

Black Forest Fire Assessment Team

Report to

The Governor of Colorado

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Prepared by:

Pikes Peak Wildfire Prevention Partners

In Cooperation With

Black Forest Fire Rescue Department

And Falcon Fire Department



Acknowledgments

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Literally, hundreds of hours have been invested by community volunteers, private industry and government agency personnel to broaden our knowledge of wildfire and the impact it has on life, property and natural resources. Without the collaborative efforts by the US Air Force Academy Fire Department, the Black Forest Fire Department, the Boulder County Land Use Department, the City of Boulder Fire Department, the Colorado Division of Fire Prevention and Control, the Colorado State Forest Service, the Coalition for the Upper South Platte, the Wescott Fire Department, the Falcon Fire Department, the Larkspur Fire Department, the Pikes Peak Wildfire Prevention Partners, the Tri-Lakes Fire Department, the US Fish & Wildlife Service the initial data collection, and ultimately the final report would not have been possible.

Again, thank you.

Respectfully,



Keith Worley, Past President
Pikes Peak Wildfire Prevention Partners

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Executive Summary

The Black Forest Fire broke out on June 11, 2013. Once the smoke had cleared, it was learned the wildfire had taken two lives, destroyed 486 homes and blackened over 14,000 acres of ponderosa pine forests. Many were left wondering how this happened given what we know about wildfire mitigation.

The Pikes Peak Wildfire Prevention Partners (PPWPP) was contacted by the Governor's Office on June 19, 2013 and tasked with determining the efficacy of Defensible Space (D-Space) and homeowner wildfire mitigation during the Black Forest Fire. Defensible space is defined as "the natural and landscaped area around a home or other structure that has been modified to reduce fire hazard" (Protecting Your Home from Wildfires: Creating Wildfire-Defensible Spaces, CSFS Fire 2012-1). Questions had been raised by evacuees from the fire who lost their homes, and claimed their mitigation was not effective. The task outlined for PPWPP was to determine if these claims were true. Was mitigation effective in reducing structural losses?

The following is a summary of the assessment team's findings:

1. Individual property defensible spaces were easily overwhelmed by extreme wildfire behavior due to failure of surrounding owners to reduce fuel volumes. Property owners who heeded the advice of local officials fell victim to the inaction of their neighbors. Continuous areas of unthinned forests with ladder fuels allowed the fire, pushed by high winds, to repeatedly reform into a series of destructive crown fires that ran eight miles to the east during the first eight hour burning period. The same fuel and weather conditions then allowed the fire to burn five miles to the north on the next day. A structure assessment was done on 75 properties both in and abutting the burn area. This is included in Appendix D.
2. Defensible space, as understood by the average Wildland-Urban Interface (WUI) dweller, has different meanings and is confusing to the general public. Claims of mitigation by property owners may be true according to their own interpretation. These claims may also be based on outdated messages or information. There is very little understanding, by the general public, of wildfire behavior in the face of heavy fuel loading and extreme weather events like those experienced during the Black Forest Fire.
3. Defensible spaces, as defined by the recently replaced CSU Publication 6.302 Managing Wildfire Risks, were not generally implemented in the burn area. Very little forest management or wildfire hazard reduction had been done in the area,

despite good models provided by the Colorado State Forest Service over the past 30 years. A misguided sense of tree preservation inhibited both forest health and fuel reduction efforts by forestry and fire officials.

4. The often stated (but rarely heard) part of the defensible space message is: there are no guarantees. The team recommends messaging that conveys “risk management” as opposed to “risk elimination.” A new concept of “Survivable Space” will be introduced in this report.
5. Firefighter safety and effectiveness were jeopardized by a lack of understanding and appreciation of the risks firefighters are exposed to during wildland fires. The team’s survey of the first and second wave of firefighters who responded to the fire shows a high level of frustration with WUI dwellers who failed to provide sufficient defensible space and structural hardening. Responses can be summarized as “How can we be expected to save your home if you’ve done nothing on your own behalf?” It is well worth the time of all readers to view all firefighter comments included in Appendix C.
6. Community wide mitigation was found to be most effective in managing wildfire; even during extreme burning conditions. The community of Cathedral Pines was assessed as part of this report. The fire burned through two-thirds of the community and resulted in one home loss. In areas where ladder fuels were pruned and tree stands thinned, tree losses were minimized. Wide roadways with roadside areas free of trees served as fire breaks and helped keep the fire on the ground and out of tree crowns. Tree losses were heaviest in areas abutting unthinned forests. Firefighters were able to safely defend structures as the fire swept through the community. The full assessment, with photos, can be found in Appendix A. Two other communities, High Forest Ranch and Black Forest Reserve, will also be discussed in more detail as a partially managed forest communities.
7. State School Land Section 16 was within the burned area with minimal destruction of the forest resources. This one square mile area had been managed over the past 30 years to improve forest health and reduce wildfire behavior. These treatments proved effective and serve as a good model in the Ponderosa Pine fuel type. The full assessment is found in Appendix B.
8. “Willful blindness” will be discussed as a common mindset of the general Black Forest community. Common excuses property owners give for not mitigating their fuels or adapting their structures to a wildfire prone environment are included in this report.

This assessment has been prepared to assist the Governor, legislature, local governments, fire departments, wildfire mitigation specialist, and the citizens of Colorado with the task of understanding and changing behavior necessary for the

thousands of Wildland-Urban Interface (WUI) dwellers to co-exist with the often harsh realities of wildfire.

It is also dedicated to the 34 wildland firefighters who died in the line of duty in 2013. Colorado also marked the 20th anniversary of the South Canyon Fire on Storm King Mountain Fire in which fourteen firefighters died. It is hoped the dangers they and their fellow firefighters faced will not be in vain. It is hoped WUI dwellers recognize their role in firefighter safety and effectiveness, so everyone goes home.

The Pikes Peak Wildfire Prevention Partners celebrates its 20th year as a consortium of wildfire professionals, wildfire mitigation contractors, agency representatives and homeowners. Our mission is to provide effective reduction of the threat of wildfire to life and property in El Paso, Douglas and Teller counties in Colorado. This mission is accomplished through the effective and efficient education, cooperation and coordination of available resources by individuals, agencies, and organizations.



1 Introduction

The Black Forest Fire broke out on June 11, 2013. Once the smoke had cleared, it was learned the wildfire had taken two lives, destroyed 486 homes and blackened over 14,000 acres of ponderosa pine forests. Many were left wondering how this happened given what we know about wildfire mitigation.

Media interviews with Black Forest residents reported claims of wildfire mitigation that were not successful. The question became: “Where mitigation was done, did it work? If not, why?” This then became a question of what is mitigation, or defensible-space to the average homeowner? And, who is really in a position to judge, what constitutes effective mitigation, other than by a structure’s survival or destruction. The Assessment Team felt the best answers could be obtained from firefighters who defended homes during the Black Forest Fire.

2 Assessment Team Strategy

2.1 Assessment Team Members

An initial meeting was held July 3, 2013, in the offices of the Colorado Department of Public Safety, Division of Homeland Security and Emergency Management. Discussion centered on who was in a position to field a team to quickly assess the Black Forest Fire. Concern was raised over the rapid disappearance of evidence as destroyed or damaged properties were cleared for rebuilding to begin.

The Pikes Peak Wildfire Prevention Partners (PPWPP), a local group familiar with the burn area offered to take on the assessment. It was agreed this could be done quickly with minimal expenses. Other alternatives considered were: 1) fielding a team of university researchers; or 2) mobilizing a team similar to the Waldo Canyon Fire Adapted Communities Mitigation Assessment Team. Both of these options would require significant time and finances to mobilize. Concerns were also raised over the timeframe for report completion.

A call went out to PPWPP members, Front Range fire agencies, and local governments for volunteers to participate in the Black Forest Fire Assessment Team. Eighteen agencies or organizations responded and participated in the three-day field assessment. Over 452 hours of in-kind hours were logged, with a dollar value of \$9,849 (based on 2012 in-kind rate per www.independentsector.org website). This total does not include hours accrued by the PPWPP executive board and others who assisted with logistics for the assessment period.

2.2 Team Assignments

The assessment began on July 22nd and was completed on July 24th, 2013. Base of operation was Black Forest Fire Rescue Department Station 1, 11445 Teachout Road, Black Forest, Colorado. Teams consisted of two or three volunteers. Efforts were made to team up experienced with inexperienced volunteers to provide assessment skills to all participants. Teams then took on different tasks. These were:

- Fire Severity and Behavior
- Firefighter Survey and Interviews
- Structural Assessments
- Forestry and Fuel Treatments on Public Lands
- Cathedral Pines Forestry Treatments
- Homeowner Action After Fire Department Assessment

All participants were reminded of the primary purpose of the assessment: Where mitigation was done, did it work? If not, why?

3 Assessment Team Analysis

3.1 Fire Severity and Behavior

Initial call-out for the Black Forest Fire occurred on June 11th, at 1:43pm. Initial attack was undertaken immediately by Black Forest Fire Rescue Department, Donald Wescott Fire Department, and Colorado Springs Fire Department (auto-aid response). Fuels consisted of dense Gambel oak, and unthinned ponderosa pine stands. Efforts were made to contain the fire with progressive hose lays. Reports from initial attack crews noted that fire line closure and containment were within 100 yards when wind speeds picked up, as the fire reached steeper, uphill terrain. forcing firefighters to withdraw or risk entrapment and burn-over. Additional mutual-aid fire departments had already been dispatched to the fire and immediately began structure protection.

It is from this point the fire ran eight miles to the east within the first eight hour burning period. Firefighting efforts through the first burn period were focused on structural protection. Flame lengths of 150 to 200 feet were reported. That evening the fire remained active, but with reduced fire intensity compared to earlier in the burn period. Aerial news footage showed significant structure losses due to ember ignitions well ahead of the fire front. Much of this footage shows homes completely involved with green, unburned forests around them.

On June 12th, a second major burn period occurred causing the fire to burn five miles to the north along several fire fronts. in a series of “rabbit ears”. The fire laid down that evening when wind speeds dropped.

Ninety-eight percent of wildfires are typically contained or controlled within the first or second burning period.¹ The Black Forest Fire fits into the remaining two percent of fires that exceed the suppression capacity of fire service control due to extreme weather and fuel conditions. Most of the homes and structures were lost during this “convergence of conditions” of fuel, weather and topography within the first 24 hours of the fire.

Fuel models for the Black Forest Fire are:

- “Anderson” Fuel Models **1** and **9**²
- NFDRS Models **U** and **L**³

Other observations reported to the assessment team were:

- Large, unthinned, decadent forests exacerbated fire behavior.
- Limited fuel treatments implemented by homeowners were easily overwhelmed due to untreated fuels on surrounding properties.
- Unmitigated fuels in El Paso County road right-of-ways threatened civilian evacuation, and firefighter access and safety.
- Aerial resources were of limited value for reducing rate of fire spread due to extreme fire behavior and high winds.
- Density of the tree canopy provided challenges for the effective placement of retardant by some of the delivery system in use.

Additional observations from firefighters are covered in the next section.

¹ *Assessing Wildfire Hazards in the Home Ignition Zone*, NFPA, 2010, Publication FWC93710PKD

² *Aids to Determining Fuel Models For Estimating Fire Behavior*, Hal E. Anderson, USDA Forest Service General Technical Report INT-122, April 1982.

³ *Gaining an Understanding of the National Fire Danger Rating System (NFDRS)*, PMS 932/NFES 2665, National Wildfire Coordinating Group (NWCG), 2002.

3.2 Firefighter Survey

3.21 Introduction

Before the smoke had even cleared, concerns were raised by residents impacted by the Black Forest Fire that wildfire mitigation was not effective in saving their homes. Claims were, “We mitigated our property and the fire still burned it down.” The Pikes Peak Wildfire Prevention Partners (PPWPP) was asked to investigate these claims. In the course of early discussions with state officials, it was found much of the information about successful homeowner mitigation could only be provided by the front line firefighters who were involved in structure protection during the fire. It was also noted this information tended to be anecdotal and of minimal use to policy makers. Therefore, PPWPP set out to interview and survey these same firefighters.

Additional analysis and all firefighter responses are included in Appendix C.

3.22 Methodology

A survey form was developed to allow firefighters to relate their experiences. A series of questions were developed to determine the effectiveness, in the heat and smoke of the event, whether defensible space and wildfire mitigation were effective. Many of the questions were open-ended and allowed the respondents to provide their professional opinions, while assessing their state of mind. It was also felt that timing was of the essence to capture their insights while still fresh in their minds.

Initially, efforts were made to interview firefighters. It was quickly learned this was too time consuming and would limit the sample size. The survey was then sent out to fire agencies known to have responded to the fire. Preference was given to departments on-scene during the first twenty-four hours. This window of time was important given the two extreme wildfire behavior periods. The first occurred on the afternoon of June 11th (fire burned eight miles to the east), and the second on June 12th (fire burned five miles to the north). Most of the homes lost were during these two burning periods.

3.23 Analysis

Forty-six survey forms were returned. All written responses were then tabulated. These are included at the back of this report. Questions were then grouped under several categories of related subjects. This allowed a cross-check of responses for consistencies. One example is the series of questions on hazards encountered, additional challenges and “close calls”. It was noted that firefighter experience affected the category under which the response was given. An experienced firefighter might see it as a hazard, while a less experienced firefighter might see it as a close call.

Summaries of each category of questions are provided, and supported by data from the charts that follow. In some cases, a side-by-side comparison is given.

3.24 Firefighter Survey Summary

- Fire fighters were in agreement that mitigation worked. However, of the homes that burned, the level of mitigation was insufficient to save them.
- Even where mitigation was apparent, fire crew safety took first priority. If escape routes and safety zones were inadequate or missing, fire crews moved on to structures that stood a greater likelihood of safety and success. Where fire conditions were less extreme, fire fighters made diligent attempts to defend all structures, including un-mitigated homes.
- Time was of the essence during the extreme burning conditions. Defending homes with minimal or no defensible space cut into the time that was allowed to protect other homes.
- The difficulty of fighting this fire was compounded by aging housing stock that possessed several features that prevented safe and effective fire fighter intervention. Barriers included narrow driveways and inadequate turn-around radii for fire engines, dense trees on either sides of the driveways that simultaneously ignited during the fire event, and un-thinned, “dog hair” trees in and around homes and right-of-ways.
- The fire’s rapid rate of spread, brought on by erratic winds and bolstered by dry, heavy fuel loads created secondary hazards, such as heavy smoke and low visibility that obscured street signs critical to fire fighter orientation and escape.
- Another critical secondary hazard was inadequate communication among fire fighters due to incompatible radio frequencies between resources

In conclusion, whereas several uncontrollable factors were in play, such as weather-related and drought-stricken conditions, many of the factors that resulted in the loss of structures were preventable had there been adequate fuel mitigation and more emphasis on structural hardening. This observation is by way of comparison to another subdivision within the Black Forest fire that stood in contrast to the burned home areas and sustained the loss of only one home due to the implementation of several controllable factors (see Cathedral Pines report).

Wildland Interface (WUI) dwellers may not fully understand the concept of defensible space. This was evidenced by properties where trees were pruned, but left too close together, combustible mulches were up against structures, even though the property had been cleared, or wood stacks piled too close to homes.

The observations provided by the 46 fire fighters who responded to this questionnaire come from a highly trained and experienced group of professionals who between them, brought 498 years of experience to the Black Forest Fire.

3.3 Structural Assessments

3.31 Methodology

An assessment form was developed to collect data about structures and their surroundings. The assessment form used for the Waldo Canyon Fire assessment was modified to include information on defensible-space (D-Space), mitigation and home ignition zones (HIZ). The form was vetted with Dr. Stephen Quarles, Senior Scientist with the Insurance Institute for Business and Home Safety (IBHS).

Wildfire “mitigation” and “defensible-space” are terms often used interchangeably by the public. Recommendations for mitigation and D-space, over the past 20 years, were developed by the Colorado State Forest Service and used as the basis of comparison. These are:

- “Creating Fire Safe Zones”, CSU Service in Action Sheet No. 6.302, Released in 1992.
- “Creating Wildfire-Defensible Zones”, CSU Natural Resource Series, No. 6.302, Released in 1999, with updates made 2003 and 2006.

Both of these publications are consistent with recommendations for treating native vegetation 75-100 feet from structures, with adjustments for slopes. Both publications and updates mention 30 feet as the zone where fuel management is most critical. Based on the experience of PPWPP in the region, the public’s focus is on this 30 feet zone and considered the public’s definition (perception?) of defensible-space. Therefore, it is used as the primary zone for assessment for this report.

The more recent term, “home ignition zone” or HIZ, was developed by the USDA Forest Service based on its Missoula Fire Lab research. The HIZ is a zone wide enough to influence wildfire behavior before it reaches the area immediately surrounding structures. Depending on the fuel type, this zone is a minimum of 100 feet and as much as 300 feet if adjusted for slope.

In October of 2012, CSFS updated the Factsheet 6.302 and transformed it into the publication entitled:

- “Protecting Your Home from Wildfire”, CSFS Quick Guide Series, Fire 2012-1,

This publication includes the HIZ concept and mitigation recommendations. The HIZ zone was also identified for assessment in this report.

Additional information was also collected in the data gathering phase of the assessment process. Lot size, fire intensity both on and off the property, and building materials were noted along with signs of firefighter intervention. Neighboring properties were considered to determine levels of mitigation in the vicinity and how this relates to the effectiveness of community scale mitigation.

3.32 Challenges

Several challenges were encountered during the assessment. These were:

1. Properties were spread over the 14,000 acres of burn area, and with the exception of a few neighborhoods, widely spaced apart. This resulted in significant travel time to reach all areas of the fire.
2. Many properties had been posted with “No Trespassing” signs and were inaccessible by the team.
3. Foundation and tree clearing was already in progress on many sites resulting in lost opportunities for assessment. Grasses had also begun to regrow and obscured lightly burned areas.
4. The complexities of the wildfire environment, while burning is in progress, are not fully understood. These complexities may create burning conditions that can defy interpretation based on post fire observations and analysis.
 - a. The biggest challenge was determining the actual cause of structural loss, especially if the entire site had burned over. This was partially overcome by locating either damaged or partially burned structures, thus allowing some homes to be more thoroughly assessed for the actual point of ignition by interpreting burn patterns on the landscape and the structures.
 - b. In some areas, high intensity fire activity greatly diminished the ability of team members to assess the status of pre-fire mitigation efforts.
5. Firefighter intervention was not always determinable, unless fire lines had been constructed or there were other obvious signs of structure preparation or protection. There were some exceptions to this. Several of the first responders to the fire were part of the assessment team and were able to go back and analyze the properties they defended.
6. Experience and skill levels of the team members were varied and may have implications on the ability to analyze observations.
7. Due to the above, the assessed properties are not part of a true scientific sampling and some of the quantitative data may be skewed for that reason.

3.33 Structural Assessment Conclusions

Collected site data was input into EXCEL format in order to compare different factors. Some of the team's conclusions are:

1. Of the 75 home sites assessed, 31 homes were destroyed, 16 suffered damage and 24 had no damage.
2. Fire fighter intervention was an important factor in home survivability.
 - a. Only 1 home destroyed if there was FF intervention vs. 22 homes destroyed without firefighter intervention.
 - b. According to the firefighter interviews, a major decision on where they could go to work, with some margin of safety, were at home sites that had mitigated fuels which allowed them a space to fight fire effectively and not fear for their safety.
3. Mitigation was effective with defensible space being a key factor in home survivability.
 - a. Of 40 homes with minor or no damage, 25 had defensible space in place.
 - b. Of 31 destroyed homes, only 7 appeared to have defensible space in place.
 - c. Crown fire impact was even across the sampling for destroyed homes regardless of defensible space being in place or not, but surface fire impact was less destructive with defensible space in place.
 - d. Team member observations indicate that defensible space was often encroached upon by treed areas with little to no crown separation bringing crown fire close enough to the home to overpower the defensible space and cause home loss. This is a strong indicator of the importance of Zone 2 (the area adjacent to the Defensible Space area or Zone 1) treatment within the HIZ.
4. It is more likely for a mitigated property to be overrun by intense fire if surrounding properties are left untreated depending on extent of treatment and distances to neighboring parcels.
5. There were homes in heavily treed areas that had mitigated well in Zones 1 and 2 and survived with little or no structural damage while extreme crown fire behavior turned the land around the home into a "moonscape" of black sticks.
6. There is substantial evidence that a large area or community scale mitigation effort is highly effective in reducing the intensity of the fire and keeping fire on the ground and out of the crowns of the trees as demonstrated in the Cathedral Pines community. Two other communities, High Forest Ranch and Black Forest Reserve subdivisions had done a minimal level of fuel treatments. Community scale mitigation created a safer work environment for firefighters and resulted in few home losses within those areas due to reduced fire behavior intensity and

firefighter presence. There were significant differences in these three communities.

- a. In Cathedral Pines, fuels had been treated well enough that firefighters were able stay in the community and protect structures; even during the period of extreme fire behavior during the first afternoon of the fire.
 - b. High Forest Ranch and Black Forest Reserve were threatened late in the second day, and at the end of extreme burning periods. Firefighters were forced to retreat to safety zones due to high fuel volumes. However, resources were able to re-engage within 10-15 minutes and resume structural protection.
 - c. Wildfire threats to High Forest Ranch and Black Forest Reserve occurred when additional firefighting resources were available, as opposed to when Cathedral Pines was threatened the first afternoon.
7. There were many homes and structures located in unmitigated or under mitigated areas.
 8. There were many homes that were constructed of materials that do not withstand the effects of wildfires very well and were also prone to ember penetration to the interior of the structure.
 9. There was not one aspect of this fire that was contrary to current CSFS recommendations for mitigation of property to reduce the impact of wildfire. Where mitigation efforts were overcome by fire, it was primarily due to incomplete mitigation efforts which resulted in a path of fire directly to the structure, or were susceptible to ember ignition.

3.4 Forestry and Fuel Treatments on Public Lands

3.41 Methodology

The Colorado State Forest Service, Woodland Park District, administered numerous forestry and fuel treatments in the Black Forest area over the past 35 years. The largest managed area is on Colorado State School Land Section 16. District representatives inspected this area after the fire to assess tree survival and post-fire impacts.

3.42 Fuel Treatment Conclusions

Past forestry projects proved successful on this square mile of land within the burn area. Within one month after the fire, grasses re-sprouted vigorously and minimal damage occurred to the forest resource.

El Paso County owned lands did not fare as well. The Black Forest Regional Park suffered extensive damage. The same can be said for The Pineries Ranch Open Space. Both areas, primarily kept in unmanaged condition, suffered heavy tree losses and soil damage.

Other properties were inspected by the team. These included projects implemented with fuel treatment grant funding or under Forest Ag tax classification plans. Only a few of these did well due to their small size or proximity to untreated properties that also sustained extreme wildfire behavior. The complete assessment, along with photos, is attached as Appendix B.

3.5 Cathedral Pines Forestry Treatments

3.51 Methodology

The Cathedral Pines Subdivision is one of the few communities in the Black Forest area on which the developer had implemented forest management and fuel hazard reduction efforts as part of its development process. Two-thirds of the community fall within the burn area. A team assessed the effectiveness of these treatments and resulting fire impacts. A more thorough analysis, with photos, is attached as Appendix A.

3.52 Cathedral Pines Conclusions

Forestry and fuel treatments were effective in modifying fire behavior. The fire burned into the community from the southwest and was pushed by high winds across the entire west to east length of Cathedral Pines. The fire stayed on the ground and did minimal forest or soil damage. Only one home was lost. This occurred at least one day after fire frontal passage. Very little crown fire occurred. During the high winds, the fire dropped to and remained on the ground due to the absence of ladder fuels, tree crown separation, and wide roadways cleared of conifers.

This may be one of the few examples in Colorado of how crown fire behavior can be modified. Wide roadways, free of pine regeneration, acted as fuel breaks that forced the crown fire back to a fast moving, wind driven surface fire. This also allowed safer civilian evacuation and firefighter access, and more effective structural protection. Several important lessons from Cathedral Pines are:

- Fuel treatments must be implemented on a large enough scale to affect extreme fire behavior.
- Fuel treatments can have a significant impact on firefighter safety and effectiveness.
- Wide roadways can serve as effective fire behavior modification tools if kept free of invading pine regeneration. Civilian evacuations can also occur more safely.
- Minimal soil damage or erosion occurs when forests are restored to more natural stocking levels (widely spaced tree crowns and reduced ladder fuels).

- Ignition resistant construction materials are critical for habitation in wildfire prone areas.
- Fuel treatment effectiveness can be undone by homeowners when they fail to maintain treated areas and install combustible landscaping. These were observed to be future problems for the community if not addressed soon.

A second community, High Forest Ranch, was mentioned to the team as having some level of forestry and fuel treatments. Fire burned into this community on the third day, pushed by high winds. Twelve lots were affected, with no homes lost. However, it should be noted sufficient protection resources were in place, and the fire front died down as evening fell. It is suspected the outcome would not have been the same if the fire had burned into the community on the first day. The presence of significant ladder fuels, in the form of ponderosa pine regeneration, and continuous unthinned forests could have spelled disaster. High Forest Ranch must still reduce its ladder fuels and increase tree crown separation to survive a high intensity wildfire.

A third community, Black Forest Reserve, was identified as also having some modest levels of fuel reduction on individual lots where structures have been built. The fire burned into this community on the second day, after the winds shifted predominantly north. Approximately 27 lots were affected by the fire, but no homes were lost.

This neighborhood benefited from several factors including the wind shift, numerous fire suppression resources, a fuel break (created by the large power line corridor) and fuel mitigation that created a safe environment for firefighters to work. Even with these measures, the severe fire intensity caused firefighters to retreat numerous times to safety zones. During times when firefighters retreated, homes were able to withstand the fire's intensity because of the reduced fuel and ignition resistant construction materials used.

It is believed that this neighborhood may not have fared as well without the mitigation efforts, ignition resistant construction materials, shifted winds and fire suppression intervention. Significant fuels management, thinning and removal of ladder fuels are still desperately needed throughout this neighborhood, particularly in common areas and empty lots without structures.

3.6 Homeowner Implementation Following Fire Department Assessments

3.61 Methodology

The Black Forest Fire Rescue Department and Falcon Fire Department routinely provide wildfire assessments for residents of the fire district. The team was provided a list of these properties. One team was assigned the task of determining if, after the assessment, homeowners had implemented recommendations. It was initially thought some of these properties were within the burn area.

3.62 Homeowner Implementation Conclusions

Unfortunately, none of the assessed properties were found within or abutting the burn area. Therefore, no evidence was available. However, it should be noted requests for assessments had increased following the 2012 Waldo Canyon Fire.

4 Discussion

The Black Forest Fire of 2013 was a predicted disaster. Forestry and fire officials had warned the residents of Black Forest a wildfire of this magnitude was inevitable. It was not a matter of “If”, but “When”. The same can be said for much of Colorado.

The extreme burning conditions during the Black Forest Fire placed countless firefighter’s lives at risk. The Assessment Team, throughout the assessment process, was concerned at the level of risk firefighters took to protect structures; and thankful that no firefighters lost their lives. Again, the firefighter survey tells us training and experience paid off; but, for how long?

The year 2013, marked the 20th anniversary of the South Canyon Fire on Storm King Mountain where fourteen highly skilled and experienced firefighters died. The nation lost nineteen Granite Mountain Hotshots working to protect the town of Yarnell, Arizona. Thirty-four firefighters lost their lives in 2013. The Assessment Team’s experiences, over 20 years in the Pikes Peak Region, provides a unique opportunity to challenge typical property owner excuses for their failure to factor in firefighter safety as part of their responsibilities as WUI dwellers. The following is a list of typical homeowner responses to readily available wildfire mitigation educational material:

- “That’s why I have insurance.”
- “It’s the fire department’s responsibility. That’s what I expect from my property taxes.”
- “I want to save the ‘natural’ appearance.”

- “I moved here for the trees. I’m not cutting them down.”
- “I don’t want to destroy the wildlife habitat.”
- “I need the trees/brush for my privacy.”
- “Mitigation will destroy my property values.”
- “Mitigation means clearcutting.”
- “I can’t afford it.”
- “I can’t physically do the work.”
- “I don’t have time.”
- “It won’t happen to me.”
- “There’s nothing I can do.”

Practitioners and preachers of wildfire mitigation have heard all these excuses and many others. In several cases, like those observed in Black Forest, mitigation done by property owners was insufficient to prevent catastrophic losses of the forest and structures.

Living in the WUI brings with it certain responsibilities. Wildfire mitigation, no matter how it is described, comes down to personal responsibility of the property owner. Secondary responsibility falls on the community (neighbors, neighborhoods) to act together if fuel conditions and wildfire mitigation efforts exceed the capacity of individual owners.

Black Forest is an area not known for its cohesiveness as a “community”. Feedback from local officials is often prefaced with the challenge of overcoming the independent spirit of many Black Forest residents as it relates to property rights and the personal desires and preferences of the property owner. In the case of the Black Forest Fire, this same “spirit” contributed to the destructiveness of the fire. In some cases, this could even be described as willful ignorance.⁴

It must be understood that the lack of mitigation measures by many property owners, allowed the Black Forest Fire to quickly grow large and exhibit extreme fire behavior that devastated major portions of the entire community - not just those unmitigated parcels. When it comes to wildfire, Black Forest residents share the same bed; in this case, the same fuel bed. Although the independent spirit of many of the property owners is to be admired, if this spirit translates into willful ignorance concerning wildfire mitigation which in turn then trumps the responsibilities of being a good citizen and causes harm to others, this becomes a tragedy. The Assessment Team’s conclusions are confirmed by the findings of the Firefighter Survey and the Structural Assessment that are at the core of this report.

It should be noted the Black Forest Fire Protection District and El Paso County have Community Wildfire Protection Plans (CWPP) in place. Donald Wescott Fire Protection

⁴ Willful ignorance can be defined as “*the state and practice of ignoring any sensory input that appears to contradict one’s inner model of reality*” (Source: Rational Wiki). A related legal construct, “willful blindness”, has basis in law “*when an individual seeks to avoid civil or criminal liability for a wrongful act by intentionally putting himself in a position where he will be unaware of facts that would render him liable*” (Source: Wikipedia).

District, to the west, had also completed its CWPP in 2010. Public attendance at meetings for the development of these CWPPs was very low with public officials often outnumbering residents.

5 Recommendations

This section provides recommendations for the many stakeholders who can have an impact on wildfire and public safety.

5.1 El Paso County

El Paso County is the major governmental entity covering unincorporated areas of the Black Forest region. We recommend the following:

- County Road right-of-ways (ROW) should be cleared and kept free of oak and invading conifer species. Conifers, primarily ponderosa pines, contributed significantly to fire spread and heat transfer across roadways. Evacuation of civilians and firefighter safety were compromised. Ditch maintenance and mowing practices are also impeded. The one exception to total tree removal is if trees are adequately spaced as part of a “shaded fuel break”⁵ extending approximately 150 feet from the ROW edge. This is a public safety issue that should be addressed immediately, and with little room for debate as it relates to the county’s charge of protection of life, safety and welfare of its citizens.
- Culverts in public ROW and across any fire department access routes or potential access routes shall be constructed of non-combustible material. Several instances of plastic culverts being consumed by the fire were reported, which allowed the road to collapse and compromise the ability of fire engines and civilians to escape, or fire engines to access the fire. In at least one instance, this resulted in a near burn over of a fire engine and crew.
- County open spaces and parks that abut residential areas should be prioritized for fuel treatments that promote fire adapted ecosystems. Fuel treatment zones should be a minimum of 300 feet wide, adjusted for slope and fuel type. This should be a priority where the adjacent ownerships are managing their fuels.
- It is imperative that El Paso County be a model for ecosystem restoration and fire adaption. Given the current state of decadent, suppressed, and declining Black Forest timber, restoring forest and ecosystem health is critical for protecting its parks and open spaces. El Paso County should no longer create or accept any

⁵ See document “*Fuel Break Guidelines for Forested Subdivisions and Communities*”, Colorado State Forest Service, F. C. Dennis

open space or park property that has not been mitigated and its ecosystem restored to a fire adapted condition.

- El Paso County should not allow creation of any private open spaces or lots within any future subdivisions in which the ecosystem or forest has not been restored to a fire adapted condition. The county's current policy of requiring forest or fire mitigation plans is not effective due to failure to insure implementation of the plans. The Cathedral Pines Assessment (Appendix A) and State School Land Section 16 Assessment (Appendix B) are good examples to follow.
- El Paso County must partner with fire departments in the development of building regulations that promote compatibility with wildfire prone environments. Structural hardening is a critical criterion for construction in the WUI. This will require engagement with the politically powerful land development and home building community. Jefferson and Douglas County regulatory models should be studied for El Paso County compatibility. Given what we know about wildfire risks, failure to address this could fall into the willful ignorance or legal construct of willful blindness on the part of elected officials. The WUI can be rightfully compared to heavily regulated flood and geologic hazard zones regarding threats to life, property and natural resources. This is further compounded by the public costs for protecting WUI dwellers, and post-fire recovery expenditures that can linger on for years. The fiscally conservative approach should be to impose these costs on their beneficiaries (developers, builders and WUI dwellers). Weed abatement or junk vehicle ordinances are good examples of current regulations intended to lessen the public burden of negligent property owners.
- Education is a powerful tool for changing behavior. El Paso County currently has no wildfire awareness program in place. It is imperative for the county to reach out to existing organizations as an active partner for wildfire mitigation.

5.2 Fire Jurisdictions

The true Black Forest fuel type extends eastward from Palmer Lake and Air Force Academy, well into Elbert County. Its southern edge extends into the City of Colorado Springs (North Gate) and northern edge into the City of Aurora (E-470 and Smokey Hill Road). Multiple fire agencies provide wildfire coverage for the Black Forest timber type. The region described as "Black Forest" falls primarily within the Black Forest and Falcon Fire Districts. The wildfire occurred within these jurisdictions.

Multiple challenges exist. Recommendations are:

- Continue to work toward better communication systems. The Firefighter Survey noted poor radio communications during the wildfire that placed firefighters at risk. Communications were hampered by irregular terrain that creates “shadowed” areas with little or no coverage.
- Improve cooperation between El Paso County agencies and fire jurisdictions. Steps should be taken to improve pre-planning, training and coordination.
- Educate developers, builders, and realtors of the responsibility that they have when creating and selling homes in an area that is prone to catastrophic wildfire. They should understand that there is a moral obligation to inform prospective buyers of the wildfire hazard and to create an environment that is highly resistant to this hazard. This is no different than the obligation to disclose flood plain or geologic hazards. Home buyers are becoming increasingly savvy to the risk of wildfire destruction, as they see in the headlines of the day and as they are being informed by their insurance companies. There are certainly marketing strategies and opportunities that developers, builders, and realtors can employ that will more than recover any additional costs that wildfire hazard reduction may add to a project. The question that these folks need to ask themselves is “Am I building a strong community or am I building the stage for a disaster?”
- Fire jurisdictions should continue to pursue regulations that allow for all new developments and construction to be fire adapted. This will require partnering with non-traditional groups such as the local home builders associations, and development interests. Perpetuation of the current arrangement meets the definition of insanity (doing the same thing over and over again, and expecting a different outcome).
- Educate elected officials and the public on the continued need for improved water supplies. At the same time, it is critical to stress that cistern, dry hydrant and central water supplies are for structure protection when one structure is on fire at one time, or for containment of smaller wildfires with normal weather conditions. Extreme wildfire behavior threatens hundreds of structures at one time. A good example of this was the cistern system in Cathedral Pines. Attachment to these systems would have placed firefighters directly in line with fire spread. No amount of water mattered under these conditions.
- Educate elected officials and the public on the use of aerial firefighting resources as an effective tool if property owners have managed their fuels. Otherwise,

politicians will continue to use this important tool to obfuscate the real issue of the need to manage wildland fuels in the WUI.

- Continue efforts to educate recalcitrant WUI residents on their responsibility to manage their fuels so firefighters can work safely and effectively to protect their lives, properties and forests. The Black Forest Fire represents a “teachable moment” that must be seized before memories inevitably fade.

5.3 State Level

The Assessment Team recommends the State of Colorado move forward with recommendations of the Governor’s Wildfire Insurance and Forest Health Task Force outlined in its report dated September 2013. The Team concurs with the “Barriers to Progress” and looks forward to partnering opportunities to overcome these barriers.

The Team also recommends the following:

- Communication systems continue to be an on-going problem; not just in the Black Forest area. Convene a panel of key interests to identify deficiencies and develop a long range plan for necessary upgrades to improve interoperability.
- Consider a grant funding system that rewards jurisdictions that implement local regulations designed to promote fire adaption. These should include treatment of native fuels and structural hardening.

5.4 Black Forest Residents

As was noted in the introduction to this report, this was a predicted disaster. And, it will happen again. Black Forest residents should be put on notice that:

- Wildfire mitigation is the responsibility of the property owner who is the sole owner of his/her fuels. An Australian saying bluntly states, “You own the fuel, you own the fire.”
- Secondary responsibility falls on neighbors who must work together to manage their collective wildfire risks. Property owners who do not mitigate their fuels place their neighbor’s homes and forests at risk.
- Trees must be cut to save the forest. The Black Forest is a decadent, declining forest. At this point, failure to recognize this truly becomes willful ignorance. At what point does this become negligence?

- Structural hardening against ember ignitions and flames must be done on all structures constructed in wildfire prone environments. This will be a critical component in maintaining access to affordable homeowner insurance.
- Property owners must recognize their responsibility to firefighters by providing a safe working space. Firefighters may attempt to protect all homes, if safe to do so. Owners should also be aware that failure to mitigate their structures and native fuels takes away valuable time from those who mitigated their fuels.
- Property owners must learn that traditional firefighting resources are based on one house on fire at one time. Wildfires, especially with extreme burning conditions, place hundreds of homes at risk at one time. Property tax assessments and fire suppression capabilities are predicated on the traditional model- not the wildfire model.

6 Conclusions

No amount of fire engines, firefighters, bulldozers, slurry bombers or helicopters could have stopped the Black Forest Fire. Unmitigated forest fuels, combined with up sloping terrain and high winds immediately overwhelmed any attempts at containment. Two Black Forest residents lost their lives in the ensuing fire storm. Over 500 structures were damaged or destroyed.

Critical lessons learned are:

- Defensible spaces are critical for ensuring firefighter safety and effectiveness.
- Defensible spaces can be overwhelmed by wildfire from adjoining properties.
- Where forest fuels have been treated, tree losses and resource damage are significantly reduced. Fire in Cathedral Pines and State School Land Section 16 can be characterized as “good fire”, comparable to prescribed fire.
- Structural hardening is just as important as treatment of surrounding native fuels. Ember ignitions of structures were a major contributor to wildfire intensity.
- Unregulated construction in areas prone to extreme wildfire behavior will continue to result in similar disasters.

It is obvious that along the Front Range of Colorado, the combination of continuing drought conditions, and the overgrown and degenerative state of the native fuels will continue to produce large scale fire events with extreme fire behavior. In the last two years, four fires on the Front Range (Black Forest Fire, Waldo Canyon Fire, Lower North Fork Fire and the High Park Fire) were responsible for eight civilian fatalities, over

1,100 homes destroyed, almost 125,000 acres burned, and over \$69 million in fire suppression costs alone. Much like the response to the repeated urban conflagrations that burned down several of our nation's major cities during the early years of our country's history, when do we say enough to this scale of preventable destruction? It is paramount that those who live in the WUI take the responsibility to act now, with determination and with a community scale effort. If this does not happen soon before more lives are lost, communities destroyed, and ecosystems ravaged, will the only recourse be government action to mandate such measures be taken and what those measures are? This is what the property owners and communities of the WUI must now consider. The choice is to tap their independent spirit and take responsible and aggressive actions for themselves and their communities or suffer the mandates imposed by others.

The findings of this report support recommendations of the Governor's Wildfire Insurance and Forest Health Task Force. Destruction caused by wildfires can be significantly reduced using current science. The Assessment Team and Pikes Peak Wildfire Prevention Partners look forward to partnering with others to continue the challenge of educating homeowners on their responsibilities as Wildland-Urban Interface dwellers.

Appendix A

Cathedral Pines Post-fire Assessment

Part of the:
2013 Black Forest Fire Assessment Report
Pikes Peak Wildfire Prevention Partners
January 2014

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Photo Credits:

Margo Humes, Keith Worley



Cathedral Pines- A Case Study from the Black Forest Fire 2013

Introduction

The Cathedral Pines subdivision was one of the first communities hit by the Black Forest Fire on the afternoon of June 11, 2013. Mutual aid fire departments converged on the area in the hope of containing the fire. High winds and heavy fuels southeast of Cathedral Pines prevented containment. Wildfire entered the community as a crown fire and ember blizzard. The fire passed quickly through the area and continued its eight mile run that same afternoon.

Cathedral Pines Development History

Development began in late 1990 and developed in four phases. Mitigation was done by the developer before construction. Trees were limbed and thinned. Ladder fuels and brush removal was also done. Wide paved roads were installed with highly visible house numbers. Roadside ditches are kept free of invading ponderosa pine seedlings. An overall community map is shown in Figure 1.

Number of homes sites: 175

Average lot sizes: 2.5 to 5 acres

Number of homes lost: 1

Covenants require fire resistant building materials. For the seven years prior to and at the time of the fire, these were a requirement of the fire code for the Black Forest Fire Protection District which require wildfire mitigation and interior sprinklers on homes over 6,000 square feet (based on fire flow of local jurisdiction). Alternatives were installation of cisterns or hydrant systems, or financial contribution to a Rural Water/Fire Fund.

Wildfire Impacts

Visually, there was an obvious change in fire behavior at the outside boundary of Cathedral Pines. Crown fire, in thick timber outside of the community, dropped to the ground. The fire still burned hot enough to scorch some trees. Ground fires were broken and erratic, and burned off most ground litter (needles) without major soil impacts. Vigorous regrowth of grasses occurred within one month. Some minimal soil erosion is occurring in drainages, but unlikely to cause major damage.

The wildfire intensity map below (Figure 2) shows the general location of Cathedral Pines within the Black Forest Fire's western burn area. Highest intensities show up as a dark green color. Intermediate burn rates show up as a brown to rust color. Lowest intensity burn areas are tan to pink. Unburned areas show up as pink to red. Roads and roofs show up as white.



Figure 2, Black Forest Fire Infra-red burn intensity map (source: NASA)

One home at the southwest outside boundary (13420 Darr Cir) experienced structural damage. It appeared to be an ember ignition on wood deck. A vinyl soffit was melted by heat from the adjacent ground fire with crown fire 10+ feet to south.

A single home burned (12825 Tewksberry) with no evidence of surrounding burn in tree crowns. Likely ignition of the structure was by embers blown from the southwest. Note the condition of the surrounding forest in which no tree crowns were burned (Figure 3).

1/19/14

Some scorching of needles on lower branches did occur. Trees lost on this lot were due to heat from the structure.



Figure 3, Tewkesberry home loss and surrounding forest. Photo by M. Humes

Significant crown fire runs were evident southeast of Cathedral Pines with a high percentage of home loss along Darr Circle. Estimates of fire behavior in Cathedral Pines are: <10% crown fire, 15% scorched, and 30% ground fire throughout.

The meadow to the west of Winslow Dr. was an effective fuel break between forested areas.

Lots were purchased with mitigation completed. However, many homeowners have not yet addressed maintenance and numerous ponderosa pine seedlings are present. Some homes have additional landscaping that will reduce the effectiveness of forest thinning with regards to ignition potential in the future. The area was mitigated to begin with. Then, homeowners have re-introduced landscaping material which may negate some of those benefits.

It was observed in several areas that mulch contributed to tree damage in several areas of low ignition potential. Reinforce that mulch can ignite and should not be used in conjunction with other combustible materials, plants or adjacent to structures.

Defensible space in 0-5 feet is compromised by landscaping in at least 30% of homes. This is a hazard for individual homes.

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A forester involved with the community's developer in 2006 stated the following:

"I am pleased to report that on-going forestry work being performed at Cathedral Pines will significantly reduce the risk of catastrophic wildfire. During my inspections of the property, I also observed that thinned stands of trees were treated to levels that will improve forest health resulting in less potential for mountain pine beetle outbreaks. It was impressive to observe the amount of ground vegetation already returning that will improve forage for wildlife."

Several other items were noted. These are:

1. *Increased tree spacing will reduce crown fire potential within continuous stands of trees.*



Forest Thinning in Cathedral Pines. Photo by K. Worley, 2006

2. *Ladder fuels have been treated high enough to keep a low intensity ground fire from becoming a raging crown fire.*



Ladder fuel pruning in progress at Cathedral Pines. Slash was chipped and spread evenly over the site. Photo by K. Worley, 2006

3. *Clearing debris (slash) has been retained on site and returned to the forest floor where it can be recycled by the remaining trees. This also avoids placing any further burden on limited land fill space. Mulch, if applied evenly to the forest floor, will also reduce drought stresses on the trees. Most importantly, the timeframe of increased wildfire risk due to accumulations of clearing debris has been eliminated. Merchantable size material has been removed for use as firewood or sawlogs.*
4. *Road right-of-ways have been cleared of all debris and provide excellent fuel breaks as currently constructed. The community has multiple access points that will provide escape routes for not only the residents of Cathedral Pines, but also the surrounding neighborhoods.*



Cathedral Pines roadway clearing in progress. Note un-thinned forest on right, outside of the community. Photo by K. Worley, 2006

- 5. Aesthetics have been improved significantly. The former forest condition of heavy, “dog hair” stands was not only a severe fire hazard, but also detracted from the aesthetic value of the property. I also noted you have retained trees in various age classes that will provide diversity aesthetically, and which will also avoid susceptibility of the forest to any one insect or disease. The retention of crooked and uniquely shaped trees, as you have done, is an excellent way to maintain a more natural appearance.*



*“Dog hair” (thick as the hair on a dog’s back) ponderosa pine stand abutting Cathedral Pines.
Photo by K. Worley, 2006.*

6. *Numerous old stumps were observed. It should be noted that no “virgin” or “old growth” timber was found. The forest is all “second growth” forest that returned after the logging/harvesting done in the late 1800’s and early 1900’s. The overly dense stands that replaced the original open grown, fire resistant forest has resulted in significant fuel loading that can lead to catastrophic wildfire. The well-intentioned, but misguided policy of suppressing all wildfires over the course of the last 100 years exacerbated this hazard. The forestry thinning and harvesting you are doing will help the remaining forest become more fire resistant.*



Maintenance of stand age class diversity in Cathedral Pines. Photo by K. Worley, 2006

7. *Tree health and vigor should increase over the next 3-5 years. I have observed increases in tree growth rates in thinned stands of 300 to 1,000 percent.*
8. *Water, for firefighting, is now available for both structural and wildland firefighting. The water features and ponds have been upgraded with “dry hydrants” for structural firefighting. These can also be utilized by helicopter water buckets for water drops on wildland fires.*
9. *The subdivision has been rated using the Colorado State Forest Service wildfire hazard rating form. As currently constructed, Cathedral Pines will have a “Low Hazard” rating of 29 (See attached form and criteria). Adjacent subdivisions would rate as “High Hazard”.*

During our on-site meetings we discussed the architectural guidelines for your future homeowners. You noted that homeowners will be required to use fire resistant building materials. This, coupled with the forest fuel reduction, will significantly reduce the risk of homes destroyed by wildfire.” (Excerpt from a letter, by Keith Worley, to Paul R. Thompson, Partner, Cathedral Pines dated July 12, 2006. Photos added from file.)

Discussion

Forestry and fuel mitigation done as part of the subdivision development process contributed significantly to lower fire intensities than those experienced in neighborhoods directly abutting the community. Cathedral Pines experienced the same wind event. Several key differences should be noted:

1. Firefighter safety was not compromised while defending homes. Defensive efforts were minimized and allowed limited engine and crew resources to defend multiple structures. Water use for firefighting was also minimized.

2. Good access and survivable spaces (D-spaces) allowed fire crews to remain in place as the wind driven fire burned through the community.
3. Firefighter safety zones were present at key intersections, community amenities and meadows.
4. Ladder fuels had been pruned and understory trees removed. Very few ladder fuels were present. Even in areas where young trees had been retained, the wind driven fire did minimal damage.
5. Wide roadway clearing limits acted as significant fuel breaks. The area along Winslow Drive is a good example of how a crown fire returned to the surface on the east side of the road. It appeared these have been kept free of invading pine seedlings by periodic mowing of all roadside ditches.
6. Tree losses were minimized in thinned and pruned areas. Ponderosa pine is a fire tolerant species capable of surviving lower intensity surface fires like those experienced in Cathedral Pines.
7. Heaviest tree losses occurred in areas abutting untreated surrounding properties and un-thinned open spaces.
8. Firefighting water resources constructed by the developer, in the form of water features and cisterns, were not used during the fire. The fire hit the community too quickly for these to be utilized.

Overall, Cathedral Pines sustained minimal forest damage and only one home loss. However, residents should not be lulled into a false sense of invincibility from wildfire. Concerns mentioned previously are the invasion of pine seedlings and crown closure occurring in young tree stands. Also noted were the use of combustible mulches and landscape plantings placed close to structures. These will continue to provide exposure to ember ignitions.

A series of post-fire pictures follows.



Wildfire behavior in Cathedral Pine from the Black Forest Fire in thinned and pruned ponderosa pine regeneration, Windhaven Place. Photo by K. Worley, 2013



Wildfire behavior in Cathedral Pine from the Black Forest Fire in thinned and pruned ponderosa pine regeneration, Windhaven Place. Photo by K. Worley, 2013

1/19/14



Surface fire pushed by strong winds in Cathedral Pines along Windhaven Place. Photo by K. Worley, 2013



Wildfire impacts along the west side of Winslow Drive at the southwest corner of Cathedral Pines. Area on the left is outside the subdivision and unthinned. Photo by K. Worley, 2013

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Wildfire impacts along the east side of Winslow Drive in Cathedral Pines. The crown fire dropped to the ground as a surface fire through this property. Photo by Keith Worley, 2013



Wildfire impacts along the west side of Winslow Drive next to Cathedral Pines. The crown fire dropped to the ground on the east side of Winslow. Photo by Keith Worley, 2013

1/19/14



Neighborhood abutting Cathedral Pines, 2006. Note red circled tree in this photo and the post-fire photo below. Photo by K. Worley



Neighborhood abutting Cathedral Pines, 2013. Note blue building in the 2006 photo above has been repainted red. Photo by K. Worley

1/19/14



Cathedral Pines east boundary at Vessey Road. The fire remained a surface fire across the entire subdivision until it reached un-thinned fuels on the left and resumed its crown fire behavior. Photo by K. Worley, 2013



Burn area at Vessey Road inside Cathedral Pines. Photo by K. Worley, 2013

1/19/14



Burn area at Vessey Road inside Cathedral Pines. Photo by K. Worley, 2013



Representative fire behavior in “dog hair pine”, Black Forest Fire. Photo by M. Humes.

Appendix B
Black Forest School Section 16
Management History and the Effect on Fire Behavior

Part of the:

2013 Black Forest Fire Assessment Report

Pikes Peak Wildfire Prevention Partners

January, 2014

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Larry Long, Dave Root



Findings of the CSFS team on the Effectiveness of Fuel Treatments During the 2013 Black Forest Fire

- Five grant sponsored fuel treatments are located within the Black Forest Fire (BBF) perimeter. The first, a defensible space treatment was located directly in the path of the fire when it made an eight mile run in the first burning period. The house was located in a meadow area approximately four acres in size. All of the trees located around the meadow were completely consumed. The structure was destroyed from an ember shower, not direct flame impingement. The trees adjacent to the structure had needle scorching, but were not consumed; this was a result of super-hot air from the main fire. The second, a fuel break located in the area of Highway 83 on the northwest part of the fire. The fire dropped to the ground when it hit the area of the fuel break and in conjunction with the forest road became the perimeter of the fire. It appears that aircraft may have used the fuel break to lay down water and retardant drops. Third is a defensible space treatment on a property on Black Forest Road north of Swan road in the heart of the eight mile run. This home survived although the trees were severely scorched by hot air. The combination of D-space and firewise construction were responsible for saving the home while all other homes in the vicinity were lost. Fourth, is a fuel break and dwarf mistletoe treatment on Wolford Elementary School property immediately south of the school. Heated air severely scorched most of the trees, but the fire dropped to the ground in this area. Fifth, is a three acre fuel break located along Black Forest Road south of Gun Club Trail. Again, super-heated air killed most of the trees, but the fire burned on the ground in the fuel break.
- A forest ag property located at the northeast part of the fire has years of thinning along the ranch roads resulting in the creation of shaded fuel breaks. These areas were used to burn out along the active fire line and as drop points for retardant, resulting in the fire being halted in these areas and control lines being created.
- The Cathedral Pines area was treated before any homes were built. As a result of the fuel treatments the fire fighters were able to stop the fire along the HOA's boundaries. One structure burned as a result of spotting into the area, not from the main body of the fire.
- The Pineries Ranch area is located in the southeast area of the fire and was at the end of an eight mile run on the first day. Due to the open nature of the area from years of forest thinning and road building, the fire was able to be controlled

in this area and stop the easterly run. Many trees were killed from super-hot air when the fire initially blew into the area.



Pineries Ranch- 100% needle scorch on mature trees from super-heated air
(Photo by K. Worley)

- State Land Board section 16 was completely burned in the fire. Years of forest management and fuel break creation resulted in only 20-25 acres of crown fire in the 640 acre section and most of the section having only a surface fire with individual torching. The cost of the fuel break treatments averaged \$750 per acre; however; the section will recover naturally without any rehabilitation costs other than hazard tree removal in the trail corridor.



Section 16, Low intensity under-burn (Photo by L. Long)



Section 16, Surface fire through thinned forest stand (Photo by L. Long)



Section 16, Surface fire with minimal needle scorch (Photo by L. Long)



Section 16, Surface fire with minor damage to regeneration (Photo by L. Long)

The following photos are within a demonstration project implemented by the Pikes Peak Wildfire Prevention Partners in 2008. Fire burned through the demo area during the Black Forest Fire. In the final two photos, taken on August 8th 2013, note the rapid recovery from the fire.



PPWPP Black Forest Demo Project 2008 (Photo by D. Root)



PPWPP Demo area in progress 2008 (Photo by D. Root)



PPWPP Demo after Black Forest Fire 2013 (Photo by D. Root)



PPWPP Demo after Black Forest Fire 2013 (Photo by D. Root)

Appendix C

Firefighter Survey

Part of the:
2013 Black Forest Fire Assessment Report
Pikes Peak Wildfire Prevention Partners
January, 2014

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Firefighter Survey from the Black Forest Fire 2013

By Pikes Peak Wildfire Prevention Partners

Introduction

Before the smoke had even cleared, concerns were raised by residents impacted by the Black Forest Fire that wildfire mitigation was not effective in saving their homes. Claims were, “We mitigated our property and the fire still burned it down.” The Pikes Peak Wildfire Prevention Partners (PPWPP) was asked to investigate these claims. In the course of early discussions with state officials, it was found much of the information about successful homeowner mitigation could only be provided by the front line firefighters who were involved in structure protection during the fire. It was also noted this information tended to be anecdotal and of minimal use to policy makers. Therefore, PPWPP set out to interview and survey these same firefighters.

Methodology

A survey form was developed to allow firefighters to relate their experiences. A series of questions were developed to determine the effectiveness, in the heat and smoke of the event, whether defensible space and wildfire mitigation were effective. Many of the questions were open-ended and allowed the respondents to provide their professional opinions, while assessing their state of mind. It was also felt that timing was of the essence to capture their insights while still fresh in their minds.

Initially, efforts were made to interview firefighters. It was quickly learned this was too time consuming and would limit the sample size. The survey was then sent out to fire agencies known to have responded to the fire. Preference was given to departments on-scene during the first twenty-four hours. This window of time was important given the two extreme wildfire behavior periods. The first occurred on the afternoon of June 11th (fire burned eight miles to the east), and the second on June 12th (fire burned five miles to the north). Most of the homes lost were during these two burning periods.

Analysis

Forty-six survey forms were returned. All written responses were then tabulated. These are included at the back of this report. Questions were then grouped under several categories of related subjects. This allowed a cross-check of responses for consistencies. One example is the series of questions on hazards encountered, additional challenges and “close calls”. It was noted that firefighter experience affected

the category under which the response was given. An experienced firefighter might see it as a hazard, while a less experienced firefighter might see it as a close call.

Summaries of each category of questions are provided, and supported by data from the charts that follow. In some cases, a side-by-side comparison is given.

SUMMARY

- Fire fighters were in agreement that mitigation worked. However, of the homes that burned, the level of mitigation was insufficient to save them.
- Even where mitigation was apparent, fire crew safety took first priority. If escape routes and safety zones were inadequate or missing, fire crews moved on to structures that stood a greater likelihood of safety and success. Where fire conditions were less extreme, fire fighters made diligent attempts to defend all structures, including un-mitigated homes.
- Time was of the essence during the extreme burning conditions. Defending homes with minimal or no defensible space cut in to the time that was allowed to protect other homes.
- The difficulty of fighting this fire was compounded by aging housing stock that possessed several features that prevented safe and effective fire fighter intervention. Barriers included narrow driveways and inadequate turn-around radii for fire engines, dense trees on either sides of the driveways that simultaneously ignited during the fire event, and un-thinned, “dog hair” trees in and around homes and right-of-ways.
- The fire’s rapid rate of spread, brought on by erratic winds and bolstered by heavy fuel loads created secondary hazards, such as heavy smoke and low visibility that obscured street signs critical to fire fighter orientation and escape.
- Another critical secondary hazard was inadequate communication among fire fighters due to lack of cell reception and incompatible radio frequencies between ground crews and air fleet

In conclusion, whereas several uncontrollable factors were in play, such as weather-related and drought-stricken conditions, most of the variables that resulted in the loss of structures were preventable had there been adequate mitigation and more emphasis of the creation of defensible space. This observation is by way of comparison to another subdivision within the Black Forest fire that stood in contrast to the burned home areas and sustained the loss of only one home due to the implementation of several controllable factors (see Cathedral Pines report)

Wildland Interface (WUI) dwellers may not fully understand the concept of defensible space. This was evidenced by properties where trees were pruned, but left too close

together, combustible mulches were up against structures, even though the property had been cleared, or wood stacks piled too close to homes.

The observations provided by the 46 fire fighters who responded to this questionnaire come from a highly trained and experienced group of professionals who between them, brought 498 years of experience to the Black Forest Fire.

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I. Hazards Encountered, Additional Challenges and Close Calls

Fire fighters are accustomed to working under dangerous conditions. They consider this to be an occupational hazard of their profession. The benefit of undertaking this assessment one month after the State's largest catastrophic wildfire provides a unique opportunity to capture their most vivid and visceral responses to the situation in which they found themselves and the intensity of their experiences in an area long known to wildfire specialists as "a train wreck waiting to happen".

Respondents were first asked to list "Hazards Encountered" (table 1-a) followed by "Additional Challenges" (table 1-b) regarding the risks they confronted during the Black Forest fire. They were also asked to list "Close Calls" (table 1-c). All 46 respondents answered the first question with extraordinary recall of the event as they experienced it. Not surprisingly, there was a great deal of replication throughout these three broad categories.

Visibility was the single greatest variable that surfaced in all three questions and received the highest overall risk weight of **(29%)**. Respondents reported being blinded and disoriented by heavy smoke. For those who reached the scene at night, the combination of the smoke and darkness further intensified their disorientation and perceived risk.

"The biggest challenge was working nights. I've never been so disoriented".

Many respondents reported burned down street and traffic signs, or signs obscured by smoke. In one example listed under "Close Calls", the obscurity of a street sign leading to an escape route put one respondent at risk of being entrapped by encroaching fire. As this respondent reported,

"We were trapped by the end of the road. (We) could not see street signs, so we passed our 'get-out' road."

Infrastructure, i.e., downed power lines, narrow roads/driveways, inadequate ingress and egress - the latter of which characterizes the aging subdivisions within the Black Forest fire zone, was given a second overall risk weight of **(24%)**. Responses included insufficient space for line set-up, engine turn-around, and inability to safely back down driveways. Crushed/melted culverts added further fears of entrapment, as did the aforementioned melted street/stop signs. Narrow driveways, coupled with sharp drop-offs, and fire within the heavy tree-lined edges of driveways/roads were specifically mentioned under "Hazards Encountered". In terms of "Close Call" experiences, two respondents reported being caught on a narrow road during a crown fire. In perhaps the most poignant recounting, one fire fighter attempted to evacuate residents but had to turn back when the fire blew up. The residents became the two casualties of the Black Forest fire.

Fuel Load was weighed as a separate, but distinct risk factor of **(12%)**, given the abundance of vegetation and dry fuels. Coupled with **Weather/Fire Behavior**, a

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weight factor of nine percent (**9%**), the combination of the two acted as a conduit to the fast moving and erratic fire reported by respondents under “*Close Calls*”.

Other “Close Calls”: Six respondents described being overrun by crown fire (one respondent three times), being trapped when fire blew up around them, and in one instance, getting a truck stuck while trying to outrun the fire. Four respondents reported barely escaping a roof collapse while inside a structure, from a water-drop from a Blackhawk helicopter.

Communication Barriers: A risk factor barely alluded to under “*Hazards Encountered*”, barriers in communication emerged as a significant obstacle by respondents under “*Additional Challenges*”, (**27%**) and the second highest risk factor under “*Close Calls*” (**10%**). Lack of cell phone reception made it difficult to account for fire crews; and incompatible radio frequencies between ground crews and aircraft, coupled with confusion over the role of other first responder units added to the lack of clear communications. In the case of the roof collapse, one of the respondents attributed the near miss to bad air/ground communication. Poor maps or the lack thereof to assist fire fighters was also listed under “*Other Challenges*”.

Traffic Obstruction, i.e., streets congested by vehicles, abandoned animals, emergency vehicles and evacuees was given a risk weighting of eight percent (**8%**) as other hazards encountered. Although respondents expressed appreciation for the National Guard and military units in managing ground traffic, other fire fighters voiced that their presence posed obstacles in their ability to navigate within the tight spaces. Two respondents reported cars driving too fast for the conditions.

Significantly, (**51%**) of respondents reported no close calls. This may correlate back to the high degree of experience and training reflected by this particular group of veteran fire-fighters (See ***Fire Fighter Experience in Section III.***) It may well be that such experience and training paid off during this fire.

Overall, unprecedented hot, dry weather, coupled with aging subdivisions nestled in an overly dense forest created extreme challenges that forced fire fighters to rely on their experience, skill and navigational instincts. As one respondent reported,

“You could tell fire progression by sound progression, e.g.,- tires popping, propane tanks exploding, ammunition going off”.

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II. Evidence of Mitigation, Reaction to Mitigation Condition and Effect on Decisions, Strategies and Tactics

“Citizens need to grip reality. They are the first person responsible for their homes. They need to own this responsibility. This is the first step to saving a home. With development in the wild land area, these disasters are going to happen”.

Mitigation works! That’s the central message firefighters have to impart to residents who live in fire prone areas. That being said, properties with adequate escape routes and safety zones matter even more. Catastrophic fires are changing the mindset about how fires are being fought, and the conditions under which fire-fighters will place themselves at risk. Homeowners must follow suit by taking more responsibility in this era of heightened awareness.

I got upset that the elementary school had no mitigation at all. They teach kids!

Level of Mitigation: Seventy- six percent (**76%**) of respondents indicated that mitigation was evident (*table 2-a*), but when asked to respond to the *level* of mitigation only (**21%**) of the respondents answered this question. Of the (**12%**) who said they could *not* tell if properties had been mitigated, all responded that the lack of visibility due to smoke and darkness prevented them from being able to know. Partial mitigation was reported by only seven percent (**7%**) of the respondents – all of whom reported some aspect of mitigation. When asked if the majority of homes in the Black Forest Fire area were mitigated, *no respondent indicated this to be the case*, and only seven percent (**7%**) indicated that at least half of the homes appeared to be. Fourteen percent (**14%**) recounted *some* level of mitigation, such as pruned trees, but with no defensible space; or mitigation of trees, but evidence of wood mulch or flammable shrubs up against the house, and/or, stacked wood too close to structures.

“The property was mitigated but then the mulch caught fire and extended to the structures. When the home owners came back in, they replaced the burned mulch with new mulch. We advised them that that was a poor idea, but they ‘liked the look’ ”

Fire-Fighter response to mitigation. When asked “How did you feel?” (*table 2-a*) when fire-fighters encountered both mitigated and unmitigated properties, respondents conveyed both objective and attitudinal responses. As one respondent asserted,

“(I was) shocked at the lack of preparation, even though it was well known that Black Forest was susceptible to fire”.

For reasons unknown, the drop-off rate for these questions rose appreciatively when respondents were asked a series of questions pertaining to decision-making based on evidence of, and level of mitigation. For instance, when asked if evidence of mitigation had an effect on decisions to protect unmitigated properties, (**39%**) of respondents said that it did (*table 2-b*). Twenty two percent (**22%**) of respondents however, did not answer this question. The exception was the number of concerns about fire crew safety, (*table 2-c*) which comprised (**36%**) of the responses, i.e.,

“we tried to save all we could with fire fighter safety as the number one concern”.

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(It is significant to note that the June 2013 event preceded the Arizona fire that happened a month later when 19 experienced fire fighters lost their lives in a comparable catastrophic fire).

Protection of Surrounding Properties: Similarly, decisions to protect *surrounding properties* were contingent upon many of the same variables (*table 2-c*). Thirty-four percent of respondents (**34%**) stated that mitigated conditions of contiguous properties drove decision-making, with fire crew safety being the most significant factor (**19%**), followed by fuel load/fuel type at seven percent (**7%**).

“We noticed that the fire moved through the timber, so if the property was mitigated but the adjoining property had no mitigation, then some of the homes were still lost. . . Too bad.”

Attitudinal Effect on Decision-making: Whereas respondents expressed strong opinions such as frustration, discouragement and anger toward the lack of mitigation undertaken by residents, (**21%**) (*table 2-d*) and likewise, appreciation toward those who had (**23%**), the greatest number of factors leading to the decision to protect, and the strategies used was almost exclusively contingent upon the overall odds of saving a home (**49%**) (*table 2-d*). Factored into this was the extent of time needed on the property, and the amount of time such work would take.

“The less mitigation done, the harder it (the home) was to save.” . . . “If too much mitigation was needed, little to no time was spent on that structure”.

The important factors listed included a positive attack plan prior to fire-front arrival; sufficient defensible space in which to work, such as being able to navigate a brush truck; adequate ingress/egress; and the ability to keep the fire on the ground and controlled. Fourteen percent (**14%**) of the factors listed were based on the amount of time needed per structure, as compared to the number of properties needing protection. All told, out of the **27** respondents who replied to the question of success rate in saving homes, (**44%**) indicated that they were able to save most of the homes, and (**39%**) reported success some, or half of the time. Only one respondent who answered this question reported knowing of at least one lost home.

Unsympathetic responses were noted by respondents over the lack of mitigation & homeowner responsibility (**21%**) (*table 2-b*)

If there's a tree on your property that's more important than your home, then live in it!

However, there was a corresponding sentiment of regret and sadness expressed by respondents for those same homeowners who had lost their homes (**16%**). While frustrated, fire fighters nevertheless relied on triage, and not their opinions to perform their jobs. That being said, *mitigated* homes had a strong effect on morale. Thirty seven percent (**37%**) of the responses reflected that homeowner mitigation made a difference in increasing fire-fighters' odds of success by minimizing the amount of work necessary to be undertaken on such properties, so that time could be spent saving more homes.

“(I) felt overjoyed – raw joy like unicorns and rainbows!”

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III. Fire Fighter Experience

The **46** fire fighters who responded to the questionnaire have **498** years of accrued fire-fighting experience, including six who fought the Waldo Canyon fire (*table 3-a*).

Although they do not represent a randomized sample of the total number of fire fighters who were deployed on the Black Forest fire, the acquired experience and knowledge of this seasoned group of professionals provides insights based not only on their fire-fighting expertise, but also on their years of experience being on the front line.

Why Homes Survived/Why Homes Burned

Respondents were asked their opinions as to why some homes survived while others did not. Thirty two percent (**32%**) of the responses attributed the survivability of homes to adequate **Defensible Space**. Destruction due to **Wind/Fire Behavior**, mentioned (**22%**) of the time as the most *uncontrollable* variable of this particular fire, was largely dependent on manageable factors, such as the effectiveness of mitigation, space in which to work, and brush clearance by residents. Nevertheless, strong opinions were expressed regarding the degree to which any home could be saved in extreme fire/weather conditions.

“No amount of mitigation will help against a running crown fire”

Fire resistant materials used in home construction was mentioned eight percent (**8%**) of the time by respondents as the reasons why homes survived. Despite a healthy understanding of fire science, the fire’s veracity compelled ten percent (**10%**) of respondents to attribute the survivability of homes to **Outside Forces** – in this case, plain *good luck!*

Are all homes defensible? Unequivocally “No” , according to (**96%**) of respondents. (*table 3-b*).

“Mitigation increases the chances, but there is never a total guarantee”.

Professional Pride shone through in every instance when asked personal viewpoints about mitigation, homeowner responsibility, or how priorities are made with regard to saving properties. Fifteen percent (**15%**) of the time, fire fighters mentioned that despite their opinions, they put their personal feelings aside when fighting a fire.

“My feelings don’t go into it. It’s not an arbitrary decision. It’s based on time and experience”; or “My attitude didn’t impact tactics, but the logistics of saving an unprotected house did; and “No. It’s part of being a professional. You set that stuff aside and try to do what you can”.

This in part, may explain the high “no response” rate pointed out earlier to questions such as how decisions were made based on the mitigated conditions of properties.

Take Away Messages to Fire-fighters: As has been the theme throughout the questionnaire, emphasis on safety has been the overriding concern of respondents, as follows:

- **Mental Preparedness (27%)** Stay aware, be aware; think clearly; remain calm; be patient; slow down; use good judgment; be well-briefed; and mentally prepare for mass destruction.

Keep (your) head on a swivel

- **Safety (23%)** Monitor crew safety; speak up when uncomfortable; don't be afraid to turn down assignments; know when to walk away; always have a way out (escape route); put right people in right positions; have a safety zone around structures, and have an adequate communication system and plan in place.
- **Training/Experience (16%)** Know 18/LCES proficiently.
- **Exceptional Planning (16%)** Be prepared for anything; plan in place; know your equipment.
- **Prepare for Extreme Conditions (13%)** Be aware of extreme weather conditions; realize the situation can change in a second; assume nothing; watch for climbing ladder fuels.
- **Collaboration (5%)** Be a team member; develop relationships with other fire departments.

IV. Recommendations to the Governor and State Legislators

- **More Funding and Resources (35%)**
More Air Support; more wild land apparatus, i.e., radios, tenders; more general purpose funds; funding for smaller fire departments; funding to affected communities ; more grant funds (unspecified).
- **Unified System of Delivery (29%)**
Fire risk needs to be viewed as a state problem; not a fire department problem; there needs to be state administered funds for implementation; a state dispatch system; a state data base for property assessments; a state focused CWFPP; an improved state website that is easy to navigate; consolidated fire departments, i.e., larger and fewer; and a more unified message and communication system.
- **Thanks! (13%)**
For making the National Guard and Army available; and for the air support.
- **Policy (10%)**
There needs to be an easing of environmental restrictions, i.e.,- timber cutting; and homeowner responsibility should be mandated.
- **Education for Decision-makers (6%)**
Positive impact of mitigation; research other options

I. Hazards Encountered, Additional Challenges and Close Calls

A total of 46 firefighters responded to the survey.

N= Number of firefighters that responded to the question.

M= Number of times category is mentioned in all responses.

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PTM= Percentage of total mentions.

1-a	HAZARDS ENCOUNTERED		1-b	ADDITIONAL CHALLENGES		1-c	CLOSE CALLS		
	M	PM		M	PM		M	PM	PTM
Visibility (33) Blinding smoke (25), driving in smoke (4), darkness (4)	33	29%	Visibility (10) Blinding smoke (4), disoriented in dark (4 'like' properties (2)	10	17%	Visibility (2) Fire moving in- couldn't see St. sign to get out 1); sight of rd (1)	2	4%	20%
Infrastructure (27) Downed power lines (15), melted/crushed culverts (6), roads/drives: narrow; backing down drives; sharp drop-offs (2), melted/missing St/ "stop" signs (2), tight turn-around radius(1), septic (1)	27	24%	Infrastructure (6) Water source: fire hydrant access too far away for tenders (3); roads/driveways: access to homes in tight driveways (1), tight turn-around for large trucks (1); power lines (1)	6	10%	Infrastructure (2) Roads/driveways: on a rescue when fire blew up on both sides. Rescue attempt ended in two fatalities (1); trapped by end of road on crowned-over fire on street (1)	2	4%	16%
Fuel Load (24) Falling, unstable trees (14), snags (6), embers (1), wood piles in yards (3)	24	21%	Fuel Load (3) Trees during back burning (1), dry fuels (1), ladder fuels (1)	3	5%	Fuel Load (0)	0	0%	12%
Traffic Obstruction (9) Evacuees (3), abandoned animals (2), congestion : cars, FD vehicles (2), driving too fast (military) (2)	9	8%	Traffic Obstruction (2) Abandoned animals (1); working in limited spaces (1)	2	3%	Traffic Obstruction (2) Helping evacuees too close to fire (2)	2	4%	6%
Weather/Fire behavior (8) Erratic, shifting winds (3), active fire (3), intense heat(2)	8	7%	Weather/Fire behavior (6) Speed of fire/ expansion in mult directions (3) wind (1) temp	6	10%	Weather/Fire behavior (6) Fire blew (2), overrun by cr n fire (2), car stuck (1) overrun 3X (1)	6	12%	9%
Hazmat Elements (6) Propane tanks (3) gas lines igniting (1) ammo (1) other	6	5%	Hazmat Elements (0)	0	0%	Hazmat Elements (0)	0	0%	3%
Communication Barriers (3) Lack cell phone reception (2), unknown assignments (1)	3	3%	Communication Barriers (16) Gen (4) radio issues: (9) no compatibil w/ strike teams, poor commun w/ aircraft; bad receipt in area; hvy radio traffic; non-fire interruption w/ civil teams; confusion w/ other units	16	27%	Communication Barriers (5) Communication confusing (1), Army helo dropped water w/ no communication – was almost hit by it while inside burning structure (4)	5	10%	11%
Wellbeing Concerns (2) Breathing difficulty (2); fatigue (1)	2	2%	Wellbeing Concerns (1) Hungry; sleepy (1)	1	2%	Wellbeing Concerns (0)	0	0%	1%
Lack of Resources (0)	0	0%	Lack of Resources (10) Maps: poor/none (4); not enough fire fighters (3); not enough engines (2); Couldn't access resources (1)	10	17%	Lack of Resource (0)	0	0%	5%
FF Proficiency (0)	0	0%	FF Proficiency (2) Following chief's decision felt unsafe (1); fairly new driver (1)	2	3%	FF Proficiency (2) "0" leadership (1); sev 10's & 18's violated by command staff (1)	2	4%	2%
Structural (0)	0	0%	Structural (0)	0	0%	Structural (1) Roof collapsed while inside – missed team by 6' (1)	1	2%	0%
Time Factors (0)	0	0%	Time Factors (1) Limited time @ homes; and to cover (1)	1	2%	Time Factors (1)	1	2%	1%
Responded "None"	1	1%	Responded "None"	0	0%	Responded "None"	25	51%	12%
Not Applicable to Assignment (1)	1	1%	Not Applicable to Assignment (1)	2	3%	Not Applicable to Assignment (1)	3	6%	3%
No Response Provided (0)			No Response Provided (3)			No Response Provided (5)			

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II. Evidence of Mitigation; Attitude Toward Mitigation Condition; & Effect on Decisions, Strategy & Tactics

A total of 46 firefighters responded to the survey.

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PM= Percentage of firefighters who mentioned the category.

PTM= Percentage of total mentions.

2-a EVIDENCE OF MITIGATION (N=42)	M	PM		LEVEL OF MITIGATION (Observational N=42))	M	PM
Yes: (32) If mitigation was significant (2); if mitigated around home (1); "yes" only comments (29)	32	76%		Most: (0)	0	0
Sometimes: (3) Examples of comments: Many homes had pruned trees; no defensible space	3	7%		Half: (3)	3	7%
No: (5) Too smoky to tell; too dark; couldn't tell first day	5	12%		Some: (6)	6	14%
N/A: (2)	2	5%		No Response: (32)	32	76%

2-b ATTITUDINAL EFFECT ON DECISION TO PROTECT UNMITIGATED PROPERTIES N=46	M	PM		DID LEVEL OF MITIGATION HAVE EFFECT ON STRATEGIES & TACTICS? N=44	M	PM
Yes, affected decision: (18)	18	39%		Yes, it did: (16)	16	36%
Sometimes: (10)	10	22%		No, it didn't: (5)	5	11%
No, it did no: (4)	4	9%		Don't Know: (5)	5	11%
N/A: (4)	4	9%		N/A: (2)	2	5%
No Response: (10)	10	22%		No Response: (16)	16	36%

"(I was) shocked at the lack of preparation, even though it was well known that Black Forest was susceptible to fire."

II. Evidence of Mitigation; Attitude Toward Mitigation Condition; & Effect on Decisions, Strategy & Tactics

A total of 46 firefighters responded to the survey.

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PM= Percentage of firefighters who mentioned the category.

PTM= Percentage of total mentions.

REACTION TO MITIGATED PROPERTIES N=40 2-c			REACTION TO UNMITIGATED PROPERTIES N=37		
	M	PM		M	PM
+ Odds of Saving Home (21) Could make a difference (12), hopeful (2), brush truck could navigate (1) place to anchor (1) focus on other structures (4) could hold more homes with one engine(1)	21	37%	- Odds of Saving Home (7) Not savable (3); harder to save (4);	7	18%
Less Work (1) Made job easier (1)	1	2%	More Work (6) A lot of work to do; (2) made job harder (4)	6	16%
Saved time (6) Less sense of urgency (2); time saved = focus on other efforts (4)	6	11%	Working Against Time (6) Time was against us (3), worried about getting house mitigated in time (3);	6	16%
Felt Safer (4) Safe (3); safe haven (1)	4	7%	Felt Less Safe (1) Trapped, congested, at-risk (1)	1	3%
Attitudinal Responses			Attitudinal Responses		
Appreciate Residents Efforts(13) Effort (3), cared enough (2), learned from Waldo; (2); took responsibility (6)	13	23%	Frustration, Discouragement Toward Resident (8) Less likely to put forth effort (2); overwhelmed (2); angry (3)	8	21%
Sadness for homes lost (2) Lost home was mitigated & made me feel bad (1); wondered why? (1)	2	4%	Sadness for Resident (6) Felt bad for their loss (5); disappointed for homeowner (1)	6	16%
Professional Pride as FF(8) Felt good FF could be successful (8)	8	14%	Professional Pride as FF(2) Just acted as a professional	2	5%
N/A: (2)	2	4%	N/A: (2)	2	5%
No Response: (6)		14%	No Response: (9)		24%

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II. Evidence of Mitigation; Attitude Toward Mitigation Condition; & Effect on Decisions, Strategy & Tactics

A total of 46 firefighters responded to the survey.

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2-d ATTITUDINAL EFFECT ON DECISION TO PROTECT UNMITIGATED PROPERTIES N=30				MITIGATION & EFFECT ON STRATEGIES & TACTIC			
	M	PM		M	PM	PTM	
+/- Odds of Saving Home (4) Availability/priority of Resources: (3) , i.e., retardant availability; Depended on what crew was able to do (1);	4	12%		+/- Odds of Saving Home (10) Contingent upon: establishing a positive attack plan, i.e factor in effectiveness prior to fire-front arrival (3); (1) ability to work within D-space; (2); could finish the mitigation efforts (2); ability to triage (2) kept fire on ground -controlled	10	25%	19%
Extent of Work Needed (3) contingent upon level effort needed (3)	3	9%		Extent of Work Needed (7) Level of assistance needed (6); easier if mitigation done (1)	7	18%	14%
Time Pressures (3) Yes- If too much time was needed (1), mitigated if time permitted (1)	3	9%		Time Pressures (9) Weighed amt time needed per structure vs. time devoted to other properties, (9)	9	23%	16%
Safety Concerns (14) Crew safety weighed the heaviest (14)	14	42%		Safety Concerns (12) Crew safety first priority (12); bad mitigation = no crews (1)	12	30%	36%
Attitudinal Responses				Attitudinal Responses			
Sadness for Resident				Sadness for Resident			
Professional Pride as Firefighter(5) Put feelings aside to do job	5	15%		Professional Pride as Firefighter (0)	0	0%	7%
N/A: (4)	4	12%		N/A: (2)	2	5%	8%
No Response: (16)				No Response: (16)			
	33				40		

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II. Evidence of Mitigation; Attitude Toward Mitigation Condition; & Effect on Decisions, Strategy & Tactics

A total of 46 firefighters responded to the survey.

N= Number of firefighters that responded to the question.

M= Number of times category is mentioned in all responses.

PM= Percentage of firefighters who mentioned the category.

PTM= Percentage of total mentions.

MITIGATED/UNMITIGATED CONDITION OF SURROUNDING PROPERTIES AND EFFECT ON DECISION TO PROTECT 2-e				OTHER FACTORS AFFECTING DECISION TO PROTECT PROPERTIES AND SURROUNDING PROPERTIES				
N=45		M	PM	N=33		M	Pm	PTM
Definitely Affected Decision: (24)				All of the above: (23)		23	29%	34%
		24	42%	In response to factors mentioned in question; i.e., <i>Crew safety, LCES, long narrow driveway, heavy area fuels, home location relative to fuel/weather/topography, neighborhood mitigation.</i>				
Did Not Affect Decision: (11)		11	19%					
We were able to protect both								
Don't Know: (1)		1	2%					
Not Applicable: (3)		3	5%	Not Applicable: (7)		7	9%	7%
No Response: (6)		6	11%	No Response: (3)		3	0	7%
FACTORS TAKEN INTO CONSIDERATION				FACTORS TAKEN INTO CONSIDERATION				
Safety: (2)		2	4%	Safety: (24)		24	30%	19%
				Crew safety (9); Escape routes (ingress/egress) (8); safety zones (6), overhead power line (1)				
Fuel Load: (3)		3	5%	Fuel Load/Fuel Type: (6)		6	8%	7%
Infrastructure: (0)		0	0%	Infrastructure: (5)		5	6%	4%
				Narrow driveway/heavy timber on both sides				
Effective Triage (4)		4	7%	Effective Triage: (0)		0		
Triage decisions, i.e., saving the homes you can; due to point at which property joined fire; had to protect the woods from burning;								
Fire Behavior: (0)		0	0	Fire Behavior: (4)		4	5%	3%
Structure: (0)		0	0	Structure: (4)		4	5%	3%
				Construction materials (3), open deck (1)				
Resource Availability: (1)		1	0	Resource Availability: (2)		2	0	2%
Time: (2)		2	0	Time: (2)		2	0	3%

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Observations and Points to Consider:

While strong emotions were noted by respondents over the lack of mitigation & homeowner responsibility, there was also a corresponding sentiment of sadness that was expressed by respondents for the homeowners who lost their homes. While frustrated, fire fighters nevertheless relied on triage, and not their emotions to perform their jobs. That being said, mitigated homes did affect morale. 38% of respondents reported they could make a difference and could increase their odds of success.

“Felt overjoyed – raw joy like unicorns and rainbows!”

III. Fire Fighter Experience

3-a FIRE FIGHTER EXPERIENCE & YEARS ON JOB N=40		3-b IS EVERYTHING DEFENSIBLE IN FACE OF EXTREME FIRE? N=44
Accrued years of experience: 498		No: (41) 93%
		It Depends: on # of safety zones (1) 2%
		Not Applicable: (2) 5%
Average years of experience: 12	*	Comments by Respondents >5yrs exp.
Training: S130/90: (6); S131: (4); S133: (2); S211: (2); S212: (3); S215: (3); S290:(3); STEN: (1);CO Wildland Certifications: (3) Engine Boss Training:(3); Crew Boss Training:(1) Classes/Training:(4); Carson Hot Shot: (1); Air National Guard: (1);Waldo: (6); NWCG: (2)	Points to consider: A highly experienced crew of FF w/ 498 combined years of experience adds significant credibility to their responses & recommendations to homeowners, legislators, etc	Unforeseen conditions limit firefighting abilities; no guarantee (2); not at 2000 degrees; Mother Nature prevails; not unless resources immediately available; safety 1st for fire fighters; fire behavior unpredictable; not in drought or crown fires

IV Recommendations to Homeowners, Other Fire Fighters, Governor and State Legislators

THOUGHTS ON WHY HOMES SURVIVED/ BURNED N=43	M	PM
Defensible Space/ or Lack Thereof : (40) All mitigation; (23) i.e.ladder fuels, fuels in vicinity (5), dense trees, good defensive space (2),good prep by resident, brush clearance, sporadic mitigation, green grass	40	45%
Weather/Fire Behavior: (22) Wind-blown fire, drought	22	25%
Outside Forces (11) Luck (6); Bad Luck (1); Mother Nature (3) God (1)	11	12%
Construction Materials (8) Trex deck (1), rated shingles(1), other (6)	8	9%
Topography/Location (3) 3%	3	3%
Available Resources (3) Timely deployment, got there in time	3	3%
Structure Protection (2) 2%	2	2%

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MESSEGE TO HOMEOWNERS N=42	M	PM
Mitigate! (38) It's your responsibility (6) too much work, we'll move on (2); clear trash around home (4);don't put our lives at risk (3), mitigation works (2), etc. .	38	83%
Sorry for Your Loss (3) We did the best we could with the resources and conditions we faced.	3	7%
Thank You for Your Support (3)	3	7%
Support Tax + for Services (2) We pick up the check (1); remember us when asked to approve a tax increase (1)	2	4%
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"If there's a tree on your property that's more important than your home, then live in it!"

"I got upset that the elementary school had no mitigation at all. They teach kids!"

ADVICE TO OTHER FIRE FIGHTERS N=35	M	PM
Mental Preparedness (15) Stay aware, be aware; think clearly remain calm (5); patient; slow down; keep head on swivel; use good judgment; be well-briefed; mentally prepare for mass destruction	15	27%
Safety (13) Monitor crew safety (4), speak up when uncomfortable; don't be afraid to turn down assignment; know when to walk away (2); always have a way out (escape route); put right people in right positions; have a safety zone around structures, better communications necessary;	13	23%
Training/Experience (9) Know 18/LCES proficiently (5)	9	16%
Exceptional Planning (9) Be prepared for anything (6); plan in place; know your equipment (2)	9	16%
Prepare for Extreme Conditions (7) Extreme weather conditions (7); situation can change in a second; assume nothing; watch for climbing ladder fuels	7	13%
Collaboration (3) Be team member; relationship w/ other FD's	3	5%

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MESSAGE TO GOVERNOR; LEGISLATURE N=28	M	PM
More Funding/Resources (11) Air Support (3); wildland apparatus, i.e., radios, tenders (2); \$ in general (2); \$ to smaller FD's (1); to affected communities (1); more grant funds (1)	11	35%
Unified System of Delivery (9) View as a state problem; not a FD problem (2); state administered funds for implementation (2); state dispatch system (1); state data base for property assessments; state focused CWFP (1); Better state website (1); larger FD's – consolidate (1); unified messages (1)	9	29%
Thanks! (4) Making National Guard; Army available (3); air support (1)	4	13%
Policy (3) Ease environ restrictions - timber cutting (1), mandate homeowner responsibility (2)	3	10%
Education for Decision-makers(2) Positive impact of mitigation (1); research other options (1)	2	6%
Support for Fire Fighters (2) No more lay-offs (1); education (1)	2	6%

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SUCCESS IN SAVING STRUCTURES N=18	
Most of time: (8) 44%	<p><i>“We tried to save all we could with fire fighter safety as the number one concern”</i></p> <p><i>“The less mitigation done, the harder it was to save”</i></p>
Half of time: (4) 22%	
Some of time: (3) 17% Yes, despite lack of mitigation (2); depending on a retardant drop (1)	
Known lost homes: (1) 6%	
N/A: (2) 11%	
No Response: (28)	

“We tried to save all we could with fire fighter safety as the number one concern”

“The less mitigation done, the harder it was to save”

**Black Forest Fire
Firefighter Survey**

Name and Department: _____

Date: July ____, 2013 Time: _____

Do you have photos or video footage? Yes No Nos. _____

Date and approximate time of response to the fire (first call out: 6-11-13, 1343hrs)

June 11: Afternoon Approx. time _____

June 11: Evening Approx. time _____

June 12: Night into morning Approx. Time _____

June 12: Day Approx. time _____

Other Dates/Times _____

Evacuation in Progress? Yes No

Issues/Concerns: _____

Your Assignment:

Structure Protection Structure Prep Triage Fire Containment/control

Type of Attack: Offensive Defensive Combination

Location of assignments (streets, neighborhoods, Div.)

Number of people in your attack team: _____ Engine Type: 1 3 6 Other

Amount of water (gal.) you had on board: 100-200 201-400 401-600 >600

Refill Water: Hydrant Tender Portable Tank Lake/Pond Hydrant Cistern

If lake, pond or cistern, dry hydrant available? Yes No

Upon Arrival:

Addresses and street signs generally visible? Yes No

In heavy smoke: Yes No Unknown **At night:** Yes No Unknown

Type of Fuels Encountered: Timber Brush Timber/Brush Mix Grass/Prairie All

What was the first thing you thought upon arrival?

What was the fire activity like?

(crowning, surface, spotting, winds, homes ignited, structure-to-structure, etc.)

What hazards did you encounter?

(downed power lines, melted culverts, falling trees, blinding smoke, evacuees, etc.)

Could you tell if the property (s) had been mitigated, and did this affect your strategy and tactics?

(pruning, thinning, defensible space, structure hardening, level of maintenance, etc.)

When you came to a home and/or property that had been mitigated, how did it make you feel?

Notes:

When you came to a home and/or property that had NOT been mitigated, how did you feel?

Did this factor into your decision to attempt structure protection, and were you successful?

Did the mitigated or unmitigated condition of surrounding properties affect your decisions?

If you were assigned to structure protection, what other factors did you take into account that helped you decide to protect a house or structure? (crew safety, LCES, access, long narrow driveway, heavy fuels in the area, location of home in relation to fuel/weather/topography, neighborhood mitigation, etc.) LCES: Lookouts, Communications, Escape routes, Safety zones

What other challenges did you face?

What training or experience have you been through that prepared you for the responsibility given? Years on the job: _____

Did you have any close calls? Please describe:

Is everything “defensible” in the face of extreme fire behavior?

What are your thoughts on why some homes survived and others burned?

What other lessons would you like to pass on to other firefighters who may encounter the same type of fire?

What would you like to pass on to home and property owners? Please be frank:

What message would you like to send to the Governor and State Legislature?

Keith Worley or mail to:

Pikes Peak Wildfire Prevention Partners
P.O. Box 62819
Colorado Springs, Co 80962-2819

The following section contains the survey questions and actual responses from the firefighters.

1. What was the first thing you thought upon arrival?

1. Grown up in BF, not surprised at amount of destruction
2. Very different than wildland fires I had been on
3. More fire than had heard on radio- structures were burning as we drove up Milan Rd at approximately 14:00
4. Not enough resource
5. Overwhelmed
6. This is the fire of a lifetime, and I was concerned due to my lack of experience.
7. Strategies and tactics – lets get to work
8. Not that concerned initially
9. Where is the main body of fire located? Where does the road go? (smoke).
10. Thought we could stop this one.
11. Crew safety, crew accountability. Keep current on fire location in relation to specific assignment, LCES
12. This is big.
13. This is going to be a large fire, with many homes lost. (2)
14. WOW
15. Lots of fire activity on the ground and in tree stands. Triaging houses was a difficult yet necessary part of the job.
16. This is a large incident that will destroy homes
17. Fire was going to jump Meridian and east side of Meridian was going to burn
18. Provide structure protection around Sylvan Meadows homes
19. Hot spots all over the place – a few threatening structures
20. This is going to be a long fight
21. Big fire. We are going to be here all night
22. Thick timber
23. Who was in charge?
24. Uncoordinated information from Command Staff already on scene
25. Keep calm, think clearly, act decisively. Review IAF, be safe and operate efficiently.
26. Lot of work to be done
27. We were in mop up mode the entire assignment
28. It's a big fire. After driving by some structures, then went to Division. Slightly disorganized, as it always is with multiple agencies. It's just the way it is.
29. Focus on size up; make sure we had safety zones and escape routes. None of us had been there before.
30. ICP on Shoup was fairly unorganized but it was jus starting up.
31. Where is our safety area, due to low visibility conditions
32. Safety of our crew adjacent resources and the public, location of escape routes
33. Large fire in unknown territory. Dark and heavy Smoke.
34. Mass destruction.
35. Protecting the Homes/School
36. Heavy ground fire, trying to find ladder fuels with high winds. Conditions are serious and dangerous.

2. What was the fire activity like?

(Crowning, surface, spotting, winds, homes ignited, structure-to-structure, etc.)

1. Part of mop up phase so thoughts revolved around amount of burned property
2. Crowning isolated, spotting winds, and mainly surface fire associated with short crown runs and group torching
3. All of above 4 except structure-to-structure 3
4. Homes burnt, some crowning, mostly creeping fire
5. Spotting, torching, crawling
6. Crowning surface, spotting, winds, home ignited
7. Radiant heat extreme preheating trees & homes
8. Initially surface, just minutes from ground to crown
9. Surface, spotting, winds, homes ignited, torching (single & group) backing
10. Couldn't see because of heavy smoke/trees
11. A little bit of everything.
12. Mix. Very windy out of NW pushing fire tree to tree
13. Hot spots
14. Crowning, surface, low wind, some structures fully involved.
15. Spotting, 10 -15 m winds
16. Crowning, structure, slow creeping, wind driven
17. Crowning, winds, homes ignited, thick dark smoke
18. Low –mop up stage w/hot spots along dozer line
19. Cranking. Tearing holes wherever it went. Big angry plume
20. Surface, winds, spotting
21. Crawling, driven by wind and terrain.
22. Smoldering with a few flare ups in the afternoon.
23. Intense. Night backing and runs, torching. Lacked wind at night.
24. Day – significant runs. Night – a backing fire
25. Surface fire with some torching
26. All of the above on the afternoon of 6/11
27. Spotting, winds, homes ignited, erratic , no containment
28. Surface fire with wind-driven runs, occasional torching/group torching, some structures burning.
29. Extreme fire activity had all of the above.
30. Backing surface fire. It was obvious the fire was making runs on the other side.
31. Winds, homes ignited
32. Surface, homes ignited
33. Winds, homes ignited surface fire
34. Crown fires, torching, spotting high winds homes starting from roof and attic fires

3. What hazards did you encounter?

(downed power lines, melted culverts, falling trees, blinding smoke, evacuations, etc.)

1. Downed power lines (4) gas lines igniting, falling limbs and snags
2. Evacuees, law enforcement driving in smoke, blinding smoke often
3. All the above (2)
4. Blinding smoke (9)
5. Very active fire still in area (2)
6. Downed power lines, blinding smoke, erratic fire behavior
7. Turn around radius in some homes, backing down drives
8. Could tell fire progression by sound progression – tires popping, propane tanks exploding, ammunition going off
9. Heavy fuel loads, (3) huge woodpiles in backyard, intense heat
10. Unfamiliar with some areas geographical layout, fences
11. Heavy smoke, extreme fire behavior, dangerous trees

12. Melted signs, downed trees, blinding smoke, heavy fire activity
13. Downed power lines, blinding smoke, evacuees, missing "Stop" signs
14. Cars going up and down Meridian. Horses
15. Snags could drop on our heads, falling trees, ankle breaking potholes
16. N/A
17. Visibility, smoke, embers
18. Thick dark blinding smoke, high heats
19. Snags biggest hazards; traffic (National Guard)
20. Downed power lines, falling trees, blinding smoke
21. All of above
22. Gas lines, downed power lines, blinding smoke
23. Blinding smoke, downed trees
24. People and military trucks driving too fast on the roads
25. Power lines, snags dropping, several houses had hazmat element w/attached garages.
26. Snags, power lines, propane tanks popping pressure relief valves, fatigue being on nights
27. Snags
28. Power lines, hazard trees, crushed culverts
29. Downed power lines, falling trees, smoke
30. Melted culverts, falling trees, narrow roads, propane cylinders, septic, cisterns
31. Power lines, trees down
32. Blinding smoke, unstable trees
33. Blinding smoke, smoke from structure and vehicle fires making it hard to breath, fire climbing and burning power poles

4. Could you tell if the property (s) had been mitigated, and did affect your strategy and tactics?

(pruning, thinning, defensible space, structure hardening, level of maintenance, etc)

1. Not the first day
2. Yes, could tell, and yes, made a difference
3. Mitigated properties needed very little assistance, but homeowners need to harden the exterior particularly mulch, decks where they meet the ground, or rocks.
4. Some had been mitigated but most were not (3)
5. Yes. Less time spent on those homes that were mitigated. Efforts spent on
6. Mitigated homes felt more worthwhile.
7. Yes – No, it did not affect tactics (3) Yes, apparent. No impact on mop up
8. Yes, some were & some needed work
9. Absolutely. Looking at 30 homes – only 2 could stand alone, possibly (3)
10. Could see around house mitigated – otherwise no
11. Yes Properties that had previously been mitigated gave us a major advantage in that we could establish a more positive attack plan as fire activity was more likely to remain on the ground.
12. Yes, most were obvious an attempt was made or not. Made the decision on triage easier.
13. Yes and no. Homes that were mitigated, that did not experience extreme fire looked to only have property damage, as opposed to structural damage.
14. No, very difficult in the dark (2)
15. All of the above helped us harden fire lines instead of being behind the eight ball, so to speak. Mitigated houses saves us valuable time & work in saving what homes we could.
16. Yes, if the property was significantly mitigated. Minimal vegetation mitigation is not necessarily evident during a long event.
17. Some looked to be mitigated and some not so much
18. It makes it easier to finish the mitigation efforts

19. Sometimes you could tell, some not due to heat, others mitigation did help a lot.
20. Yes and yes. Initially passed the fire front and thought we could help save these, but one unmitigated house could use the same time as 3 mitigated ones.
21. Encountered several structures & many were a combination of all
22. Some properties were mitigated and some needed prepping
23. It was a mix of properties that had been mitigated and not. We had less work to do to protect the mitigated homes.
24. About half the properties had little work that needed done.
25. Some had mitigation and you could tell. Impacted tactics – easier to protect homes with good mitigation. We didn't waste a lot of time with properties without mitigation.
26. Obviously some people had done considerable work and we had to do less. Others didn't do a damn thing.
27. We could tell which ones had been worked on and which had not. Firefighter safety concerns kept us away from the unmitigated properties.
28. Yes, some property you could tell had been mitigated 2
29. Yes, some had clearly been mitigated & that made our work easier – use Dspace to strengthen our lines.
30. Yes. Mitigation is always a large factor in structure triage.
31. N/A (2)Yes, few had been mitigated. Spent less time on ones that had been mitigated.
32. Frequent house with pruning but no thinning and limited defensible spaces. Rated shingles on houses helped make some structures defensible once thinning had been performed via sawyers.

5. When you came to a home and/or property that had been mitigated, how did it make you feel?

1. Grateful for the homeowner
2. Positive that we could make a difference, relieved to a degree also because we could prevent damage at that address
3. Hopeful
4. Overjoyed. Raw joy like unicorns and rainbows
5. More calm due to known success
6. Felt like I could actually make a difference to positively affect the homes, outcome of the fire.
7. Structure could be saved
8. House & property would and could be saved
9. Allowed to focus our efforts on other structures.
10. Rare treat, safe haven, place to anchor
11. Peregrine – Cathedral Pines Comfortable saying brush truck could have operated other places.
12. Lots of back yard ponds, waterfall, lots of rocks.
13. Felt like the Homeowners previous efforts gave us a significant opportunity at success, or best chance at protecting the specific property.
14. Like giving a little more effort to the property.
15. That the homeowner took pride in their property and had the forethought to make every attempt to make their home defensible.
16. No different. (2)
17. I had my eyes and ears focused on any safety issue.
18. Happy?
19. Like we could make a good stop, or at least have better odds then what it would look like unmitigated.

20. Safer
21. Sad to see other homes lost
22. Makes job easier
23. Good. We could walk around & make sure things were good, check for embers.
24. Like crews were doing their job
25. One lost house had mitigation. It made me feel bad. I was filled with wonderment on what did and didn't survive.
26. My crew felt mitigated homes were the most savable.
27. It made our job easier and made me feel like we could keep this house standing
28. Believed I could save this property
29. Could hold more homes with our engine if they would all mitigate
30. We made a good stand at one property because the mitigation was so good. It makes you feel good that you can do some work because the people did good work. The message seems to be getting around to people.
31. Appreciative that they were concerned enough about their own property.
32. Folks took wildland fire seriously, learned from Waldo Canyon fire in Colorado.
33. Felt good to know some people were informed but there's obviously a lot of ignorance about mitigation techniques
34. Good for homeowner – structure still standing
35. We had a better chance of saving structures
36. They cared enough about their home to protect it.
37. Nice to see some home owners were learning about Firewise. Makes our job easier.
38. N/A 2s
39. Less sense of urgency
40. Good, felt like we had a chance to save the structure

6. When came to a home and/or property that had NOT been mitigated, how did you feel?

1. Unfortunate that there were not time/resources to expend defending the home
2. Dejected
3. Sad. Disappointed for the homeowner
4. Frustrated. Almost felt like no matter what the home was a loss, so why try.
5. Harder to save structure
6. We can do only what we can do
7. Hard to judge homes – extremely frustrated – difficult decisions – even windows were open.
8. Feel sad, but must move on 1 Do our best to prevent impingement in short time
9. Overwhelmed with amount some homes/properties required in relation to work and limited time.
10. Like the homeowner wanted to loose the home.
11. Frustrated and challenged. Did I have enough time to attempt to mitigate this home?
12. Ike we had a lot of work to do in order to keep that house. No one wanted to give up on any houses, but some houses were better protected.
13. Trapped, congested, at risk
14. Sad – the whole event was sad
15. No different
16. Fine, just needed to get it mitigated.
17. Honestly, exhausted knowing the work that had to be done to hope to save it. Sometimes it did not work and I felt bad.

18. Frustrated. They didn't care enough before the fire.
19. That home may have a harder time surviving the fire.
20. I'm not going to spend as much time as I would on a home that has taken some ownership in their property.
21. Time was against us and prepping needed to be completed
22. It made me feel like I wasn't sure if we could defend the structure
23. A little concerned Overwhelmed
24. Disappointed because we're there to do what we can but the homeowner won't do anything with their own property. (2)
25. It's frustrating.
26. That we couldn't do much.
27. Shocked at the lack of prep even though it was well known that Black Forest was susceptible to fire.
28. Lesser chance of saving structure and that fire may spread to exposures
29. Sorry for them. Their house might be spared but unknown.
30. Made our job harder. Some homes were determined "not savable"
31. More work
32. Worried that we wouldn't be able to get enough mitigation done in time to save structure & less likely to put out the effort versus moving to another structure requiring less work. Triage of structures was happening by mitigation needs.
33. N/A 2

7. Did mitigation condition factor into your decision to attempt structure protection, and were you successful?

1. Yes. Homes needing protection to resources available. We had to prioritize!!
2. No
3. Mostly successful
4. Yes. Harder attempts were made to protect unmitigated homes, but you felt like efforts were for nothing
5. Yes – Due to poor mitigation, lost a house on Brinkerhoff
6. Yes (6)
7. Absolutely – wrote them off Could we save the crew?
8. Some houses were questionable
9. Yes it was a factor. We were successful on multiple occasions, as well as unsuccessful on some.
10. Certain houses it works.
11. Some houses were successful and unfortunately some were close to heavy fuels
12. Yes, but most houses we worked on were savable, and we could put in lots of efforts or it was already gone beyond what we could help with.
13. Absolutely – unmitigated properties created significant hazards to fire crews.
14. Did not factor, if it needed it we did the mitigation
15. Only two I believe. The School of the Woods & a residential house
16. Whether they mitigated factors in because of what our crew could do. Feelings had no impact. We worked on all of them.
17. Yes. Time pressures are too much. My feelings don't go into it. It's not an arbitrary decision. It's based on time and experience.
18. Some homes were savable and some were not.
19. It did factor into structure protection and combined with a retardant drop from a MAFT unit we were successful
20. No, yes
21. My attitude didn't impact tactics, but the logistics of saving an unprotected house did.
22. No. It's part of being a professional. You set that stuff aside and try to do what you can.
23. Attitude didn't impact tactics, but the logistics of saving an unprotected house did.

24. Tried to save all we could with FF safety #1 concern
25. Less mitigation done the harder it was to save. We were able to save some despite lack of mitigation
26. Protected what we could. Did mitigation as best as possible.
27. We were successful on the homes we had time and resources to work with; most of the time.
28. N/A 2
29. Yes, successful majority of time

8. Did the mitigation condition of surrounding properties affect decisions?

1. It made it difficult to mop up the fire.
2. Yes. FF safety working in and around homes was paramount!
3. Yes, tried some that were savable.
4. No (7)
5. Yes, had to triage homes and let homes go that were totally unmitigated
6. Yes (8)
7. Not really, as were located at larger single properties (2)
8. Hard to see and determine each time due to heavy smoke conditions as well as heavy fire conditions at times.
9. No, we were able to protect both
10. Helped determine which house would be easier to save
11. Yes – mitigated neighborhoods are definitely more defensible.
12. Yes, that's structure triage. Save the ones you can
13. Yes. If a couple of unmitigated houses were together and fire was already there, then we passed them due to our safety.
14. Tactical – yes. Time – do we have time to be effective?
15. Yes. Continuous fuels or lack of fuels makes a difference
16. Yes. Some unmitigated properties were not savable
17. Didn't affect our decisions as much as our availability of resources to accomplish the goal.
18. Yes. When you look at the bigger picture in terms of what the fire does before that house. But defending that house, no. 2
19. It tips into extension sometimes, from a tactical standpoint.
20. We noticed that the fire moved through the timber so if the property was mitigated but the adjoining property had no mitigation then some of the homes were still lost, due to the adjoining property not mitigating. Too bad.
21. If too much mitigation was needed little to no time was spent on that structure.
22. Yes, depending on how much was available to burn. Yard with extreme over growth and trashy were always a threat.

9. What other factors did you take into account deciding to protect structure?

(crew safety, LCES, access, long narrow driveway, heavy fuels in the area, location of home in relation to fuel/weather/topography, neighborhood mitigation, etc.)

1. FF safety, LCES, access. Long driveways covered with heavy timber didn't even get a quick look. Mitigation of the subdivision was key to crew safety zones.
2. Lot of black in some of the areas we were in for a safety zone
3. All the above (10)
4. Crew safety, access, heavy fuels in area, amount of mitigation already completed.
5. Everything. Most driveways were narrow & heavily treed.
6. Crew safety, LCES, ALLES, long narrow driveways, heavy fuels, location of home, home construction materials, ability to get in and out

7. All to include manpower
8. I was on a tender, with a strike team. LCES was a big roll and one that needed to be a priority. Topography and neighborhood knowledge was a large asset.
9. LECL, safety zone, all of the above
10. All of the above play into deciding what houses can and can't be saved
11. Crew safety, narrow driveways with heavy fuel over, heat, escape routes.
12. All, especially accessibility for escape routes; including overhead power line. I have to be able to get out.
13. # 1 Would be: Is there a safety zone in place so we could stay and protect?
14. All the above and 18 watch out situations
15. Access, fuel types, available resources
16. Crew safety, fire behavior, terrain, mitigation effort, fuel type, escape routes and safety zones.
17. All of it. (2)
18. It's frustrating
19. All of the above plays into it.
20. Yes, all the things taught if Fire Ops in the Wildland Urban Interface.
21. In addition to the above list: yard accumulation, materials used in construction, open decks
22. LCES
23. LCES is top priority. Depending on fire behavior at a given time, we may totally pass a house up if we couldn't ingress and egress safely.
24. Crew safety
25. Crew safety, fuels, extent of fire, accessibility
26. Crew safety, property condition
27. Crew safety, escape routes, safety zone, ease of egress, fire conditions

10. What other challenges did you face?

1. Heavy radio traffic, air resources or lack of, rapidly expanding fire front
2. Not enough fire engines and FF for task at hand. 2
3. Heavy Smoke 1
4. Blinding smoke
5. Visibility
6. I got hungry and sleepy
7. Area not seen in daylight, radio communications difficult due to area
8. Having a fairly new driver
9. Lack of resources, manpower. Couldn't access passing resources
10. High winds, no air, fast moving fire, long turn around time for tenders as water resources were a distance away
11. No communication with Incident 3 Team
12. Communication (no cell) evolving plan of fire attack due to movement in multiple directions, heavy smoke conditions = difficult visibility
13. Communication, lookouts
14. Long travel distances for H2O from a hydrant
15. Communication issues, map issue, non fire agency interruption community/civil fire fighting.
16. Radio issues, local FD's being able to quickly talk to Type 1 crews, like responding to fire alarms in the burn area
17. Radio coverage issues (communications) Needed better maps. Accountability of fire crews.
18. Darkness
19. Access to homes in tight driveways
20. Communication 1 Communications – strike team w/no radio compatibility.1
21. No maps to assist crews in navigating in unknown areas.

22. Hard decisions to follow a chief's decision when it felt unsafe. Once we pulled out and told Chief no go.
23. With continuous trees and flat ground a lot of properties looked alike.
24. Weather and manpower to cut effective line (?)
25. Hot dry temps, heavy smoke, dry fuels
26. Biggest challenge was working nights. I've never been so disoriented. 2
27. None
28. Needed maps
29. Sometimes water sources were too far away to be useful.
30. Poor communications with aircraft & helicopter
31. Abandoned animals, other resources working in limited space.
32. N/A (2)
33. Area to cover and short time available at a given structure
34. Downed power line, speed of fire spread, limited turn around for large trucks
35. Dark night, pine trees during back burning, ladder fuels

11. What training/experience have you been through to prepare you? Years on job

1. 12 yrs The Colorado Wildland fire & Incident Management Academy has been a very valuable resource.
2. 28 yrs. All my training and experience were utilized during this fire. It was essential to maintain Situational awareness for your immediate area and ensure LACES
3. 23 yrs on job. Department participated/deploys nationwide. Involved many of the fires throughout the Front Range in last 18 yrs.
4. 31 yrs on job. Have lots of wildland certifications.
5. 9.5 yrs Wildland training. Absolutely devastating catastrophic event. Not much preparation for that kind of event.
6. 4 yrs Basic wildland training. Nothing could prepare you for that fire. Being on that fire was a great experience.
7. 8 yrs (2) Waldo Canyon fire 1 Wildland certs
8. 13 yrs plus Waldo fire
9. 12 yrs wildland firefighter (Jody) Kept fire out of district (Tri Lakes 2)
10. 10 yrs (Aaron) All prep worked out perfect
11. 3 yrs (Adam)
12. Engine boss training. WUI training. Numerous deployments to other states
13. 11.5 yrs USFS Wildland firefighter 1 yr
14. 7 yrs Engine Boss/Crew Boss training
15. 8yrs Small grass fires and training helped. This was on a larger scale. Basic ICS knowledge was an asset.
16. 7 yrs S=130/90, S212, S215, L180, S131. Ia 100, 200, 700, 80v (??)
17. 7 yrs. Experience on job
18. 4 yrs 5 S130/190, S211, a few fires and deployments 2 Waldo canyon fire 3
19. 18 yrs Previous fires/classes/training
20. 13yr S130/190, L180,S131, S215, S212
21. 15 yrs STEN (T) lcr 4
22. 8 yrs Learning form the Waldo fire and classes over the last year.
23. 8 yrs Engine Boss – NWCG, multiple deployments
24. 22 yrs 3 yrs with Type II hand crews; other agencies; Engine Boss
25. 10 yrs. Continuous training at work and deployed to over 10 fires.
26. 14 yrs, 7 in California working on large campaign fires.
27. 6 yrs, S-130,190 training, limited experience w/Waldo Canyon fire
28. 6 yrs 130,S190,131,z90 (?)

29. 13 yrs Multiple deployments: 5 yrs S Metro, 1 y Carson Hot Shts, 7 y Air National Guard Type II 2
30. 13 y multiple deployments, training, wildfire team sees/practices "it" in real life.
31. 25 yrs. Past wildland fire assignments and yearly training.
32. 5 yrs. Several fires but not many in the WUI. Have taken all classes thru Single Rescue
33. 17 yrs
34. 3 yrs S-212, S-215, S-290, S-131, S-133
35. 13 years
36. 24 yrs. Pueblo 10 yrs. Task Force Leander qualified, numerous classes
37. S130, S190, Waldo Canyon Fire
38. S130, S190
39. 20 yrs NWCG FFT1, Fire Officer 2 yrs
40. 15 yrs

12. Did you have any close calls? Please describe:

1. As leaving Remington the fire was running N, a homeowner was still packing. Stopped and got her out of there.
2. No 23
3. Not really 2
4. Yes, fast moving fire and lost sight of road in the black forest reserve. Fire burned up to truck, then we found the road.
5. Yes. Initially fire was in drainage, saw smoke plume, 300 – 400 progression. Breezy, ground fire. Wind picked up and trees torched, fire blew up. Lost tools etc as needed to drop everything and get out. (early responders near start of fire)
6. Yes. Attempting to rescue the two fatalities. Access was a two lane road. A fire storm blew up on both sides of the road. Had to turn around and evacuate.
7. Yes, Two. Overrun by crown fire, vehicle stuck
8. Yes, two. We were supposed to go in for a rescue. 4 vehicles were told to follow a Chief; street was crowned over and heavy heat. We pulled out, damaged trucks. Second got trapped by the end of Swan road. Could not see street signs so we passed over get out road.
9. Several 10's & 18's violated by Command Staff when sending us out to the line.
10. Communication that was confusing, 0 objectives, 0 leadership
11. Roof fell in on one structure's section that was having water dropped on it by a Blackhawk. We were inside looking for fire extension into the home.
12. Not any closer than what we do and part of the job!
13. While working interior on a house the roof collapsed, missing our team by 6 feet – No one was injured
14. Helicopter almost dropped water on us from above.
15. Army helicopter dropping water with no communication. We were close to being dropped on. That is unacceptable.
16. Yes. Over run 3 times, shelter deployment not considered but hose was left and later recovered due to escape needs.

13. Is everything defensible in the face of extreme fire behavior?

1. No (27)
2. Absolutely not
3. No, because you might not be able to do anything but bug out.
4. Not at all.
5. Nothing is a guarantee in the face of extreme fire behavior including fire attack.
6. No. Many unforeseen conditions limit firefighting abilities.
7. Not necessarily. Up to a point. Sometimes you have to make good judgment calls to cut & run.

8. No, extreme fire behavior is very unpredictable.
9. No. it all depends! There must be safety zones pm these properties
10. Not unless the resources needed are immediately available.
11. No. Certainly not
12. No, not when the timber is drought stricken and it runs through the tree tops
13. No. Safety first for fire fighters.
14. Yes
15. No. Mitigation increases the chances, but there is never a total guarantee.
16. N/A 2

14. What are your thoughts on why some homes survived & others burned?

1. Homes with thinned trees & kept brush clear from around houses fared better.
2. Mitigation, building construction. Green grass slowed the spread.
3. Suspect embers burned the homes down. Others we just got to them before the ground fires did and we able to save them.
4. Wind and luck
5. Luck
6. Clearings, location, green grass surrounding home
7. Mitigation, resources available to make a stand, fire behavior
8. Mitigation, wind, fire behavior & luck
9. Fire behavior, winds, topography
10. Mitigation & luck
11. Proper materials, roof, stucco, trex decking. Homeowner did his homework
12. Provided an area to stay and fight.
13. Mitigation was a huge factor. Cases where properties were mitigated but still burned due to embers falling on roof. Most structures burn from the top down.
14. Good mitigation, good structure protection, weather, luck (2)
15. Fuels in the vicinity, some mitigated and others not providing a constant fuel supply, building construction materials, fuels close to homes (trees and mulch)
16. Mitigation, building construction (2)
17. Fire/weather behavior
18. Mitigation plays a big part.
19. Some people mitigated, others did not.
20. It was an erratic wind driven fire.
21. Mother Nature
22. Lack of mitigation or extreme fire situation
23. Unexplainable – construction features definitely help protect homes from embers. Mitigation reduces the fuel load & heat intensity.
24. Fire travels with the wind, some mitigated some not
25. Luck and fire behavior
26. Fuels/weather/topography. Mitigation
27. The ones that survived had good defensible space and luck.
28. Mitigation of fuels. Many homes had trees and other fuels too close and it allowed the fire to reach the structure.
29. Mitigation efforts and surrounding fuels
30. A good percentage is on mitigation but drought and extreme fire behavior too. No amount of mitigation will help against a running crown fire. (2)
31. Some of its luck or lack of luck. Some of it is mitigation and people prepping their house and timely deployment of resources.

32. One item we encountered and found was that the wood mulch caught fire and held heat, causing the loss of some homes and barns. The property was mitigated but then the mulch caught fire and extended to the structures. When the home owners came back in they replaced the burned mulch with new mulch. We advised them that was a poor idea but they liked the look.
33. Some prep helped but the fire even took homes that were bomb proof
34. Part of job
35. Some, due to mitigation efforts
36. God & mitigation
37. Mitigation played a major role. Fire behavior and pure luck was part of it also.
38. Depended on the fire conditions of the day
39. Mitigation and random weather patterns
40. Depended on the movement of the fire
41. Proper mitigation and rated shingles

15. What other lessons would you like to pass on to other firefighters who may encounter the same type of fire?

1. In this situation you have to bring your "A" game. If not leave. Know when to walk or drive away.
2. Safety and more safety
3. Keep your head on a swivel
4. Know your equipment, communicate, and don't be afraid to ask questions
5. Be safe, know strategies, tactics and fire behavior. Know what your limits are and when to say no.
6. Don't be afraid to turn down an assignment. Don't be overwhelmed by what need to be done.
7. Have a good working relationship with all surrounding fire departments. Then everyone will be on the same page.
8. Remain calm and think clear, constantly monitor crew safety. Keep aware of objectives & tactics, understand magnitude of incident, ensure every goes home.
9. Speak up when something looks wrong or you are uncomfortable with a task.
10. Use LCES, and 18 fire line points. Be prepared, and assume nothing.
11. Train, LCES, Know your 18 watch out situations; fire behavior can change in a second.
12. Training, have a plan in place
13. Be prepared for anything and make sure you make wise judgments.
14. Be patient. You can't stop it on your own.
15. Pre-plan as much as can but realize Mother Nature" can ruin any good pre-plan
16. Keep your head up and stay aware of your surroundings
17. Know your equipment, stay calm and think clearly
18. Use LCES always have a way out
19. If felt unsafe, do not do it and say no
20. Put the right people in the right position. Know your equipment.
21. Get a good briefing, from local F.D. and personnel prior to engaging
22. Take a systematic approach to triage structures and decide what can be saved.
23. Keep calm, think clearly, act decisively. Train and review 10's and 18's.
24. Remember LCES and other fundamentals like not over committing yourself. 2
25. In extreme condition the fire will be unpredictable.
26. No tunnel vision, keep eyes open and think
27. Get as much training as you can – even if you have no plan to be squad/engine boss training at higher level to be more effective as a team member
28. Be mentally prepared for mass destruction. Slow down and MAKE time to size up. Maintain situational awareness.
29. Always be prepared for the unexpected.

30. Be mentally prepared for mass destruction. Slow down and MAKE time to size up> Maintain situational awareness.
31. N/A (2)
32. Watch wind conditions carefully to help determine fire direction & watch the
33. ladder fuels. Cautious when notice ladder fuels climbing, took off fast in crown

16. What would you like to pass on to home and property owners? Please be frank:

1. Sorry for loss (2) and thank you for your support
2. Do your work at your home because if we only have a little time and your home looks to need a lot of work we will move on!!
3. More mitigation is needed.
4. Always mitigate. But in some catastrophic event it does not matter what you have or have not done.
5. Please mitigate. Sorry for anyone's loss, but know with all certainty we did what we could with conditions & resources presented to us.
6. Mitigate your property – Trash, debris, cars, etc can made it hard to save you home, and effect our decision to stay & fight or leave.
7. Please help us help you by mitigating your property and making it defensible.
8. Is there a tree on your property that's more important than your home? If so, live in it. Be realistic
9. Mitigate 50 yards around structure. Mitigate driveway 50 yards on each side.
10. Help us increase our effectiveness and success by preplanning and mitigating prior to an incident of this magnitude. We only have minutes to make any improvements, not weeks or months.
11. Mitigate
12. Assist us by mitigating your home. It's your responsibility
13. Know where you live.
14. Mitigation will save your home. Cut ladder fuels, clear pine needles away form your home.
15. Mitigation works. Neighborhood mitigation works!
16. Please properly mitigate your property. All of our lives are at stake.
17. Mitigate and have a list ready if you have to leave
18. Please help mitigate your homes so we can better help you, your family, and your property.
19. Mitigate! Remove combustibles from around home – clear/widen driveways- provide good addressing – leave keys in trucks/tractors and park them on the driveway away from structures.
20. Clean up your property. One day it could make all the difference in the world.
21. Thank you for the mitigation, and sorry it did not help. I did not save a lot of homes like the home owners think, sometimes when we got there the house was saved already by luck and we just prevented relight. Other homes that were not mitigated, sorry but you could have prevented some other houses from being lost. I got upset that the elementary school had no mitigation at all. They teach kids.
22. Take time to care about your own property. Help us help you.
23. If they don't take ownership in their property then there won't be time to mitigate during a fire.
24. Make your home defensible by keeping a good clearance of fuels.
25. Ensure mitigation is accomplished if you want your house to still be standing
26. Fire fighters risked their lives to protect your homes. Remember that the next time they ask for a tax increase to keep fire fighter jobs.
27. Don't use wood mulch in the flower beds and around the structures.
28. Mitigate and clean
29. If you live in these areas you need to mitigate. The more you do the easier it is for us to defend it. Relying on insurance to pick up the check isn't enough. We end up picking up the check. (2)
30. There are studies that show mitigation works. They need to be good stewards of their home and property, especially when living in those areas.
31. We are not going to protect homes that are not well mitigated.
32. Stop planting flammable shrubs against your home. Mitigate your property.

33. Clean up your yard. We may not even try to save it.
34. Do mitigation. It saves homes.
35. Clean up your yard!! We may not even try to save it.
36. Clear a space out around your home.
37. Tell owners to not have any trees or any type of plants close to the property
38. Mitigation, Thinning and removing ladder fuels. Consider fire truck egress on your drive way.
39. Mitigation of ladder fuels
40. Citizens need to grip reality. They are the first person responsible for their homes. They need to own this responsibility. This is the first step to saving a home. With development in the wild land area, these disasters are going to happen.

17. What message would you like to send to the Governor and State Legislature?

1. With building codes and mitigation, we also need to -----resource mobilization.
2. More monies to the smaller fire departments, grant money
3. More resources for these type of incidents initially
4. Educate yourself. Start looking at sensible timber cutting. Research other options. Transition to reality – conservation not environmental restrictions.
5. Write stronger mitigation standards for state of Colorado
6. More air resources for state of Colorado
7. Thank you for support of Colorado Nation Guard and Army
8. Please educate yourselves and understand the importance of wildfire mitigation. Provide assistance & resources to the communities with an increased risk. Assist fire entities with educating and raising awareness in communities.
9. This was a large fire. Early use of air attack is key. With extreme weather a preplan of air support and mutual aid helps.
10. A more pro-active and aggressive method of deploying state and federal resources. Let us fight fire & decisions on homes that are partially involved.
11. MAFFS or types of air resources need to be available much sooner
12. Thanks for the air support! Keep them coming.
13. Take care of your fire fighters
14. Provide more funds for wild land fire fighting
15. I'm glad the National Guard was there to control traffic. They were helpful
16. Since we can't figure it out, they need to legislate larger, fewer fire departments. We need to be bigger and more consistent.
17. The fire problem needs to be viewed as a state problem, not a FD problem. Need a state wide standard message for vegetation management/evacuation/ management/fire response/etc. Not each FD doing their own thing.
18. A state wide program/data base to perform property risk assessments and then a follow up damage assessment layer
19. A state focused CWFPP that is designed to be used during a fire event.
20. Train firefighters to be successful and make resources available.
21. Protect fire fighter jobs. We worked this fire on duty and off. We would gladly do so again to protect ours and our surrounding community. The last thing we need is lay offs & furloughs because of budget cuts.
22. The state needs to stop screwing around and get a unified system to pull together resources and funding and authority to command it. The Division of Fire Prevention doesn't have enough authority. We need significant fundamental changes on how agencies cooperate and respond.
23. The state dispatch system (web eoc) is not clear to me and is cumbersome. Ross seems more streamlined. I'm the department's wildland coordinator and I know little or nothing about web eoc.
24. Citizens need to grip reality. They are the first person responsible for their homes. They need to own this responsibility. This is the first step to saving a home. With development in the wildland area, these disasters are going to happen.

25. Need more money allocations for wildland fire fighting. Every department needs wildland apparatus.
26. Update the MAFTS
27. More funding for wildland radios and water tenders
28. Citizens need to grip reality. They are the first person responsible for their homes. They need to own this responsibility. This is the first step to saving a home. With development in the wild land area, these disasters are going to happen.

Appendix D

Black Forest Fire Structural Assessment

Part of the:
2013 Black Forest Fire Assessment Report
Pikes Peak Wildfire Prevention Partners
January, 2014

Field Assessment and Data Collection Team:

Roster of Participants/Organizations included at end of this section

Data Input and Analysis:

Brad Horner, Valley Park Firewise Committee

Editor:

Randy Johnson, Fire Marshal, Larkspur Fire Protection District

Asst. Editor:

Keith Worley



Black Forest Fire Structural Assessment

An assessment form was developed to collect data about structures and their surroundings. The form used for the Waldo Canyon Fire assessment was modified to include information on defensible-space (D-Space), mitigation and home ignition zones (HIZ). The form was vetted with Dr. Stephen Quarles, Senior Scientist with the Insurance Institute for Business and Home Safety (IBHS).

Wildfire “mitigation” and “defensible-space” are terms often used interchangeably by the public. Recommendations for mitigation and D-space, over the past 20 years, were developed by the Colorado State Forest Service and used as the basis of comparison. These are:

- “Creating Fire Safe Zones”, CSU Service in Action Sheet No. 6.302, Released in 1992.
- “Creating Wildfire-Defensible Zones”, CSU Natural Resource Series, No. 6.302, Released in 1999, with updates made 2003 and 2006.

Both publications are consistent with recommendations for treating native vegetation 75-100 feet from structures, with adjustments for slopes. Both publications and updates mention 30 feet as the zone where fuel management is most critical. Based on the experience of PPWPP in the region, the public’s focus is on this 30 feet zone and considered the public’s definition (perception?) of defensible-space. Therefore, it is used as the primary zone for assessment for this report.

Given the focus on d-space after recent fires, public perception is that d-space and forest restoration are separate issues. This may need to be a point of clarification for future public education efforts.

The more recent term, “home ignition zone” or HIZ, was developed by the USDA Forest Service based on its Missoula Fire Lab research. The HIZ is a zone wide enough to influence wildfire behavior before it reaches the area immediately around structures. Depending on the fuel type, this zone is a minimum of 100 feet and as much as 300 feet if adjusted for slope.

In October of 2012, CSFS updated the Factsheet 6.302 and transformed it into the publication entitled:

- “Protecting Your Home from Wildfire”, CSFS Quick Guide Series, Fire 2012-1,

This publication includes the HIZ concept and mitigation recommendations. The HIZ zone was also identified for assessment in this report.

Additional information was also collected in the data gathering phase of the assessment process. Lot size, fire intensity both on and off the property, and building materials were noted along with signs of firefighter intervention. Neighboring properties were considered to determine levels of mitigation in the vicinity and how this relates to the effectiveness of community scale mitigation.

Challenges

Several challenges were encountered. These were

1. Properties were spread over the 14,000 acres of burn area, and with the exception of a few neighborhoods, widely spaced apart. This resulted in significant travel time to reach all areas of the fire.
2. Many properties were posted with “No Trespassing” signs and inaccessible by the team.
3. Foundation and tree clearing was already in progress on many sites resulting in lost opportunities for assessment.
4. The complexities of the wildfire environment, while burning is in progress, are not fully understood. These complexities may create burning conditions that can defy interpretation based on post fire observations and analysis.
 - a. The biggest challenge was determining the actual cause of structural loss, especially if the entire site burned over. This was partially overcome by locating either damaged or partially burned structures, thus allowing some homes to be more thoroughly assessed for the actual point of ignition by interpreting burn patterns on the landscape and the structures.
 - b. In some areas, high intensity fire activity greatly diminished the ability of team members to assess the status of pre-fire mitigation efforts.
5. Firefighter intervention was not always determinable, unless fire lines were constructed or there were other obvious signs of structure preparation or protection. There were some exceptions to this. Several of the first responders to the fire were part of the assessment team and were able to go back and analyze the properties they defended.
6. Experience and skill levels of the team members varied and may have implications on the ability to analyze observations.
7. Due to the above, the assessed properties are not part of a true scientific sampling and some of the quantitative data may be skewed for that reason.

Conclusions

Collected site data was input into EXCEL format in order to compare different factors. Some of the team’s conclusions are:

1. Of the 75 home sites assessed, 31 homes were destroyed, 16 suffered damage and 24 had no damage. There were four assessed properties that could not be classified as to damage or data was not entered by the field team.
2. Fire fighter intervention was the single most important factor in home survivability.
 - a. Only one home was destroyed where firefighters intervened vs. 22 homes destroyed without firefighter intervention.
 - b. According to the firefighter interviews, an important factor determining where they could work, safely and effectively was if homeowners mitigated fuels .
3. Mitigation was effective with defensible space being a key factor in home survivability.
 - a. Of 40 homes with minor or no damage, 25 had defensible space in place.
 - b. Of 31 destroyed homes, only 7 appeared to have defensible space in place.
 - c. Crown fire impact was consistent across the sampling for destroyed homes regardless of defensible space being in place or not, but surface fire impact was less destructive to the forest with defensible space in place.
 - d. Team member observations indicate that defensible space was often encroached upon by treed areas with little to no crown separation bringing crown fire close enough to the home to overpower the defensible space and cause home loss. This is a strong indicator of the importance of Zone two (the area adjacent to the Defensible Space area or Zone one) treatment within the HIZ.
4. It is more likely that a mitigated property will be overrun by intense fire if surrounding properties are left untreated depending on extent of treatment and distances to neighboring parcels.
5. Many homes in heavily treed areas that mitigated well in Zones 1 and 2 and survived with little or no structural damage while extreme crown fire behavior turned the land around the home into a “moonscape” of black sticks.
6. As demonstrated in the Cathedral Pines and Black Forest Reserve subdivisions, there is substantial evidence that large area or community scale mitigation effort is highly effective, keeping fire on the ground. Community scale mitigation created a safer work environment for firefighters and few home losses due to reduced fire intensity and firefighter presence.

7. There were many homes and structures located in unmitigated or inadequately mitigated areas.
8. Many homes were constructed of materials that do not withstand the effects of wildfires well and were prone to ember penetration to the interior of the structure.
9. Not one aspect of this fire was contrary to current CSFS recommendations for mitigation of property to reduce the impact of wildfire. Where mitigation efforts were overcome by fire, it was primarily due to incomplete mitigation efforts which resulted in a path of fuel directly to the structure or combustibles adjacent to the structure that were susceptible to ember ignition.

The following tables contain information from data collected during the three day on-site structural assessment, July 22-24, 2013. Number of structures lost varied from 486 to 511 depending on whose count was used. Information collected was for residential structures only.

Slope Analysis

Sum of Count	Column Labels				
Row Labels	Destroyed	Minor	None	(blank)	Grand Total
Bottom	6	5	2		13
Low	5	3	1		9
Moderate	1	2	1		4
Mid	12	4	11	2	29
Low	9	4	4	1	18
Moderate	3		6	1	10
Steep			1		1
Top	11	5	9		25
Low	6	3	1		10
Moderate	5	2	6		13
Steep			1		1
Left blank			1		1
Not recorded	2	2	2	2	8
Grand Total	31	16	24	4	75

Residence damage in relationship to location on slope.

* Not good to be up the slope

D-Space vs. Intensity

Sum of Count	Column Labels				
Row Labels	Destroyed	Minor	None	(blank)	Grand Total
Dspace Yes	7	12	13	1	33
Crown Fire	6	4	2		12
None		1			1
Some Crowning		4	3	1	8
Surface	1	3	8		12
Dspace unknown	10	3	7	1	21
Crown Fire	5	1			6
Some Crowning	1	1	4		6
Surface	4		3	1	8
Left blank or unknown		1			1
Dspace No	14	1	4	2	21
Crown Fire	5			1	6
None				1	1
Some Crowning	2	1	3		6
Surface	6		1		7
Left blank or unknown	1				1
Grand Total	31	16	24	4	75

Residence damage to defensible space and fire intensity

* note of the 31 destroyed homes only 7 had D-space 22%

* Of the 40 homes with with minor or no damage 25 had D-space 62%

Neighborhood Mitigation

Sum of Count	Column Labels			
Row Labels	(blank)	No Neighborhood Mit	Neighborhood Mit	Grand Total
Destroyed	8	16	7	31
Minor	4	7	5	16
None	11	7	6	24
Left blank or unknown	3	1		4
Grand Total	26	31	18	75

Seven of 18 destroyed or 39% if neighborhood is mitigated vs 16 of 31 destroyed or 52% if neighborhood isn't mitigated

Firefighter Intervention

Sum of Count	Column Labels				
Row Labels	Destroyed	Minor	None	(blank)	Grand Total
Left blank or unknown	8	1	3		12
No FF Inter	22	8	9	2	41
FF Inter	1	7	12	2	22
Grand Total	31	16	24	4	75

Only one home destroyed if there was FF intervention vs 22 without intervention.

Firefighter Intervention and D-Space

Row Labels	Sum of Count
FF Inter	22
Dspace No	1
Dspace unknown	7
Dspace Yes	14
No FF Inter	41
Dspace No	17
Dspace unknown	10
Dspace Yes	14
(blank)	12
Dspace No	3
Dspace unknown	4
Dspace Yes	5
Grand Total	75

- There are only enough firefighters for 1/3 of homes to get intervention
- FF tend to intervene when there is D Space

Material stored under Decks

Sum of Count	Column Labels				Grand Total
Row Labels	Destroyed	Minor	None	(blank)	Grand Total
Unknown	24	4	8	3	39
No Stuff under Deck	6	9	11	1	27
Stuff under Deck	1	3	5		9
Grand Total	31	16	24	4	75

No story here, but then hard to say what was under the deck of the lost houses

Structures
Inventoried
by Street

Sum of Count Row Labels	Column Labels				Grand Total
	Destroyed	Minor	None	(blank)	
Black Forest Rd.	1	2	2		5
Blue Spruce	1	4			5
Brentwood Dr.	7		2	2	11
Connaught Rd.	1	1	2		4
Cypress				1	1
Darr	1				1
Fox Chase Way			2		2
Frank				1	1
Gun Club	1				1
Herring Rd	3	2	5		10
Highline Drive	2	2	2		6
Holmes		1	3		4
Meadow			1		1
New Discovery Rd.			1		1
NW Snowmass Drive	1				1
Piedra Vista			1		1
Pine Glen	1				1
Pinery Dr	7	1	1		9
Remington Road	1				1
Shoup	1				1
Snowmass Rd.	1	1			2
Tia Lane	1				1
Whispering pines			1		1
Wildridge	1	2			3
Saxton Hollow rd			1		1
Grand Total	31	16	24	4	75

The following page shows the form used for all assessments. This form was modeled on the form used as part of the Waldo Canyon Lessons Learned report of 2012. Special thanks to Dr. Stephen Quarles, Senior Scientist, Insurance Institute for Business and Home Safety (IBHS), and Andrew Notbohm, Boulder County, for their input.

Black Forest Post-fire Assessment Form

Date: July ____, 2013 Time: _____

Photos: Yes No Nos. _____

Site Information-

Address: _____ Address Visible: Yes No

Parcel and Residence Information-

Type of Parcel: Single Family Multi-family Horse Property

Property Size: < 1/2 acre > 1/2 acre, < 2.5 acres 2.5-10 acres
>10 acres Unknown

Slope: Low (flat-10%) Moderate (11-30%) Steep (>30%)

Position on Slope: Flat/Bottom Mid-slope Top of slope

Extent of Damage:

Property: None Minor Destroyed
Residence: None Minor Destroyed
Outbuildings: None Minor Destroyed

Type of Ignition: Ember/0-5 Vegetation Ember/5-30 Ember/Building
Wildfire Unknown

Fire Intensity on Property: None Surface fire only Some crowning Crown fire

Describe: _____

Defensible Space (per CSU 6.302) Yes No Unknown

0-5 feet: Non-combustible Mulch Grass Shrubs Trees

6-30 feet: Ladder Fuels Pruned? Yes No Crown Separation? Yes No

Propane Tanks? Yes No Wood or Debris Piles? Yes No Wood Fence? Yes No

D-Space Comments: _____

Home Ignition Zone: None 100 ft. 200 ft. >200 ft.

Trees Pruned? Yes No Crown Separation? Yes No

HIZ Comments: _____

Proximity to Neighbors / Secondary Building(s): Front _____ Left _____ Right _____ Back _____

Neighboring Property Mitigation Levels (Y/N): Front _____ Left _____ Right _____ Back _____

Neighborhood Mitigation Implemented: Yes No

Evidence of Firefighter intervention: Yes No

Describe: _____

Structure Ignitability-

Roof: Rated? Unrated Unknown

Complex Roof Elements? Yes No Unknown

Eave Type: Open Soffited Material: _____ Unknown

Gutters: Vinyl Metal Free of Debris? Yes No Unknown

Vents: Eave Gable End Through-roof Ridge

Vent screening: Yes No

Siding: Combustible? Yes No Non-combustible? Yes No Material: _____

Clearance Below Siding to ground? None 1-3 inches 3-6 inches > 6 inches

Deck: Non-combustible Combustible (Wood/W-P Composite)

Combustibles under deck? Yes No Material: _____

Foundation: Slab-on-grade Crawl Space Basement Walkout Level Vents? Yes No

Windows- Frame: Vinyl Other Glass: Single Pane Multi-pane Tempered

Window Screen: Yes No

Additional comments on back

Notes:

Black Forest Fire Assessment Team
 July 22 to July 24, 2013

			Mon.	Tues.	Wed.
Name	Organization	Office			
Steve Wallace	AFA, USFWS	719-333-3308		1	1
Judy von Ahlefeldt	BF News	719-495-8750			
Bob Harvey	BFFRPD	719-495-4300	1	1	1
Scott MacDonald	BFFRPD				
Walt Seelye	BFFRPD	719-495-4316	1	1	1
Andrew Notbohm	Boulder County		1	1	0.5
Jim Webster	Boulder County	720-564-2600	1	0.5	
Ryan Ludlow	Boulder County	720-564-2641	1	0.5	
Kim Kobel	Boulder Fire	303-441-3370	1		
Kim Scott	Boulder Fire	303.441.4355	1		
Chris Brunette	CDFPC	303-692-2507	1	1	
Matt Russell	CDFPC	719-275-6865	1		
Rob Geislinger	CDFPC	720-498-0664			1
Rob Sontag	CDFPC	303-697-2885	1	1	
Taylor Triolo	CDFPC	303-823-5774	1		
Dave Root	CSFS	719-687-2921	0.5	1	
Larry Long	CSFS	719-687-2921	1	1	
Michele Connelly	CUSP	719-748-0033	1		
Margo Humes	DWFPD	719-488-8680	1	1	1
Vernon Champlin	Falcon Fire	719-495-4050			1
Roni Vale	Firewise Ranch	719-465-6397	1	1	1
Randy Johnson	LFPD	303-681-3284	1	1	1
Marti Campbell	Past Pres. PPWPP				1
Keith Worley	PPWPP	303-681-2492	1	1	1
Susan Rule	Rampart Landscape	303-681-2085	1	1	1
Jean Blaisdell	Ridgewood HOA	719-686-1408	1	1	1
Mike Keough	Tri-Lakes Fire	719-484-0911		1	
Rudy Gilbert	Tri-Lakes Fire				0.5
Brandon Eubanks	USAFA			0.5	
Elaine Perkins	USAFA			0.5	
Jason Linta	USAFA			0.5	
Jonathon Milan	USAFA			0.5	
Martin Clinton	USAFA	719-333-1964	1	1	1
Reid Lohse	USAFA			0.5	
Roy Dalton	USAFA			0.5	
Brad Horner	Valley Park	719-535-1339		1	1
Organizations	18		20.5	21	15

164	168	120
452		
\$		
9,849.08		