

Latitude (dd mm ss)	39 ° 22 ' 15 " N
Longitude (dd mm ss)	105 ° 19 ' 30 " W
Elevation (ft.)	6,000

Weather observations from the Bailey Remote Automated Weather Station (RAWS) were averaged for May to October from 1995-2003 to calculate these conditions. Values for each variable (1 hr, 10 hr, and 100 hr fuel moisture, woody fuel moisture, herbaceous fuel moisture, and wind speed) were derived from the moderate variable range (16-89 percentile range) calculated by Fire Family Plus to represent an average fire season day.

The “extreme conditions” were calculated using ninety-seventh percentile weather data. That is to say, the weather conditions existing on the four most severe fire weather days (sorted by Spread Component SC) in each season for the ten-year period were averaged together. It is reasonable to assume that similar conditions may exist for at least four days of the fire season during an average year. In fact, during extreme years such as 2000 and 2002, such conditions may exist for significantly longer periods. Even these calculations may be conservative compared to observed fire behavior. Drought conditions the last few years have significantly changed the fire behavior in dense forest types such as mixed conifer. The current values underestimate fire behavior especially in the higher elevation fuels, because the extremely low fuel moistures are not represented in the averages. The following values were used in **FlamMap**:

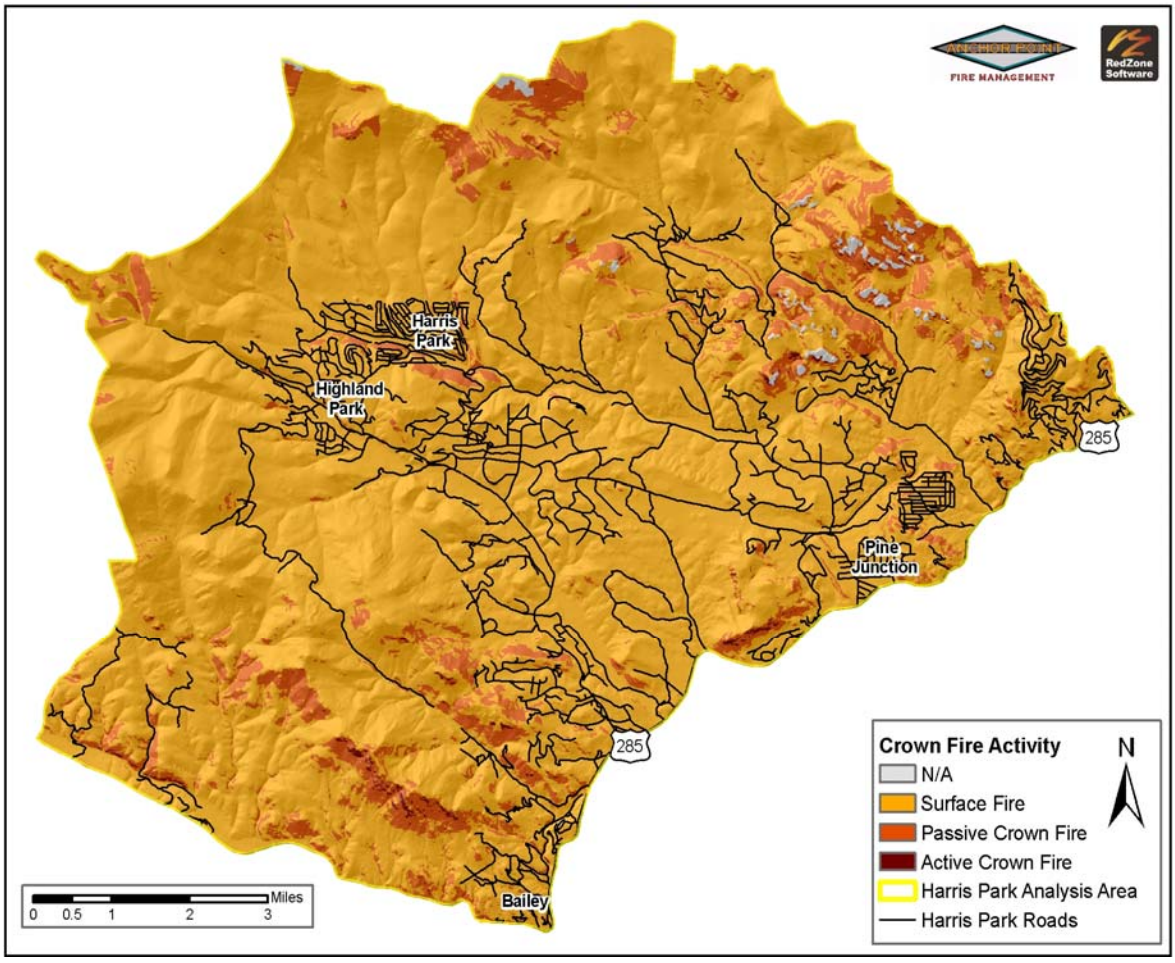
Average Weather Conditions	
Variable	**Value**
20 ft Wind speed up slope	6 mph
Herbaceous fuel moisture	146%
Woody fuel moisture	138%
100 hr fuel moisture	16%
10 hr fuel moisture	13%
1 hr fuel moisture	8%

Extreme Weather Conditions	
Variable	**Value**
20 ft Wind speed up slope	11 mph
Herbaceous fuel moisture	64%
Woody fuel moisture	10%
100 hr fuel moisture	11%
10 hr fuel moisture	7%
1 hr fuel moisture	4%

Fire Behavior Analysis Outputs

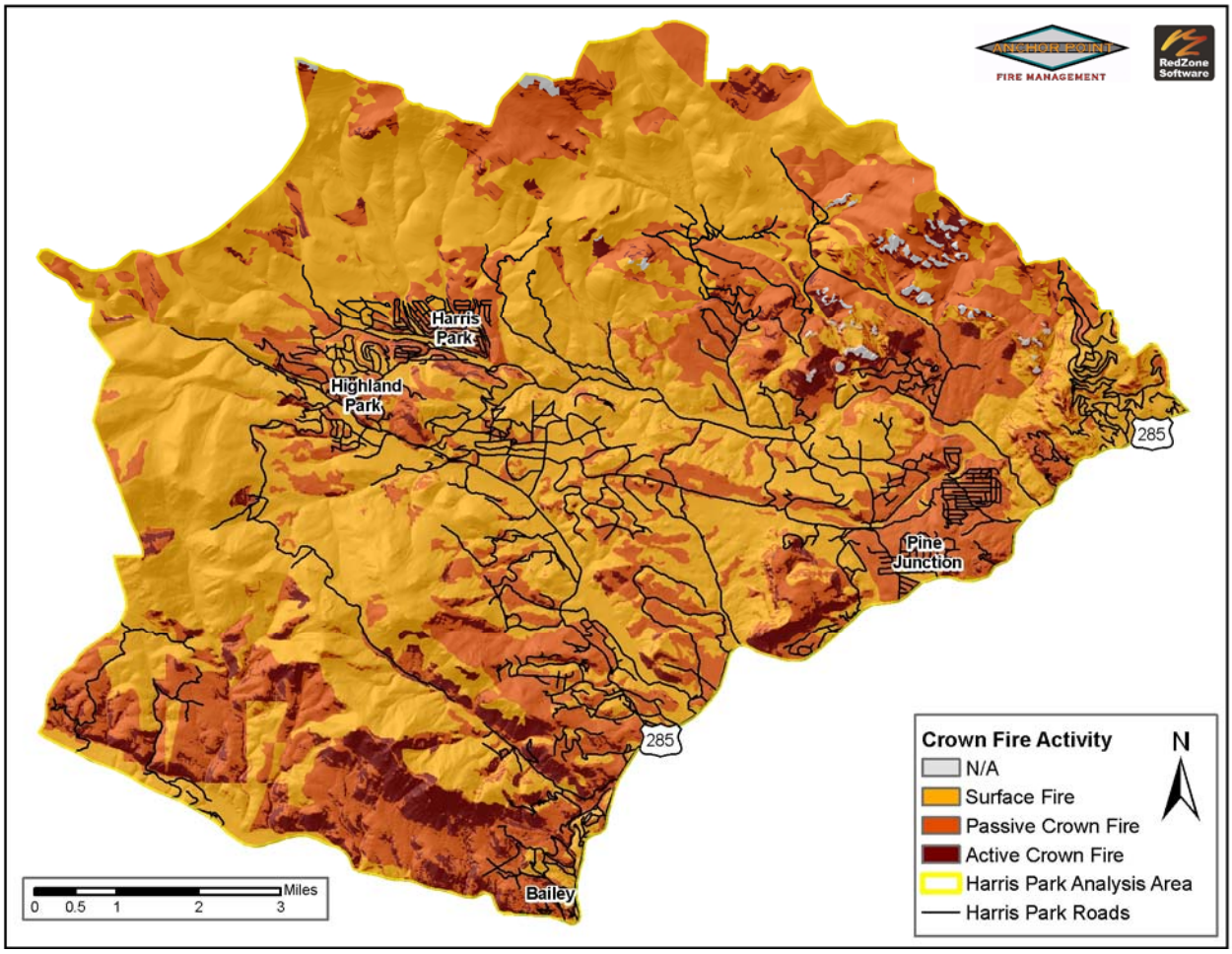
From the fire behavior analysis, predictions of crown fire activity, rate of spread and flame length are derived. The following maps graphically display the outputs of FLAMMAP.

Figure 17. Prediction of Crown Fire Activity (Average Weather Conditions)



See Appendix B for Larger Scale Map
(Map 12 - Crown Fire Activity Predictions – Average Weather Conditions)

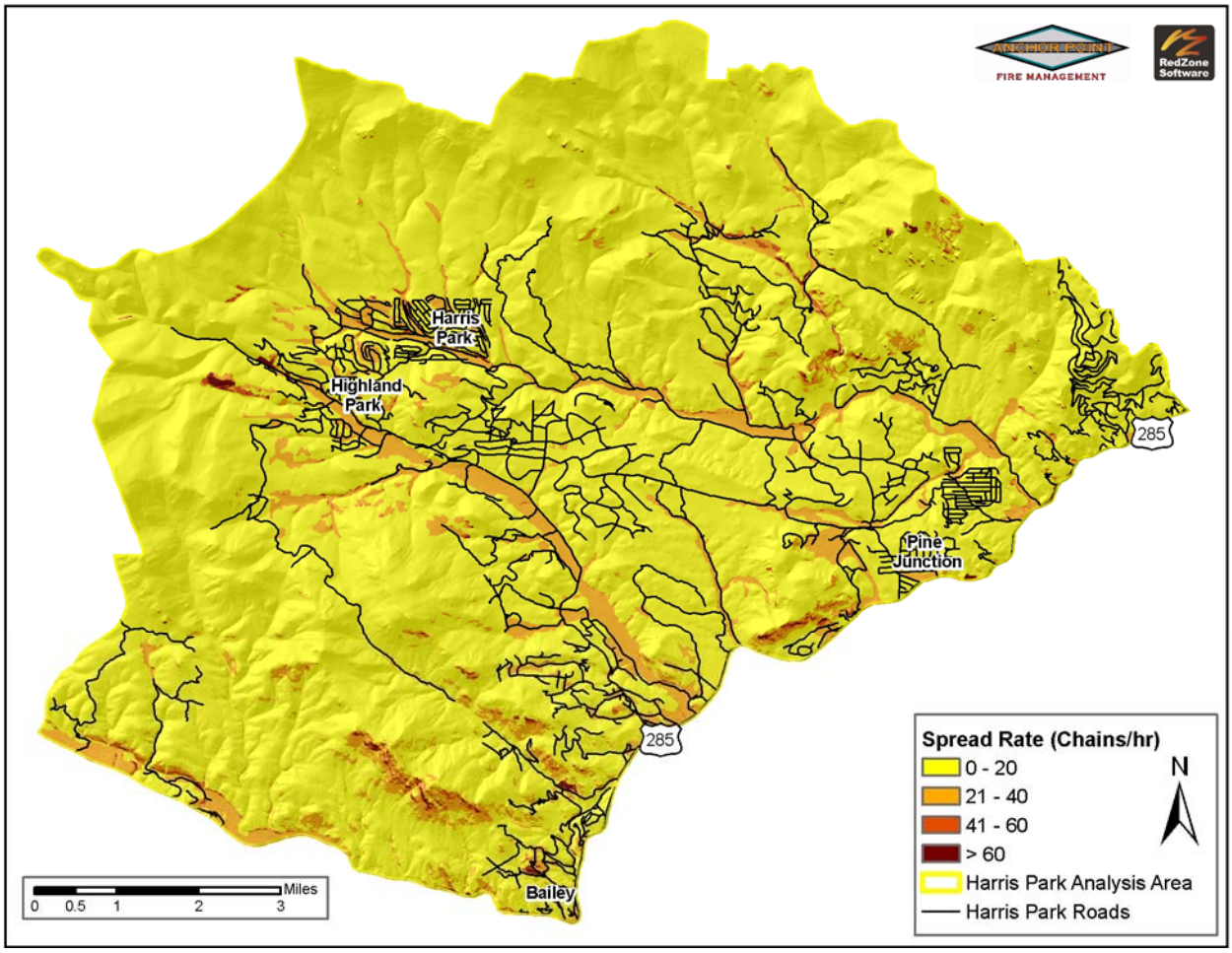
Figure 18. Prediction of Crown Fire Activity (Extreme Weather Conditions)



See Appendix B for Larger Scale Map
(Map 13 - Crown Fire Activity Predictions – Extreme Weather Conditions)

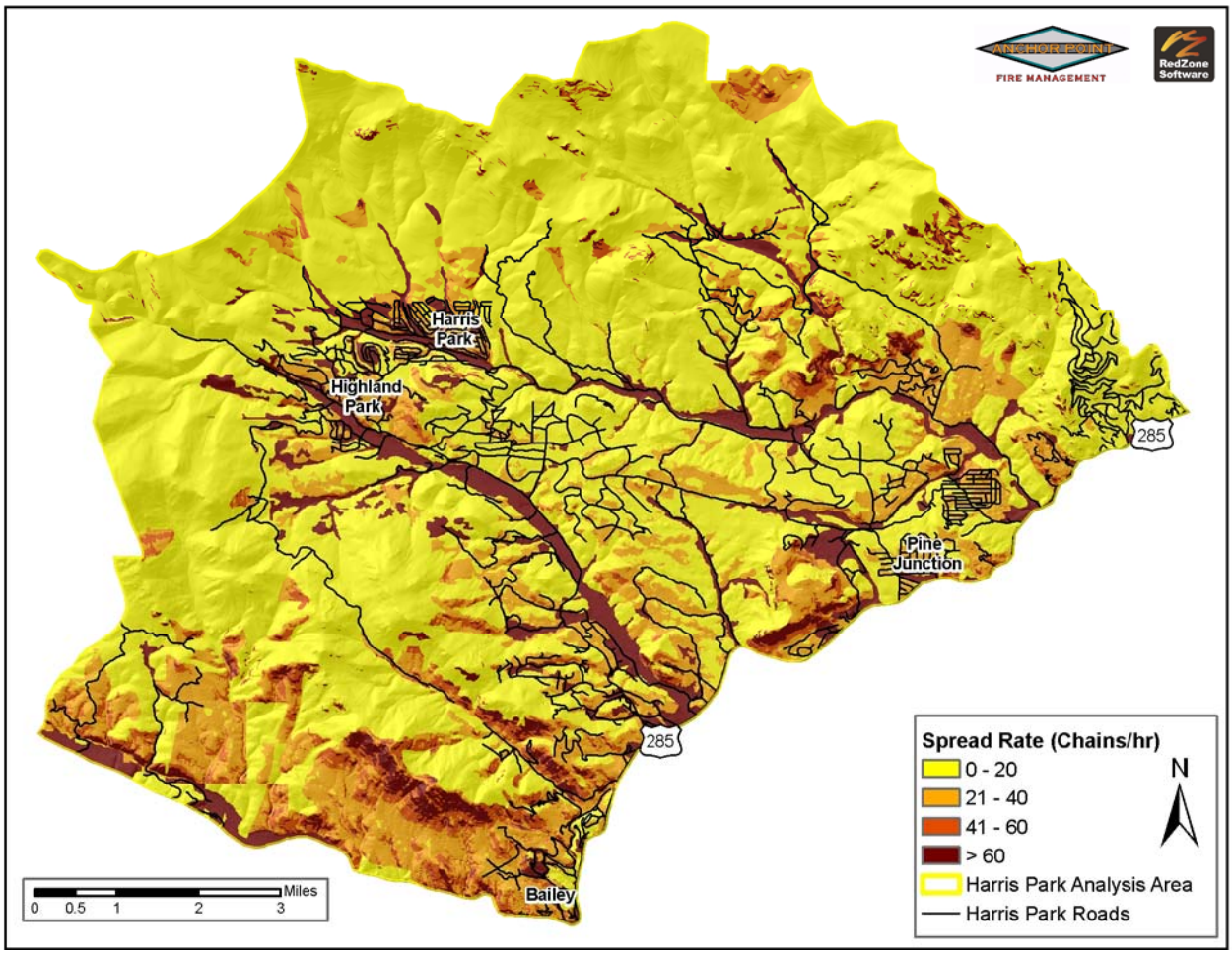
Crown fire activity values are generated by the FlamMap model and classified into 4 categories based on standard ranges: active, passive, surface and not applicable. In the surface fire category, little or no tree torching will be expected. During passive crown fire activity, isolated torching of trees or groups of trees will be observed and canopy runs will be limited to short distances. During active crown fire activity, sustained runs through the canopy will be observed that may be independent of surface fire activity.

Figure 19. Spread Rate Prediction (Average Weather Conditions)



See Appendix B for Larger Scale Map
(Chains/hr = Feet/ minute)
(MAP 14. Spread Rate Predictions – Average Weather Conditions)

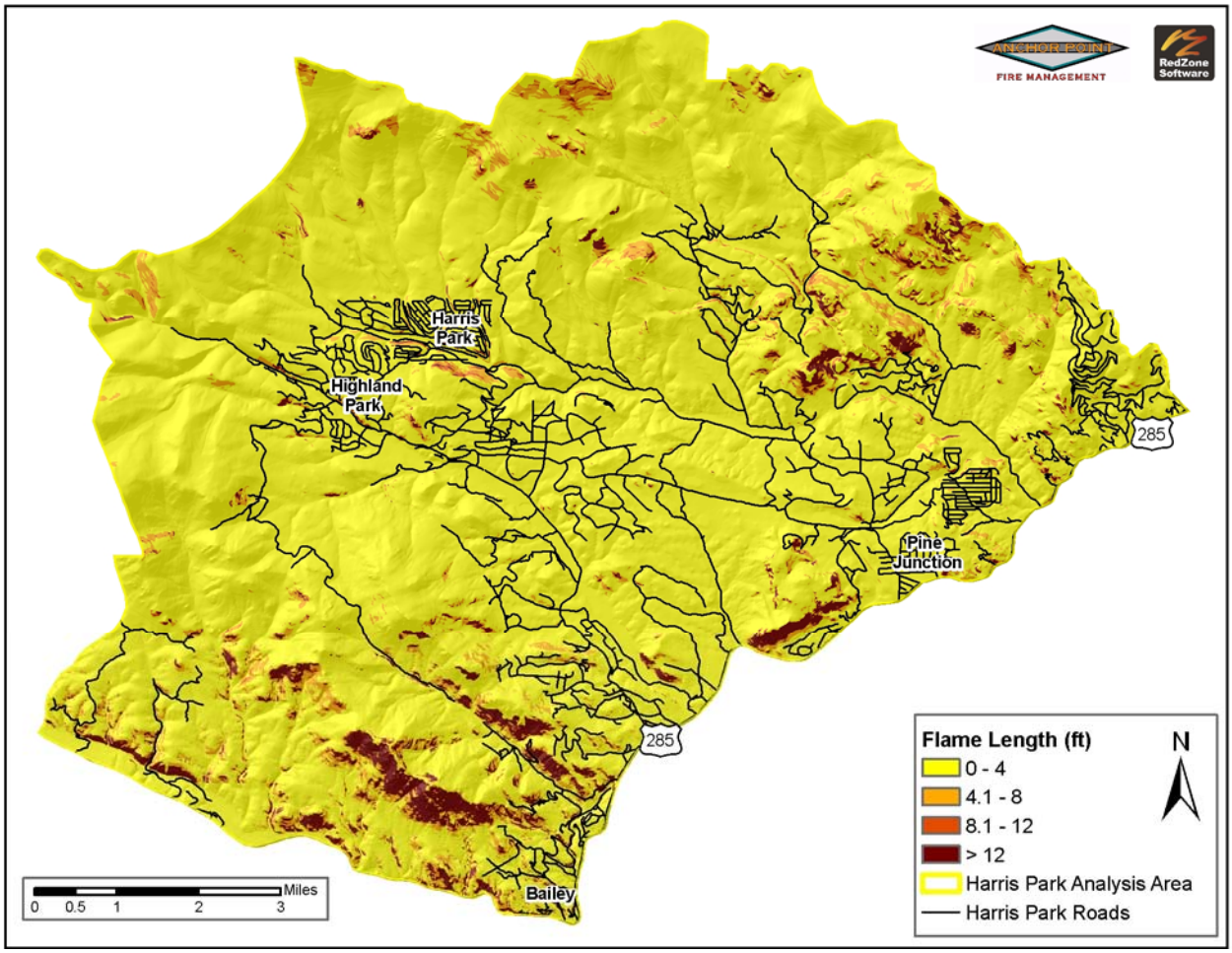
Figure 20. Spread Rate Prediction (Extreme Weather Conditions)



See Appendix B for Larger Scale Map
(Chains/hr = Feet/ minute)
(MAP 15. Extreme Fire Spread Rate Predictions – Extreme Weather Conditions)

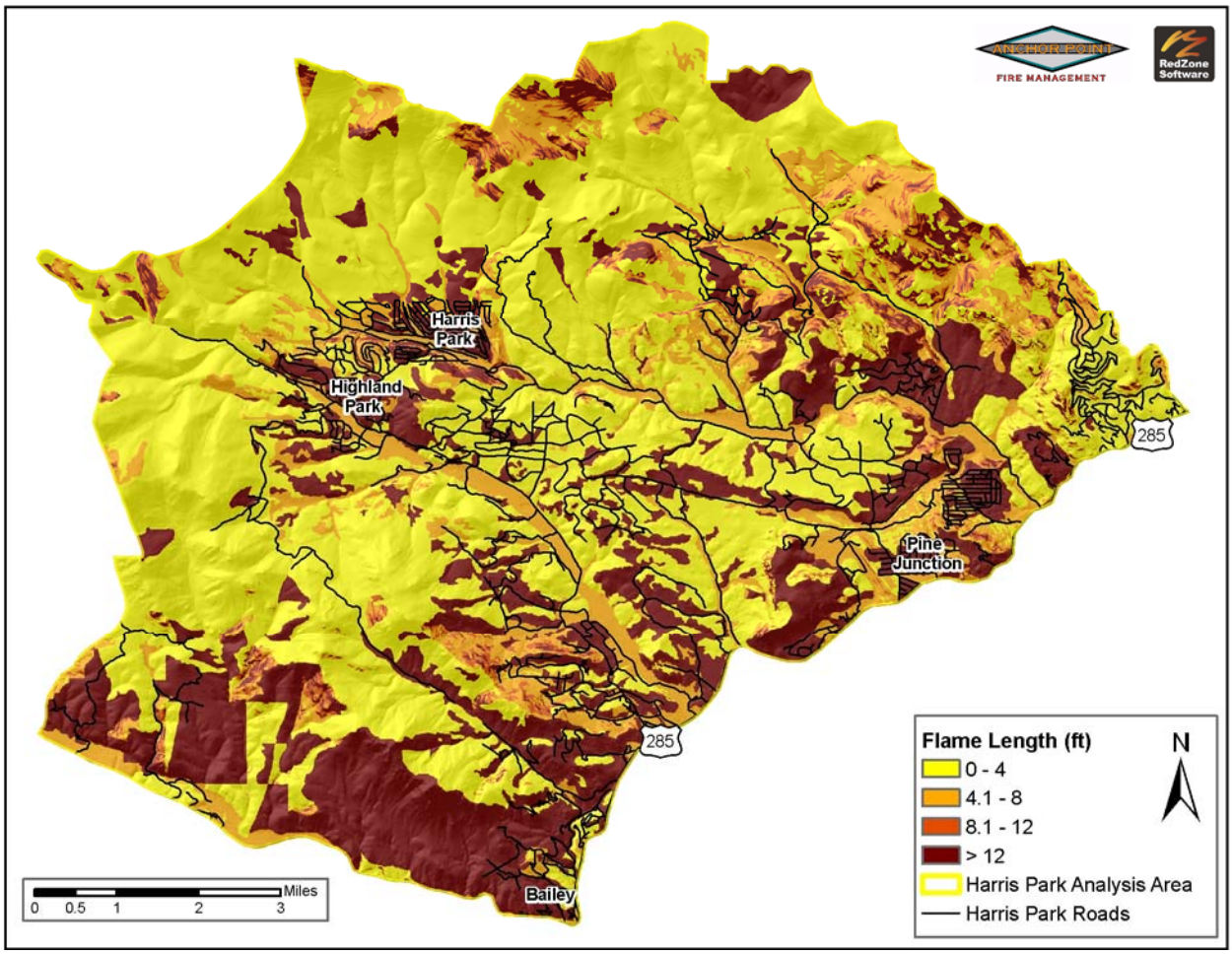
Spread rate values are generated by the FlamMap model and classified into four categories based on standard ranges: 0-20 CPH (chains/hour), 20.1-40 CPH, 40.1-60 CPH, and greater than 60 CPH. A chain is a logging measurement that is equal to 66 feet. One mile equals 80 chains. 1 CPH equals 1 foot/minute.

Figure 21. Flame Length Predictions (Average Weather Conditions)



See Appendix B for Larger Scale Map
(MAP 16. Fire Flame Length Predictions – Average Weather Conditions)

Figure 22. Flame Length Predictions (Extreme Weather Conditions)



See Appendix B for Larger Scale Map
(MAP 17. Fire Flame Length Predictions – Extreme Weather Conditions)

Flame length values are generated by the FlamMap model and classified in the four categories based on standard ranges: 0-4 feet, 4.1-8 feet, 8.1-12 feet and 12.1-60 feet. Flame lengths of 4 feet and less are acceptable for direct attack by hand crews. Flame lengths of 8 feet and less are suitable for direct attack by machinery. With flame lengths of greater than 8 feet, indirect and aerial attacks are the preferred methods.

Fire Behavior Interpretation and Limitations

This evaluation is a prediction of likely fire behavior given a standardized set of conditions and a single point source ignition at every point. It does not consider cumulative impacts of increased fire intensity over time and space. The model does not calculate the probability that a wildfire will occur. It assumes an ignition occurrence for every cell (a 10 x 10 meter area).

Weather conditions are extremely variable and not all combinations are accounted for. These outputs are best used for pre-planning and not as a stand-alone product for tactical planning. It is recommended that whenever possible, fire behavior calculations be done with actual weather observations during the fire. It is also recommended that the most current Energy Release Component (ERC) values be calculated and distributed during the fire season to be used as a guideline for fire behavior potential.[6]

This fire behavior analysis and the resulting output maps were key components in supporting the stakeholders in their decision making process. Fire behavior maps were constantly referenced during the delineation of the fuels treatment polygons. Other output maps such as “spread rate” are being used as an educational tool during public meetings. In particular the “spread rate” map helps demonstrate the need for community action and mitigation. The fire department is able to hypothetically demonstrate an ignition point, calculate the time line for the fire to reach the community and compare that with their anticipated response times. Often it is demonstrated that the fire will move through the community before the first fire engine is able to reach the homes. This type of analytical, objective interpretation of the fire behavior maps helps re-enforce the concept of a shared responsibility.

[6] Energy Release Component is an index of how hot a fire could burn. It is directly related to the 24-hour, potential worst case, total available energy within the flaming front at the head of a fire. ERC serves as a good characterization of a fire season as it closely tracks seasonal fire danger trends.

CURRENT PROJECTS

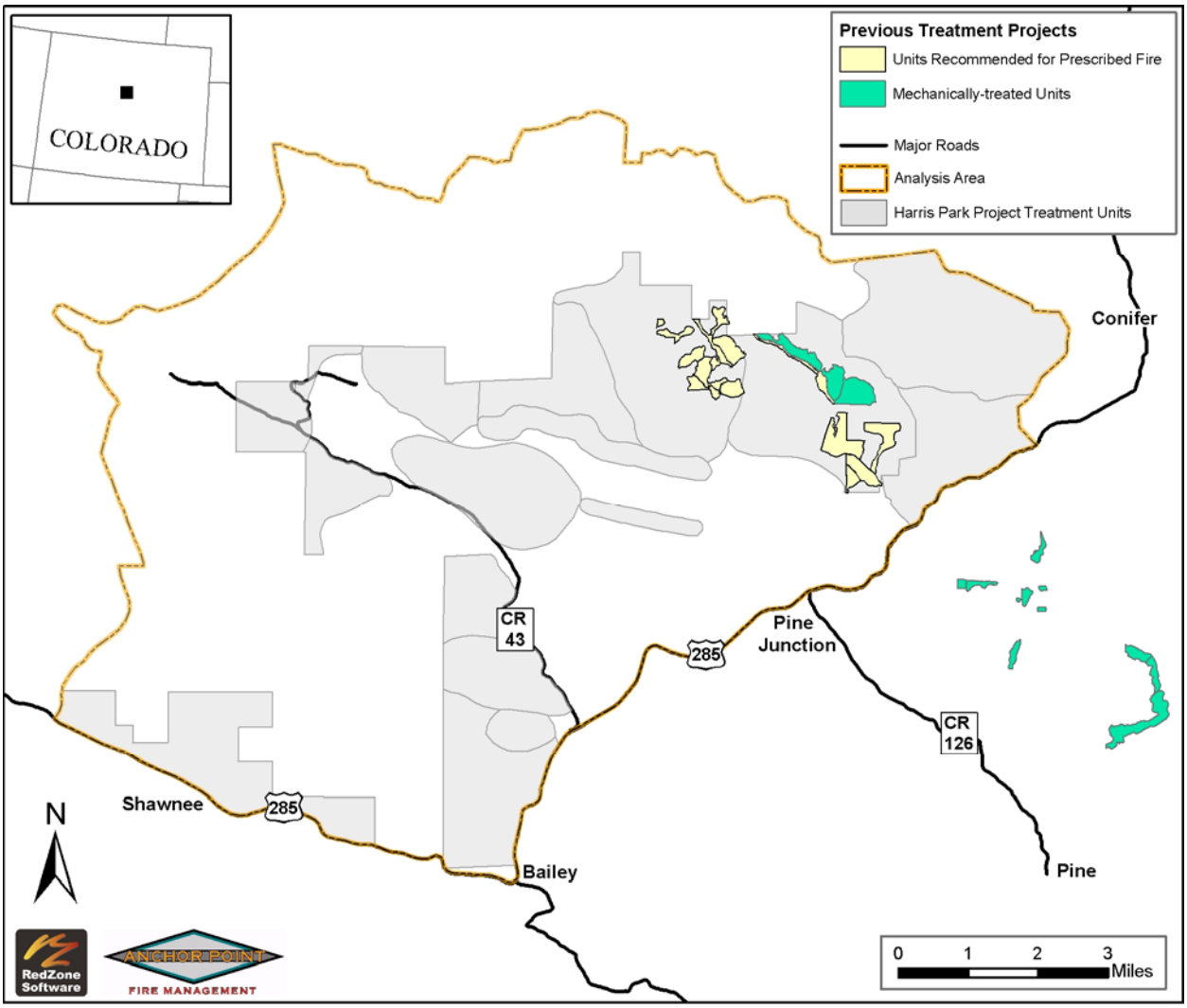
An initial step, after establishing general community attributes and fire behavior potential but before convening the collaborative stakeholder group, was to investigate and obtain information on any and all fire and fuels related initiatives in the study area. This helped the stakeholder group formulate a more cohesive approach to landscape scale fuels treatment opportunities in the following ways:

- share best-practices;
- identify redundancy;
- leverage off of other jurisdiction's work;
- address hazardous fuels conditions and treatment priorities;
- develop and map treatment planning areas;
- coordinate boundaries and potential types of treatments;
- share agency and public concerns to ensure all partners are of common understanding;
- share mapping and satellite imagery analysis data to enable uniformity in planning; and
- conduct site visits of Staunton State Park's in-progress treatment activities to assess treatment standards and to coordinate the potential extension of Colorado State Forest Service treatments onto abutting National Forest land through the "Good Neighbor" program.

Staunton State Park Fuels Treatment Project

Since 2002, the Colorado State Forest Service has been implementing fuels management projects on Staunton State Park, within one of the Harris Park Initiative's planning areas. Mechanical treatments approaching 350 acres have been completed and units recommended for prescribed fire have been identified. These treatment areas are displayed graphically in Figure 23. A State Fire Assistance grant to provide 50/50 cost share has been obtained for use with residents in Elk Falls Ranch, Lion's Head and King's Valley sub-divisions. Lessons learned from the Lower Elk Creek Management Unit of the Upper South Platte Watershed Project will be carried forward to the future development of private land projects within Harris Park.

Figure 23. Previous Treatment Projects



Grey Areas Delineate Project Treatment Units

Environmental Assessment: USFS Harris Park Project Area

In August 2004, the South Platte Ranger District, Pike National Forest, initiated an Environmental Assessment (EA) scoping process for its portion of the initiative area, a 26,300-acre fuels management project to reduce the threat of catastrophic wildfire to Harris Park (Colo.) area communities and subdivisions, north and northwest of Bailey. The 285 Fuels Initiative partners were active participants in each of the public sessions, offering citizens insights into the broader picture regarding treatment activities that will impact them, addressing concerns regarding treatments on private land and, most importantly, demonstrating a seamless interaction and coordination between agencies. The public input will be used to help identify the specific acreages to be treated, with an estimated seven to ten thousand acres expected to receive treatment. The EA is slated to be completed in the summer of 2005, at which point the initiative's partners will take important next steps in planning and implementing their multilateral fuels treatment activities, working closely with impacted citizens and communities. A draft overview of the EA, which is in the public comment phase at the time of this writing, has been included as an appendix to this report (Appendix C).

Additionally, the South Platte Ranger District has been effectively treating fuels in the South Platte River Watershed for several years. The lessons learned from this Upper South Platte Watershed Protection Project are being shared with the partners and being applied to the overall 285 Conifer - Bailey Fuels Treatment Initiative.

Executive Summary: Platte Canyon District-Wide Hazard and Risk Assessment

The Platte Canyon Fire Protection District, an Initiative partner, developed a district-wide hazard assessment in 2002 via the State Fire Assistance grant program. The Platte Canyon Fire Protection District initiated their wildland urban interface hazard and risk assessment in July of 2003. Although the summary included here should be sufficient to familiarize most readers with this project, the complete text of Platte Canyon Hazard and Risk Analysis report has been included in Appendix A.

The purpose of the analysis was to provide a comprehensive, scientifically based Community Wildfire Protection Plan for the study area. The document provided stakeholders with short-term and long-term fuels and fire management plans as well as recommendations for sustainable development in the wildland-urban interface environment. Additionally it provided the expanded stakeholder group with the base, fire behavior data necessary to help define legitimate fuels reduction projects on a landscape scale.

The desired outcomes of the assessment included:

Promotion of community awareness:

Quantification of the community's risk from wildfire facilitated public awareness and assisted in creating public action to mitigate defined hazards.

Improve wildfire prevention through education:

Awareness, combined with education, help to reduce the risk of unplanned human ignitions.

Facilitate appropriate hazardous fuel reduction:

The prioritization of hazardous Fire Management Units (FMU) assisted land managers in focusing future efforts towards the areas of highest concern from both an ecological and fire management perspective.

Promote improved levels of response:

The identification of areas of concern improved the accuracy of pre-planning, and facilitated the implementation of cross-boundary, multi-jurisdictional projects.

Provide the necessary supporting data for a CWPP:

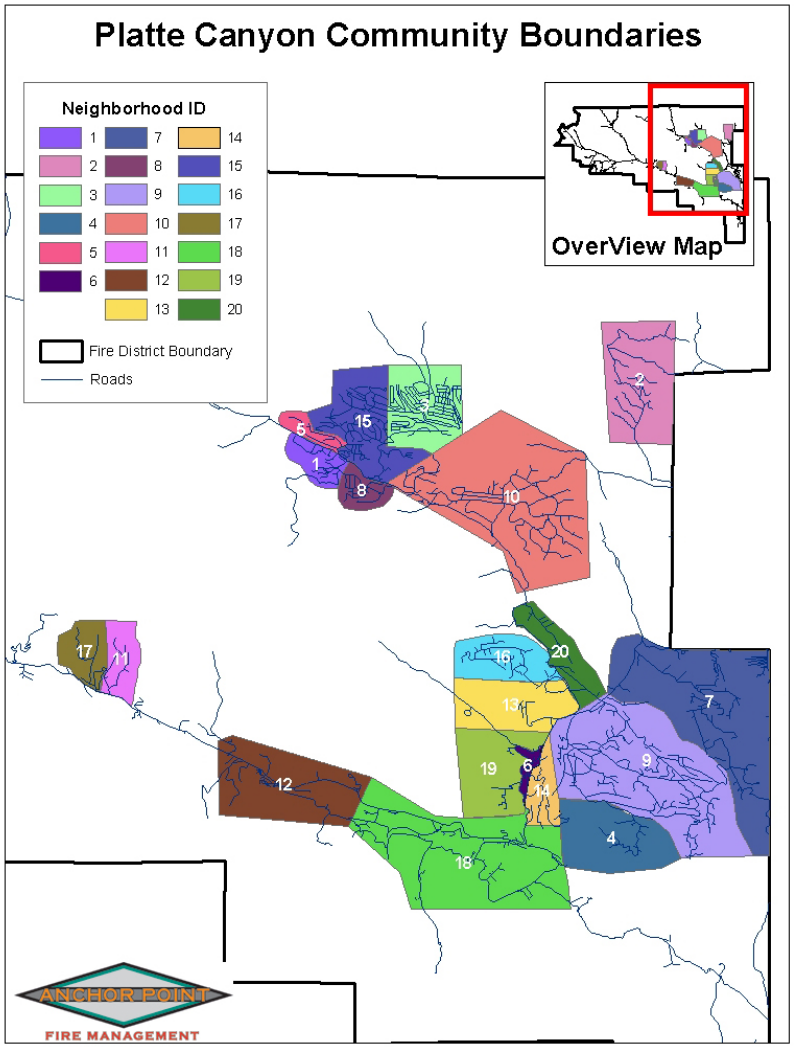
By analyzing the fuels, fire behavior, and community hazard and risk, prior to a collaborative initiative, the Platte Canyon FPD was able to maximize stakeholder participation through empowering the group with scientific analysis of the study area

Figure 24. Platte Canyon - Typical Area

The Platte Canyon Fire Protection District is considered to be in the Montane zone (7,000'- 9,600') of the eastern slope of northern Colorado.[7] The predominant vegetation is ponderosa pine (Pinus ponderosa) and lodgepole pine (Pinus contorta). Vegetation density ranges from savannah to woodland to closed canopy forest (see Figure 1). The area also contains dense stands of mixed conifers primarily on north facing slopes. The forest cover is broken up by large grass meadows. A unique character of this landscape is the presence of open grass meadows with standing dead trees from recent fires.

[7] Elevation limits for life zones were based on life zone ranges from: Jack Carter, "Trees and Shrubs of Colorado" (Boulder, CO: Johnson Books, 1988).

Figure 25. Platte Canyon Community Boundaries



1. Upper Deer Creek	2. Hidden Valley	3. Harris Park Estates	4. Bailey Mountain
5. Royal	6. Horseshoe	7. Roland Valley	8. KZ Ranch
9. Burland	10. Ranchos	11. Singleton	12. Shawnee
13. Ravenswood	14. Park	15. Elk Creek	16. Friendship Ranch
17. Bellford	18. Bailey	19. Bailey Estates	20. Mill Iron D Estates

Community Values at Risk

There are over 4,700 homes in the Platte Canyon Fire Protection District. Neighboring Elk Creek Fire Protection District has approximately 4,500 homes. In addition to full and part-time residents, the Pike National Forest is home to many species of wildlife and important wildlife corridors. The economic and quality-of-life values in the area include hunting, fishing, recreation, agriculture and watershed resources.

Site Specific Wildfire Analysis

A site-specific wildfire analysis was performed for the study area using two distinct models, fire behavior potential and community wildfire hazard rating.

The community wildfire hazard rating (WHR) identifies factors relating to the ability of homes to withstand wildfire without firefighter intervention and/or be defensible during a wildfire event. Factors that mitigate undesirable fire outcomes to life and property are ranked on a 50-point scale and geographic communities are developed based on contiguous areas of similar hazard factors. The WHR addresses structural flammability issues within the context of the community. The resulting map of Community Hazard Ratings (Figure 5) can be found on page 11. The combination of the two models provides for a complete site-specific wildfire analysis that takes into account both fire behavior and potential hazards to existing development from the adverse impacts typically associated with a wildfire event.

Figure 26. Platte Canyon Fire District Wildfire Hazard Assessment Slope Map

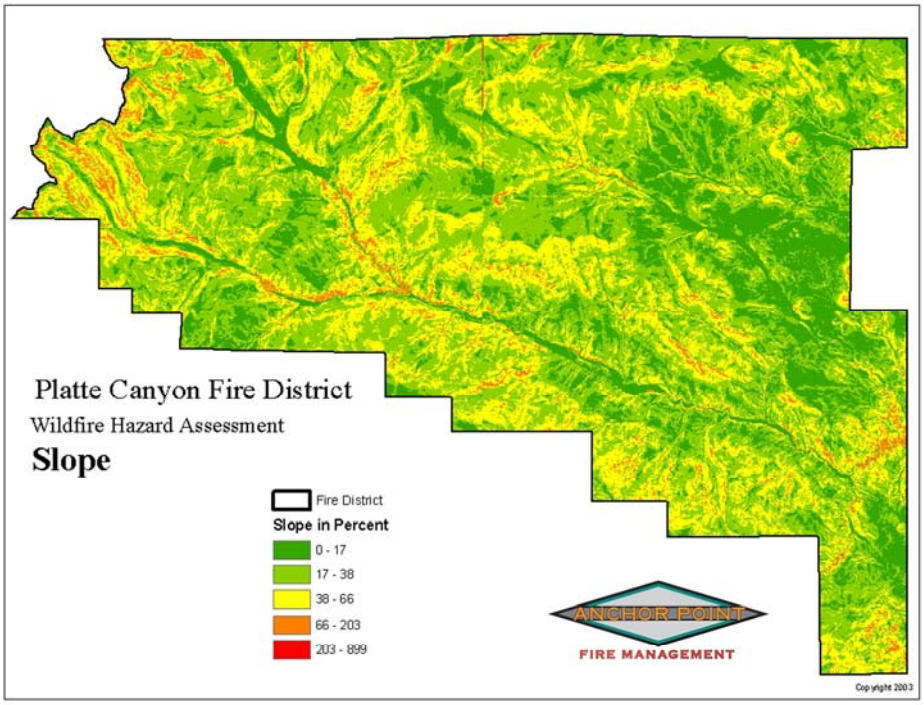


Figure 27. Platte Canyon Fire District Elevation Map

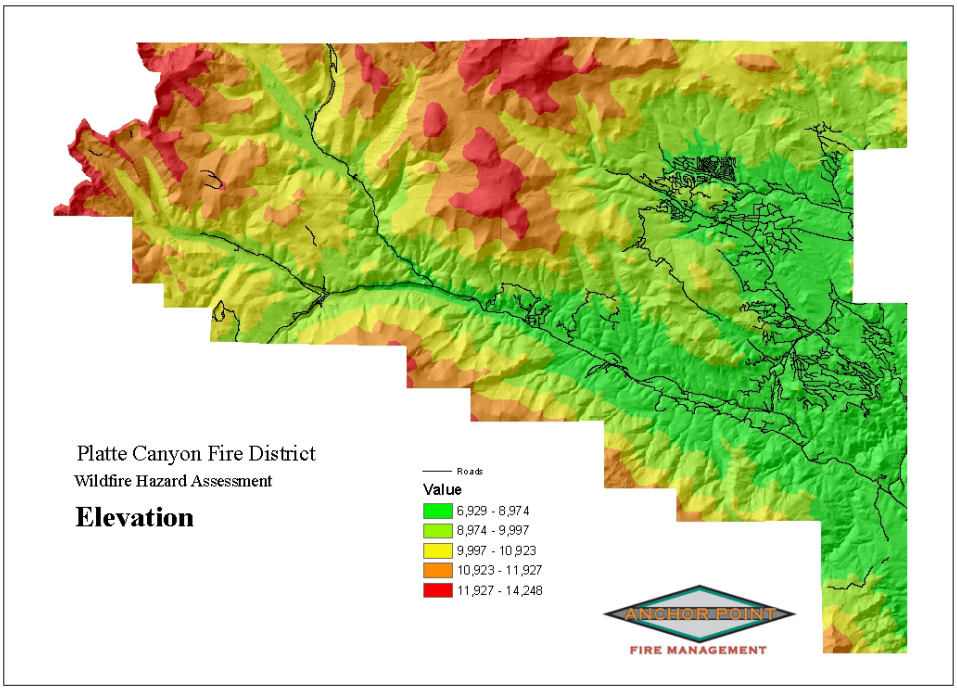
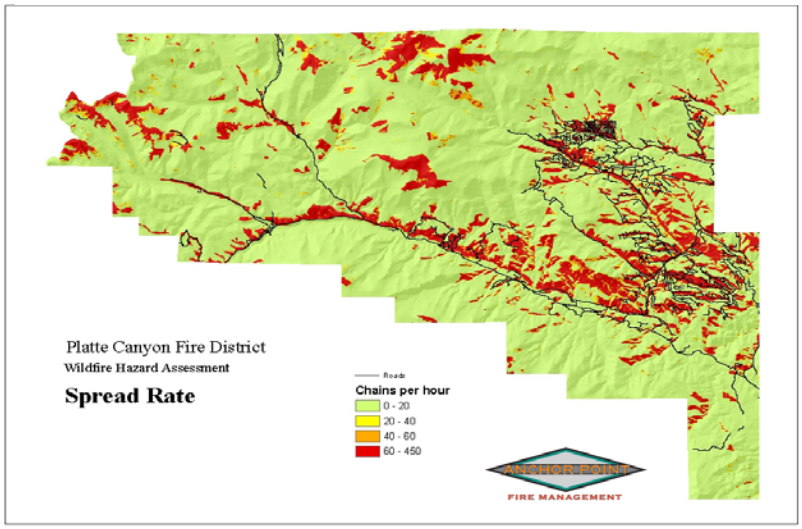
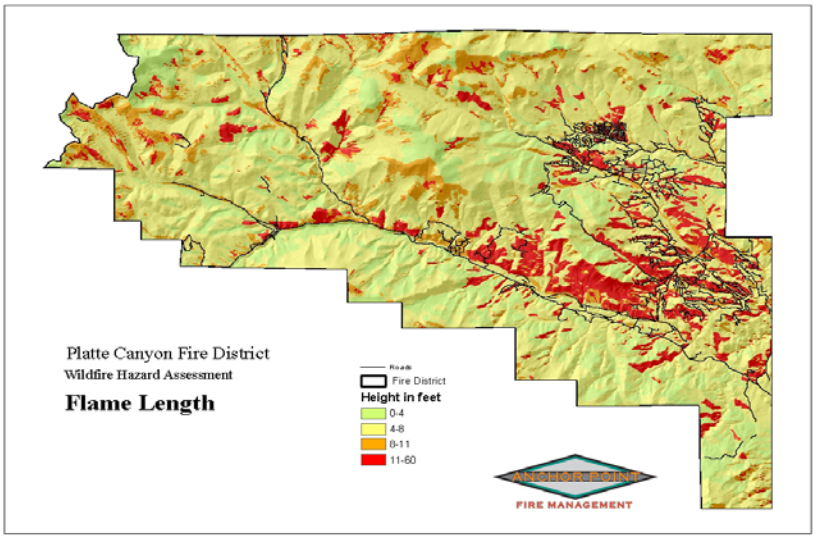


Figure 28. Platte Canyon Fire District Spread Rate Map



See Appendix B for Larger Scale Map
(MAP 4. Platte Canyon Spread Rate Predictions)

Figure 29. Platte Canyon Fire District Flame Length Map



See Appendix B for Larger Scale Map
(MAP 5. Platte Canyon Flame Length Predictions)

Platte Canyon Hazard and Risk Assessment Outcomes

Information collected included fuels mapping, fire behavior predictions, community hazard ratings and mitigation recommendations. Through the 285 Fuels Initiative, all of the assessment's data was shared with the partners and was incorporated directly into the Harris Park CWPP. Activities that have resulted from the Platte Canyon Hazard and Risk Assessment include: community meetings to encourage fuels treatments on private lands, a resident slash disposal program, and mailings to residents on wildfire preparedness and pre-planning. Platte Canyon will continue to function as a community outreach focal point, and provide feedback to the Initiative's partners on local concerns and opportunities throughout the planning process.

Elk Creek District-Wide Assessment

Another partner, the Elk Creek Fire Protection District, received a State Fire Assistance grant to complete a district wide hazard assessment. Methodology developed for the Platte Canyon Assessment will be used to provide for a "seamless" application across fire district boundaries. Community education and private landowner assistance will be coordinated through the fire district and the Colorado State Forest Service. Like Platte Canyon FPD, Elk Creek will be instrumental in public education related to wildfire hazard reduction.

INTER-AGENCY COORDINATION

Jefferson County and Park County Emergency Management play a role in helping coordinate grants and future project opportunities. These entities will be vital in displaying and describing the process and products produced from the Harris Park CWPP mitigation projects and identifying other geographic locations for Community Wildfire Protection Planning. Finally, members of the 285 Fuels Initiative are represented on the Jefferson County biomass steering committee, the proponent for an ongoing Jefferson County led, regional biomass feasibility study. This initiative has the potential to play a major role in the effective use of biomass materials recovered from the 285 Initiative's long-term fuels treatment projects.

The Collaborative Process

"The initial step in developing a CWPP should be formation of an operating group with representation from local government, local fire authorities, and the state agency responsible for forest management… Once convened, members of the core team should engage local representatives of the USFS and BLM to begin sharing perspectives, priorities, and other information relevant to the planning process."[8]

Nine federal, state, county, local and private agencies entered into the Harris Park CWPP initiative which developed into the 285 Conifer – Bailey Fuels Management Initiative. The 285 Fuels Initiative partners include the South Platte Ranger District of the U.S. Forest Service, Colorado State Forest Service, Park and Jefferson counties, and the Platte Canyon and Elk Creek fire protection districts. Three Colorado consultant companies are also integral members of the partnership: Anchor Point, Greystone, Inc., and RedZone Software.

This initiative was in concert with, and in response to, several concurrent planning initiatives in the area. A comprehensive Hazard and Risk Assessment was completed for the Platte Canyon FPD, while the CSFS was completing their long range planning for the Staunton State Park. As discussed earlier in this report, the Pike San Isabelle National Forest initiated an Environmental Assessment (EA) scoping process for an area of land within the soon to be established project boundaries. This timing established the logical creation of a collaborative planning process. In the spirit of cooperation, several jurisdictions amended their timelines, for their individual planning process, to meet the needs of the overall collaborative plan. For example, the USFS slightly delayed their EA analysis in order to incorporate the two Fire protection Districts and their fuels treatment needs on Federal Lands.

In a long-term planning and implementation endeavor, the partners have focused their joint efforts on protecting several foothills communities at risk, irrespective of jurisdictional borders, within a 94 square mile assessment area along a 13-mile populated corridor. The UWI analysis that the Platte Canyon FPD completed, provided the multi-agency stakeholder group, significant data sets to assist in the decision making process of the landscape fuels reduction portion of the CWPP. By having all the communities in their jurisdiction rated and ranked for wildfire threats, the group was able to prioritize landscape fuels reduction projects logically, and with a scientific foundation. Through this collaborative effort, the partners identified six distinct treatment planning areas encompassing 38,975 acres of federal, state and private lands within an overall 60,420-acre general assessment area.

The initiative includes fuels treatments currently being completed or developed on private lands adjacent to the Pike National Forest and in Staunton State Park, and

[8] *Preparing a Community Wildfire Protection Plan - A Handbook for Wildland-Urban Interface Communities,* March 2004, p. 5

complements treatments being conducted on adjacent Arapaho-Roosevelt National Forest land near Evergreen.

In addition to addressing more localized concerns in the foothills southwest of Denver, this initiative contributes to and complements the Colorado Front Range Fuels Treatment Partnership's goal of managing fuels on a landscape scale across public and private boundaries. *(See the imbedded map which displays the Initiative's planning and project areas)* **http://www.rockymountainwildlandfire.info/frftp.htm**

Working together and individually, partner agencies have brought resources, accomplishments and opportunities to the table in planning the long-range **285 Fuels Initiative** projects and activities. The Harris Park CWPP is the first area to be planned under the 285 Fuels Initiative.

The true collaborative process was initiated with a stakeholder meeting. The initial meeting intent was to bring all past, current and future efforts and needs to the table across jurisdictional boundaries. The primary focus of the group was on cross boundary fuels reduction opportunities, best practices and anticipated "roadblocks". Supporting the decision making process was a series of physical and fire behavior maps (see these maps in the executive summary of the Platte Canyon Hazard and Risk Analysis above). The stakeholder group was encouraged to utilize the fuels, fire behavior, and slope and aspect maps in refining their areas of concern. This first meeting generated a rough area of interest map for future refinement. The polygons were created without reference to the Forest Service or Fire Protection District boundaries. A Key reference in these delineations was the Community Level Hazard and Risk Analysis from the Platte Canyon Fire Department.

Treatment Unit Methodology

A three step approach was utilized to define specific fuels reduction treatment areas.

STEP 1: Establish Overall Project Area

STEP 2: Define Community Protection Zone (CPZ) Boundaries

STEP 3: Refine polygons into Protection Treatment Units (PTU)

Figure 30. Conceptual Drawing of Three Step Process

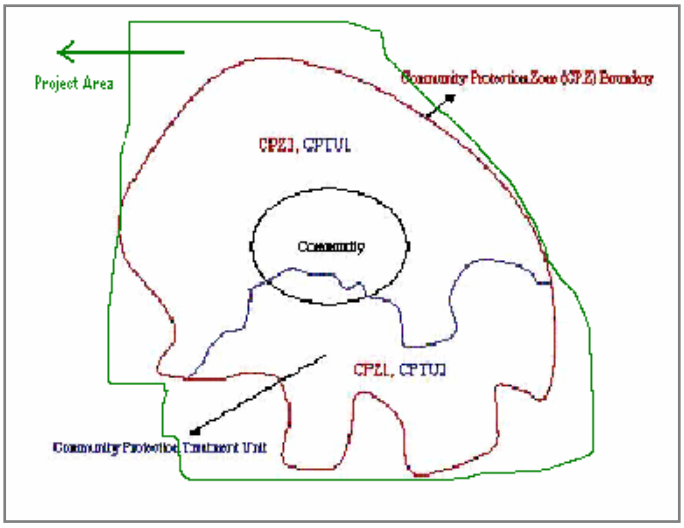
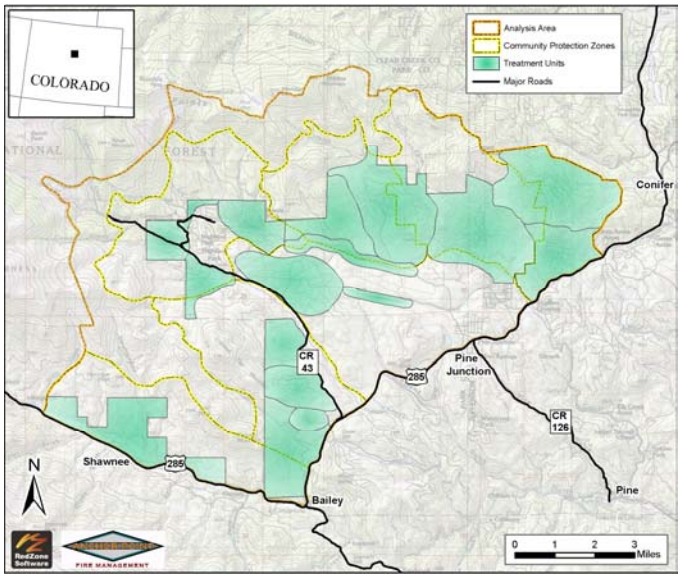


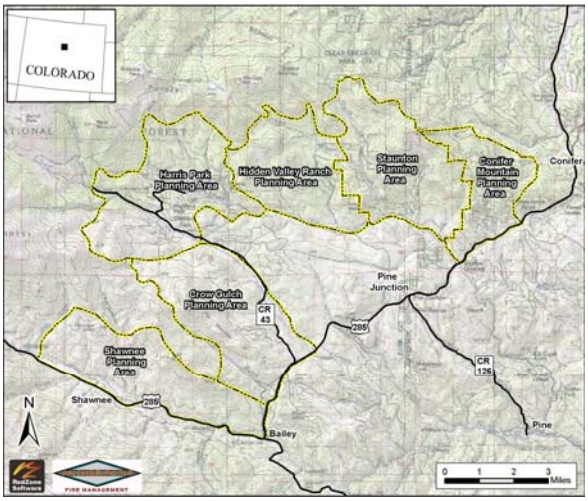
Figure 31. Finalize Three Step Process



STEP 1:

The original **Overall Project Area** was selected in reference to watersheds, fire protection jurisdiction, and road infrastructure. Additionally, the value in including multiple jurisdictions; Federal, State and private lands, in the area of interest was considered. The original planning area was adjusted in the first stakeholders meeting. A decision was made to incorporate two communities of high concern in an adjacent fire protection district. This inclusion was supported through the collaborative process and validated through fuels and fire behavior modeling. In essence the newly included area created a direct potential impact from a fire perspective but was originally excluded because it was in an adjacent Fire Protection District.

Figure 32. Community Protection Zone Map

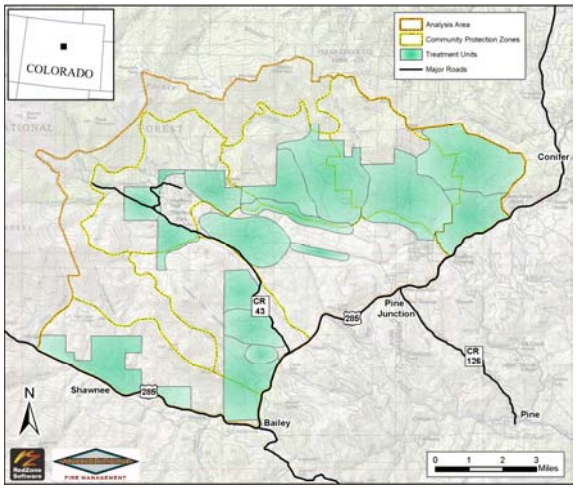


See Appendix B for Larger Scale Map (MAP 6. Community Protection Zones)

STEP 2:

The final **Community Protection Zone** map was derived through a second stakeholder meeting that identified fuels polygon treatment areas on a landscape scale. This helped to refine the initial map polygons. Both Federal and non federal partners then generated specific fuels projects within these larger polygons and within their jurisdictional boundaries. These areas became known as Community Protection Treatment Units. A final meeting was held to "blend" the projects into a more cooperative approach to fuels management. The rough draft of this map is seen below in Figure 30.

Figure 33. Community Protection Treatment Units Map



See Appendix B for Larger Scale Map (MAP 7. Treatment Units)

STEP 3:

To derive valid, **Community Protection Treatment Units**, the stakeholder group utilized several reference maps. The USFS Fuels Treatment by Vegetative Class map provided the group with a starting point to help blend the possible treatment opportunities on the federal lands with the needed treatments on private and State lands as defined in the CWPP and subsequent stakeholder meetings. The group was able to amend the rough draft CPTU's to more logically coincide with possible treatment units on federal lands.

The maps below show the hand drawn CPTU's in relation to potential federal land treatment units. Strong consideration for refining these polygons was given to potential fire behavior, prevailing and historic wind patterns and values at risk.

Figure 34. USFS Fuels Management by Vegetative Class

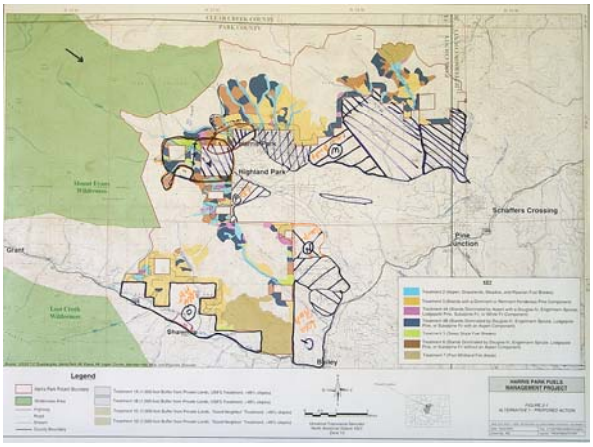
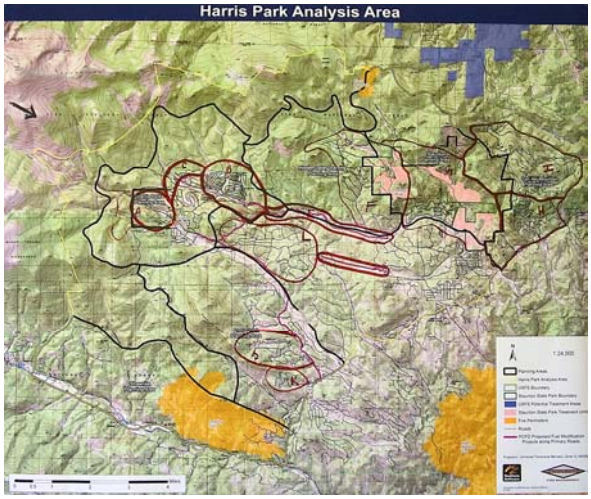
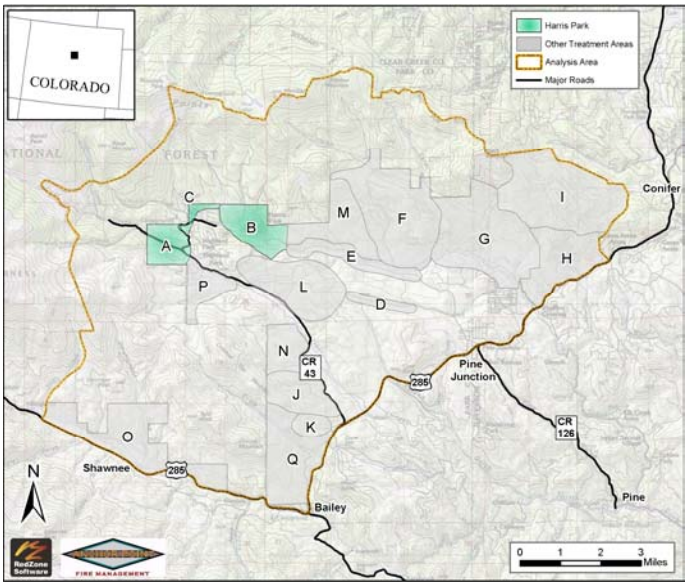


Figure 35. Hand Drawn Treatment Units Map



Harris Park Community Protection Zone - Treatment Units



A. Upper Deer Creek – This area Includes two extreme-hazard communities identified in the Platte Canyon Hazard-Risk Analysis. There is good community cohesion, but limited population and some seasonal homes may present a problem in forming consensus. Mechanical thinning is recommended for the area (broadcast or pile); defensible space treatments will also be needed. Pile burning should be considered to eliminate piles from mechanical thinning operations.

B. Harris Park – this is a high density area, with homes close together. Mechanical treatments along access roads and defensible space thinning are recommended. Pile burning should be considered to eliminate piles from mechanical thinning operations.

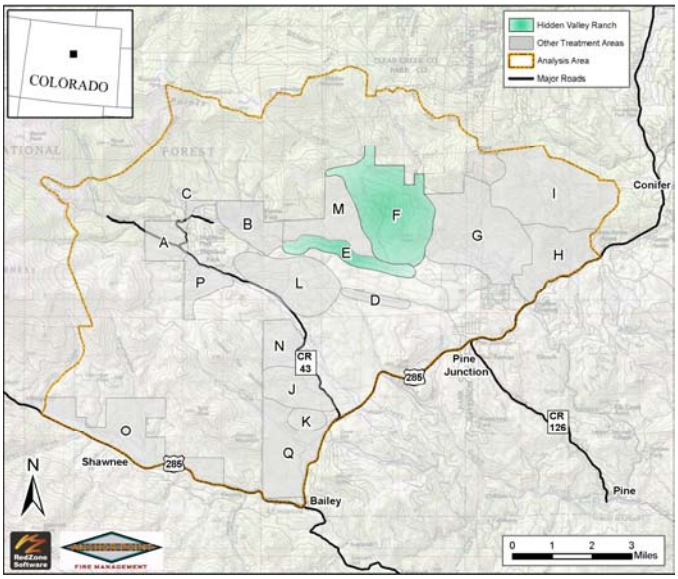
C. Elk Creek Highlands – This is an area of mixed government and private land ownership. Private landowners have the reputation of being receptive to federal land managers in the area. Defensible space thinning, light mechanical thinning and prescribed fire should be considered in this treatment unit.

D. Please see "Treatment Units Outside of Community Protection Zones" for a description of this unit.

Community Protection Treatment Units 1

Factor	Upper Deer Creek	Harris Park	Elk Creek Highlands
Fuel Model	8,10	2	8,10
Dominant Vegetation	Timber	Timber	Timber
Slope (Mean in %)	28	29	18
Aspect (Mean)	East	South	South
Size (in acres)	637	907	136
Treatment Options			
Do Nothing	No	No	No
Mow	Yes	Yes	Yes
General Thinning	Yes	Yes	Yes
Fuelbreak	N/A	N/A	N/A
TSI	N/A	N/A	N/A
Patch Cut	N/A	N/A	N/A
Mechanical Mastication	N/A	N/A	N/A
Prescribed Fire	Yes	Yes	Yes
Defensible Space	Yes	Yes	Yes

Hidden Valley Community Protection Zone - Treatment Units

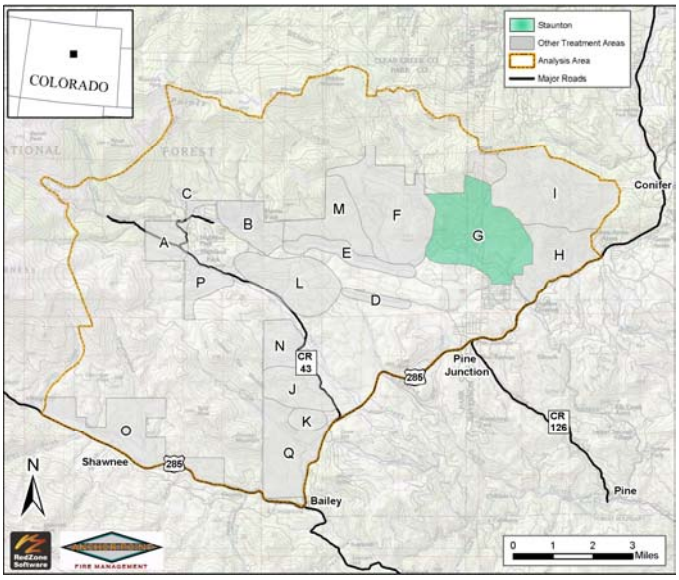


E. Hidden Valley Ranch - This area provides the only exit from the Harris Park community. Shelter-in-place tactics should be considered here so as not to add to the evacuation problem. Defensible space thinning, fuel breaks along access roads and road improvements are all recommended for this treatment unit.

F. Upper Hidden Valley Ranch – This is an area with poor egress, no safety zones and extreme fire behavior potential. Treatments in this area should focus on thinning and fuel breaks along existing roads and road improvements. Many parcels need defensible space thinning. Pile burning may be a possibility to eliminate piles from mechanical thinning operations. There may by potential for cross-boundary fuels reduction with the state park adjacent to this area.

Community Protection Zone 2 (CPZ2)		
Factor	**Hidden Valley Ranch**	**Upper Hidden Valley Ranch**
Fuel Model	8,9	2,8,10
Dominant Vegetation	Timber	Timber
Slope (Mean in %)	23	29
Aspect (Mean)	South	South
Size (in acres)	726	2,773
Treatment Options		
Do Nothing	No	No
Mow	Yes	Yes
General Thinning	Yes	Yes
Fuelbreak	Yes	Yes
TSI	N/A	Yes
Patch Cut	N/A	N/A
Mechanical Mastication	Yes	N/A
Prescribed Fire	Yes	Yes
Defensible Space	Yes	Yes

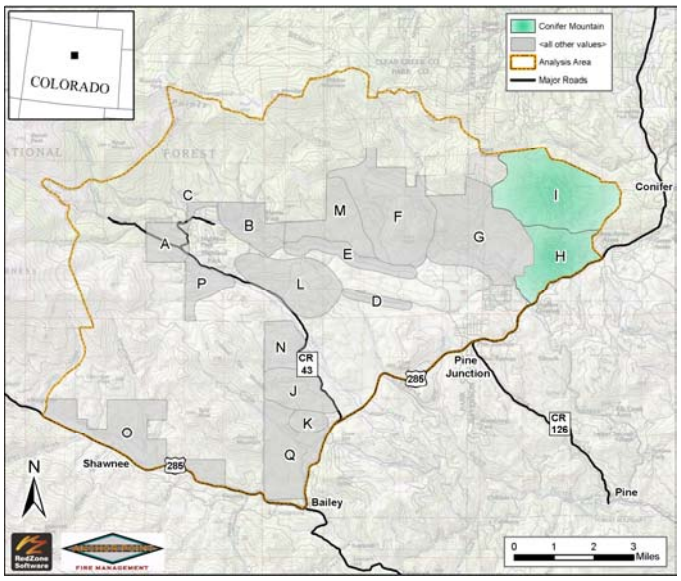
Staunton Community Protection Zone - Treatment Unit



G. Elk Falls Ranch – This is a private ranch adjacent to Staunton State Park. Defensible space thinning, light mechanical thinning and prescribed fire should be considered in this treatment unit. There may by potential for cross-boundary fuels reduction with the state park adjacent to this area.

Community Protection Zone 3 (CPZ3)	
Factor	**Elk Falls Ranch**
Fuel Model	2
Dominant Vegetation	Grass & Open-Canopy Timber
Slope (Mean in %)	35
Aspect (Mean)	South
Size (in acres)	2,887
Treatment Options	
Do Nothing	No
Mow	Yes
General Thinning	Yes
Fuelbreak	N/A
TSI	N/A
Patch Cut	N/A
Mechanical Mastication	N/A
Prescribed Fire	Yes
Defensible Space	Yes

Conifer Mountain Community Protection Zone - Treatment Units

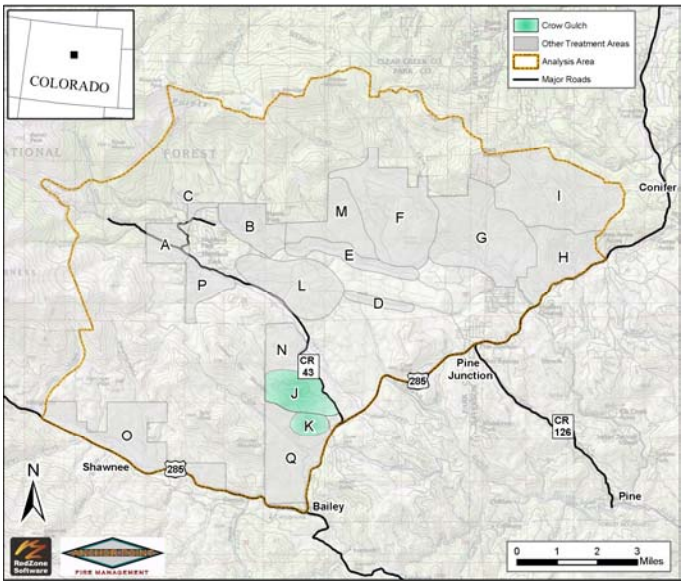


H. Kings Valley – There is an active home owner's association in this community. Steep slopes will make mechanical thinning difficult in this area. Defensible space thinning and maintenance are the most important treatments for this area. Chipping may be a better method for slash removal than burning.

I. Conifer Mountain – Very similar to the above community except for primary aspect and the presence of fuel model 10 in the northeast corner. Steep slopes will make mechanical thinning difficult in this area. Defensible space thinning and maintenance are the most important treatments for this area. Chipping may be a better method for slash removal than burning.

Community Protection Zone 4 (CPZ4)		
Factor	**Kings Valley**	**Conifer Mountain**
Fuel Model	8,9	8,9,10
Dominant Vegetation	Timber	Timber
Slope (Mean in %)	34	29
Aspect (Mean)	South	South
Size (in acres)	1,464	2,773
Treatment Options		
Do Nothing	No	No
Mow	Yes	Yes
General Thinning	Yes	Yes
Fuelbreak	N/A	N/A
TSI	N/A	N/A
Patch Cut	N/A	N/A
Mechanical Mastication	Yes	Yes
Prescribed Fire	No	No
Defensible Space	Yes	Yes

Crow Gulch Community Protection Zone - Treatment Units

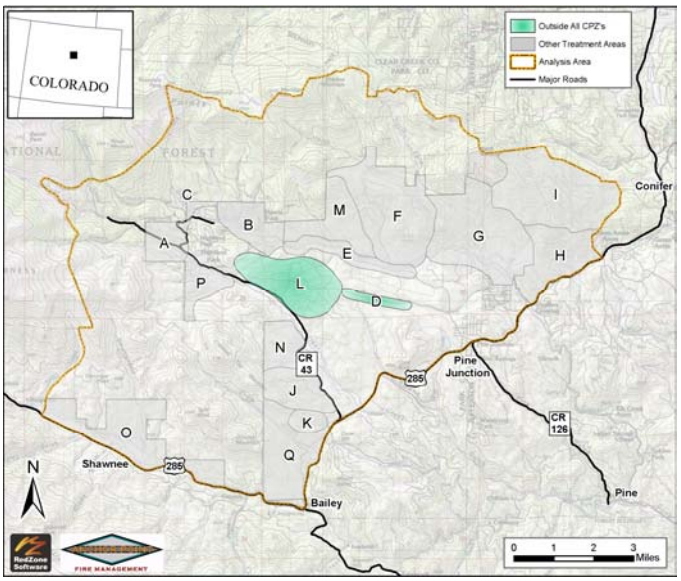


J. Friendship – The land owners are not organized in this area at all. Fuel breaks along access roads and defensible space thinning are recommended. Prescribed fire and pile burning on private land should be considered. Heavy fuels on adjacent federal land make this area a good candidate for cross boundary fuels reduction.

K. Ravenswood – Land owners not organized in this area at all. Fuel breaks along access roads and defensible space thinning are recommended. Prescribed fire and pile burning on private land should be considered. A fuel break along the western side of this area is recommended. This treatment unit is a good candidate for cross boundary fuels reduction.

Community Protection Zone 5 (CPZ5)		
Factor	**Friendship**	**Ravenswood**
Fuel Model	1,2,9,10	2,9
Dominant Vegetation	Timber	Timber
Slope (Mean in %)	27	28
Aspect (Mean)	East	East
Size (in acres)	942	299
Treatment Options		
Do Nothing	No	No
Mow	Yes	Yes
General Thinning	Yes	Yes
Fuelbreak	Yes	Yes
TSI	Yes	Yes
Patch Cut	N/A	N/A
Mechanical		
Mastication	Yes	Yes
Prescribed Fire	Yes	Yes
Defensible Space	Yes	Yes

Treatment Units Outside Community Protection Zones



D. Magnus Ranch – This is a single large ranch and accessibility for treatments may be an issue. The primary treatment recommendation for this unit is for cutting a fuel break along the access road which is a critical escape route.

L. Deer Creek Ranches – Land owners in this area are well organized and motivated. The primary treatments recommended for this area are defensible space thinning and fuel break cuttings along access roads.

Treatment Units Outside Community Protection Zones		
Factor	**Magnus Ranch**	**Deer Creek Ranches**
Fuel Model	1,2,9,10	2,9
Dominant Vegetation	Timber	Timber
Slope (Mean in %)	27	28
Aspect (Mean)	East	East
Size (in acres)	942	299
Treatment Options		
Do Nothing	No	No
Mow	Yes	Yes
General Thinning	N/A	Yes
Fuelbreak	Yes	Yes
TSI	N/A	N/A
Patch Cut	N/A	N/A
Mechanical Mastication	Yes	Yes
Prescribed Fire	No	No
Defensible Space	Yes	Yes

Future Treatment Units

M, N, O, P, Q – These areas have been identified as possible future treatment units but at the time of this report no names have been given to these units. No treatment options have been discussed, and although most of these units fall into existing Community Protection Zones no discussion of their relation to other treatment units within those zones has been undertaken.

Future Treatment Units **Factor**	**"M"**	**"N"**	**"O"**	**"P"**	**"Q"**
Fuel Model	8,9	1,2,9 Grasses & Open Canopy	1,2,9 Open Canopy	1,2,8 Open Canopy	1,2,8,9 Open Canopy
Dominant Vegetation	Timber	Timber	Timber	Timber	Timber
Slope (Mean in %)	30	21	29	21	38
Aspect (Mean)	South	East	South	East	South
Size (in acres)	1,196	693	2,227	639	1,696
Treatment options not identified for these areas					

HARRIS PARK ACTION ITEMS

Planning

Responsible Party: Full collaborative group. Fire Protection Districts, CSFS, USFS

Comments: Contact local and state media for coverage, ensure PIO is present, invite to open house for "roll-out" of planning documents.

- Create a Community Wildfire Protection Plan for the Harris Park Study area including the pertinent elements for CWPPs developed for the Platte Canyon and Elk Creek Fire Protection Districts.
- Conduct an Environmental Assessment of proposed treatments for the Harris Park study area.
- Complete the NEPA compliance process for the Harris Park study area.
- Complete a Hazard and Risk Analysis of the Platte Canyon Fire Protection District.
- Complete a Hazard and Risk Analysis of the Elk Creek Fire Protection District.
- Development of a Pre-Attack/Operational Plan for all Fire Protection Districts in the study area.
- Conduct parcel level assessments in Platte Canyon FPD, beginning with the areas identified at greatest risk.
- Conduct parcel level assessments in Elk Creek, beginning with the areas identified at greatest risk.
- Utilize the structure triage methodology provided in Platte Canyon Hazard and Risk Assessment to identify homes not likely to be defendable before a fire occurs.

Public Education

Responsible Party: Fire Protection Districts

Comments: Contact local and state media for coverage, ensure PIO is present, invite to advisory council meetings.

- Utilize these web sites for a list of public education materials, and for general homeowner education:
  - http://www.nwcg.gov/pms/pubs/pubs.htm
  - http://www.firewise.org
  - http://www.colostate.edu/Depts/CSFS/fire/CSFSfire.html
- Provide citizens with the findings of this study including:
  - Levels of risk and hazard.
  - Values of fuels reduction programs.
  - Consequences and results of inaction for planned and unplanned ignitions within the community.
- Create a Wildland Urban Interface (WUI) citizen advisory council to provide peer level communications for the pertinent fire districts. The council should be used to:
  - Bring the concerns of the residents to the prioritization of mitigation actions.
  - Select demonstration sites.
  - Assist with grant applications and awards.

Fire Department Recommendations

Responsible Party: Fire Protection Districts

Comments: Several state and federal grants are available to enhance local training and equipment upgrades. FEMA's Assistance to FF Grants may be most applicable.

- Provide continuing education for all firefighters including:
  - NWCG S-130/190 for all department members.
  - Annual wildland fire refresher and "pack testing" (physical standards test).
  - S-215 Fire in the Interface
  - S-290 Intermediate Fire Behavior
  - I-200 and I-300 – Basic and Intermediate ICS
  - RX-234 Ignition Specialist

- Equipment:
  - Provide minimum wildland Personal Protective Equipment (PPE) for all firefighters.
    - (See NFPA Standard 1977 for requirements).
  - Provide gear bags for both wildland and bunker gear to be placed on engines responding to fire calls. This will help ensure that firefighters have both bunker gear and wildland PPE available when the fire situation changes.
  - Provide and maintain a ten-person wildland fire cache in addition to the tools on the apparatus.

Addressing

Responsible Party: County Road and Bridge, County Emergency Dispatch, Fire Protection Districts, homeowners.

- One of the principle problems with rapid response in Park County has been dispatching confusion arising from inconsistent addressing of properties. It is our understanding that PCFD has been in the process of cataloging all of the existing addresses in the district in order to provide a consistent database for dispatching. We consider this effort to be of the highest priority and recommend that the same action be undertaken in the pertinent areas of Elk Creek FPD.
- Add reflective address signs at each driveway entrance to all homes in the study area.

Evacuation

Responsible Party: Fire Protection Districts with the assistance of CSFS and support from Citizens advisory council.

- Recommended Evacuation Routes:
  - **Hidden Valley**: It may be possible to create a secondary access to this area by improving the jeep trail between Vigilante Road and Spirit Lake Road.
  - **Bailey Mountain**: A possible secondary access could be established to Forest Service Road 543.
  - **Burland**: Old US Hwy 285, that is now closed, may make a good alternate access if it is graded and maintained.
  - **Singleton**: There is a possible access to the North end of this community from Gildry Road via a jeep road running through Long Meadow Ranch. The permission of the ranch would need to be secured, and some improvements would need to be done to make this an effective route for emergency vehicles.
  - **Mill Iron D Estates**: There is a secondary egress via a bulldozer road to US Hwy 285 that is currently locked. PCFD should request permission from the landowner to use this as an emergency route. Some improvements may be necessary for emergency vehicle access.
- In communities where multiple access routes exist, consider preplanning the use of one primary access for mutual aid agencies and one primary escape route for citizens.
- In order to reduce conflicts between evacuating citizens and incoming responders, preplan the use of potential nearby evacuation centers for citizens and staging areas for fire resources. Evacuation centers should include heated buildings with facilities large enough to handle the population. Schools and churches are usually ideal for this purpose. Fire staging areas should contain large safety zones, a good view in the direction of the fire, easy access and turnarounds for large apparatus, a significant fuel break between the fire and the escape route, topography conducive to radio communications and access to water.
- In addition to improved access/egress PCFD, is working on “Safety in Place” areas that are designed as alternatives to evacuation through hazardous areas. This work should continue, and the completed document should be published as part of citizen education and fire resource pre-attack planning. We consider this effort to be high priority and recommend that the same action be undertaken in the Elk Creek FPD.
- Perform response drills to determine the timing and effectiveness of fire resource staging areas.

Fuels Reduction Projects

Responsible Party: Fire Protection Districts, Forestry support from CSFS, USFS for cross boundary projects.

- A fuels modification project should be implemented along the primary access roads in the Upper Deer Creek community of Platte Canyon FPD. Elements of the fuel modification space for access and egress routes should include:
  - Tree crown separation of at least 10' with groups of trees and shrubs interspersed as desired.
  - Tree crown separation greater than 10' may be required to isolate adjacent groups or clumps of trees.
  - Limb all remaining trees to a height of 8' or 1/3 of the tree height (whichever is greater).
  - Clean up ground fuel within the project.
  - Post placards clearly marking "fire escape route". This will provide functional assistance during an evacuation and communicate a constant reminder of wildfire to the community. Be sure to mount signage on non-combustible poles.
- Implement a fuels modification project along the primary access roads in the Hidden Valley community of Platte Canyon FPD (see the recommendation for the Upper Deer Creek Community for project specifications).
- Implement a fuels modification project along the primary access roads in the Harris Park Estates community of Platte Canyon FPD (see the recommendation for the Upper Deer Creek Community for project specifications).
- Implement a fuels modification project along the primary access roads in the Royal community of Platte Canyon FPD (see the recommendation for the Upper Deer Creek Community for project specifications).
- Implement a fuels modification project along the primary access roads in the Horseshoe community of Platte Canyon FPD (see the recommendation for the Upper Deer Creek Community for project specifications).
- The Roland Valley, Burland and Bailey Estates communities of Platte Canyon FPD all have snags and fire weakened timber from previous fires that may threaten access and should also be thinned to 100’ from the centerline of main access routes through these communities. Existing and natural barriers to fire should be incorporated into the project dimensions.

Homeowner Mitigations

Responsible Party**:** Homeowners and HOA's, support from CSFS and Fire Protection Districts.

- Achievement of national FIREWISE status for all communities in the study area.
- The following defensible space recommendations should be practiced by all property owners in the study area:

1. Be aware of the current fire danger in the area.
2. Clean your roof and gutters at least 2 times a year, especially during cure up in the autumn.
3. Stack firewood uphill or on a side contour, at least 30 feet away from structures.
4. Don't store combustibles or firewood under decks.
5. Maintain and clean spark arresters on chimneys.
6. When possible, maintain an irrigated greenbelt around the home.
7. Connect, and have available, a minimum of 50 feet of garden hose.
8. Post reflective address numbers on the residence so that they are clearly visible from the main road or driveway.
9. Trees along driveways should be limbed and thinned as necessary to maintain a minimum 13'6" vertical clearance for emergency vehicle access.
10. Create and maintain defensible space to specifications provided in the CSFS Fact Sheet #6.302 *Creating Wildfire-Defensible Zones*.
    - Mow grass and weeds to a low height.
    - Remove any branches overhanging the roof or chimney.
    - Remove all trash, debris and cuttings from the defensible space.

Water Supply

Responsible Party: Fire Protection Districts with support from HOA or community leaders.

- Construct one or more cisterns in the Hidden Valley community of Platte Canyon Fire Protection District (PCFPD).
- Ponds should be mapped and included in pre-attack plans for the Harris Park Estates community of PCFPD. Consider adding a dry hydrant to the large pond in the southeast corner of this community.
- Construct one or more cisterns in the Bailey Mountain community of PCFPD. The nearest water supply is the dry hydrant at Chickadee and CR72, which is a significant distance from the community.
- Construct one or more cisterns in the Horseshoe community of PCFPD.
- Construct one or more cisterns in the Ranchos community of PCFPD.
- Add a cistern to the north end of the Singleton community of PCFPD. Although there is a good draft site at the south end of this community, the steepness of the terrain reveals the need for an additional water supply for the north side.
- Construct one or more cisterns in the Ravenswood community of PCFPD.
- Construct one or more cisterns in the Parkview community of PCFPD due to steep terrain and distance to the nearest existing water supply.
- Add one or more dry hydrants to the ponds in the Elk Creek community of PCFPD. These ponds should also be named or numbered and included in the pre-attack plan.
- Construct a cistern in the east end of the Friendship Ranch community of PCFPD.
- The town of Bailey has a hydrant system that is not functional according to PCFD. Although there is a draft site near the post office, it would be desirable to have a functioning hydrant system considering the fire history and hazard levels of the surrounding areas.
- Construct one or more cisterns in the Bailey Estates community of PCFPD.
- It is our understanding that digitizing of a water supply layer for GIS mapping is being developed by PCFD. A water supply pre-attack plan should be developed by combining that data with the information in this report. The resulting plan should be distributed to all area firefighting resources.
- One alternative to cisterns and dry hydrants in individual neighborhoods would be to place 3 larger (10,000-30,000 gallon) cisterns in central locations. Recommendations for this approach would be to add one cistern for the Hidden Valley community, one to service Upper Deer Creek, Royal and Ranchos, and one to service Horseshoe, Bailey Mountain, Ravenswood, Parkview, Friendship Ranch and Bailey Estates. Although the ability to draft from deep cisterns is a concern for smaller engines, PCFD may prefer this approach to improving the water supply due to their existing investment in excellent water supply apparatus.

HARRIS PARK PROJECT SUMMARY

The Harris Park Community Wildfire Protection Plan represents a significant milestone in wildfire preparedness for wildland-urban interface communities in Colorado. The project links hazard and risk assessments preformed for two independent fire protection districts together in a seamless mosaic and extends the potential for effective hazard reduction projects across federal, state and local boundaries. Representatives of the fire departments, the United States Forest Service, the Colorado State Forest Service and private contractors all worked diligently and successfully to bring this project to life. In this project resides the framework for eventually tying the entire highway 285 corridor of fire protection districts together into a unified planning area stretching from Denver to Buena Vista and beyond. The level of interagency cooperation demonstrated in this document proves that services critical to the preservation of life, property and other values at risk such as pre-attack planning, fuels hazard reduction treatments and mutual aid no longer need to be confined to traditional jurisdictional borders. This project has demonstrated that the goal of creating a unified response to the wildfire threat in Colorado and throughout the western United States is indeed within our grasp.

GLOSSARY

The following definitions apply to terms used in the Harris Park Community Wildfire Protection Plan.

Citizen Safety Zone: An area that can be used for protection by residents, and their vehicles, in the event that the main evacuation route is compromised. The area should be maintained, cleared of fuels and large enough for all residents of the area to survive an advancing wildfire without special equipment or training.

Community Assessment: A fifty-point scale analysis designed to identify factors that increase the potential and/or severity of undesirable fire outcomes in WUI communities.

Defensible Space: An area around a structure where fuels and vegetation are modified, cleared or reduced to slow the spread of wildfire toward or from the structure. The design and distance of the defensible space is based on fuels, topography, and the design/materials used in the construction of the structure.

Extended Defensible Space (also known as Zone 3): A defensible space area where treatment is continued beyond the minimum boundary. This zone focuses on forest management with fuels reduction being a secondary consideration.

Fire Behavior Potential: The expected severity of a wildland fire expressed as the rate of spread, the level of crown fire activity, and flame length. Derived from fire behavior modeling programs utilizing the following inputs: fuels, canopy cover, historical weather averages, elevation, slope and aspect.

Fire Danger: Not used as a technical term in this document due to various and nebulous meanings that have been historically applied.

Fire Hazard: The likelihood and severity of Fire Outcomes (Fire Effects) that result in damage to people property and/or the environment. Derived from the Community Assessment and the Fire Behavior Potential.

Fire Mitigation: Any action designed to decrease the likelihood of an ignition, reduce Fire Behavior Potential, or to protect property from the impact of undesirable Fire Outcomes.

Fire Outcomes (aka Fire Effects): A description of the expected effects of a wildfire on people, property and/or the environment based on the Fire Behavior Potential and physical presence of Values-at-Risk. Outcomes can be desirable as well as undesirable.

Fire Risk: The probability that an ignition will occur in an area with potential for damaging effects to people, property and/or the environment. Risk is based primarily on historical ignitions data.

Fuel Break: A natural or constructed discontinuity in a fuel profile utilized to isolate, stop, or reduce the spread of fire. Fuel breaks may also make retardant lines more effective and serve as control lines for fire suppression actions. Fuel breaks in the WUI are designed to limit the spread and intensity of crown fire activity.

Shelter-in-Place Areas: A method of protecting the public from an advancing wildfire involving instructing people to remain inside their homes or public buildings until the danger passes. This concept is new to wildfire in the United States, but not to hazardous materials incident response where time, hazards, and sheer logistics often make evacuation impossible. This concept is the dominant modality for public protection from wildfires in Australia where fast moving, short duration fires in light fuels make evacuation impractical. The success of this tactic depends on a detailed preplan that takes into account the construction type and materials of the building used, topography, depth and type of the fuel profile, as well as current and expected weather and fire behavior. For a more complete discussion of the application and limitations of Shelter-in-Place concepts see the “Access, Evacuation, and Sheltering-In-Place FMU" section in the main report.”

Values-at-Risk: People, property and environmental features within the project area which are susceptible to damage from undesirable fire outcomes.

Glossary of Forestry Terms

Age class: A classification of trees of a certain range of ages.

Aspect: The direction in which any piece of land faces.

Basal area: The cross-sectional area of tree boles in a forested area as measured at the diameter at breast height (dbh).

Biological Diversity: The variety of living organisms considered at all levels of organization, including the genetic, species, and higher taxonomic levels, and the variety of habitats and ecosystems, as well as the processes occurring therein.

Bole: The main stem or trunk of a tree.

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

Coarse Woody Material: Portion of tree that has fallen or been cut and left in the woods. Pieces are at least 16 inches in diameter (small end) and at least 16 feet long.

Cohort: A group of trees developing after a single disturbance, commonly consisting of trees of similar age, although it can include a considerable range of tree ages of seedling or sprout origin and trees that predate the disturbance.

Crown Class: A class of tree based on crown position relative to the crowns of adjacent trees.

Dominant: Crowns extend above the general level of crown cover of others of the same stratum and are not physically restricted from above, although possibly somewhat crowded by other trees on the sides.

Co-dominant: Crowns form a general level of crown stratum and are not physically restricted from above, but are more or less crowded by other trees from the sides.

Intermediate: Trees are shorter, but their crowns extend into the general level of dominant and co-dominant trees, free from physical restrictions from above, but quite crowded from the sides.

Suppressed: Also known as overtopped. Crowns are entirely below the general level of dominant and co-dominant trees and are physically restricted from immediately above.

Crown fire: Fire that advances through the tops of trees.

Defensible fuel reduction zones: Areas of modified and reduced fuels that extend beyond fuel breaks to include a larger area of decreased fuels. These would include managed stands with reduced amounts, continuities, and/or distributions of fuels that would provide additional zones of opportunity for controlling wildfire.

Density management: Cutting of trees for a variety of purposes including, but not limited to: accelerating tree growth, improved forest health, to open the forest canopy, promotion of wildlife and/or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.

Diameter at breast height (dbh): The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Down, dead woody fuels: Dead twigs, branches, stems, and boles of trees and shrugs that have fallen and lie on or near the ground.

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APPENDIX B

MAP 1 – Historic Fires

MAP 2 – Communities

MAP 3 – Condition Class

MAP 4 – Platte Canyon Spread Rate Predictions

MAP 5 – Platte Canyon Flame Length Predictions

MAP 6 – Community Protection Zones

MAP 7 – Treatment Units

MAP 8 – Slope

MAP 9 – Aspect

MAP 10 – Elevations

MAP 11 – Fuel Models

MAP 12 – Crown Fire Activity Predictions – Average Weather Conditions

MAP 13 – Crown Fire Activity Predictions – Extreme Weather Conditions

MAP 14 – Fire Spread Rate Predictions – Average Weather Conditions

MAP 15 – Fire Spread Rate Predictions – Extreme Weather Conditions

MAP 16 – Fire Flame Length Predictions – Average Weather Conditions

MAP 17 – Fire Flame Length Predictions – Extreme Weather Conditions