

DEVELOPING A COMMUNITY WILDFIRE PROTECTION PLAN
FOR THE HIGHWAYS 410 AND 12 URBAN WILDLAND INTERFACE AREA

EXECUTIVE LEADERSHIP

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____

ABSTRACT

The problem was that the Highways 410 and 12 wildland urban interface area did not have a plan to address the wildfire risk. The purpose of this applied research project was to develop a community wildfire protection plan for the Highways 410 and 12 urban wildland interface area.

The action research method was used to determine answers to four questions. First, what components are necessary to meet recognized standards for an acceptable community wildfire protection plan? Second, what are the demonstrable benefits of developing a community wildfire protection plan? Third, what methods have other communities used to develop a community wildfire protection plan? Fourth, how will the community wildfire protection plan relate to the Yakima County Multi-Jurisdictional Hazards Mitigation Plan?

Surveys, focus group meetings, and general discussions were used to identify wildfire protection needs, concerns and strategies for plan development. In addition, personal interviews were conducted with authors of community wildfire protection plans, program managers of environmental and emergency management agencies, and representatives of federal, state and local fire services.

A plan was developed to address community wildfire protection. The plan included assessment of the wildfire risks and identification of strategies to mitigate the damage from wildland fires. Survey results indicated that there were similarities in values and strategies of successful plans as well as the specific difficulties that were encountered.

The recommendations from this research included a) endorsing the plan and annexing it to the Yakima County Multi-Jurisdictional Hazards Mitigation Plan, b) providing a related

training component, c) petitioning the state forester for officially identified at-risk communities, d) assisting the community in the application for wildland grant funds, e) establishing an advisory group to monitor plan implementation, and f) encouragement of future readers to replicate a comprehensive wildland fire protection plan in at-risk communities.

TABLE OF CONTENTS

Abstract.....	3
Table of Contents.....	5
Introduction.....	6
Background and Significance.....	7
Literature Review.....	10
Procedures.....	19
Results.....	24
Discussion.....	32
Recommendations.....	39
References.....	41
Appendix A (Highways 410 and 12 Community Wildfire Protection Plan).....	45
Appendix B (Contact List—Washington State County Fire Marshals’ Survey).....	108
Appendix C (Survey—Washington State County Fire Marshals’ Wildland Code Requirements).....	109
Appendix D (Survey Results—Washington State County Fire Marshals’ Wildland Code Requirements).....	110

INTRODUCTION

Yakima County encompasses a rural jurisdiction on the east side of Washington State with an area exceeding 4,300 square miles and a population of approximately 220,000. The County is bordered by urbanized areas, Hanford Nuclear Reservation, Yakama Indian Reservation, Yakima Training Center Military Reservation, United States Forest Service (USFS), Bureau of Land Management (BLM) and Washington State Department of Natural Resources (WADNR) land. Much of the outlying area of the County is subject to high and extreme fire risk due to the urban wildland interface (UWI). Fire suppression services for the unincorporated area of the County are provided by a total of twelve individual fire protection districts. The Fire Protection Bureau (FPB), which provides all other fire service responsibilities identified in the International Fire Code, is a division of Yakima County government under the Department of Public Services and is comprised of four employees: the fire marshal, one fire and life safety inspector, and two combination fire investigator/inspectors.

In April of 2001, Yakima County adopted the Urban Wildland Interface Code (UWIC). A requirement of that code was to identify urban wildland interface areas and record them through the county mapping system. Analysis of the risk zone maps created by the geographic information system (GIS) revealed that the corridor of Highways 410 and 12 were the areas of Yakima County most in need of a plan to address the wildfire risk.

The problem is the Highways 410 and 12 wildland urban interface area does not have a plan to address the wildfire risk.

The purpose of this research is to develop a community wildfire protection plan (CWPP) for the wildland urban interface area of Highways 410 and 12.

This project will use the action method of research to develop a community wildfire protection plan. Answers to four questions will be determined. First, what components are necessary to meet recognized standards for an acceptable community wildfire protection plan? Second, what are the demonstrable benefits of developing a community wildfire protection plan? Third, what methods have other communities used to develop a community wildfire protection plan? Fourth, how will the community wildfire protection plan relate to the Yakima County Multi-Jurisdictional Hazards Mitigation Plan?

BACKGROUND AND SIGNIFICANCE

Washington State is separated from west to east by the natural geographical boundary of the Cascade Mountain Range. The western side of the state is quite industrialized with waterways in the Puget Sound area as well as a number of large corporations. This development has contributed to more densely populated areas with a strong economy and a comfortable tax base. The climate is mild with abundant rainfall and a relatively low fire danger. The eastern side of the state is primarily agricultural with a more scattered population, weaker economy, and marginal tax revenues. The climate is more extreme with hot, dry summer conditions and a relatively high fire danger. As is common to east side jurisdictions, the outlying area of Yakima County is comprised of fire sensitive ecosystems ranging from a proliferation of weeds, sagebrush, and other flammable vegetation to heavily forested properties. Over the past ten years there has been a trend from urban to suburban living, especially in areas referred to as the urban wildland interface. The result is an increasing number of properties intermingled with flammable native vegetation.

The task of protecting lives and property from wildfires in urban wildland interface areas poses a significant problem to wildfire protection agencies. In an attempt to promote

adequate protection, Yakima County began discussing the need for fire prevention education and regulation in 1999 as development extended into urban wildland interface areas.

Informal meetings were held by representatives of a number of fire protection districts with citizens to explain the hazards of living in these areas. In concert with these efforts, the Yakima County Planning Department was reviewing requirements for development in natural resource areas.

As the 2000 wildfire season progressed into one of the most disastrous in Washington State history, public awareness of the fire problem became increasingly apparent. Under the direction of the County Commissioners, Fire Protection Bureau staff began to pursue measures to help prevent and mitigate the dangers from wildfire in Yakima County.

In October of 2000, an initial meeting was held to discuss the adoption of code requirements to address wildfire issues. After several months of meetings with various stakeholders, the Board of County Commissioners enacted an ordinance adopting the Urban Wildland Interface Code. Enforcement of the provisions of this code became the responsibility of the Fire Protection Bureau. Staff was further directed to develop and deliver public safety education programs for wildfire prevention to meet the needs of various interest groups within the community.

Recognizing that wildfire education had been ongoing throughout the adoption process for the UWI Code, staff began to consider potential audiences that would benefit from a better understanding of a comprehensive wildland fire prevention program. Based upon the composition of the stakeholder group, a broad spectrum of experience and expertise represented diverse interests of business and the community. Presentations that acknowledge

this diversity would help to promote acceptance of wildland programs and enhance continued political support.

While the need for wildland prevention had been recognized, programs and audiences identified, and the UWI Code adopted, no additional resources were allocated for education and enforcement. In an effort to obtain additional funding, staff began to research the availability of grant funds through the National Fire Plan (NFP). Results of this research revealed that there were funds available for wildfire prevention and education that could assist in the delivery of the overall wildfire prevention programs promoted through Yakima County. Requirements of the NFP grants (2004) included the development of partnerships with the various land use agencies associated with the UWI areas of the county. As staff began to meet with the DNR, USFS, and the Yakama Nation, it became apparent that our need for wildfire protection went beyond the education and enforcement programs. In order to address the true wildfire needs of the county and enhance opportunities for grant funds, a comprehensive plan would be required. Recognizing that limited resources would not support the development of a comprehensive county-wide plan at this time, the decision was made to focus on the most hazardous UWI area for the development of a community wildfire protection plan. GIS maps identifying low, moderate, high, and extreme risk zones had previously been developed in concert with adoption of the Urban Wildland Interface Code. Based on this mapping of UWI risk zones for Yakima County, the corridor of Highways 410 and 12 was selected.

The task of developing a community wildfire protection plan is consistent with the operational objectives of the United States Fire Administration (USFA) to reduce loss of life

to firefighters as well as responding to the emergent issue of wildland fire protection (NFA, 2003).

This applied research project was conducted as a course requirement for the *Executive Leadership* class at the National Fire Academy (NFA). The project relates to the course content in several ways. The research project attempts to assess the vulnerability to wildfire and proceed with mitigation measures based on appropriate decision-making skills identified in Unit 3. The ability to influence, use feedback, and persuade as identified in Units 7, 8, and 14 were critical to managing the direction and timelines of the focus group. Effective networking helped promote the collection of relevant information. Storytelling and proper use of power assisted in the direction of diverse ideas and facilitation of the development of a community wildfire protection plan (NFA, 2000). The need to pursue grant funding for Yakima County as well as the author's interest in enhancing the public safety through the development of a community wildfire protection plan became the basis for this applied research paper.

LITERATURE REVIEW

QUESTION 1

Despite comprehensive reports providing recommendations for urban wildland interface planning, fire suppression, vegetation management, and building construction, wildfire remains a problem nationwide. Cohen and Saveland (1997) relate that citizens often fail to recognize their ability to mitigate the damage and destruction caused by wildland fires. In describing how their home survives and a neighbor's residence is destroyed, terms like "miracle" or "luck" are used. "These words imply helplessness, a lack of control, and a detachment from responsibility" (p. 20). While luck may play a part, the chances for home

survival are much improved when homeowners accept responsibility and implement UWI firewise recommendations. Cohen and Saveland further note that homeowner acceptance depends on an increased understanding of wildland fire hazards and “aesthetically acceptable firewise measures.” Ultimately, fire protection agencies must provide firewise home and landscape designs in order to cope with the increasing wildland fire problem. Lavin (1997) agrees that firewise programs encouraged and delivered through the fire services help residents understand their role in making their neighborhoods safer. This shared responsibility provides the most effective strategy for managing the risk of fire to people, structures, and the environment in the intermix areas.

The Western Governors’ Association (1996) notes that there is an overall inability to cooperatively prioritize and implement fire protection strategies. “Fire risk, multiple levels of protection responsibilities, and limited resources contribute to a very complex challenge to create a cost effective fire protection program for the nation’s Interface” (p. 4). Almost all agree that the only effective method is to establish partnerships at all levels. “As with almost all natural resources issues, resolution begins when the local communities realize there’s a problem and agree how to fix it” (p. 4). Without that local recognition of the problem, effective solutions cannot be identified and implemented.

The National Fire Plan, summarized in the article entitled, “What is the NFP?” (2005), recognizes that communities need assistance in reducing the risk of fire in the WUI and notes, “community participation is at the core of carrying out citizen-driven solutions to reduce the risks of fire in the wildland/urban interface” (p. 3). The intent of the NFP is to actively respond to severe wildland fires and their impacts to communities and to ensure sufficient firefighting capacity for the future.

The Healthy Forests Restoration Act (HFRA) of 2003 promotes the idea of community-based forest planning and prioritization. A community wildfire protection plan serves as a local wildfire protection plan based on the needs of the people involved in an identified WUI area (USDA/USDI, 2004). As described in HFRA (2003), the term wildland urban interface means an area within or adjacent to an at-risk community. An at-risk community refers to a group of structures within or adjacent to federal land, with basic infrastructure and services, in which conditions are conducive to a wildland fire event. These WUI areas and at-risk communities have been identified by state foresters and are recorded in the Federal Register (2001). The information in the list is used to identify priority areas that would benefit from hazard reduction and helps ensure that available funding is focused on areas of local importance. The CWPP may address issues of wildfire response, hazard mitigation, community preparedness, structure protection, or a combination of all of these. According to the Society of American Foresters' (SAF) handbook, *Preparing a Community Wildfire Protection Plan*, "the language in the HFRA provides maximum flexibility for communities to determine the substance and detail of their plans and the procedures they use to develop them" (p. 2).

The Federal Emergency Management Agency (FEMA) has directed state and local governments to adopt pre-disaster mitigation programs designed to develop and implement measures to reduce or eliminate losses resulting from natural and technological hazards. Funding is provided to assist in implementing cost-effective hazard mitigation activities that complement a comprehensive program. Guidance for preparing an acceptable benefit-cost analysis (BCA) or identified projects is available through software entitled "Mitigation BCA

Toolkit.” FEMA has identified the National Incident Management System (NIMS) as the operating protocols necessary for hazard mitigation planning (FEMA, 2005).

QUESTION 2

Over the past ten years wildland fires have destroyed the beauty and serenity of thousands of acres of forested land throughout the United States. Wildfire has also been responsible for the destruction of homes and structures located within the interface areas, resulting in millions of dollars in property loss and exorbitant fire suppression costs. According to the National Interagency Fire Center (2004), there were 77,534 fires that consumed 6,790,692 acres for the year 2004, with an estimated cost of fire suppression totaling \$890,000 for Federal agencies alone. Of most concern, though, is the loss of life to residents and firefighters in the battle with these fires. According to Harris and Crandell (1999), firefighter safety should lead the agenda during protection of structures in an interface fire. “When fire personnel respond to a fire in the interface, they have lots of fast-paced work ahead of them in a very challenging setting. Their most important issue is to provide for their safety and the safety of their firefighting team” (p. 34).

Significant residential fire losses in the United States have focused attention on this increasing wildland urban interface problem and the resulting loss of life and property to wildfire. Cohen and Saveland (1997) explain that wildland fires differ from typical residential fires in that they generally include several simultaneously exposed structures, rapid involvement of the overall areas, overwhelmed fire-protection capabilities, and total loss of those residential structures ignited. Structure losses during wildfires have occurred in such diverse locations as New York, California, Florida, Arizona, and Washington.

Developing a Cooperative Approach to Wildfire Protection states that the rapid expansion into the urban wildland interface challenges governing entities and has the potential to greatly affect the quality of life for people who choose to live in those areas. Problems are compounded by the fact that wildfires do not respect political boundaries, often requiring combined and coordinated efforts of various government agencies (National Wildland/Urban Interface Fire Protection Program, 1998).

The publication *Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility*, recognizes that the devastation resulting from a wildfire impacts various organizations as well as the entire community. "When wildland/urban interface fires occur, community services are strained; natural resources, homes and precious family possessions are destroyed; and jobs, civic pride and even lives can be lost" (p. 5). Consequently, the task of implementing fire protection measures cannot be the responsibility of a single agency (National Wildland/Urban Interface Fire Protection Program, 1998).

The fire risk in the UWI is comprised of both the natural environment and those who live there and use it. As more and more people inhabit and recreate in the wildland, the question of a large scale conflagration has become a question of when rather than if. According to *Development Strategies in the Wildland/Urban Interface*, the first step to community support is to create a realistic awareness of the wildfire hazard. In concert with that risk awareness, it is critical to develop an understanding of the capabilities and limitations of fire-suppression services. Recognizing that the homeowner is but one piece of the community, a number of fire protection agencies has formed cooperatives (co-ops) made up of a group of public and private agencies joined together with a common cause. While the goal may be fire prevention and loss reduction in the wildland, an important objective is to

address the environmental and economic concerns and interests of community members as well (Western Fire Chiefs Association, 1996).

Teie and Weatherford (2000) note that politicians need to be convinced that it is in their best interest to address the issue of growth in the wildland and to implement actions that bring structures into compliance with fire safe guidelines.

The publication entitled *Wildfire Prevention Analysis and Planning* notes that it is critical to evaluate the risks, hazards, and values associated with the wildland and to provide a cost effective mix of activities to mitigate potential fire problems. An operational plan that outlines protection of resources from wildfire and identifies program development and implementation costs is necessary to enlist community support (Bureau of Land Management, 1998).

According to the article, “Effects of Wildland Fire on Cultural Resources,” the benefit of communicating strategies for wildland fire protection in concert with the historical importance of protecting cultural resources provides the means to develop a sense of connection. Relating the value of fire management to the preservation of traditional sites, artifacts, or memorials enhances motivation to cooperate through an understanding of the cultural application (Wiltz, 2001).

As the nation has suffered devastating loss of life in the WUI, firefighter safety has become a personal issue to many communities. Mangan (2000) notes, “With lands in the intermix continuing to increase, it is time to clearly define all the groups involved in these areas, and to identify the factors that must be addressed to ensure firefighter safety when the inevitable wildland-urban intermix fires do occur” (p. 1).

Sponsors of the National Wildland/Urban Interface Fire Protection Program (1996) agree that planning for fire protection in the intermix cannot be left to “the other guy. Each level of government, and ultimately each citizen, shares the responsibility for both fire protection and fire prevention” (p. 5).

Community-based forest planning and prioritization were given increased impetus through the enactment of the Healthy Forests Restoration Act in 2003. This legislation provides statutory incentives for the USFS and the BLM to give consideration to the priorities of local communities in the development and implementation of forest management and hazardous fuel reduction projects. In order for a community to take advantage of these incentives, a community wildfire protection plan must first be prepared. Interagency grant opportunities are also offered through the National Fire Plan and the Pacific Northwest forest management agencies for the development of a CWPP and ongoing projects identified in that plan (NFP, 2004).

QUESTION 3

The Josephine County, Oregon, Integrated Fire Plan (2003) was developed to increase awareness, collaboratively build relationships and strengthen fire protection and prevention for the fire services, government and public agencies, and the citizens of the community. The mission of that plan is to reduce the risk from wildfire to life, property, and natural resources in Josephine County.

The Applegate, Oregon, Fire Plan (2001) was designed to lower the risk and hazards of wildfire and to prevent catastrophic fire through an effective and coordinated effort by all neighbors. This plan addresses four aspects of the overall problem: human-caused wildfires, hazardous fuels, access for fire suppression, and emergency communications.

The aim of the Upper Mattole, California, Fire Plan (2004) is to assist the participating communities in being better prepared for wildfires and to help save lives and property through effective planning efforts. This plan was developed as part of the National Fire Plan in its efforts to help prepare communities for the eventuality of wildfire.

The Shasta-Trinity, California, Fire Management Plan (2002) documents the assessment of the wildland fire potential and includes stakeholder contributions, priorities, and solution strategies. The goal of this plan is to reduce the cost and losses from wildfire by protecting the assets at risk through effective pre-fire management and increased success of initial attack.

The Community Wildfire Protection Plan for Bingen and White Salmon, Washington (2004), offers advice to homeowners and local officials on how to make planning areas less vulnerable to wildfire. The purpose of this plan is to identify and assess wildfire hazards, risk factors, and to develop a strategy to reduce the potential for wildfire damage.

The Swauk Basin, Washington, Wildfire Protection Plan (2004) was written by homeowners for homeowners and visitors and provides a summary for wildfire response. This plan is designed to help people prepare for a wildfire and improve their chances of survival and the probability that their homes and property will survive.

The Union Valley, Washington, Community Wildfire Protection Plan (2004) addresses the concerns of residents for the protection of life, property, and essential infrastructure from the risk of wildfire. The primary goal of this plan is to identify and implement projects that will protect residents, firefighters, and emergency personnel from injury or loss of life.

The Squilchuck Valley, Washington, Community Wildfire Protection Plan (2005) was developed through the collaboration of local residents and County Commissioners. This plan is designed to identify and implement actions to protect lives and community assets and to reduce the risk of future wildfire related disasters.

The Peshastin Creek Drainage, Washington, Community Wildfire Protection Plan (2005) was developed to protect the community from the effects of wildfire through outreach, education, strategic planning, and action. The primary goal of this plan is to protect human life, private property, and essential infrastructure and resources through projects that improve forest health and preserve the natural beauty of the area.

QUESTION 4

The Yakima County Multi-Jurisdictional Hazards Mitigation Plan (YCMJHMP) is the result of a collaborative effort between government and public agencies, non-profit organizations, and the private sector. The mission of the YCMJHMP is to promote sound public policy to protect citizens, critical facilities, infrastructure, private property, and the environment against natural and technological hazards. The plan goals describe the overall direction that can be taken toward the mitigation of risk from the appropriate hazard. Four primary goals identified in the plan include 1) the protection of life, property and public welfare, 2) public awareness, 3) partnerships and implementation, and 4) emergency services (Yakima County, 2004).

This research identified components necessary to meet federal, state, and local requirements pertaining to WUI planning. The potential benefits to the community and environment were evaluated to determine the feasibility of mitigating the wildfire risk and to

develop the community wildfire protection plan included in Appendix A. Overall impacts of the wildfire problem were also incorporated.

PROCEDURES

DEFINITIONS

Firewise. The resulting status of property where mitigation measures provide protection to life and property in the event of a wildfire.

Urban Wildland Interface Area. That geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

Wildfire. An unplanned and uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

Wildland. An area in which development is essentially nonexistent and structures, if any, are widely scattered.

ASSUMPTIONS AND LIMITATIONS

The terms “wildland urban interface,” “urban wildland interface,” and “intermix” were assumed to be interchangeable as well as the abbreviations “WUI,” “W-UI,” and “UWI.”

Much of the information contained in the Urban Wildland Interface Code (UWIC), published by the International Fire Code Institute, and the International Urban Wildland Interface Code (IUWIC), published by the International Code Council, is identical. Unless specifically quoted, references to “Urban Wildland Interface Code” were assumed to include the UWIC and the IUWIC.

Limitations on this research project included the requirement that the research be completed within the six months time period allowed by the NFA Applied Research Project

Guidelines (NFA, 2002). Contacts for agencies that had developed community wildfire protection plans were provided by jurisdiction only and some of the information was no longer valid. Individual contacts were somewhat difficult to obtain. In some cases, the individuals who participated in initial efforts were no longer available for consultation.

RESEARCH METHODOLOGY

The literature reviewed for this project was initiated at the National Fire Academy Learning Resource Center. An additional literature review was conducted on the Internet, using search engines, to access wildfire legislation, community wildfire protection plans, wildfire data and statistics, and a variety of educational publications. Other reference materials included personal textbooks, professional publications, reports, and periodicals. Several personal interviews and surveys were also conducted.

QUESTION 1

A focus group of interested stakeholders was established to identify the CWPP boundaries and proceed with the development of a plan. Group members were invited to participate following their attendance at a Firewise workshop presented by the Yakima County Fire Marshal's Office, USFS, and the WADNR. Of the fifty who attended the Firewise workshop, a CWPP focus group of fourteen was formed. Through a series of 4-hour Saturday meetings, scheduled primarily on a bi-weekly basis, the focus group discussed their values and the overall vision and goals for a comprehensive wildfire protection plan.

Focus group members represented a variety of interests which included the preservation and enhancement of recreation areas, wildlife habitat, heritage and cultural sites, wilderness areas, the environment and the overall wildland setting. The majority of members

had served in a volunteer capacity through the local fire department, recreational and land use planning commissions, and/or resource management boards.

Meetings were facilitated by the Yakima County Fire Marshal's Office with technical expertise provided by the DNR and the USFS. Special presentations were provided by representatives of the Yakima County Commissioners, Sheriff's Office, and Office of Emergency Management.

A personal interview was conducted with Jim Bailey, Assistant Fire Management Officer for the Naches Ranger District of the USFS. The questions posed included: 1) What is the appropriate role of local, state, and federal government in the development of the CWPP? 2) What methodology should be used to identify CWPP boundaries? 3) What is the process to verify that the CWPP meets the requirements of the HFRA?

Representatives of the YCFPB attended a conference entitled, "Preparing a Community Wildfire Protection Plan: Procedures and Financing." Washington State Forester, Pat McElroy and USFS National Fire Plan Director, Bonnie Wood, presented workshops addressing the roles of state and local government in community wildfire protection planning and detailing the process of developing a plan.

QUESTION 2

According to the State Fire Marshal's Office, Washington State suffered wildland fires encompassing 25,000 acres and costing \$15, 575,000 in 2004. Despite the increasing development into the intermix areas, limited planning for prevention and mitigation efforts has taken place (D. Johnson, personal communications, September 3, 2005). The Washington State Department of Natural Resources experienced a fire of 4000 acres and

costing \$1,080,000 in 2004 in Yakima County alone (M. Eberlein, personal communications, December 8, 2005).

An interview was conducted with Betsy Bloomfield, South Central Washington Program Manager for The Nature Conservancy. The following questions were addressed:

1) What measures are currently being taken to improve wildlife habitat and preserve historical and cultural sites? 2) How could the CWPP help to restore the fire-adaptive ecosystems? 3) What is the impact if no action is taken?

A personal interview was conducted with Chief Dan Mansfield. Chief Mansfield leads a combination city fire department and fire protection district which provides service and mutual aid for high risk areas of Highways 410 and 12. These high risk areas are also adjacent to WUI properties that lie outside of any fire protection district. Questions discussed with Chief Mansfield included: 1) How does the fire district respond to properties outside the protection boundaries? 2) What are the primary concerns for the WUI areas both inside and outside of the fire protection district? 3) How would a CWPP for the Highways 410 and 12 risk areas affect the operations of your department?

QUESTION 3

An electronic survey was sent to nine western state agencies that had developed wildfire protection plans. These agencies were identified through the handbook, *Preparing a Community Wildfire Protection Plan*, and the WADNR (SAF, 2004). A copy of the distribution list is included in Appendix B. A copy of the survey is included in Appendix C. A copy of the survey results is included in Appendix D.

Personal interviews were conducted with Kathy Lynn, Barbara Camacho, and Michael Rickel. These individuals were selected as representatives of wildfire protection

plans that were most similar to the communities of Highways 410 and 12 by a combination of factors including the size of the WUI area, type and number of structures, fuel and weather conditions, and local government participation. The following questions were posed:

1) How has your plan been evaluated for compliance with the Healthy Forest Restoration Act and FEMA Pre-Disaster Mitigation Program requirements? 2) How does your plan interface with your local comprehensive emergency management plan? 3) How was development of your plan funded? 4) What difficulties were encountered in the development and adoption of the plan?

QUESTION 4

A discussion was conducted with Charles Erwin, Senior Program Analyst, for the Yakima Valley Office of Emergency Management (YVOEM). Mr. Erwin was the lead planner in developing the YCMJHMP. He was asked to describe the process used to determine and prioritize risks, hazard mitigation measures specific to wildfire, and the involvement of the media in the preparation and mitigation process.

A joint discussion was conducted with Jim Hall, Director of Emergency Management, Charles Erwin, Chief Dan Mansfield, Jim Bailey, and representatives of the CWPP focus group. Discussion centered on the relationship of a community wildfire protection plan, a county-wide wildfire protection plan, and the wildfire protection requirements of the YCMJHMP. Mr. Hall and Mr. Erwin were asked to explain how the requirements of FEMA would relate to the development of wildfire protection plans, to identify the roles and responsibilities of the various stakeholders in the overall plan, and to suggest appropriate proactive measures that could be taken by the focus group.

RESULTS

A copy of the Highways 410 and 12 Community Wildfire Protection Plan is included in Appendix A.

QUESTION 1

The focus group met for six months to assess the general fire potential, fuels and hazards, structural vulnerability, and protection capabilities for the identified CWPP boundary area. Government representatives emphasized their role as facilitators and technical advisors and reiterated the fact that community members were the actual authors of the CWPP. Recognition that the group had ownership of the plan and responsibility to develop wildfire protection strategies was a driving force in their investment of time and energy. Member Pam Brown jokingly quipped, “You’re the government and you’re really here to help us” (P. Brown, personal communication, June 11, 2005).

The handbook, *Preparing a Community Wildfire Protection Plan*, and the fire planning step process included in the Josephine County CWPP (2003) were used to establish meeting agendas and facilitate ongoing group discussions. In conjunction with development of the CWPP document, group members conducted risk evaluations of communication and evacuation strategies, identified current activities and resources for community protection, and developed action plans for mitigation measures to improve prevention and suppression capabilities. As these tasks were addressed, members discussed the overall wildfire risk and agreed that community residents must share the responsibility for wildfire protection. Member Paul Ebert stated that the application of Firewise principles in concert with an overall CWPP would help to preserve the lives of residents and firefighters as well as

maintain the beauty of the Highways 410 and Highway 12 area (P. Ebert, personal communication, June 25, 2005).

When asked about the appropriate role of local, state, and federal government in the development of the CWPP, Jim Bailey noted that while each level of government was expected to provide technical assistance, local government would have the most direct tie to the community and would best serve as a facilitator to the focus group. Mr. Bailey recommended establishing a CWPP boundary that would mostly reflect dry forest, rangeland, and grassland types. Topographical features such as prominent ridges and roads coincidental to ridge tops would demonstrate potential fuel breaks and ease of mapping. Wilderness boundaries could also be followed where they are coincidental to other features. Mr. Bailey noted that management activities would not occur within the wilderness but fires starting within a wilderness area may directly impact or threaten the community and should, therefore, be identified. When asked about the process to verify that a CWPP meets the requirements of HRFA, Mr. Bailey noted that a plan accepted by the State Forester, Yakima County Commissioners, and Fire Protection District Commissioners would demonstrate the necessary level of collaboration. He indicated that a plan following the guidelines of the handbook, *Preparing a Community Wildfire Protection Plan*, should meet the HFRA requirements. He also recommended the outline included in the Josephine County, Oregon, Integrated Fire Plan as a guide to ensure compliance with FEMA's Pre-Disaster Mitigation Program and the National Fire Plan (J. Bailey, personal communication, October 24, 2005).

QUESTION 2

According to Dan Johnson, Washington State Fire Marshal's Office, Chelan County suffered a wildland fire that involved 180,000 acres of land and incurred costs in excess of

\$12,300,000 in 1994. Ten years later, Chelan County experienced a wildland fire encompassing 16,439 acres with an estimated cost of \$12,500,000 (D. Johnson, personal communication, September 3, 2004). Despite the repeated disasters, Chelan County's lack of funds and limited staff did not allow for the development or implementation of prevention and mitigation strategies. Despite the benefit of developing a CWPP, this process only became possible after Chelan County was awarded a National Fire Plan grant to fund the project (M. Rickel, personal communication, September 19, 2005). USFS representative, Jim Bailey, stressed the need for similar wildfire protection planning for the areas of Highways 410 and 12. He noted that his agency alone has experienced wildland fires in this area encompassing over 2000 acres, with suppression costs of nearly \$5,000,000, in the past twenty years (J. Bailey, personal communication, November 21, 2005).

When asked what measures are currently being taken to improve wildlife habitat, Betsy Bloomfield noted that there has been a multi-partner effort to resolve the "checkerboard" ownership pattern, whereby different entities own and manage every other square mile in grids throughout the area affected by the CWPP. She explained that this pattern creates a complex land management effect, resulting in wildlife habitats and cultural sites being distributed across several ownerships. Ms. Bloomfield stated that efforts are being made to purchase and transfer private commercial timberland held in checkerboard ownership to public ownership in order to resolve the difficulties of managing for natural ecological processes. Ms. Bloomfield noted that the CWPP helps to restore fire-adaptive ecosystems by providing a mechanism for participating agencies and stakeholders to focus on the problems related to development within the UWI. "Just the experience of working on the wildland fire risk assessment portion of the plan brought forward the concept of wildland fire

ecology for the first time to some participants and local officials,” she stated. When asked of the impact if no action were taken, Ms. Bloomfield explained that the CWPP process provides a forum for fire districts, citizens, and elected officials to consider strategies, costs and benefits of fire in high risk areas. Absent the CWPP program, less understanding of the reality and impact of wildland fires would result in limited support for projects related to wildland fire issues (B. Bloomfield, personal communication, November 18, 2005).

When asked how the fire district responds to properties outside the protection boundaries, Chief Dan Mansfield noted that the Naches Fire District would only respond to those properties which have entered into a contract for service. Private properties in a “no-man’s land” are essentially unprotected. Chief Mansfield stated that his primary concern for properties in the WUI are lack of water supply and the inability to gain access due to substandard driveways, bridges, and inclement weather conditions. He also expressed his concern that a number of property owners live on the western side of the mountains and are unfamiliar with the wildfire risk in the Highways 410 and 12 areas. Chief Mansfield discussed the benefits of a CWPP in providing fire safety education to citizens within and outside of the fire protection district and commented that he believes fire prevention is the most effective use of tax dollars in saving lives and property (D. Mansfield, personal communication, September 11, 2005).

Initially focus group members analyzed the cost and benefits of developing the CWPP. Through these discussions the group identified staff time and printing as the only hard costs associated with the plan. Providing strategies to mitigate the loss of life to residents and firefighters as well as the destruction of wildlife habitat, historical sites, and the beauty of the environment were recognized as priority benefits of a CWPP. While no dollar

values were associated with these “quality of life” issues for the plan development, the focus group agreed that a benefit/cost analysis, based on FEMA’s guidelines, would be necessary for implementation of programs and projects identified in the CWPP. Technical discussions of the focus group centered on past fires in wildland areas with similar fuels, weather and topography. The Thirtymile Fire of 2001, in which four firefighters perished, three from the Yakima Valley and one from a neighboring community, most tragically demonstrated the need for comprehensive wildfire mitigation efforts. Recognizing that the WUI area of Highways 410 and 12 contained many similarities, group members were committed to developing wildfire prevention, mitigation and evacuation strategies. Member and volunteer firefighter, Frank Freshwater, emphasized their ability to help eliminate the need to put firefighters at risk. USFS representative, Jim Bailey, agreed that the potential for this type of fire is most likely a matter of “when” rather than “if” and praised members for their commitment to mitigating the threat (F. Freshwater, J. Bailey, personal communication, June 25, 2005).

QUESTION 3

Of the nine agencies that had developed a CWPP, eight surveys were returned. The extent of the wildfire protection area ranged from small communities or cities to multi-county plans with populations of 12,000 to 180,000. The amount of land area encompassed was equally diverse with the majority of structures being residential or commercial. A wide variety of governmental agencies participated in each of these plans and completion time ranged from three months to two years. Plans were facilitated and authored primarily by community organizations and contracted agencies outside of local government. A copy of the survey results is included in Appendix D.

When asked how the CWPP had been evaluated for compliance with the Healthy Forest Restoration Act and FEMA Pre-Disaster Mitigation Program requirements, Kathy Lynn indicated that state and federal forest agencies and local emergency management staff participated with Josephine County in the development of the plan to help ensure compliance with these regulations. She noted that this plan contains a strong component of the ICS training and interagency coordination and has been included in the County's all-hazard FEMA mitigation plan. Development of the plan was funded through grant moneys provided through the National Fire Plan. Ms. Lynn noted that the primary difficulty in the plan development was maintaining the commitment level required. "Maintaining diverse stakeholders and a strong collaborative environment requires a significant investment of time and energy and a commitment from all partners," she stated (K. Lynn, personal communication, November 4, 2005).

Michael Rickel agreed that involvement of the representative agencies is critical to ensuring that the CWPP meets the HFRA and FEMA requirements. He has facilitated and authored several plans for Chelan County which were funded through National Fire Plan grants. Because each fire protection district will have a CWPP, there is a vast commitment of time with a variety of fire service agencies and community members to complete the plans (M. Rickel, personal communication, September 19, 2005).

Barbara Camacho explained that California has the resource of Fire Safe Councils to assist in the development of a CWPP. Fire Safe Councils are comprised of members whose focus is wildfire prevention through a variety of mitigation and education programs. She noted that the California Department of Forestry (CDF) was also instrumental in the development of their plan. The experience and expertise of CDF was a necessary component

in addressing the wide variety of issues to be incorporated into the CWPP. Ms. Camacho stated that “getting folks together” was the most difficult task for the development and adoption of the plan (B. Camacho, personal communication, November 8, 2005).

QUESTION 4

Charles Erwin described the risk assessment process used to identify hazards in Yakima County and rank their degree of severity. The YCMJHMP recognizes six criterion including human impact, property impact, business impact, mitigation activities, internal resources, and external resources. By assigning a value to each of these, an assessment can be made regarding the community’s vulnerability to the effects of various hazards. This type of risk assessment formula weighs the probability and severity of potential impacts against preparations in place. Yakima County is subject to 54 hazards. For the purpose of the mitigation plan, flooding, earthquakes, landslides, wildfires, severe winter storms, windstorms, volcanic activity and hazardous materials were identified as those representing a higher level of concern. Using the risk assessment formula, YVOEM prioritized wildfire as the second highest potential risk in Yakima County. Mr. Erwin noted that the YCMJHMP identifies developing ordinances and educating people as the first mitigation measure. Other mitigation measures include developing fire detection programs and emergency communications systems, exercising warning systems and evacuation plans, planning escape routes for personnel living in wildlands, and establishing potential road closures during fires. With regard to the media, Mr. Erwin noted that most of the focus has been directed toward interactions during an event. The need for media involvement in the planning and mitigation process is critical to community acceptance of codes and regulations. By providing public awareness of the risks posed by wildland fires and the measures to prevent them, the media

becomes a partner in community protection. Developing good media relations at this point allows for enhanced communication should a wildfire event occur (C. Erwin, personal communication, August 30, 2004).

Director Jim Hall explained that the YCMJHMP serves as a comprehensive emergency management plan addressing a variety of hazards which exist in Yakima County. This plan was developed in accordance with the Pre-Disaster Mitigation Program requirements administered through the Federal Emergency Management Agency. Contained in this comprehensive plan is a section on wildland fire. A county-wide wildfire protection plan would be incorporated as a special subject under the wildland fire section of the current plan. The CWPP for Highways 410 and 12, and any CWPP for an identified area of Yakima County, would be incorporated as an annex to the special subjects section. Mr. Erwin explained that there were various levels of preparedness and response criteria identified in the plan. He noted that there were associated guidelines to establish responsible individuals and agencies. Chief Dan Mansfield discussed the need to coordinate communication, response and evacuation procedures through the Office of Emergency Management to the numerous emergency services agencies. Checklists identifying methods of notification, agency response assignments, and evacuation contact information would be critical to the planning for any type of event. Mr. Hall and Mr. Erwin explained the functions of a citizens emergency response team (CERT) and how members of the focus group could form such a team. Mr. Erwin emphasized the need to format all response efforts under the NIMS structure to meet FEMA requirements and to ensure the coordination of responding agencies. Members of the focus group discussed the success of the community in providing for one another during severe floods that occurred in 1996 and that the basic principles of that event

would provide a starting point for pursuing the formation of a CERT. Jim Bailey reminded the group that, although the CWPP is incorporated into the YCMJHMP, community response for wildfire could be significantly different than floods or other events. He also noted that the CWPP goes beyond a hazard mitigation plan in that it should address a means of restoring fire-adapted ecosystems in the planning process (J. Bailey, C. Erwin, J. Hall, D. Mansfield, personal communication, August 5, 2005).

DISCUSSION

The community wildfire protection plan, which represents the results of this research, addresses the collaboration of government and community resources for the development of a comprehensive wildfire protection plan for WUI areas. This CWPP is intended to provide direction to agencies considering such a plan.

For hundreds of years fires in wildland areas caused little or no economic damage or loss of life. It is the relatively recent expansion of people and their lifestyles into the wildland areas that creates a potentially volatile mixture. Because a severe wildland fire can destroy entire neighborhoods, Cohen and Saveland (1997) demonstrate that it is everyone's responsibility to manage fire risks. Residential fire safety in the urban wildland interface area can only be improved when individual residents take primary responsibility for the survival of their property. According to Lavin (1997), federal, state, and local fire agencies are realizing that without homeowner involvement, little can be done to reverse the W-UI fire loss trend. These fire agencies know they must be a community partner and provide information about fire risks in the W-UI. In addition to providing fire suppression, they must coordinate firewise programs and assist homeowners in meeting firewise requirements (p. 6).

The National Fire Plan (2001) outlines five key points including firefighting,

rehabilitation, hazardous fuels reduction, community assistance, and accountability as the basis for accomplishing the goal of managing fire in the WUI. As more communities develop and grow in these fire-prone lands, community fire protection planning becomes critical. Such planning requires the interaction of local, state, and federal government with community members, environmental agencies, and all interested stakeholders to help educate citizens on the effects of fire and to identify actions that can be taken to live safely in these interface areas.

The minimum HFRA (2003) requirements for a CWPP include collaboration, prioritized fuel reduction, and treatment of structural ignitability. The final contents of a CWPP must be mutually agreed upon by the applicable local government, the local fire department, and the state entity responsible for forest management. The entities must consult with and involve local representatives of the United States Forest Service, the Bureau of Land Management, and other interested parties in the development of the plan. The process is intended to involve local and state officials, federal land managers, and the broad range of interested stakeholders. According to NFP Executive Director, Bonnie Wood, only the communities currently identified by state foresters and listed in the Federal Register are considered to meet the criteria for at-risk communities. Through the CWPP process, stakeholders could petition the state forester to identify a planning area as an at-risk community (B. Wood, personal communication, October 14, 2005).

The handbook, *Preparing a Community Wildfire Protection Plan*, provides step-by-step recommendations to help communities develop a wildfire protection plan that addresses the core element of community protection and includes items required under the HFRA. These eight steps include convening decision-makers, involving federal agencies, engaging

interested parties, establishing a community base map, developing a community risk assessment, establishing community priorities and recommendations, developing an action plan and assessment strategy, and finalizing the community wildfire protection plan (SAF, 2004).

Teie and Weatherford (2000) recognize the need to develop programs that will educate homeowners, legislators, planners, and developers to the potential disaster in the UWI. *Development Strategies in the Wildland/Urban Interface* notes that much of past education focused on the technical, physical, and biological dimensions of the wildland problem. Recently efforts have shifted toward problem awareness in order to promote public action. Wildland fire hazards are the predictable result of actions taken by people who live and recreate in those areas. Before its causes can be eliminated and possible responses developed, the public must acknowledge that a problem exists (Western Fire Chiefs Association, 1996).

Despite the fact that the area has not been recognized by the State Forester as an at-risk community, the Highways 410 and 12 focus group is convinced of the need to develop a community wildfire protection plan. The CWPP area is prone to severe weather conditions that can support extreme fire behavior. The landscape has many valleys with steep slopes and dense forests. Insect infestations of western spruce budworm, mountain pine and fir beetle are becoming more prevalent. In addition to a number of large fires in and around the CWPP boundary, hundreds of fires have occurred within the boundary that were suppressed while still small in size. The similarities of predicted fire behavior to that of the Thirtymile Fire as well as the devastating personal loss to residents of this area vividly demonstrate the need to develop a CWPP.

With the William O'Douglas wilderness area and Yakama Nation tribal lands bordering Yakima County, it is important for the YCFPB to include the impact of wildland fire on cultural resources as a part of community wildfire protection planning. Discussions to promote awareness of the potential losses to our national heritage help the community relate more personally to the destruction of treasures that cannot be replaced. In the article, "Effects of Wildland Fire on Cultural Resources," Wiltz (2001) notes, "People and their cultures are a natural part of our ecosystem. The evidence of our cultures, past and present, can be found throughout our forests, prairies, and deserts" (p. 40). Betsy Bloomfield agrees that a more informed citizenry through the CWPP process can lead to broader support for wildland restoration project funding. "Since wildlife habitat, cultural and historic sites are all at risk, this process provides an opportunity to discuss local values related to their protection along with the human communities at risk," she states (B. Bloomfield, personal communication, November 18, 2005).

Demonstrating the devastation of wildland fire on life, property, and natural resources provides government regulators the tools for enacting controversial legislation. Elected officials are responsible for setting standards meant to ensure a safe environment as well as maintaining the economic health of the community. Given the complexity of constituents in any community, a variety of attitudes are displayed when attempting to enforce wildland provisions. Hansen (2002) notes, "When owners fail to protect their homes, the responsibility falls on government, at taxpayer expense." Despite this financial impact to the public at large, cost is often the primary reason behind any hesitation on behalf of those responsible for enacting fire safety legislation. The YCFPB must address these diverse opinions among the political decision makers as well as the general public by presenting

programs that emphasize both the benefits of protection and the cost of wildfire response as a part of the CWPP.

The interagency grant opportunities offered through the National Fire Plan (2005) provide funding for governments to dedicate staff and resources toward the development and implementation of wildfire protection plans. Eligible projects also include fire prevention and education activities to help market and promote the goals recognized in the CWPP. Language in the HFRA (2003) specifies that priority for financial assistance shall be given to communities that have adopted a community wildfire protection plan. Federal projects included in these planning areas also receive priority as a result of these proactive measures to reduce fire risk on private property.

The referenced community wildfire protection plans differed in a number of ways including land mass, population, number and types of structures, and degree of community participation. Despite these differences, there was a high degree of commonality in the values, visions, and goals of the plans. The Josephine County (2003) and Applegate (2001), Oregon, fire plans were developed to increase awareness, reduce the risk and hazards, and to prevent wildfire through coordinated efforts of citizens and government. The Upper Mattole (2004) and Shasta-Trinity (2002), California, plans recognize the need to help communities prepare for wildfire in order to protect and save lives and to reduce the cost and losses from wildfire. Swauk Basin (2004) and Bingen and White Salmon (2004), Washington, wildfire protection plans address the importance of homeowner responsibility in the preparation and survival of a wildfire. The CWPP for Peshastin Creek Drainage (2005), Squilchuck Valley (2005), and Union Valley (2004), Washington, all note that residents value their homes, privacy and beauty of the surrounding forestlands. Their goals include the protection of

lives, property and essential infrastructure within the CWPP boundary. Some recognition of the protection of life and property, preservation of the beauty and serenity of the forestlands, and the need for community accountability was identified in each of the plans. While community awareness was often a result of a local fire, the methodology to address these issues was similar based on the particular states. Since the endorsement of the State Forester is required for a CWPP to meet the requirements of HFRA, this consistency would seem appropriate.

The majority of the participants in the development of wildfire protection plans noted the ability to impact fire planning for the USFS and the BLM lands as a driving force toward compliance with the Healthy Forests Restoration Act of 2003. The potential for grant funding was also a critical factor, demonstrated by the fact that many of the plan facilitators were funded through existing grants. The remainder of facilitation was provided through local fire service agencies. Many of these fire service agencies share a level of frustration in the “catch 22” of the funding process. Both the NFP (2005) and the HFRA (2003) note that having a CWPP associated with a grant proposal is essential to the success of securing the funds. Few agencies currently have the resources available to dedicate to the development of a CWPP without the assistance of grant funds yet funds are not allocated without a plan in place.

Members of the CWPP focus group demonstrated a high degree of enthusiasm and commitment to the plan development. By maintaining a flexible meeting agenda and allowing free flow of discussion, a variety of insights pertaining to the concerns and values of the community were discovered. Member Mary Van Amburg expressed the overall sentiment of the group when she stated, “We know what our issues are and we’re smart

enough to do something about them” (M. Van Amburg, personal communication, September 17, 2005). This history and experience of focus group members was a valuable asset to the YCFPB in identifying resource allocation and ongoing partnerships for the implementation of the CWPP. The participation of related agencies was essential to coordination of the CWPP strategies. The adoption of wildland codes and ordinances and the ongoing review of the UWI problem by Yakima County Commissioners demonstrated the political investment for community protection. Law enforcement representatives identified the need to address inherent hazards not generally considered in wildland areas, such as chop shops and methamphetamine labs. Discussions with Emergency Management staff helped to ensure the coordination of the CWPP with the YCMJHMP to allow incorporation into the overall plan.

Incorporation of the CWPP for Highways 410 and 12 into a county-wide wildfire protection plan, and ultimately into the Yakima County Multi-Jurisdictional Hazard Mitigation Plan, will be critical to the ongoing funding and implementation of the CWPP. The combined requirements of FEMA (2005), NFP (2005), and HFRA (2003) dictate that coordination of all types of comprehensive emergency plans is essential to qualify for future funding opportunities. Identifying wildland issues and mitigation strategies through the CWPP enhances the ability of the community to partner in all-risk emergency procedures and address the associated environmental and ecosystem concerns.

Media coverage of the increasing number and severity of wildland fires across the country has heightened public awareness of the reality and devastation that occurs. Tragic firefighter injuries and deaths have alerted citizens to the fact that the repercussions extend beyond those who have the ability to mitigate the hazard. The YCFPB needs to partner with the media to demonstrate the potential for wildland fire, the risk to homeowners and

firefighters, and to enlist the support of the community in mitigating the risk. The National Wildland/Urban Interface Fire Protection Program (1996) recommends bringing everyone together who might be involved in a fire to let them know what and where the problems are. Washington State Forester, Pat McElroy, supports the development of a community wildfire protection plan as the means to inform citizens of the risks, to develop measures to mitigate those risks and protect against wildfire, and to recognize that the responsibility for protection of lives, property, and resources falls upon those living and recreating in the wildland urban interface areas (P. McElroy, personal communication, October 14, 2005). Teie and Weatherford (2000) provide good advice for the YCFPB, “In a nutshell, the public, planners, and politicians need to be convinced it is in their best interest to address the issue of growth in the wildland as it develops and to implement actions that will bring both new and existing structures into compliance with fire safe guidelines” (p. 9).

RECOMMENDATIONS

The Yakima County Board of Commissioners should endorse the Highways 410 and 12 Community Wildfire Protection Plan in Appendix A. This CWPP should serve as an annex to the Yakima County Multi-Jurisdictional Hazards Mitigation Plan. The YCFPB should further pursue development of a CWPP for additional at-risk communities and, ultimately, the adoption of a county-wide wildfire protection plan.

The YCFPB should develop and deliver training on the CWPP as it relates to the YCMJHMP. The training should relate the strategies used to address issues and concerns of the community with regard to wildland fire protection and should also demonstrate how those strategies may be applied to all types of hazards within Yakima County.

In concert with the local wildfire coordinating agencies, the YCFPB should petition the Washington State Forester to formally classify “at-risk” communities of Yakima County to be listed in the Federal Register. With this official endorsement, the YCFPB should assist the communities of Highways 410 and 12 in acquiring grant funding for implementation of the CWPP.

An advisory group, consisting of CWPP focus group members, should be established to ensure that the CWPP is reviewed and updated annually to reflect current issues. Members of this group would be instrumental in updating codes and ordinances, evaluating success of mitigation and education programs, and maintaining public awareness of the problem. A liaison with the media should be identified to help promote the importance of wildland fire protection to the public.

Finally, it is recommended that future readers consider developing a comprehensive wildfire protection plan in their own organization. Development in the urban wildland interface continues to expand each year. With that expansion comes the risk to properties, the environment, and, of most concern, the lives of residents and firefighters. Developing strategies for identification of risk factors to prevent and mitigate potential damage from wildfires provides the best opportunity to protect our citizens, our communities, and our natural resources in the urban wildland interface.

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APPENDIX A
HIGHWAYS 410 AND 12
COMMUNITY WILDFIRE PROTECTION PLAN

The following pages contain the CWPP as designed and formatted by the focus group and technical staff.

Highways 410 and 12 Community Wildfire Protection Plan

December, 2005

Prepared by
Residents of the Highway 410 and 12 Communities
with assistance from

Yakima County Fire Marshal's Office, Yakima County Sheriff's Office, The Nature Conservancy,
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Table of Contents

INTRODUCTION	1
Purpose and Need	1
Community Awareness	2
Values	3
PLANNING AREA	3
General Description of the Area	4
General Description of Existing Populated Areas	4
.....	
Other Values at Risk	5
.....	
PLANNING PROCESS	8
Process and Partners	8
ASSESSMENT	9
Existing Information	9
Fire Regime/Condition Class	9
Vegetation	10
Fire Ecology	12
Fire History	14
General Fire Behavior Potential	15
Air Quality	15
Protection Capabilities	16
Structural Vulnerability	17
Key Contacts	17
RISK EVALUATION	18
Access	18
Evacuation, Escape Routes and Safety Zones	19
Evacuation Centers	19
Safety Zones	19
Command Post/Staging Area Locations	19
Water Supplies	20
CURRENT ACTIVITIES	20
Protection Measures	20
Existing Procedures	20
Project Proposals	20
Coordination with Forest Service Activities	20
Landowner Committees	21
MITIGATION ACTION PLAN	21
Fuels Reduction	21
Education/Outreach	24
Improve Prevention/Suppression Capabilities in the Wildland/Urban Interface	24
References	26

List of Maps

Map 1, Community Wildfire Protection Plan Boundary	7
Map 2, Crown Fire Susceptibility on Federal Land.....	10
Map 3, Fire Regime	11
Map 4, Condition Class	11
Map 5, Fire Occurrence	15
Map 6, Structural Vulnerability.....	17
Map 7, Proposed Projects	23

List of Tables and Charts

Table 1, Recreation Residences	5
Table 2, Values at Risk	5
Table 3, Fire History	14
Chart 1, Fire Occurrence	11
Table 4, Key Contacts.....	17
Table 5, Evacuation Centers & Safety Zones	19
Table 6, Command Post/Staging Areas.....	19
Table 7, Fuels Reduction Projects	21
Table 8, Education/Outreach Projects.....	24
Table 9, Improve Prevention/Suppression in the WUI Projects	24

Appendices

Appendix 1, Designation of Andy Simkus	29
Appendix 2, Designation of Dan Mansfield	31
Appendix 3, Glossary of Terms.....	33
Appendix 4, Glossary of Acronyms.....	54

1. Introduction

Citizens of the Highway 410 and 12 corridors of Yakima County and local wildland fire experts have been concerned about the effects of wildfire for some time. Recent fires throughout the western United States have mobilized local residents and firefighting agencies to join together to proactively plan and implement actions to protect lives, protect their community and reduce the occurrence and severity of future wildfires.

Purpose and Need

The citizens of Highway 410 and 12 corridors value their homes, natural resources and quality of life. Their overarching aim is to protect life and property of the community, its members, and essential infrastructure from fire through prevention and education programs, strategic planning and implementation of hazardous fuel reduction treatments.



The goal of this Community Wildfire Protection Plan (CWPP) is to:

- Improve prevention and suppression
- Reduce hazardous fuels
- Restore fire adapted ecosystems
- Promote community assistance
- Recognition of and adherence to environmental laws and policies
- Tier to existing and approved emergency response plans within Yakima County



More specifically, the residents of the Highway 410 and 12 communities wish to:

1. Provide for human health and safety.
2. Identify areas with a high risk of loss to wildland fire.
3. Suggest and prioritize projects to reduce this risk.
4. Identify avenues for funding these projects.
5. Minimize risk of damage or loss of property and essential infrastructure due to wildfire.
6. Identify the entire area within the CWPP boundary as Wildland/Urban Interface (WUI).
7. Provide input to the WDNR, WDF&W, and USFS as to the management of public land adjacent to our communities.
8. Explore options for biomass utilization wherever practical.
9. Encourage community members to become involved in the NEPA/SEPA process by commenting during the scoping phase of proposed activities.
10. Restore fire adapted ecosystems to a pre-suppression era condition.
11. Maintain the undeveloped character of the forest, shrub lands, and grasslands.
12. Promote and host fire prevention programs such as *Firewise*, *FireFree*, and *Fire Safety Fever – Catch it with Cody* within the local community.
13. Support homeowner and landowner compliance with fire prevention program recommendations as a community objective.
14. Identify communication and suppression equipment needs.
15. Identify avenues for funding these equipment needs.
16. Support and promote participation in our local volunteer fire departments and our elected fire district commissioners.
17. Be in compliance of all environmental laws, regulations, and policies as they apply to each landowner and agency.
18. Present this document to the Yakima County Commissioners so they are aware that we have recognized wildland fire as a threat to our community and are taking action to mitigate that threat.
19. Request that this document be incorporated as an appendix to the Yakima County Multi-Jurisdictional Hazard Mitigation Plan.
20. Form a Community Emergency Response Team (CERT) utilizing this CWPP as one of its guiding documents.
21. Meet as a community frequently to review, validate, and/or update this plan, and to identify additional projects and opportunities.
22. Maintain communication and cooperation with our county, state, and federal government partners.



Community Awareness

The community of Highway 410 and 12 corridors is very aware of the need to develop a Community Wildfire Protection Plan. Recent large-fire activity in and around the CWPP boundary include the Mud Lake Fire of 2004, the Old Naches Fire of 2003, the Woodshed Fire of 2001, the Spruce/Dome Complex of 2001, the Gold Creek Fire of 1997, the Rock Creek Fire of 1990, the Saddle Camp Fire of 1989, and the Devils Rim Fire of 1985. In addition, hundreds of fires have occurred within the boundaries

that were suppressed at a small size. The Highway 410 and 12 corridors landowners have provided the community energy, input and guidance essential for the creation of this document. Additionally, it is the hope of the community that residents of the area will start (or continue) efforts to make their properties "Firewise" and implement defensible space strategies.

Values

The citizens of Highway 410 and 12 corridors value their homes, forest and rangeland, and privacy. We wish to improve the safety of their community and contribute to the overall health of the ecosystem. We also want to provide input on land management decisions for adjacent Federal and State lands. Specifically, the residents identified the following values as contributing to their quality of life in this area:

- Life safety
- Wildland setting
- Wildlife habitat
- Outdoor recreation opportunities – hunting, fishing, rafting, hiking, horseback riding, skiing, snowmobiling, boating, etc.
- Economics – taxes, local employment
- Heritage and cultural resources
- History of William O. Douglas as a local resident and forest user
- History of the Longmire Trail
- Nearby wilderness areas
- Air quality
- Water quality
- Water ways – recreational, scenic
- Infrastructure – utilities, roads, ponds, bridges
- Mather Memorial Scenic Byway
- Climate
- Sense of community
- The local volunteer fire department as a part of the community

2. Planning Area

The Highway 410 and 12 CWPP area is approximately 284,712 acres (Yakima County GIS, 2005) and lies west of the City of Yakima and Town of Naches in Yakima and Kittitas Counties, Washington (see Highway 410 and 12 CWPP Area Map, Page). The entire planning area is considered Wildland/Urban Interface (WUI), having conditions that are conducive to large-scale wildland fire. There exists a significant threat to human life and property. The planning area was developed with the help of local fire experts to include those areas where a fire escaping initial attack could directly impact the local community. The area portrays one in which local residents may be concerned that an escaped fire could imminently threaten their life or property.

Areas within the Highway 410 and 12 corridors are defined by watersheds and sub-watersheds. These major drainages and their tributaries include: Tieton River, South Fork Tieton River, North Fork Tieton River, Rimrock Lake, Clear Lake, Naches River, lower Little Naches River, Rattlesnake Creek, Nile Creek, Bumping River, American River, and Bumping Lake.

About 63% (178,893 acres) (Yakima County GIS, 2005) of the area is federally owned. The character of residential development on private lands within the Highway 410 and 12 corridors is rural in nature. Yakima County tax roles indicate that the CWPP boundary includes 1,320 residences on all land ownerships. Development is ongoing. With few areas left available at lower elevations to be developed, more residences being established in the WUI at higher elevations and in more inaccessible areas. Besides the rural, unincorporated areas of Yakima and Kittitas Counties, the planning area includes the communities (also unincorporated) of Goose Prairie, Cliffdell, and Rimrock Retreat. In addition to year-around established residences, recreation residences on federal land make up a large component of the dwellings within the CWPP, accounting for over 500 homes plus organization camps.

General Description of the Area

The Highway 410 and 12 CWPP encompasses a wide variety of terrain, elevation, aspects, and the varying fuels associated with forest and rangelands. Lower elevations and the eastern end of planning area is largely shrub/steppe (grasses, bitterbrush, sagebrush). As you move to the west and to higher elevations, the forest transitions from dry deciduous (Oregon white oak and cottonwood), through dry conifer (ponderosa pine, Douglas-fir), mid-elevation conifer (grand fir, western larch, western hemlock), to high elevation wet conifer (mountain hemlock, pacific silver fir).

At Risk Community/Wildland Urban Interface (WUI)

As described in the Healthy Forest Restoration Act (HFRA, 2003), the term Wildland Urban Interface means an area within or adjacent to an At Risk Community that is identified in recommendations to the Secretary in a Community Wildfire Protection Plan. An At Risk Community means a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land, one in which conditions are conducive to a large-scale wildland fire disturbance event, and one for which a significant threat to human life or property exist as a result of a wildland fire disturbance event. The CWPP boundary was drawn with these parameters defining the planning area and the Wildland Urban Interface. Topographic and weather influences were a major factor in determining the CWPP boundary. Consultation with fire behavior experts identified the margin of potential threat.

General description of existing populated areas

Goose Prairie – This community is a mix of full time residents and a few recreation residences. Goose Prairie is home to Camp Fife, a large Boy Scout camp, typically housing more than 200 scouts and staff members during summer months. Goose Prairie Inn is central within the community and provides a small restaurant and convenience store. Telephone and electrical service are not provided to the area. Goose Prairie is very unique in being a private in-holding completely surrounded by Forest Service administered land. Within 400 feet and on all sides of the boundary of Goose Prairie is the William O. Douglas Wilderness Area. Access is one-way in, one-way out by way of Bumping River Road. Goose Prairie is not within a Fire District and structural protection may not be provided unless by contract with Yakima County Fire Protection District 14 (Nile).

Cliffdell – The community of Cliffdell is comprised mostly of full time residents with a few recreation residences. Access is by way of State Highway 410, coming from Naches and Yakima to the east and Chinook Pass to the west. Whistlin' Jack Lodge is a major tourist attraction within the community, providing cabins, a motel, a restaurant and lounge, and a convenience store with gasoline available. Electrical and telephone services are provided to Cliffdell.

Nile Valley and Highway 410 – The rural area described here is considered those privately owned lands beginning at the intersection of State Highway 410 and U.S. Highway 12 and extending to the community of Cliffdell. Business interests include Gold Creek Station, Black Bear Resort, The Woodshed/Eagle Rock Resort and numerous other privately owned businesses. Access is provided by Highway 410, the Nile Loop Road, and Old River Road. These roads serve as collectors for numerous arterials and Forest Roads. Growth continues in this area, and housing is being developed at higher elevations. Those being built at mid and upper slopes currently rely on cellular phones (limited coverage) and alternate energy sources such as wind, solar, and generator supplied power. The higher elevation homes are remote and not in a fire district. Services within the community include electricity, telephone, businesses, an organizational camp, a community center/library, Community Park, and a community church.

Rimrock Retreat – The community of Rimrock Retreat is located on U. S. Highway 12 approximately 16 miles west of the Town of Naches. Residents are largely year-around. The community is served by electricity and telephone. Three businesses are in Rimrock Retreat, including Trout Lodge Restaurant and Motel, Getaway Sports, and Gameridge Motel. Rimrock Retreat is not within a fire district, and protection is provided only under individual contract with Yakima County Fire Protection District 3 (Naches).

Highway 12 – The rural area described here is considered those privately owned lands beginning at the intersection of U.S. Highway 12 and State Highway 410 and extending to approximately mile post 170, two miles west of Rimrock Retreat (not inclusive). This area contains widely scattered, year around residents.

Recreation Residences – Recreation residences are those in which privately owned cabins are established by lease on Forest Service administered land. The Naches Ranger District has the second highest number of recreation residences of any in the National Forest system. By permit, the structure may not be used as a principal place of residence. Amenities range across the spectrum from no plumbing/electricity/telephone, to full service with all of the facilities of a typical family home. As these are on federal land, they are not in a fire district except where under individual contract with Yakima County Fire Protection Districts 3 (Naches) or 14 (Nile). Recreation residences are located along major travel routes off of U.S. Highway 12, State Highway 410, the Tieton Loop Road, and Bumping River Road. Recreation residences are typically within “Summer Home Groups” of 6-72 lots. A very few groups contain only 1-3 lots.

Recreation residences within the Highway 410 and 12 CWPP include:

Highway 410 Corridor	# Lots	Highway 12 Corridor	# Lots
American Forks	21	Andy Creek	72
American River	11	Bear Cove	39
Bumping Lake	12	Bear Creek	6
Cliffdell	15	Bootjack	9
Crag	17	Chelminar	35
Edgar Rock	7	Hart Creek	35
Edgewater	13	Horseshoe Cove	16
Gold Creek	35	Indian Creek	19
Hawks Nest	4	Russell Creek	14
Idlehour	7	Silver Cove	21
Idlewild	20	South Fork	20
Indian Flat	29		
Kloshe/Gold	10		
Little Naches	11		
Lost Creek	1		
Sleepy Hollow	15		
Stillwater	2		
Timber Creek	13		
Union Creek	6		
Willow Springs	10		

Table 1, Recreation Residences

Please note that *Table 1* denotes the number of lots within the group, and not the number of structures. The majority of lots will have multiple structures on each lot which may include the primary residence and any number of outbuildings (sheds, outhouse, garage, etc.).

Other Values At Risk

The community would also like to acknowledge that the following values and property are also at risk to loss by catastrophic wildfire. These areas and facilities are an integral part of the community. As such, fire protection and prevention, and hazardous fuel reduction plans and treatments should also be considering these sites.

Values at Risk

Municipal Watersheds

Highway 410 Corridor
North Fork Rattlesnake Creek

Highway 12 Corridor

Infrastructure

Highway 410 Corridor

Highway 12 Corridor

Values at Risk

State Highway 410
 Nile Loop Road and arterials
 Bumping River Road
 Old River Road and Arterials
 Nile Community Church
 Pacific Power
 Verizon
 Little Bald Radio Site (Nile Fire Department)

U.S. Highway 12
 Tieton Loop Road
 Benton Rural Electric Association
 Cowiche Telephone Company

Administrative Sites

Highway 410 Corridor

Nile Fire Department Station 1
 Nile Fire Department Station 2
 Nile Fire Department Station 3
 DOT - Cottonwood Shop
 Bumping Dam
 Chinook Pass Work Center
 Cleman Mountain Communication Towers
 Little Bald Communication Towers
 Cleman Mountain Lookout

Highway 12 Corridor

Tieton State Airstrip
 Oak Creek Game Station
 Rimrock Dam
 White Pass Work Center
 Bethel Ridge Communication Towers
 Jumpoff Lookout
 Oak Creek Feeding Station
 WDF&W AmeriCorp Cabin
 Naches/Tieton Irrigation Canal

Nile Game Feeding Station
 Sawmill Remote Automated Weather Station (RAWS)
 Fontaine Lane Traffic Camera

Developed Recreation Facilities

Highway 410 Corridor

Jim Sprick Park
 Camp Fife
 Goose Prairie Inn
 Whistlin' Jack Lodge
 Gold Creek Station
 Squaw Rock Resort
 Elk Ridge Motel
 Eagle Rock (Woodshed)
 Bumping Campground (CG)
 Bumping Boat Launch
 Bumping Marina
 Bumping Crossing CG
 Cougar Flat CG
 Soda Springs CG
 American Ridge Ski Bowl Lodge
 American Forks CG
 American River Guard Station
 Little Naches CG
 Halfway Flats CG
 Sawmill Flats CG
 Milk Pond CG
 Cottonwood CG
 Boulder Cave Day Use Area
 Mather Memorial Parkway Rest Area
 Camp Roganunda
 Lost Creek Village
 Flying H Boys Ranch

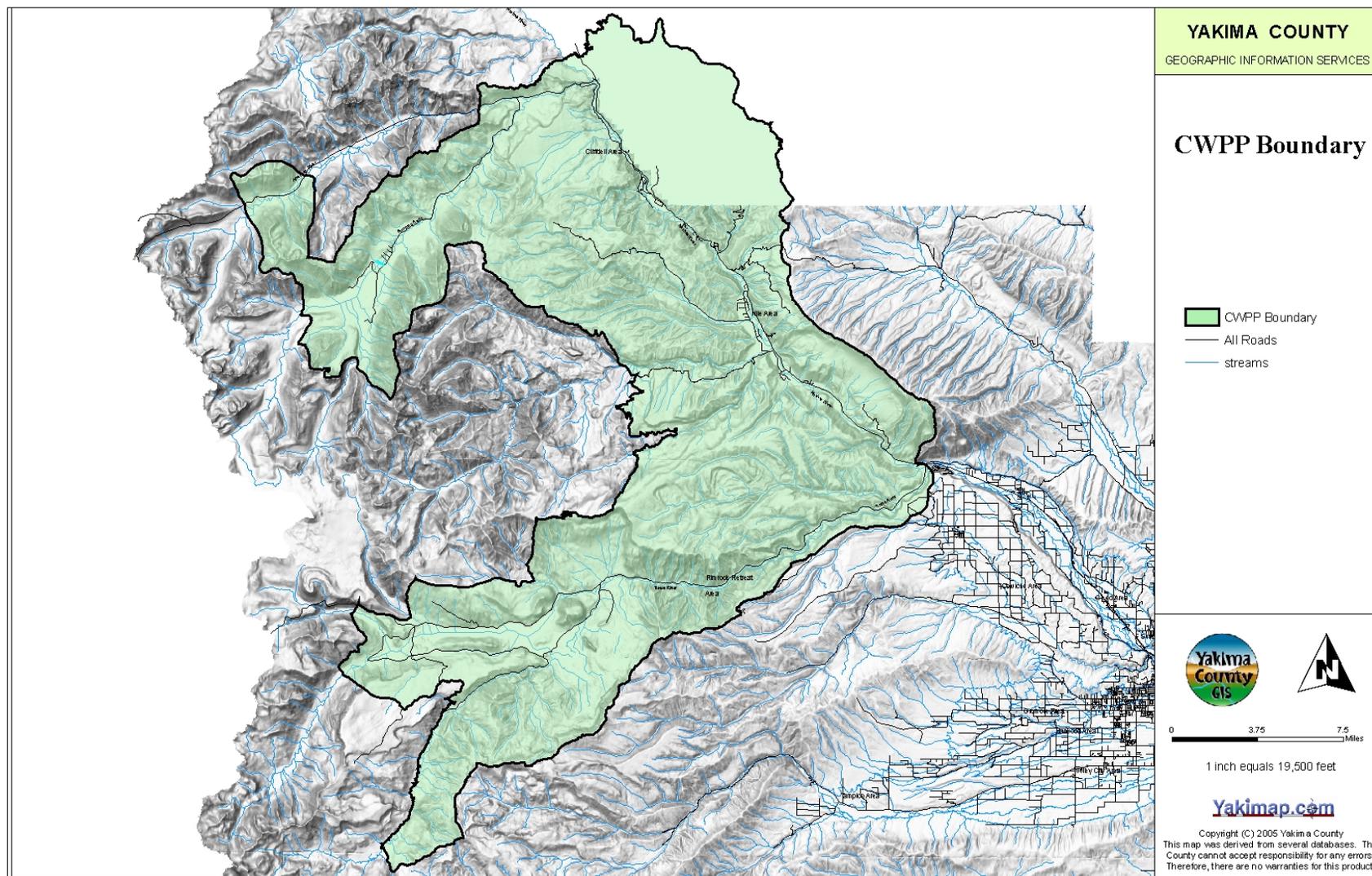
Highway 12 Corridor

Trout Lodge
 Getaway Sports
 Game Ridge Motel
 Rimrock Store
 Snug Harbor
 Masters Resort
 Silver Beach Resort
 Indian Creek Corral
 Windy Point CG
 Wild Rose CG
 River Bend CG
 Haus Creek CG
 Peninsula CG
 Peninsula Boat Launch
 South Fork Bay CG
 South Fork Tieton CG
 Gray Creek CG
 Clear Lake South CG
 Fishhawk CG
 Clear Lake North CG
 Clear Lake Day Use Area
 Clear Lake Reservation Site
 Indian Creek CG
 Camp Ghormley
 Camp Jubilee
 Camp Dudley
 Grace Brethren Camp

Camp Zarahemla
 Camp Prime Time

Table 2, Values at Risk

Community Wildfire Protection Plan Boundary



Map 1

3. Planning Process

Process and Partners

In April of 2005, the Yakima County Fire Marshal's Office and the Washington Department of Natural Resources sponsored a Firewise workshop in the community of Cliffdell. Three hundred invitations were sent out to the local community for this workshop, with thirty-eight persons attending. At this workshop, Fire Marshal Jakki MacLean proposed that interested community members form a committee to prepare a Community Wildfire Protection Plan. The need and advantages of having a CWPP was presented and interested persons invited to sign up.



In June of 2005, interested community members gathered at the Naches Ranger Station to begin preparation of the CWPP. With the facilitation of Jakki MacLean, community members identified the purpose and need for this document, community values, concerns and priorities, and the CWPP boundary. The community group solicited input from the Yakima County Sheriff's Office, Yakima County

Commissioner Mike Leita, Fire Chiefs and Commissioners from the Nile and Naches Fire Departments, Yakima County Department of Emergency Management, Washington Department of Natural Resources, and the USDA Forest Service. Preparation of the document began in July of 2005 with community members meeting approximately bi-weekly to review and edit work to date.

4. Assessment

Existing Information

A substantial amount of data is already available from several sources. Primary fire planning information/Geographic Information System (GIS) data used in this plan came from Yakima County GIS, USFS Naches Ranger District, and WDNR.

Fire Regime/Condition Class

Fire regime is a description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured, such as fire return interval (NWCG 2005). Fire Regime describes a circumstance that is static on the landscape, changing within moisture regimes or with climatic shifts.

Fire Regime 1 means an area in which historically there have been low-severity fires with a frequency of 0 through 35 years and that is located primarily in low elevation forests of pine, oak, or pinyon juniper. (H.R. 1904, 2003)

Fire Regime 2 means an area in which historically there are stand replacement severity fires with a frequency of 0 through 35 years and that is located primarily in low- to mid-elevation rangeland, grassland, or shrubland. (H.R. 1904, 2003)

Fire Regime 3 means an area in which historically there are mixed severity fires with a frequency of 35 through 100 years and that is located primarily in forests of mixed conifer, dry Douglas-fir, or wet Ponderosa pine. (H.R. 1904, 2003)

Condition Class is a depiction of the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk). (NWCG 2005)

Vegetation

This discussion will not consider developed agricultural land within the CWPP boundary. Developed agriculture is most common in the CWPP boundary in the Nile Valley and eastern portion of the Highway 410 corridor. We will also only discuss the broad categories of wildland types, and not attempt to identify the subtle and innumerable variations within each forest type. Nor will we attempt to identify every species present.

Vegetation within the CWPP boundary transitions from dry shrub/steppe at the lower elevations and at upper elevations of the eastern boundary of the planning area. These areas are dominated by Antelope bitterbrush (*Purshia tridentate*), Big sagebrush (*Artemisia tridentate*), Crested wheatgrass (*Agropyron cristatum*), Pinegrass (*Calamagrostis rubescens*), Idaho fescue (*Festuca idahoensis*), and Sandberg bluegrass (*Poa Sandbergii Vasey*). The shrub/steppe as well as the dry forested land has been invaded by the exotic Cheatgrass (*Bromus tectorum*) (see discussion in Fire Ecology).

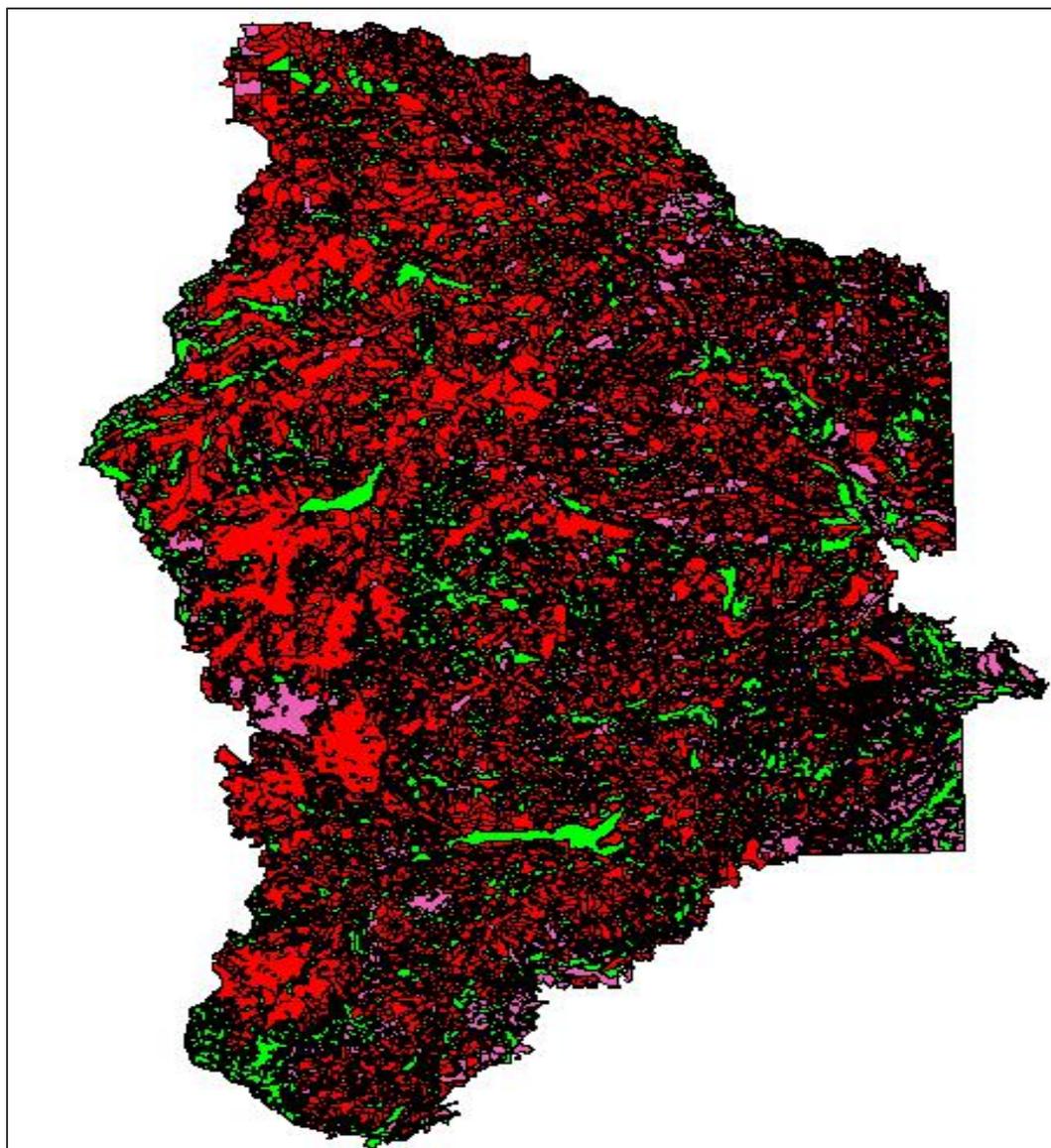
The driest forest type within the CWPP boundary is that which includes Oregon white oak (*Quercus garryana*). This type is unique in that it is limited within the extent of the Okanogan-Wenatchee National Forest to the lower reaches of the Naches and Tieton watersheds, is the hottest and most droughty of forest types, and marks the lower boundary of woodland and forest (Lillybridge, Kovalchik, Williams, Smith, 1995).

The forest then transitions to Ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*). This is the driest of the conifer forests within the CWPP boundary and will often include Antelope bitterbrush, Pinegrass, wheatgrasses and fescues, and cheatgrass. While Grand fir (*Abies grandis*) is typically a mid-elevation tree, it occurs on dry sites on the southern portion of the Okanogan-Wenatchee National Forest. As a result of fire suppression, Grand fir is a major contributor to the dense, overstocked stands, resulting in high fire susceptibility on dry forest sites. Grand fir is often referred to as "white fir", but true White fir (*Abies concolor*) occurs well south of this region.

Moving west and gaining in elevation, Grand fir, Western larch (*Larix occidentalis*), and Western hemlock (*Tsuga heterophylla*) are common dominant trees. Lodgepole pine (*Pinus contorta*) is also common in many stands.

Upper elevations and the most western portion of the CWPP boundary may include Pacific silver fir (*Abies amabilis*), Mountain hemlock (*Tsuga mertensiana*) and possibly Subalpine fir (*Abies lasiocarpa*). This forest type is present in the western most of the recreation residences and in the upper elevations of the CWPP boundary. The mature condition of this forest type is closed canopy with abundant ladder fuels and ground fuel loadings. Because of this, fires tend to be a stand-replacing type.

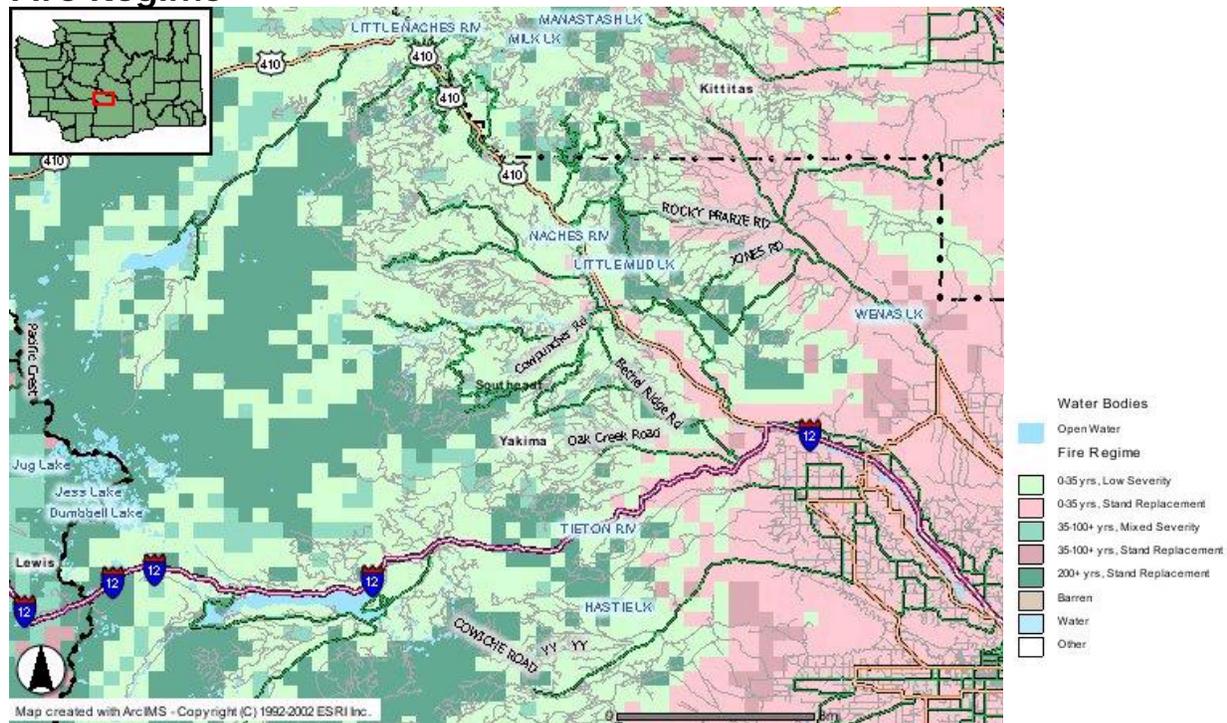
Crown Fire Susceptibility on Federal Land



Vegetation mapping of the Naches Ranger District indicates a mostly High to Moderate susceptibility to crown fire, indicated by the red (high) and magenta (moderate) coloring (Naches RD, 2002).

Map 2

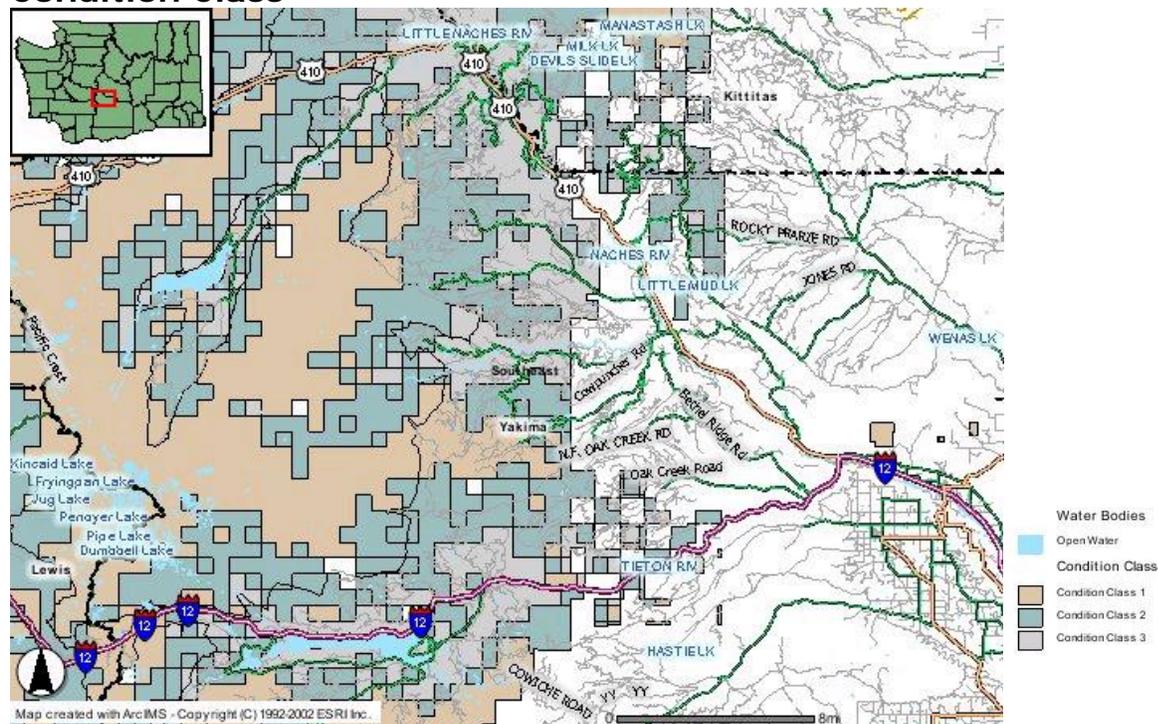
Fire Regime



Map 3

Low resolution mapping indicates that the majority of the CWPP area is in Fire Regime 1, 2, or 3 (DNR Mapping).

Condition Class



Map 4

Condition Class mapping indicates a CC of 2 or 3 in Fire Regimes 1, 2, or 3 (DNR Mapping).

Fire Ecology

Prior to fire suppression, frequent low intensity fire maintained dry forests as open and park-like. Occasional fire-free intervals provided the opportunity for some ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*pseudotsuga menziesii*) to grow large enough to resist destruction by fire (Keane et al. 1990). These communities appeared to have a stable structure which was disrupted at the small scale of the patch. Mature Douglas-fir and ponderosa pine individuals are considered to be highly fire resistant and are not significantly affected by low or moderately severe fire (Williams and Smith, 1991). In contrast, young, small diameter individuals of these species are intolerant to even low intensity fire and will typically be eliminated from a site, leaving the larger, more mature individuals largely unaffected. However, ponderosa pine becomes fire tolerant at a smaller diameter than Douglas-fir. Following severe, stand-destroying fires a grass/forb community with shrubs and conifer seedlings will likely develop (Fischer and Bradely, 1987).

Fire influence in non-forested types ranges from none in the rock and water areas, to little influence in the wet shrub meadows and lithosols, to moderate and high influence in the grasslands, shrublands, and riparian areas. Fire Regime 2 is, by definition shrub, steppes and meadows. These areas experience rapid moving fires, which may be high intensity, but typically with a short duration or residence time. Fire return intervals are 0-35 years and of stand replacement severity. The Condition Class in Fire Regime 2 has been altered by invasives such as cheat grass (*Bromus tectorum*), and no longer has its original condition. For Fire Regime 2 this is described as Condition Class 2.

In forest communities, fire suppression has combined with grazing to alter the shrub component. Bunting et al. (1987) described the response of different sagebrush series (identified by dominant sagebrush species) to fire. Most species are nonsprouters and are reduced or eliminated by fire and reestablished by seed in burned areas. Fire frequency has been altered so that some areas burn less frequently and others more frequently than in the past. Large areas of the sagebrush-grass type have been fragmented and overgrazed so that shrub cover is now high and grass fuels are suppressed, or have such low site potential and low fine fuel loading making burning difficult and requiring wind to carry a fire. Still other areas have experienced a significant increase in wildfires associated with the continuous fuel provided by the exotic cheatgrass. Here, shrubs may be removed by repeated wildfire. Summer burns occurring in the presence of cheatgrass and with perennial grasses weakened by grazing, removes shrubs and further weakens perennial grasses. This is a simplified positive feedback mechanism in which fire favors cheatgrass and cheatgrass promotes fire.

Two important shrub components, bitterbrush (*Purshia tridentata*) and mountain big sagebrush (*Artemisia tridentata*), are easily killed by fire, and likely were not historically present at the levels seen today, due to fire suppression. Mountain big sagebrush will not resprout. Regeneration following fire is from on-site and off-site seed. Seedlings often reestablish readily and grow rapidly on light to moderate burns; reproductive maturity may occur in 3 to 5 years. Even though bitterbrush is often killed outright by fire, it often occurs in communities with a high fire frequency. Fire may be necessary to maintain populations of bitterbrush by removing competing vegetation and barring mineral soil, which favors rodent seed caching (Driver, Winston, and Goehle, 1980, Kuchler 1964). In burned sagebrush communities, prompt rehabilitation before cheatgrass can dominate is important.

Another shrub, snowbrush ceanothus (*Ceanothus velutinus*), was a more common early seral species in the Douglas-fir/ponderosa pine type (Dyrness 1973, Franklin and Dyrness 1973, Halpern 1989, Isaac 1940, Mueggler 1965, Schoonmaker and McKee 1988, Youngberg et al. 1979). It typically increases rapidly after fire through resprouting/or seedling establishment where the fire-free interval was 15 years and less. Snowbrush ceanothus may also be less prevalent due to excessive wildlife use, associated with the reintroduction of elk beginning in 1913.

Cheatgrass is not a climax dominant or indicator species in any habitat classification because of its role as a seral invader after disturbance. However, it can maintain its dominance for many years on sites where the native vegetation has been eliminated or severely reduced by overgrazing or frequent fire. In these situations cheatgrass remains the de facto climax dominant regardless of the site potential. Cheatgrass is a highly flammable species due to its complete summer drying, its fine structure, and its tendency to accumulate litter (Klemmedson and Smith 1964, Tisdale and Hironaka, 1981). Because of its flammability, cheatgrass greatly increases the fire hazard on a site. The rate of spread, size, and frequency of fire all increase. Besides increasing fire frequency, the length of time

cheatgrass remains a hazard is longer than that for perennial grasses. Cheatgrass dries 4 to 6 weeks earlier than perennials and is susceptible to fire 1 to 2 months longer in the fall (Stewart and Hull, 1949).

Stand development within the wet grand fir series was associated with naturally experiencing short return interval crown and severe surface fires (33-100 year fire-free intervals). This scenario is referred to as the moderate fire regime (Agee 1993). The moderate fire severity regime has the most complex interaction of low, moderate and high severity fires. Fire history is most difficult to reconstruct in these areas because of the variability of fire on the landscape. This variability is largely a function of the influence of weather as the primary factor driving the occurrence of fire. It is predicted that 30 percent of the area with a moderate severity fire regime can be expected to burn with moderate or high intensity, while 70 percent of the area experiences low severity fire (Agee 1993). This regime is represented by overstocked stands and open park-like stands, and gradually supports an abundance of live and dead biomass. Community structure is described as relatively dense (greater than 40 percent canopy closure), multi-storied, with an abundance of snags and down wood less than 12 inches diameter. Insect infestation also contributes to the creation of standing and down woody material in these communities (Hessburg et al).

Weather, topography, and fuels affect wildfire behavior. The Highway 410 and 12 corridors CWPP area, like other areas of Yakima County, is prone to severe weather conditions that can support extreme fire behavior. The landscape has many valleys with steep slopes and dense stands dominated by ponderosa pine, which are primarily less than 18 inches in diameter. Many stands have closed canopies and abundant ladder fuels. Continuous, tall underbrush also predominates. Insect infestations of western spruce budworm, mountain pine beetle and/or fir engraver beetle are becoming more prevalent.

Since the weather and topography of a community cannot be changed, the best approach to minimize the risk to people and potential property losses is to modify and/or reduce fuels surrounding the home, as well as at the landscape level. Fuels treatments within and adjacent to a community can improve safety for fire fighters, help overall fire suppression efforts be successful, and reduce potential risk/damage to individual structures/property. Wildlife habitat benefits can also be gained through fuels reduction and natural vegetation restoration projects.

Current fuel profiles reflect a high to moderate fire susceptibility within the forested vegetation types. For purposes of this discussion, susceptibility will be defined as a relative measure of the potential of a fire within a stand, to produce a stand replacement fire on a typical summer day. Included are such factors as vegetation type, crown closure, ladder fuels, vertical arrangement and horizontal continuity of a stand (stand structure), ground fuels, and topography. These same factors, along with favorable weather conditions were described by Rothermel, 1993, as the components necessary to produce a crown fire.

Fire History

Recent fire occurrence and intensity on federal lands is well documented. It can be assumed that ignitions on other ownership on similar elevations, aspects, and vegetative types would follow pattern of that on the federal lands in frequency and intensity.

Forest Service, Naches RD

Statistical Cause		# Fires	% by cause
1	Lightning	436	35%
2	Equipment	55	4%
3	Smoking	145	12%
4	Campfire	434	35%
5	Debris	33	3%
6	Railroad	0	0%
7	Arson	25	2%
8	Children	3	0%
9	Miscellaneous	124	10%
	Total	1255	

Table 3, Fire History

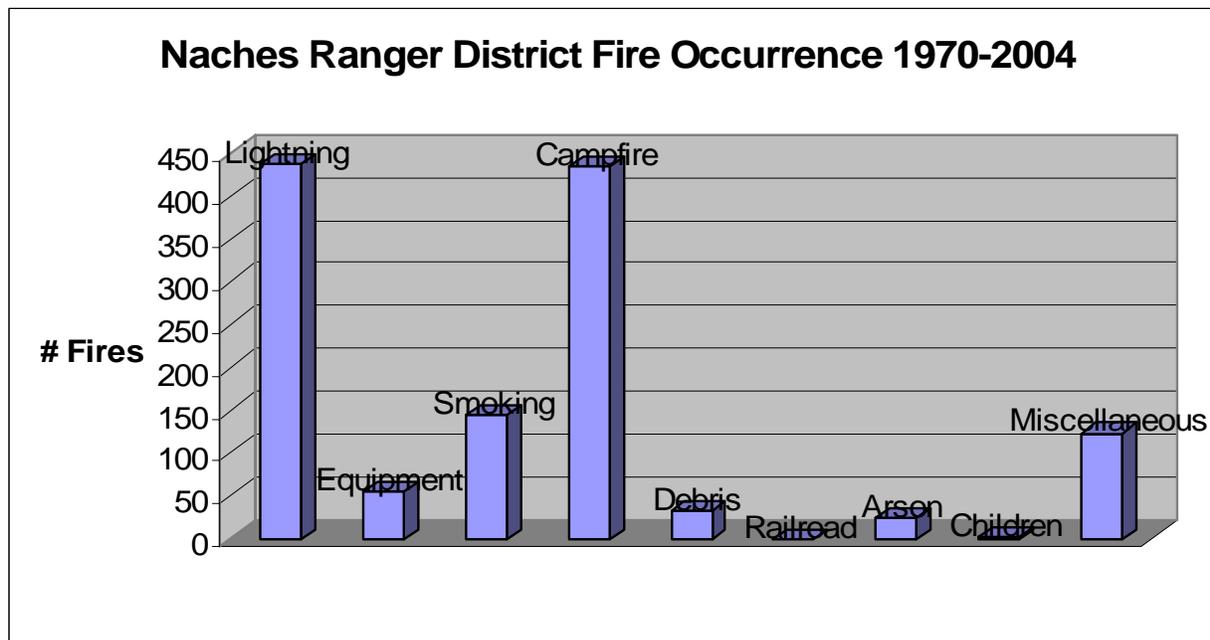
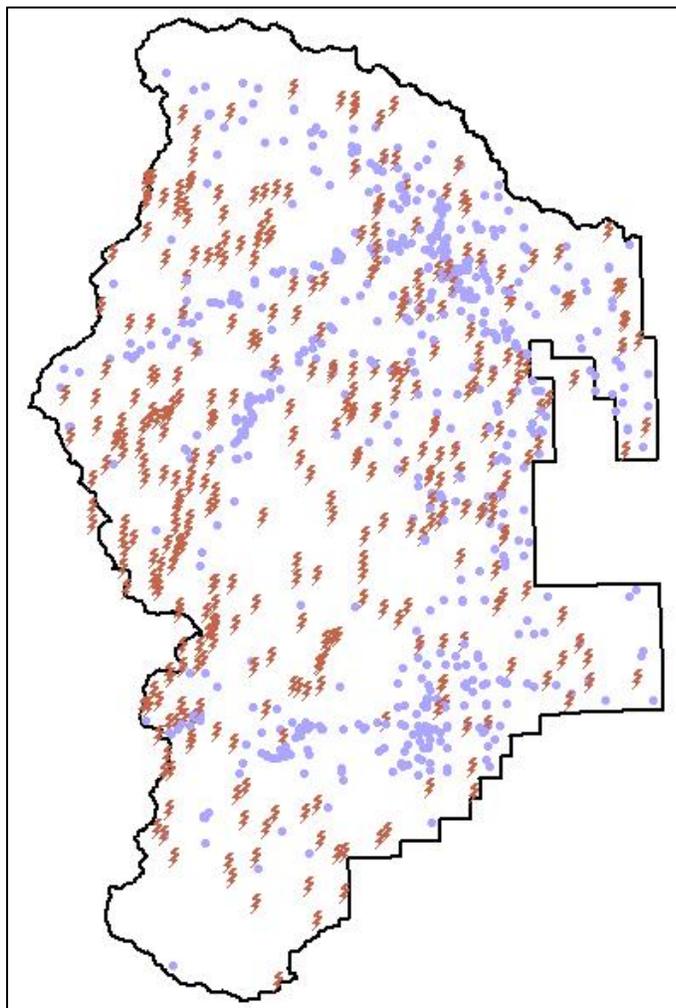


Chart 1, Fire Occurrence

(STATFIRE, 2004)

Fire Occurrence



Resolution of this map does not accurately depict the actual number of fire starts, however does portray distribution and composition of ignitions. The blue dots represent human caused fires, and the brown lightning bolts represent lightning caused (Naches RD, 2002).

Map 5

General Fire Behavior Potential

Fires occurring in or out to the CWPP boundary would historically move rapidly up slope to a ridgeline. Once at the ridgeline, fire spread will depend largely on wind speed and direction. With little or no wind, fires would most likely smolder or creep downhill with low flame lengths, and isolated passive torching in fuel concentrations resulting in short range spotting. Fires would continue to move downhill until encountering a change in aspect where they could make uphill runs or a change in fuels that would stop fire growth. With moderate or higher wind, a fire could also move rapidly along the ridges and down slope. Torching trees would give long range spotting down slope and into draws which would make aggressive uphill runs back into the main body of the fire as well as moving with the wind.

Air Quality

Population centers, summer home groups, heavily used roads and highways, and Class I wilderness areas are considered sensitive to smoke, dust, and other pollutants. Recreation sites would also be affected by smoke and its associated pollutants should fire occur nearby. Air quality in and near the planning area can be described as good. Intuitively, we can assume, prior to fire suppression, that may not have been the case. Fire frequency in the American west during the summer months would

have resulted in fires, sometimes large fires, burning nearly constantly and creating a hazy-to very smoky environment.

The topography allows for good transport of air through the analysis area. Small scale temperature inversions that affect air quality are not common. Large scale inversions and subsidences are common in the fall and can be associated with regional air quality degradation. Impacts to air quality are also associated with pollution flowing with weather patterns through White and Chinook Passes from west-side sources.

The most likely and largest contributor to a pollution event originating in the analysis area would be a wildfire. By using emission modeling, a wildfire can be simulated with the smoke column directed at specific, smoke sensitive receptor sites. Emissions produced, predicted pollutant concentrations, and changes in visibility can be modeled. For purposes of this analysis, a 100 acre fire was modeled over a 24 hour period using typical summer conditions and modeling for severe and low severity type fires. Under these conditions, 103-336 tons of CO was produced in a 24 hour period. During the same period, 5-16 tons of CH₄, and 8-27 tons of PM_{2.5} would be produced (FEPS, 2005). Visibility would be reduced, depending on proximity to the fire, from 0.3 miles to sites within 5 miles of the fire, to little effect on sites 50 miles away. The volume of smoke produced will increase with fire size and lower fuel moistures. What area and who will be affected is dependant on wind direction and speed. Fuel reduction treatments will, in the case of underburning, also create smoke, but in a more controlled manner. By burning when weather conditions are favorable and in controlled amounts (acres), impacts to surrounding residents, communities and use sites can be minimized. By treating fuels, the impacts of a wildfire can be lessened.

Protection Capabilities

Fire protection within the CWPP boundary is supplied by numerous agencies, each with its own charge, capabilities, and limitations. Cooperative agreements exist that allow all agencies to work together to best protect lives, property, and natural resources. Local county, state, and federal agencies have forged positive working relations.

Yakima County Fire Protection District 14 (Nile) is entirely within the CWPP boundary. Yakima County Fire Protection District 3 (Naches) has only the very western edge of their district within the CWPP boundary, but responds throughout the Highway 12 corridor for medical emergencies to the western county line. The emphasis of these departments is to take action for fire suppression, rescue, and emergency medical and hazardous materials emergencies, and to provide fire prevention and education programs for the citizens in the response area. Nile and Naches Fire Departments respond within their districts and outside of district by request. The ability to respond to large wildland fires is limited by equipment and personnel.

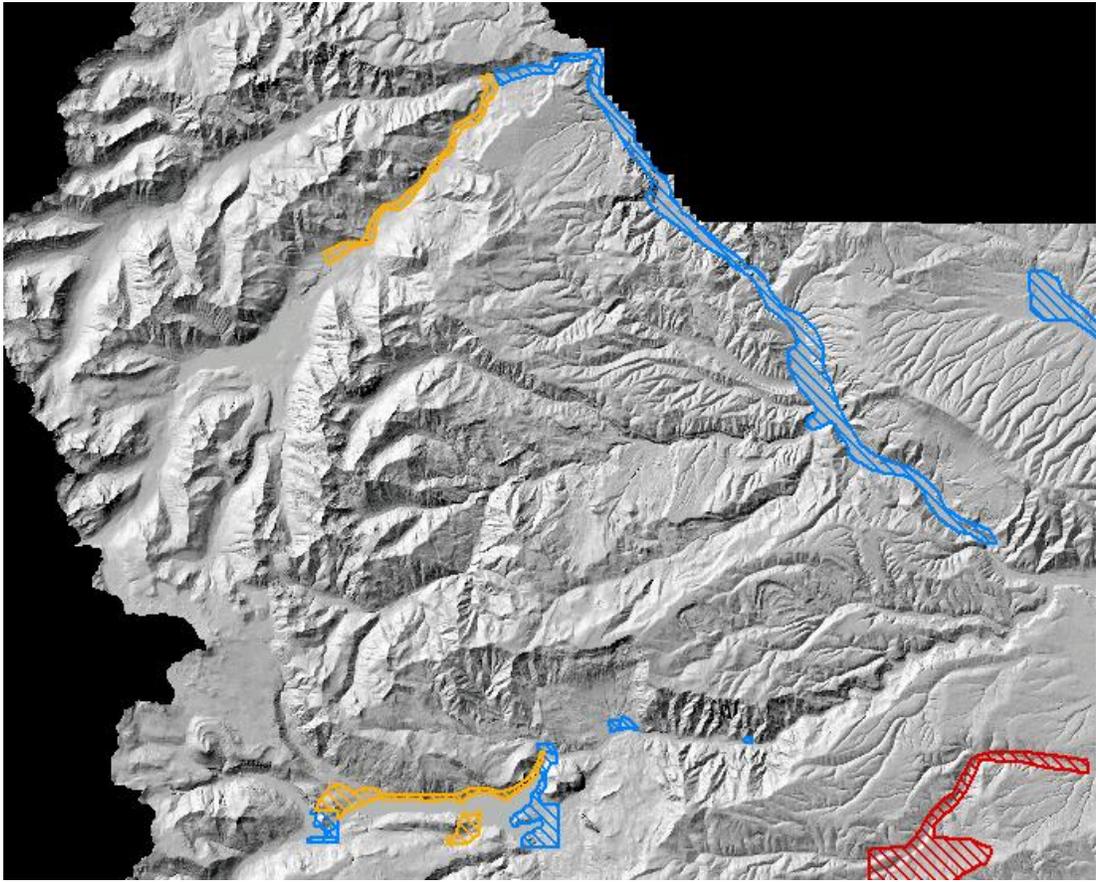
The community of Goose Prairie and all recreation residences are outside of any fire district. As such, they do not pay into a tax levy for fire protection. Fire districts are therefore prohibited from responding to these homes as this would constitute gifting of public funds. Some residents have entered into contracts with the nearest fire district to provide protection. This list of residents is constantly developing and being added to. Therefore, we will not attempt to identify those owners in this document.



The Washington State Department of Natural Resources and USDA Forest Service are the primary wildland firefighting agencies within the CWPP boundary. Through cooperative agreements, either agency is able to mobilize large amounts of personnel, equipment, aircraft, and logistical support. However, the actual number of firefighting resources stationed in the locale is small in relation to the area covered, and the CWPP boundary constitutes only a small portion of the district they must protect. Delays in the arrival of suppression forces of several hours to several days are likely, depending on the availability of these resources.

These agencies are not equipped or trained to fight structure fires and do not provide protection of this nature.

Structural Vulnerability



Washington Department of Natural Resources data* suggests that homes within the CWPP boundary are at a Moderate to High risk of loss due to catastrophic wildfire, indicated by the blue (moderate) and orange (high) coloring

Map 6

*DNR Product License Agreement required. DO NOT distribute this data, including the above map.

Key Contacts

Organization	Contact	Phone Number
Yakima County Fire District #14	Chief Derrik Newton	911
Yakima County Fire District #3	Chief Dan Mansfield	911
Yakima County Fire Marshal	Jakki MacLean	(509) 574-2360
Yakima County Sheriff	Sheriff Ken Irwin	911 574-2500
Washington Department of Natural Resources	Rex Reed	(509) 925 - 8510

Key Contacts (continued)

Naches Ranger District (USFS)	District Ranger - Randy Shepard FMO - Gary Jennings AFMO - Sean Stafford	(509) 653-1400
Central WA Interagency Comm. Center (CWICC)		(509) 884-3473 1-800-826-3383
Pacific Power	24 hour customer service Outages	1-888-221-7070 1-877-548-3768
Benton Rural Electric Association		1-509-865-2600
Washington Department of Transportation		(509) 577-1600
Bureau of Reclamation		(509) 249-1138

Table 4, Key Contacts

5. Risk Evaluation

Community members have expressed concern about fuel conditions and fire hazard.



Of special worry is the current epidemic of western spruce budworm and the increased fire hazard as a result of dying and dead trees. Treatment and prevention of such epidemics are ideally the same as treatments that would be conducted to reduce hazardous fire conditions, e.g., thinning of shade tolerant, fire susceptible trees species in overstocked dry forest types.

Escape routes were also identified as a priority consideration. The Bumping River drainage and the community of Goose Prairie are at extreme risk due to threats associated with increased fire hazard as a

result of western spruce budworm epidemic in the drainage, a high incidence of human caused and lightning fires, and a one-way-in, one-way-out escape route on a narrow, winding road.

Communications are difficult outside of the main line of both corridors. Goose Prairie has no phone service. Cellular telephone providers at this time have no plans of installing cellular phone towers in the area, due to low profitability. Community members have identified the installation of cellular towers or other communication systems as a key component to improving fire protection to the residents and wildlands within the CWPP boundary.

Access

Major access is provided within the planning area by U.S. Highway 12 and State Highway 410. County maintained roads, while are easily accessible by low-clearance passenger cars, are limited to the

Tieton Loop Road off of Highway 12, the Nile Loop Road with arterials off of Highway 410, and the Bumping River Road off of Highway 410.

Forest roads are generally rock or native surface and are suitable for high-clearance or off-road vehicles. As development continues at mid-slope and higher, consideration must be given that roads accessing these properties may not be accessible by emergency vehicles.

A number of private bridges were constructed over the Naches River following the flood of 1995. Residents have been notified that the fire department will not respond over these bridges unless a certified load limit has been posted on the bridge.

Evacuation, Escape Routes and Safety Zones

Evacuation is an organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas (NWCG, 2005). An escape route is a preplanned and understood route...to move to a safety zone or other low-risk area (NWCG, 2005). A safety zone is an area cleared of flammable materials used for escape in the event the (fire)line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity (NWCG, 2005).

It is recognized that even if fuels were to be treated around all communities and all residences conformed to Firewise standards, evacuations may be necessary in the event of a nearby wildland fire. Safety zones large enough to accommodate an entire community are rare, and it is not desirable to evacuate citizens to a safety zone. However, fuel treatments are not completed and the possibility exists that local residents may need to utilize an escape route and safety zone if firefighting agencies have not had time to respond or react to a new fire start near a community. Safety zones can be uncomfortable, unhealthy (smoke), and frightening until a fire has passed by. Residents may find themselves in a safety zone for several hours. Whenever possible, citizens should take refuge in an evacuation center as directed by law enforcement or firefighting officials. Should the need arise; the community has identified the following sites for evacuation or safety zones.

Evacuation Centers

Highway 410 Corridor	Highway 12 Corridor
Nile Community Church	Camp Dudley
Flying H Youth Ranch	Grace Brethren Camp
Naches School District	Camp Ghormley
Camp Fife	White Pass Lodge
	Naches School District

Safety Zones

Highway 410 Corridor	Highway 12 Corridor
Bumping Dam/Bumping Lakebed*	Rimrock Lakebed
Camp Fife	Tieton State Airstrip
Jim Sprick Park	
Tim Jefferson Ranch	
Paul Ebert Ranch (large animal/livestock)	

Table 5, Evacuation Centers & Safety Zones

Command Post Locations and Staging Area for Tactical Resources

Possible command post and staging areas are on federal, state, and private land. Contact with the land owner/manager should be made prior to use.

Command Post/Staging Areas

Highway 410 Corridor	Highway 12 Corridor
Chinook Pass Work Center	White Pass Work Center
Jim Sprick Park	Tieton State Airstrip & Peninsula Campground
Jefferson Helibase	Oak Creek Game Station
Naches School District	Naches School District

Table 6, Command Post/Staging Areas

Water Supplies

Water for firefighting is abundant within the CWPP boundary in comparison to many areas throughout the western United States, or even in eastern Washington. Major rivers, lakes, and streams are available as water sources for drafting and for aircraft. The DNR and Forest Service have inventoried and mapped water sources on lands under their administration. Fire Districts would benefit from development of drafting sites or standpipes in the WUI, as identified in Section 7 of this plan.

6. Current Activities

Protection Measures

Fire protection within the CWPP boundary is provided by Yakima County Fire District #14 (Nile) and Yakima County Fire District #3 (Naches). Depending on location within the planning area, response times average 10-30 minutes.

Primary responsibility for protection of the wildlands falls on the WDNR and the USFS. Response times within the planning area can be 90 minutes or more, depending on location and time of day.

Existing Procedures

Community members have already organized themselves for the purpose of producing this CWPP, and have identified the need to continue the work by hosting Firewise and FireFree workshops and by forming a Community Emergency Response Team. Many landowners have implemented projects that have reduced the fuel loads around individual homes. Grant funds have been applied for through the Washington Department of Natural Resources for larger fuels reduction projects and shaded fuel breaks. The communities have forged close ties to the County Fire Marshal, who presides as the chairwoman of the Local Coordinating Group. This group coordinates grant applications (particularly National Fire Plan Grants and Western States Grants) that can provide funding for fuels reduction, and prevention and education programs.

The USFS has implemented shaded fuel break projects around many recreation residences and private communities, and continues this work.



Project Proposals

Project proposals as indicated in Part 7 were developed with input from fire and fuels specialists from the WDNR and USFS. The Wenatchee National Forest Dry Site Strategy was used as guidance in selecting projects, with particular attention being paid to Fire Regimes 1 and 3.

Coordination with Forest Service Activities

The Naches Ranger District, Okanogan and Wenatchee National Forest maintain close relations with the local fire departments, the Yakima County Fire Protection Bureau (Fire Marshal's Office), Yakima Sheriff's Office, WDNR, WDF&W, and local citizens. Several employees of the Naches Ranger District were involved in preparing this plan, including the District Ranger, the District Fire Management Officer, Geographic Information Systems (GIS) Analysts, and the District Fire/Fuels Planner. While not present at the community meetings, review and input was also received from the District Silviculturist and Botanist/Ecologist.

Landowner Committees

The committee that formed to prepare this CWPP was originally formed at a Firewise presentation in the community of Cliffdell. Members of the CWPP have expressed a desire that, working through the Fire Marshal's Office and the WDNR, annual Firewise and

FireFree workshops be offered.

After meeting with the Yakima County Office of Emergency Management (DEM), members of the CWPP committee have also expressed interest in forming a Community Emergency Response Team (CERT). It was decided that forming CERT was not within the scope of duties of a committee tasked to prepare a CWPP, but that the plan would be one of the guiding documents of a CERT. Community members will follow-up with DEM to form and organize a CERT.

7. Mitigation Action Plan

Fuels Reduction (listed in order of priority)

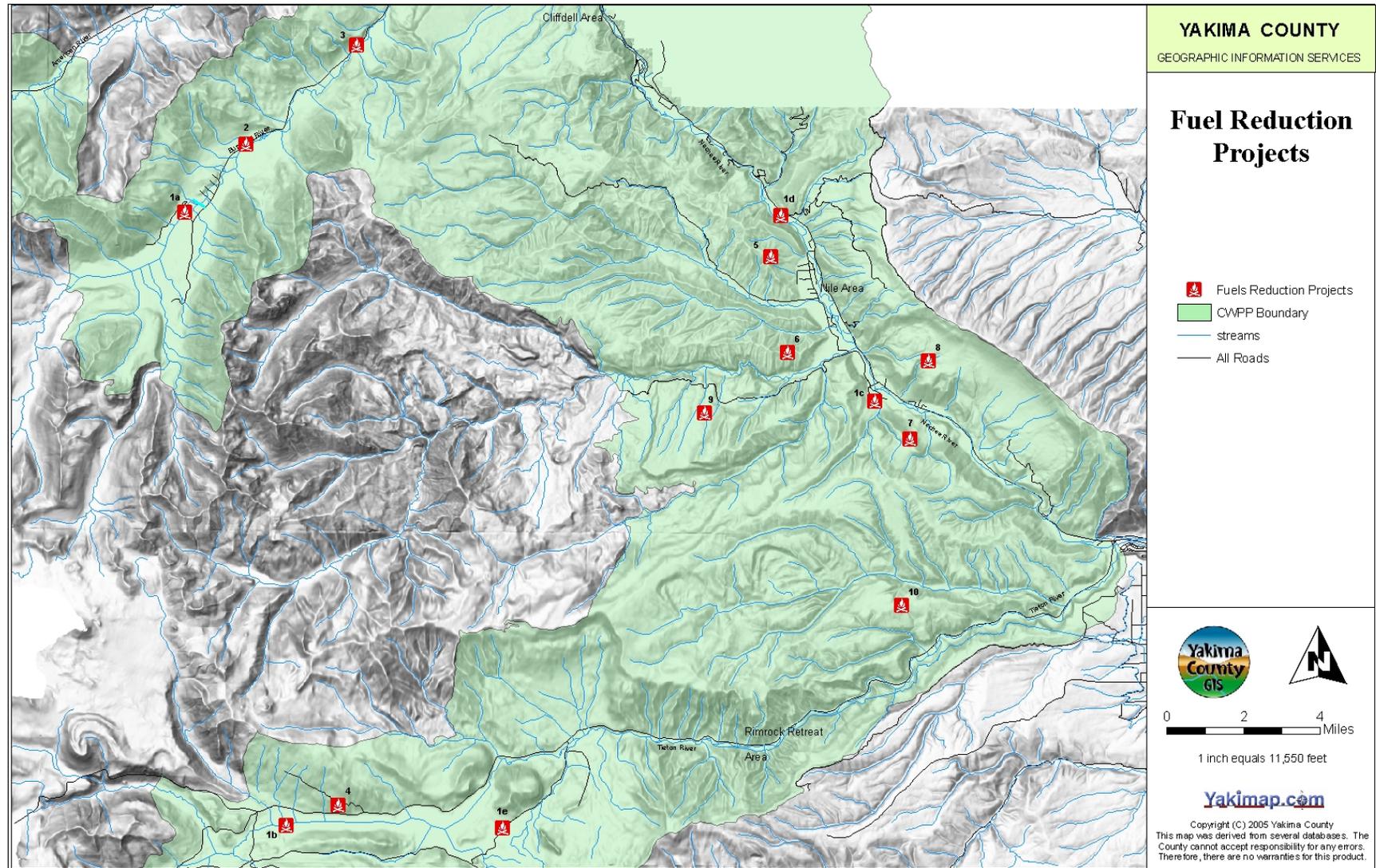
Project Number	Name of Project	Status	Landowner/Responsible Party	Funding Opportunities
1	Defensible Space Improve/establish safety zones	Intermittent	Homeowners Community, Yakima County, DNR, USFS	National Fire Plan (NFP) Grant, Western States Grant NFP, Western States
	<ul style="list-style-type: none"> a. Bumping Dam/lakebed b. Rimrock Lakebed c. Flying H Youth Ranch d. Jim Sprick Park e. Tieton State Airstrip 			
2	Goose Prairie	Completed on FS land.	FS	
3	Bumping River Road Escape Route	Approved for implementation in 2006 Will be implemented when Goose Prairie is complete. Proposed	DNR/Yakima County FS	NFP NFP/Western States
	Request/encourage state and private timber land owners to treat backlog slash, especially in the dry forest WUI		Private timber land owners, DNR, WDF&W, The Nature Conservancy (TNC)	
	<ul style="list-style-type: none"> • Rattlesnake • Little Rattlesnake • Rock Creek • Benton Creek 			

Project Number	Name of Project	Status	Landowner/Responsible Party	Funding Opportunities
	<ul style="list-style-type: none"> • Gold Creek • Bald Mountain • Oak Creek 			
	Encourage timber land owners/managers to treat fuels created by commercial logging and other activities	Proposed	Community	
	Encourage community to comment during scoping on proposed timber sales and request that slash treatment be included as part of all harvest and/or thinning projects	Proposed	Community	
4	Russell Ridge	Planning had nearly been completed for a shaded fuel break. Project is now being re-analyzed for a more aggressive treatment due to rapidly deteriorating stand conditions.	FS	
5	Nile Ridge	Proposed	Private/DNR	NFP, Western States
6	Dry Creek	Proposed	Private/DNR	NFP, Western States
7	Meloy Canyon to Rattlesnake	Proposed	Private/DNR	NFP, Western States
8	Sanford Pasture/Cleman Mountain/Bald	FS is planning a fuels reduction project	DNR	NFP

Project Number	Name of Project	Status	Landowner/Responsible Party	Funding Opportunities
9	Mountain Rattlesnake Creek	immediately adjacent FS is currently implementing fuels reduction projects immediately adjacent	WDF&W, DNR	NFP
10	Oak Creek		WDF&W TNC FS FS	NFP, Western States
	Expand personal use firewood collection available to reduce residues that are in excess of large woody debris requirements	Personal use firewood collection is not allowed in many areas with high fuel loadings	DNR	

*Table 7, Fuels Reduction Projects
Project Numbers are keyed to Map 7, below*

Proposed Projects



Map 7 – See Table 7, above, for key to project numbers

Education/Outreach (listed in order of priority)

Name of Project	Responsible Party	Funding Opportunities
Structural Risk Assessments	Fire districts, Yakima County Fire Marshal	Assistance to Firefighters Grant (AFG), NFP
Firewise	Community/Wildland Fire Agencies	NFP
FireFree	Community/Wildland Fire Agencies	NFP
Community Sign Plan	Homeowners, working with Nile and Naches FD's to set standards	AFG
Interagency relations – annual community meetings	Agencies and community	
Fire Safety Fever – Catch It With Cody	Yakima County Fire Marshal	NFP

Table 8, Education/Outreach Projects

Improve Prevention/Suppression Capabilities in the Wildland/Urban Interface

Name of Project	Responsible Party	Funding Opportunities
Form a Community Emergency Response Team (CERT)	Community members with assistance from Yakima County Department of Emergency Management	
Recruit and Train Volunteer Firefighters	Naches/Nile FD's	Assistance to Firefighters Grant (AFG)
Advanced Wildland Firefighting Courses	Naches/Nile FD's	AFG
Structural Risk Assessments	Homeowners, Naches and Nile FD's	AFG
Improve communications	Naches/Nile FD's Community	AFG, partnerships with government agencies for use of existing facilities
<ul style="list-style-type: none"> • Install cellular phone towers • Systematic warning system • Alert warning system • Tree phones 		
Community Sign Plan/Address Coordination/Signing Evacuation Plan	Homeowners, Naches and Nile FD's Naches/Nile FD's, YSO, Community	AFG
Identify Evacuation Centers, develop notification plan	Naches/Nile FD's, YSO, Affected facility managers	
Identify Evacuation Zones tied to evacuation plan		
Establish/improve water drafting sites and stand pipes	Naches/Nile FD's	AFG
Consider if development of a fire district or extending Fire District 3 and/or 14 to include recreation residences is feasible	Naches/Nile FD's, County Commissioners, local recreation residence owners	AFG
Upgrade rural fire department equipment and vehicles	Naches/Nile FD's and Fire Commissioners	AFG
Standardize equipment/apparatus to interagency criterion	Naches/Nile FD's	AFG, Federal Excess Property
Request/encourage state and	Community, Naches/Nile	AFG

Name of Project	Responsible Party	Funding Opportunities
private land owners to clearly number and post roads for emergency response	FD's	
Encourage public land agencies to minimize road closures allow fire fighting access	Community	
Establish community volunteer firewatch and lookouts	Naches/Nile FD's	
International Urban Wildland Urban Interface Code enforcement	Community Yakima County Fire Marshal	

Table 9, Improve Prevention/Suppression Capabilities in the WUI Projects

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Appendix 1

Letter of Designation

We, the District Fire Commissioners of Yakima County Fire District #14 (Nile/Cliffdell) designate Commissioner Andy Simkus as our representative to the Highways 410 and 12 Community Wildfire Protection Plan, hereafter referred to as the CWPP. Mr. Simkus is designated authority to review the CWPP and sign the CWPP on behalf of Yakima County Fire District #14, indicating approval and adoption.

name
Commissioner, Yakima County Fire Protection
District #14

name
Commissioner, Yakima County Fire Protection
District #14

name
Commissioner, Yakima County Fire Protection
District #14

name
Commissioner, Yakima County Fire Protection
District #14

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Appendix 2

Letter of Designation

We, the District Fire Commissioners of Yakima County Fire District #3 (Naches) designate Chief Dan Mansfield as our representative to the Highways 410 and 12 Community Wildfire Protection Plan, hereafter referred to as the CWPP. Mr. Mansfield is designated authority to review the CWPP and sign the CWPP on behalf of Yakima County Fire District #3, indicating approval and adoption.

name
Commissioner, Yakima County Fire Protection
District #3

name
Commissioner, Yakima County Fire Protection
District #3

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Commissioner, Yakima County Fire Protection
District #3

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Commissioner, Yakima County Fire Protection
District #3

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Appendix 3

Glossary of Terms

"A"

Aerial Fuels:

All live and dead vegetation in the forest canopy or above [surface fuels](#), including tree branches, twigs and cones, [snags](#), moss, and high [brush](#).

Aerial Ignition:

Ignition of [fuels](#) by dropping incendiary devices or materials from aircraft.

Aerial Reconnaissance:

Use of aircraft for detecting and observing fire behavior, values at risk, suppression activity, and other critical factors to assist command decisions on strategy and tactics needed for fire suppression. Often called aerial recon or just recon.

Agency:

Any federal, state, or county government organization with jurisdictional responsibilities.

Air Attack:

The deployment of fixed-wing or rotary aircraft on a wildland fire to drop retardant or suppressant, shuttle and deploy crews and supplies, or perform aerial reconnaissance of the overall fire situation. Can also refer to the person functioning as air attack officer and directing aerial operations.

Airtanker:

A fixed-wing aircraft equipped to drop fire [retardant](#) or [suppressant](#).

Anchor Point:

An advantageous location, usually a barrier to fire spread, from which to start building a [fireline](#). An anchor point is used to reduce the chance of firefighters' being flanked by fire.

Aramid:

The generic name for a high-strength, flame-resistant synthetic fabric used in firefighters' protective clothing. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Aspect:

Direction toward which a slope faces.

"B"

Backfire:

A fire set along the inner edge of a fireline to consume the [fuels](#) in the path of a wildfire and/or to change the direction of force of the fire's convection column.

Backpack Bucket:

A portable sprayer with a hand pump, fed from a liquid-filled container fitted with straps and worn like a backpack, used mainly in fire and pest control. (See also [Bladder Bag](#))

Bambi Bucket:

A collapsible bucket slung beneath a helicopter. Used to dip water or retardant from a variety of sources for fire [suppression](#).

Behave:

A system of interactive computer programs for modeling [fuels](#) and [fire behavior](#) that includes two systems: BURN and FUEL.

Bladder Bag:

A collapsible backpack portable sprayer made of neoprene or high-strength nylon fabric fitted with a pump. (See also Backpack Pump)

Blow-up:

A sudden increase in [fire intensity](#) or [rate of spread](#) strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a [fire storm](#). (See [Flare-up](#).)

Brush:

A collective term that refers to stands of vegetation dominated by shrubby, woody plants or low-growing trees, usually of a [type](#) undesirable for livestock or timber management.

Brush Fire:

A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Bucket Drops:

The dropping of fire [retardant](#) or [suppressant](#) from a specially designed bucket slung beneath a helicopter.

Buffer Zones:

An area of reduced vegetation that separates wildland areas from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is often used for another purpose such as agriculture or recreation, or parks or golf courses.

Bump-up Method:

A progressive method of building a [fireline](#) on a wildfire without changing firefighters' relative positions in the line. Work is begun with a suitable space between firefighters. Whenever one overtakes another, all crew members ahead move one space forward and resume work on the uncompleted part of the line. The last in line does not move ahead until completing his or her section of line.

Burn Out:

Setting fire inside a [control line](#) to widen it or to consume [fuels](#) between the edge of the fire and the [control line](#).

Burn Plan:

This document provides the prescribed fire burn boss the information needed to implement an individual prescribed fire project. Also called prescribed fire plan.

Burning Ban:

A declared ban on open-air burning within a specified area, usually put into place by the agency in charge of managing that area and usually in cases of sustained high fire danger.

Burning Conditions:

The state of the combined factors of the environment that affect [fire behavior](#) in a specified fuel type.

Burning Index:

An estimate of the potential difficulty of fire containment as it relates to the [flame length](#) at the most rapidly spreading portion of a fire's perimeter.

Burning Period:

That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

"C"**Campfire:**

As used to classify the cause of a [wildland fire](#), a small fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control [agency](#).

Candle:

A single tree or a small clump of trees that is candling, or burning from the bottom up.

Chain:

A unit of linear measurement equal to 66 feet, often used in describing the length of fireline built or yet to be built.

Closure:

Legal restriction on -- but not necessarily elimination of -- specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front:

The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 mph or more often continue for 12 to 24 hours.

Cold Trailing:

A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hands for heat to detect any fire, digging out every live spot, and trenching any live edge.

Command Staff:

The command staff consists of the information officer, safety officer, and liaison officer. They report directly to the incident commander (IC) and may also have assistant staff.

Complex:

Two or more individual [incidents](#) located in the same general area which are assigned to a single incident commander or unified command.

Condition Class 1:

Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within the historical range.

Condition Class 2:

Fire regimes have been moderately altered from their historical range. The risk of losing key

ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.

Condition Class 3:

Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

Contain a Fire:

A fuel break around the fire has been completed. This break may include natural barriers such as a river or road, and/or fireline built by hand, and/or fireline constructed mechanically.

Control a Fire:

The complete extinguishment of a fire, including [spot fires](#). Fireline has been strengthened so that [flare-ups](#) from within the perimeter of the fire will not break through the line.

Control Line:

All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency:

An agency supplying assistance other than direct [suppression](#), rescue, support, or service functions to the [incident](#) control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coyote Tactics:

A progressive line construction duty using self-sufficient crews who build [fireline](#) until the end of the [operational period](#), stay or camp there while off duty, then begin building line again the next operational period where they left off.

Creeping Fire:

Fire burning with a low flame and spreading slowly.

Crew Boss:

A person in supervisory charge of a crew -- usually 16 to 21 firefighters -- and responsible for their performance, safety, and welfare.

Crown Fire:

The movement of fire through the crowns or tops of trees or shrubs more or less independently of the surface fire. A fire is said to be crowning when the flames get up into the tops of trees and spreads.

Curing:

Drying and browning of herbaceous vegetation or [slash](#).

"D"

Dead Fuels:

Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture ([relative humidity](#) and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning:

A fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space:

An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and resources or lives at risk. In practice, defensible space is generally defined as an area of 30 feet or more around a structure that is cleared of flammable brush or vegetation or other fuels.

Deployment:

Removing a fire shelter from its case and using it as protection against fire.

Detection:

The act or system of discovering and locating fires, for example, by staff or volunteers in lookout towers.

Direct Attack:

Any treatment of burning fuels, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning fuels from unburned fuels.

Dispatch:

The implementation of a command decision to move a resource or resources -- such as crews or dozers or engines or aircraft -- from one place to another.

Dispatch Center:

A facility from which resources are directly assigned to an [incident](#).

Dispatcher:

A staff person who receives reports of discovery and status of fires, confirms their locations, receives orders for resources and takes action to provide people and equipment needed for control, and sends them to the designated locations.

Division:

Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of [resources](#) exceeds the span-of-control of the operations chief. A division is located with the [Incident Command System](#) organization between the branch and the task force or [strike team](#).

Dozer:

Any tracked vehicle with a front-mounted blade used for exposing [mineral soil](#) or constructing fireline or safety zones.

Dozer Line:

Fireline constructed by a dozer.

Drip Torch:

A hand-held device for igniting fires by dripping flaming liquid fuel onto the materials or area to be burned; consists of a fuel fount, burner arm, and igniter. The fuel used is generally a mixture of diesel and gasoline.

Drop Zone:

Target area for [airtankers](#), helicopters, and cargo dropping.

Drought Index:

A number representing the net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep [duff](#) or upper soil layers.

Dry Lightning Storm:

Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff:

The layer of decomposing organic materials lying below the [litter](#) layer of freshly fallen twigs, needles, and leaves and immediately above the [mineral soil](#).

"E"**Energy Release Component (ERC):**

The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine:

A ground vehicle providing specified levels of pumping, water, and hose capacity.

Engine Crew:

Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Entrapment:

A situation where personnel are unexpectedly caught in a [fire behavior](#)-related, life-threatening situation where planned escape routes or [safety zones](#) are absent, inadequate, or compromised. An entrapment may or may not include [deployment](#) of a [fire shelter](#). These situations may or may not result in injury; they include "near misses."

Environmental Assessment (EA):

EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are analytical documents prepared with public participation to determine whether an Environmental Impact Statement (EIS) is needed for a project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS):

EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision-makers by providing information, analysis, and an array of action alternatives, allowing managers to see the probable effects of management decisions on the environment. Generally, an EIS is written for a large-scale action or geographical area.

Equilibrium Moisture Content:

Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a [fuel](#) particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route:

A pre-planned and understood route firefighters can take to move to a [safety zone](#) or other low-risk area, such as an already burned area (commonly called "the black"), a previously constructed safety area, a meadow that won't burn, or a natural rocky area that is large enough to provide refuge without being burned.

Extended Attack Incident:

A fire which has exceeded or is expected to exceed [initial attack](#) capabilities or [prescription](#).

Extreme Fire Behavior:

"Extreme" implies a level of [fire behavior](#) characteristics that ordinarily precludes methods of direct control action. One or more of the following are usually involved: high [rate of spread](#), prolific [crowning](#) and/or [spotting](#), presence of [fire whirls](#), a strong convection column. Predictability is difficult because such fires often exercise influence on their environment and behave erratically, sometimes dangerously.

"F"**Faller:**

A person who cuts down or fells trees. Also called a sawyer or cutter.

Field Observer:

Person responsible to the Situation Unit Leader for collecting and reporting information about an incident obtained from personal observations and interviews.

Fine Fuels:

Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a [timelag](#) of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

Fingers of a Fire:

The long narrow extensions of a fire projecting from the main body.

Fire Behavior:

The manner in which a fire reacts to the influences of fuels, weather, and topography.

Fire Behavior Forecast:

A prediction of probable fire behavior, usually prepared by a Fire Behavior Analyst, in support of fire [suppression](#) or prescribed burning operations.

Fire Behavior Specialist:

A person responsible to the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuels, weather, and topography. Also called Fire Behavior Analyst.

Fire Break:

A natural or constructed barrier used to stop or check fires, or to provide a [control line](#) from which to work.

Fire Cache:

A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew:

An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Front:

The part of a wildland fire in which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the [fire perimeter](#). In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity:

A general term relating to the heat energy released by a fire.

Fireline:

A linear fire barrier that is scraped or dug to [mineral soil](#) after being cleared of all vegetation.

Fire Load:

The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire Management Plan (FMP):

A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Perimeter:

The entire outer edge or boundary of a fire, which may contain within it substantial areas of unburned fuels.

Fire Season:

1) Period(s) of the year during which [wildland fires](#) are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities are regulated by state or local authority.

Fire Shelter:

An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire [entrapment](#) situation.

Fire Shelter Deployment:

Removing a fire shelter from its case and using it as protection against fire.

Fire Storm:

Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire Triangle:

Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Use Module:

A team of skilled and mobile personnel dedicated primarily to [prescribed fire](#) management. These are national and interagency [resources](#), available throughout the prescribed fire season, trained to ignite, hold, and monitor prescribed fires.

Fire Weather:

Weather conditions that influence fire ignition, fire behavior, and [suppression](#).

Fire Weather Watch:

A term used by [fire weather](#) forecasters to notify firefighters and agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into a dangerous fire weather situation.

Fire Whirl:

A spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft

smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls can equal the intensity of a small tornado.

Firefighting Resources:

All people and major items of equipment that are or could be assigned to fires, ranging from crews and other personnel to engines to aircraft to dozers to water tenders and including a large variety of support personnel and services.

Flame Height:

The average maximum vertical extension of flames at the leading edge of the [fire front](#) . Occasional flashes that rise above the general level of flames are not considered. The flame height is less than the [flame length](#) if flames are tilted by winds or slope.

Flame Length:

The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); flame length is an indicator of [fire intensity](#) .

Flaming Front:

The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone, combustion is primarily glowing. [Light fuels](#) typically have a shallow flaming front, and [heavy fuels](#) have a deeper front. Also called [fire front](#).

Flanks of a Fire:

The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flare-up:

Any sudden acceleration of fire spread or intensification of a fire. Unlike a [blow-up](#), a flare-up lasts a relatively short time and does not radically change control plans.

Flash Fuels:

Fuels such as grass, leaves, pine needles, ferns, tree moss, and some types of [slash](#), flash fuels or flashy fuels ignite readily and are consumed rapidly when dry. Also called [fine fuels](#).

Forb:

A plant with a soft rather than permanent woody stem, that is not a grass or grass-like plant.

Fuel:

Combustible material. Includes vegetation such as grass, leaves, ground [litter](#), plants, shrubs, and trees that feed a fire. (Also see [Surface Fuels](#).)

Fuel Bed:

In a research setting, an array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also commonly used to describe the fuels composition in natural settings.

Fuel Loading:

The amount of fuels present expressed quantitatively in terms of weight per unit area.

Fuel Model:

Simulated fuel complex (or combination of vegetation [types](#)) for which all fuel descriptors required for the solution of a mathematical [rate of spread](#) model have been specified.

Fuel Moisture:

The quantity of moisture in fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit. Also referred to as fuel moisture content.

Fuels Reduction:

Manipulation, including combustion or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control. Often includes thinning and/or prescribed burning.

Fuel Type:

An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fusee:

A colored flare originally designed as a railway warning device and widely used to ignite suppression and prescription fires.

"G"**General Staff:**

The group of [incident](#) management personnel reporting to the incident commander. They may each have a deputy or assistant, as needed. Staff includes operations section chief, planning section chief, logistics section chief, and finance/administration section chief.

Geographic Area:

A political boundary designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization of fire management resources. Each geographic area includes a [Geographic Area Coordination Center](#) (GACC) that handles fire intelligence, information, ordering, and dispatch.

Ground Fuels:

All combustible materials below the surface litter, including duff, tree or shrub roots, punky wood, peat, sawdust, and other materials that can support a glowing combustion without flame.

"H"**Haines Index:**

An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line:

A fireline built with hand tools, such as shovels and pulaskis.

Hazard Reduction:

Any treatment of a hazard that reduces the threat of ignition and [fire intensity](#) or [rate of spread](#).

Head of a Fire:

The portion of the fire having the fastest rate of spread.

Heavy Fuels:

Fuels of large diameter such as [snags](#), logs, and large limb wood, that ignite and are consumed more slowly than [flashy fuels](#).

Helibase:

The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot:

A temporary landing spot for helicopters.

Helitack:

The use of helicopters to transport crews, equipment, and fire [retardant](#) or [suppressant](#) to the fireline during the initial stages of a fire. Helitack can also refer to personnel, as in helitack crews.

Helitack Crew:

A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions:

Planned actions required to achieve wildland [prescribed fire](#) management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources:

Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive [mop-up](#).

Hose Lay:

Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew:

A highly trained and experienced [fire crew](#) used mainly to build fireline by hand. Hotshots -- also called Interagency Hotshot Crews or IHCs -- are national resources, also called Type 1 crews.

Hotspot:

A particular active part of a fire.

Hotspotting:

Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

"I"

Incident:

A human-caused or natural occurrence, such as a [wildland fire](#) or tornado or hurricane or major flood, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP):

The plan that contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next [operational period](#) on an incident. The plan may be oral or written. When written, the plan may have a number of attachments, including incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, fire weather, and incident maps.

Incident Command Post (ICP):

Location at which primary command functions are executed. The ICP is often co-located with the incident base or other incident facilities.

Incident Command System (ICS):

The combination of facilities, equipment, personnel, procedures, and communications operating

within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives on an incident.

Incident Commander:

The individual responsible for the management of all operations at the incident site. The IC is usually in charge of an incident management team, which may be national (Type 1) or regional or local (Type 2 or 3) and which includes a wide variety of resources and personnel.

Incident Management Team:

The incident commander and appropriate general staff or [command staff](#) personnel assigned to manage an incident. Teams vary in size and experience and are assigned based on availability of the teams and complexity of the incident.

Incident Objectives:

Statements of guidance and direction necessary for selection of appropriate [strategy](#) or strategies, and the tactical direction of assigned resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Infrared Detection:

The use of heat sensing equipment, known as Infrared Scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack:

The actions taken by the first resources upon arrival at a wildfire to protect lives and property and prevent further expansion of the fire.

"J"

Job Hazard Analysis:

This analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions, and the required safety equipment to ensure public and employee safety.

Jump Spot:

Selected landing area for [smokejumpers](#).

Jump Suit:

Approved protection suit worn by smokejumpers.

"K"

Keetch-Byram Drought Index (KBDI):

Commonly used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought). [Updated maps](#) are online.

Knock Down:

To reduce the flame or heat on the more vigorously burning parts of a fire edge.

"L"

Ladder Fuels:

Fuels which provide vertical continuity between strata, thereby allowing fire to carry from [surface](#)

[fuels](#) into the crowns of trees or shrubs with relative ease. They help start and continue [crowning](#) on a fire.

Large Fire:

1) For statistical purposes, a fire burning more than a specified area of land; e.g., 100 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Lay Down:

A fire is said to "lay down," often at night, when temperatures drop and RH rises. Fires do not "lie down." It's a long-standing term in fire and means that the fire is burning less actively than it did during the day.

Lead Plane:

Aircraft used to make dry runs over a target area to check wind and smoke conditions and topography and to lead [airtankers](#) to targets and supervise their drops. Lead planes are mandatory with [MAFFS](#) operations.

Light Fuels:

Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a [timelag](#) of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL):

A number, on a scale of 1 to 6, that reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Line Scout:

A firefighter who determines the location or placement or route of a fireline to be built.

Litter:

Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer. It's composed of loose debris including sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels:

Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms rather than by external weather influences.

"M"

Micro-Remote Environmental Monitoring System (Micro-REMS):

Mobile weather monitoring station. A Micro-REMS usually accompanies an incident meteorologist and Air Transportable Modular Unit (ATMU) to an incident. The ATMU is a weather data collection and forecasting unit consisting of four modules, weighing a total of 282 pounds and occupying 27.1 cubic feet of space when transported. Used by incident meteorologists on an incident.

Mineral Soil:

Soil layers below the predominantly organic layers; soil with little combustible material.

Mobilization:

The process and procedures used by all organizations -- federal, state, and local -- for activating, assembling, and transporting all resources requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS):

A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified military C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop up:

To make a fire safe or reduce residual smoke after the fire has been contained, by extinguishing or removing burning material along or near the [control line](#), felling [snags](#), or moving logs and large rocks so they won't roll downhill. Mop-up work is usually (but not always) handled by hand crews.

Multi-Agency Coordination (MAC):

A generalized term describing the functions and activities of representatives of involved agencies and/or jurisdictions who make decisions regarding the prioritization of incidents and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement:

Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request by furnishing personnel and equipment.

"N"**National Environmental Policy Act (NEPA):**

NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes [Environmental Impact Statements](#) and [Environmental Assessments](#) to be used as analytical tools to help federal managers make land management decisions.

National Fire Danger Rating System (NFDRS):

A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildlife Coordinating Group (NWCG):

A group formed under the direction of the Secretaries of Agriculture and the Interior that includes representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and National Association of State Foresters. The group's purpose is to handle coordination and effectiveness of wildland fire activities and provide a forum to discuss and resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex®:

Trade name for a fire-resistant synthetic material used in the manufacturing of flight suits and protective clothing worn by firefighters. (see [Aramid](#))

Normal Fire Season:

1) A season during which the weather, fire danger, and number and distribution of fires are about average. 2) Period of the year that normally comprises the fire season.

"O"**Operational Period:**

The period of time scheduled for execution of a given set of tactical actions as specified in the [Incident Action Plan](#). Operational periods can be of various lengths, although usually are not more than 24 hours.

Operations Branch Director:

Person under the direction of the operations section chief who is responsible for implementing that portion of the [incident action plan](#) appropriate to the branch.

Overhead:

People assigned to supervisory positions, including incident commanders, command staff, general staff,, directors, supervisors, and unit leaders.

"P"**Pack Test:**

The pack test gauges the aerobic capacity of fire suppression and support personnel and assigns physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections. Various levels of the test apply to various levels of firefighting duties or jobs.

Paracargo:

Anything intentionally dropped, or intended for dropping, from an aircraft by parachute, by other retarding devices, or by free-fall. Often includes firefighting supplies and tools for firefighters in remote areas.

Peak Fire Season:

That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to cause damage at an unacceptable level.

Personal Protective Equipment (PPE):

All firefighting personnel must be equipped with protective equipment and clothing in order to mitigate the risk of injury from or exposure to hazardous conditions encountered while working. PPE includes, but is not limited to, 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves, and individual first aid kits.

Preparedness:

Condition or degree of being ready to cope with a potential fire situation. Preparedness Levels are determined by region and nationally as the season progresses, based on current and expected conditions.

Prescribed Fire:

Any fire ignited by management actions under certain pre-determined conditions to meet specific objectives related to hazardous fuels reduction or habitat improvement. A written, approved [prescribed fire plan](#) must exist, and [NEPA](#) requirements must be met prior to ignition. Prescribed fires are ignited and managed within a "window" (see "Prescription" below) of very specific conditions including winds, temperatures, humidity, and other factors specified in the burn plan.

Prescribed Fire Module:

A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, trained to ignite, hold, and monitor prescribed fires.

Prescribed Fire Plan:

This document provides the prescribed fire burn boss the information needed to implement an individual prescribed fire project. Also called burn plan.

Prescription:

Measurable criteria that define conditions under which a prescribed fire may be ignited, which also

guide selection of appropriate management responses and indicate other required actions. Prescription criteria may include safety, economic factors, air quality, public health, and other environmental, geographic, administrative, social, or legal considerations.

Prevention:

Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuels hazards.

Project Fire:

A fire of such size or complexity that a large incident management organization and prolonged activity are required to suppress it.

Pulaski:

A combination chopping and trenching tool that combines a single-bitted ax blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

"R"**Radiant Burn:**

A burn injury incurred from a radiant heat source.

Radiant Heat Flux:

The amount of heat flowing through a given area in a given time, usually expressed as calories per square centimeter per second.

Rappelling:

Technique of landing specially trained firefighters from hovering helicopters; involves sliding down ropes with the aid of hand-held friction-producing devices called "Genies." Rappellers are often deployed into remote areas where access is difficult (e.g. without roads or helicopter landing spots) or too remote to allow effective deployment of firefighters without extended hiking time.

Rate of Spread:

The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the [fire front](#), or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in [chains](#) or acres per hour for a specific period in the fire's history.

Reburn:

The burning of an area that has previously burned but that contains flammable fuels that ignite when burning conditions are more conducive to ignition. Can also refer to an area that has returned.

Red Card:

Fire qualifications card issued to fire-rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions on a fire or other incident.

Red Flag Warning:

Alert issued by fire weather forecasters to warn personnel about an ongoing or imminent critical [fire weather](#) situation.

Rehabilitation:

Commonly referred to as "rehab," the work necessary to repair damage or disturbance caused by wildland fire or suppression activities. Often includes restoration of firelines or dozer work, and

projects such as erosion control, installation of water bars or culverts, re-seeding or other rehab of fire-damaged areas.

Relative Humidity (RH):

The ratio of the amount of moisture in the air to the maximum amount of moisture that the air would contain if it were saturated -- the ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automated Weather Station (RAWS):

There are nearly 1,500 interagency [Remote Automated Weather Stations](#) (RAWS) strategically located throughout the United States. Weather data assists land management agencies with monitoring air quality, rating fire danger, and providing information for research applications. Most of the stations owned by the wildland fire agencies are located where they can monitor fire danger. RAWS units collect, store, and forward data to a computer system at the National Interagency Fire Center ([NIFC](#)) in Boise, Idaho, via the Geostationary Operational Environmental Satellite ([GOES](#)). The GOES is operated by the National Oceanic and Atmospheric Administration ([NOAA](#)). These data are automatically forwarded to other computer systems including the Weather Information Management System (WIMS) and the Western Regional Climate Center in Reno, Nevada (www.wrcc.dri.edu). Other Automated Weather Stations (AWS) transmit data to the WIMS system via telephone telemetry. Fire managers use RAWS data to predict fire behavior and monitor fuels; resource managers also use data to monitor environmental conditions.

Resource Management Plan (RMP):

A document prepared by field office staff with public participation and then approved by field office managers, providing direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order:

An order placed with dispatch for firefighting or support resources, often initiated by the incident management team on a fire.

Resources:

1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to fires or other incidents. 2) The natural resources of an area, such as timber, wildlife habitat, grasslands, watershed values, and recreational and other values.

Retardant:

A substance or chemical agent which reduces the flammability of combustibles. Retardant application is generally via fixed-wing airtankers or helicopters, and is used to slow or retard the flames, often for pre-treatment of fuels prior to ground attack or other suppression activities or for slowing the spread or potential for spread of the fire.

Run of a Fire:

The rapid advance of the [head of a fire](#) with a marked change in fireline intensity and [rate of spread](#) from that noted before and after the advance. A fire "makes a run" if such conditions are present.

Running:

A fire event including rapidly spreading surface fire with a well-defined head.

"S"

Safety Zone:

An area cleared of flammable materials used for escape in the event the line is outflanked or in case a [spot fire](#) causes [fuels](#) outside the [control line](#) to render the line unsafe. In firing operations, crews maintain a safety zone close at hand. Safety zones may also be constructed as integral

parts of fuel breaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of a blow-up in the vicinity.

Scratch Line:

An unfinished preliminary fireline hastily established or built as an emergency measure to slow or halt the spread of fire.

Severity Funding:

Funds provided to increase suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource:

An individual, a piece of equipment (such as an engine) and its staff, or a crew or team of persons with an identified work supervisor.

Size Up:

To evaluate a fire to determine a course of action for suppression.

Slash:

Debris left after logging, pruning, thinning, or brush cutting; can include logs, chips, bark, branches, stumps and broken understory trees or brush.

Sling Load:

Cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over:

A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smoke Management:

Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smokejumper:

A firefighter who travels to fires by aircraft and parachutes in to the fire area.

Smoldering Fire:

A fire burning without flame and barely spreading.

Snag:

A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester:

A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Spot Fire:

A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast:

A special forecast issued to fit the time, topography, and weather of a specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than regular zone forecasts.

Spotter:

In smokejumping, the person responsible for selecting drop targets and supervising all aspects of dropping smokejumpers.

Spotting:

Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area:

Locations set up at an incident where resources can be placed while awaiting a tactical assignment on an available basis. Staging areas are managed by the operations section.

Strategy:

The science and art of command as applied to the overall planning and conduct of an incident.

Strike Team:

Specified combinations of the same kind and type of resources -- such as a group of staffed engines -- with common communications and a leader.

Strike Team Leader:

Person responsible to a division or group supervisor for performing tactical assignments given to the strike team.

Structure Fire:

Fire burning any part or all of any building or structure.

Suppressant:

An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when directly applied to burning fuels.

Suppression:

All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels:

Loose litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Swamper:

(1) A worker who helps [fallers](#) and/or sawyers by clearing away brush, limbs, and small trees. Carries chainsaw gas, oil, and tools and watches for dangerous situations. (2) A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

"T"**Tactics:**

Deploying and directing resources on an incident to accomplish the objectives designated by [strategy](#).

Temporary Flight Restrictions (TFR):

A restriction requested by an agency and put into effect by the Federal Aviation Administration (FAA) in the vicinity of an incident restricting the operation of nonessential aircraft in the airspace around that incident.

TerraTorch®:

A device for throwing a stream of flaming liquid, used to initiate rapid ignition during [burn out](#) operations on a wildland fire or during a prescribed fire project.

Test Fire:

A small fire ignited within the planned burn unit to determine the characteristics of the prescribed fire, such as fire behavior, detection, performance, and control measures.

Timelag:

Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its [equilibrium moisture content](#). If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching:

The ignition and [flare-up](#) of a tree or small group of trees, usually from bottom to top.

Two-way Radio:

Radio equipment with transmitters on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type:

The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability in power, size, or capacity. Can refer to type of engine or type of crew or type of team.

"U"**Uncontrolled Fire:**

Any fire which threatens life, property, or natural resources.

Underburn:

A fire that consumes [surface fuels](#) but not trees or shrubs.

"V"**Vectors:**

Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Volunteer Fire Department (VFD):

A fire department of which some or all members are unpaid.

"W"**Water Tender:**

A ground vehicle capable of transporting water in the field, generally used to supply engines.

Weather Information and Management System (WIMS):

An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line:

A line of water, or water and retardant, sprayed along the ground, which serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildland Fire:

Any non-structure fire, other than prescribed fire, that occurs in a wildland area.

Wildland Fire Implementation Plan (WFIP):

A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire that is managed for resource benefits.

Wildland Fire Situation Analysis (WFSA):

A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions. A [WFSA](#) is required when the documentation of suppression decisions needs to occur when (1) a wildland fire escapes initial actions or is expected to, or (2) a wildland fire managed for resource benefits exceeds prescription parameters in the fire management plan, or (3) a prescribed fire exceeds its prescription and is then declared a wildland fire.

Wildland Fire Use:

The management of naturally ignited (usually by lightning) wildland fires to accomplish specific pre-stated resource management objectives in predefined areas outlined in [Fire Management Plans](#).

Wildland/Urban Interface:

The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Often incorrectly referred to as the "interzone" or "urban/wildland interface."

Wind Vectors:

Wind directions used to calculate fire behavior.

Appendix 4

Glossary of Acronyms, Abbreviations, Symbols

AFG:

Assistance to Firefighter's Grant

CC:

Condition Class

CERT:

Community Emergency Response Team

CG:

Campground

CH₄:

Methane

CO:

Carbon Monoxide

CWPP:

Community Wildfire Protection Plan

DEM:

Department of Emergency Management (Yakima County)

DNR:

Department of Natural Resources (Washington State)

FD:

Fire Department

FR:

Fire Regime

FRCC:

Fire Regime Condition Class

FS:

Forest Service

GIS:

Geographic Information System or Geographic Information Services

NEPA:

National Environmental Policy Act

NF:

National Forest

NFP:

National Fire Plan

NWCG:

National Wildfire Coordinating Group

PM_{2.5}

Particulate Matter less than 2.5 microns in diameter

PM₁₀

Particulate Matter less than 10 microns in diameter

RAWS:

Remote Automated Weather Station

RD:

Ranger District

SEPA:

State Environmental Policy Act

TNC:

The Nature Conservancy

USFS:

United States Forest Service

USDA:

United States Department of Agriculture

WDF&W:

Washington Department of Fish and Wildlife

WDNR:

Washington Department of Natural Resources

WUI:

Wildland/Urban Interface

YCFPB:

Yakima County Fire Protection Bureau (County Fire Marshal's Office)

YSO:

Yakima County Sheriff's Office

APPENDIX B
COMMUNITY WILDFIRE PROTECTION PLAN
SURVEY CONTACT LIST

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APPENDIX C**COMMUNITY WILDFIRE PROTECTION PLAN (CWPP) SURVEY**

Name:

Contact Number:

Jurisdiction:

1. What is the extent of your wildfire protection plan (community, county-wide, multi-county, etc.)?
2. What amount of land area is encompassed in your CWPP?
3. What is the population included in your CWPP area?
4. What types of structures are located in the CWPP area?
5. What governmental agencies participated in the development of your CWPP?
6. Who facilitated the development of your CWPP?
7. How long did it take to complete your CWPP?
8. Who authored your CWPP?

APPENDIX D
COMMUNITY WILDFIRE PROTECTION PLAN
SURVEY RESULTS

1. What is the extent of your wildfire protection plan (community, county-wide, multi-county, etc.)?

County-wide (2)
Multi-county
City
Fire protection districts
Community (3)

2. What amount of land area is encompassed in your CWPP?

28,800 acres
350,000 acres (3 plans)
500,000 acres
1,040,000 acres
560 square miles
3850 square miles

3. What is the population included in your CWPP area?

12,000
35,360
76,000
100,000
180,000
Chelan County (by fire district)

4. What types of structures are located in the CWPP area?

Residential (7)
Commercial (7)
Industrial
Historical sites (2)
Churches
Schools
Hotels (4)
Zoo
Warehouses (3)

5. What governmental agencies participated in the development of your CWPP?

US Forest Service (7)
US Bureau of Land Management (7)
National Parks Service
US Air Force Academy

National Marine Service
 National Fire Protection Association
 State Forestry Agency (3)
 State Environmental Quality Agency
 State Fish and Wildlife Agency
 State University Extension Service
 Fire District or Department (4)
 Local Office of Emergency Management (2)
 Conservation District
 County Forestry Department
 County Planning Department
 County Building Department
 County Public Works Department
 County Sheriff's Office
 County GIS Department
 County Government (2)
 County Fire Safe Council
 City Government (2)
 State Government
 Federal Government
 Public Utilities
 Landowner Partnership (2)
 Watershed Council (2)
 Social Service Agencies

6. Who facilitated the development of your CWPP?

State University Contractor
 Non-profit Community Organization
 Fire Department
 Fire Management Contractor
 Fire Safe Council Coordinator
 County Conservation District

7. How long did it take to complete your CWPP?

3 – 4 months
 9 - 12 months
 10 months
 14 months
 16 months
 24 months

8. Who authored your CWPP?

State University Contractor
 Plan Partners (5)
 Fire District or Department Staff (2)
 Fire Management Contractor
 County Conservation District (3)