

**DEVELOPING A
WILDFIRE RISK REDUCTION PLAN
FOR
JEFFERSON-COMO FIRE DEPARTMENT**

Leading Community Risk Reduction

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ABSTRACT

The problem was the Jefferson-Como Fire Department did not have a wildfire risk reduction plan to provide safety for the rural community within the fire district.

The purpose of this applied research project was to develop a plan for wildfire risk reduction for the Jefferson-Como Fire Department.

This was an action research project. The research questions were:

1. What are the benefits to the fire department to develop a wildfire risk reduction plan?
2. What are similar organizations doing to prepare for wildfire risk reduction?
3. What are the ramifications of a wildfire risk reduction plan and will it aid in protecting life, property and the environment?

The research procedures included: (a) distributing and analyzing a survey form which was distributed to 40 fire departments; (b) a literature review written on wildfire risk and risk reduction plans; and (c) Internet research on suggested wildfire risk reduction.

The research results demonstrated the need for a wildfire risk reduction plan. A well-developed plan will help ensure the safety of homes built in the wildland urban interface and the surrounding forest. A wildfire risk reduction plan was developed from this research, to be presented to the Department's Board of Directors.

The results also showed that Wildfire Risk Reduction Plans have been implemented in many areas throughout the United States and have strengthened the line-of-defense against wildfire in the urban interface.

Based on this study, the recommendation was to establish and adopt a wildfire risk reduction plan, and work with the community on defensible space mitigation, creating wildfire defensible zones.

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INTRODUCTION

Wildfire Risk Reduction is a subject of study during the National Fire Academy's Leading Community Risk Reduction course. The issue of developing a wildfire risk reduction plan for our rural mountain community related directly to the concepts of community risk reduction studied in the Academy's Leading Community Risk Reduction course.

The Jefferson-Como Fire Department does not have a written wildfire risk reduction plan to provide information and guidance to the community on defensible space mitigation for creating wildfire defensible zones. This plan will aid in safety for the community members, their homes, and the forest in which they live.

The purpose of this applied research project is to develop a Wildfire Risk Reduction Plan and its associated practices for the Jefferson-Como Fire Department and surrounding community.

Following are the research questions that were the catalyst for this project:

1. What are the benefits to the fire department to develop a wildfire risk reduction plan?
2. What are similar organizations doing to prepare for wildfire risk reduction?
3. What are the ramifications of a wildfire risk reduction plan and will it aid in protecting life, property and the environment?

Because the Department lacks a wildfire risk reduction plan, and the community is growing fast in the wildland urban interface, a plan becomes a valid concern for the safety of the community members, their homes, and the forest in which they live. The department leaders feel that a wildfire risk reduction plan will provide harmonious living

in the wildland urban interface which is critical to the safety of community members and firefighters.

BACKGROUND AND SIGNIFICANCE

The Jefferson-Como Fire Department is a combination department with career and volunteer firefighters comprising its membership. The Department provides emergency services to the residents and visitors of Park County, Colorado, in a mountainous region extending over an area of 525 square miles. Nearly forty volunteer members and three paid personnel sustain emergency services from six fire stations equipped with fourteen fire apparatus.

Emergency services provided by the Department include structural fire suppression, wildland fire suppression and mitigation, emergency medical services, hazardous material spill control, fire code enforcement, CPR and 1st aid for the community, and fire prevention and safety education. Notably, the most important service the Department provides is customer care and public relations to our citizens in the community. Our public knows who we are and they rely on us for their emergency care, community safety and education.

The main population lives within the wildland urban interface. Currently there is no plan in place to manage risk reduction involving wildfires.

The Wildfire Risk Reduction plan, resulting from this research project, needs to be adopted, education provided to the firefighters and community, and implementation and assistance provided to our residents.

A wildfire risk reduction model will be created and implemented for the

subdivisions in the wildland urban interface. In addition to a written plan, the fire department will assist the homeowner in identification of areas that must have forest mitigation and help with the actual mitigation process. Many of our citizens are older, work full-time jobs, and or do not own a truck or trailer to remove the downed timber.

Our department has provided two slash burn pits for the homeowners as they clear their property. However, we are finding that a plan is needed to help with the overall cohesiveness of all the work, the plan will also address issues that are not currently being worked on and identify where additional assistance is needed to complete the plan/project.

Our wildland interface is over due for a hundred year fire. With the amount of homes built in this interface area, a fire of this magnitude would be devastating. The adoption of a Wildfire Risk Reduction plan will provide focus for the County, the Commissioners, Firefighters, and homeowners. With this focus, I feel that the much needed mitigation can aid in the protection of homes and forests alike.

LITERATURE REVIEW

According to research, in 1987, the National Fire Protection Association (NFPA) adopted a standard on Fire Department Occupational Safety and Health, NFPA 1500. This standard set a precedence for the safety of firefighters in that the standard addressed issues related to avoiding injuries, fatalities, and occupational illnesses experienced by emergency response personnel while performing their duties. In 1992, the NFPA 1500 standard was revised and a section was added requiring fire

departments to have a written plan on risk management. The plan was to be adopted into the department's official policies and procedures.

The plan must identify and evaluate risks within that department's jurisdiction. A control plan must be implemented and followed along with the department's policies and procedures for emergency response.

The components of a risk management plan should be:

- risk identification
- risk evaluation
- risk control techniques
- program evaluation and review

In risk identification, the department will need to make a list of the potential problems related to the operations of the department. This list should contain such topics as the risks that members are or may be exposed to, records of injuries, accidents, and illnesses, and reports on building inspections and fire apparatus.

In the risk evaluation, the points listed in the identification portion need to be evaluated for the potential frequency of occurrence, severity and expense of the occurrence.

Risk control techniques included the development and implement strategies to reduce or control the risk. To enforce safety programs and follow the policies and procedures of the department.

Program evaluation and review provides for periodic evaluations to determine how the plan is working and if any updates need to be made.

Federal Emergency Management Agency (1996) states that “risk management incorporates a full range of measures that may be used to limit, reduce or eliminate the probability that an undesirable outcome will occur” (p. 23).

It is the job of a fire department to manage risks for others. The community is always at risk from many hazards and it is the fire department’s role to reduce the probability of harm to the community. Therefore, the fire department manages internal risks, external risks, and the community, as it’s routine assignments.

By identifying risks within the department it becomes commonplace to identify risks within the community. The same process may be followed by risk identification, risk evaluation, risk control, risk management, monitoring and follow-up.

By understanding the NFPA 1500 standard it will allow for adoption in the community. The same guidelines that are used to protect and safeguard firefighters can be applied to the public. In developing a Wildfire Risk Reduction Plan, two benefits will be realized. First, it will provide for firefighter safety and second, it will provide safety and direction for the community.

According to FEMA (1996), hazard recognition, preplanning and working towards the reduction of that hazard can reduce the risk to personnel and the community. The NFPA 1500 standards play an important role in community safety.

As well as risk reduction practices, pre planning the area of concern can greatly influence the outcome of the hazard. Having prior knowledge of the wildfire risk and having a pre plan in place will aid in the control of a situation until the total risk reduction plan is in place and implemented.

Following the severe fire season of 2002 in Colorado, Arizona and Oregon, Congressman McInnis (2002) introduced legislation to “bring effective and much needed reform to Forest Service policies and decision-making processes” (p. 1). According to Congressman McInnis he feels that the nation must start managing the forest better and proposed two principles. The two principles are:

(1) Public input in forest management is a must.

(2) The process that governs management of our forests and rangelands simply moves too slowly.

Per Congressman McInnes (2002), “The bill introduced guarantees meaningful opportunities for public input during the formulation of thinning projects, as well as an opportunity for thinning opponents to challenge those projects either through administrative channels or in the courts” (p. 2). With his proposal, the thinning operations would be implemented at a faster pace instead of taking several years to move through the process.

The focus is to reduce the risk of catastrophic wildfires in communities near the wildland-urban interface. The legislation authorizes additional funding for hazardous fuels reduction on the national forests and public lands.

With the support of congress and President Bush, wildfire risk reduction is getting a head-start and more people are becoming aware of the dangers and what can be and should be done to protect homes and forests.

Another issue that comes up in the growing population on the wildland urban interface, is man-power. Due to the increasing number of homes built in forested areas, wildland and structural firefighter managers are finding the need to cross train. The

wildland urban interface is creating new problems in firefighting with the mix of heavy forested areas and homes. Firefighters, equipment and fire apparatus are now being outfitted to handle both structure fires and wildland fires. The need for a wildfire risk reduction plan addressing both firefighting and home/land owners is growing.

The financial impact of severe wildland fires on communities and on private and public lands is astonishing. Additional funding has been needed to fight wildfires. Approximately \$20 billion has been expended nationally in fighting fire in the wildland urban interface since 1970 and the amount continues to grow at a very fast pace.

Fire has been a natural occurrence within the forest for centuries. However, with the movement of the countries population to the remote rural areas, natural occurring fires, for example from a lightning strike, have been suppressed; therefore, not allowing for the natural clearing of the land. Homes are being built with no regard for the forest it is built in.

One of the first steps needed is to educate the public. Also, firefighter training will be a large undertaking. With the support and education of the public living in the wildland urban interface, mitigation can be done and reduce the fire danger.

Fire protection in the wildland urban interface is not the responsibility of any one agency. Fire affects numerous organizations and the entire community. When these fires occur, community services become over taxed, natural resources, homes and precious family possessions are destroyed and even lives can be lost.

More emphasis needs to be placed on wildland firefighter safety, fire behavior and fire suppression tactics in the wildland urban interface. Structural firefighters must have

extensive training in wildland firefighting, be provided wildland fire protective equipment and the rural water supply and delivery capabilities must be enhanced.

A good program that has been targeted for the wildland urban interface is called Firewise. Also, the Colorado State Forest Service program is designed to target mitigation factors of access, structure design and fuels that make wildland fires so complex in the interface. The program helps communities address the issues surrounding people moving into the wildland areas. Firewise and the National Fire Fund address the issues of broad scale fuel hazard reduction and individual home mitigation. The program is managed by the community and they take ownership of the problems. The goal is to solve existing fire risk problems and develop a plan to keep from creating additional fire risk problems as the community grows. Water supplies, thinning and pruning pines are among the activities. Education is the key. Homeowners and other community members must be educated and develop plans to address the risks.

The community fire chief, public works director, city planner, and emergency management director should be brought into the discussions as early as possible. An assessment of the wildfire hazard in the community area must be done, including individual homes. The assessment should include the location of pine stands that need thinning, homes that need better access and location of dry hydrants and/or water supplies. Some of the most important activities are to encourage homeowners to thin and prune trees, create a defensible space, improve driveways, post addresses, and do seasonal maintenance like cleaning leaves out of gutters and off the roof.

Firewise stands for **F**uel and vegetation management, **I**ntegrated planning, **R**esource protection/management, **E**nvironmentally sensitive techniques, **W**eather and

fire history based, Interagency cooperation, **S**trategic applications and **E**conomically feasible. A Firewise program is a strategic planning model that can be integrated into all levels and disciplines of land use planning. Conflicting fire protection, environmental, and developmental values can be effectively mitigated during the pre-development and initial site analysis review process. Firewise planning is designed for applications of differing scales and concerns.

The National Fire Protection Association has published a wildland fire hazard assessment in the 299 Standard. The form helps rural homeowners determine their actual fire hazard rating. This form also assists fire departments with the rating. For example, the rating includes road width, turnaround areas, street and house address signage, and hilly areas.

According to the Federal Alliance for Safe Homes, Inc. (2003), the NFPA Standard 299 references a "Wildfire Hazard Severity Checklist" (p.1) which will aid in determining the risk level of homes in the wildland urban interface and surrounding area. Hazards in the interface include such things as building construction and type, subdivision design and access, vegetation type and density in the surrounding area.

Risk assessment should include review of the home and surrounding area for potential hazards.

Low risk assessment includes bare ground, leafy trees and few plants growing low to the ground. Moderate risk assessment includes thick, continuous grasses, weeds and/or shrubs, continuous thin layer of pine needles and scattered pine trees and some clearings. A high risk assessment includes a thick bed of pine needles and many pine trees, continuous grasses and shrubs with no clear view or clearings.

An assessment is vital in developing a risk reduction plan. Fires will spread rapidly in areas with continuous fuels, thick vegetation and continuous overhead tree canopies. Wildfire can outpace an initial firefighter response and use fuels to spread into populated areas. Fire will spread when combustion requirements are present. By reducing and/or eliminating fuel (a combustion requirement) around and near the interface home, the spread of wildfire can be stop or greatly reduced.

As stated by the Federal Alliance for Safe Homes (2003), “homes within the wildland urban interface can be maintained to increase the chances of wildfire survival (p.2). Weather and terrain are unchangeable, however, reducing fuels, maintaining adequate water supplies, roads and addressing can greatly aid in the survival of the homes and forest.

Included in the planning process should be the source and accessibility of water. This source should be within a twenty minute round trip time. Water supplies should be will marked and accessible for fire apparatus.

Defensible space should be done around homes in the interface. All dead plants and trees should be remove from the property. Remaining trees should be thinned, pruned and limbed-up within a minimum of 30 feet around the home. Defensible space may need to be increased to as much as 100 feet under high-risk conditions.

The goal for defensible space is to modify or break up the fuels in such a way that lessens catastrophic fires and their threats to public and firefighter safety and reduces damage to property. Effective fuel mitigation treatments can be implemented across jurisdictional boundaries, on private lands or within communities.

Homeowners and communities have a responsibility to create fire safe conditions in and around structures that will limit the transmission of fire from wildlands to property and property to wildlands.

A large factor to consider during wildfire risk reduction is what is at risk, savable lives, savable property or nothing savable? Also, fire behavior prediction for the immediate area where fire crews will be operating to protect what's at risk. Structure protection in the interface usually involve protecting savable property, therefore justifying firefighters risking little.

Risk management for firefighter safety is the first decision that should be made once an assignment in the interface is received. Assessing the availability of useable safety zones, making sure the crew and engine can get to these safety zones using a viable escape route, ensuring communications between crews and supervisors, and establishing a lookout member who can see what the fire is doing. With wildland risk reduction, firefighter safety can be achieved. Education of the community will play an important key during risk reduction.

Building community partnerships is a major factor in a successful risk reduction plan. A partnership will develop support within the community. As a whole, the hazard(s) must be identified and determine how vulnerable is the community should there be a situation resulting from the hazard. A plan needs to be developed prioritizing the risk reduction actions to be taken and communicating the results and progress of the plan.

When building a community partnership, all of the stakeholders should be identified. For example, persons to consider and ask for involvement would be the emergency preparedness coordinator, law enforcement, fire officer, EMS officer, local

officials, business persons, county officials and any other stakeholder with an interest in risk reduction. It helps if the stakeholder has an obligation to protect the safety and economic stability of the community. Mutual aid agreements with regional counties should be developed and in place. Other stakeholders might be such organizations as animal rescue groups, volunteer citizens, the American Red Cross, Salvation Army to name a few.

The stakeholders should work together to find ways to contribute to the overall effort to build a disaster-resistant community.

With risk reduction planning, the risk(s) must be identified and the vulnerability it creates to the community. Through this identification, the areas most vulnerable can be determined and reduction efforts made.

Risk assessment also defines the potential consequences of the disaster based upon a combination of the community hazards and vulnerability identification.

Prioritizing the risk reduction actions requires identifying the mitigation priorities, what measures will be taken to complete the priority and the sources for financial and other needed support to achieve those measures needed.

A main feature is to prepare a long-term plan that specifies a strategy for accomplishing the goals for mitigation. Communicating plans and receiving feedback is another important part in the continued support of the planning process.

According to Mr. Davies (1996), "risk itself is simply the likelihood that injury or damage is or can be caused by a substance, technology, or activity" (p.5).

Analysis of the risk(s) and prioritizing are the main focus point when starting a risk reduction plan. As stated by Mr. Davies (1996), "risk assessment is a set of analytical techniques for answering the question: How much damage or injury can be expected as

a result of some event” (p.6)? Over the years, risk assessment has gone from large industrial accidents to such hazards as building homes and living within the forested areas of a region.

“Risk management developed as a contrasting term to risk assessment. Risk management considers the social, economic, and political factors involved in risk analysis, determining both the acceptability of damage that could result from an event or exposure and what, if any, action should be taken with regard to the risk of that damage” Davies (p.7).

Mr. Davies goes on to refer to stakeholders and the importance of community, state and national involvement. As well as having a vested interested in the well-being of the community, a stakeholder also becomes an advisor to elected officials and other persons of greater responsibility to ensure risk reduction efforts are developed.

PROCEDURES

The following procedures are one of the accepted research methodologies used in accredited College, University, and National Fire Academy classes and research projects.

Research Methodology

Action research procedures were used to determine the need for a wildfire risk reduction plan. Through literature review, the issues facing our fire department were among the same issues facing other areas of the county. This literature review was used to determine the need for a written plan including risk identification, risk evaluation, risk control techniques and program evaluation and review. As stated many times, to

ensure the safety of the community and firefighters, a wildfire risk reduction plan should be developed.

Wildfire Risk Reduction Planning was researched on the Internet. Most documents were consistent, in that, a wildfire risk reduction plan is needed regardless of the size of the community when it exists in the urban wildland interface. It was evident through this research that other departments and communities have dealt with these same issues, and wish to see a wildfire risk reduction plan for the protection of life, property and the environment.

Letters were sent to forty fire departments in the United States, along with a survey form asking for assistance in analyzing a wildfire risk reduction plan. The survey asked what the benefits resulted from the plan, ramifications, if any, and did the plans aid in community safety and continuity. The cover letter that was sent along with the request for the survey is shown in Appendix A, the actual survey is shown in Appendix B, and the response tabulation from thirty-one departments are shown in Appendix C.

The survey results obtained from the responding fire departments were compiled and reviewed for components that meet the needs identified by the Jefferson-Como Fire Department. With the literature review and the survey results, the need and direction of a wildfire risk reduction plan was formed. A number of issues and ideas used in developing the plan came from existing stakeholders within the Jefferson-Como Fire Department area. All information gathered was edited to ensure that the final wildfire risk reduction plan met the needs required for the safety and security of the community and members of the Jefferson-Como Fire Department. The wildfire risk reduction plan can be found in Appendix D.

The results of the literature review allowed this author to identify various strategies that should aid in preparing the wildfire risk reduction plan for the Jefferson-Como Fire Department.

RESULTS

A copy of the wildfire risk reduction plan developed for the Jefferson-Como Fire Department and its communities is in Appendix D.

Research has shown that a wildfire risk reduction plan is instrumental in providing community safety. The Plan is related to the Firewise and Colorado State Forest Service programs whose ideas and goals have proven successful for many communities. The plan will be the basis from which fire personnel and community stakeholders derive the parameters for assessment and evaluation to aid in the larger picture of the mission of wildfire risk reduction.

Through the literature review, many sources were found regarding wildfire risk reduction. Works researched by this writer were favorable for establishing a plan and seeing that it is followed. Community members and stakeholders want a safe living environment and look towards the fire department to lead the way.

The survey results revealed that most fire departments responding have a wildfire risk reduction plan in place, and further showed that most fire departments were the leaders in their community on development and follow-through of the plan. The fire departments have the enthusiasm and see the benefit of a successful plan. There were no ramifications from developing and working with a wildfire risk reduction plan. There was a good response concerning stakeholders and fire department members partnership in developing and working the plan to work towards a safe community.

There are many elements to a successful wildfire risk reduction plan and the issues covered in this research paper relate to those identified by the Jefferson-Como Fire Department. A strong wildfire risk reduction plan, along with the mission of the stakeholders and community, training, education, and follow-through will accomplish the needs of the Jefferson-Como Fire Department to aid in protecting life, property and the environment.

Answers to Research Questions

Research Question 1. *“ What are the benefits to the fire department to develop a wildfire risk reduction plan?”*

The research indicates that the fire department, as well as the community at-large, would benefit greatly from a wildfire risk reduction plan. With the movement of people to live in the rural mountain setting, inherent risks accompany this life style. One of the many, but most dangerous and destructive, is the ever present threat of wildfire. Many times people see the beautiful mountains and trees and are unaware of the severe danger of living in the wildland urban interface. With proper education, stakeholders by-in, and lots of hard work, this ever growing life style can work for both the community and environment.

With a comprehensive wildfire risk reduction plan and community support, we can make the wildland urban interface a safe and beautiful place to live. The plan cannot be implemented over night, but, with education programs and the assistance of the fire department and stakeholders, areas will begin to show signs of progress.

Through literature review there are many benefits to an organization when providing education and assistance with a comprehensive wildfire risk reduction plan.

Research Question 2. *“What are similar organizations doing to prepare for wildfire risk reduction?”*

Other departments responded by indicating that many of them have a wildfire risk reduction plan in place. Wildfire risk reduction might not apply to all areas where communities are established, however, the knowledge and training is beneficial in the event of a major catastrophe such as the Hayman Fire in Park, Teller, and Jefferson Counties, Colorado, Summer 2002. With knowledge of wildfire risk reduction, larger metropolitan fire departments and stakeholders are able to help in the time-of-need. Research showed the wildfire risk reduction is not limited to rural areas when assistance from outside agencies is needed.

Community and stakeholder support are what makes a wildfire risk reduction plan a success and allows for the safety of all involved during an emergency.

Research showed that one simple area that leads in preparing the community and stakeholders is the awareness of the wildfire risk reduction plan. The guidance a plan provides is valuable in developing support and continuing the work towards a safe community. And, in the event of a large wildfire, the community will be better prepared to deal with the effects of the emergency and the recovery efforts.

The initial development and implementation of the plan is only the beginning for a safe community and environment. As new community members move into the area and trees die, once again the wildfire risk reduction process must be carried out.

Research Question 3. *“What are the ramifications of a wildfire risk reduction plan and will it aid in protecting life, property and the environment?”*

Research shows that a wildfire risk reduction plan helps alleviate ramifications as it clarifies the procedures of the community, stakeholders and fire department. Wildfire risk reduction planning will aid in continuity of mitigation in making a safe community.

A wildfire risk reduction plan will aid in the protection of life, property and the environment now and in years to come. The ramifications of not having a plan could be devastating to life, property and the environment. It has been proven that we must do our part in providing for and continuing to provide for a lasting, cooperative life style if we are to co-habitat with nature.

DISCUSSION

A wildfire risk reduction plan for today's wildland urban interface life style has proven to save lives, property and the environment.

Today, with the ever increasing threat of increased population in the urban interface, people of the community and it's stakeholders must plan ahead for the future. To live in harmony with nature, people must work hard and develop a safe community.

Advantages of a comprehensive wildfire risk reduction plan are a safer community, beautiful and healthy forests, and a habitat for the forest animals. Planning means protecting the way of life that many people have come to know.

A good wildfire risk reduction plan should establish a process that recruits community members, stakeholders, and officials who all have a desire to improve and protect their community. Skills and planning through professional development and training will aid towards making the area better. Also, a good plan prevents future community members and stakeholders from becoming stagnant and provides new opportunities for learning and contributing to the organization.

Wildfire risk reduction planning can force feed development. Planning and sharing will help the organizations' leaders to deal with hazards and continue work towards a safe environment.

Congressman McInnes (2002) discussed how wildfire risk reduction planning means working towards thinning operations at a faster pace to aid in the safety of communities in the urban interface. His actions work towards additional funding for hazardous fuels reduction on the national forests and public lands. With the support of congress and President Bush, wildfire risk reduction is getting a head-start. With community and stakeholders involvement, the wildfire risk reduction plan will make a difference we all can live with.

Research clearly states that leaders and interested parties in both the public and private sector have a desire to meet the demands of today's hazards and are able to develop a strategic plan for tomorrow. The Fire Chief supports a program to provide for a safer community, to protect lives, property and the environment. Without this support and that of the community, the wildland urban interface will suffer in the long run.

The Federal Alliance for Safe Homes, Inc. (2003) reminded us that such agencies as the National Fire Protection Association feels strongly enough about wildfire risk reduction that it addresses this topic in the 299 standard. Saving lives and protecting the men and women firefighters is of the utmost important.

Developing a solid wildfire risk reduction plan will require some time and the implementation of the plan will not happen over night. The lack of a wildfire risk reduction plan and disregard for life, property and the environment can cause great problems and hardships.

Leaders must develop the willingness and ability to enter into a community plan for the future. These efforts will include identifying hazards, assessing these hazards and taking steps to mitigate the problem areas. A plan to continue risk reduction in the future should also be included.

Planning meetings need to be held on a regular basis to identify and assess the hazard. This author agrees that leaders should be encouraged and educated on planning toward a wildfire risk reduction plan.

Research findings are relevant to the Jefferson-Como Fire Department and the community which it serves. To fulfill the mission statement of the fire department, to protect life, property and the environment, it is imperative that a wildfire risk reduction plan be developed, followed, and continued in place for years to come.

Through the research, it is evident that standards have been put in place for wildfire risk reduction and there is no need to seek changes. By following the plans and ideas that are currently in place throughout the nation, the community of the Jefferson-Como Fire Protection District can develop and implement a successful plan.

As stated by the Colorado State Forest Service (1999) the *Firewise* program has developed defensible space thinning standards, which are easily defined and followed throughout the community. It addresses trees, brush, shrubs, ladder fuels, and slope adjustment factors. Keeping within the guidelines for defensible space management zones, the Firewise program educates community members on the mitigation zones and how to maintain them over the years. This author believes the Firewise program to be the most adaptable community program to meet the needs presented.

The Firewise program addresses defensible space, maintaining the defensible space, outdoor water supplies, driveway width and tree clearance for fire and emergency

equipment access. Road signs and house numbers should be posted and easily visible. Family fire drills and a fire evacuation plan is discussed along with escape routes, and a meeting place.

A wildfire risk reduction plan will bring all of the components together into one comprehensive plan for the entire community. At the present time, such topics as family fire drills and evacuation are topics delivered at the school level during fire prevention week. With a wildfire risk reduction plan, these topics and wildland mitigation will be covered with adults and young people alike.

This author agrees with the research on preparing worksheets and has permission from the Colorado State Forest Service and Firewise to use their worksheets and ideas in the wildfire risk reduction plan. Worksheets will establish guidelines with which to follow and help with consistency through the process. There has been great importance placed on technical competence and follow-through in the ability to develop a wildfire safe community.

This researcher's opinion is that a wildfire risk reduction plan will accomplish the mission statement of the fire department and bring together the community and stakeholders to provide a safer community in which to live and raise a family.

RECOMMENDATIONS

Based on this research, the Administration Office of the Jefferson-Como Fire Department has written a wildfire risk reduction plan.

The plan has input from the community and stakeholders and follows the established guidelines of the Colorado State Forest Service. Continued mitigation and safety practices are included in the plan for future generations.

It is the recommendation of this researcher that the Jefferson-Como Fire Department adopt and review the wildfire risk reduction plan in Appendix D to aid in the safety of it's community, property and environment.

The wildfire risk reduction plan recommends the practices to be followed and lead by fire department personnel.

The research indicates that employees working with the risk reduction plan have a complete understanding of the necessary mitigation steps and assist homeowners with the process.

Risk reduction practices take time to see major improvements, however, the results will be invaluable. A wildfire risk reduction plan will provide for a healthy and beautiful forest while allowing for communities to be developed near and within it's boundaries.

The wildfire risk reduction plan should be reviewed periodically, preferably no less frequently that every 12 months. The plan should be a working document, allowing for adjustments and change as needed or improved ideas arise.

The problems facing Jefferson-Como Fire Department were identified and through research it was discovered that they are common problems. Research consistently recommends that a wildfire risk reduction plan be adopted and implemented because of the ever increasing risk to lose of life, property and damage to the environment.

In conclusion, there are many books and articles written on wildfire risk reduction planning and future readers can find helpful information from the references sited and documents already being used by other departments and organizations. Wildfire risk

reduction issues need to be identified by the reader or researcher and customized to meet their specific needs of their community environment.

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APPENDIX A**Cover Letter**

JEFFERSON-COMO FIRE DEPARTMENT

P. O. Box 380
Como, Co 80432
719-836-3244

July 21, 2003

To whom it may concern:

I am the Fire Chief for the Jefferson-Como Fire Department and I am working on a wildfire risk reduction plan for our community for an applied research project for the National Fire Academy.

Enclosed is a research survey form. If it is convenient, I hope you will have a few minutes to complete this form. The information contained on this form will be very helpful in completing my research project on creating a wildfire risk reduction plan.

I would like to thank you in advance for your time and if you have any questions, please feel free to contact me at 719-836-3244.

Sincerely,

Judith L. Anderson, Chief

APPENDIX B
SURVEY
FOR
WILDFIRE RISK REDUCTION PLAN

SURVEY QUESTIONNAIRE FOR WILDFIRE RISK REDUCTION PLAN
RESEARCH PROJECT

Does your department have a written wildfire risk reduction plan for your community?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does the plan address involving community members and stakeholders?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does the plan create a workable format for people to follow?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Where there any notable ramifications of the wildfire risk reduction plan?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is your plan currently in place and do you believe that it is aiding in the protection of life, property and the environment?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Comments: _____

**APPENDIX C
SURVEY ANALYSIS**

**ANALYSIS OF SURVEY QUESTIONNAIRE
(30 out of 40 Departments Responded)**

QUESTION	YES	%	NO	%
Does your department have a written wildfire risk reduction plan for your community?	28	93%	2	7%
Does the plan address involving community members and stakeholders?	21	70%	9	30%
Does the plan create a workable format for people to follow?	30	100%	0	
Where there any notable ramifications of the wildfire risk reduction plan?	2	7%	28	93%
Is your plan currently in place and do you believe that it is aiding in the protection of life, proerty and the environment?	30	100%	0	

APPENDIX D WILDFIRE RISK REDUCTION PLAN

Due to the mountainous region of the Jefferson-Como Fire Protection District in Park County, Colorado, the threat of wildfire is high. Approximately 4000 homes are built within the wildland urban interface with little concern for the heavily forested areas surrounding these homes.

The purpose of this wildfire risk reduction plan is to reduce the causal factors which could lead to a devastating fire.

The economic and material damage from this type of disaster can be reduced by mitigating causal factors such as poor fuel management, non-compliance with wildland urban interface building codes, poor coordination of emergency response systems, and lack of citizen education on wildland mitigation.

The following intervention strategies are proposed:

1. Form a wildfire coalition to pursue state mitigation funding and develop a wildfire prevention strategy. This will involve key business and citizens in response and recovery issues as well as reducing the economic impact of a disaster.
2. Adopt and enforce the National Fire Protection Association (NFPA 299 & 1144) codes for Wildland Urban Interface. This will update and strengthen both fuel modification and building construction codes and provide clear guidelines for Code Enforcement Officers.

3. Public education initiatives will inform our citizens how to prevent or reduce damage to themselves and their properties.
4. Fire department funding for apparatus and equipment specific to wildland firefighting will enhance the Fire Department's capability to protect lives and property. Mutual aid agreements with surrounding emergency response agencies should be signed and reviewed periodically and planning disaster drills should be held with these agencies.

The goal is to reduce the casual factors surrounding wildfire by 50% by summer of 2004. The mission is that the Fire Department will lead the community in the reduction efforts. The Fire Department will assist, as requested, in the mitigation process. Funding will be obtained from grants and private sources.

These interventions will be monitored and continuously evaluated with bi-annual reports on progress to the Park County Commissioners. A pre-action and post-action survey of residents will be conducted to determine levels of effectiveness of the public education program. Tours of the area will be conducted annually to check on fuel modification initiatives. Code Enforcement Officers will inspect properties for code violations. The Fire Department will made periodic inspections throughout the year.

It is the intention of this plan to reduce the number of homes and lives destroyed by wildfire disasters.

Defensible Space Checklist
Jefferson-Como Fire Protection District - Wildfire Risk Reduction Plan

- Zone 1:** The area of maximum modification and treatment. This area is 15 feet around the structure where all flammable vegetation is removed. This 15 feet is measured from the outside edge of the home's eaves and any attached structures, including decks.
- Zone 2:** The area of fuel reduction beyond zone 1. Zone 2 depends on the slope of the ground where the structure is built. The zone should be at least 75 to 125 feet from the structure. Continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs.
- Zone 3:** The area of traditional forest management and is of no particular size. This area extends from the edge of your defensible space to your property boundaries.

Dispose of slash (branches and prunings) and debris on the forest floor by mulching or removal to the burn pit.

Woodpiles or detached structures within the defensible space zones are considered fuels and 10 feet of clearance to the nearest vegetation is required.

These regulations are supported by the Colorado State Forest Service, Firewise, and the Jefferson-Como Fire Department. For questions or site assistance please call Jefferson-Como Fire Station 5 at 719-836-3244.

**JEFFERSON-COMO FIRE DEPARTMENT
PARK COUNTY COLORADO
WILDFIRE RISK AND HAZARD SECURITY ASSESSMENT FORM**

Name: _____
Address: _____

Subdivision: _____
Owner: _____
Application Date: _____ **Completion Date:** _____

A. Means of access

- | | | |
|---|---|-------|
| 1. Ingress and egress | | |
| a. Two or more roads in/out | 0 | _____ |
| b. One road in/out | 7 | _____ |
| 2. Road width | | |
| a. >24 ft. | 0 | _____ |
| b. 20 ft. - 24 ft. | 2 | _____ |
| c. < 20 ft. | 4 | _____ |
| 3. All-season road condition | | |
| a. Surfaced road, grade <5% | 0 | _____ |
| b. Surfaced road, grade >5% | 2 | _____ |
| c. Non-surfaced road, <5% | 2 | _____ |
| d. Non-surfaced road, >5% | 5 | _____ |
| e. Other than all-season | 7 | _____ |
| 4. Street signs | | |
| a. Present, 4inch in size and reflectorized | 0 | _____ |
| b. Not present | 5 | _____ |

B. Vegetation (Fuel models)

- | | | |
|---|----|-------|
| 1. Characteristics of predominate vegetation within 300 feet. | | |
| a. Light (Grasses) | 5 | _____ |
| b. Medium (Light brush - small trees) | 10 | _____ |
| c. Heavy (Dense brush - large trees) | 20 | _____ |
| d. Slash (Downed branches) | 25 | _____ |
| 2. Defensible space | | |
| a. Vegetation treatment extending 100' from structure | 1 | _____ |
| b. Vegetation treatment extending 70' from structure | 3 | _____ |
| c. Vegetation treatment extending 30' from structure | 10 | _____ |
| d. Vegetation treatment extending <30' from structure | 25 | _____ |

C. Topography within 300 feet of structure(s)

- | | | |
|--------------------|----|-------|
| 1. Slope <9% | 1 | _____ |
| 2. Slope 10% - 20% | 4 | _____ |
| 3. Slope 21% - 30% | 7 | _____ |
| 4. Slope 31% - 40% | 8 | _____ |
| 5. Slope >41% | 10 | _____ |

D. Roofing

- 1. Non Combustible 0 _____
- 2. Combustible 10 _____

E. Building Construction

- 1. Materials - Noncombustible/fire resistive siding 0 _____
- 2. Materials - Noncombustible/fire resistive siding
Combustible deck 5 _____
- 3. Materials - Combustible siding and deck 10 _____
- 4. Building setback >30 feet to slope 1 _____
- 5. Building setback <30 feet to slope 5 _____

F. Available Fire Protection

- 1. Water source availability
 - a. Water source within 5 miles 0 _____
 - b. Water unavailable within 5 miles 10 _____
- 2. Organized response resources
 - a. Fire station <5 miles from structure 0 _____
 - b. Fire station >5 miles from structure 3 _____

G. Total for home or subdivision (total of all points) _____

Hazard Assessment

- 1. Low Hazard
- 2. Moderate Hazard
- 3. High Hazard
- 4. Extreme Hazard

Points

- 40
- 41 - 69
- 70 - 112
- 113>

Recommendations: _____

Inspector: _____, Jefferson-Como Fire Protection District

WILDFIRE RISK REDUCTION WORKSHEET

	Date:	Completed √	ReChecked √
<input type="checkbox"/> Trees & brush: Properly thinned and pruned within defensible space			
<input type="checkbox"/> Slash: Disposed of			
<input type="checkbox"/> Roof & gutters: Clear of debris			
<input type="checkbox"/> Roofing: Fire resistive or noncombustible			
<input type="checkbox"/> Chimney: Has spark arrester			
<input type="checkbox"/> Branches: Removed over chimney & roof			
<input type="checkbox"/> Grasses: Mowed within 10' of house			
<input type="checkbox"/> Firewood: Stacked uphill from home			
<input type="checkbox"/> Water Supply: Hose and nozzle			
<input type="checkbox"/> Fire Extinguishers: Checked & in working cond.			
<input type="checkbox"/> Driveway: Easy access for emer. vehicles			
<input type="checkbox"/> Signs: Address & street name posted			
<input type="checkbox"/> Fire Drills: Family fire drill and evacuation plan practiced			
<input type="checkbox"/> Safety Zone: Safety zone/fire break around your home - 30'. 100' for home on slope			

Owner's Name: _____

Address: _____

Phone #: _____

ASSESSING WILDFIRE RISK

Hazard Identification	Wildfire
Probability of occurrence	High
Treat to fire jurisdiction	Yes
Frequency of occurrence	* Small fires annually * Potential of catastrophic fire

Casual factors	* Human factors * Living in the wildland urban interface * Lightning * Unattended campfire * Mechanical failure * Children * Smoking materials
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- 4,000 homes in the wildland urban interface in target area
- Heavy dense forest
- Heavy ground fuels
- Standing dead fuels
- 100 years since last large forest fire

Risk Rating

Hazard	Prob. Of Occurrence	Vulnerability	Risk
Wildfire	Likely (3)	High (3)	High = 6

Vulnerability Assessment		
Hazard	Wildfire	
Impact Rating		
High = 3; Moderate = 2; Low = 1		
Danger/Destruction/Personal Harm	3	
Economic	3	
Environmental	3	
Social	3	
Political Planning Level (Local = 1; Regional = 2, Federal = 3)	2	
Total Vulnerability Rating (sum of all factors)	14	
Rank Low = 5-8 Moderate = 9-11 High = 12-15	High	

CONSENT FORM

**Jefferson-Como Fire Protection District
P. O. Box 380
Como, Co 80432**

Date: _____

Property Owners Name: _____

Property Address: _____

Subdivision: _____

Mailing Address: _____

Phone: _____

I, _____, legal owner of the property described above, understand that the wildland mitigation program offered by the Jefferson-Como Fire Protection District complies with the Colorado State Forest Service, Firewise and the Jefferson-Como Fire Department mitigation plans. This program in no way guarantees that my home will not burn during a forest fire, however, by following the guidelines, my home will be more defensible in the event of a fire. I understand that all work will be performed by Jefferson-Como Firefighters volunteering their time. This mitigation will be of no cost to you, the home/land owner.

I understand the wildland mitigation program and agree to have Jefferson-Como Firefighters mitigate my property. A worksheet and diagram will be provided to me, for my approval, prior to work starting.

Signature

Fire Chief's Signature

APPENDIX E
WILDFIRE RISK REDUCTION PLAN

	JEFFERSON-COMO FIRE DEPARTMENT	
	SUBJECT: Wildfire Risk Reduction Plan	1
	APPROVED:	Previous
	APPROVED: J. L. Anderson, Chief	Revised

PURPOSE:

To establish a plan-of-action to develop cohesive living within the wildland urban interface in the Jefferson-Como Fire Protection District.

MISSION:

To protect and preserve life, property and the environment. To provide for safe living in the rural mountain setting of South Park Colorado.

VISION:

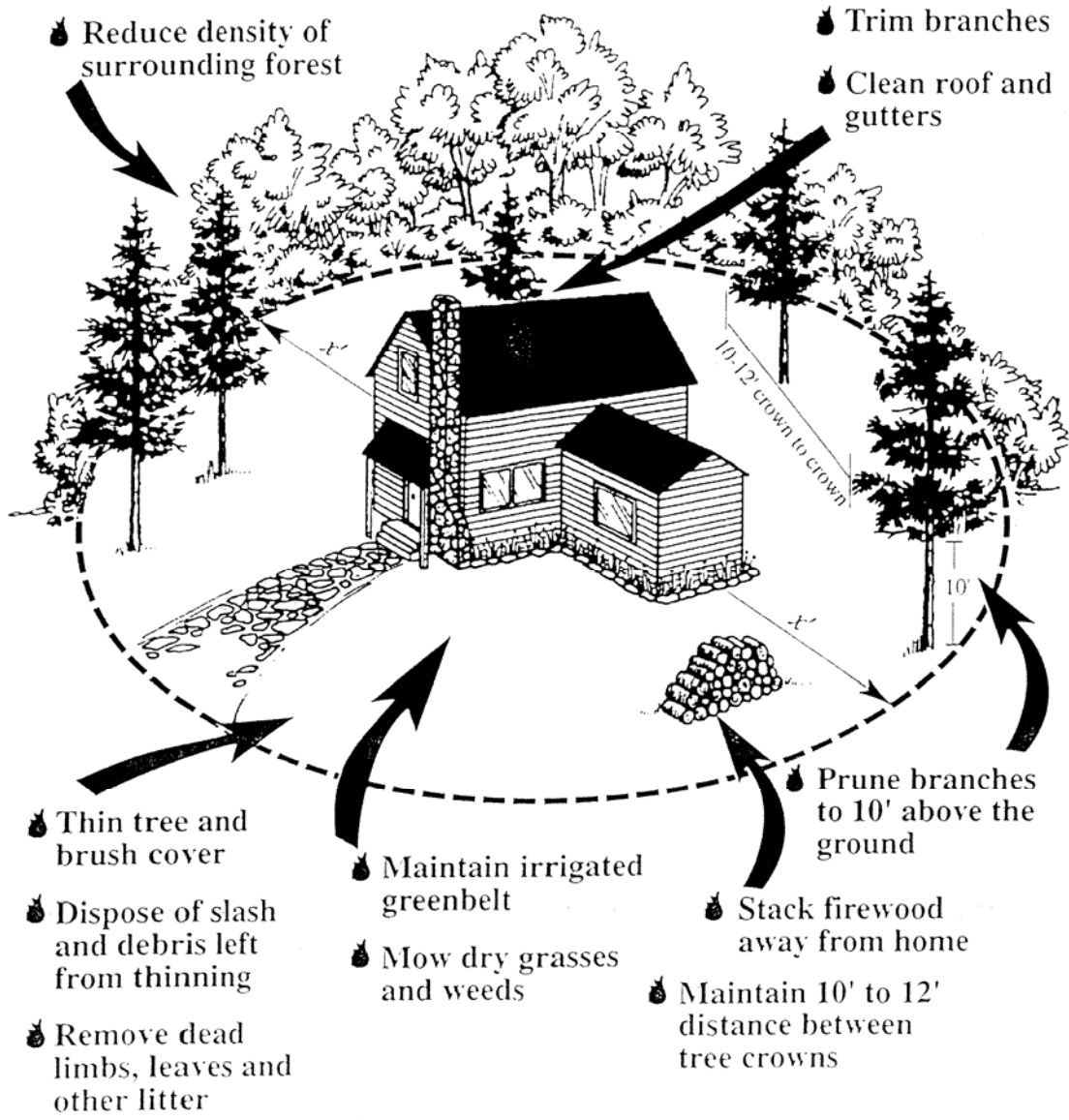
The Jefferson-Como Fire Department is committed to accomplishing its mission in a time and cost effective manner, and to provide the best possible community lifestyle possible in the wildland urban interface.

POLICY:

Leaders of the Jefferson-Como Fire Department will maintain the highest level of cohesiveness for wildland urban interface living by planning and community development.

PROCEDURES:

- A. Identify the hazards
- B. Risk analysis
- C. Plan-of-action
- D. Funding
- E. Community and Fire Department education and awareness
- F. Implement project
- G. Evaluate project
- H. Review and evaluate changes.
- I. _____
- J. _____
- K. _____
- L. _____



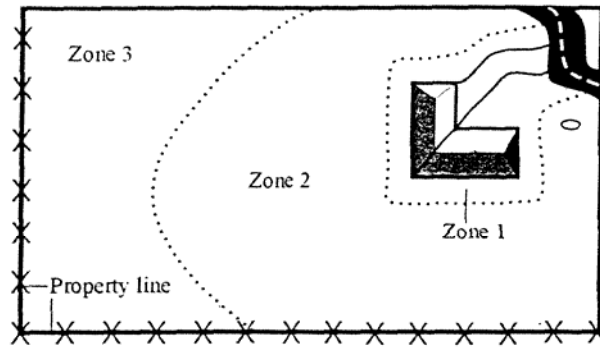


Figure 1: Forested property showing the three fire-defensible zones around a home or other structure.

