Acknowledgements

Cohesive Wildfire Strategy and Secure Rural Schools Act Title II funding supported the revision of the Wallowa County CWPP.

A special thank you to the Community Wildfire Protection Plan Steering Committee who dedicated their time and effort to this project while continuing to carry out the duties of their everyday jobs.

Recognition also goes to the many citizens of Wallowa County and to local, state, and federal government organizations that assisted in this planning effort by providing historical and technical information for the project.

Signature Page

The Wallowa County Wildfire Protection Plan provides a framework for assessing the current wildland urban interface wildfire risks, multiagency firefighting resource response shortfalls, and community preparedness levels using both best available data and local knowledge. The plan identifies methods of reducing human ignitions, large fire potential and mitigating wildfire risks through implementation of the three Cohesive Wildfire Strategy elements of creating fire adapted communities, restoring resilient landscapes and improving wild fire response.

The Wallowa County Board of Commissioners approved this plan and its contents with agreement from local wildland firefighting agencies, Rural Fire Districts, and the City's structural fire protection services. The plan contents should be revisited annually and projects may be revised and updated as necessary. All recipients are requested to advise Wallowa County Emergency Services of any changes that might result in its improvement or increase its usefulness.

Susan Roberts, Wallowa County Commissioner

Todd Nash, Wallowa County Commissioner

Paul Castilleja, Wallowa County Commissioner

Paul Karvoski, Wallowa County Fire Defense Board Chief & Emergency Manager

Joe Hessel, District Forester, Northeast Oregon District, Oregon Dept. of Forestry

I. Introduction

Plan Overview and Development

The Wallowa County Community Wildfire Protection Plan (CWPP) was updated to be consistent with changing federal, state, and local level policies, and to meet the needs of changing county demographics, such as population, economics, expanding wildland-urban interface, recreational interests, stakeholder concerns, and fire protection concerns.

Data from numerous sources was used to prepare the plan. The Community Wildfire Protection Plan for Wallowa County is the result of detailed analyses, professional contribution, collaboration and wildfire risk assessments. Contributed information was analyzed with the intent to reduce the potential for wildfires that threaten people, structures, infrastructure, and values in Wallowa County. Because of the different sources and data reference periods, the transition between data sets is not always fluid and there are occasional gaps in data collection. Where relevant, these gaps are identified and all sources are cited.

The county's goal is to provide the best protection for those living in and near wildland-urban interfaces where private and public lands intersect. This CWPP also expands risk assessment to include middle ground landscapes beyond the homes to restore forest resiliency on both sides of the public/private divide. It is also the intent of this plan to identify the roles and responsibilities of all those that represent Wallowa County including, but not limited to, county, state, and federal agencies, cooperators, and private land owners. It is the county's desire to advance in wildfire risk mitigation while focusing on three key overall goals of fire-adapted communities, resilient landscapes, and appropriate wildfire response.

The CWPP emphasizes ongoing development of robust relationships between all agencies, local landowners and communities to prepare and protect lands from devastating wildfires. It recognizes shared responsibility toward fire prevention as well as preparing communities and preserving local values in the event of wildfire.

In February of 2016 the CWPP steering committee began meeting to initiate the revision of Wallowa County's CWPP. Subsequent meetings (*see Chapter V, Community Participation*) were held to establish a county wildfire mission (this included developing goals, objectives, and evaluation process for the county's wildfire risks), identify and prioritize communities at risk; organize community workshops; provide guidance on plan content and organization; and prioritize risk reduction projects.

Plan Compliance

The Wallowa County Commissioners, with cooperation and input from the Community Wildfire Protection Plan Steering Committee, endorse this plan. These representatives mutually agree to the final contents of the plan. The plan is not regulatory and does not create or place mandates or requirements on individual jurisdictions. This plan does not bypass the individual rules and procedures that govern the participating agencies, organizations, and individuals.

Wildfire on the landscape is common, particularly in fire-prone ecosystems. With steady increases in home dwellings in forested areas, fires in the wildland-urban interface are also becoming commonplace with unfavorable results. Understanding what, where, and why to apply fire protection measures allows fire managers the flexibility to assist homeowners in an all-inclusive approach of shared responsibilities. Although some actions are voluntary, agencies must comply with existing management direction.

Since the 2006 CWPP was written, several concerns have arisen to cause fire management at all levels to reconsider fire in and near wildland-urban areas. As a result, new approaches are being used to preserve landscape aesthetics, sustain site productivity, increase forest health, and expand defensible space. High growth in homes near forest areas has further raised the financial stakes in the event of a wildland fire. Recognizing the need to get all landowners involved in conducting management activities on their property, the CWPP promotes collectively reducing risks and helping keep fire budgets and fees low (PNW 2010).

This plan attempts to comply with local, state, and federal direction in meeting the needs of a CWPP and incorporating current information when assessing communities and landscapes at risk. The role of the plan is to serve as a working document to coordinate fire and land managers and their efforts in Wallowa County. It is the intent of this document to guide both private landowners and agency managers in meeting the CWPP goals and objectives while incorporating reference to several guiding documents. This community wildfire protection plan has been prepared in compliance using local, state and federal direction as directorial information.

National Cohesive Wildland Fire Management Strategy (CWS), April 2014.
The CWS provides guidelines that can be tailored to meet local and regional needs. Priorities in the Cohesive Wildfire Strategy include safe and effective fire response to wildfires, vegetation and fuels management, engaging homeowners and communities to be proactive prior to a wildfire, and emphasis on programs and activities designed to meet local needs in an effort to prevent human caused ignitions. The three goals of the Cohesive Wildfire Strategy include: restore and maintain landscapes, develop fire-adapted communities, and improve wildfire

response preparedness. It also emphasizes communication and collaboration to keep people informed and involve all partners to maintain dialog in the community.

The 2009, Guidance for Implementation of Federal Wildland Fire Management Policy.
This policy directs federal fire directors to work collaboratively with state, local, tribal fire managers, members of the public, and nongovernment organizations to foster better understanding and support for the complexity of wildland fire management. It also directs the federal fire directors to revise or develop accountability standards, performance measures, and tracking systems to assess if resource and protection objectives are met during the course of management on all wildland fires.

Oregon Senate Bill 360 (The Act of 1997)
This act enlists the aid of all property owners to achieve the goal of converting fire-susceptible urban and suburban properties into less volatile zones where firefighters may more safely and effectively defend homes from wildfires. The law requires property owners in identified forestland-urban interface areas to reduce excess vegetation, which may fuel a fire, around structures and along driveways. In some cases, it is also necessary to create fuel breaks along property lines and roadsides. (For more information, http://www.oregon.gov/odf/pages/fire/sb360/sb360.aspx)

Healthy Forests Restoration Act, 2003. This act requires at that the following three entities must mutually agree to the final content of the CWPP: local government (counties or cities); local fire department(s) or representation of a county's structural agencies; and state entity responsible for forest management (Oregon Department of Forestry). The act is designed to achieve several goals, including:

1) Reducing wildfire risk to communities, municipal water supplies, and other at-risk Federal land through a collaborative process of planning, prioritizing, and implementing hazardous fuel reduction projects.
2) Authorizing grant programs to improve the commercial value of forest biomass (which would otherwise contribute to the risk of catastrophic fire or insect or disease infestation) for producing electric energy, useful heat, transportation fuel, and petroleum- based product substitutes, and for other commercial purposes.
3) Enhancing efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape.
4) Enhancing forest ecosystem components.

The incentive for communities to engage in comprehensive forest planning and prioritization was given new momentum with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. The language in HFRA provides maximum flexibility for communities to determine the substance and detail of

their plans and the procedures they use to develop them. HFRA emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuels reduction projects and developing measures to reduce structure ignitability. The act also places priority on treatment areas identified by communities themselves in a community fire plan.

The NE Oregon Regional Natural Hazard Mitigation Plan, 2014.
The natural hazards mitigation plan is intended to assist Northeast Oregon reduce the impacts from natural hazards by identifying resources, information, and strategies for risk reduction. It recognizes the increase in residential development in the interface areas and the need to provide mitigation actions to reduce the impact of wildfire through the county's CWPP.

Federal Register, 2001.
This provides an update to the initial list of urban-wildland interface communities in the vicinity of federal lands that are at high risk from wildfire, published in the Federal Register on January 4, 2001. It is important to note that the urban-wildland interface is not limited to communities in the vicinity of Federal land. Many states have submitted revised community lists that include all interface communities in their State, regardless of their relationship to Federal land.

Fiscal Year 2017 Budget Overview, United States Department of Agriculture.
To meet the daunting challenges ahead, the FY 2017 President's Budget for the Forest Service focuses its efforts in three key areas: restoring and sustaining our Nation's forests and grasslands by creating resilient landscapes (including mitigation of wildfire risks), bringing benefits to the public through Forest Service management activities and infrastructure investments and through public use of our national forests and grasslands in order to build thriving communities, and apply knowledge globally. The FY2017 Budget supports the 2009 Federal Land Assistance, Management, and Enhancement Act along with the three goals of the National Cohesive Wildland Fire Management Strategy. This CWPP is included in the Northern Blue Mountain Cohesive Strategy Pilot Project.

Oregon Administrative Rules Chapter 477, *Fire Protection of Forests and Vegetation*. ORS 477.025 recognizes that the forestland-urban interface in Oregon varies by condition, situation, fire hazard and risk. Different forestland-urban interface fire protection problems exist across the state because of this variability, and these different problems necessitate varied fire prevention and protection practices. In order to give recognition to such differences and their effect on the accomplishment of the public policy stated in ORS 477.023 (Fire protection system), certain classifications of the forestland-urban interface within the State of Oregon are established by ORS 477.027 (Rules for classification of lands), and the Oregon Department of Forestry, Division 44, Criteria for Determination of Wildfire Hazard Zones.

Plan Endorsement and Development

The CWPP revision is being led by Wallowa County, with the assistance of several local, state, and federal fire management agencies coming together as the CWPP steering committee. The steering committee full-time members include representatives from the Oregon Department of Forestry, Local Rural Fire Departments, Wallowa County Emergency Services, Bureau of Land Management, U.S. Forest Service, private landowners as well as a member of the local Blue Mountain Cohesive Wildfire Strategy Team. The Wildfire Protection Plan Steering Committee endorses this plan.

The Wallowa County Commissioners, with cooperation and input from the Community, Cooperators, and Fire Management Agencies, agree to produce a document that will provide future guidance in fire prevention, protection, and risk reduction. These representatives mutually agree to the final contents of the plan. The plan is not regulatory and does not create or place mandates or requirements on individual jurisdictions. This plan does not bypass the individual rules and procedures that govern the participating agencies, organizations and individuals. This plan acknowledges existing rules and regulations and makes recommendations to improve public and fire fighter safety, emergency fire response, and landscape and ecosystem resiliency in a fire prone environment.

Through increased knowledge of wildfire prevention and mitigation in a fire-prone region, the methods outlined in the CWPP will seek to create fire-resilient landscapes – healthy stands of timber and underbrush – which provide the beauty and solitude people seek when living and recreating in the forest. This plan recognizes the economic importance of fire protection of rangeland, forests and communities as well as the economic importance of jobs, products, and new opportunities through fire risk mitigation measures.

Summary

The project steering committee began meeting in February 2016 to revise the 2006 Wallowa County Community Wildfire Protection Plan. The CWPP revision is designed to accomplish a number of tasks including:

- incorporate and meet new policies
- update changes to local Wildland Urban Interface boundaries and at risk communities
- review the need to update the CWPP mission
- reinforce goals and objectives to be consistent with the Cohesive Wildfire Strategy
- develop a fire risk assessment utilizing best available data
- identify and prioritize geographic areas and communities

- strengthen all agencies and community collaboration encouraging involvement through organized community workshops
- maintain oversight and guidance on plan content and organization
- prioritize risk reduction projects and incorporate new wildfire mitigation tool options
- establish priority areas for the WUI Zone, Communities at Risk and the County as a whole.
- In the county, collectively work together to identify mitigation action items designed to reduce wildfire risks.

Plan design is focused on better serving the communities in improved wildfire assessment and protection, incorporating new community members in the process, evaluating economic opportunities, and increasing local competitiveness for fire mitigation and protection funding sources.

Data used in this Plan is denoted and referenced in the bibliography.

The planning committee, made up of collaborating partners, is responsible for implementing this project and includes:

Paul Karvoski	Wallowa County Emergency Services	Co-chair
Matt Howard	Oregon Department of Forestry	Co-chair
Jenny Reinheardt	Wallowa Resources	member
Nathan Goodrich	Wallowa Fire Zone FMO (FS)	member
Jason Lyman	Wallowa Fire Zone AFMO (FS)	member
Joby Sciarrino	Umatilla National Forest	member
Mark Jacques	Oregon Department of Forestry	member
Heather Melville	Landowner Constituent	member
Scott English	BLM	member
Nils Christoffersen	Wallowa Resources	member

Bibliography

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Flame Act 2009. The Federal Land Assistance, Management, and Enhancement Act of 2009, Report to Congress.

Oregon Laws 2015, State of Oregon Administrative Rules Chapter 477, *Fire Protection of Forests and Vegetation*. ORS 477.025

Oregon State University; University of Idaho; Washington State University, 2010. A Pacific Northwest Extension Publication. *Reducing Fire Risk on Your Forest Property*, PNW 618 October 2010

University of Oregon, February 2014. *Regional Natural Hazards Mitigation Plan Northeast Oregon,* Counties of Baker, Grant, Union, and Wallowa and Addenda for Baker City, Enterprise, Halfway, John Day, and La Grande. Northeast Oregon Multi-jurisdictional Natural Hazards Mitigation Plan.

USDA 2016. United States Department of Agriculture, Fiscal Year 2017 Budget Overview for the U.S. Forest Service, February 2016.

II. Mission, Goals and Objectives

Mission Statement

Wallowa County, the Oregon Department of Forestry, the Wallowa County Fire and Emergency Services, the USDA Forest Service and the Bureau of Land Management, and community members are dedicated to implementing a Community Wildfire Protection Plan (CWPP) utilizing the Cohesive Wildfire Strategy (CWS) as a strategic and operational foundation.

The county's first priority is the protection and safety of community members and firefighters during all phases of wildfire response. Through the creation of the CWPP the county has crafted a plan to successfully meet the challenges of wildland-urban interface protection. This CWPP identifies fire risk mitigation strategies to accomplish a multitude of issues facing the county including:

- Improving safety through advancing wildfire response capabilities.
- Providing community education, outreach, and partnerships that progress toward living in a fire dependent environment.
- Creating opportunities to advance landscape resiliency through vegetation and fuels manipulation.

The Wallowa County CWPP stresses the need to promote a fire resilient landscape, fire-adapted communities, and improve wildfire response while putting safety in the forefront.

Wallowa County and partnering agencies have a mission;

> *"To assist in the coordination of wildland fire, structural agency resources and communities through education and implementation to promote fire risk mitigation, fire threat reduction, and fire prevention methods, while endorsing healthy resilient landscapes for the future."*

National Strategy

Recent decades show an upsurge of citizens moving into wildland urban areas accompanied by an increase in large wildfires exhibiting extreme fire behavior. This trend has gained the attention of landowners, interest groups, and representatives from Federal, State, and Local agencies. These fires pose safety risks to fire suppression and emergency resources as well as the local populace. Rising expenses, including an increase in annual fire suppression costs and monetary and environmental loss to communities in terms of property and landscapes have triggered a Congressional mandate for action (CWS 2014).

In 2009 the "Federal Land Assistance, Management, and Enhancement Act of

2009" (FLAME Act of 2009) was created. The FLAME Act of 2009 directed the Secretary of the Interior and the Secretary of Agriculture to work together to develop a report for Congress that would provide a cohesive wildfire management strategy. In April of 2014, "The National Strategy," The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy (CWS), was completed. The CWS identifies four priority guidelines and three strategic goals under a national vision for wildland fire management. In designing Wallowa County's CWPP emphasis was given to the national priorities and goals within the CWS.

The four guidelines in the CWS establish priorities for agencies working through the challenges of establishing procedures and planning activities. The primary emphasis is on safe and effective response to wildfire. The plan and resulting actions must acknowledge the importance of being prepared for wildfire response in both structural protection and wildfire prevention. These guidelines will be tailored to meet the local needs of Wallowa County.

1) Safe response to an incident must maximize advanced preparedness for full effectiveness of initial response (CWS 2014).

2) Fuels and vegetation management, the most challenging priority, includes the analysis, design, and prioritization of treatments. Guidance should include strategic placement of fuels treatment, increasing the use of all approaches to further advance toward resilient forests and rangelands, and leveraging the use of wildland fire to meet resource objectives (CWS 2014).

3) Designing programs focused on preparedness through working with homeowners and communities in proactive approaches prior to wildfires (CWS 2014). Homeowner and community involvement is essential for successful landscape preparation in advance of potential wildfires.

4) Identification of geographical areas that take into consideration broad-scale fuels management; programs related to homes, communities, and values at risk; activities designed to meet the needs of the local population and strengthen efforts to prevent human-caused ignitions (CWS 2014).

Using these four guidelines while keeping safe and effective wildfire response in mind, the CWS outlines three primary goals to consider when developing a Community Wildfire Protection Plan:

- Restore and maintain landscapes
- Fire-adapted communities
- Wildfire response (CWS 2014)

Wallowa County acknowledges the importance of these goals by incorporating them into the goals of this CWPP.

Wildfire suppression will continue to be a priority mission. There is a need for preparation in advance of wildfires through agencies' and landowners' proactive actions toward structure composition and landscape scheme, adjacent vegetation treatments, and infrastructure design. With safety and proactive measure in mind the Cohesive Wildfire Strategy's vision is to:

> "*Safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire."*

It is important to recognize that in high fire prone areas fires will start, fires will burn, and some fires will become large in nature. However, being prepared for these fires will improve how fire managers, landowners, and ecosystems respond to the wildfire event.

Goals and Objectives

Wildland fires do not distinguish between property lines of ownership or land management agencies, they burn where and when conditions are favorable. National guidance allows local areas to take a prudent but broad approach when addressing the three priority goals, with the highest priority being safe and effective response to wildfires (CWS 2014). With this in mind, a larger-scale approach to reduce fire threat and increase protection opportunities was considered appropriate. Recognizing immediate threats to communities as the most important issue to address, landscapes with significant deviation from pre-fire suppression conditions create additional challenges to protection by contributing to increased fire intensities and unprecedented fire behavior. (See Fire Regime Condition Class, Figure VII – 2 and Appendix B)

In order to meet a broad-scale approach, an expansion of the analysis area is needed to provide a "middle ground" treatment (CWS 2014). This provides new opportunities for the implementation of strategically placed fuels treatments to interrupt fire spread prior to reaching a community. For this reason individual Wildland Urban Interface WUI areas have been dissolved into an all-encompassing WUI Zone to better address landscape fire risks. The wildland-urban interface zone (WUIZ) is,

> *"An area strategically identified that provide effective wildfire defense for communities, infrastructure, and other values at risk that meet or intermingle with wildland fuels and offer opportunities for broadened mitigation measures. These measures are designed to interrupt wildfire spread and modify wildfire behavior in order to protect social, economic, and environmental interests".*

The goals and objectives of this plan are designed with the CWS in mind. Objectives were initially framed by the plan committee with gradual refinement using input obtained during community workshops.

Using these goals as the foundation, the Wallowa County CWPP planning committee designed county-specific goals pertinent to the local area that incorporate the best available science as well as local knowledge and experience.

Consistent with the highest priority of the CWS, Wallowa County also considers life and property the utmost priority.

Through local geographic assessments using a multitude of venues and meetings county wide issues and mitigation measures were identified. These mitigation measures were then placed under the most applicable of the three goals.

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters (NWCG 2014). Wallowa County CWPP identifies:

> *"Mitigation is an effort that reduces loss of life, property, infrastructure, and natural resources through a variety of tools and actions."*

Using the three goals of the CWS, the CWPP committee has listed below in order of priority, opportunities to move the landscape and communities closer to desired conditions. The CWPP recognizes that restoring historical conditions is neither practical nor desirable in some locations. Land management objectives and community values will help determine the degree to which wildfires and fuels management can be tolerated.

Fire-adapted communities, wildfire response, and landscape restoration and maintenance are not stand-alone goals. *In order for one goal to be achieved, results are necessary in the other two.* Through landscape restoration and maintenance, wildfire behavior will be altered, allowing for a higher probability of success in wildfire response. In order to achieve landscape restoration it is imperative that communities, landowners, and fire managers share ownership in planning and treatment implementation across boundaries.

Wildfire Response

Goal: *All jurisdictions participate in making and implementing safe, effective, efficient response to wildland fire.*

Existing Efforts

Large wildfires in the western states continue to pose significant challenges to fire management agencies authorized with protecting lives, property, and natural resources. Increasing growth in the number of housing units appearing in forested areas is complicating the efforts put forth by fire management resources.

Wildfire response takes into consideration fires of all causes, scale, and size. From a national perspective, large fires often pose the primary challenges regarding suppression response, causing issues to be centered on surrounding large, long-duration wildfires (CWS 2014). Locally, the likelihood of fire starts and origin of ignition source play an important role in committing and prioritizing fire management resource responses.

Human-caused fires have the same potential of becoming large scale based on environmental conditions, but because they are typically a single source event there is a higher possibility of fire suppression efforts being successful.

Multiple fire starts occur when dry summer thunderstorms travel across NE Oregon counties leaving numerous fire starts in their wake, causing fire managers to prioritize both fire suppression resources and fire starts. These storms require regional, state, and local fire authorities to evaluate priorities for "initial attack" with focus on fires that pose the greatest threat to life, resources, and property.

One of the worst situations occurred in 1989 when Wallowa County experienced a thunderstorm that left approximately 98 ignitions on the landscape between July 26th and July 31st. This was followed by another thunderstorm in August that added an additional 33 ignitions between the 10th and 13th. Unfortunately, weather also knows no boundaries; prior to reaching Wallowa County the July storm had ignited approximately 93 fires on the Baker and La Grande Fire Zones according to local data. These multiple ignitions events continue to occur creating a drawdown in fire suppression resources and a need for prioritizing. Preparedness in resource capabilities, communities, and landscapes will better help fire managers during the decision making process. It will also assist suppression resources when responding to and suppressing ignitions.

The 2006 Wallowa County CWPP identified its third goals as: Reducing wildfire risk to local communities, watersheds and other at-risk lands through a broad-based collaborative process that continues to improve pre-suppression planning in the event of a wildfire (WC CWPP 2006). Since 2006, there have been

ongoing efforts to address several wildfire response issues, of which include: 1) Increase Wallowa County wildfire response capacity by acquiring and updating newer equipment needs. Through a Memorandum of Understanding (MOU) with the Forest Service, local rural fire departments have obtained several pieces of equipment. 2) The county's co-op prevention program has higher multi-protection agencies participating in the school and community programs, but loss of funding may jeopardize the program. 3) Efforts are being made to build upon rural fire department training needs, wildland fire qualifications, and to increase opportunities for a coordinated approach.

Opportunities for Improvement

There is increasing need for investment in firefighting capacity at the local level. Capacity from all entities with fire response responsibilities must be commensurate with the workload need and risks posed by wildfire, which in many areas is increasing.

This is compounded by the finite amount of fire protection resources. Vast expanses of the West have less than one fire station per 100 square miles. This leads to extended response times in rural areas—areas often characterized by Federal ownership, steep slopes, beetle-killed trees, and poor road access (CWS 2014).

Wildfire movement is without borders moving across boundaries regardless of landownership. For this reason there is increasing need for an all hands-all lands approach to fire suppression with supporting MOU's in order to facilitate the most effective response. State and rural fire departments are often the first defense against a fire starting in the Wildland Urban Interface (WUI) while State and Federal fire personnel are most often first to respond to areas beyond the communities into the middle ground locations. It is important that local responders be efficient and swift in containing wildfires to reduce potential impacts to the public.

Improving upon a combined effort approach to fire response provides many long term benefits:

- It improves training through programs designed to meet rural fire department needs. It provides options to use locally based trainers and creates a cooperative interagency support venue between structure and wildland fire training standards.
- Investment in the fully trained firefighting workforce provides well-qualified firefighters on the ground during mitigation projects.
- Maximizes funding resources when addressing specific needs of rural fire departments. This leads to results in interagency compatibility of technology, communication networks, common terminology, and response protocols.
- Improvements for interagency protection and suppression response

capabilities. Through increased interagency coordination and advances in fire preparedness long term improvements of all wildland firefighting efforts will occur that continue to increase the overall initial attack success.

Fire agency's capabilities must be appropriate to meet the fire ignition volume and risks posed by wildfire, which in many areas is on the rise. Using the Cohesive Strategy wildfire response goal, Wallowa County has highlighted several areas of improvements that would move the area toward an improved wildfire response workforce.

Objectives:

It is important to increase the protection of life, property, and natural resources through improved emergency **wildfire response**. In order for safe wildfire response we must reduce risk to firefighters and the public through fire management activities (CWS 2014). Unless otherwise stated an annual review of the proposed objectives is needed to insure they are in alignment with the goal of fire response. Appendix L provides forms to assess the validity of the objectives during the annual CWPP committee meeting. Wallowa County's new wildfire response objectives are consistent with the following 2006 CWPP objectives: 2, 4, 5, and 6. Objectives identified under the current goal of Wildfire Response include:

a. Identify local equipment and training needs on an annual basis with emphasis in promoting rural capabilities.
b. Promote cooperation and relationships among agencies, organizations, jurisdictions, and communities through a multiple of venues including public meetings, simulations, agreements, boots on the ground, pilot projects, and field trips.
c. Improve interagency and community communications during all phases of wildfire including: before, during, and after emergency situations.
d. Improve pre-suppression planning strategies among all agencies with protection responsibilities.
e. Prevent human caused ignitions through education by increasing fire prevention awareness (CWS 2014).
f. Design strategies where human populations and infrastructure can withstand a wildfire without loss of life and property (CWS 2014).
g. Improve awareness of the WUI homeowners' responsibilities in being prepared for wildfire.
h. Improve response capabilities for both structural and wildland fire agencies to meet local community protection needs.

Fire Adapted Communities

Goal: Strive toward and environment where: *Human populations and infrastructure can withstand a wildfire without loss of life and property.*

Existing Efforts

Technological advancements and declining household size coupled with the desire for privacy have motivated homeowners to relocate from metropolitan areas to more rural settings. Wildland-urban interface areas have seen dramatic population increases, escalating the wildfire problems due to new residents, many of which may have little or no experience with wildfire on the landscape.

During the time span from 1940 to 2000 the number of housing units for WUI areas more than tripled (R.B. Hammer et al. 2009). Over the past 50 years there have been 220 million acres identified as WUI in the United States, with populations exceeding 120 million people residing in 50 million housing units. This has created a growth rate of 300% in the WUI, more than the general population growth rate for the same time period (IAWF 2013).

Residents knowledge and understanding of wildfire risk is essential to public involvement in mitigating wildfire and responses during a wildfire event. This public knowledge is often a result of education or personal experience with and about wildfires. Educating communities on all aspects of wildfire including how to prepare for, what environmental conditions influence the occurrence and behavior of a wildfire, and how they can assist when an evacuation occurs will provide them with the ability to understand and cope with most wildfire incidents. Taking into account in all stages of a wildfire (preparation in advance, during a fire, after a wildfire has occurred) provides community members with the ability to cope particularly during and after a wildfire.

Motivations for community action are often driven by an understanding of firefighting resource capabilities, the various attributes of risk that contribute to wildfire behavior, or their personal experience with wildfire such as having been evacuated or knowing someone that has, loss or damage to properties, even the feeling that the threat is imminent can change ones perception.

Several of Wallowa County 2006 CWPP goals will continue to be promoted through the new fire-adapted community goal. These original goals have promoted a number of opportunities for county residents to increase wildfire awareness and preparedness. The 2006 CWPP Wallowa County introduced programs such as FIREWISE, Living with Fire, and Fire Prevention School Programs, I'm Concerned, Cost-Share Grant Programs, and other workshops to the communities in an effort to increase public awareness and responsibility.

Although few in numbers some residents in the county have initiated actions to increase chances for successful fire response in and around their homes.

Defensible space and home protection measures have occurred to varying extents in many of the wildland urban interface communities in Wallowa County. These measures include treatments such as surface fuels reduction, stand density reduction, defensible space clearing and increasing the distance of the crown base height above the surface vegetation. A map of treatment accomplishments near communities is provided in Chapter X.

Wallowa County's fire prone ecosystem underscores the need for creative approaches for communities to work with fire managers and share responsibility for protection of life and property. Understanding that community is not limited to homeowners but is all inclusive toward people, businesses, infrastructure, agencies and government officials, and interest groups is the first step toward fire adapted communities. With firefighter and public lives as the highest priority it is important for community members to take action in wildfire preparedness well in advance of a fire incident. Fire managers in Wallowa County are reliant on local residents to assist in meeting the fire adapted community goal.

Preparation through actions cannot occur until education of wildfire risk and wildfire preparation precedes it. Fundamentals in education defining fire adapted communities is key to the success of getting the public involved in wildfire defense efforts, reducing post fire effects both in and out of the WUI Zone and Communities at Risk (CAR) areas, as well as possible situations communities could experience.

Education and understanding of the potential for emotional impacts for both responders and residents can prepare involved parties with skills to communicate, act, and cope in high stress situations such as wildland fires.

Opportunities for Improvement

It is the desire of the county to use this CWS goal as the foundation for further promoting wildfire education, preparation, and prevention. Using collaboration as a tool for education and knowledge sharing can catalyze follow-through toward implementation in which property owners share responsibility in saving lives and mitigating fire effects. Through fire-adapted communities, fire emergency resources can partner with community members and cooperators in ensuring long-term sustainability of their investments and efforts.

Collaborative partnerships between emergency resources, members of the public, and cooperators to ensure long-term protection of life and property and sustainability of investments is key in creating fire-adapted communities.

Understanding that becoming a fire adapted community is a process that includes building characteristics such as the ones listed below will increase public acceptance of their role as a partner. A fire-adapted community should have the following characteristics (FAC 2014):

- ➢ It is in or near a fire-adapted ecosystem, often associated with high fire occurrences.
- ➢ It has adequate local fire suppression capacity to meet most community protection needs.
- ➢ Its structures and landscaping are designed, constructed, retrofitted and maintained in a manner that is ignition resistant.
- ➢ It has local codes [building, planning, zoning, and fire prevention codes] that require ignition-resistant home design and building materials.
- ➢ Fuels on land near and inside the community are treated and maintained for safety and easy suppression
- ➢ It has and uses a community wildfire protection plan and continues to implement the plan into the future
- ➢ It has built other safety features such as buffers between fuels and the community; safe designated evacuation routes; and safe zones in the community when evacuation is not advisable (FAC 2014).

Additionally, Wallowa County believes a fire-adapted community should also include:

- ➢ A program and prevention coordinator who's primary position would be designed to work with both agencies and communities in areas such as education, fire prevention, emergencies, and tracking CWPP accomplishments.
- ➢ Mutual understanding between communities and fire manager on concepts relating to risks, potential results of mitigation efforts, and potential outcomes post wildfire.
- ➢ Provide a clear distinction between protection priorities and opportunities prior, during and post wildfire.
- ➢ Operate under common terminology and understanding of living in fire dependent environments and know how proactive actions can set a course of living with fire.
- ➢ Understand missions and limitations of firefighting resources, making wildfire mitigation a tool for suppression resources.

Although the term "fire-adapted communities" was established in 2014, Wallowa County efforts since its 2006 CWPP have worked towards meeting fire-adapted communities through a combined effort of community members and agencies across landownership. New strategies in meeting this goal are part of our CWPP revision in hopes of accelerating the pace and scale of accomplishments.

Objectives

It is Wallowa County's goal to develop **fire-adapted communities** in both the Communities at Risk and the WUI Zone areas by coordinating risk reduction strategies and treating of hazardous fuels using a collaborative landscape approach. The intent of this plan is to improve the ability of ecosystems and communities to respond to natural events that have the potential for producing

increased risk of a wildfire and design strategies where human populations and infrastructure can withstand a wildfire without loss of life and property (CWS 2014).:

a. Identify and share data and use a common set of base information for risk assessment, concepts of “defensible space” and fire-adapted communities.
b. Work with communities to educate and provide knowledge of wildfire conditions by sharing the analysis results of risk assessment and use common terminology at all levels.
c. Create and maintain partnerships among agencies and citizens through education forums, information sharing, and an all hands-all lands treatment approach.
d. Provide opportunities for science, community, and local knowledge input on analysis results, as one means of information verification.
e. Utilize fire threat, effects, and risks to help prioritize geographical areas in the WUI Zone of the CWPP as well as determine recommended management actions within the Communities at Risk.
f. Identify economic opportunities to supply forest product needs, ranging from biomass to higher valued products (CWS 2014, USDA 2015). Make efforts to utilize biomass material whenever appropriate. Utilize fuel reduction material where suitable and cost-effective. (WC CWPP 2006)
g. Identify economic opportunities to offset costs during treatments and to supply local areas with forest products, ranging from biomass to higher valued material (CWS 2014).
h. Maintain and improve our forest products and manufacturing infrastructure by supplying material during appropriate protection strategy activities to preserve local ability to conduct restoration activities
i. Develop a process for monitoring the needs for maintenance of treated areas overtime, in order to preserve the benefits of forest health already achieved (USDA 2004 -HFRA 2003, revisions 2014). Schedule periodic maintenance of treatment areas based on HFRA Section 102, (g) regulations.
j. Develop wildfire mitigation strategies that take into account protection of community infrastructure and values such as municipal watersheds, cultural assets, view sheds, parks, transportation and utility corridors (CWS 2014). Include FIREWISE, Ready-Set-Go, etc.
k. Encourage investments in ecological restoration and outdoor recreation that result in job opportunities (USDA 2014).
l. Design treatments based on ecosystems health, landowner input, highest potential for wildfire protection success combined with ecosystem benefits where appropriate, and increased funding opportunities.
m. Identify opportunities for across-boundary funding sources to increase pace and scale of planning and implementation.
n. Jointly educate and prepare fire management agencies and public members in terms of wildfire protocols and the potential social and personal reactions to all phases of wildfire.

To promote consistency and common standards, it is important to design mitigation measures with a county-wide approach that still allows flexibility of application at the local district and municipalities. Achieving full effects of Fire-Adapted Communities will require corresponding attention by community members along with fire management efforts to ensure successful wildfire preparedness and protection.

Restore and Maintain Landscapes – Resiliency

Goal: *Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.*

Existing Efforts

Resilient landscapes are often defined as having the ability to sustain, resist, and recover from disturbance. Creating fire-adapted natural communities is part of ecological restoration. Ecological restoration includes: restoring healthy, resilient ecosystems capable of withstanding stresses and disturbances, including those associated with climate change (Tidwell 2011).

Landscape resiliency is essential in promoting defensible strategy options for fire suppression resources, sustainable healthy ecosystems in fire prone areas, and long-term reduced costs of doing business. One of the purposes of the CWPP is the prioritization and alignment of landscape investments and fire suppression resource utilization with the intent to reduce risks to life, property, and ecosystems over time.

The CWPP's primary focus is wildfire disturbance. Wallowa County is a high fire frequent area based on the West Wide Wildfire Risk Assessment (WWRA), the CWS, and fire history studies conducted locally. Emily Heyerdahl (see Appendix B) estimated median fire return intervals of large fires (1000 – 4999 acres) to be 23, 25, and 11 years in her study plots surrounding Wallowa County. These were considered conservative estimates due to plot size, tree bark thickness and number of trees sampled. Kathleen Maruoka estimated, in her study of 15 plots in and around Wallowa County, to have mean fire return intervals as low as 9.9 years up to 30.8 years depending on the plot location.

The CWS recognizes Wallowa County as predominately having historical fire history falling within a fire regime group of I, II, and III, with the area predominantly a fire regime I. Fire regime I is identified as a relatively high frequency of fires averaging 35 years or less between fire events and includes fire-adapted forests and rangeland types (CWS 2014). Historically, fire regime I burned with low-severity resulting in post fire conditions of less than 25 percent of the dominant overstory vegetation experiencing mortality, with some areas experiencing mixed-severity with potential to replace up to 75 percent of the

overstory (CWS 2014). Large fires were frequent prior to suppression, but historically these fires often benefited the ecosystems and resulted in retention of the overstory on the landscape. Fire predominately burned on the surface of the forest floor with an occasional stand sustaining mortality.

Wallowa County's CWPP recognizes that fire is a frequent visitor of our local forests and management approaches should be taken with community and landscape resiliency in mind. Undertakings of treatments for protection of community and landscape have occurred on both private and public lands. These treatment locations are identified in Chapter X.

Opportunities for Improvement

National, regional, and local management objectives will be part of the guiding principles in fuels and vegetation management. Developing a broader landscape approach provides a higher degree of flexibility for treatment locations and type, with the ability to extend beyond community boundaries into the "middle ground" areas. This model begins to address the large landscape-scale changes needed to alter wildfire behavior, improve landscape resiliency, minimize wildfire loss, and ensure protection of life and properties (CWS 2014). Focusing investments in areas where multiple objectives can be achieved provides the maximum benefit of funding.

Under the 2006 CWPP individual WUI areas apply for and receive funds. These dollars could not be distributed toward multiple locations. This resulted in multiple applications for revenue for each separate geographic location even though the management objectives and the priority levels may be the same. Competing for funds between geographic areas reduces opportunities for landscape applications, results in duplication of efforts and missed opportunities.

Analysis of a broad-scale WUI zone approach eliminates the need for funding to be concentrated in a single location, allowing for geographically prioritizing large-scale areas. This provides fire managers with the ability to apply multiple treatments concurrently, utilizing one financial source, in several areas of the WUI zone.

It is the intent of the new CWPP to consider larger landscape scale management, restoration, and fuels treatment projects that promote fire mitigation across jurisdictional and ownership boundaries. This revision eliminates small, isolated Wildland Urban Interface parcels and recognizes an all-inclusive "WUI Zone" that takes into consideration areas outside of the "communities and residential developed areas" to include the landscape between communities and the more distant wildlands. Given the number and size of wildfires, the West needs large landscape-scale changes in vegetative structure and fuel loadings to significantly alter wildfire behavior, reduce wildfire losses, ensure firefighter and public safety, and improve landscape resiliency (CWS 2014). Opportunities for treatment

should not be limited to strictly WUI Zone acres but should be proactive in inclusion of all areas in Wallowa County. Expansion outside the WUI Zone is prudent when there is a likelihood achieving multiple goals and objectives of this plan or the expansion is a more economical approach.

One of the tasks put forth by the Board of Forestry in the Northern Blue Mountain Cohesive Strategy 2013 is to encourage large scale management, including restoration and fuels treatment projects, that embrace sustainability by recognizing the social, environmental and economic benefits derived through applying the three goals of the Cohesive Strategy on the ground across all ownerships.

The resilient landscape goal provides opportunity for Wallowa County to:

- Create sustainable ecosystems through hazardous fuels management to reduce the extent, severity, and intensities of wildfire in the county, with urgency given to priorities within the WUI Zone areas and CAR.
- Alter fire behavior characteristics through manipulation of fuel and vegetation by strategically placing treatment areas and utilizing new and innovative tools.
- Promote local economic opportunities while addressing forest fuel, forest health conditions, and debris removal needs.
- Develop a reasonable process of funding distribution where CAR, WUI Zones, and other geographic areas meet criteria regarding prioritization, condition, and need for treatment.

Active management of public and private land holdings is important, including harvesting and thinning operations to reduce hazardous fuels in and around communities and in the middle ground (CWS 2014). Through the acknowledgment of a larger WUI Zone, agencies and communities can provide complementary and supportive actions that promote landscape scale management.

Objectives

Wallowa County strives to restore and maintain landscapes through creating ecosystems that are sustainable and resilient to disturbance. It is important when evaluating local ecological conditions with human needs and interaction to find a balance for managing wildfire for ecological resource objectives (CWS 2014). The county recognizes the value in restoring the functions and processes characteristic of healthier, more resistant ecosystems. Creative approaches can be used to achieve desired results.

a. Develop opportunities for increasing community understanding of how resilient landscapes benefit communities through sustainable multiple-use management of the national forests and grassland (FS_2015). This includes but is not limited to sustainability of forest products, aesthetics,

opportunities, and ecological systems.

b. Identify economic opportunities to supply forest product needs, ranging from biomass to more highly valued products (CWS 2014, USDA 2015). Make efforts to provide accurate information on biomass material availability. Utilize fuel reduction material where suitable and cost-effective.
c. Develop a process for monitoring the needs for maintenance of treated areas overtime in order to preserve the benefits of forest health already achieved (HFRA 2003, revisions 2014). All lands should be evaluated when considering maintenance of investments.
d. Increase and identify opportunities for economic expansion in forest and grassland-dependent communities (CWS 2014). Invest in ecological restoration and outdoor recreation that result in job opportunities (FS 2015).
e. Focus initially on areas that show the highest wildfire risk to both watersheds and communities. Develop economically-viable treatments that provide return revenue in order to accomplish fuels reduction at a landscape scale and to reduce overall fire risk in the County.
f. Design treatments based on ecosystems health, landowner input, and highest potential for wildfire protection success, combined with ecosystem benefits where appropriate, and increased funding opportunities.
g. Identify opportunities for across-boundary funding sources to increase pace and scale of planning and implementation. Recognize that pace and scale must increase in order to effectively protect communities and landscapes.
h. Improve efficiency in planning timber sales and stewardship contracts to increase the pace and scale of forest restoration and management. (Tidwell, 2015)
i. Develop new approaches for allocation of monies within the WUI Zones. Eliminate funding application to one location and allow for allocation of dollars to multiple areas that meet funding request criteria.
j. Encourage revenue-producing (i.e. commercial timber harvest) projects that, in turn, can help support increased restoration and forest management activities while providing some economic benefits to our local communities (Northern Blue Mountain Cohesive Strategy {NBMCS} 2013).
k. Promote increased utilization of the “Good Neighbor Policy” and Stewardship contracting authority to accomplish forest management and restoration activities (NBMCS 2013).
l. Integrate with local forest collaborative groups to capitalize on mutual efforts that support the intent of landscape treatments and fire risk mitigations. Identify conditions where fire is placed within a broader vision with multiple jurisdictions of responsibility.

Communication and Collaboration

Northern Blue Mountain Cohesive Strategy Goal: *Ensure the coordinated implementation of the Cohesive Strategy among all stakeholders and partners in the Pilot Project Area.*

Although fire managers play a significant role in addressing wildland fire in terms of management, operations, and Wildland Urban Interface areas, it requires people working together toward a common mission and mutual understanding of what it means to live in fire-dependent ecosystems. The importance of collaboration throughout the Cohesive Strategy effort, of hearing all the voices, and involving all the partners cannot be overemphasized (CWS 2014).

Existing Collaboration

During the 2006 CWPP development a series of meetings were held to inform citizens about the progress of the CWPP development. Topics included discussion of the risk assessment involved in determining high hazard areas around the county, discussion of Wallowa County Emergency Services operations related to wildfire response, and involvement of citizens in defining wildland-urban interface boundaries using hazard, risk, and values that may be affected by threat of wildfire (Wallowa County CWPP 2005).

Since the 2006 CWPP, several collaboration efforts have led to a variety of accomplishments including cross boundary projects, acquisition of fire response equipment, training improvements, and community education. Projects were developed in coordination with local residents and agencies to begin creating defensible space and improving fire response capabilities. A number of private landowners have acquired fire mitigation funding for their properties with the assistance from state and federal agencies.

Collaboration between federal and local rural fire departments has provided opportunities to create surplus equipment agreements to acquire excess fire equipment from federal surplus.

Additional collaboration groups have evolved that would complement the CWPP concepts including the Wallowa-Whitman Forest Collaborative group, Umatilla Forest Collaborative and the Northern Blue Mountain Cohesive Strategy group (NBMCS). The Wallowa-Whitman Forest Collaborative group mission is, *"To improve the social, economic, and ecological resiliency of the Wallowa-Whitman National Forest and local communities through collaboration by a diverse group of stakeholders."* This mission is consistent with the CWPP's commitment in meeting the Cohesive Strategy's three goals.

The NBMCS is a pilot project tiered off the National Cohesive Wildfire Strategy with identified goals and actions that support the CWS. The Blue Mountain pilot

project contains a description of actions and tasks that are necessary for implementing a successful Cohesive Wildland Fire Management Strategy (a.k.a. Cohesive Strategy) in the Pilot Project area (NBMCS 2013). One example is that during public meetings, the CWPP committee educates and informs the stakeholders/partners in the Pilot project area on the Cohesive Strategy (NBMCS 2013). Organized meetings with the rural fire chiefs, local cooperators, and members of the public have all been designed for this purpose.

Opportunities for Improvement

In meeting the goals and desired conditions within the CWPP, Wallowa County is also able to support the Forest Collaborative mission of social, economic, and ecological resiliency through it's "all hands-all lands" (cross boundary) projects. Coordination with the Forest Collaborative provides an opportunity for project recognition and diverse support; potential increased funding, project creativity and design, while improving increased awareness of fire risks in Wallowa County.

Emphasis is also being placed on creating and maintaining lasting partnerships among agencies and populaces. Agency activities include, but are not limited to, local, state, tribal, and Federal agencies showing support for one another through wildfire response, engagement in collaborative planning and decision-making processes that take into account all lands and recognize the interdependence and statutory responsibilities among jurisdictions (CWS 2014).

The CWPP is a key platform to which fire managers, cooperators, and community members can align roles and responsibilities to promote organized approaches in fire management across all jurisdictions. Since the 2006 Wallowa County CWPP fire managers have recognized advancements in wildfire risk assessments, treatment approaches, and science research. Public learning of how this information can be used in developing fire adapted communities will lead to collective actions toward wildfire protection.

Using the WUI Zone model designed for a landscape approach allows expansion beyond the classic communities at risk in Wallowa County and increases opportunities for additional participatory roles that may otherwise not be considered. Through an inclusive approach that addresses a broad range of values at risk of fire such as scattered farm/ranch communities, dwellings, and infrastructure improvements watersheds, communication sites, and critical habitats (CWS 2014), the CWPP creates a holistic representation of landscape mitigations.

Potential partners were identified through CWPP committee discussions and using the three goals of the CWS and action items described in the Northern Blue Mountain Cohesive Strategy with an understanding that *ALL* Wallowa County citizens play an important role in the success of these goals.

Partnerships centered on the following characteristics were of high consideration:

a. Ability to provide skills and participate in the wildfire assessment and development of the CWPP.
b. Expertise and capabilities in the implementation of mitigation action items in the CWPP.
c. Protection capabilities and capacity to provide assistance in suppression and protection efforts.
d. Key infrastructure areas that may assist with or benefit from efforts to implement actions, prepare for, and respond to wildfires.
e. Key infrastructures areas that may contribute to potential threats or pose additional safety issues in the event of a wildfire.
f. Ability to assist the community in pre, during and post wildfire evacuation.
g. Property owner(s) within identified WUI Zone and CARs are key participants in wildfire protection, acknowledging that all property proprietors within the county play a role in the event of a large wildfire.
h. Stakeholders with an interest in the CWPP mission.

Development and implementation of a communication process creates an essential link between fire managers and citizens. Emphasis on good public relations will promote and sustain collaboration by producing informed communities, consistent partnerships among stakeholders, and a guide toward future efforts. A transition plan outlining community participation that progresses from development, to implementation, to post-treatments is essential for a successful collaborative effort and informed communities.

Through community outreach, essential information was compiled on structures, roads, and water resources throughout the WUI Zone. Community involvement is crucial for successful wildfire planning. County citizens are the best source of information when developing planning opportunities toward public safety and mitigations of wildfire risks. Outreach within the community encourages and supports a continuous, rolling, and collaborative dialog among stakeholders and across regions to enhance shared understanding, roles, mutual trust, and willingness to pool resources and take joint actions (CWS 2014).

Education and community outreach were a primary focus when creating this community fire protection plan. The CWPP efforts include fostering widespread collaboration and consistent support of the Community Wildfire Protection Plan. One priority is to create and maintain partnerships among agencies and citizens by combining efforts in developing a range of ideas and actions designed for wildfire protection and ecosystem health. Through these efforts the following can be accomplished:

a. Use the CWPP as a coordinated resource tool, educational piece, and building block or protection efforts.
b. Create strategies that make an effort to hear all voices and involve all partners; this is vital for success (CWS 2014).

c. Build upon fire prevention programs that focus on education and human caused ignitions.
   Identify funding mechanism and improve landowner assistance through various grant sources.
d. Coordinate communication and education efforts to provide consistent and comprehensive messages.
e. Implement CWPP action items within WUI Zone areas. Motivate individual community members and key community interests to take positive action (BMCWS 2013).
f. Provide CWS's vision, goals, and national direction to increase knowledge and understanding of guiding principles, core values, and national priorities (CWS 2014).
g. Build an interagency approach to implement Firewise in at risk fire communities.
h. Work to educate and assist residents in at-risk fire communities in meeting their individual and collective responsibilities of preparing their homes and properties for the possibility of fire (BMCWS 2013).
i. Explore opportunities for Fire Adapted Community demonstration sites as a Pilot Project to use as an educational tool.

This approach is in alignment with the CWS concepts to improve and expand communications of diverse groups within communities to ensure best science and proven professional practices are used. Diverse groups include scientists, program managers, specialists, and stakeholders (CWS 2014).

Funding and Economic Assistance

Overview

Successful fire suppression over the last eight decades has created landscape conditions that would have historically been treated by natural fire disturbance. Overstocked stands have subsequently created increasing suppression difficulty, which also increases costs of doing business. This, in combination with an upsurge of new home disbursement in and near forested areas has driven up the cost of doing business on a regular basis.

Unfortunately, *suppression* costs are associated with a wildfire that is already actively burning, thereby removing opportunities toward pre-fire preparation for risk reduction. The cost of fire suppression has grown from 13 percent of the U.S. Forest Service agency's budget just 10 years ago to more than 40 percent in 2014 (USFS, 2014). Recent studies have found a positive correlation between firefighting expenditures and the presence of housing and private lands (Gebert and others 2007, Liang and others 2008). Average annual fire suppression expenditures by the U.S. Forest Service alone totaled $580 million from 1991 to 2000, and more than doubled to $1.2 billion annually from 2001 to 2010 (USDA Forest Service 2011c). The National Association of State Foresters (NASF)

conducted a biannual survey of State Forestry agencies on wildfire protection, prevention, and suppression (including Federal funding expended by State agencies), and found more than $1.6 billion dollars was spent annually; more than doubling the amount from 2000 to 2010 (NASF 2010). Also, local governments are estimated to average close to $1 billion dollars per year during the 2000s (IAWF 2013). This does not take into account the cost associated with property damage or devaluation, rehabilitation of properties and ecosystems, human health, or impacts to local businesses. Of highest value, where monetary measures cannot compare, is loss of life or injury.

Not only are suppression costs increasing, so too are the number of structures lost per year per decade since 1960. The following graph was recreated from the WUI FACT SHEET issued by the International Association of Wildland Fire (IAWF) in August of 2013. Based on 2012 U.S. Census statistics, approximately 46 million homes are located in WUI, of which 21 million or 46 percent of the existing homes are less than 10 years old (IAWF 2013).

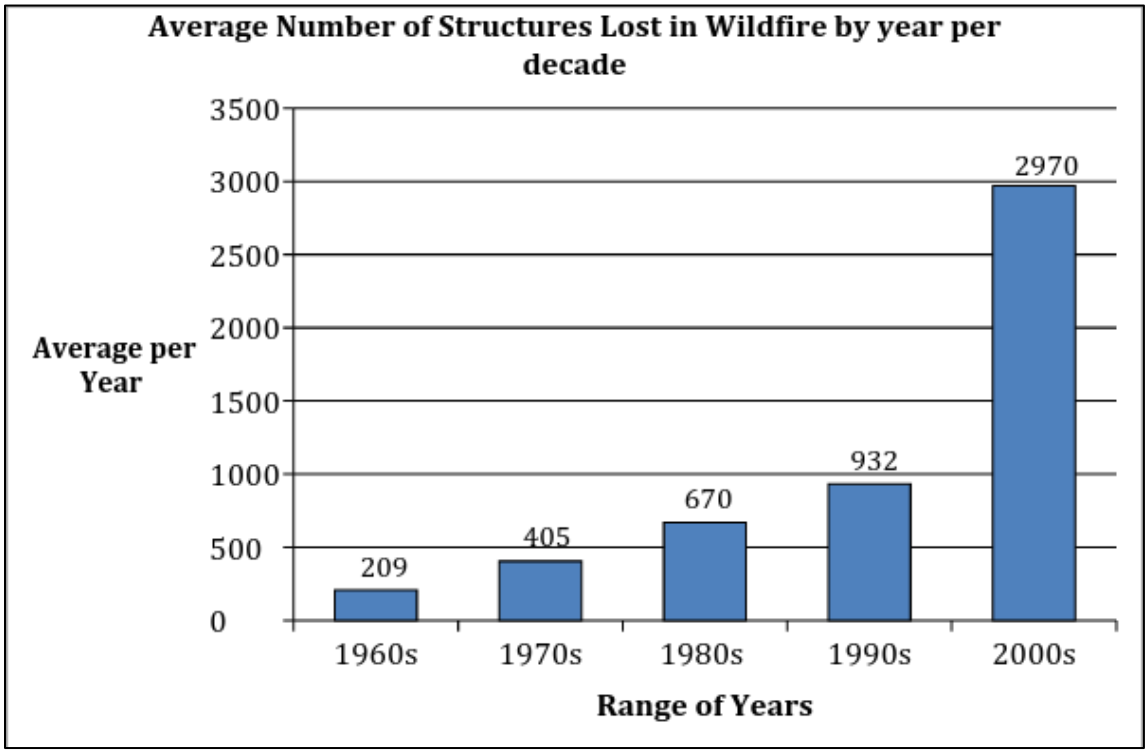


Figure II – 1. Structures Lost by Decade. Graph demonstrates the gradual increase in structure loss until the year 2000 where number of structures lost is 3 times higher than the 1990's. Data from International Association of Wildland Fire 2013.

The financial and social costs of wildfires demonstrate the need to reduce fire impact on lives and property through prevention and protection methods. Assessment of the short- and long-term economic and environmental consequences from large-scale wildland fires indicates that cost savings can be realized through preparedness and risk reduction. This includes a coordinated effort of planning for fire protection and implementing activities among local,

state, and federal agencies, the private sector, and community organizations.

Recent fire seasons bring the wildland interface problem and the problem of overabundant dense forest fuels to the forefront. The forest fuels issue is a major and continuing problem that has received national attention. Work is underway to reduce fuels in WUI areas by way of community involvement and funding from the *National Fire Plan* and the goals of the Cohesive Wildfire Strategy. National Fire Plan goals are to:

- Ensure sufficient firefighting resources for the future.
- Rehabilitate and restore fire-damaged and fire-adaptive ecosystems.
- Reduce fuels (combustible forest materials) in forests and rangelands at risk, especially near communities.
- Work with local residents to reduce fire risk and improve fire protection.

As with many programs, funding is critical to success. Funding sources are not always straightforward; knowledge of mechanisms to acquire revenue increases the likelihood of participation and program success. Potential for cost savings can be achieved through coordinated efforts in prevention, preparedness, and risk reduction.

Community Assistance grants and other grant opportunities to aid in achieving these goals are available through federal, state, local, and private grants as well as grants offered through the National Fire Plan (NFP) and Cohesive Wildfire Strategy. Efforts toward these goals represent a substantial amount of work, and their ultimate success will depend on involved landowners, agencies, and organizations working in concert. The CWS recognizes that western landscapes are generally more vast, steep, and limited-access. For this reason, the CWS recommends landscape scale changes are needed in vegetative structure and fuel loadings to significantly alter wildfire behavior, reduce wildfire losses, ensure firefighter safety, and improve landscape resiliency (CWS 2014). No agency or group working alone can achieve the CWS and the NFP's goals.

Applying funds on the ground within the WUI Zone and CARs in advance of a wildfire event is anticipated to reduce costs of suppression and loss of properties when a fire event happens. Practices such as harvesting and thinning, prescribed burning (where appropriate), and fuel reduction throughout the identified areas are key to mitigating wildland fire threat, fire effects, and fire risk. Vigorous cross-boundary management on both public and private land holdings is crucial to addressing the interdependence and statutory responsibilities among jurisdictions.

Opportunities for Improvement

It is the desire of the CWPP to provide resource funding mechanisms in order to apply prevention, protection, response efforts on the landscape both pre and post wildland fire events. Grant and funding mechanisms are listed in Appendix I, identifying what avenues are available to access revenue in addressing

mitigations tiered toward the plans goals. Collective participation is imperative for acquisition of revenue.

In a survey of Colorado homeowners examining willingness to pay for prescribed fire, thinning, and fire suppression, Kaval et al. (2006) found support for reducing fuels now, and showed that those who had conducted defensible space activities were more willing to pay for thinning on public lands (Kaval and Loomis 2008).

In Oregon, all land that is zoned Forest Resource by the state is automatically subject to wildfire mitigation requirements to protect adjacent property. In addition, because mapped wildfire areas are often done at a general level and may contain errors, many communities require that a site-specific wildfire analysis be done for proposed projects in a mapped area to make sure that wildfire measures are, in fact, necessary and justified (NFPA 2013).

The CWPP is designed to accomplish a wildfire analysis of Wallowa County. The Oregon Legislature boosted national forest restoration, allocating $2.88 million in state lottery funds to accelerate projects in eastern Oregon (Andersen 2014). This allows for implementation of restoration projects with “boots on the ground” by local forest collaborative groups working together on complex forestry issues. Additionally, it has enabled the U.S. Forest Service a number of opportunities for acquiring funds to accelerated thinning and restoration projects for various reasons, including fire risk reduction (Andersen 2014).

Oregon continues to be proactive in emergency preparedness and wildfire mitigation efforts. As part of the movement toward cross-boundary treatments, several mechanisms have been made available in an attempt to support and work collaboratively with communities including activities that promote wildfire risk reduction.

Oregon is home to the HB 2050 Wildfire Protection Act that is designed to control and equally distribute costs in Oregon’s wildfire protection system, which combines state and landowner resources to protect forest and communities (ODF 2013). This legislation is designed to increase capacity to extinguish fires rapidly, before they become large and costly (Oregon.gov 2014).

Oregon Senator Ron Wyden’s office has made available *A Guide to Federal Grants,* which provides details regarding grant names, purpose and description, eligibility, web site, contacts and any matching funds requirements (Appendix I). Specific grants within the Public Safety section are designed to assist firefighting in communities.

Wyden Amendment (16 U.S.C. 1011a) allows the Forest Service and BLM to enter into cooperative agreements with landowners for the protection, restoration, and enhancement of fish and wildlife habitat and other resources on public or private lands, as long as the agreement benefits the fish, wildlife, and other

resources on national forest and BLM lands within the watershed (GAO 2017)

Good Neighbor Authority (2014 Farm Bill) (16 U.S.C 2113a) that authorizes the Forest Service and Bureau of land Management to enter into “good neighbor” agreements with state governors, under which the federal agencies and the states can carry out similar and complementary forest, rangeland, and watershed restoration services, including fuel reduction projects, on both federal and nonfederal lands (GAO 2017)

The Grants.gov Program Management Office offers numerous federal funding opportunities in a centralized location. The site is designed to provide a common website for federal agencies to post discretionary funding opportunities and for grantees to find and apply to them (Grants.gov 2014). This site allows for easy search criteria to be used to identify grants with specific purposes. This avenue of grants awards more than $500 billion dollars annually, centralizing more than 1000 grant programs across all 26 federal grant-making agencies.

Cooperative Forestry Assistance Act of 1978 (Pub. L. No 95-313). This authorizes the Secretary of Agriculture to provide financial, technical, educational, and related assistance to state foresters or equivalent state officials to carry out activities such as protecting forest lands from damage caused by fire (GAO 2017).

Cost-Share Grant Programs through National Fire Plan

ODF provides homeowners within Wallowa County a free home site inspection. After the inspection, technical advice is shared with the homeowner as to what can be done to lessen the structural ignitability rating of the home. The amount and type of vegetation to be removed varies depending on the amount of survivable space needed to protect the home. This could entail a substantial cost to the homeowner; however there may be grant funds available to share in the cost of the project. (See Appendix I Funding Mechanisms)

Funding is highly competitive across the counties and states. This CWPP is intended to provide increased leverage by addressing multiple fire issues and concerns through a highly collaborative process. Issues and opportunities outlined in the following chapters are developed with this approach in mind.

During the development of this plan, several collaborative meetings occurred including: a fire management meeting with rural fire chiefs, a simulation with local cooperators could either contribute to successful outcomes or posed additional concerns during wildfire, community wildfire survey of homeowners, public meeting with homeowners in the Lostine CAR, the stock growers committee, and other interested members of the public. The workshops allowed the steering committee an opportunity to discuss the plan concepts, completion timeline, the risk assessment, values threatened, and any additional concerns related to emergency services and fire agency response. Meetings were held primarily in

Enterprise and Lostine. Discussion topics included the importance of the planning effort, the local risk assessment and emergency operations related to wildfire events, formulation and rationale of WUI Zone, CARs, and potential projects (see Chapter V for Community Workshop Summaries).

Summary

Wallowa County is dedicated to developing a CWPP that addresses the concerns of the National Fire Plan and embraces the new Cohesive Wildfire Strategy's three goals of fire response, fire-adapted communities, and restoring and maintaining local landscapes. Through committed, coordinated efforts with fire agencies, cooperators, and communities the county strives to educate on fire response, prevention, and risk mitigation.

Recognizing that fire knows no boundaries, the Wallowa County CWPP strives to create a broad-scale approach when addressing the counties wildland fire conditions. Through an "all hands-all lands" stance, joint efforts of landowners will provide much needed improved forest conditions; the aim is to intercept wildfire spread by slowing forward progress, altering fire behavior, and generating increased opportunities for suppression success. Living in a fire-prone environment requires an understanding of inherent risks, fire dependent ecosystems, and types of actions landowners can take in fire mitigation efforts.

Current efforts are designed to meet desired future conditions such as:

- Increased response capacity of local fire management resources through improved training, equipment, and facilities.
- Developing fire-adapted communities through public awareness and involvement supports the cross boundary approach.
- Having common missions and terminology to aid both the public and fire management agencies in understanding the desired results for fire risk mitigation.
- Promote resilient landscapes that can withstand and recover from wildfires.

When living in a landscape dependent on fire disturbance, it must be recognized that creating resilient landscapes is key to sustaining healthy ecosystems while reducing long term costs of doing business. Historical fires burned through the forests of Eastern Oregon creating an area prone to low fire severity with occasional mixed severity results.

Collaboration is essential to achieving the mission and goals of this document. These proposed communication efforts build upon existing methods to improve not only social facets but also to recognize the importance of community economics and ecological functions. Creating and maintaining lasting partnerships makes success of the CWPP goals a likely outcome.

Meetings designed to hear all voices and consider all options create a sense of ownership toward goal attainment. Collaboration and combined efforts on the ground increase opportunities to obtain funding; many funding mechanisms today often inquire about collaborative efforts occurring on adjacent lands. Partnerships in mitigation measures increase the probability of awarded monies, thereby increasing the likelihood of successful fire suppression efforts.

Bibliography:

Andersen, 2014. Forests for Oregon magazine of the Oregon Department of Forestry, Fall 2014. Article: *A New Game Plan for Oregon's National Forests*. Tony Andersen

Board of Forestry. 2013. Northern Blue Mountain Cohesive Strategy Pilot Project Action Plan. Board of Forestry July 25, 2013 Meeting Minutes Attachment 18; Agenda Item B

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Fire Adapted Communities (FAC) 2014. Fire Adapted Communities, http://www.fireadapted.org/resources/what-is-a-fire-adapted-community.aspx

Flame Act 2009. The Federal Land Assistance, Management, and Enhancement Act of 2009, Report to Congress.

GAO 2017. United States Government Accountability Office. Report to Congressional Requesters. *WILDLAND FIRE RISK REDUCTION Multiple Factors Affect Federal-Nonfederal Collaboration, but Action Could Be Taken to Better Measure Progress.* May 2017 GAO-17-357.

Gebert, K.M.; Calkin, D.E.; Yoder, J., 2007. *Estimating Suppression Expenditures for Individual Large Wildland Fires.* Western Journal of Applied Forestry. 22: 188–196.

Hammer, Roger B. 2009. Department of Sociology, *Sustainable Rural Communities Initiative*, Oregon State University, Corvallis, Oregon, USA

Hammer, Roger B.; Stewart, Susan I.; Radeloff Volker C.; 2009. Forum: *Demographic Trends, the Wildland–Urban Interface, and Wildfire Management* Society and Natural Resources, 22:777–782 Copyright # 2009 Taylor & Francis Group, LLC ISSN: 0894-1920 print=1521-0723 online DOI: 10.1080/08941920802714042

Heyerdahl, Emily and Jim Agee, 1996. *Historical Fire Regimes of Four Sites in the Blue Mountains, Oregon and Washington*.

Liang, J.; Calkin, D.E.; Gebert, K.M.; Venn, T.J.; Silverstein, R.P. 2008. *Factors Influencing Large Wildland Fire Suppression Expenditures.* International Journal of Wildland Fire. 17: 650–659.

Maruoka, Kathleen Ryoko 1994. *Fire history of Pseudotsuga menziesii and Abies grandis stands in the Blue Mountains of Oregon and Washington*. M.S. thesis. Seattle, WA: University of Washington

National Fire Protection Association (NFPA), 2013. *Community Wildfire Safety Through Regulation – A Best Practices Guide for Planners and Regulators*.

National Wildfire Coordinating Group (NWCG), 2014. *Wildland Urban Interface Wildfire Mitigation Desk Reference Guide*, PMS 051. August 2014.

Oregon Department of Forestry, 2013. House Bill 2050: Wildfire Protection Act. 2013 Legislative Session.

Oregon Department of Forestry, 2013. *West Wide Wildfire Risk Assessment, Final Report – Addendum I*, Detailed Technical Methods March 31, 2013. The Sanborn Map Company, 2012.

Tidwell, Tom 2011. USDA Chief of the Forest Service, Speech: *Investing in a Restoration Economy*. National Capitol Society of American Foresters, Luncheon. Washington, DC May 25, 2011.
USDA 2004. United States Department of Agriculture; U.S. Forest Service; U.S. Department of Interior; Bureau of Land Management. The Healthy Forests Initiative and Healthy Forests Restoration Act, Interim Field Guide.

U.S. Department of Agriculture [USDA], Forest Service. 2011c. Wildland fire suppression costs: ten-year rolling average. Unpublished data provided by the Forest Service Budget Staff. On file with S. Stein, USDA Forest Service, Cooperative Forestry, 1400 Independence Avenue, SW, Mailstop 1123, Washington, DC 20250-1123.

USDA 2014. United States Department of Agriculture, Fiscal Year 2015 Budget Overview for the U.S. Forest Service, March 2014.

WC CWPP 2006. Wallowa County Board of Commissioners, Oregon Department of Forestry, Wallowa County Emergency Services, and county structural fire departments. Wallowa County Community Wildfire Protection Plan, March 24, 2006.

Web links:

FAC 2014.
http://www.fireadapted.org/resources/what-is-a-fire-adapted-community.aspx

Oregon.gov 2014. https://www.oregonlegislature.gov/citizen_engagement/Reports/BB2014Forestry.pdf

III. Wildland-Urban Interface Planning

Introduction

Both the National Fire Plan (NFP) and the "Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities and the Environment" place a priority on working collaboratively with communities in wildland urban interface to reduce their risk from large-scale wildfire.

The incentive for communities to engage in comprehensive forest planning and prioritization was given new momentum with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. The language in HFRA provides maximum flexibility for communities to determine the substance and detail of their plans and the procedures they use to develop them. HFRA emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and it places priority on treatment areas identified by communities themselves in a community fire plan. Combine this with the direction of NFP and the "Ten-Year Comprehensive Strategy…," which also states that collaboration and prioritization of projects by a community is essential (USDA 2004, WC CWPP 2006).

HFRA requires that three entities must mutually agree to the final contents of the CWPP:

- The applicable local government (i.e., counties or cities);
- The local fire departments(s) or representative of a county's structural agencies; and
- The state entity responsible for forest management (Oregon Department of Forestry.

Additionally, Federal Emergency Management Agency (FEMA) provides funding mechanisms for grants and training for firefighting and for community response to natural disasters (Kruger 2016). Projects to reduce the risk of future fires may also be eligible under FEMA's Pre-Disaster Mitigation Program. The Stafford Act provides the legal basis for state tribal, and local governments to undertake risk-based approaches to reducing natural hazard risks through mitigation planning and requires state, tribal, and local governments to develop and adopt FEMA approved hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance (FEMA 2017). The NE Oregon Hazard Mitigation Plan (NEOHMP) completed in 2014 also advocates for collaborative and the implementation of action items identified in this CWPP.

The Cohesive Wildfire Strategy (CWS) released in 2014 recognizes the need for collaboration when developing local CWPP plans. Fire adaptation is viewed as a continuum, with communities moving toward fire adaptation through concerted collaborative effort that include CWPPs (CWS 2014)

The Wallowa County CWPP is part of a pilot project for the CWS that puts emphasis on a planning process designed to involve the recommended entities listed above as well as incorporating new approaches toward wildfire mitigation efforts. Details of collaboration and participation will be addressed in Chapter VI.

Wildland-Urban Interface Zone Concept

Wallowa County is the northeastern most county in Oregon. The county is bordered by two states, Idaho to the east and Washington to the north. This area was and continues to be home to the Nez Perce Tribe.

Today, several communities are established primarily within the Wallowa Valley and along some of the county's rivers. The communities in Wallowa County are considered Wildland Urban Interface areas (WUIs), with a high percentage of the structures within or adjacent to forested lands.

In August 2001, the Federal Register provided a comprehensive list of communities identified as Urban Wildland Interface in the vicinity of Federal lands that were considered at risk from wildfire. Wallowa County communities in the federal register include Freezeout Creek, Hurricane Grange, Imnaha River Woods, Imnaha, Lostine, Prairie Creek, Lostine River Subdivision, Ski Run/Ski Run Road, Wallowa Lake Basin,

It is important to note that the urban wildland interface is not limited to communities in the vicinity of Federal land. Many states submitted revised lists for communities within their State regardless of their relationship to Federal land (Federal Register 2001). In an assessment, *Communities at Risk,* conducted by the state of Oregon in 2006, the cities of Enterprise, Joseph, Wallowa, and the County of Wallowa were also identified as at risk (ODF 2006).

Additional Wildland Urban Interface areas of concern not listed by the Federal or State records but are identified in Wallowa County's 2006 CWPP are: Alder Slope, Allen Canyon, Bartlett and Eden Bench, Bear Creek, Davis Creek, Divide Camp, Dry Creek, Flora, Liberty, Little Sheep Creek, Lost Prairie, Powers Meadows, Promise, Troy, and Wallowa Canyon. These areas are comprised of small communities or a high number of scattered residential homes across the county's landscape. This updated CWPP will carry over the Federal, State, and county listings as part of its fire risk assessment.

Western states contain vast forested landscapes that are often remote and steep. With a finite amount of fire protection resources, these states are recipients of lightning starts that annually burn an average of 4,666,030 acres from wildfires based on data between 2008 and 2012 (CWS 2014). In addition to natural lightning starts, each year wildfire growth is further compounded by centuries of fire exclusion, long-extended drought, and increasing insect and disease mortality. As a result, fire suppression resources have become less effective and wildfire behavior more extreme. Wallowa County is no exception with its vast grassland and forested landscape where access is limited due to a multiple of reasons that include inadequate or poor road conditions, dissected steep

terrain, and Wilderness boundaries adjacent to private making it inaccessible for some suppression equipment.

The Cohesive Wildfire Strategy (CWS) acknowledges these issues and the potential threats they pose by recommending *large landscape-scale* changes in vegetative structure and fuel loadings in order to significantly alter wildfire behavior, reduce wildfire losses, ensure firefighter and public safety, and improve landscape resiliency (CWS 2014).

The 2006 CWPP identified and prioritized twenty-two WUI areas in Wallowa County. The new 2016 revision recognizes the need, based on "middle ground" landscape treatment concepts, to reassess the concepts behind Wildland Urban Interface areas as well as their size and number of WUI areas. For this reason new approaches have been developed in addressing the conditions driving wildfire risk and urban interface areas.

The term "middle ground" refers to the areas between communities and the more distant wildlands (CWS 2014). These middle ground areas play a significant role when developing efforts for altering wildfire behavior prior to it reaching communities. Multiple CWPP committee discussions occurred regarding the best methods for addressing these lands. A new approach was agreed to by the CWPP committee that is consistent with the CWS involving additional acreage. There was also agreement to merge the original wildland urban interface areas in more contiguous areas that represent communities at risk within the county.

As a result the group identified two large Wildland Urban Interface "Zones" (WUIZ) that took into consideration this middle ground landscape (Figure VIII – 1). The CWPP committee also recognized the importance of identifying specific issues facing communities in terms of wildland fire risk. These communities at risk (CAR) and their assessments can be found in Chapter VII. While the CAR assessment provided a wildfire risk ranking of relative comparison for communities, the WUI Zone allowed managers to take a holistic approach in wildfire risk mitigation at a landscape level.

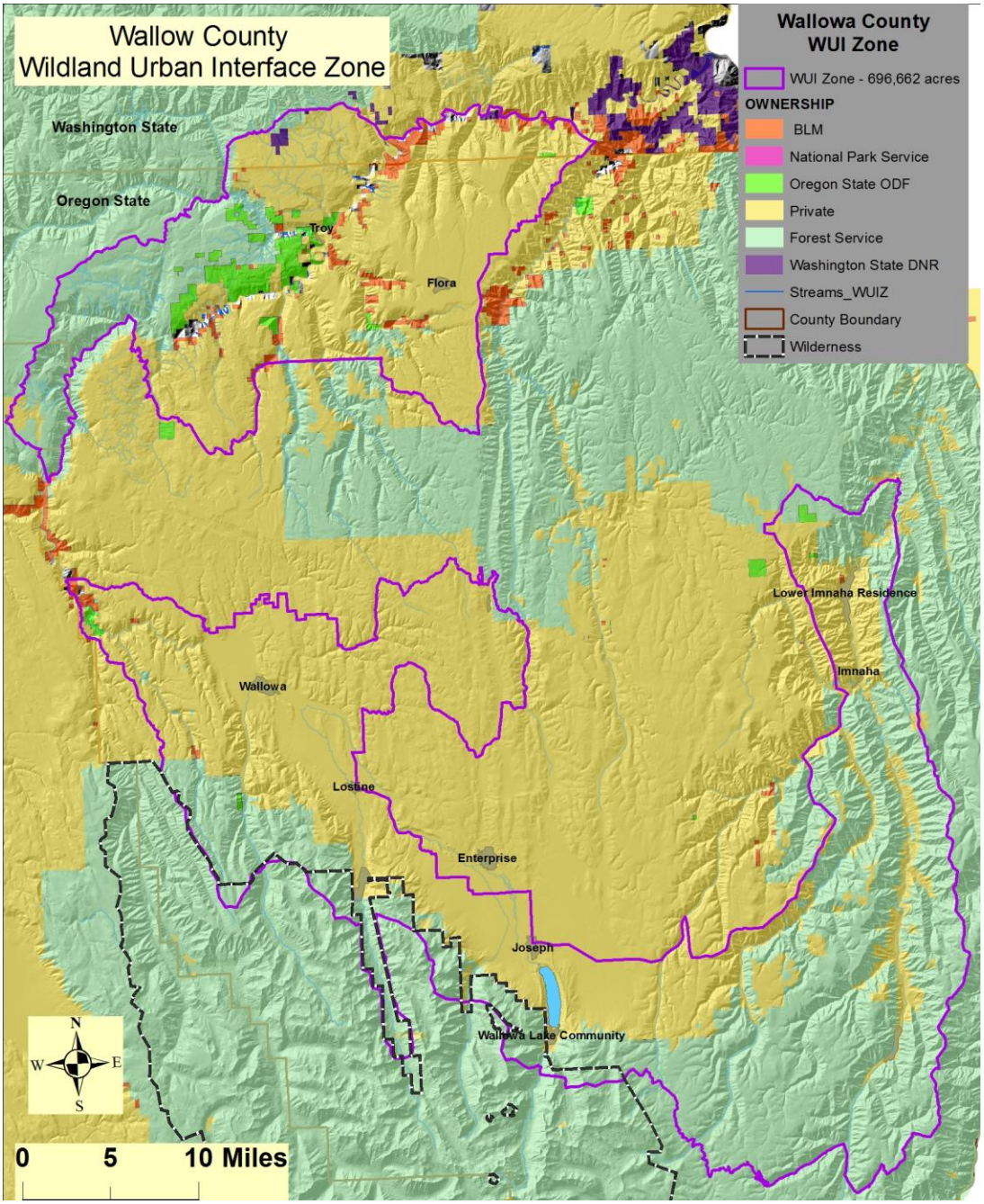


Figure III – 1. Wildland Urban Interface Zone. Incorporates the landscape between communities and distant lands.

There were several positive aspects identified for this new WUI Zone concept model:

1. It addresses the all hands-all lands concept where fire prone landscape areas have the need to involve both landowners near communities and landowners where large fires can develop then spread toward communities posing a threat to life and property. It dissolves property lines when it comes to fire threats, acknowledging fire has no boundaries and approaching cross-boundary treatments as a whole instead of isolated units.

2. It allows for a holistic approach to treating large acreages, recognizing the need for both first entry risk reduction as well as maintenance of previous investments, thereby addressing treatments in a temporal and spatial approach. It is important to include treatment of lower priority areas and maintenance of previously treated areas, particularly when that ground separates two high priority areas on the landscape. There is a growing need to balance previously completed activities with new treatment areas to protect earlier investments during a single entry approach.
3. Previous individual WUIs were rated against each other, resulting in competition for funding between wildland urban interfaces. This new approach recognizes that although some communities may be of higher risk and need, it does not eliminate opportunities for landowners in moderate or low risk areas to initiate or continue to promote risk reduction measures. It also allows for specific attributes that contribute to fire risk to share funding with other communities with similar mitigation needs.
4. Defensible space is no longer limited to land immediately adjacent to homes and structures but now includes lands that provide an extended treatment buffer between distant forest and communities, thereby creating an opportunity to stop the fire in the middle ground, well in advance of reaching structures. Designing projects that improve wildfire buffers between large forest blocks and private lands increases management and suppression options, while preserving ecosystem integrity in the event of a wildfire. It also provides opportunities to consider large-scale application of tools which otherwise would not be applicable and/or cost effective at a smaller scale.
5. The WUIZ allows for consideration of mitigation measures that protect natural resources values to occur during treatment endeavors, where and when appropriate. It increases fire managers' ability to protect important community values and investment in locations that meet multiple resource management objectives.
6. Creates opportunities to protect areas that may otherwise not be considered. Provides options within the WUIZ to seek out areas considered of value to county citizens that are not necessarily associated with a specific threatened community. It gives individuals an opportunity to be involved in mitigation efforts and creates a sense of ownership in protection efforts focused on these values such as: favorite recreation sites, viewpoints, forested byways, historic sites, visual and scenic resources, etc.
7. Provides opportunities for increased participation by *all* county residents, not just those directly at risk, to provide input on their forest and valued interests.
8. Enables possibilities of assisting multiple landowners with risk reduction treatments through a single funding source and project design. Distribution of funds would not be limited to one "WUI" area but to the entire WUIZ that meet the criteria of the funding source. This approach eliminates the competition for funding that previously existed.
9. Eliminates the need to separate the three national Cohesive Strategy goals. Landscape approaches (WUI Zone) allows for achieving multiple goals and

objectives in the same location, creating a synergy or mutually reinforcing positive effect (CWS 2014).

The WUIZ method helps address issues with reduced budgets, declining forest management staff, increased wildfire potential and their combined impacts on risk and safety. Uniting agencies and public efforts creates additional avenues for funding acquisition at all levels that may otherwise be unattainable.

The rationale for a WUIZ is further supported by the Management Options outlined in Chapter 3 of the Cohesive Wildfire Strategy. Applying a "one size fits all" wildfire risk mitigation solution is not realistic for all counties in Oregon. The WUIZ allows each county to focus on attributes specific to their area. These options can be designed to either change wildfire extent and intensity, number of human caused ignitions, or to alter risk by changing the degree of exposure (CWS 2014) of both firefighting personnel and local values.

The CWPP committee created the following final definition. The wildland-urban interface zone is:

> *"An area strategically identified that provides effective wildfire defense for communities, infrastructure, and other values at risk that meet or intermingle with wildland fuels and offer opportunities for broadened mitigation measures designed to interrupt wildfire spread and modify wildfire behavior in order to protect social, economic, and environmental interests".*

The National Fire Plan and the Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities and the Environment place a priority on working collaboratively within communities in the WUIZ to reduce their risk from large-scale wildfire. **The Cohesive Wildfire Strategy places strong emphasis on community and agency involvement early in the process to create a sense of ownership by all parties.** For this reason by developing the WUIZ, it is intended to emphasize an "in it together" approach for reducing wildfire threat. It creates opportunity to draw into discussions county residents who may not have land or structures at threat but place a high value on recreational and/or local natural resources.

Plan Review Schedule and Mechanisms

Plan maintenance will be directed by Wallowa County Emergency Services and coordinated with the plan's steering committee members, a core group of who have agreed to be a standing committee to assist with monitoring and evaluation.

Plan review and maintenance will be set annually, at a minimum. The annual meeting will consist of a plan review, re-evaluation of priority mitigation action items, and progress of accomplishments and challenges.

A total plan revision should occur at least every 5 years or as needed based on evolving local, state, and national strategies and policies, funding opportunities and local conditions.

Plan revision is recommended as the infrastructure needs of Wallowa County change. Specific considerations during revisions include: population fluctuations, land use changes, completion of fuels reduction projects, emergency service improvements, computer software/hardware updates, new and revised data, and extreme wildfire hazard fluctuations. Revisions should be directed in part by applicable policies and guidelines at all jurisdictional levels regarding matters such as: Land Management, Fire Management, Rural Housing Development, etc.

Annual evaluation of strategies and recommendations will be necessary as changes to wildfire risks become altered or circumstances (if less than a year) make it necessary to re-evaluate the plans progress and intent. Given the dedicated time, collaborative effort, and cost to revise the CWPP it is vital that follow-up monitoring and evaluation of the plan occur. Understanding that communities change, infrastructure needs are adjusted, and forests are dynamic, the risk of wildfire to communities cannot be viewed as static. At a minimum the CWPP committee should meet to complete an annual progress report of accomplishments and challenges. A form to record progress is located in Appendix L.

Each participant must maintain an ongoing commitment to work through the plan with community, cooperators, and fire agencies in Wallowa County. Community outreach and education is a continuous process of building on established relationships and developing new affiliations whenever possible. Outreach opportunities can be found in Chapter V. Annual reviews should be announced in order to include representation from the stakeholders who participated in the development of the Community Wildfire Protection Plan.

Mechanisms for initiating a CWPP Committee meeting are outlined in Appendix L page 9, under the form titled *Go/No Go CWPP Evaluation, Revision, or Committee Meeting*. This table is designed so that any question that receives a “yes” answer warrants the need for the CWPP Committee to meet and discuss changing conditions or progress. It provides the Evaluator key, unbiased questions or conditions that would typically create a need to re-assess the County CWPP. These questions can and should be modified or changed to meet the needs of the CWPP committee or process.

Mechanisms to identify the need for public meetings will be left up to the CWPP Committee unless there is a high level of demand for fire agencies assistance by landowners or unexpected tensions between parties. Notification of meetings in Wallowa County should not be limited to one type of outreach. Multiple avenues should be used to encourage as many citizens as possible to attend the meeting. The best forms of public announcement and access utilized at the time of this revision were: radio, Facebook, internet web sites, newspapers, US Postal Service, and local residence assistance. As thoroughly as possible, record and maintain a detailed list of

participants that have participated in some fashion in the CWPP development and implementation.

All records of accomplishment, data, funding acquired, equipment, and infrastructure improvements should be identified and recorded to the CWPP file. The file will follow the current planning process with a joint effort between Oregon Department of Forestry (ODF) and Wallowa County. Whenever possible, geographic location points with longitude and latitudes and/or polygons should be made known. This allows up-to-date information to be entered in the CWPP file. Whenever possible map or document accomplishments to display across boundary treatments, level of landowner participation, specific locations of mitigation action items, and areas where maintenance work will not be overlooked in the future.

There is a form (Annual Community Wildfire Protection Plan Evaluation Form) available for reporting annual accomplishments in Appendix L. The form provides a level of standardization for the CWPP committee when assessing progress. During the year each fire management agency is responsible for updating plan achievements, at a minimum. Progress or obstructions to work completion should be identified and posted to maintain discussions throughout the year in an effort to prevent redundant occurrences. The annual information should be presented at the annual CWPP committee meeting. Annual postings will inform the collaboration group of trends in implementation issues, successes, and other topics contributing to or preventing success in plan implementation. Ongoing upkeep of records and documentation throughout the year can be used during the next plan update. Written communications of progress are needed for tracking purposes.

In an attempt to provide consistent messages, common language definitions are provided in the *Glossary of Terms.* These definitions provide a level of standardized terms and concepts necessary for clear communication between agencies and with members of the public. Eliminating confusion in definitions is the first step to a common vision and expected outcome. Shared terms among agencies can be found in Appendix J: *Glossary of Terms.*

Customized terms or reporting may occur within specific fire agency guidelines and/or policies. An example is the reporting of new fire starts. Each agency has its own required reporting process and form for database upload. There is however, specific, standardized information that is *required* in order for a holistic County approach during the next revision. New fire starts regardless of responding agency *must* report at a minimum fire start date, latitude and longitude, cause, and fire size to provide meaningful statistical information. This ensures consistent and statistically valid data and is a priority of this plan.

Agencies also have customized terminology of definitions and conditions regarding forest management as outlined in their agency's direction. Management direction and terms must remain tailored to their agency's specifications. This plan does not serve as a means of bypassing the individual processes and regulations of the participating

agencies. Each project must adhere to any pertinent local, state or federal rules or guidelines in determining the point of project implementation. The plan is a coordinating document for wildfire mitigation measure and forest projects related to safety, education and outreach, information development, fire protection, and fuels treatment for altering fire behavior.

National Priorities

The National Strategy, supported by scientific analysis, processed over 100 different data sources to thoroughly examine wildland fire issues across the nation in order to understand the differences and similarities among locations.

National Strategy for prioritizing where activities should be emphasized was based on the premise that planned actions have a greater likelihood of being most effective and efficient in areas where conditions contributing to the issue are most severe (CWS 2014). Four spatially prioritized opportunities and challenges were assessed in the CWS at the national level.

1. In areas that historically were frequented by fire, successful suppression efforts have exacerbated fuel conditions that contribute to higher intensity wildfires. As a result, these fires become more damaging and costly while threatening both firefighter and public safety (CWS 2014).
2. Homes, communities, and other values are at risk simply because of their proximity, or juxtaposition with flammable natural vegetation in environments conducive to wildland fire (CWS 2014).
3. Human ignitions account for the majority of wildfires throughout the Nation, requiring response organizations to be maintained in most locations (CWS 2014).
4. There is a need for highly competent multi-jurisdictional response resources with capabilities to quickly suppress the majority of wildfires. The effects of large wildfires are not only costly from an economic and ecological impact standpoint, but also threaten the health and safety of firefighters and public (CWS 2014).

On a measure of High, Moderate, Low, or Very Low, the CWS's broad scale look at a national assessment (mapping) of the above four topics resulted in Wallowa County as:

Category	National Rating
Vegetation and Fuels Management	High Priority
Homes, Communities, and Values at Risk	High Priority
Managing Human-caused Ignitions	Low
Effective and Efficient Wildfire Response	High Risk of Wildfires More Potential for Resource Benefits

Table III – 1. National Priority rating for Wallowa County relative to counties from all lower 48 states. Information was taken from maps located on pages 61 – 64 of the Cohesive Wildfire Strategy.

The National Strategy emphasizes the safe and effective response to wildfire as the highest priority. Acknowledging that equipment and personnel are important for wildfire response, areas such as improved coordination, communication, and training are important components of intergovernmental preparedness and should be included locally as well.

Wallowa County Plan Priorities

Details of prioritization of elements within this plan are outlined in Chapter VII, describing various levels of risk, threat, and effects geographically on the landscape. Recognizing possible time and budget constraints, prioritization should be given to firefighter and public safety first and foremost.

Elements key to firefighter and public safety are given the highest importance with actions that provide the most efficient approach to wildfire risk reduction. Using analysis completed in the West Wide Risk Assessment for the State of Oregon, local data, community knowledge and expertise, county components were identified that took precedence as priority. Potential for high priority conditions within the county included both temporal and spatial considerations:

a. Treatments across jurisdictional boundary creating a contiguous landscape of treatments.
b. Deficiencies in equipment and infrastructure where improvements would increase fire response success.
c. Locations of high fire threat (includes start density) and fire effects (potential negative impacts to values) that result in a high and extreme fire risk.
d. Potential threat to firefighter and public safety exceeding what would be considered an inherent risk or one that is preventable through a mitigation action. An example would be poor ingress/egress,
e. Identified high fire occurrence level locations with long response times or no local response capabilities.
f. Areas where concentrated ignition starts are coupled with vegetation that contributes to extreme fire potential.
g. Actions that improve suppression effectiveness and successful value protection.

Conditions where multiple high potential for a undesirable outcomes overlap one another convey locations and actions needed to address the most efficient use of funds while still meeting both the local and national intent.

Roles and Responsibilities:

As part of the priority process, information was gathered from multiple facets of the population. These sources provided key information and played a role in the development of this plan. Our CWPP development occurred through that collective effort from multiple agencies, cooperators, and public members. Understanding the

roles and responsibilities of those involved will provide insight on development and implementation of the plan.

County Commissioners

Final approval of the CWPP will be conducted by the Wallowa County Board of Commissioners. As part of CWPP planning and development, the county commissioners maintain oversight of the planning and implementation process. Plan maintenance will be coordinated through Wallowa County Emergency Service. In addition, they will:

1. Remain informed on progress through all stages of the plan.

2. Provide final Plan approval and approval of any revisions to the CWPP.

Wallowa County Emergency Services (WCES)

Wallowa County Emergency Services was a primary lead during the CWPP committee meetings, media venues, oversight of plan development, and coordination with county officials. Its roles in the CWPP include:

1. WCES is responsible for apprising the county commissioners and cohesive wildfire strategy group on the progress of the CWPP on topics regarding plan maintenance, plan implementation, and progress.

2. Provides oversight to the CWPP committee on all aspects of plan development.

3. Maintains involvement in plan implementation and public contact to ensure firefighter and public safety is priority.

4. Coordinates with local fire management agencies to meet the three goals of the CWPP.

5. Holds and maintains the CWPP document, forms, and project files.

CWPP Committee Members

Multiple fire management agencies were represented on the CWPP committee. Those participating on a regular basis included: Oregon Department of Forestry, Wallowa County Emergency Services and Fire Chief, Umatilla Fire Management, Wallowa-Whitman (Wallowa Fire Zone) Fire Management, Bureau of Land Management Fire and Fuels, local private landowner, and Blue Mountain Cohesive Wildfire Strategy Pilot Project Lead. These individuals worked through numerous meetings assessing county conditions and identifying mitigation action items needed to reduce impacts from wildfires. Their ongoing responsibilities include:

1. Oregon Department of Forestry provides the lead in developing the risk assessment for the CWPP and its five year revision (ODF 2015).

2. Provide local knowledge and data to be incorporated into the county CWPP.

3. Continued public contact and implementation of the action items identified within the CWPP. Submit progress reports for their agency on meeting those action items.

4. Work together collaboratively between agencies and public to meet the three goals of the CWPP.

5. Continue as part of a collective group to assist members of the public in acquiring funding to reduce wildfire risk.

6. Collectively participate and provide assistance at public meetings on the CWPP concepts.

7. Recommend, review, and give input into the content of the CWPP Plan.

8. Participate in ongoing CWPP meetings.

Rural Fire Departments

Rural fire departments play a complex role in county protection services. These fire resources not only are important in fire response; they are also crucial for communications with local landowners in their areas. Many of the rural firefighters are members of the communities in which they serve and have an established rapport with citizens. As a result they are often the first contact for risk mitigation information. Their participation includes:

1. Participate on the CWPP committee through a representative and convey input to that representative about knowledge of local fire issues in their districts.

2. Provide representation at public meetings to share concepts behind the CWPP with community members.

3. Work with other fire management agencies to educate and encourage members of the public to implement and meet the CWPP goal of Fire Adapted Community.

4. Provide periodic reports to committee members on known landowners' fire risk reduction measures.

5. Continue to update fire statistical information for the State of Oregon Fire Marshal's Office; including but not limited to the following information: fire location using latitude/longitude, fire size, and fire cause.

6. Collaboratively work with other local fire management agencies in meeting the goal of Wildfire Response.

Cooperators

Wallowa County cooperators are significant players when it comes to wildfire prevention and participating in wildfire events. For the purpose of this document, cooperators are considered non-fire agencies that play a role before, during, and after a wildfire event. Cooperators are considered: agencies that supply assistance to direct tactical or strategic approaches and wildfire support to a wildfire event; infrastructures that could pose increase risk during a wildfire event; and they partake in prevention functions not only in the WUI Zone but in some cases throughout the county (i.e. Transmission lines, railroads). Examples of cooperators are Oregon State Police, Pacific Power Co., Union Pacific Railroad, and American Red Cross.

Their responsibilities differ somewhat from their fire agency counterparts.

1. Work collaboratively with lead fire management jurisdictional agencies in preparing for wildfire response regarding infrastructure.

2. Understand their role in emergency fire situations where infrastructure may pose threat to or assist in community protection.

3. Coordinate with Wallowa County Emergency Services in development or changes to infrastructure as part of annual progress report.

4. Participate in risk reduction whenever/wherever possible and fire prevention to reduce the number of human caused fires.

5. Support public and firefighter safety as the number one objective during a fire incident.

6. Has potential to be actively involved with fire agencies in all phases of a wildfire.

7. Actively participate in fire emergency simulations conducted by Wallowa County Emergency Services and Fire Organizations

Wallowa County and Adjacent Fire Management Agencies

Closest suppression resource concepts and cross boundary approaches, include fire agencies adjacent to Wallowa County. Wallowa County supports WUI Zones that are adjacent to or fall into another Fire Management agencies protection responsibility. This is particularly true in areas near Troy, Minam Community, the Tram-way on Mount Howard. These locations are bordering or expand into Umatilla National Forest – Umatilla County and Baker County.

1. Collectively report all fire starts according to their agencies protocols.

2. Understand the three goals of the CWPP its ideas and recommendations.

3. Work collaboratively toward the three goals of the CWPP during all phases of planning, implementation, and reporting.

4. Knowledgeable of WUI Zone concept. Understands fire risk, threat, and effects on the landscape and the need to reduce fire risk based on all hands all lands concept.

5. Function as part of joint effort of fire suppression in protecting life and property and minimizing wildfire impacts to communities while meeting the goal of wildfire response.

6. Oregon Department of Forestry notifies owners of properties within the county's forestland-urban interface (WUI Zone) areas (ODF 2015).

7. Participate in site visits and demonstration projects.

Community

The communities of Wallowa County are familiar with wildfire on the landscape; due to mother nature a small number of residence have firsthand experience of fire near their communities. For the most part, fire suppression resources have been highly successful in protecting the local communities.

With only a fraction of landowners having participated in risk reduction, community members are being encouraged to join with fire management agencies in protecting their local values. Oregon Senate Bill 360 is an option to enlist the aid of property owners toward the goal of turning fire-vulnerable urban and suburban properties into less-volatile zones where firefighters may more safely and effectively defend homes from wildfires (ODF 2015).

1. Property owners in identified forestland-urban interface areas, once notified that their land meets the criteria of forestland-urban interface, have two years to reduce excess vegetation, which may fuel a fire around structures and along driveways (ODF 2015).

2. Appropriately apply funds received for risk reduction to property based on funding source guidelines.

3. It is the CWPP committee's desire that landowners reach out to fire managers to convey their fire risk concerns and property needs.

Although some community members have participated more than others, input was vital toward a collaborative CWPP. Wallowa County residence are scattered across the landscape with the highest concentrations located along state highway 82 from Wallowa to the town of Joseph. In order to reach out to as many community members as possible the county tax assessment office inserted a letter and link to the wildfire risk survey in the annual property tax statements.

According to the Annual Population Report completed by Portland State University, the 2015 population estimate for Wallowa County was 7,100. Sixteen communities were identified around the county with populations ranging from less than 100 to approximately 1,940 residents, with the highest population centers in Enterprise and Joseph.

Western states support vast areas of forested and rangeland acres where potential fire spread may threaten rural communities. Wallowa County, Oregon is no exception. Because of the vast amount of forested public and private land surrounding the communities and their proximity to one another, a single WUI Zone concept met several recommendations for the western states outlined in the National Cohesive Strategy.

Summary

A comprehensive approach to the CWPP planning process is important to successfully meeting management and policy direction, promoting collaborative planning and addressing wildfire mitigation measures.

The 2014 Cohesive Wildfire Strategy played a significant role in the planning by putting emphasis not only on the forest areas in close proximity of private lands but takes into consideration expanding wildfire mitigation actions well beyond the property lines into the general forested areas. By recommending large landscape-scale changes to vegetative structure and fuel loadings an effort can be made to safely and successfully engage wildfires prior to them reaching communities. Creating this type of defensible space not only provides added protection for communities but protects social, economic, and environmental interests as well.

Establishing a WUIZ accomplishes the need to address middle ground areas that lie between untreated areas and urban interface areas and provides the ability to allocate funding to multiple areas meeting the criteria of the monies.

In order to ensure plan goals and action items are being met, periodic progress reporting and annual meetings are needed. These are designed as a means of checks and balances among fire management agencies, community members, and public officials. Collaboration that continues through the implementation process promotes coordinated efforts across jurisdictions and property lines while achieving the three goals of the CWS.

Forests and communities are dynamic in nature, exhibiting changes over time, so too is the CWPP document . The CWPP is a fluid, active document that should be updated and assessed annually to meet landscape and communities changes. Plan strategies will be evaluated for new opportunities, changes in regulations, implementation progress, and validity of plan intent. Updates of the CWPP should include appropriate amendment measures that take into consideration National, State, and Local priorities.

The plan is an all-inclusive document where community members and organizations play an active role in fire mitigation. Wallowa County Emergency Services will provide a lead role in CWPP implementation with the support of ODF and local fire management agencies. Through this collaborative effort community members can be provided with assistance and guidance as part of the plan implementation. Engaging as many groups and individuals in wildfire mitigation creates a holistic approach toward meeting the goals and objectives of the plan.

Bibliography:

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Federal Register, 2001. U.S. Government, Federal Register/Vol. 66, No. 160/ Friday, August 17, 2001/Notices 43384.

Kruger 216. Lennard G. Kruger, Specialist in Science and Technology Policy. *Assistance to Firefigher Programs: Distribution of Fire Grant funding.* Congressional Research Service.

Oregon Department of Forestry (ODF), 2006. Communities at Risk state wide assessment.

Oregon Department of Forestry; 2015. *Oregon Forestland-Urban Interface Fire Protection Act* – Senate Bill 360. http://www.oregon.gov/odf/pages/fire/sb360/sb360.aspx

Portland State University, 2015. College of Urban & Public Affairs Population Research Center web site. https:pdx.edu/prc/population-reports-estimates. Provided by Wallowa County Clerk's Office.

University of Oregon 2014. *Northeast Oregon Multi-jurisdictional Natural Hazards Mitigation Plan.* University of Oregon's Community Service Center: Resource Assistance to Rural Environments and Oregon Partnership for Disaster Resilience.

USDA 2004. United States Department of Agriculture; U.S. Forest Service; U.S. Department of Interior; Bureau of Land Management. The Healthy Forests Initiative and Healthy Forests Restoration Act, Interim Field Guide.

WC CWPP 2006. Wallowa County Board of Commissioners, Oregon Department of Forestry (ODF), Wallowa County Emergency Services, and Wallowa County Structural Fire Departments. *Wallowa County Community Wildfire Protection Plan* 2006.

Web sites:

FEMA 2017. https://www.fema.gov/hazard-mitigation-planning-laws-regulations-policies

IV. Wallowa County Profile

Introduction

The Nez Perce Tribe originally occupied a territory that encompassed virtually all of what is now north central Idaho as well as extensive portions of what is now southeastern Washington and northeastern Oregon, including Wallowa County. Wallowa County has a long history of Native American influence, with the Wallowa Band of the Nez Perce once making the Wallowa Valley their home for hunting, fishing, and gathering. They followed changing seasons from headwaters of rivers in spring, to high mountains of the Wallowas in summer and returned to deep canyons of the Snake River and its tributaries in winter (Nez Perce 2017).

Wallowa County, Oregon's far northeastern county, shares state boundaries with both Washington and Idaho. The county is mostly mountainous and forms the headwaters of several important tributaries to the Columbia/Snake River System. About 3/5 of the land area in Wallowa County is publicly owned, including lands administered by a variety of federal, state, and local agencies (Table IV – 1). Most public land is part of the Wallowa-Whitman National Forest and is administered by the United States Forest Service (USFS).

Wallowa County is considered part of the northern portion of the Blue Mountain range characterized by a dissection of ridges and valleys typical of the Blue Mountains. The rugged landscape hosts the Blue's most scenic mountains called the Wallowas. These snow-capped peaks, dramatic river canyons are classic glacial topography (WCChamber, 2017). Wallowa County encompasses 3,152 square miles (2,017,280 acres). The majority of the County falls in the Lower Grande Ronde River Basin, an eastern portion lies within the Lower Snake River Basin

The 359,991 acre Eagle Cap Wilderness lies in the heart of the beautiful Wallowa Mountains hosting approximately 535 miles of trails and extends beyond the County's southern border. The Wenaha Wilderness lies to the northwest and is noted for its deer and elk hunting, as well as backpacking adventures. The newest wilderness area is the Hells Canyon Wilderness, along the eastern boundary of the county that takes in both sides of the Snake River canyon. The Snake River is the counties eastern border and the Oregon-Idaho boundary. This wilderness is buffered within the much larger Hells Canyon National Recreation Area.

The Wallowas beauty is gaining notoriety as one of Oregon's 7 Wonders identified by the Statesmen Journal. As one of Oregon's 7 Wonders it is now being identified in numerous ad campaigns through a number of popular web sites, magazines and a 7 Wonders of Oregon – YouTube video. It even managed to land in the Travel section of The New York Times.

Wallowa County is approximately 323 miles east of Portland, Oregon and 233 miles northwest of Boise, Idaho. Wallowa County is surrounded by three highly popular Wild and Scenic Rivers. The Grande Ronde River is north separating the county from Washington State; the Snake River runs the entire length of Wallowa County's eastern border defining it from the state of Idaho; and the Minam River runs along its western edge. Baker County is on the southern border.

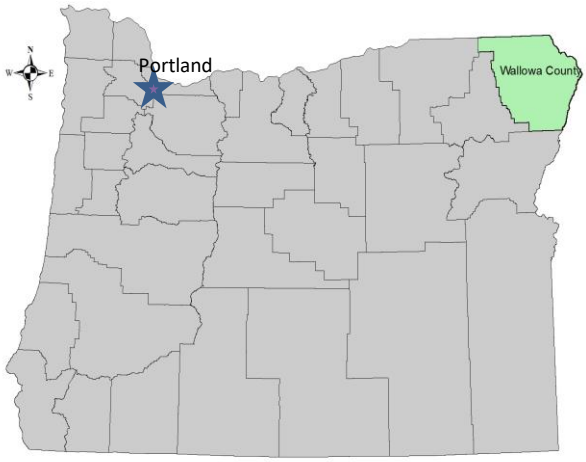


Figure IV – 1. - Wallowa County Vicinity Map for State of Oregon

Wallowa Valley lies in the center of the county and supports the highest population base. The valley starts where the Minam Canyon opens near the town of Wallowa and runs 32 miles to the southeast to where McCully Creek enters the valley, just south of Kinney Lake. The valley is approximately 16 miles at the north (Trout Creek) to south point near (Ski Run).

Elevation spans in the county are significant with the lowest point located at 875 in the Hells Canyon National Recreation Area at the mouth of Cache Creek, to 9,845 feet at the top of Sacajawea Peak in the Eagle Cap Wilderness.

These elevation difference is telling to the abrupt changes from valley floor to ridgelines within the county. Wallowa County's steep, dissected country provides a high degree of elevation changes, influencing a number of environmental conditions including wildfire behavior and suppression effectiveness.

The county offers a number of opportunities to residents and visitors alike, including recreational activities such as skiing (snow and water), snowmobiling, hunting, fishing, wildlife viewing, hiking, biking and rafting. Residents also rely on the local area for irrigation of farm lands and crops, livestock grazing, timber products, and gathering products such as morels, firewood, huckleberries, blackberries, various other items in the surrounding national forest. Fire impacts to rivers and landscape could have high detrimental effects to both the economy and ecology of the area.

Communities

Wallowa County supports multiple scattered communities located primarily along major highways or rivers. There are 4 incorporated communities all located in Wallowa Valley proper. Enterprise is the largest with 1,940 people followed by Joseph, Wallowa, and Lostine with populations of 1,095, 810, and 215 respectively (PSU 2016).

Additionally, 7 communities and multiple clusters of residential homes are unincorporated all located in the outlying areas of the county. Although unincorporated, these areas make up 43% of the county's population. This does not take into account the summer tourism that increases some areas populations significantly. For instance, the Wallowa Lake community is host to a significant increase in population from Memorial Day through the end of September. The Wallowa State park attendance data provided by Oregon Parks and Recreation Department for the month of July 2016 alone totaled 103,544 (OPARD 2017). Recreational details can be found in this chapter under the section titled Recreational Economy. Figure IV-2 displays spatial distribution of communities around the county. Communities are predominantly located along main travel corridors and primary river access points. Except for

the communities located in the center of the valley, most are in close proximity or adjacent to public forested lands.

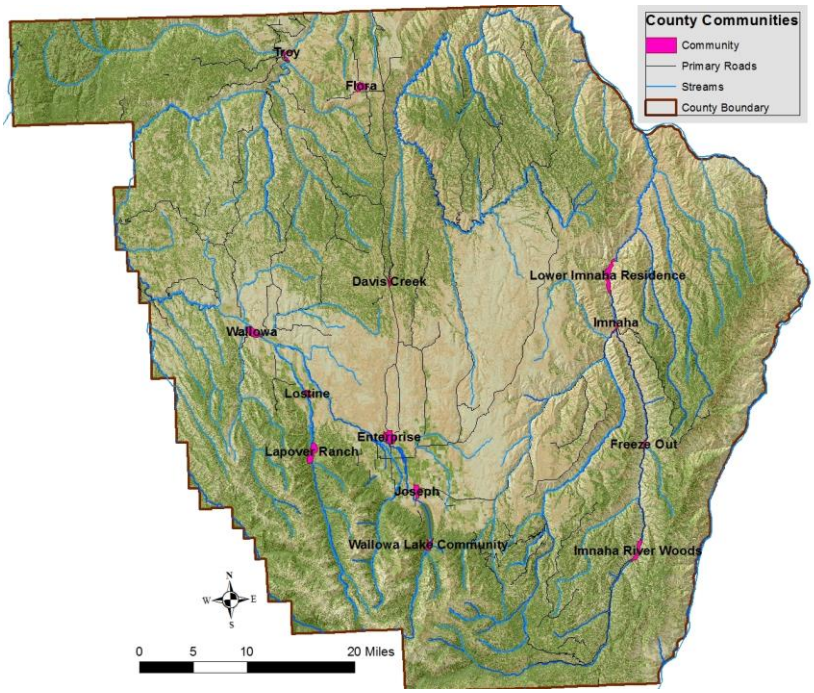


Figure IV - 2. Distribution of populated communities throughout Wallowa County.

Wallowa County has 5 fire districts/departments, providing structural fire protection primarily in and around the four incorporated towns including Wallowa Lake Community. Figure IV-3 shows the distribution of Wallowa County's five rural fire departments. Agencies primarily responsible for wildland fire protection include the U.S. Forest Service, Oregon Department of Forestry, the three city fire departments - Enterprise, Lostine, and Joseph - and 2 rural fire departments (Wallowa and Wallowa Lake). Fire Protection is discussed in further detail under Section XI – Emergency Management.

City fire protection agencies are responsible for structure protection within their protection areas. Rural departments provides not only structural protection but assist with wildland fire protections as well. For example, the Wallowa Rural fire department provides structural protection across a 62 square mile area but assist Oregon Department of Forestry (ODF) with wildland fire protections over an additional 150 square mile area.

The county area is a little over 2 million acres. The northern WUI Zone is 223,222 acres (11% of the county). The northern WUI Zone has no structural protection districts - it is serviced 100 percent through wildland protection by the Forest Service and ODF. The southern WUI Zone encompasses 273,53 acres (14% of the county).Thirty percent (142,742 acres) of the southern WUI Zone acres fall under city or rural structure protection (Figure IV – 3). In 2016 the decision was made to have 100% of Wallowa County under full wildland fire protection.

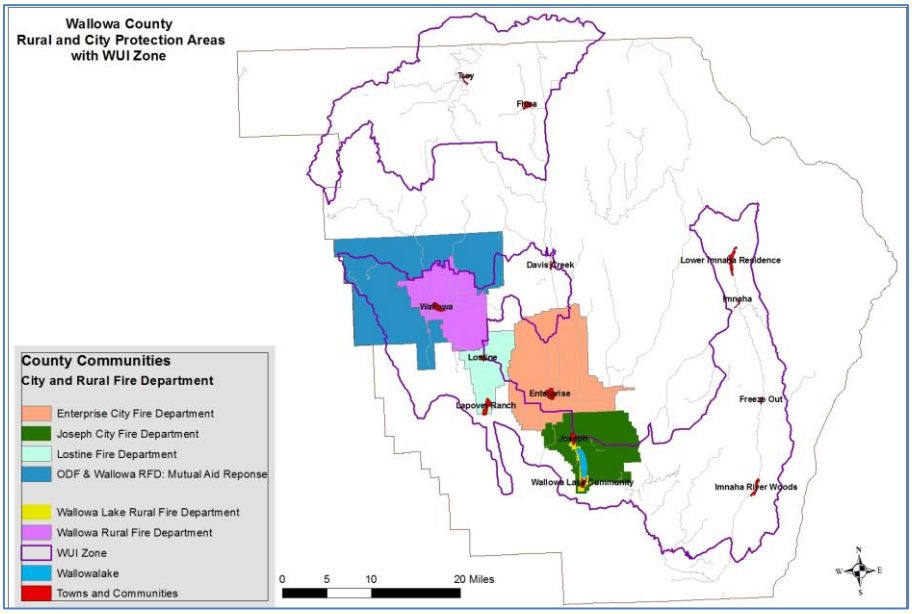


Figure IV – 3. Wallowa County WUI Zone with Rural and City Fire Districhttp://www.gnacsports.com/trackfield/t response coverage.

Two areas of the northern WUI Zone overlap into adjoining counties. A small portion of Union County (10,096 acres) falls in the southwest finger of the northern WUI Zone as it follows the Grande Ronde River on the east flank and Forest Service road 6200 on the west extending from Fry Meadows along the ridge to Long Meadow – Hoodoo Lookout area. The largest portion of the WUI Zone outside of Wallowa County is 31,348 acres lying just across the Washington State border in both Asotin and Garfield counties. This area encompasses a large portion of properties managed by Washington State Department of Natural Resources (DNR) with small fragments of Bureau of Land Management peppered across the area.

Land Ownership and Stewardship

Roughly 58% percent of Wallowa County is public lands managed by the U.S. Forest Service and 39% is privately owned. The remaining 3% of the acres is the Nature Conservancy, Bureau of Land Management, and State of Oregon.

Public land management and protection by the Forest Service occurs at higher elevations of mountainous areas and in deep canyons surrounding the private lands. Privately owned land totaling 777,607 acres, includes all of Wallowa Valley, Promise, Troy area and Imnaha River Corridor. These private lands are under ODF protection agreements, including the Nature Conservancy. The BLM lands speckle the landscape and are under a mutual aid agreement for fire protection with the Forest Service, Wallowa-Whitman National Forest.

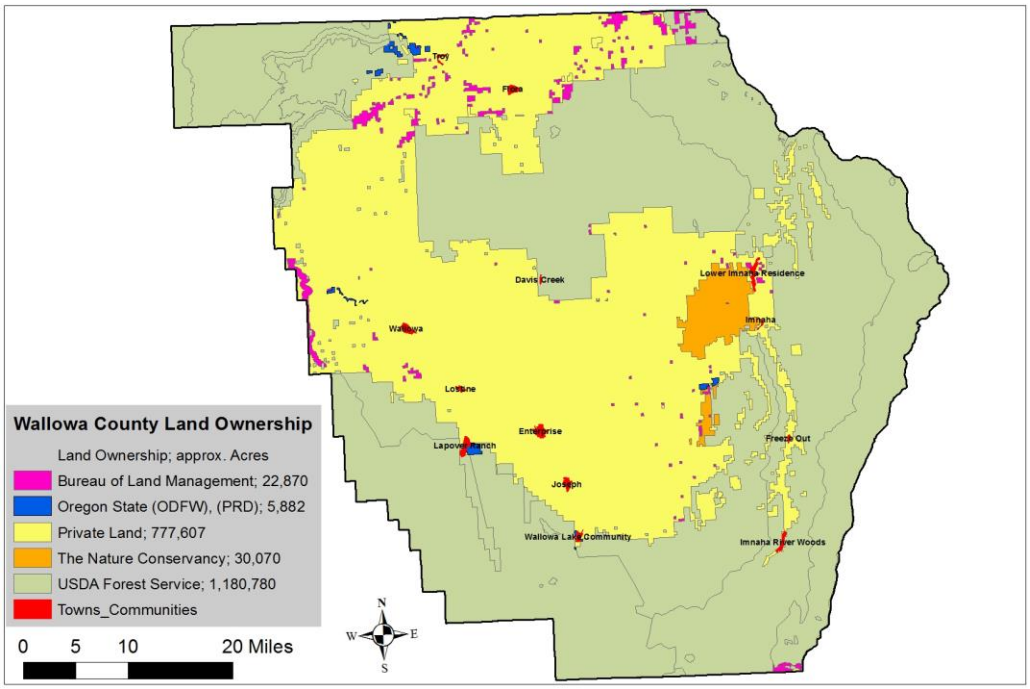


Figure IV – 4. Wallowa County Land Ownership. Wallowa County is predominately public lands managed by the Forest Service and Private lands. ODFW = Oregon Department Fish and Wildlife; PRD = Parks and Recreation Department.

Using land ownership data from the West Wide Risk Assessment, land ownership distribution is displayed for Oregon State and Wallowa County in Table IV-1, showing administered land in Wallowa County as compared with the state as a whole. Wallowa County is divided among federal, state and private ownership or stewardship. Federal land managers include the United States Forest Service and the Bureau of Land Management. The Oregon Department of Forestry provides technical forest stewardship assistance and fire protection patrol for state and many private forest lands throughout Wallowa County.

Administered Lands	Acres of Land (% of Land)				
	Private	BLM	TNC	State Lands	USFS
Wallowa County Lands 2,017,209 acres	777,607 (39%)	22,870 (1%)	30,070 (1.5%)	5,882 (.5%)	1,180,780 (58%)
State of Oregon Lands *	26,920,509 (44%)	16,039,949 (26%)	94,049 (1%)	1,603,254 (2%)	15,751,194 (25%)

Table IV – 1. Wallowa County and State of Oregon comparison of land distribution. * State lands include: Parks and Rec., Fish and Wildlife, Dept. State Lands, and other State Managed Lands. Remaining acres *not shown within Oregon state totals* are properties of: U.S. Fish and Wildlife, National Parks Service, Dept. of Defense, National Oceanic, and local county governments.

Population and Demographics

According to the Portland State University Population Research Center, Wallowa County's population consisted of 7,140 people in the year 2016.

Wallowa County Community Populations Community	2016 PSU July 1 Population Estimates	April 1 Census Population Estimates 2000 PSU*	Population Change 2000-2016	Percent Change 2000 – 2016
Enterprise	1,985	1,895	90	4.5%
Joseph	1,100	1,054	46	4.2%
Lostine	215	263	-48	-22%
Wallowa	805	869	-64	-8%
Wallowa County	***7,140***	***7,226***	***-86***	***-1.2%***
Incorporated	**4,105**	**4,081**	**20**	**.5%**
Unincorporated	**3,035**	**3,145**	**-110**	**-3.6%**

Table IV - 2. **Population Estimates for Wallowa County Incorporated Cities: April 1, 2000 - July 1, 2016 Prepared by Population Research Center, Portland State University, 4/18/2017:

Both Enterprise and Joseph have shown an increase in population since 2000, with Enterprise displaying a slightly higher growth rate of .3 percent compared to Joseph (Table IV – 2). Lostine and Wallowa have shown a decline in the number of residents. Some of the changes may be due to movement of local residence within the county itself, however the overall county population has seen a 1.2% decline between 2000 and 2016.

Looking toward future population trends Portland State University (PSU), Population Research Center provided insight on urban growth boundaries (incorporated cities) and areas outside the urban areas. The 2016 document titled, *Coordinated Population Forecast 2016 through 2066, Wallowa County Urban Growth Boundaries (UGB) and Area Outside UGBs.* Portland State University used recent and historical population changes to events that had an influence as a gauge in determining what could realistically occur in a given area in the future (PSU 2016).

Wallowa County's two largest towns – Enterprise and Joseph – are expected to show a combined population growth of around 50 between 2016 and 2035 and approximately 110 from 2035 to 2066. Wallowa and Lostine are anticipated to show a decline in population through the entire projection period (PSU 2016). (See Table IV – 3)

Although the population of the county may decline the number of individuals that enter the county on an annual basis is anticipated to increase when taking into consideration the increasing popularity of the county as a prime vacation spot.

Population Areas	Wallowa County, Oregon				
	FORECAST				
	2016	**2016 - 2035**	**2035 - 2066**	AAGR **2016 - 2035**	AAGR **2035 - 2066**
Wallowa County	*7,070*	*7,098*	*7,013*	*0.02%*	*-0.04%*
Enterprise	1,964	1,993	2,059	0.1%	0.1%
Joseph	1,107	1,132	1,179	0.1%	0.1%
Lostine	232	227	215	-0.1%	-0.2%
Wallowa	863	805	746	-0.4%	-0.2%
Outside Incorporated Cities (remaining county areas)	2,904	2,942	2,814	0.1%	-0.1%

	Forecast Population Distribution		
	2016	**2035**	**2066**
Wallowa County	*100.0%*	*100.0%*	*100.0%*
Enterprise	27.8%	28.1%	29.4%
Joseph	15.7%	15.9%	16.8%
Lostine	3.3%	3.2%	3.1%
Wallowa	12.2%	11.3%	10.6%
Outside Incorporated Cities (remaining county areas)	41.1%	41.4%	40.1%
AAGR = **Average Annual** Growth Rate			

Table IV - 3. Projected Population of Incorporated Cities and Surrounding County Area. Information was taken from Figure 16 Wallowa County and Sub-Areas – Forecast population and AAGR (PSU 2016, Forecast by Population Research Center)

Although Enterprise and Joseph will show a slight growth rate through 2066, the remainder of the county will offset this with the entire county having a drop in population. Although the expected change in population is slight the shift in aging population is important. From 2016 to 2035 there is an expected increase in the county's population 65 and older from near 29 percent to about 42 percent. If this projection holds true, this would have a significant impact on the availability of workforce aged personnel fire responder positions. More detailed information can be found in Chapter XI Emergency Management.

County growth has potential impacts on several aspects of fire protection. First, fire response capabilities can be limited when an additional 13% of the workforce is expected to enter retirement age over a 19 year time span. This could potentially compound an already existing lack of workforce recruitment.

Secondly, 18 percent of fire starts within the WUIZ are human-caused, indicating that almost half of all fire starts may be preventable. An increase in population is expected to bring an increase in recreation and land use. As a result, it can be anticipated that an increase of human-caused fires will occur with population growth. Third, an increase in population will likely result in additional development in the WUIZ, in effect increasing the number and types of values at risk and potential hazards. New residents bring new home constructions, outbuildings, and livestock, as well as increased infrastructure, causing new fire response assessments. In addition, heavy populations and large proportions of landscapes in the

wildland-urban interface (WUI) intermix can lead to even small wildfires threatening structures, increasing the risk and complexity for firefighters (CWS 2014).

According to the US Census Bureau, as of 2010 Wallowa County has a variety of household types, some of which are worth mentioning to bring attention to potential issues that may surface during potential evacuation situations. Out of the 10,501 households in Wallowa County, 8.5 percent have single male with children under 18 or single female with children under 18 (218 and 668 respectively). Households with single occupants over the age of 65 living alone account for 10.5 percent, of the total, with figures at 232 male and 777 female residents in this situation. Identification of residents within the WUI areas who may require additional assistance or longer than average time to evacuate may assist emergency services personnel in pre-fire assessments and planning.

Employment and Industry

Wallowa County hosts many diverse businesses and employment opportunities. The industries supporting the largest number of employees are in Agriculture, Forestry, Fishing and Hunting; followed by Healthcare and Social Assistance, Retail Trade, Construction, and Educational Services.

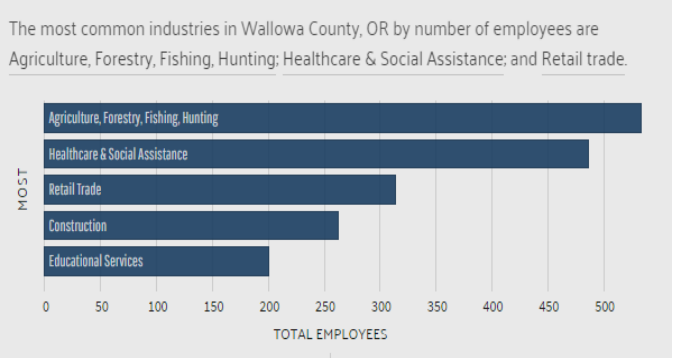


Figure IV – 5. Most common industries in Wallowa County. Data provided by Nils Christoffersen

In 2015, the Service Sector accounted for 41% of the local labor earnings. Within this sector, Health Care, Retail Trade, Wholesale Trade and Food Services were the four largest industries accounting for 8.4%, 6.4%, 4.2% and 4.0% of the county's total labor earnings, respectively. The Non-Service Sector accounted for 32% of earnings – with Farms (14.7%), Construction (7.8%), Forestry and Ag Services (5.1%), and Manufacturing (3.7%) providing the main sources of labor earnings. Government jobs (federal, state and county) provided 27% of total labor earnings.

From 1970 to 2015, employment grew from 2,871 to 4,578, a 59% increase driven largely by women and farm families entering the workforce. During that same period of time, the county's population grew by 10%. Wage and salary employment (people who work for someone else) grew from 1,651 to 2,615 (a 58% increase), while proprietors (the self-employed) grew from 1,220 to 1,963, a 61% increase (reflecting a strong growth in cottage industries). Compared to other counties across the US, Wallowa

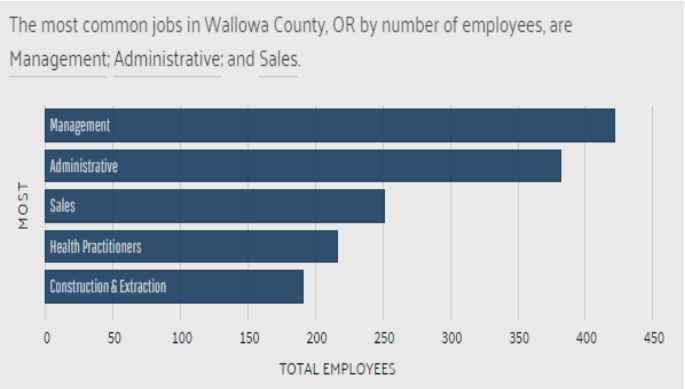


Figure IV – 6. Common jobs in Wallowa County. Data provided by Nils Christoffersen.

County has an unusually high number of employees in specialized sectors, in particular Farming & Forestry; Health Practitioners; and Life, Physical, & Social Science.

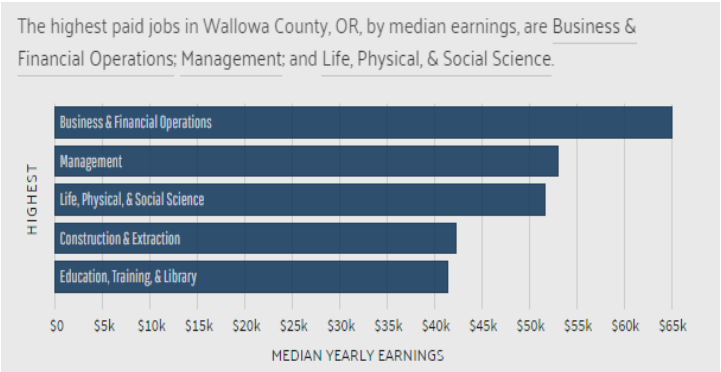


Figure IV – 7. Highest paid jobs in Wallowa County. Data provided by Nils Christoffersen.

The median wage in Wallowa County was $32,637 in 2015, and the median household income was $40,581. Wages in Northeast Oregon (Baker, Umatilla, Union and Wallowa counties) are distributed more evenly compared to the national average. The highest paid jobs in Wallowa County are in Business & Financial Operations; Management; Life, Physical and Social Sciences.

Median annual earnings in these sectors range from $52,000 to $65,000. These jobs are primarily located in Wallowa Valley (Census Tract 9603) where the median household income is $45,391. The median income in the eastern half of the county (outside the main valley corridor) is $39,514, and in the western half of the county it is $34,844, with 15.3% of Wallowa County residents falling below the poverty level.

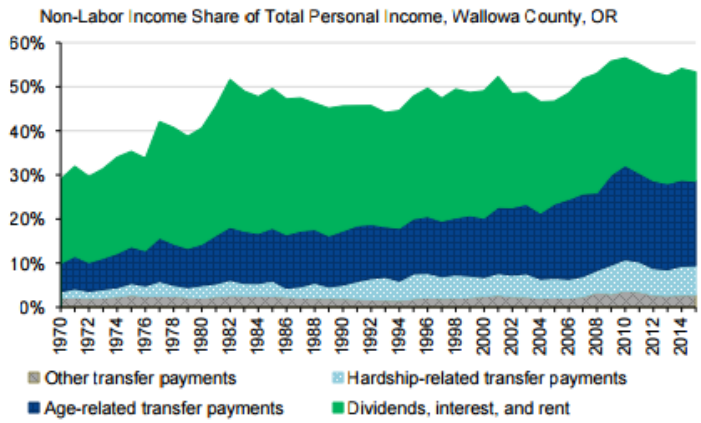


Figure IV – 8. Share of total Personal Income that is non-labor income. Data provided by Nils Christoffersen.

From 1970 to 2015, labor earnings grew from $105.3 million to $136.0 million (in real terms), a 29% increase, while non-labor income grew from $43.8 million to $155.4 million (in real terms), a 255% increase. By 2015 non-labor income represented 53% of total personal income. Non-labor income was 39.5% of total personal income statewide in Oregon, and 36.1% for the USA as a whole. In Wallowa County, dividends, interest, and rent grew from $28 million to $72 million, an increase of 154 percent over the period 1970-2015. Over the same time period, transfer payments grew from $15 million to $83 million, an increase of 439 percent. Transfer payments includes government retirement and disability insurance benefits, medical payments such as mainly Medicare and Medicaid, income maintenance benefits, unemployment insurance benefits, etc. The median age for Wallowa County residents was 52.2 years in 2015, up from 44.4 in 2000, and 37.8 in 1990. Wallowa County's median age is significantly higher than that for Oregon and the USA, which were 39.1 and 37.6, respectively, in 2015.

Natural Resource Industries

About one-quarter of Wallowa County's land are in farm production – distributed across 522 individual farms. Approximately 55% of the farms are engaged in livestock production, predominantly beef cattle with some sheep and goat production, and a small amount of poultry production. This industry bears risk from wildfire including direct risk to livestock and pasture, as well as subsequent risks from restrictions in use of public land allotments following a fire.

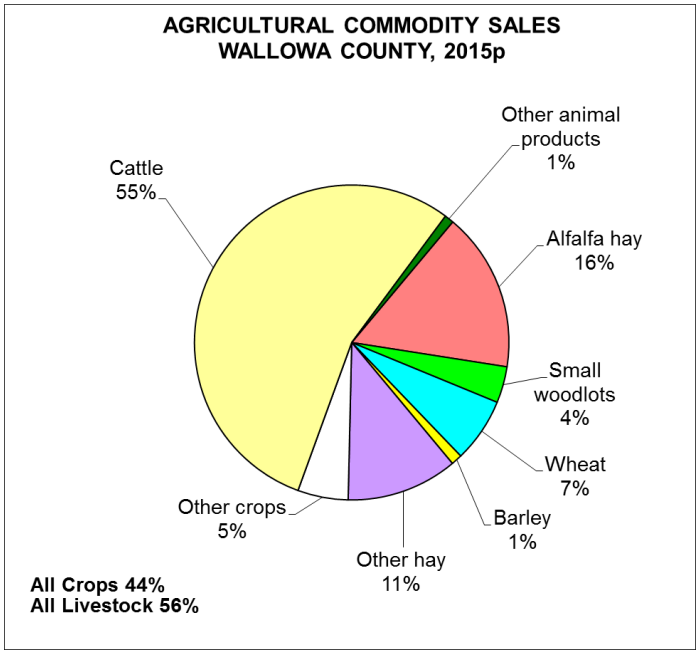


Figure IV – 9. Agricultural Commodity Sales in Wallowa County as of 2015.

The remaining farms are in crop production – primarily livestock forage (grass hay / alfalfa) with some grain production – or some other type of farming. Revenue from all types of farming increased from 2001 to 2015. Total farm revenue in 2015 was $63.8 million, of which $35.4 million was from livestock and related products, and $28.3 million was from crops. In 2015, average annual wages in crop production were $31,079 and average annual wages in animal production were $28,438.

Farm jobs accounted for 12.8% of Wallowa County's employment, with Farm Proprietors employment accounting for 81% of total farm jobs. Most farms in Wallowa County are family businesses. Farming is a much more significant sector of employment in Wallowa County than for the USA.

Percent of Total Farm Jobs, Wallowa County, OR vs. U.S., 2015

	Employment Share		Location Quotient
	Wallowa County, OR	U.S.	
Farm Employment	12.8%	1.4%	9.1
Farm Proprietors Employment	10.4%	1.0%	10.4

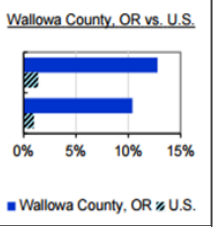


Figure IV – 10. Farm job comparison of Wallowa County and US 2015. Data provided by Nils Christoffersen.

Oregon Labor Market projections for Region 13, including Union, Baker, and Wallowa Counties from 2010 to 2022, show a gain of 11 percent for all occupations. Using the Oregon Employment Office standard occupational classification code listing, the regional employment projection for farming, fishing, and forestry is expected to show the largest positive change of employment categories, with a projected increase of 17.5 percent by the year 2022. Notable sub-groups of this category include Agricultural Workers, with the largest projected growth of 19 percent, while the Forest, Conservation, and Logging Workers sub-

category is predicted increase at 14.3 percent. Health Care is the second largest primary category with a projected 13.8 percent rise, followed by Construction and Extraction at 13.7 percent over the same period. Professional and related occupations are expected to increase 8 percent just above Management, Business, and Financial type employment increasing by 6.2 percent (Oregon Employment Department. 2014).

Although supervisors and managers of firefighting and prevention workers are expected to remain constant, the number of individual firefighting jobs is expected to increase by 11 percent. Changes in firefighters are expected to increase by nine positions from 82 to 91 with replacement openings occurring in 22 of the existing positions (Oregon Emply. Depart. 2014).These positions will play a key role in fire protection, particularly if changes in snow/rain precipitation and amounts continue to shift.

Local Climate

Wallowa County enjoys four distinct seasons with wide temperature fluctuations between day and night. Sitting at approximately 3,757 feet in elevation the town of Enterprise's weather station was used as a reference.

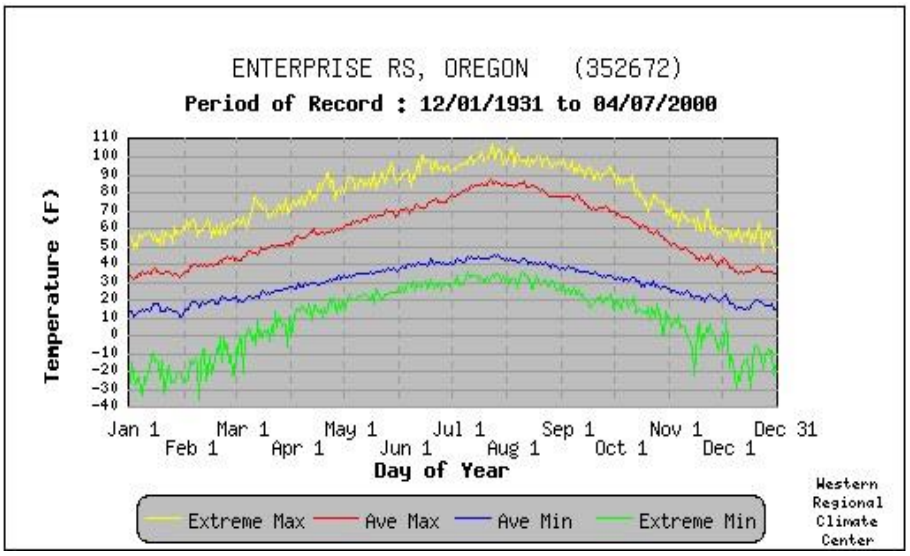


Figure IV - 11. Daily Extremes and Averages of the Enterprise weather station. Information from the Western Regional Climate Center.

Summer temperatures can reach a maximum more than 100 degrees, with maximum average temperatures peaking late July to early August where there is a gradual decline into January. Winters can be cold and harsh at times, with lows dropping well below zero for multiple days to weeks, with average temperatures typically range from 10 to 20 degrees in December and January.

Precipitation is measured in both rainfall and high-elevation snowpack. Annual precipitation data taken from the U.S. Department of Agriculture Natural Resource Conservation Service website shows annual precipitation in Wallowa County is as extreme as it's temperatures. The lowest annual precipitation amounts are approximately 11 – 12 inches in locations such

as the confluence of the Imnaha and Snake River**,** while high mountain precipitations vary with location. The highest moisture locations in the county are across the mountain peaks of the Eagle Cap Wilderness, where Sacajawea and Anaroid Peaks can receive between 70 – 80 inches of moisture annually, see Figure IV - 12. Wallowa Valley, where the highest population exists, received an annual rainfall between 13 and 20 inches. Because of the high elevation pass locations the snow packs on the Wallowa Mountains Loop, road scenic byway to the town of Halfway in Baker County is closed for an average of 7 months a year, leaving only two access points into the county during the winter months. Seasonal distribution of moisture for the Wallowa County varies significantly as stated above.

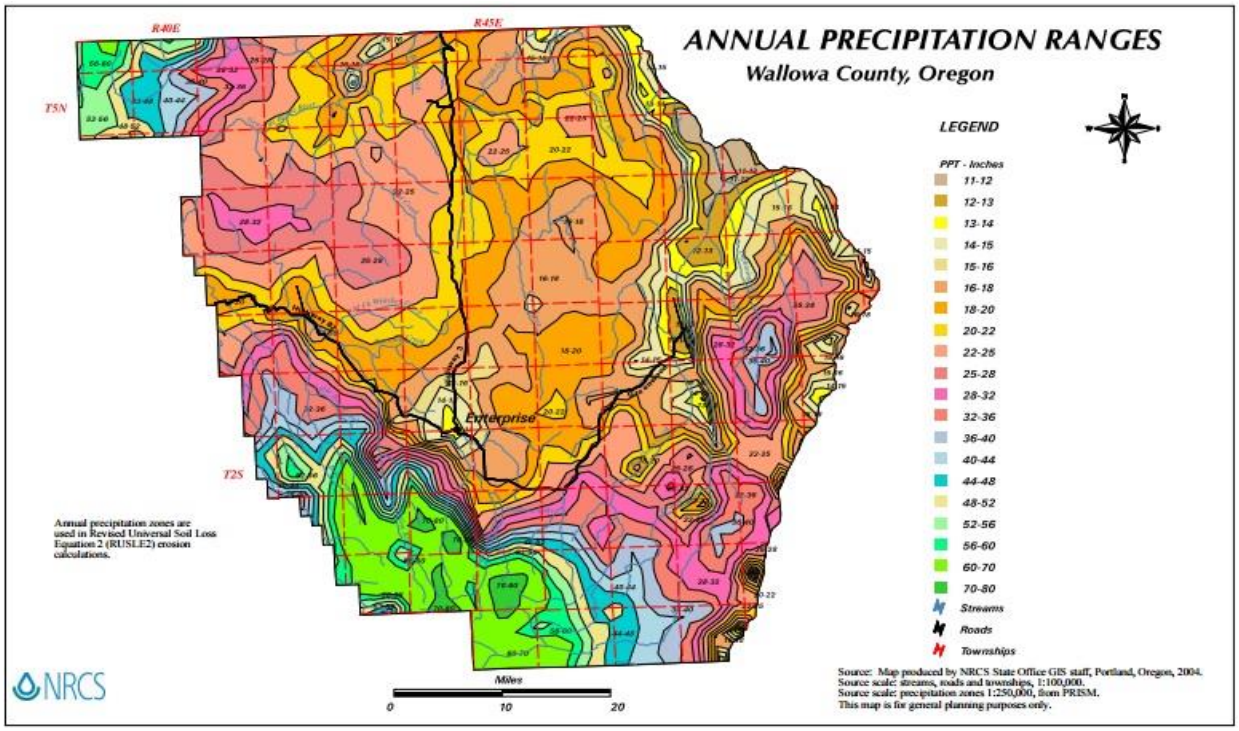


Figure IV – 12. Geographic distribution of precipitation for Wallowa County Wallowa County.
NRCS 2017. https://efotg.sc.egov.usda.gov/references/public/OR/wallo_ppt.pdf

Coastal influence west of the Cascade Mountain Range brings a mean rainfall of six inches per month for November, December, and January alone at the Salem airport weather station (Western Regional Climate Center WRCC, 2013). Data from 1971 – 2000 shows mean precipitations of 6.39, 6.46, and 5.84 inches respectively for Salem. Relative to the west side of the state of Oregon, northeast Oregon is a much drier climate with lower humidities and substantial less moisture in the form of rainfall.

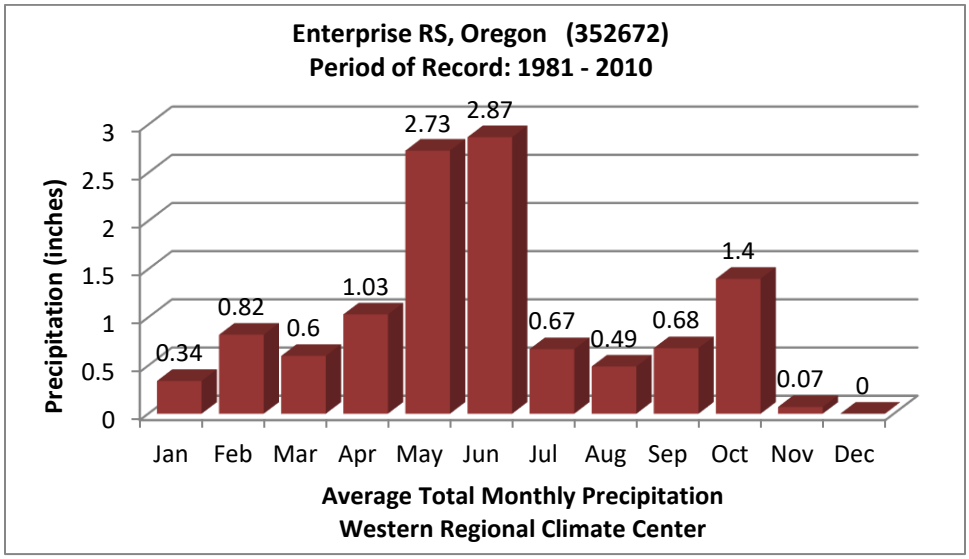


Figure IV – 13. The average monthly precipitation total over 30 year period for the Enterprise, Oregon weather station. Western Regional Climate Center, https://wrcc.dri.edu/cgi- bin/cliMAIN.pl?or2672

Wallowa County data using Enterprise weather station, number 352672, shows averages for time span between years 1981 to 2010, with the highest average precipitation records occurring from April through June with the exception of October. Moisture in June often arrives near the beginning of the month with very little rain during the latter weeks. The driest months occur November through January when cold dry Artic air arrives then again in July, August, and September with August as the 4th driest when dry high pressures build over the Pacific Northwest region. (Figure IV -13).

Precipitation that does occur during the summer months is often associated with thunderstorms, making moisture sporadic and accumulations gradual. For example during the month of July, August, and September the average *daily* moisture amounts equates to 0.02, 0.015, and 0.02 inches respectively. These intermittent moisture accumulations often have little to no effect on the overall fire conditions during fire season. Frequent thunderstorms that bring lightning into the mountainous regions of the Blue Mountains make eastern Oregon highly susceptible to lightning-caused fires with the capability to spread during typical dry summer conditions.

Annual moisture amounts and temperatures play an important role in wildfire behavior. When rainfall amounts and temperature changes occur over extended periods the available fuels – live and dead – react accordingly with the environment. Lower rainfall and warmer temperatures often lead to an increase in available burnable fuels, particularly with extended periods of persistent drought.

Temperature data was obtained through the National Centers for Environmental Information – National Oceanic and Atmospheric Administration (NOAA). Wallowa County data was analyzed for the years between 1955 through 2015. Mean temperature was assessed over the 60-year time period using the overall average from all years as the baseline for change. The average temperature for this time was divided into 15-year increments. Annual temperatures for Wallowa County are displayed in Figure IV – 15, showing each 15-year

period compared to the average from 1955 - 2014, with each plot point representing a 12-month period. Prior to the 1980s, average annual temperatures for the first three decades (1955 – 1969, 1970 – 1984) fell below the 60-year average, with 70 percent of the years below average and 30 percent of the years above average temperatures.

A shift in temperature averages began around 1986, showing close to a full degree average temperature increase by the year 1999. Since 1999, over roughly 19 years, temperatures have exhibited a .5 degree Fahrenheit or greater departure from the base period mean temperature, with 2016 being the most recent. Since 1999 this shift continued to increase for the next 15 year mean with another .4 degrees increase between 2000 and 2014. The annual average temperature for the 15 year span (2000 – 2014) in Wallowa County resulted in 11 of the 15 years above the base period temperature line, as shown in Figure IV - 15.

The annual temperature departures for years that fell into the warmest 10% ever recorded totaled 8 years since 1992 with departures ranging from 1.0 to 3.2 degrees. The year 2015 showed the most extreme departure of 3.2 degrees, matching a record set in 1934 for the warmest year.

This is consistent with findings in NOAA's *Regional Climate Trends and Scenarios for the U.S. National Climate Assessment*, that found five of the nine warmest summers have occurred since 1998 (Kunkel et. al. 2013). Dalton et. al. also found that temperatures of the last 30 years in the Northwest have generally been above the 20th century average, and since 1998, all but two years are above the average for the century (Dalton et. al 2013). Temperature trends for 1895 – 2011 have risen annually and for all seasons except spring, with increases ranging from +0.10 to +0.20^{o}F/decade (Kunkel et. al. 2013). Using temperature and precipitation stations for the Pacific Northwest located in the Historical Climate Network (USHCN) (Peterson and Vose 1997) it was found that most stations in the Northwest showed temperature trends as positive over the 1920 to 1997 period (Mote 2001).

The implications of rising temperatures are shown to have a correlation to both the length of fire seasons and accentuated conditions that favor large wildfires. Westerling et. al., found that the incidence of large wildfires in western forests showed an increase in the mid-1980s. This parallels the increase in temperatures since the 1980s. Comparisons of fire frequency and fire size from 1970 – mid-1980's to fires after the mid-1980s show the latter time period had wildfire frequency that was nearly four times higher and the total burned area from the fires was over six and half times as large (Westerling et. al. 2006).

The length of the wildfire season also increased in the 1980s (Westerling et. al. 2006). This too, is consistent with the prolonged above average temperature found in NOAA's graphs of Wallowa County. Westerling et. al. determined the average fire season length increased by 78 days (64 percent) when comparing timeframes of 1970 to 1986 with 1987 to 2003 overall, while the Northwest fire season increased five percent by 2003. Warm years accelerating earlier snowmelt, particularly since the mid-1980s, have shown a concentration of increased wildfire frequency at between 5500 and 8500 feet in elevation (Westerling et.al 2006).

Recent years have been no exception; from May 2012 through May 2015, both precipitation and temperatures have deviated from the most recent 30-year averages between 1981 – 2010. Warmer than normal winters, low snowpack, and lower than normal precipitation, at the

time of this document development, have impacted many areas of the West. Figure IV – 14 shows the last 36 months departure from the 30-year average based on the Western Regional Climate Center 2015. Until the winter of 2016 snowpack moisture levels were below average for Wallowa County.

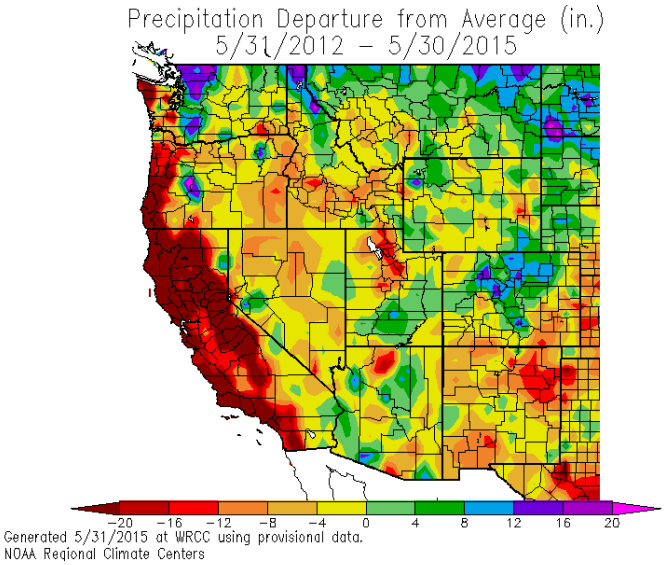


Figure IV -14. Precipitation Departure from Average for 2012 – 2015. NOAA Regional Climate Center.

Year 2017 is currently showing moisture level ranges from slight departure to normal levels. However, since April 2017 the precipitation departures for Wallowa County are again showing a lower than average in precipitation. Although moisture levels are near normal, temperatures for 2017 remain above average continuing the warming trends for the region.

A single winter of high snow pack does not necessarily indicate a recovery from recent trends. For instance, the year 2010 was in the top 33% for wettest years with a +3.98” of moisture departure from average. This was followed by 2011, and 2012 showing +0.06” and +1.30” yet the long term drought index for precipitation remained below normal.

The National Interagency Coordination Center, National Predictive Services Unit shows Oregon – including Wallowa County – to have an expected normal fire season in terms of significant wildland fire potential outlook for July through September of 2017. Future climate trends, particularly where temperature is concerned, are expected to continue to show above average temperatures. This anticipated prolonged warming has management implications for wildfire response, mitigations, and costs. Further information can be found in Chapter VI, Wildfire Risk and Hazard Assessment.

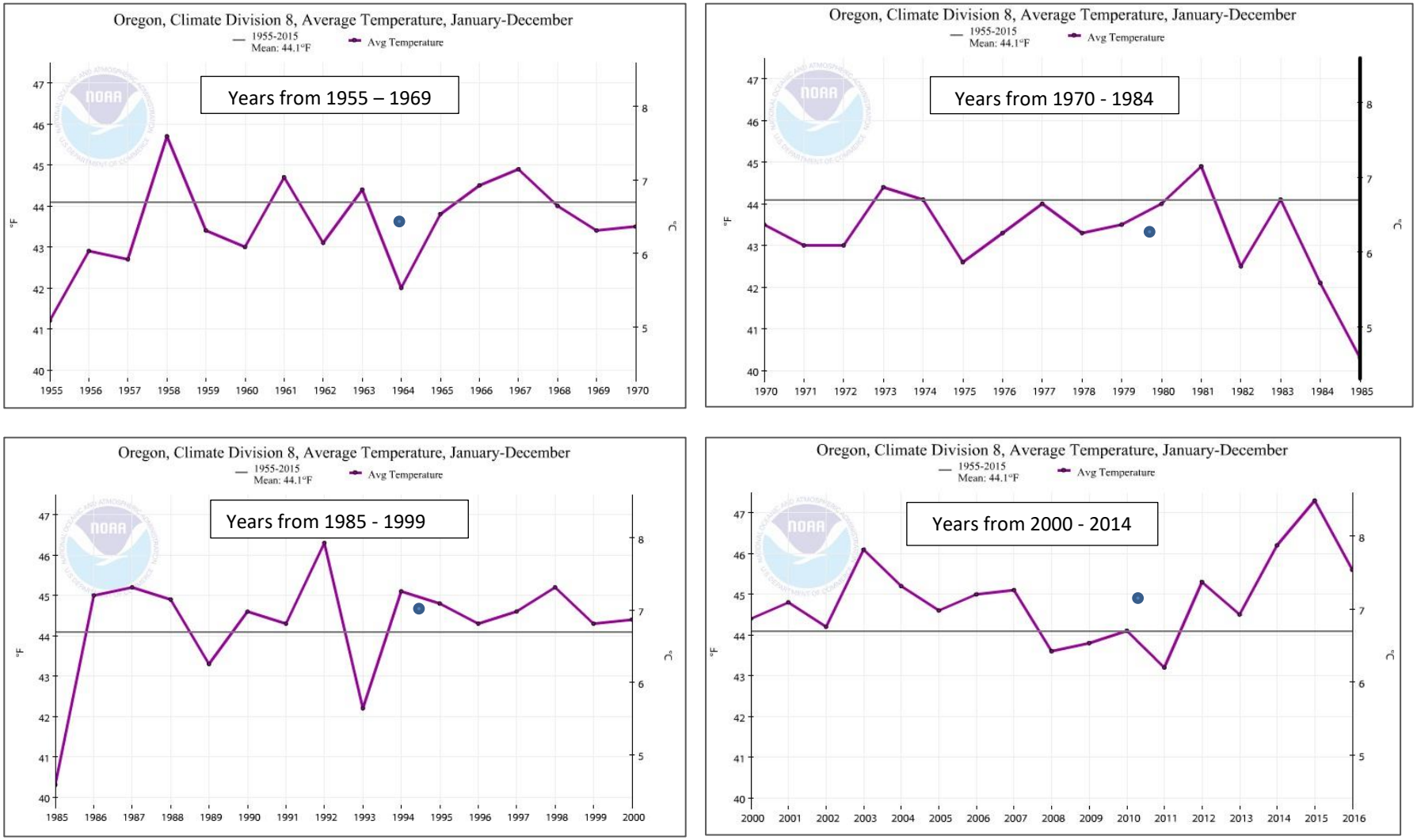
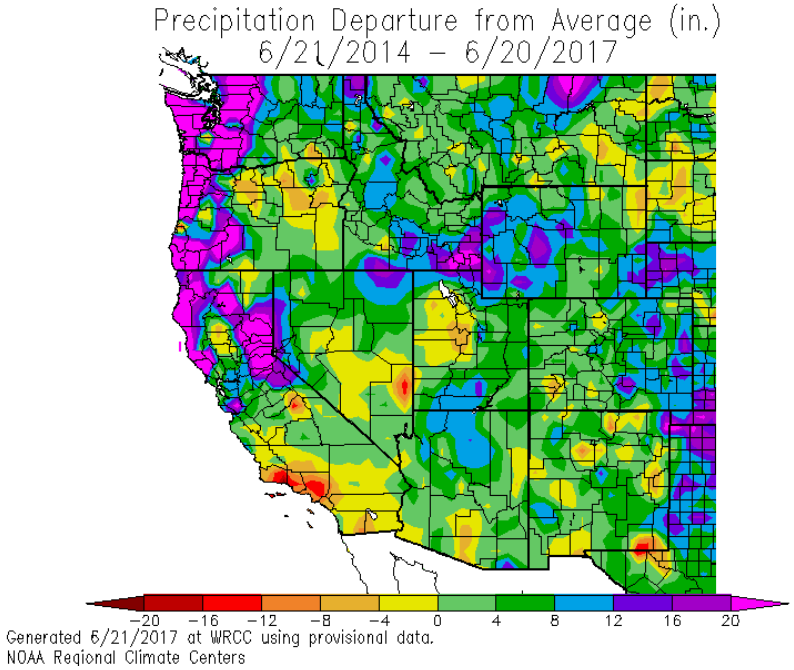


Figure IV – 15. 60 Year Temperature Trends. ● = Fifteen year Mean Temperatures for NE Oregon relative to 1955 – 2015 as Average baseline. National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information. https://www.ncdc.noaa.gov/cag/time-series/us/35/8/tavg/12/12/1985-2016?base_prd=true&firstbaseyear=1955&lastbaseyear=2016

36 Month Precipitation Departure



36 Month Temperature Departure

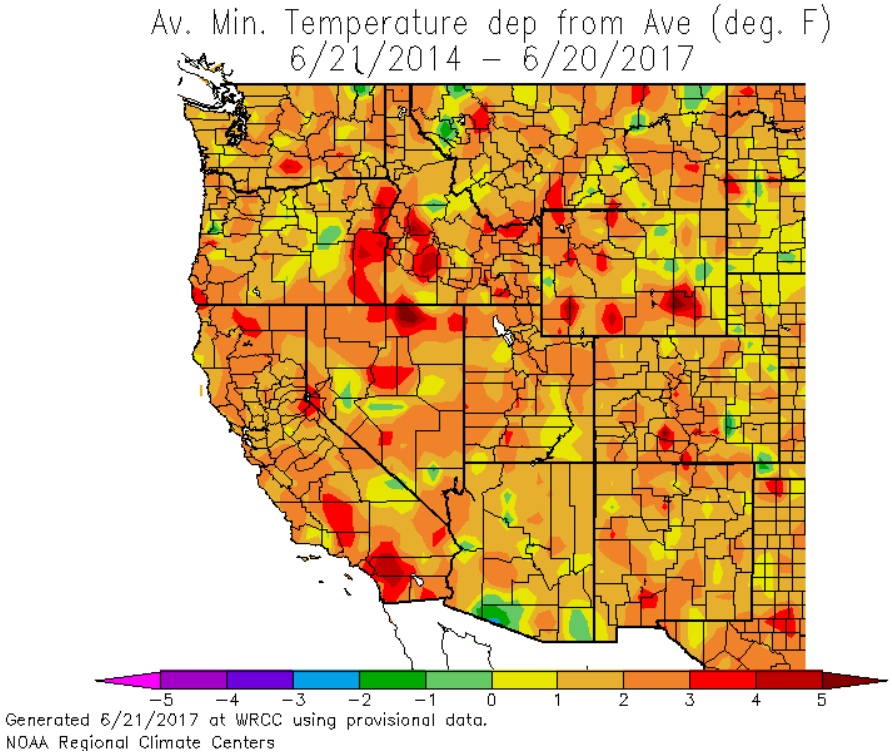


Figure IV – 16. Generated 6/21/2017Western Regional Climate Center, Reno Nevada. Partners with National centers for Environmental Information (NCEI); State Climate Offices; Regional Climate Centers; USDI climate Science Centers; and NOAA Regional Integrated Sciences and Assessments.

Fire History Overview

Wallowa County and the surrounding area have a significant history of lightning caused fires with around a fifth of the fires human caused. A combination of climate, fuels, and topography make Wallowa County an ideal receptor to wildfire. Figure IV - 17 shows Wallowa County and surrounding area fires over a 10-year period from 1999 to 2008, displaying both lightning and human ignitions and their geographic distribution. for (Oregon Department of Forestry - WWRA, 2013). Approximately 660 fire starts (human and natural) were reported during the years 1999 – 2008 according to the West Wide Risk Assessment data. During that time frame, human causes were responsible for approximately 117 (18 percent) of starts in Wallowa County, while lightning strikes totaled 543 (82 percent) of ignitions.

In analyzing just the fires within the identified WUIZ, which accounts for 43 percent of all county fires, human caused fires increase in proportion to lighting fires. Human-caused fires just within the WUIZ account for 23 percent of fire starts while lightning starts account for 77 percent in the WUIZ. This implies that approximately 23 percent of fires within the WUIZ may be preventable. In comparing the number of human caused fires inside and outside the WUIZ, there are roughly 55% and 45% respectively.

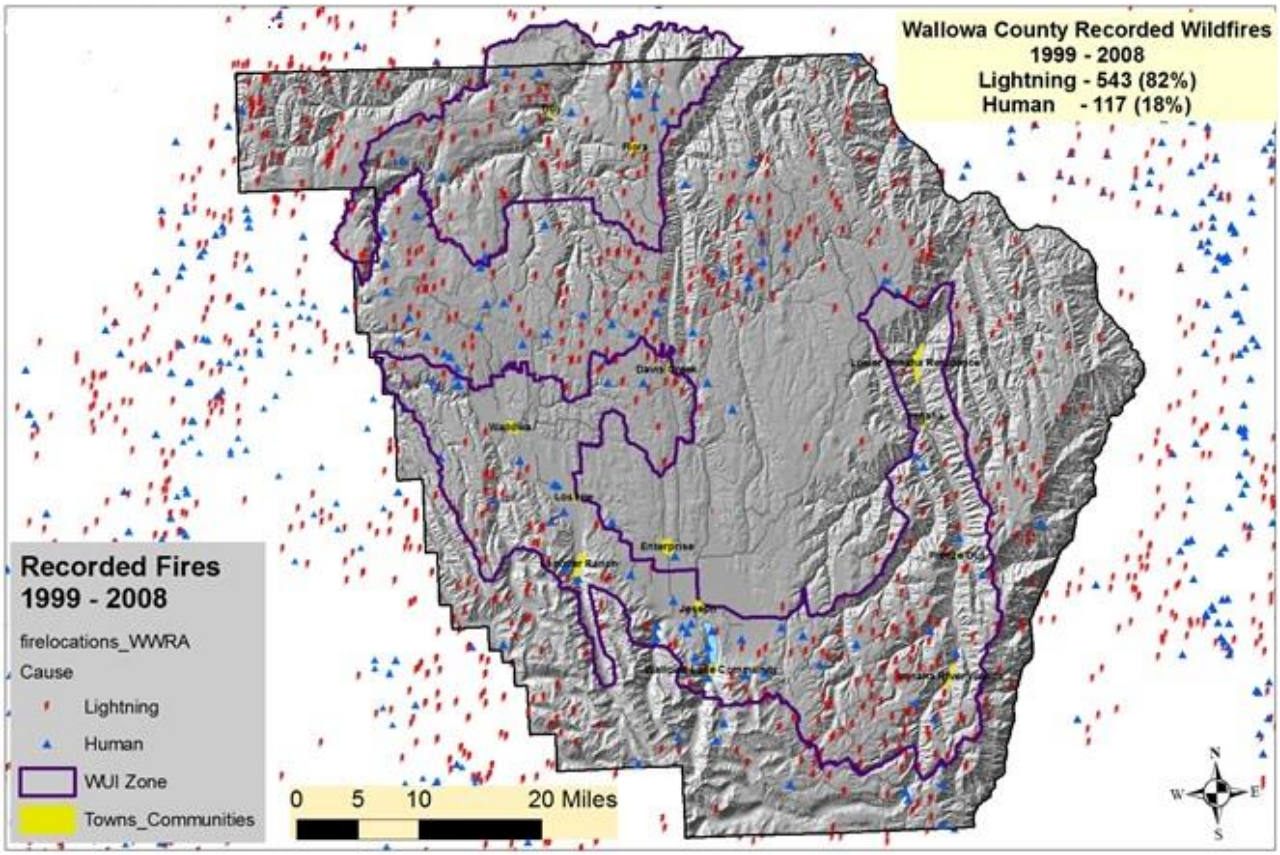


Figure IV – 17. Fire Starts for Wallowa County and surrounding area. Data used to create map was provided by the West Wide Risk Assessment, Don Carlton and Jim Wolf 2014. Years used were based on availability of data from five federal agencies and 17 individual states' data.

The WWRA provided results at a scale compatible with state and community use, much finer than the current national efforts (ODF-WWRA 2012). Fire points used needed to be from a data base period that was supported in all 17 western states during the West Wide Wildfire

Risk Assessment development. WWRA summary of statistics for Oregon indicates that key data used in the assessment varies with respect to accuracy and date of compilation. Federal and most state fire ignition data was utilized for the period of1999 - 2008, however this range varied depending upon the availability of useable data. For most of the states, fire occurrence data ranging from 2004-2009 was used from the National Fire Incident Reporting System (NFIRS) to supplement the fire ignition data for private land (ODF -WWRA 2012). Key pieces of information needed to utilize fire start data were the latitude and longitude and fire size. One finding, in the fire reporting systems at the field office level, is key information needed was stated as optional or mandatory depending on the protection agency. Thus, resulting in the elimination of data, producing an inability to project some fire data. Implications of inconsistent reporting and missing fire details could result in fewer than actual Fire Occurrence Areas for Oregon State and its counties.

The West Wide Risk Assessment reviewed the number of fires ignited per 1000 acres per year to display areas of fire start concentrations over the 10-year period. Figure IV – 18 takes into account the fire start locations and proximity of the fire occurrence area for Wallowa County and adjacent counties the WUIZ includes. This provides fire managers with areas that have a higher probability of a fire ignition and middle ground areas that are high receptors for lighting.

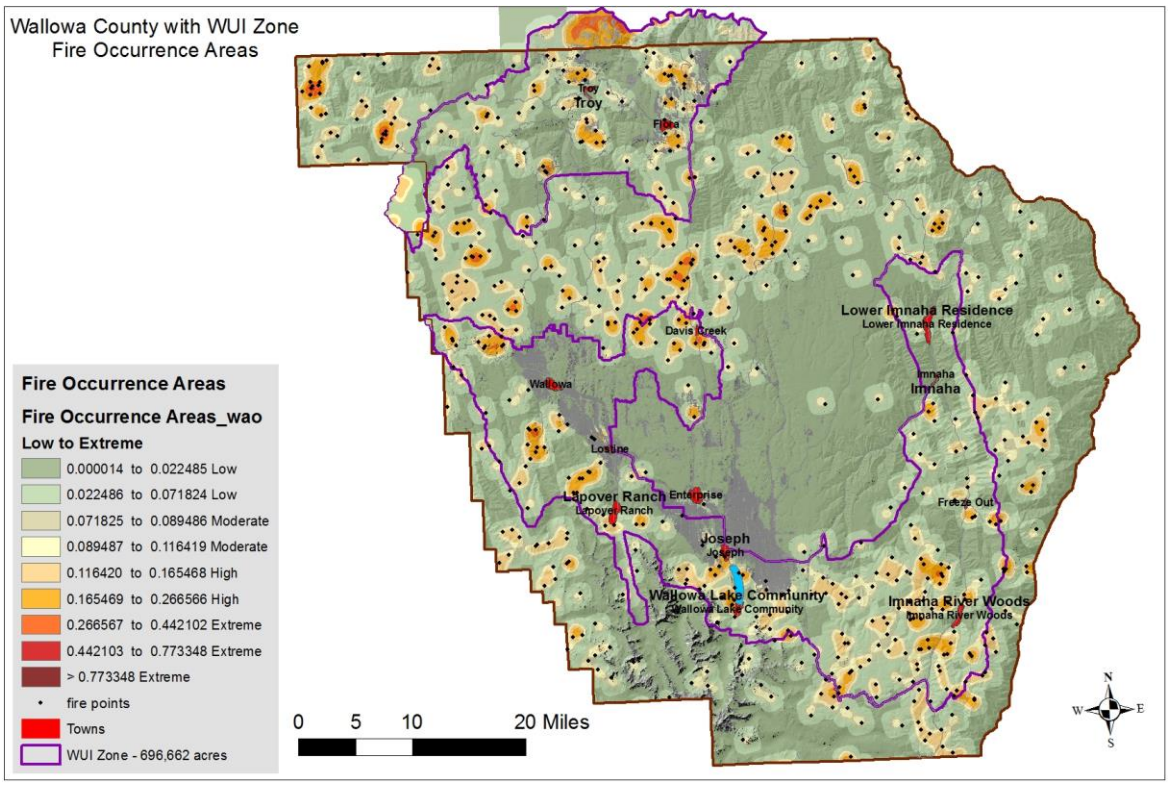


Figure IV – 18. Fire Occurrence Areas. Based on the number of fire starts and land mass ratio. Depicts the number of fire starts per 1000 acres per year. The higher the number of starts the higher the fire occurrence.

Wallowa County had a total of 660 recorded fire starts, based on the West Wide Assessment, over the 10-year period. That is an average of 66 fires per year. As shown above, Wallowa County annually endures many fire starts from both lightning and human sources.

The number of fires reaching a 10-acre threshold was 57. An average of 5.7 fires per year exceeded 10 acres. Twenty-five fires were between 10 and 100 acres. A total of 33 fires were over 100 acres in size in the ten year period. Fourteen fires between 1999 – 2008 were sized at 100 to 1000 acres, averaging out to 1.4 fires per year. There were 19 fires over 1000 acres average 1.9 fires over 1000 acres per year, with the three largest fires recorded at 42,700 (Haas/Tyron Complex), 56,319 (Jim Creek Ranch), and 79,149 (Battle Creek). Human-caused fires accounted for five (20%) of the large fires over 100 acres, ranging from 120 to 1,745 acres.

LARGE FIRE STATISTICS (acres) 1999 - 2008				
10 +	10 to 100	100 +	100 - 1000	1000 +
57	25	33	14	19
Average Number of Fires Per Year / Per Size				
5.7		3.3		1.9

Table IV – 4. Large fire count per size category. Displays the number of fires of each size over a 10 year period, from 1999 – 2008. Data made available by West Wide Risk Assessment.

Time of year also provides insight on when to expect the highest level of fire activity. In Wallowa County, July and August account for approximately 77 percent of all fires over the 10-year period. Including up until September 16th, close to 85 percent of all the fires occurred in a two and a half month period (Figure IV-19). This plays an important role in fire management preparedness and response.

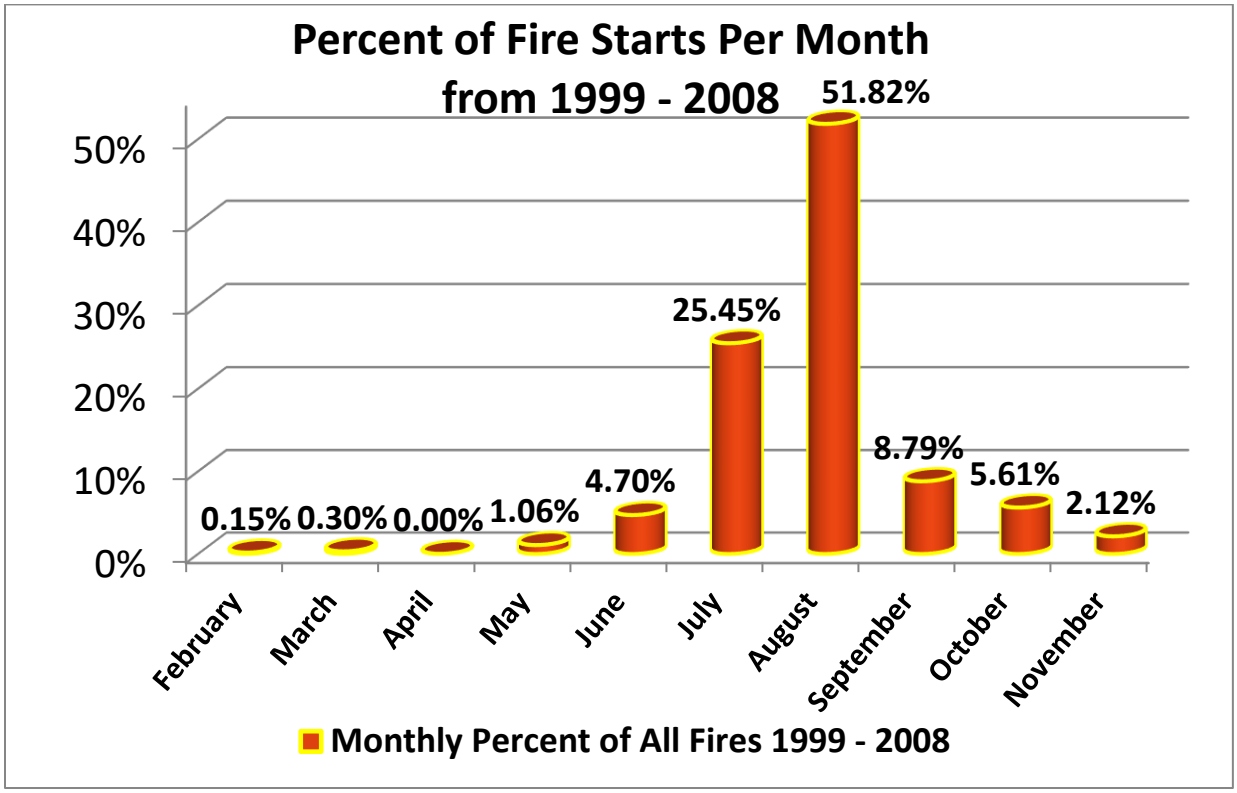


Figure IV - 19. Distribution of fire starts per month for a 10 year period.

Human caused fires often occur as single ignitions where multiple suppression resources can act together to contain the fire. Large fires situations in Wallowa County can be contributed to two causes: First, seventy-five percent of large fires are lightning caused due to thunderstorms. The majority of storms rarely ignite a single fire and typically originate elsewhere and move into the county. By the time the storm reaches Wallowa County it has left a wake of small fires on the landscape behind it, often depleting suppression resource early on existing fires. Multiple fire starts often present challenges for fire managers since all agencies are prioritizing fires locally on the Wallowa-Whitman National Forest, regionally (Oregon and Washington), and nationally. For example, in 1989 Wallowa County experienced 180 total fires starts of which 132 occurred in a two week period from July 14 to July 31. Thirty-three fires started on July 26th, 33 fires on July 27th, and 15 on July 28th in Wallowa County. Local resource depletion is common when numerous storms occur over several days. However, the majority of the fires were contained with minimal acreage burned. Out of all 180 fire starts; 170 were less than 5 acres, 174 were less than 20 acres, only 3 (1.6%) were over 1000 acres. Unfortunately, the small percentages of large fires often require long term suppression efforts and a large number of suppression resources.

Secondly, terrain conditions in some areas of Wallowa County make it difficult to suppress fires with hand and engine crews. In steep terrain ground resources are typically assisted with aerial support at the height of fires season, providing resources are available. Steep slopes (topography) contribute to fire spread increasing the probability a fire growth. As the fire perimeter expands the number of resources needed to suppress also increases. The mountainous terrain also influences the flow patterns of the storms in a number of ways The storms build over the mountains and have enough thermal lifting to create cumulus; the storms build over the Cascade and central Oregon areas and slowly travel into Wallowa County from the south-southwest; and lastly the storms originate out of Nevada – south central Oregon and move into our area from the south following the Snake River.

Effective initial attack and coordinated local suppression efforts have kept large fire numbers lower; Historically, before effective suppression era these fires may have been significantly larger. This level of fire activity coupled with current landscape conditions creates potential for large damaging wildfires both in and near communities and their adjacent forested areas.

Major Wallowa County Fires

Just in the past 20 years since 1995, Wallowa County has had 25 large fires (1000 acres +) of which 11 had potential threats to communities. A few of the fires that had potential threat to local communities are mentioned below. Those mentioned here are Canal Fire 1989: Carrol Creek Fire 2000; Thorn Fire 2000; Grizzly Fire – 2015. These fires held significance for the local communities for various reasons.

Many of the these fires resulted in the issuance of The Emergency Conflagration Act—that authorizes the Oregon Office of the State Fire Marshal to mobilize structural firefighters and equipment to assist local resources battling fires and is invoked by the Governor of Oregon.

Canal Fire 1989 was the result of a thunderstorm that ignited a series of 33 fires in Wallowa County alone on July 26th 1989. A total of 110 fire ignitions were detected one that one day between the Wallowa-Whitman, the Umatilla National Forests. July 27th and July 27th resulted in an additional 56 and 28 fire starts respectively.

The following information is an account given by retired Fire Management Officer and Incident Commander Type II qualified Nick Lunde:
"Due to the high volume of fire starts locally and in the surrounding area of northeast Oregon it created in a shortage of firefighters resulting in the need to set priorities for initial attack. Located on a high rocky ridge in sparse fuels the Canal Fire was determined to be low priority. Mr. Lunde was assigned as the incident commander who initial attacked the fire on July 28th with a 20 person crew but safety was immediately compromised due to a spot fire outside the perimeter of the main fire. Shortly afterward a second fire was detected on Mount Nebo that rapidly spread sending spot fires up to ¾ mile away. The two fires burned together making a significant run at which time suppression resources retreated to a safe area and others firefighters assisted in warning residents of Little Sheep Creek Valley to prepare to evacuate." Additional information of Nick Lunde's account can be found in Appendix B

The fire continued to burn toward the town of Joseph during the week of Chief Joseph Rodeo. The fire burned from the east making a run west into McCully Basin threatening local residence in the Prairie Creek / Divide areas and stopping just 2 miles short of the town of Joseph, Oregon.

Carrol Creek and Thorn Fire: Started by lightning on August 24, 2000 and a conflagration act was signed for increased assistance for this fire and the Thorn Fire burning at the same time. The Carrol Creek fire grew to an estimated 3197 acres threatening southeast Joseph while the Thorn fire threatened Thompson meadows area. A total of 20 structures were threatened with the loss of 1 barn and 1 outbuilding.

Horse Creek Fire started on August 14, 2001 from a lightning storm burning approximately 16, 459 acres. Steep terrain, strong winds, and low humidities increased fire behavior causing active spotting threatening the town of Imnaha. The conflagration act was enacted on August 17th due to structures threatened in town and along the Imnaha River.

Hurricane Creek Fire: The Hurricane Creek Fire was reported on July 14, 2014 after a thunderstorm passed through the local area. The fire started in steep terrain just inside the Eagle Cap Wilderness growing to an estimated 1,615 acres by August 8, 2014. The fire was located within a quarter mile of private land and 4 miles southwest of the town of Joseph resulting in an area closure and the closure of the Hurricane Creek Trail #1807 (InciWeb). Local residence in the Hurricane Creek canyon were put on a ready (an alert of potential threat) notice in the event the fire moved further toward their properties. Defensible space work was implemented along the Forest Service boundary near private residences increasing home defensibility should the fire spread north.

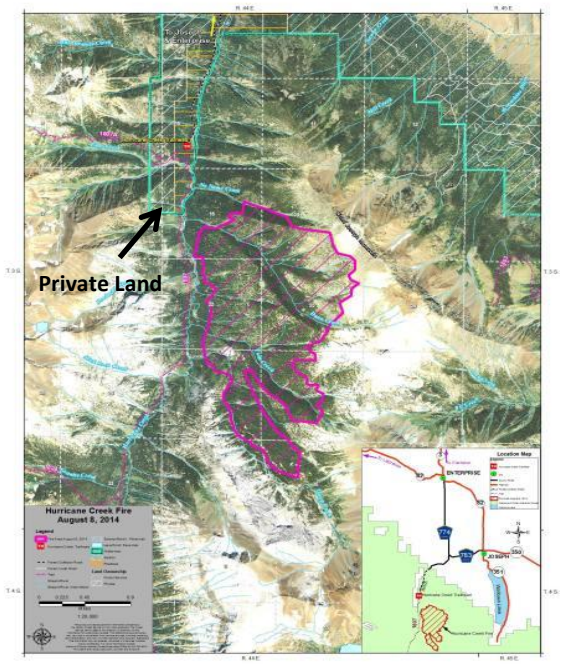


Figure IV - 20. Fire Perimeter Map August 8, 2014 -Hurricane Creek Fire – US Forest Service – Incident Information System **https://inciweb.nwcg.gov/incident/map/3966/0/**. Fire photo by Oregon Department of Forestry Taken July 20, 2014.

Figure IV - 21. 5 Mile Fire burning near the Imnaha River south of the town of Imnaha. Photo provided by Oregon Department of Forestry

The 5 Mile Fire began on August 3, 2014 burning within a half mile south of the town of Imnaha. Road closures were put into effect from Freezeout Creek (community) north to Imnaha as well as the popular Hat Point road to the east (InciWeb). The fire burned approximately 4524 acres. (Figure IV - 21)

Grizzly Bear Complex: On August 13, 2015 a dry lightning storm resulted in 22 individual fire starts one of which 17 wilderness fires merged into the Butte Creek or Bear Ridge Fires. These fires later became the Grizzly Bear Complex with final acres totaling 76,475 acres as of September 2015 (USFS PNWR). On August 20th the fire grew 30,000 acres creating a plume visible for 100+ miles (USFS PNWR) promoting evacuations of local homeowners (Figure IV – 22). See Appendix B for full report. Threatened by the fire were the communities of Troy and residents of Eden and Bartlett Benches. The National Interagency Coordination Center, on August 25th, identified fire behavior as active with group torching, uphill fire runs, and short range spotting The fire started on the Umatilla National Forest in Washington State burning into Oregon toward communities along the Grande Ronde River. The Emergency Conflagration was invoked by the Governor on August

20th (OR 2017). The conflagration act was enacted for Wallowa County. Firefighting efforts saved many of the homes and outbuildings but lost 5 primary residence and 28 outbuildings (USFS PNWR) According to the State of Oregon conflagration history there were 405 residence and 98 other structures threatened with structures saved estimated at 400 residence and 78 other structures (OR 2017).

Figure IV - 22. The Grizzly fire grew 30,000 acres on August 20th creating a plume visible for 100+ miles. Photo by USFS.

Figure IV - 23. Grizzly Fire 2015 from the Grand e Ronde River. Taken by Local resident Morgan Anderson.

Communities and Wildfire

One of the Actions outlined in the Northern Blue Mountain Cohesive Strategy Pilot Project Action Plan in the Goal *"Human populations and infrastructure can withstand a wildfire without loss of life and property",* is to *Develop an Integrated Information, Education, and Awareness Program* (Board of Forestry 2013).

Wildfire effects and values threatened are individual and subjective to residents. They occur in the form of buildings, homes, infrastructure, public and firefighter safety, health, and benefits the surrounding landscape provides to the communities and residents (CWS 2013).

Community education and preparedness is critical to lessening these impacts.

> *"The capacity of a community to prepare for, respond to, and recover from a wildfire event is also a critical concern. There is emerging literature on the concept of social vulnerability to catastrophic events."* (CWS 2013)

Wildfires have an ecological as well as social impact to their geographic area and residents both during and after the incident. Communities directly threatened by wildfires can experience financial, physical, and psychological impacts (Cohn et al. 2006, Downing et al. 2008). Wildfires can impact community members in a number of ways and for many reasons even when there are limited losses. Evacuated residents reported substantial anxiety due to not knowing the status of their home and properties (Kent et al. 2003, Rodriguez-Mendez et

al. 2004) and having little control over the ongoing events (Hodgson 2007). Additionally, anxiety from evacuating can be affected by the type of evacuation order (voluntary or mandatory), the amount or lack of fire preparedness accomplished around their properties, presence of pets or livestock on the premises, current physical health of family members, and previous experience with wildfire evacuations (Cohn et al. 2006, Mozumber et al. 2008).

Post-fire is not without concern; it can result in psychological impacts to residents when they return home to a variety of issues stemming from loss of homes, physical possessions, family memorabilia, and documents (Downing et. al 2008) and/or apprehension over long term site conditions. There may also be emotional scars even if loss of homes does not occur and residual impacts from the wildfire are experienced such as: smoke damage, charred landscape and vegetation, and injury or death of pets/livestock (Taylor et al. 2007). The visual impacts, whether ecologically damaging or not, can leave residents with a variety of perceptions when viewing the results from their homes.

While the wildfire is actively burning, having current knowledge of the situation often allows residents to cope with the situation and understand the extent of combined efforts put into fighting the fire (Carroll et al. 2005). There are also times when community cohesiveness surfaces from impacted local residents through humanitarian efforts to assist one another in dealing with and rebuilding during and after a wildfire.

The residence of Wallowa County are not exempt from these psychological effects. The high visibility of the flaming fire fronts from local communities have left many residents with the memory of the Canal, 5 Mile, and Grizzly Bear fires, particularly with the burn area still visible from the valley. These fires made wildfire threat a much more tangible danger.

Public meetings, website posts of public safety concerns, and current fire information during the Grizzly Creek Fire helped local residents with fire situational awareness and understanding of decisions being made by the fire managers. Public opportunities to see and talk to local fire managers were conducted to provide a better understanding of the situation, the decision process occurring and to answer question.

Communication before, during, and post-fire has been found to be important to the success of future outreach efforts. Educating people about wildfire risk reduction measures in advance of wildfires and building awareness that local forests are prone to fire is crucial to a successful program. Time and place of the application of treatments and utilizing tools available will help both residents and land managers prepare for future wildfires.

Economic Impact of Major Fires

Northeast Oregon supports a dynamic landscape of ecosystems with constantly changing environments. Shifts in stand dynamics have occurred over the last century partially as a result of successful fire suppression in fire-adapted ecosystems. Historically, fire would have naturally performed stand cleansing by periodically removing accumulation levels of surface fuels, pruning of residual trees, and limiting stand undergrowth. The Carsey Institute issued a briefing paper in the spring of 2012 resulting from a survey conducted in the fall of 2011. The focus was the tri-county area of Northeast Oregon including Baker, Union, and Wallowa

Counties where landscapes and communities are changing in interconnected ways. One of the key findings in the survey is that large majorities of those surveyed perceive wildfires, insects, and the loss of forestry jobs and income as a serious threat to their communities (Hamilton et. al 2012).

In 2014 there were 63,612 wildfires reported at the national level, of which 666 were significant. Significant fires defined in the National Mobilization Guide are fires that are a minimum of 100 acres in timber, 300 acres in grass/brush fuel types, or are managed by a Type 1 or 2 Incident Management Team, a National Incident Management Organization or a Wildland Fire Management Team. Significant fires accounted for approximately 1.1 percent of the all wildfires reported (NIFC 2015).

By comparison, the Northwest (NW) states of Oregon and Washington received a total of 3,087 and 1,480 reported fires, respectively. Significant fires for the NW totaled 113, accounting for 2.4 percent of all the wildfires reported in these two states (NIFC 2015).

Although large wildfires occur nationally every fire season, fire starts that are considered significant are a relatively small percentage in comparison to the total wildfires reported and suppressed. However, these fires account for most economic impact on state and federal funding in terms of suppression costs, natural resource loss, personal property loss, and local economies.

Mean Fire Costs

Fire costs for Forest Service records in Wallowa County were available from 1986 through 2014. Using the 28 years of data and 1986 as a starting point a seven year mean fire cost estimate was completed to showed mean fire costs in the hundreds of thousands. This rose to a mean large fire cost of more than a million dollars per fire over the next two decades, this mean fire cost has already carried into the current decade where six fire seasons, 2010 to 2016, have passed.

Using the same fire information from Figure VI – 24, and using fires 100 acres and larger, data shows the mean fire cost for Wallowa County's large fires from 1986 to 1993 was $1,180,397 with the mean fire size for the same time period of 5608 acres. Although the next three 7 year increments progressively has fewer fires fire costs were increasing. The next three 7 year increments in order of dates showed mean fire sizes as 9621, 11,454, and 8170 acres respectively. The years from 2008 to 2014 had less fires over 100 acres (16 fires) compared to the previous three time frames the costs were higher on average.

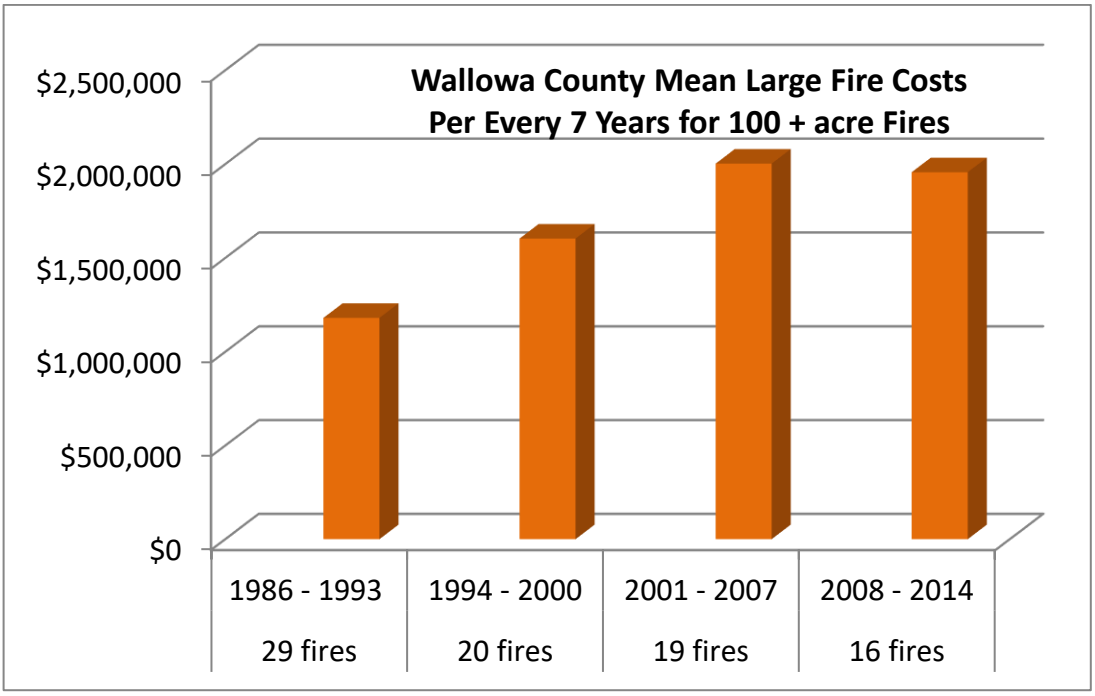


Figure VI – 24. Fire costs of public land fires since 1986. Graph displays a mean cost per fire for that 7 year period of fires 100 acres and larger. Data includes fires ignitions that originated in Wallowa County only. Note: * accounts for only four years of current decade. http:/www.fs.fed.us/r6/data-library/gis/umatilla

This increase in fire acres and costs is important since the western United States supports large blocks of publicly owned land, encompassing more than half of the total land area. Fires that occur on public lands and spread onto private lands are a significant problem in the west. The problem is further compounded by steep slopes, insect and deceased trees, and limited resources as well as access (CWS 2014). Total individual fires reported, regardless of size or agency, in the western U.S. from 2008 through 2012 were on average, approximately 23,091fires per year, resulting in an average annual burned acres of 4,666,030 (National Interagency Coordination Center 2013). Fires reported by all agencies in Oregon and Washington (northwest), for the 2014 fire season totaled 3092, involving 996,542 acres in Oregon and 1480 fires for 386,972 acres in Washington (NIFC 2014). In 2014, there were 2,155 human causes accounting for only 11 percent of the acres burned, while 2,417 lightning fires accounted for 89 percent of the fire acres (NWCC 2014). This closely matches Wallowa County fires where 18% were human caused and 82% lightning.

Suppression Costs

Fire suppression costs have continued to increase since the 1980s. The average cost of fire suppression expenditures for a 10-year period from 1990-2000 was around $350 million dollars. Fiscal years 2000, 2002, 2003, and 2006 had suppression expenditures totaling approximately $1 billion annually for USDA Forest Service alone (Gebert et. al. 2007 and Prestemon et al. 2010). Between Fiscal Year (FY) 2002 and FY 2012, the Forest Service found it necessary to transfer funds from discretionary, mandatory, and permanent accounts to cover fire suppression costs. In a statement before the Committee of Energy and Natural Resource of the U.S. Senate in 2013, the Chief of the Forest Service Thomas Tidwell stated,

"*These transfers occur when the agency has exhausted all available funding resources from Suppression and FLAME accounts"* (Tidwell 2013). In 2002 alone, the Forest Service transferred $999 million to cover suppression costs. Since FY 2000, the 10-year average has risen almost every year up to $1 billion in 2010 and beyond (Tidwell 2013).

These fires not only impact suppression cost but also affect natural resources and infrastructure. In 2012, more than 4,000 structures were destroyed, including 2,216 residences, exceeding the annual average loss of 1,416 between 1999 and 2012 (Tidwell 2013). In 2014, 1,953 structures were destroyed nationally including 1,038 residences, 874 minor structures, 20 commercial structures, and 14 mixed commercial/residential structures (NIFC 2015).

Economically, losses to natural resources and infrastructure can have significant impacts to businesses, water delivery systems, municipal watersheds, power supplies, and transportation systems, in addition to impacting the health and wellbeing of local communities. Home construction in the western states may increase future fire suppression costs since only 14 percent of available wildland interface areas are currently developed (Gude et. al 2008). Environmental conditions in combination with effects of expanding WUI areas underlie four broad areas of risk: risk to firefighters and civilian safety, ecological risks, social risks, and economic risks (CWS 2014).

Suppression costs are often associated with immediate costs of wildfires and WUIs, while some costs are associated with various other impacts that wildfires may have on the communities and ecosystems. These can occur during a wildfire incident or can extend well into the future, leaving long-lasting economic impacts. Costs related to wildfire reach beyond acres burned and the length of time of the actual fire event (WFLC 2009). Costs related to wildfires are explained here in the categories of direct and indirect costs.

Direct costs for the purpose of this document are expenses incurred during or immediately after a wildfire. When large fires occur, they are rarely an exclusive agency event. As a result, suppression costs are often associated with multi-agency expenditures that occur in categories such as: aviation, engines, firefighting crews, and personnel in supporting roles. Other direct costs include private property losses (insured and uninsured), infrastructure shutdown or damage, damage to recreation facilities, loss of timber resources, and evacuation/emergency aid (WFLC 2009).

Indirect costs often emerge post-fire when suppression resources are either down to bare bones or completely withdrawn from fire duties. Rehabilitation efforts are frequently associated with stabilizing and improving damaged fire areas. These can accumulate years post fire depending on the degree and amount of severely burned areas. Examples such as delayed fire effects to overstory trees (mortality may occur up to five years post burn), heavy rains a year or two later when vegetation is slow to re-establish causing soil or land movement, or potential for irrevocable impacts when loss of life is involved.

The Western Forestry Leadership Coalition examined six case studies of wildfires, all located in the western U.S., illustrating the range of costs from fire impacts. Table IV - 5 shows that actual wildfire costs exceed those often calculated, particularly when considering rehabilitation, direct and indirect costs; with differences vary from 2 to 30 times (WFLC 2009).

FIRE	COST CATEGORY							
	Suppression Costs	Other Direct Costs	Rehabilitation Costs	Indirect Costs	Additional Costs	Total Costs	Total / Suppression	Suppression / Total
Canyon Ferry Complex (MT 2000)	$9,544,627	$400,000	$8,075,921	$55,310	n/a	$18,075,858	1.9	53%
Cerro Grande (NM 2000)	$33,500,000	$864,500,000	$72,388,944	n/a	n/a	$970,388,944	29.0	3%
Hayman (CO 2002)	$42,279,000	$93,269,834	$39,930,000	$2,691,601	$29,529,614	$207,700,049	4.9	20%
Missionary Ridge (CO 2002)	$37,714,992	$52,561,331	$8,623,203	$50,499,849	$3,404,410	$152,803,785	4.1	25%
Rodeo-Chedeski (AZ 2002)	$46,500,000	$122,500,000	$139,000,000	$403,000	n/a	$308,403,000	6.6	15%
Old, Grand Prix, Padua (CA 2003)	$61,335,684	n/a	$534,593,425	$681,004,114	n/a	$1,276,933,224	20.8	5%

Table IV - 5. Summary figures (last two columns) presented in Table are: 1) a ratio of total costs to suppression costs, and 2) suppression as a percentage of total costs. USFS, 2007 Large Fire Cost Review. Table was obtained in section Case Studies, Summary of Cost Information in The True Cost of Wildfires in the Western U.S. by Western Forestry Leadership Coalition. State and Federal government partnership including: 23 state and Pacific Island Foresters of the West; 7 western Regional Foresters, 3 western Research Station Directors, and Forest Products Lab Director of the USDA Forest Service (WFLC 2009).

Recreation

Travel and tourism is one of the most important industries in Wallowa County offering a tremendous amount of variety when it comes to recreation opportunities, much of which is reliant on the county's local forests and waterways.

Figure IV - 25. Looking south over the town of Joseph into the Wallowa Lake Basin. Photo taken by Leon Werdinger.

Wallowa Lake is nestled between Chief Joseph Mountain and Mount Howard just south of the town of Joseph. This pristine glacier-formed lake draws in an annual average of 74,220 visitors for camping, lodging, fishing, boating, hiking and horseback riding in the Eagle Cap Wilderness each summer.

Each year thousands of visitors line Wallowa Lake and vicinity often for vacation purposes, particularly in the summer months. In 2016 alone June, July, August, and September received 51,138, 103,544, 53,592, and 89,256 respectively, in day use numbers. This equates to a daily use of 1,704 in June; July hosting 3,451 visitors; August 1,728; and September with 2,975 (OPRD 2017).

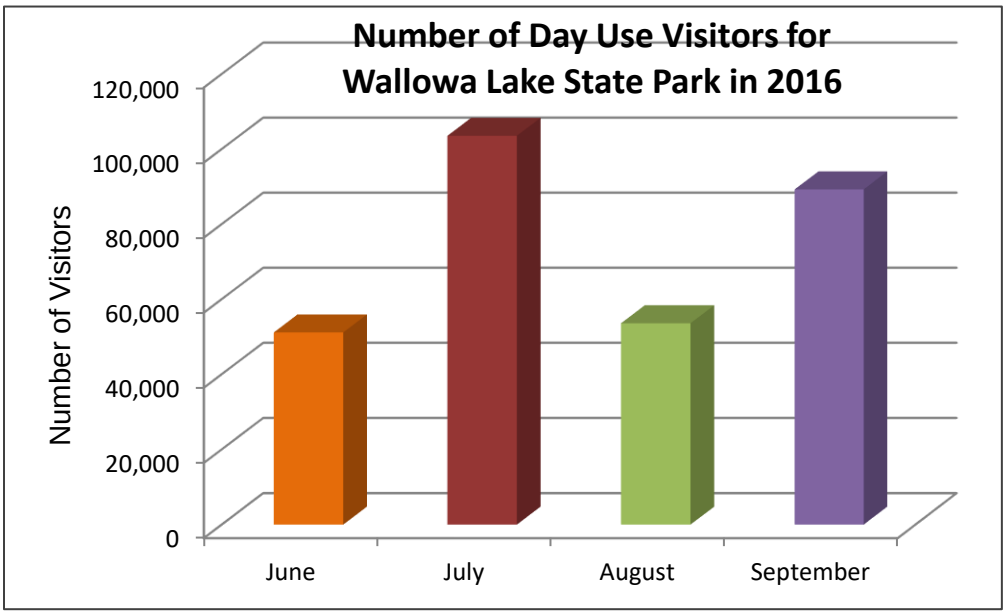


Figure IV - 26. Number of people visiting Wallowa Lake State Park in the summer months of 2016. Data provided by Elliot Hinman of Oregon Parks and Recreation Department (OPRD), Salem Oregon 2017.

These daily averages occur during the peak of fires season months. This is significant in that there is *only one access road* to the south end of Wallowa Lake. Additionally, the highest State Park and recreation use is also the time of the highest number of fire starts for the county. The following two graphs display the annual attendance, from January to December, for the State Park from 2008 through 2016 for day use and for night use.

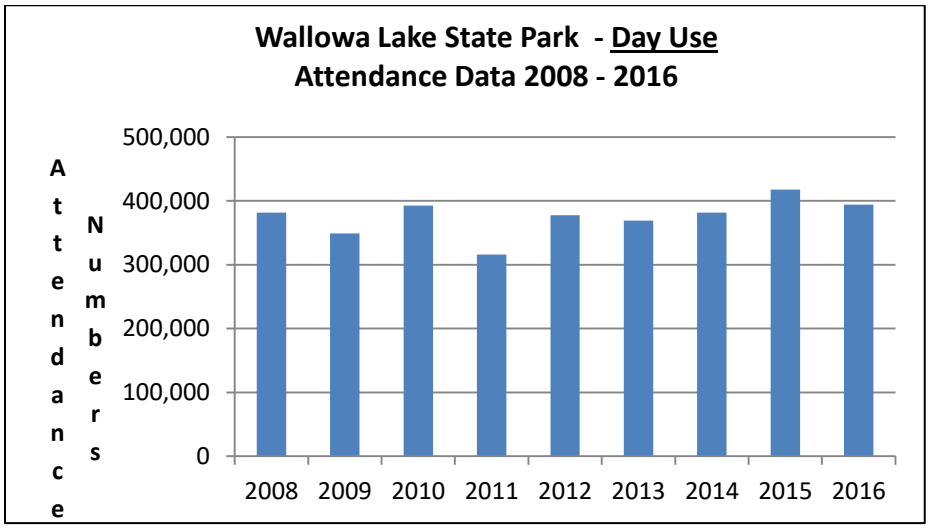


Figure IV - 27. Day Use Attendance at Wallowa Lake State Park. Data provided by Elliot Hinman Oregon Parks and Recreation Department, Salem Oregon 2017.

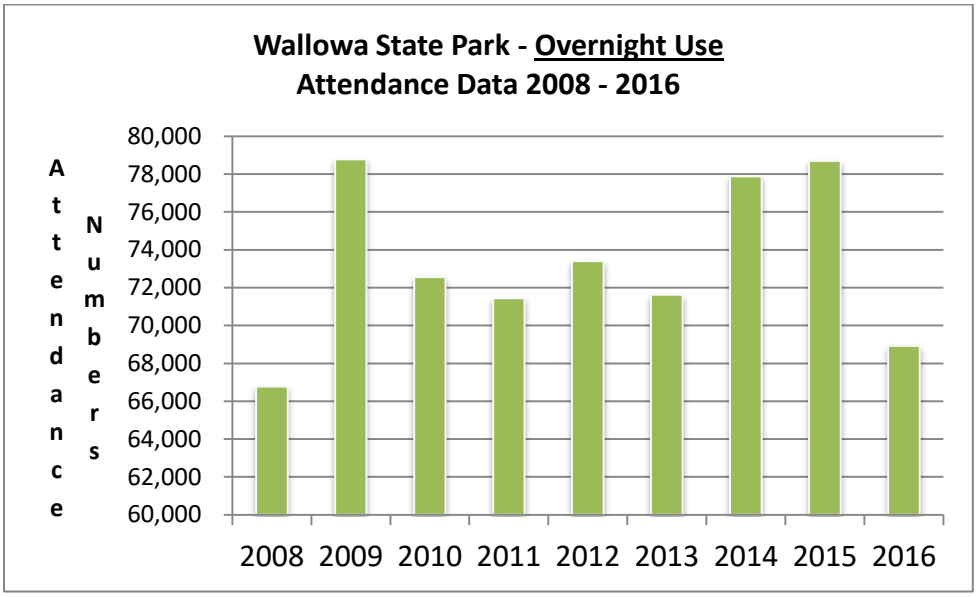


Figure IV - 28. Overnight Use Attendance at Wallowa Lake State Park. Data provided by Elliot Hinman Oregon Parks and Recreation Department, Salem Oregon 2017.

The Wallowa Lake Tram that transports sightseers to the top of Mount Howard is located at the south end of Wallowa Lake and is another high day use area. According to Tram Owners the 4 mile long cable transports an average of 32,000 people between mid-May and the end of September, averaging 235 people per day. The Tram not only creates summer jobs but attracts a high number of tourists that can get an amazing view of the Eagle Caps and Wallowa Valley from the top. It is important to note, there are 25 towers that rise 3700 feet from the base to the top over forested landscape with its highest use during the peak of fire season. The highest point of the tram cars above ground is 120 feet and the lowest is only 3 feet off the ground. There has been some fuels mitigation on the face of Mount Howard where areas average anywhere from 30 to 100 tons of down material per acre. At the time of the Mount Howard project plot data revealed 37% of all trees under 14 inch diameter breast height were dead. Untreated areas since the time of the fuels plot studies in 2005, are expected to have increased further with many of the standing dead trees contributing to the already heavy down woody debris

According to Dean Runyan Associates, May 2017 Oregon Travel Impacts prepared for the Oregon Tourism Commission in Salem, Oregon; the travel impacts into Wallowa County resulted in 28 million dollars in destination travel resulting in 12.7 million in earnings for the county while supporting 590 in employment. There was an estimated 444,000 overnight visitors in 2016 alone for the county.

Visitor spending for travelers on different overnight accommodations for Wallowa County has increased in all categories except for Vacation Home. All numbers reflect changes from 2013 – 2016p in ($Million): Hotel, Motel 10.3 – 12.7; Private Home 1.3 – 1.4; Campground 6.4 – 6.8; Vacation Home 1.3 – 1.3: Day Travel 5.7 – 6.3; Spending at Destination 25.0 – 28.5

(Runyan Associates 2017). Destination spending includes accommodations, food service, food stores, local transportation and gas, arts/entertainment/recreation, and retail sales.

In the summer of 2012, an in-person survey was conducted by Oregon State University on questions regarding tourism in Wallowa county and their estimated expenditures. These were first hand interviews with visitors. The 2013 results showed that 60% of visitors traveled more than 175 miles with typical party size of 4 adults (80%). The average daily spending was estimated at $129.80 which is consistent with Dean Runyan Associates 2012 estimates of $133 per day per travel party.

The total direct travel spending occurring in Wallowa County annually could be significantly impacted if a wildfire were to significantly damage the landscape around the Wallowa Lake area. Large fires in Wallowa County and adjacent areas can impact the economy for several reasons. First, Wallowa County has a strong economy base in natural resources, agriculture, and tourism, with recreation a key component. Recreation can be further divided into hiking, bicycling, swimming, and rafting. For example, bicycle tourism alone contributes up to $15 million for the Eastern Region of Oregon. Travel expenditures to Wallowa County from 2000 to 2012 have increased by $5.4 million dollars, with earnings in 2012 of $9 million (NEOEDD 2013).

Although much of the expenditures in the county are a result of summer tourism spending typical family vacation visits, it also accounts for seasonal visits of non-locals for hunting fowl, bear, turkey and big game as well as steelhead fishing. The beauty and outdoor opportunities that Wallowa County offers could be significantly impacted if a fire of proportional size were to occur.

Timber

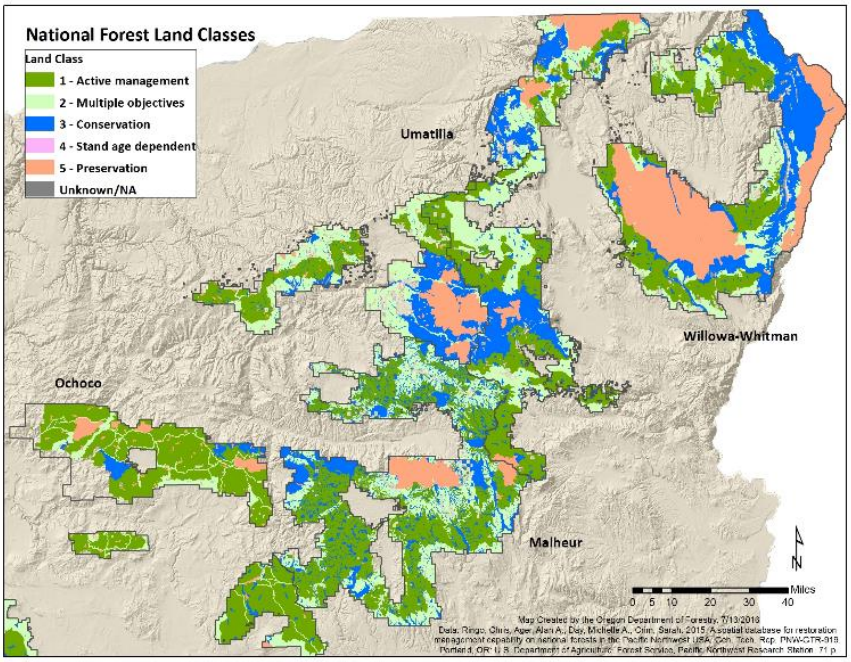


Figure IV – 29. Five Land Designation Classes in NE Oregon. Ringo et. al. 2016.

About half of Wallowa County is covered by forest but only a portion of this remains available for timber production – efforts to assess, plan and implement fire risk reduction actions are critical to sustaining this production potential. Of the nearly 1.1 million acres of forest, approximately 73% is in federal ownership, 14% in private industrial ownership and 12% in family forest ownership. The remaining 1% is in state ownership. As is true for the Blue Mountain National Forests (Malheur, Umatilla, and Wallowa-Whitman), a significant portion of Wallowa County's

federal forests are protected through management designation. Approximately 286,000 acres (36%) falls within active management designations that allow timber production, in addition to other benefits. Nearly 505,000 acres (64%) of the federal forests have management designations that limit or prevent timber production – 344,000 acres (43% of total federal forest land area) are highly protected through wilderness area, research natural area, wild and scenic, or inventoried roadless area designations. Commercial timber production is limited across another 160,000 acres (20%) by riparian buffers, old growth reserves, and a variety of wildlife habitat designations. Furthermore, the non-wilderness portion of the Hells Canyon National Recreation Area (HCNRA) accounts for 87,000 acres of the forest in management designation that allow timber production. However, conservation interests advocate against such use in the HCNRA. Therefore, the USFS focuses its active management on only 199,376 acres (25%) of its total forested land base. Challenges of these forest managements can be found in Chapter X Accomplishments and Challenges.

Three different wilderness areas fall within Wallowa County. The Eagle Cap Wilderness Area was established in 1940, and the other two (Wenaha-Tucannon, and Hells Canyon) were created in the 1970's. Both the Eagle Cap and Hells Canyon Wilderness Areas were expanded over time – including under The Oregon Wilderness Act of 1984. Most of the other federal forest protections emerged in the 1990's following broader federal policy shifts, new Endangered Species Act listings, and court decisions seeking to protect old growth.

Forest management, timber production and wood products manufacturing were historically the largest private payroll providers in Wallowa County – supporting over 30% of the total employment and labor earnings, and paying salaries significantly higher than the average wage. Following the USFS shift from a policy of sustained yield management to ecosystem management, and the listing of Chinook and Steelhead under the ESA, in the early 1990's, timber harvest off of federal lands dropped by 95% resulting in significant job losses, mill closures, and structural changes to Wallowa County's economy. Similar shocks were experienced across the Pacific Northwest. In 1987, 95 million board feet of timber was harvested from federal lands in Wallowa County. Over the 22 year period from 1994-2015, these federal lands produced an annual average of less than 5 million board feet. This equates to 6 board feet per acre per year across the total federal land ownership in Wallowa County, and 24 board feet per acre per year from the 199,379 acres readily available for management.

Most vertically integrated wood products companies in the Pacific Northwest broke-up during this same period of profound change in federal forest management. In Northeast Oregon, Boise Cascade sold all of its forest lands to a Timber Investment Management Organization (TIMO) in 2004. The new owner, Forest Capital Partners LLC of Boston, MA, managed the lands for 8 years before selling its timberland portfolio to Hancock Timber Resource Group and Molpus Woodlands Group. In 2016, these new owners sold off about 7% of its Northeast Oregon lands to Green Diamond. Other private industrial forestland sales are expected in the near future. This trajectory is increasing the likelihood of forest fragmentation and development.

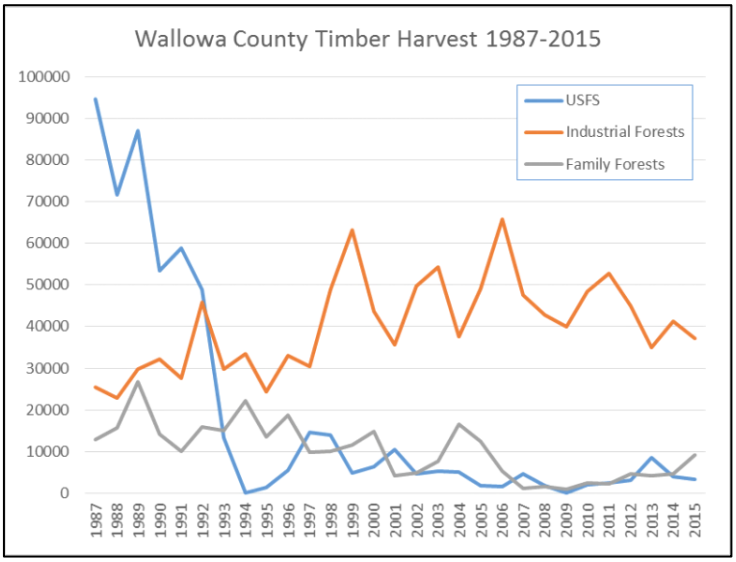


Figure IV - 30. 28 year trend in timber harvest by ownership type.

Prior to the shift in federal forest management, timber production (and resulting job impacts) were evenly spread across all three types of forest ownership. In 1992, the federal forests accounted for 44% of total timber production, industrial forest lands 41%, and family forest lands 15%. Since 1994, the industrial forest lands have generated the lion's share of timber production. In 2015, these lands accounted for 75% of the total saw log volume, family forests 19%, and federal forests 6%. After 20 years of increased harvest levels, industrial forest land production is trending downwards.

Impacts from timber harvest reduction have been felt through permanent mill closures and the loss of forest contracting businesses. From 1998 to 2014, timber proprietors in the Wallowa County shrank from 43 to 13, a 69.8% decrease. Despite the significant forest resource in the county, forest related employment accounted for only 4.7% of all jobs in 2015. Forest management and harvesting accounted for 2.8% of the county's jobs, and wood products manufacturing accounted for 1.9%. This sector continues to support high wage jobs. Average wages are $47,950 – significantly higher than the non-timber private sector average wage of $27,265, and slightly higher than the average government wage of $42,915.

Wallowa County lost all of its traditional saw mills over the period 1994-2007, but it currently supports a unique small log processing plant (Integrated Biomass Resources LLC), a few mobile saw mills (the largest being JayZee Lumber LLC), and a few commercial firewood producers. This local infrastructure plays a small but important role in the forest restoration economy. Integrated Biomass Resources (IBR) was specifically designed to process the by-product of forest restoration and fuel reduction treatments, as well as non-saw log component of traditional timber sales. Coupled with the other small proprietorships, IBR improves the cost-effectiveness of restoration projects, generating more value non-saw log volume, and significantly reducing haul costs for this lower value material.

Case Studies

In the case studies examined by the Western Forestry Leadership Coalition, they concluded that two to three years following the Canyon Ferry Complex Fire, recreational visits to the national forest declined by 10 percent; no dollar figure was provided (WFLC 2009). In 1988, Yellowstone experienced multiple fires in and around the National Park, resulting in expenditures dropping approximately $13 million in 1989, and $26 million in 1990. The Rodeo-Chediski Fire is estimated to have had indirect costs in the tribal community of $8.1 million dollars through loss of sales tax revenue and job loss. The Hayman Fire also showed impact costs post-fire extinguishment of $2. 7 million (approximate) through tax revenue and business losses, plus value reduction on surviving structures in the fire area (WFLC 2009).

Economic implications of a fire occurring in Wallowa County could be significant. A county of approximately 7,000 citizens has an estimated 440,000 visitors annually. The impacts to local economy from a large damaging wildfire could last several years post fire.

Many businesses rely on their relationship with the forests through tourism, recreation, commodities, and beauty. The multitude of impacts has not taken into account the additional ecological impacts that would be sustained affecting aquatics, wildlife habitat, and aesthetic values. On November 5, 2013, Colorado Senator Michael Bennet highlighted the need for wildfire mitigation resources at a Senate Hearing. Mitigation savings were pointed out by the Congressional Budget Office, stating that every $1 spent in wildfire mitigation saves $5 in future disaster losses (Bennet.senate.gov 2013).

The cost of suppression for land management agencies such as the Oregon Department of Forestry and United States Forest Service can mount quickly depending on fire season severity. When wildfire consumes physical property like structures, timber stands, or in areas with potential landslides, the associated costs rise dramatically, displacing people and businesses and contributing to higher overall economic losses. Wallowa County assets, both natural and created, should be protected to the extent possible against loss from wildfire.

Summary

Wallowa County supports a variety of geographic features that includes the numerous trails to high lakes in the northern Blue Mountains and Wallowa Mountains; the scenic byway from Joseph to Halfway that includes the Upper Imnaha River and Hells Canyon National Recreation Area; and local Wallowa Valley attractions such as Wallowa Lake, trail head access, Tramway, and a variety of numerous other town activities.

The diverseness of the county provides numerous economic opportunities from mercantile, agriculture, recreation, and natural resources. Non-Service Sector accounts for 32% of earnings while the Service Sector accounts for 41% of the local labor earnings and Government jobs (federal, state, and county), having a 27% labor earnings. The jobs are primarily located in Wallowa Valley where the four incorporated towns are located. Labor earnings have shown a 29% increase since 1970 and non-labor income grew 255%. Livestock and crops make up the agricultural commodity sales contributing 44% and 56% respectively.

Impacts on the timber industry have resulted in permanent mill closures and loss of forest contracting businesses with a decrease from 43 to 13 timber proprietors from 1998 to 2014 (69.8% reduction). The last traditional saw mill closed in 2007 but the county is currently supported by a small log processing plant and a few mobile saw mills.

The climate of Wallowa County varies greatly depending on elevation. The mountainous areas received from 32 to 52 inches of rain with the highest peaks reaching up t0 80 inches often in the form of snow. Wallowa Valley is relatively dry with an average annual rainfall of 12 to 18 inches with as low as 11 inches down along the Snake River in Hells Canyon. Shifts in temperature based on local data are correlated with increasing length of wildfire season and an increase of fire frequency, occurring predominantly between 5500 and 8500 feet in elevation. The bulk of wildfires typically occur between July and mid-August accounting for 77

percent of all annual fires. Wildfire ignition causes are 82 percent lighting and 18 percent human, indicating there is some opportunity to reduce the number of human fires, lowering firefighter expose and suppression costs.

Large fires over 1000 acres are common for the local county with an average occurrence of 1.9 fires per year of this size. Since the year 2000 there have been 24 fires over 1000 acres in Wallowa County with the smallest being 1,419 acres and the largest was the Grizzly Fire at 76,475 that originated outside the county in Washington and burned to the Grande Ronde River.

Fire suppression costs continue to rise with increases of homes lost and acres burned. Since fiscal year 2000, the 10-year average has risen, with costs reaching $1 billion dollars in 2010. Taking the initiative toward mitigation measures can help prevent some of the direct suppression costs. Every $1 spent on wildfire mitigation has the potential to save $5 in suppression costs. Promoting wildfire mitigation in Wallowa County will not only have potential cost savings in suppression, but will also reduce risks to firefighters and provide homeowners in treated areas opportunities to be involved in preparing their properties in advance.

Bibliography

Board of Forestry, 2013. *Northern Blue Mountain Cohesive Strategy*, Pilot Project Action Plan. July 25, 2013 Meeting Minutes Attachment 18, Agenda Item B – Attachment 18.

Dalton, M.M., P.W. Mote, and A.K. Snover [Eds.]. 2013. *Climate Change in the Northwest: Implications for Our Landscapes, Waters, and Communities.* Washington, DC: Island Press.

Employment Projections, March 2014. 2012-2022 (Baker, Union, Wallowa)
Oregon Employment Department, Workforce and Economic Research
Brenda Turner, Occupational Economist, Brenda.P.Turner@state.or.us, 503- 947-1233

GAO (General Accounting Office). 2009. Wildland fire management: Actions by Federal Agencies and Congress Could Mitigate Rising Fire Costs and Their Effects on Other Agency Programs.GAO-09-444T. Washington, DC: General Accounting Office

Gerbert, Krista M., David E. Calkin, and Jonathan Yoder. 2007. *Estimating Suppression Expenditures for Individual Large Wildland Fires.* Western Journal Applied Forestry Volume 22, No.3, July 2007, pages 188 – 196.

Gude, Patricia H., Ray Rasker, Jeff van den Noort, 2008*. Potential for Future Development on Fire-Prone Lands*. Journal of Forestry 106(4): 198-205.

Hamilton, Lawrence C.; Joel Hartter, Forrest Stevens, Russell G. Congalton, Mark Ducey, Michael Campbell, Daniel Maynard, and Michael Staunton 2012*. Forest Views, Northeast Oregon Survey Looks at Community and Environment*. Issue Brief No. 47 University of New Hampshire.

Kunkel, K.E. et al., 2013. *Part 6. Climate of the Northwest U.S.*, NOAA Technical Report NESDIS 142-6.

Moseley, Cassandra., Nielsen-Pincus M., David E. J., Evers C., and Ellison A. Fall 2012. Briefing Paper Number 48, Ecosystem Workforce Program. University of Oregon: Institute for a Sustainable Environment.

Mote, P.W. et al., 2013. Climate: Variability and Change in the Past and the Future. Chapter 2, 25-40, in M.M. Dalton, P.W. Mote, and A.K. Snover (eds.) *Climate Change in the Northwest: Implications for Our Landscapes, Waters, and Communities*, Washington D.C.: Island Press.

Northeast Oregon Economic Development District - NEOEDD, September 24, 2013. *Comprehensive Economic Development Strategy*, 2013 – 2018.

NOAA National Centers for Environmental information, Climate at a Glance: U.S. Time Series, Average Temperature, published June 2017, retrieved on June 21, 2017 from http://www.ncdc.noaa.gov/cag/

Oregon Department of Forestry, 2013. West Wide Wildfire Risk Assessment, 2013. The Sanborn Map Company, 2012.

Oregon Department of Forestry, 2012. West Wide Wildfire Risk Assessment Project, Summary Statistics of Published Results by State – Oregon, December 5, 2012.

Oregon State University, 2012. 2012 Profile of Wallowa County Agriculture

PSU 2016. Portland State University, Population Research Center, 2015 Annual Oregon Population Report Tables.

PSU 2016a. Portland State University, Population Research Center. *Coordinated Population Forecast 2016 through 2066, Wallowa County Urban Growth Boundaries (UGB) and Area Outside UGBs.* https://www.pdx.edu/prc/sites/www.pdx.edu.prc/files/Wallowa_County_Final_Forecast_Report_201606.pdf

Ringo, Chris; Ager, Alan A.; Day, Michelle A.; Crim, Sarah. 2016. A spatial database for restoration management capability on national forests in the Pacific Northwest USA. Gen. Tech. Rep. PNW-GTR-919. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 71 p.

Tidwell, Thomas. June 4 2013. Statement Thomas Tidwell, Chief USDA Forest Service -Before the Committee of Energy and Natural Resources U.S. Senate. Wildland Fire Management
United States Census Bureau, 2000. American Fact Finder, U.S. Department of Commerce
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

University of Oregon, February 2014. *Regional Natural Hazards Mitigation Plan Northeast Oregon,* Counties of Baker, Grant, Union, and Wallowa and Addenda for Baker City, Enterprise, Halfway, John Day, and La Grande. Northeast Oregon Multi-jurisdictional Natural Hazards Mitigation Plan.

USDA 2012. Wallowa CountyOregon, 2012 Census of Agriculture County Profile. U.S. Department of Agriculture.

WFLC, Western Forestry Leadership Coalition 2009. *The True Cost of Wildfire in the Western U.S.* Original publication date: April 2009; Conclusions and recommendations updated: April 2010.

Westerling A. L., Hidalgo H. G., Cayan D. R., Swetnam T. W. 2006. Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity. Published Online July 6 2006 Science 18 August 2006: Vol. 313 no. 5789 pp. 940-943 DOI: 10.1126/science.1128834

Websites:

Bennet.senate.gov 2013. Bennet Holds Senate Hearing to Highlight Need for Wildfire Mitigation Resources https://www.bennet.senate.gov/?p=release&id=1183

Blue Mountain 2015. http://bluemountainfireinfo.blogspot.com/2015/08/firefighters-continue-to-make-good.html?spref=fb

Desert Research Institute http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?orlagr, 2014 *Western Regional Climate Center, http://www.wrcc.dri.edu/*

National Geographic Society. 2014.

National Interagency Fire Center (NIFC), 2014. September 20, 2014 National Incident Management Situation Report. http://www.predictiveservices.nifc.gov/IMSR/2014/20140920IMSR.pdf

National Interagency Fire Center (NIFC), 2014. September 20, 2014 National Incident Management Situation Report. National Interagency Coordination Center, *Wildland Fire Summary and Statistics Annual Report 2014*. http://www.predictiveservices.nifc.gov/intelligence/2014_Statssumm/2014Stats&Summ.html

NWCG.gov 2015. Phillips Creek Fire News Release.
http://inciweb.nwcg.gov/incident/article/4443/29096/
http://inciweb.nwcg.gov/incident/photographs/4443/0/

Oregon Explore, 2014.
http://tools.oregonexplorer.info/oe_map_viewer_2_0/viewer.html?Viewer=wfire&LayerTheme=Ignition%20risk%20rating

Oregon Labor Market Information System (OLMIS) 2014. Region 13 Northeast Oregon.
http://www.qualityinfo.org/olmisj/Regions?area=000013&page=2

Oregon Labor Market Information System, 2013. Work source QualityInfo.org. Oregon Employment Department.
http://www.qualityinfo.org/olmisj/Regions?area=000013&page=2

Oregon.gov 2015. Projections Oregon Employment Agency Office of Economic Analysis http://www.oregon.gov/DAS/OEA/Pages/search.aspx?cx=005482606056434223770%3Auq7asij-tbc&cof=FORID%3A10&ie=UTF-8&ot=Union%20County,%20Oregon&rs=0&as_siteSearch=oregon.gov%2fDAS%2fOEA&q=Union%20County,%20Oregon&sa=Search&as_epq=&as_oq=&as_eq=&as_filetype=&as_qdr=&as_occt=&siteurl=http://www.oregon.gov/DAS/OEA/Pages/search.aspx

Portland State University, 2017. College of Urban & Public Affairs Population Research Center. https://www.pdx.edu/prc/population-reports-estimates

Prestemon, J.P., K. Gebert, and K.L. Abt. 2010. Fiscal Year 2011 September Federal Land Assistance,Management and Enhancement (FLAME) Act Forecast For the USDA Forest Service. Available online at http://www.fs.fed.us/aboutus/budget/requests/6498868_FY2011%20FLAME%20September%20Report%20-%20Report%20sent%20042711.pdf; last accessed December 9, 2011.

Runyan Dean – Associates 2015. *Oregon Travel Impacts 1991-2014p*. April 2015.

State of Oregon, March 28, 2013. Office of Economic Analysis, Department of Administrative Services. http://www.oregon.gov/DAS/OEA/Pages/demographic.aspxTaylor, *Climate of Oregon.*

State of Oregon, January 1, 2017. Oregon Governor-Declared Conflagrations Fire Impact 1996 – 2016, http://www.oregon.gov/osp/sfm/docs/conflagrationhistory.pdf

Suburbanstats 2015. Web site – Oregon Population, Demographics and stats in 2014, 2015. (http://suburbanstats.org/population/oregon/how-many-people-live-in-la-grande).

Wallowa County2015. August 5, 2015 Phillips Creek Fire Photo. https://www.facebook.com/Union-County-Emergency-Services-1408987496044757/

Wallowa County 2017. http://www.wallowacountychamber.com/wallowa-county-economy
Western Regional Climate Center (WRCC), http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?or7500, 2013. 1981 – 2010 Monthly Climate Summary, Salem WSO Airport, Oregon. Station number 357500

Western Regional Climate Center. (2015). *Cooperative Climatological Data Summaries*. Retrieved from http://www.wrcc.dri.edu/climatedata/climsum/

WestMap 2015. Climate Analysis & Mapping Toolbox, University of Arizona, Western Regional Climate Center/Desert Research Institute, PRISM Climate Group at Oregon State University. http://www.cefa.dri.edu/Westmap/Westmap_home.php

http://www.maphill.com/united-states/oregon/wallowa-county/3d-maps/satellite-map/

Western Regional Climate Center – departure maps, https://wrcc.dri.edu/anom/ore_anom.html

[1] Data Sources: U.S. Department of Commerce. 2016. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C, Oregon Employment Department, Salem, OR, and Data USA.

V. Community Collaboration and Participation

Introduction

Wallowa County is characterized by large blocks of public lands primarily situated on the outer perimeter of the county surrounding a large portion of private lands. There is a patchwork of jurisdictions and ownership in which multi-agency protection is involved when managing wildland fire incidents. Approximately 39 percent of the county is privately owned with 58% public land ownership managed by the Forest Service. As a result, collaboration efforts are vital to integrating local land agencies, fire protection agencies, cooperators, and members of the public in an attempt to create a local stakeholders partnership. The first step in accomplishing a partnership was to share information regarding existing concerns, conditions, and efforts in creating a comprehensive community wildfire protection plan.

To ensure full success in implementing a collaborative approach it was important to identify issues and individual roles toward issue mitigation. Sharing responsibility is one way to establish a sense of ownership in both the mitigation of wildfire impacts and increasing the effectiveness of fire protection agencies.

Meetings were designed to collectively work with rural fire departments, cooperators, and community members to develop the wildfire protection plan. The CWPPs goal was to create a process that would:

1. Build upon existing partnerships and create new opportunities within the communities.
2. Provide Wallowa County community members with tools, methods, and the opportunity to partake in wildfire risk reduction.
3. Demonstrate the importance of shared responsibility in wildfire prevention, risk reduction, and forest management.
4. Identify additional opportunities for understanding what can be expected during the three phases of evacuation and wildfire events. (Pre, During, Post)

Efforts were made to gather local knowledge to include in the Community Wildfire Protection Plan (CWPP). Combining a diversity of local knowledge with current data would provide as thorough a plan that would meet the needs of all landowners, cooperators and local fire management. This type of approach accomplishes several things.

1. It provides an opportunity to validate map display modeling data for accuracy with input by local resources with on the ground knowledge and expertise.
2. It establishes a collaboration forum essential for obtaining funding, especially for federal agencies through the Healthy Forest Restoration Act, thereby improving treatment opportunities on public lands and reducing potential for fire spread onto private lands. Collaboration-based decisions offer more opportunities toward efficient and effective approaches.
3. Improved chances for competitiveness in grant programs designed to provide support to state, counties, local fire departments and community members to prepare for and recover from wildfires.

4. Provides a message that is consistent with the Cohesive Wildfire Strategy to improve wildfire response, build a fire-adapted community, and move toward a resilient landscape to increase opportunities for effective suppression efforts while maintaining a healthy ecosystem.
5. Provides a mutual language and understanding of local environmental conditions to better prepare Wallowa County communities and fire managers for wildland fire events.
6. Provides the county with a plan based on local needs and expectations.
7. Communicate concerns and challenges that both fire managers and members have regarding wildfire risk.

All the meetings generated a similar message on why local knowledge was important to the CWPP process:

a. Local involvement allows the plan to be a needs-based process on what is and is not working and identifying ways to improve wildfire protection.
b. Demonstrates to all parties how a cohesive community approach through collaboration is imperative for success.
c. It provides a means of validation of base information and verification that a need exists.
d. It creates opportunities to incorporate new ideas and new approaches offered by local community members.

Collaboration and Input

Several avenues were used to incorporate local communities into the CWPP process. Media outlets such as newspapers, radio announcements, Facebook, local web sites, and postal mail were used to reach out to the public. These were found to be the best source in linking local citizens to the CWPP process.

Common messages in outreach materials and announcements were: intent of meetings and dates, opportunities to be locally involved, and local contacts for more information, opportunities to respond to an online public wildfire risk survey.

The CWPP committee designed workshops and community meetings in an attempt to reach as many Wallowa County citizens as possible. Information consistent with all workshops were to provide:

- An overview of West Wide Risk Assessment (WWRA) framework, highlighting various input data with the three key outcomes of Fire Threat Index, Fire Effects Index, and overall Final Risk Index.
- Information about Firewise and Ready, Set, Go - concepts
- Accomplishments achieved under the original 2005 CWPP
- The rationale and need to expand on current efforts
- How local conditions benefit or hinder achieving the three primary goals in the CWPP.
- Opportunities to work with local fire management in education and project design for reducing wildfire risks

- a message that we all have ownership in mitigating wildfire risks and identifying opportunities for agencies and community members to work together for a common cause.

Rural Fire Departments (RFD)

Wallowa County is supported by two rural fire department – Wallowa and Wallowa Lake that respond to both structural and wildland fires. There are also three city fire departments – Enterprise, Joseph, Lostine – that have paid contracts with identified boundaries in the rural areas providing response outside of the city limits. Rural fire departments have jurisdiction responsibilities on approximately 39,680 acres combined, of which 38,400 are protected by Wallowa Rural Fire Department. A rural and city fire department representative was a member of the steering committee throughout the CWPP development. Opportunities for RFDs to provide input during the process were important for the development of mitigation action items. A meeting with all the local fire chiefs, city and rural, was arranged. Present at the meeting were both rural fire departments, and the four city fire departments of Wallowa, Enterprise, Joseph, and Lostine.

Outreach

Fire Chiefs were contacted through via phone and email letter regarding the meeting date, location, and agenda. The letter provided a preliminary overview of new concepts and of the Cohesive Wildfire Strategies' three key goals as the foundation for the updated CWPP.

The letter stated,

> *"It is our hope that through these three goals that you as Fire Chiefs can begin to consider what and where improvements are needed, shortfalls exist, and opportunities for new innovative ideas can occur. We encourage you to approach your needs and recommendation on the premise that,*
>
> *In a perfect world with available finances, what needs to be done to better protect life (firefighter and public) and property in within your jurisdiction?"*

A list of topic categories along with a short list developed by the CWPP committee was provided with the letter to provoke thoughts and ideas in advance of the meeting. The list of specific issues that focused on areas that could potentially impact or enhance the county's capabilities of meeting the three CWS goals. These topic categories included: risk assessment in terms of life and property, potential structure loss or survivability, fuels treatment options/reduction, emergency management, collaboration/partnerships, education/outreach, technology and reporting systems, communication networks, etc.

Wallowa County Fire Chiefs Meeting

The meeting with CWPP committee members and local fire departments occurred on June 8, 2016. Rural fire departments arrived prepared to discuss all aspects of fire protection. There was representation of all fire departments, with some having multiple attendees. This meeting was productive and informative, and included discussion of existing accomplishments, fire response needs, and county and rural response concerns.

Highlights of the meeting included updates on the CWPP process and the Cohesive Wildfire Strategy key goals. Discussions centered around issues regarding road access to homes and geographic areas, water sources, future mitigation action items, public education, wildfire response capabilities, equipment and technological shortfalls, qualifications/training, home protection treatment options, communications, information sharing, and new opportunities. Specific action items developed out of the meeting are detailed in Chapter VIII Mitigation Action Items and Chapter IX Fuels Treatment.

The CWPP committee provided a time frame of 6 pm with an expectation the meeting would likely be done by 8 pm. The meeting lasted until 8:45.

Cooperators

Cooperator input was obtained through several venues such as the local fire simulation, public meetings, and one-on-one discussions with fire managers.

Information was gathered to ensure the best available data and issues that may arise for cooperators, fire managers, and members of the public during a wildfire event were identified:

- Review maps of known locations of infrastructure for accuracy.
- Discuss issues that could potentially impact or enhance the county's capabilities of response in terms of planning for, providing protection during a wildfire, and/or influencing efforts after a wildfire has occurred.
- Actively involve cooperators in developing options specific to their interests that improve their ability to effectively interact and coordinate with other cooperators and fire agencies in wildfire emergency situations.

The fire simulation provided the highest level of cooperator involvement. The simulation was held at the Cloverleaf Hall on May 4, 2016 from 0830 – 1630 (4:30pm). Simulation turnout resulted in a high degree of participation with a showing of approximately 23 participants from local cooperators. The local fire managers initiated a mock wildfire situation, that provided insight on the strengths and weaknesses of coordinated efforts prior to an actual incident. The simulation

was designed to cover the first 36 hours of a chaotic and disruptive wildfire emergency when local emergency coordination and preparedness is most critical. It also provided the opportunity to prepare everyone for the upcoming fire season. Simulation attendees are listed in Appendix H.

Outreach

Cooperators were contacted for the simulation via email notification and through the Cohesive Wildfire Strategy committee meeting notes where discussion regarding the simulation occurred. There was also occasional local one-on-one interaction between fire managers and cooperators.

Cooperators contacted fell into one or more of the three categories below:

- Those who have existing infrastructure in the area that has potential to either be compromised during a fire or could potentially impede suppression efforts. (i.e. transmission lines / Highway department)
- Those who regularly participate in fire response when communities at risk are involved (Sheriff Department)
- Those who would need to be notified in the event of potential evacuations (i.e.: Red Cross)

Some cooperators met all categories, while others may only be involved at certain times of the fire or on a specific fire based on location.

Local Residents and Communities

The CWPP committee attempted to include as many Wallowa County citizens as possible. Forums for information sharing included talking with individual land and homeowners, meeting with homeowner associations, online surveys, attending various local stakeholder meetings to share information updates

Outreach

Reaching the highest amount of community members involved a variety of settings such as: meetings, radio announcements, boots on the ground talking with local residence, and information surveys.

Wildfire Survey Questionnaire

The widest reaching venue for CWPP update notifications was primarily achieved through a letter submitted for release with the counties 2016 property tax statements. The letter dated October 7, 2016 provided community members with an explanation on the importance of updating the CWPP including; policy and guidance changes, influence and prioritize future funding, using new data and meeting changing conditions. The letter focused on the three goals of the Cohesive Wildfire Strategy (CWS) with a brief explanation of each goal.

Included in the letter were local fire manager contact numbers to allow individuals to submit specific input as well as a web-link to the Wallowa County Wildfire Protection survey questionnaire.

In this letter the Oregon Department of Forestry included a web link to the survey as well as a Quick Response bar code (QR code) that provides immediate access to the survey. See Appendix H for the release letter.

Newspaper Articles

A news article was published in the La Grande Observer on November 14, 2016, emphasizing local fire organization efforts to involve the public to create a cohesive fire prevention and fire response program. The article highlighted some CWPP efforts to identify ways to promote fire-adapted communities to enable people to live in a fire-prone environment and mitigate loss in the event of a wildland fire, looked at ways to increase the forest's resiliency and health, especially around homes, and looked into ways to improve safety for both firefighters and the public.

The news release, in Appendix H, also provided some changing concepts on wildland urban interface and the link to the wildfire survey questionnaire. A brief description of the intent of the meeting was in the article. The article announced an opportunity for community members to learn and work collaboratively with local fire agencies to mitigate loss to wildfires. The U.S. Forest Service, Oregon Department of Forestry and other local and regional firefighting agencies requested publics' assistance in addressing fire risk issues in Wallowa County.

Public Meetings

Multiple public meetings were held to provide update information about the Community Wildfire Protection Plan. A list and short overview is provided below.

An overview of the CWPP update was provided to Wallowa County Natural Resource Advisory Committee on October 25, 2016.

Risk maps and the WUI Zone concept was displayed at the meeting. A suggestion was made with regard to the high level of public use in the Lostine Corridor and that connecting the Lapover Ranch with the main body of the southern WUI Zone would be more appropriate. This information was taken back to the CWPP committee for review, discussion and was accepted in November 2016.

Lostine Town Meeting

The public meeting was held on April 13, 2017, in the town of Lostine with the assistance of a local resident in preparing for the gathering. The meeting resulted in a show of 29 individuals, not counting the CWPP committee members. The focus of the

meeting was the community of Lostine and the Lostine Canyon. Flyers were posted around the town of Lostine with the assistance of the local residence.

Figure V - 1. Lostine Community meeting to discuss the CWPP and options for fire mitigation (photo Courtesy of Stephen Tool – Wallowa County Chieftain.

The focus of the meetings was to share information about current CWPP committee activities regarding plan development, current county fire risks, ongoing collaborative efforts, fire organization and landowner responsibilities, and ways to get involved in the process. Meetings were also designed to build new and improve existing partnerships with the community. Through the meetings, we provided tools, methods, and opportunities for playing an active role in risk reduction measures. Emphasis was put on using community input to help develop portions of the CWPP and design a plan that encouraged landowner involvement in wildfire risk reduction

Several key messages were presented at the meetings to create an informative forum with up-to-date information. Discussion topics included:

- Planning efforts with an overview of the history of Wallowa County's CWPP describing the plan updates, past accomplishments, and benefits since inception.
- An overview of the new Cohesive Wildfire Strategy and its three goals of Wildfire Response, Restoring and Maintaining Landscapes with high focus on Fire Adapted Communities
- Overview of the role of West Wide Risk Assessment role and the importance of local knowledge input.
- Opportunities for the steering committee to discuss the level of fire occurrence in their area, overview of the risk assessment, values threatened by wildfire risk, plan completion timeline, and work completed under the 2006 CWPP.
- The majority of the meeting time was given to discussions with community members about their concerns, roles, and involvement in wildfire risk reduction and protection.
- An opportunity for the CWPP committee to hear the public's input related to emergency services, fire agency response, and perception of fire risk on their properties. Meeting notes can be found in project folder and a list of attendees can be found in Appendix H.
- Additional emphasis was put on the importance of shared responsibility in wildfire prevention, risk reduction and forest management. It was important to send a message of "we are in this together" in wildfire risk reduction and

prevention. Collective responsibility was also emphasized through program pamphlets offered during the meetings.
- Information was shared regarding assistance opportunities to landowners for creating defensible space while living in fire adapted communities and how best to prepare themselves through collaborative efforts and available programs. Pamphlets and information were distributed explaining programs such as Firewise and Ready-Set-Go.
- The Forest Service provided an update on the Lostine Public Safety Project that is planned in the Lostine Corridor.

It is worth noting that during and since the Grizzly Creek Fire in August of 2015, frequent public meetings have been conducted in the town of Troy. These meetings were put on by the Umatilla National Forest fire staff and Wallowa County fire managers.

Stock Growers Meeting

The CWPP committee was invited to the local Stock Growers meeting to provide updates about the wildfire protection plan. The meeting was held on December 20, 2016 at the local extension office. The update was intended to last 20 to 30 minutes; however the level of interest from the group took the topic to almost an hour of discussion. Topics of concern included the following:

- Ways stock growers can assist fire managers through grazing of tall grasses in an effort to reduce the flashy fuels and modify fire spread.
- There is an interest in seeing how grazing allotments and fire risk overlap and where there is potential for impacts to allotments and modifications to fire spread.
- The group sees a need for education and information outlet for debris burning on private lands.
- A smoother system for reporting wildfires
- Wilderness wildfires that are managed by monitoring instead of suppression approach.
- Creation of water sources for suppression resource drafting sights and livestock utilization.

Soil and Water Conservation District (SWCD)

The SWCD sent out an invite for members of the CWPP committee to attend their monthly meeting to present new CWPP updates. The meeting was held on January 10, 2017. Two members of the CWPP committee presented the information and filtered questions from the group. The SWCD also included a link to the wildfire survey in their newsletter.

Wallowa County Wildfire Public Survey

The steering committee updated the 2006 CWPP questionnaire to identify potential educational opportunities, gauge what citizens value most, and assess how those values may be threatened by wildfire. The public survey contained two sections of 49 total questions designed to gain information regarding public knowledge of wildland urban interface, risk reduction activities and cost, and defensible space. The entire survey with questions and results can be found in Appendix L.

The fires section contained 33 questions starting with general property and locality information then moving into several questions about their knowledge of defensible space, National Fire Plan fuels reduction opportunities, and their overall concern about having defensible space on their property. Some questions allowed for multiple answers while other questions provided areas for comments. Some results of the first section include:

- Property owners who responded ranged from owning zero to over 700 acres of property.
- There was a wide representation of the county landscape with 30% living outside any of the 15 geographic options provided.
- Close to 38% felt that the risk of wildfire was High, while 46% thought it was Medium.
- Question 7 asked, *If a wildfire occurred in you area, what factors would place you and/or your home at risk?* Sixty percent felt the response time/capabilities of local fire agencies was the factor that put their property at risk (this is likely due to the remoteness of residence from fire response centers), followed closely by 56% contributing the fire risk to neighboring properties and the third highest at 40% was the flammability of their structures.
- Sixty-four percent have a plan in place if a fire were to threaten their property, however only 40% have participated in fire risk reduction activities. Eighty-five percent of those that had participated in defensible space work did not use National Fire Plan funds.
- When asked about their concern for scenic view being impacted by risk reduction work, 72% and 18% said not concerned to somewhat concerned respectively with 10 percent very concerned.
- The top six of 11 options regarding methods of outreach and education for fire risk mitigation revealed members of the public most preferred: the Internet Websites (40%), Postal Mail – brochures (39%), Individual consultation (35%), Centralized workshop/classes (33%), YouTube demonstrations (30%), and neighborhood workshops (26%).
- When asked about funding and willingness to pay for fire risk reduction at their homes 22% were willing to cover majority of the cost, 47% a portion of the cost, and 33% very little. Sixty-eight percent were unaware about financial assistance and 52% of those would like to learn and/or apply for funds.
- Only 14% were willing to put on an educational program in their neighborhood; however 88% were willing to share information with a neighbor of friend.

The second part, a shorter survey of 16 questions, focused on the landowner's assessment of their own property in terms of what they value as a community member, what is their familiarity with the CWPP, wildfire accessibility, structure vulnerability, and potential safety issues. Some highlights of section 2 include:

- When asked about a large wildfire event 41% were very concerned and 32% were moderately concerned.
- Respondents were asked to list three attributes they valued most. Listed from most valued to least were Scenic/Beauty (71%), Location/Remoteness (50%), Community (48%), Wildlife (31%), Stewardship of Natural Resources (17%), Clean Air/Water (14%), Livelihood (12%), Local Products (10%), Local Service (2%). A total of 58 answered this question. Seventy-nine percent felt that a wildfire would pose a threat to what they value most.
- Forty-four percent have heard of a CWPP and 59% would like to see the CWPP, and 36 left either an email or forwarding address at the end of the survey.
- Questions 45 through 48 asked respondents identifying how they would prioritize a list of CWPP preparedness issues. Worth noting are, Emergency notification, defensible space, hazardous fuels reduction, forest health and impacts to water quality ranked high.

Outreach

The CWPP committee felt it important to integrate as many community members as possible in the planning process. Several communication mechanisms were used in an attempt to reach the largest possible number of people in the county. Local media outlets were found to be best source of information for encouraging community involvement.

The surveys were also uploaded into a web-based program called SurveyMonkey, an online survey development cloud-based company that provides free, customizable surveys. Venues utilized for public outreach included:

a. Distribution of the surveys in the county annual tax statements.
b. Newspaper articles released with the link to the website where individuals could access the survey directly.
c. The questionnaire was linked in a letter issued by Oregon Department of Forestry with a QR imbedded for scanning with a mobile application.
d. The link was also posted Oregon Department of Forestry web site where one click would take the individual to the survey.
e. Fire agencies email and distributed the link.
f. The link was provided at all meetings with groups and community members.

The SWCD and Stock Growers also included a link to the wildfire survey in their newsletter in an effort to assist with outreach.

Programs

Firewise

Firewise is a community-based program that emphasizes involving homeowners in local solutions for wildland fire protection. It has a five-step process, in which communities develop an action plan that guides their residential fire risk reduction activities while engaging and encouraging their neighbors to become active participants in building a safer place to live (Firewise 2015). Firewise empowers neighbors to work with protection agencies to reduce wildfire risk across boundaries through a collaborative approach, of creating fire-adapted communities. Firewise encompasses actions that involve wildfire education, planning, on-site implementation of mitigation measures, and communication with those involved in protection from the risk of wildfire.

Nationally recognized for their program, Firewise focuses on communities and homeowners taking responsibility and showing interest in creating and maintaining defensible space; ensuring adequate access; addressing signage; and building or retrofitting structures designed with non-combustible building material in terms of siding, decks, and roofing. It is co-sponsored by the USDA Forest Service, the US Department of the Interior, and the National Association of State Foresters.

Ready-Set-Go

This program started in March of 2011 and strives to develop and improve the discussion and information flow between local community members and local fire organizations. It is designed to better equip fire personnel with tools to teach local residents in fire-prone wildland areas how best prepare for personal safety and protect their properties against wildfire. Ready-Set-Go emphasizes preparedness in all hazard situations.

This information was outlined and made available at the public meetings with discussions on not only landscape preparation, but also on key issues that many structures have that make them more receptive to burning embers cast off from the fire. Discussion occurred covering how wildland and structure preparedness prior to a wildfire can increase personal and firefighter safety, improving the likelihood of a positive outcome after a wildfire.

Ready-Set-Go represents the steps to be taken long before a wildfire as well as during a wildfire. The CWPP committee came prepared to discuss ways to be ready well in advance of a fire occurring in their area, finding funding sources to help, and how to find workforce help if needed. Emphasis was put on local fire personnel's willingness to work in conjunction with landowners to protect life and property. Additionally, the meeting was aimed at increased public understanding and situational awareness once

a fire was burning in the area through preparing emergency items to take and staying informed on current situations. Finally, a proactive public can increase the opportunity for firefighting resources to be successful through property preparation and in the event of a fire situation be prepared to leave the area for personal safety. Acting early was a key point in part of Ready-Set-Go.

Summary and Recommendations

Multiple outreach occurred to reach rural fire departments, cooperators, and community members. Efforts were made to build upon existing partnerships and create new ones prior to a wildfire event. These connections were intended to gain local information, discuss tools available for fire mitigation, and instill a sense of ownership for all landowners to participate.

A relatively high level of participation occurred through a wide range of outreach approaches. Fire simulation connected with fire departments and several cooperators during a mock wildfire emergency. The simulation provided participating parties with insight on best tactics during wildfires. that could assist or create further safety concerns during a wildfire. A separate meeting with county fire response organizations provided a list of issues facing rural and city fire departments and fire response issues geographically in the county. They provided valuable information both general and specific to meeting the needs of the CWS goals.

Local community members participated through an online wildfire survey, Lostine Community meeting, and a variety of small organizational meetings, with some local community members providing recounted events of historic large fire events. Local community members responding to the survey indicated that their community has not had a FireWise or Ready-Set-Go presentation.

Additional meetings are intended to be held at the completion of this document at local communities. This may be an additional opportunity for fire managers to provide FireWise and Ready-Set-Go information to homeowners. The public survey responses indicated the preferred method of outreach and education is websites, postal mail, one-on-one consultation and centralized workshops.

The public survey provides fire managers with insight on what community members find important and where efforts can be made to protect those values. Sharing responsibility and working together in wildfire mitigation will continue to build the already highly valued sense of community. All stakeholders must be responsible for supporting communication, informing, and joining in the formal and informal communication networks across organizations (CWS 2014).

Bibliography:

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Oregon Department of Forestry, 2013. *West Wide Wildfire Risk Assessment, Final Report – Addendum I*, Detailed Technical Methods March 31, 2013. The Sanborn Map Company, 2012

Websites:

FIREWISE 2016. NFPA National Fire Protection Association. http://www.firewise.org/

Wildland Fire 2016. Ready Set Go, http://www.wildlandfirersg.org/About/Learn-About-Ready-Set-Go

http://www.lagrandeobserver.com/news/5226871-151/preparing-for-wildfires

VI. Wildfire Risk Assessment

Introduction

In order to understand Wallowa County's fire hazards and risk it is important to gain some appreciation of the causative factors leading to the risks. As identified in the Cohesive Wildfire Strategy (CWS), there are four broad areas of risk when addressing wildfire: risk to firefighters and civilians, ecological risks, social risks, and economic risks – social and economic risks are addressed in Chapter IV. These risks are broad scale potential outcomes placed on all wildland fires.

Chapter IV also provided a profile of Wallowa County's fire history based on fire point source. This chapter further examines research studies and area data of large perimeter fire history greater than 50 acres, temporal and spatial distribution, potential values impacted today and the ecological implications of fire exclusion that contribute to increased wildfire behavior.

This chapter uses data information from local sources and West Wide Wildfire Risk Assessment (WWRA) analysis results to explain county conditions and individual components that contribute to the counties geographic rankings of low, moderate, high, and extreme using these three primary core concepts: fire threats, fire effects, and fire risk. Historic fire frequency, fire spatial locations, stand conditions, and effectiveness of suppression efforts are part of fire threat levels – Fire Threat Index. Infrastructure, key ecological components, and local knowledge of values that hold significant importance along with the ability to protect those values contribute to the degree of negative fire effects when wildfires occur – Fire Effects Index. A progressive assessment of existing conditions provided by the WWRA includes many of these attributes in Wallowa County offering a comprehensive measure of wildfire risk.

This chapter describes the data information used to determine the overall Fire Risk for Wallowa County. A more detailed explanation of the data and its importance in the process is referenced in corresponding appendixes throughout this chapter.

Fire Statistics

Wallowa County Fire Frequency and History

Fire's interaction with the environment has played a significant role throughout Wallowa County's history. Historical fire records indicate that prior to effective fire suppression large fires were common in the Blue Mountains of eastern Oregon. The Blue Mountains extend over a large portion of eastern Oregon with 4,060 square miles of land mass. The Blue Mountain Range includes the Strawberry Mountains, Elkhorn Mountains, Eagle Cap Mountains and the Wallowa Mountains (Campbell et. al. 2003).

Fire studies conducted in the Blue Mountains (Blues) of Eastern Oregon demonstrate the high frequent fire return intervals for the geographic area. Study results are provided in further detail in Appendix B, pages 1 and 2.

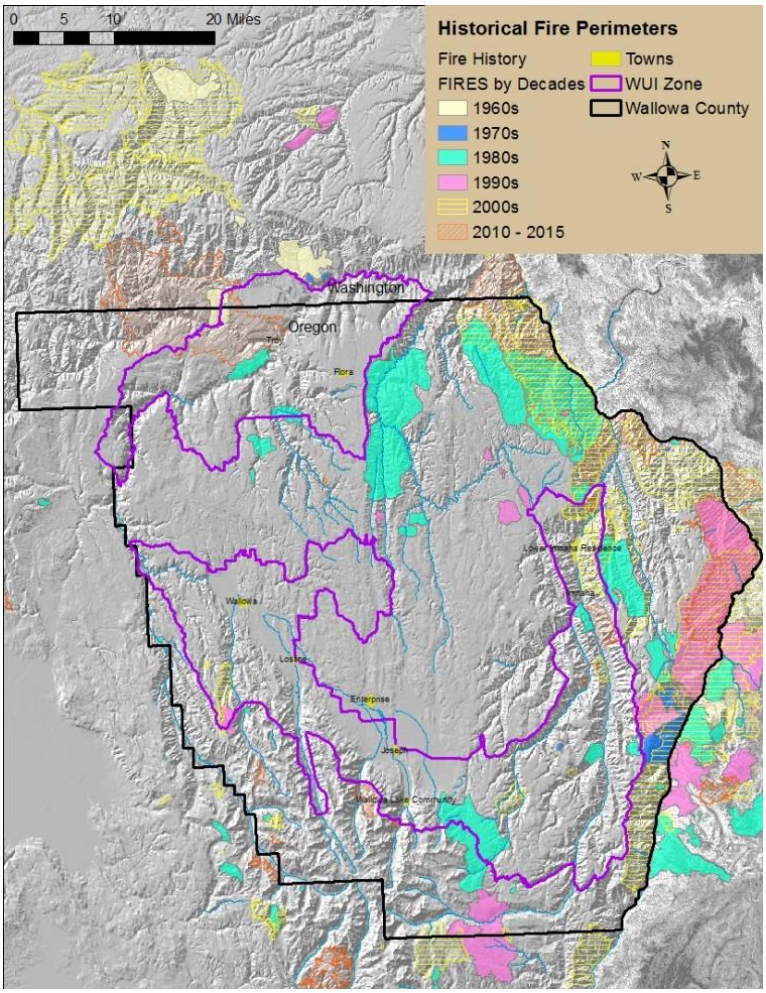


Figure VI – 1. Historical Fire Perimeters within 20 miles of Wallowa County. Years include 1960 through 2015. U.S. Forest Service GIS Data Library, 2015 and Oregon Department of Forestry data base.

Historic large fire perimeters maps were obtained from the US Forest Service online GIS Data Library (U.S. Forest Service 2016) and from Oregon Department of Forestry GIS staff. The data base provided large fire perimeters dating back to the late 1800's through 2015. However, the data prior to the 1960's revealed limited fire records of any kind. For example, between 1920 and 1949 there were no fires recorded and only one in the 1950s. For this reason large fire history was not used prior to 1960. The large fires were further reduced to fire perimeters of 50 acres or larger. Figure VI- 1 shows a spatial distribution of where fires have burned on the landscape since 1960. Many of these fires, particularly on the east side of the county overlapped the same acreage when the burned.

Fires that fell within a 20 mile radius of Wallowa County were mapped in Figure VI – 1, while the number of fires that actually burned within or intersected the county were displayed in a graph (Figure VI – 2).

In examining the fire perimeter records from 1960 to present on public lands revealed that beginning in the late 1970s, large wildfires became more commonplace. Fire perimeter records from 1960 to present information revealed the following number of large fires greater than 50 acres per decade, Figure VI – 2. Beginning in the late 1970s, large wildfires became more commonplace in and around Wallowa County. Mean acre size for the fire areas in the 1980s, 1990s, and 2000s were 1568, 3326, and 4311acres respectively.

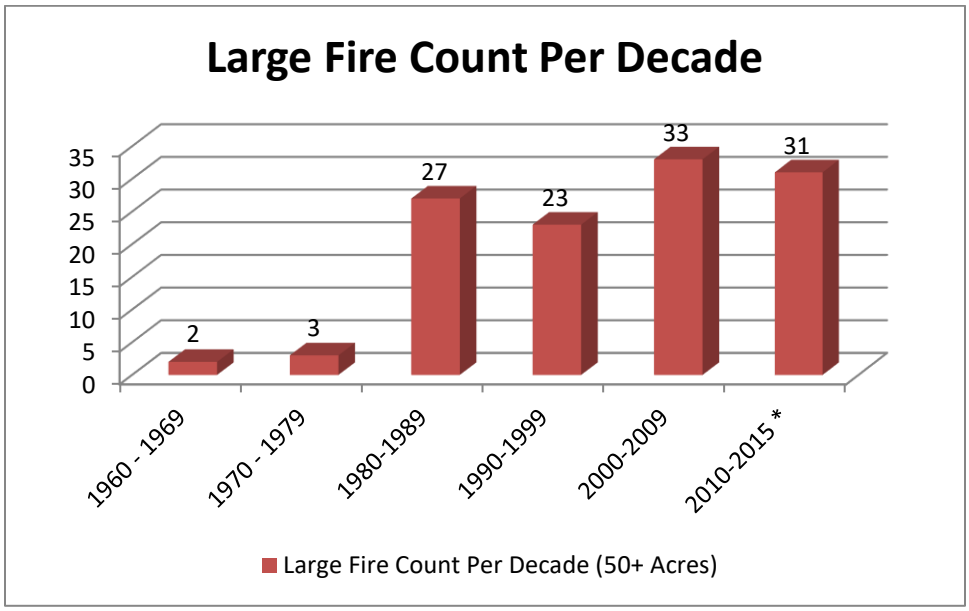


Figure VI – 2. Fire perimeter of public land fires 50 acres in size and greater. This includes all fire perimeter records that have burned entirely within or intersected Wallowa County. Note: * accounts for only five years of current decade. http:/www.fs.fed.us/r6/data-library/gis/umatilla

Fire Starts

Fire start records are all fires that were responded to and acted upon fires that a documented fire report was completed for the incident.

As mentioned in Chapter IV, fire starts are not new to Wallowa County. Reported fire starts were mapped utilizing information gathered from various fire management agencies. Fire dates used for mapping were provided by the West Wide Risk Assessment completed in 2013 that references a period from 1999 to 2008. Data years for the WWRA were limited due to the need for consistency across 17 states to allow comparisons to be made between states and consistent data to then further comparison from county to county within each state. These points were used to identify areas of fire start densities for the county and build the fire threat, fire effect, and fire risk assessment for geographic areas.

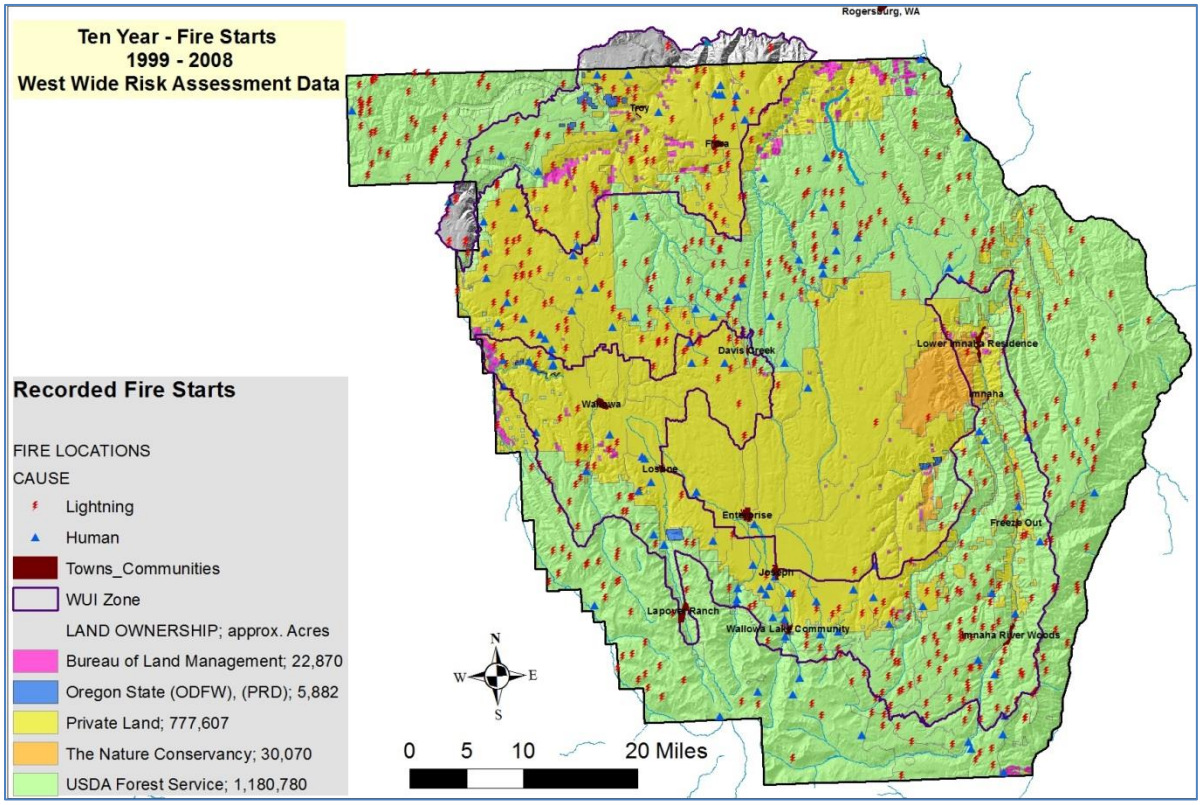


Figure VI – 3. Historical fire points in Wallowa County from 1999 to 2008. (ODF-WWRA 2013). A total of 660 fires in a ten year period, resulting in 543 lightning fires (82%) and 117 (18%) human caused.

Fires on state lands were reported for only areas that the state has the statutory responsibility (ODF-WWRA 2013) for fire protection, making it necessary for WWRA to obtain fire occurrence data for other privately owned lands, most of which receive fire protection from city or rural fire protection districts. These protection districts report their fires to the U.S. Department of Homeland Security National Fire Incident Reporting System (NFIRS) (ODF-WWRA 2013). Unfortunately, almost all the fires did not contain a latitude/longitude or legal description with a township, range, and section, or other pertinent information needed for data consistency at the assessment scale conducted by the WWRA. As a result, the ability to use the rural data in some states was either very limited or could not be used at all. Another issue for fire reports was some states have a voluntary fire reporting process making it necessary to use at a minimum what was available (ODF-WWRA 2013)

Fire points, for more recent years 2009 to 2015, were accessed from Geographical Information Systems (GIS) of the Forest Service and Oregon Department of Forestry. It was determined that between the years 2009 and 2015, Wallowa County's local data had an additional 248 fires reported on public lands and another 132 fires on private lands; duplicate fires were removed based on response agencies showing identical data for a specific fire.

Data for local City and Rural Fire Departments in Wallowa County was limited. It is noteworthy of mentioning that these local fire management agencies are not exempt from responding to vegetation fires and are all trained in wildland firefighting. Unfortunately the fire data criteria for statistical fires in the WWRA were not compatible with the Oregon State Fire Marshall data base. Using the criteria used by the WWRA for fire starts and the need for consistencies among the data, a large percentage of rural wildland fires were not capture in this document.

Although data does not reflect it, the CWPP committee agrees that fire starts in the Wallowa Valley proper are significant in numbers and the rural and city fire departments play a crucial role in providing wildland fire response to vegetation fires and particularly structure protection within the valley proper and local communities.

Fire Regime Condition Class

The Healthy Forest Restoration Act (HFRA) of 2003 is an act to improve the capacity of the Secretary of Agriculture and the Secretary of the Interior to conduct hazardous fuels reduction projects on National Forest Systems lands and Bureau of Land Management lands designed to do the following:

- at protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire
- enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfires, across the landscape, and for other purposes (HRFA 2014).

As part HFRA fire regimes condition class is one of the criteria used to determine the necessity to implement and authorize hazardous fuel reduction projects under Sec. 102 [16 U.S.C.6512] Authorized Hazardous Fuel Reduction Projects

Fire regime condition class (FRCC) is a method to determine the change in successional classes of vegetation, fire frequency, and the degree of overstory plant mortality after a wildfire (fire severity). It is a way of comparing current landscape conditions to a historical range of variation that existed before significant Euro-American settlement. One assumption in identifying FRCC is that historical fire regimes represent conditions under which fire-adapted ecosystems have evolved and been maintained over time (Hardy and others 1998). Today's vegetation departures from the historical baseline can serve as a useful proxy for potential uncharacteristic fire effects and can be used to address risks to the sustainability of fire-adapted ecosystems (Jones et.al. 2012).

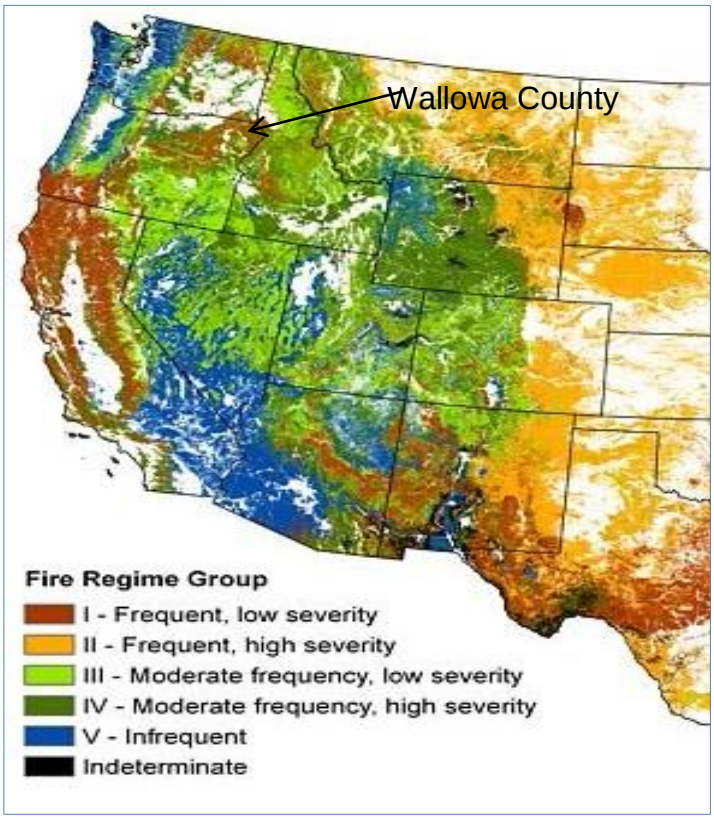


Figure VI – 4. Gross scale of historical fire regime groups values. Clipped from U.S. map Figure 3.2 of Cohesive Wildfire Strategy. CWS 2014.

Landscape fire regimes identified in the CWS is supported by fire history studies, historical large fire perimeters and fire occurrence levels within Wallowa County. Fire regimes describe the frequency of which fires occur on the landscape and their relationship to vegetation conditions shaped by those fires. These fire regimes explain the connection between the degree of mortality in the overstory vegetation of an area due to a wildfire, better known as fire severity, and the average number of years between fire events (fire frequency or mean fire interval) and their ecological consequences (Barrett and others 2013). The CWS identifies Wallowa County as predominately represented by Fire Regime Groups I, II, and III (Figure VI – 4) with a high proportion of the county falling into regimes I and III. See Appendix B for further explanation and details fire regime and condition class.

How fires interact with the environment is dependent on many variables. This is important in that the interaction of fire with the environment is influenced by many variables, one of which is the quantity and quality of vegetation on site. This in turn has a direct bearing on suppression resources ability to be successful during initial attack fire response.

The vegetative stand structure can influence the amount of live and dead material and stand health directly influencing the intensity and severity at which fires burn. Fire *intensity* is related to amount of heat emitted, rates of spread, flame length, flame height, and other fire behavior characteristics. Fire *severity* is directly linked to the effect the fire has on vegetation mortality, soil sterilization, water permeation, and area recovery rates post fire. There is a close correlation of fire regimes to forest conditions including characteristics such as: dead fuel accumulation, vegetation structure, type, quantity, and composition, which play an intricate role in contributing to wildfire behavior (CWS 2014).

Due to environmental condition changes increasing the degree of difficulty in fire suppression and extend drought periods fires size and costs have increased. Expansion of housing areas coupled with society's negative views of fire, particularly in the wildland

urban areas, have also contributed to biological and physical changes on much of the landscape.

Since the 1940s fire has been effectively suppressed allowing landscapes to progress without disturbance creating unprecedented stand conditions. The wildland fire environment, particularly over the last 40 years, is inconsistent with historic stand conditions for multiple reasons. First, with the amount of successful fire suppression has altered fire size and intensities since the 1900's. If left unimpeded, these suppressed fires would have likely been more frequent lower severity landscape size fires providing a cleansing of the forest stands. Successful suppression has resulted in fire regime changes from relatively frequent intervals to much longer intervals with higher severity (significant mortality) impacts to overstory vegetation that historically would have experienced low levels of mortality. Secondly, the large fires of today burn with more lethal results to the ecosystem than historically, in part due to accumulation of available fuels in terms of down woody and understory live vegetation creating a “ladder fuel” effect providing a means of surface fires to reach overstory canopies. Thirdly, there has been an increase in wildland-urban interface land area and housing unit growth since the 1990s. Along with housing growth comes an increase in infrastructure that provide support to the residence.

West Wide Fire Risk Assessment Data

To identify and prioritize wildland-urban interface areas-at-risk in Wallowa County, an assessment of factors contributing to large wildfire events was conducted. This section will outline the process used and highlight any unfamiliar definitions.

Wallowa County Fire Threat

WWRA provided a thorough analytical method to calculate the probability of an acre burning when developing the Fire Threat Index (FTI). A brief overview of the WWRA process can be found in Appendix D, with a detailed analysis of the process located in the final report of the WWRA. The WWRA developed the FTI by integrating the probability of an acre igniting and the expected final fire size based on the rate of spread of the fire in four weather percentile categories (ODF-WWRA 2013). Another words historical fire start locations and historical large fire size were considered with how a fire will burn under various weather conditions for an average fire season.

Fire Occurrence

Historical fire records from 1999 – 2008 were used in developing the probability of fire occurrence. These dates provided consistent data across 17 western states allowing an accurate comparison between states. This information was carried one step further to meet individual state needs of prioritization and data distribution. Data from the WWRA found that Wallowa County wildfires for the 10 year period totaled 660 fires with ignitions sources of 82 percent lightning and 18 percent human.

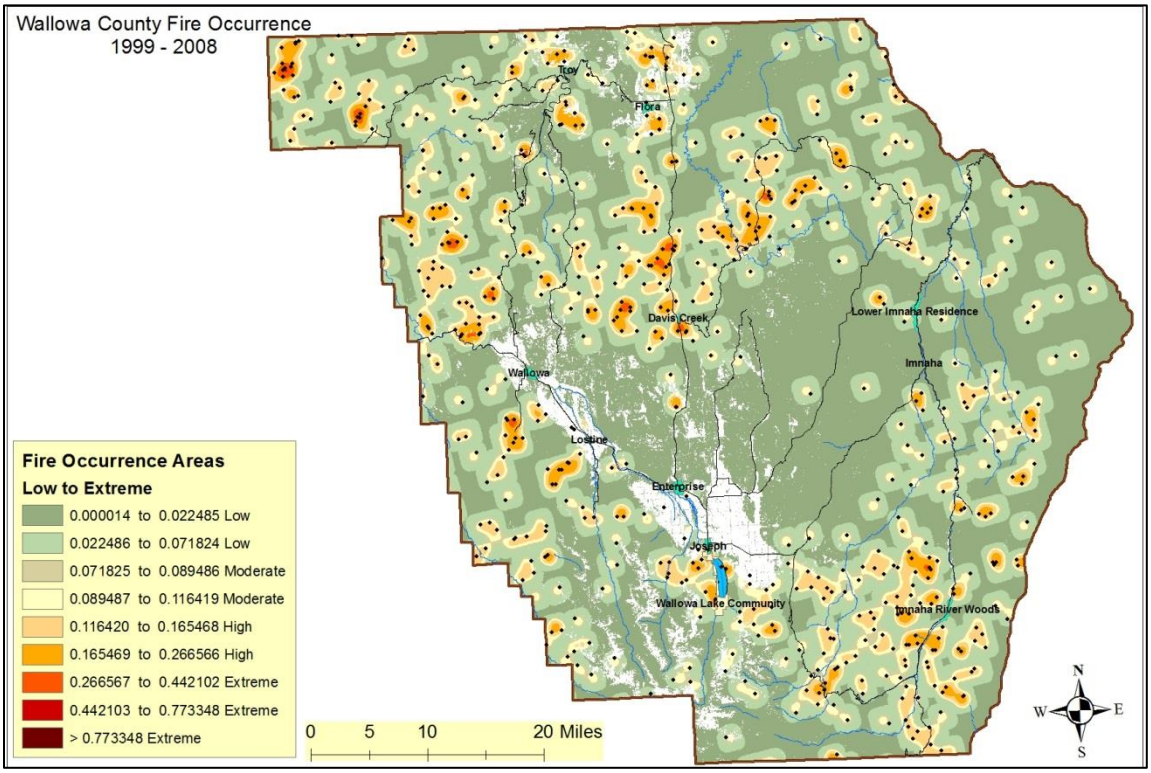


Figure VI – 5. Distribution and probability of fire ignitions in Wallowa County. The closer the numerical value to the whole number 1, the higher the historic fire density and the higher the fire occurrence. Mapping inputs provided by WWRA.

Weather

Since weather has a direct impact on curing of grasses and vegetation, these ranges include how moist or dry the forest fuels (live and dead vegetation) are and the number of days over the timeframe June – October that conditions meet a specific criteria range that result in herbaceous curing levels for each range. Weather influences curing in turn resulting in how a site condition contributes to wildfire behavior.

Weather data was broken out into four categories and the number of days during a typical fire season that exhibited one of the four weather conditions. Taking into account the weather and fuels conditions fire starts could potentially exhibit low, moderate, high or extreme fire behavior. The weather and fuels conditions were represented by the

following percent and number of days for each category between June 15th and October 15th for the weather stations that represented northeast Oregon (OR08) which includes Wallowa County (Weather Influence Zone OR08 geographic map is located in Appendix D, page 4). There is approximately 13 days through the fire season where fires fall into the high or extreme weather conditions.

For northeast Oregon, including Wallowa County the weather and curing conditions are as follows:

- low 15% – 18 days - 20% proportion of the herbaceous cured.
- moderate 75% - 92 days - 60% of herbaceous fuels contributing to fire spread.
- high 7% - 9 days - approximately 90% of herbaceous fuels cured
- extreme 3% - 4 days - 100% cured herbaceous

Wildfire starts were also examined and separated based on weather conditions at the time of ignition and put into one of the four weather categories it fell into. The percent of fires that occurred for OR08 for each condition range were as follows (ODF WWRA Addendum I - 2013):

Weather Category	Percent of fire starts in Category
low	10.74%
moderate	81.32%,
high	6.17%,
extreme	1.77%

Taking into account that OR08 includes all of Union and Wallowa County and part of Baker, Umatilla, and Grant counties the number of fire starts in high and extreme is significant. Strictly looking at Union and Wallowa counties, there are over 1200 fire starts for the 10 year period, which equates to 96 fires in high – extreme. This averages out to approximately 10 fires a year during between the two counties that start in the high to extreme conditions.

Slope

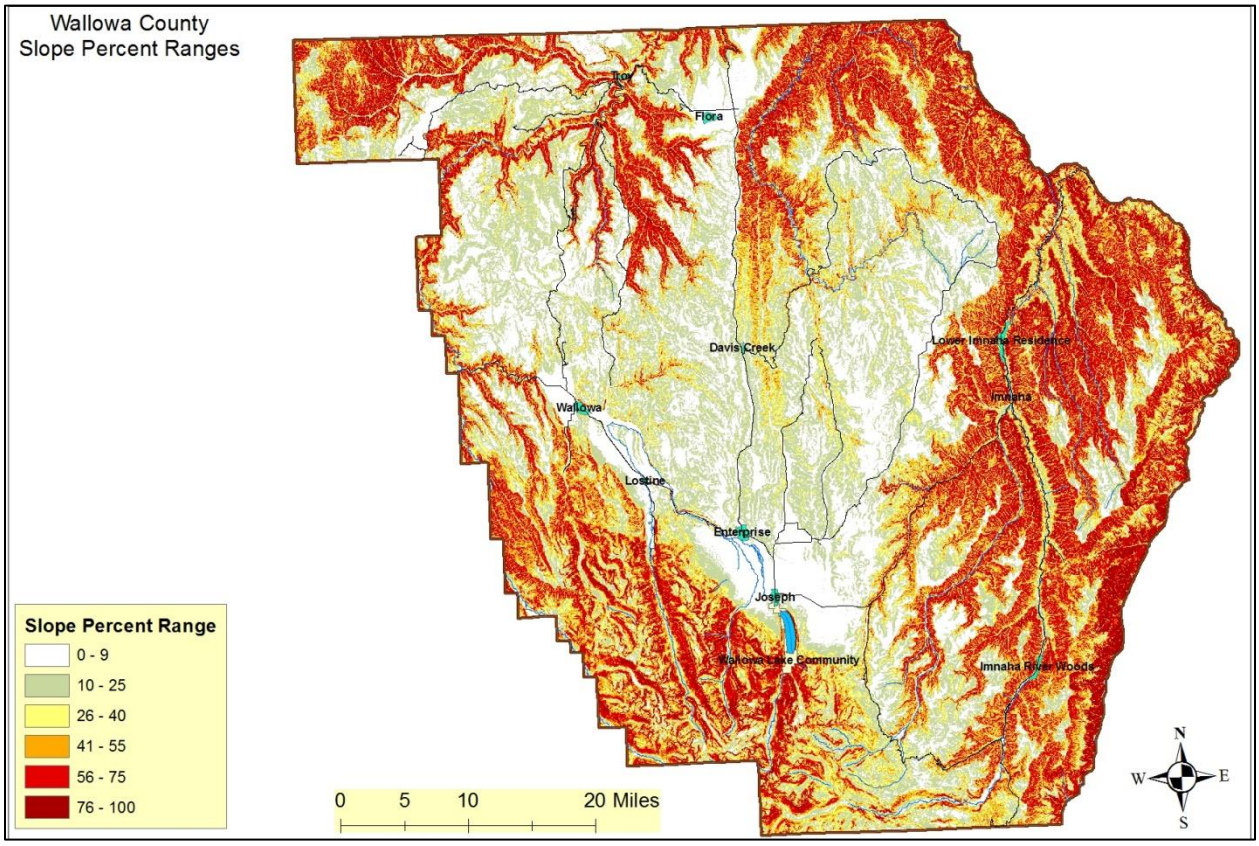


Figure VI - 6. Slope steepness of Wallowa County. Fifty-four percent of Wallowa County supports slopes over 25%, of which 34% of the area are in the slope range of 41 – 75.

Wallowa County's elevation changes of close to 8000 foot results in steep slopes surrounding Wallowa Valley on all sides. These slopes influence both fire behavior and suppression efforts. Wildfire behavior calculations display slope influences on wildfires similar to how wind influences fire behavior. The higher the wind speeds on a fire the faster the rates of spread; the steeper the slope the faster the rates of spread.

Fuel Models

Fuels models represent vegetative material that provides burnable "fuel" or material to the fire that contributes to the flaming front.

Down woody fuels play an instrumental role in fire behavior such as:

- Fuels can impact wildfire rates of spread particularly in fine dead fuels (0 – ¼" in diameter) and as well as material 3" diameter and smaller because they ignite more readily, burn faster.
- Larger stems 3" and above may take slightly longer to ignite but once burning can generate higher levels of heat (intensities) and have a longer burn time in one location (residence time).

- Fuels models are used to predict surface fire behavior, meaning fires that spread across the forest or rangeland floors. Leafy material, such as brush can be lofted into the air in the form of hot embers igniting new fires ahead of the main fire.

Figure VI – 7 shows the distribution of fuel types in Wallowa County with each type, used by WWRA based on Scott and Burgan with a list of characteristics such as:

- tons per acre of different size material
- a dynamic fuel or not (herbaceous and progressive seasonal curing)
- depth of fuel bed in feet
- and numerous other attributes

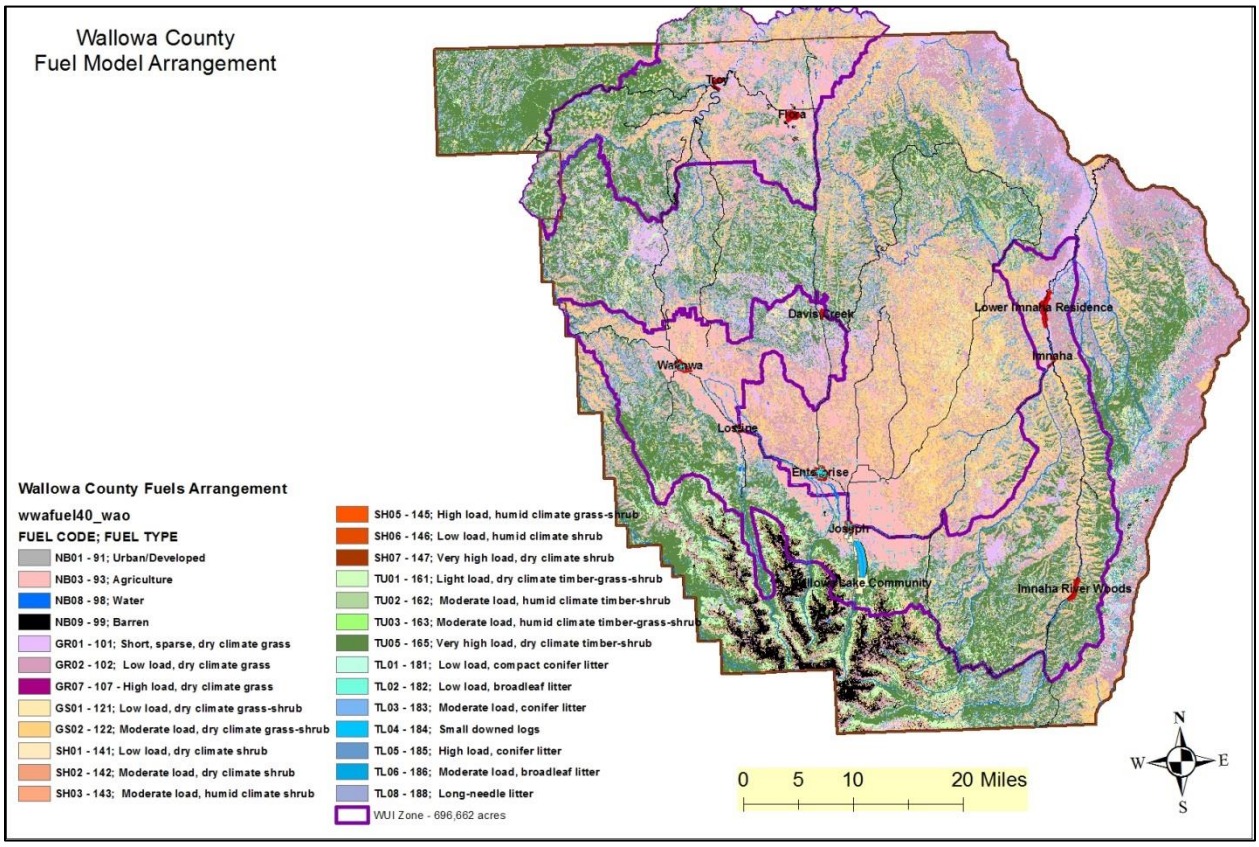


Figure VI – 7. Wallowa County distribution of fuels models used as an element to predict wildfire behavior in developing FTI. Data Source: ODF-WWRA 2013 with utilization of LANDFIRE data. NB = No Burn.

The WWRA utilized the fuel type characteristics in combination with the stand canopy conditions and the four weather categories to determine overall fire behavior. Although the valley center is peppered with a grass fuel model, many areas identified as NB (no burn) are either irrigated agricultural fields during the fire season or are a grass fuel model with a short time frame as an available fuel for burning during the summer months, this is particularly true for wheat fields just prior to harvest. Appendix D provides a more details account of how and why fuels impact fire behavior.

Canopy Fuels

Fire behavior is often influenced not only by surface fuels but by trees that contribute to the stand structure. Individual tree attributes as well as entire stand characteristics play a role in fire behavior involving tree canopies. For the purpose of this document the word *canopy refers to stands of trees* and *crown represents an individual tree*. Stands that have a tight closed canopy where limbs are touching, heavy undergrowth and down woody material pose a higher threat for crown fires. Stands that have spaces between individual tree crowns, are more open with less dense undergrowth, and lower amounts of down woody material often result in surface fires with little to no tree torching during a wildfire. Detailed description of canopy characteristics can be found in Appendix D, pages 10 and 11 - Risk Assessment Framework.

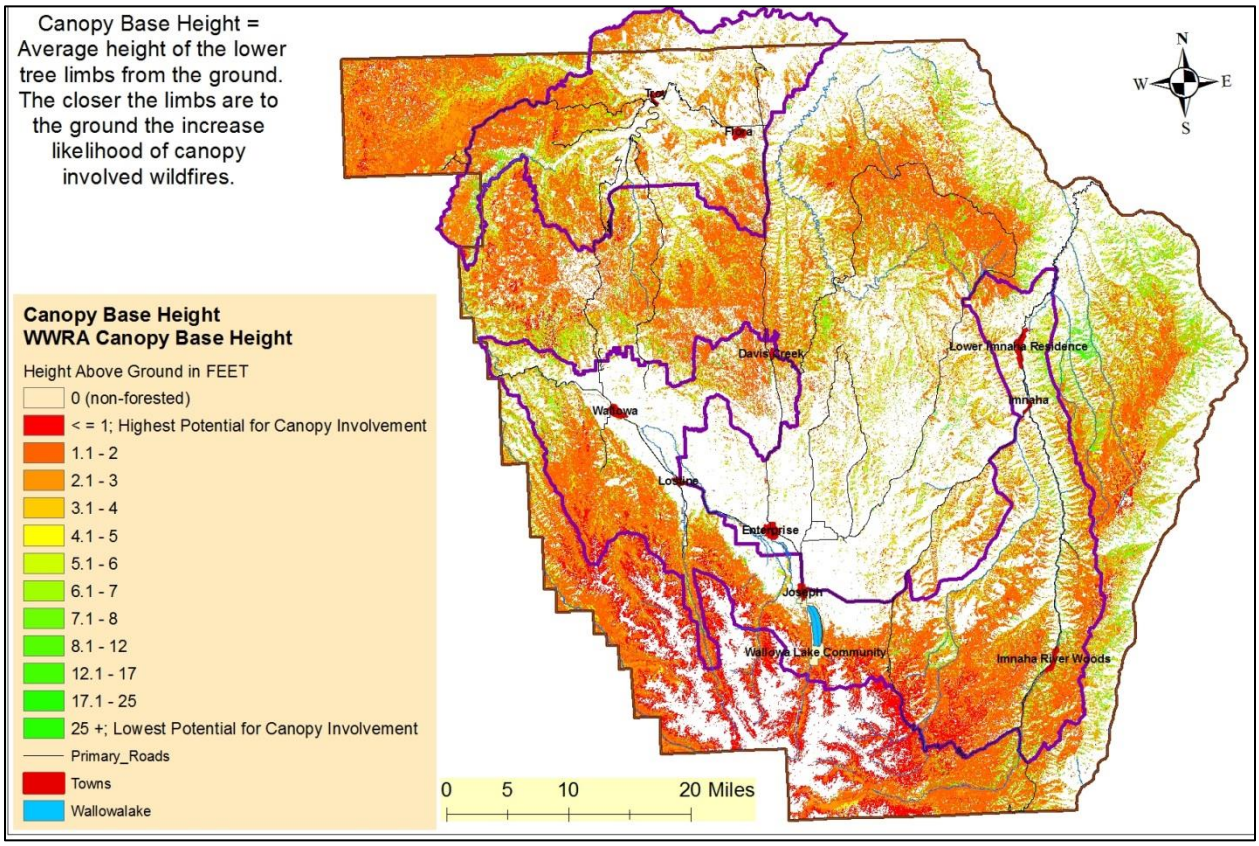


Figure VI - 8. Wallowa County forested areas showing distance of canopy from ground level measured in feet above ground (canopy base height). The lowest reading was .3 feet. This influences wildfire's ability to transition from surface fire to crown fire. The shorter the distance from the ground the greater chance of a crown fire. (ODF-WWRA 2013 Final Report page 38).

Fire Behavior Results - Surface and Canopy Fire

Fire Behavior

When wildland fire burns on the landscape a number of environmental characteristics influence it, that when working in unison, these characteristics will dictate wildfire behavior.

Figure VI - 9. Fire Behavior Triangle. Fire behavior characteristics are influenced by fuel , weather, and topography.

Three specific environmental attributes that contribute to wildfire are weather, fuels, and topography. In order to determine which geographic areas of Wallowa County will exhibit fire behavior that results in hampering suppression resources firefighting capabilities and poses the highest fire threat, it was necessary to assess the three attributes relationship to wildfire.

These data sets included: Local Weather Data, Elevation, Slope, Aspect, Fuel Model (live and dead vegetation), canopy cover, canopy height, canopy base height, and crown bulk density, all of which apply to one of the three sides of the fire behavior triangle. These attributes were used to develop fire behavior predictions that made up the subsets of the FTI. This information is an essential input for determining how effective fire suppression resources would be during a wildfire and eventually used for overall county Fire Risk Index (See Appendix D).

Fuels have a direct correlation to the amount of heat (fire intensity) released by a fire, the flame lengths exhibited, and the rate at which the fire spreads. Fuel characteristics plan an important role for several reasons. The type of fuel (grass, brush, timber, slash) can impact how fast the fire will spread, the heat emitted, the flame lengths is will exhibit, and how long a fire will burn in a given location. How the fuels are arranged will impact potential for canopy involvement,

Characteristics such as the type of fuel, its arrangement both vertically and horizontally, the amount of resin in the fuel, the size of the fuel and it's surface exposed to environmental weather, etc. This information was taken into account to estimate predicted fire behavior under the four weather categories.

Fire behavior scenarios were developed for all four weather categories taking into account dead and live fuel conditions, weather, and topographical features to demonstrate potential rates of fire spread (chains per hour) and flame lengths (feet) within the county. The probable mapped fire behavior, using the "average" weather, is presented in the body of this chapter as "expected" fire behavior, unless otherwise stated.

Fire Flame Lengths and Rates of Spread

Flame lengths play a significant role in tactical decision of suppression resources. Flame length and fireline intensity are directly related to the effectiveness of control forces (Andrews and Rothermel 1982). Fireline intensities are measured by the amount of heat released by a square foot of fuel that is actively burning within the flaming zone. Appendix D describes how flame length and fireline intensity can influence suppression resource effectiveness on a wildfire.

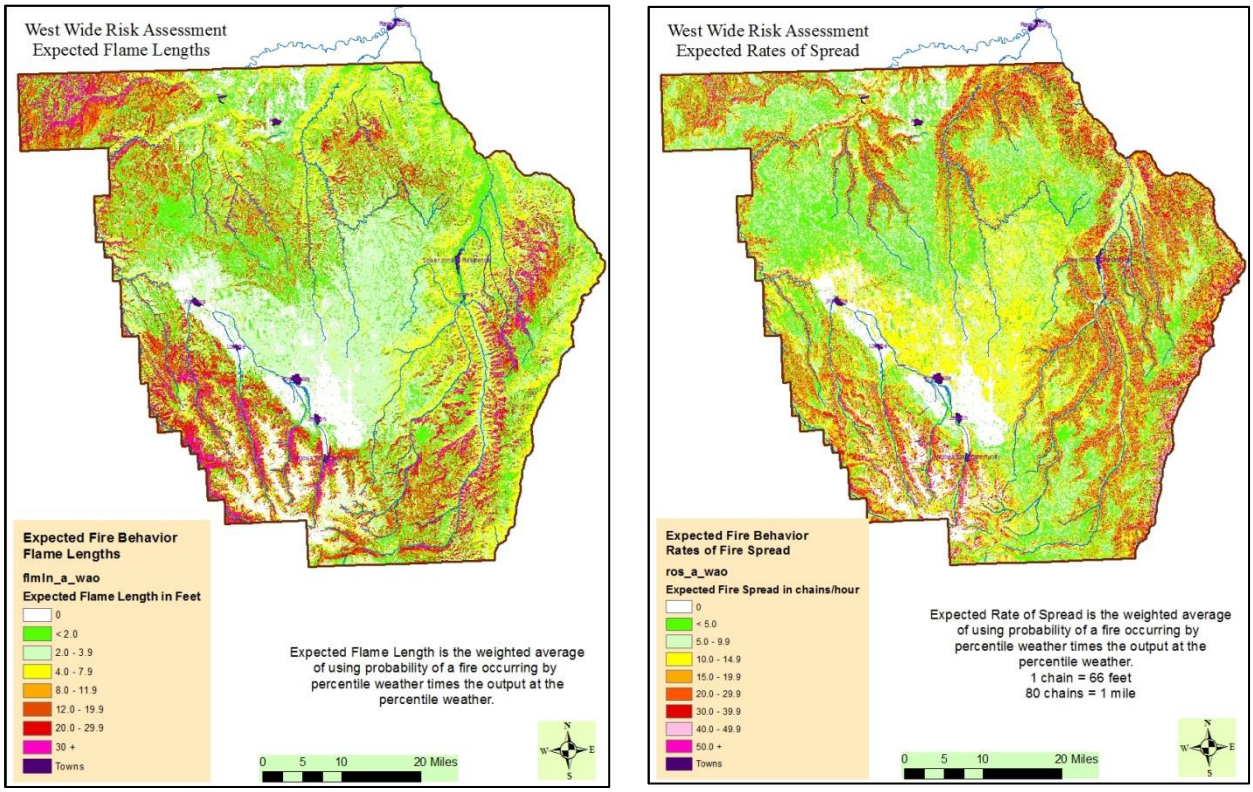


Figure VI - 10. Expected flame lengths and rates of spread an typical fire would exhibit. Used as part of impact to determine fire suppression resource effectiveness. (Information for mapping ODF-WWRA 2013)

Crown Fire Potential

WWRA delineates out the potential areas where a fire is unlikely to burn. It identifies areas where a surface fire may occur or conditions are such that a canopy fire is likely. All three fire types could potentially occur depending on environmental conditions. For practical terms both passive and active fires are collectively referred to as canopy fire (ODF-WWRA 2013). Both passive and active fires have portions or all of the canopy burning.

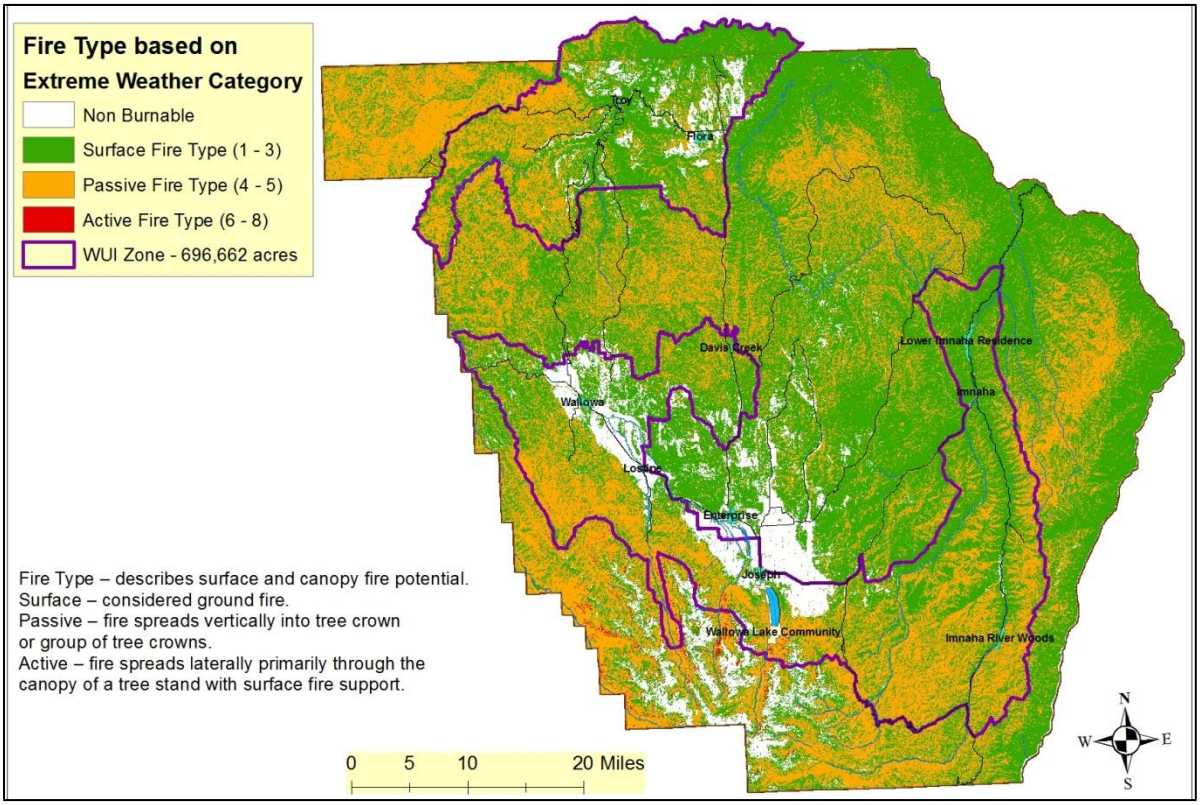


Figure VI - 11. Distribution of surface fire, passive canopy fire, and active canopy fire in Wallowa County. Areas where a canopy fire can be expected, in worst case weather conditions, these areas most likely will exhibit surface fires in conjunction with the canopy fire.

Wallowa County WIUZ supports a significant amount of passive canopy fires increasing the potential for fire spread through spotting and crown fire can occur. Areas identified as canopy fire are likely to exhibit both surface and canopy fires types.

In reviewing the three fire types the most likely fire types to occur are surface fire in the low through high weather with surface and passive canopy fires in the extreme weather. This does not imply that active canopy fire types are not possible, what is important is that the canopy is likely to be involved in some fashion in most timbered areas once the high weather category is reached.

The low through moderate weather category conditions generates 92% of the fire starts often resulting in a surface fire over a high percentage of the burned area. The canopy becomes involved in some areas when conditions move into the high - extreme weather category with a continual increase as weather and fuel moisture conditions worsen. In weather zone OR08, the remaining 8 percent of fire starts occur in high to extreme weather (WWRA 2013).

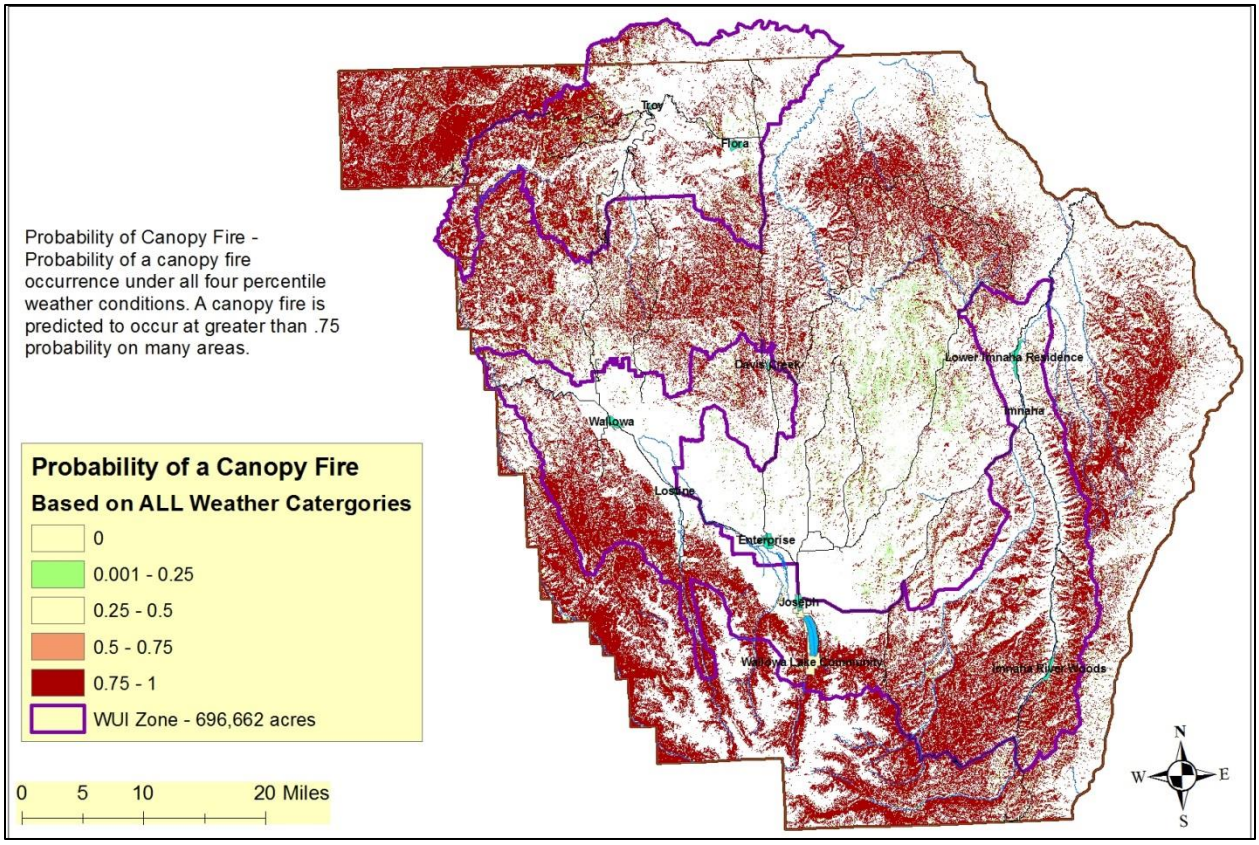


Figure VI – 12. Considering all weather categories the "expected" probability of a canopy fire is at least a 75 percent or more likelihood in most timbered areas. This includes both passive and active canopy burning.

Fire Threat Index (FTI)

Knowledge of fire behavior and the potential expected fire size was applied to calculate fire theat. Fire Threat Index is associated with the likelihood of an acre burning. It takes into account an acre igniting and the expected final fire size based on fire spread in the weather categories. This relationship between the rate of spread and final fire size was developed using the data from federal and state fire reports. The predicted annual acres burned are similar to the historic expected acres burned developed from the fire occurrence reports. Calculations were completed using the four weather categories, total expected acres burned, and probability of an acre burning based on the fire occurrence history. Details of calculations can be found in WWRA document 3.3.4 Fire Threat Index (FTI) pages 42 – 44.

Nine fire threat levels were developed ranging from the lowest threat to the highest threat. These acres were then compared relative to all other counties in the state of Oregon.

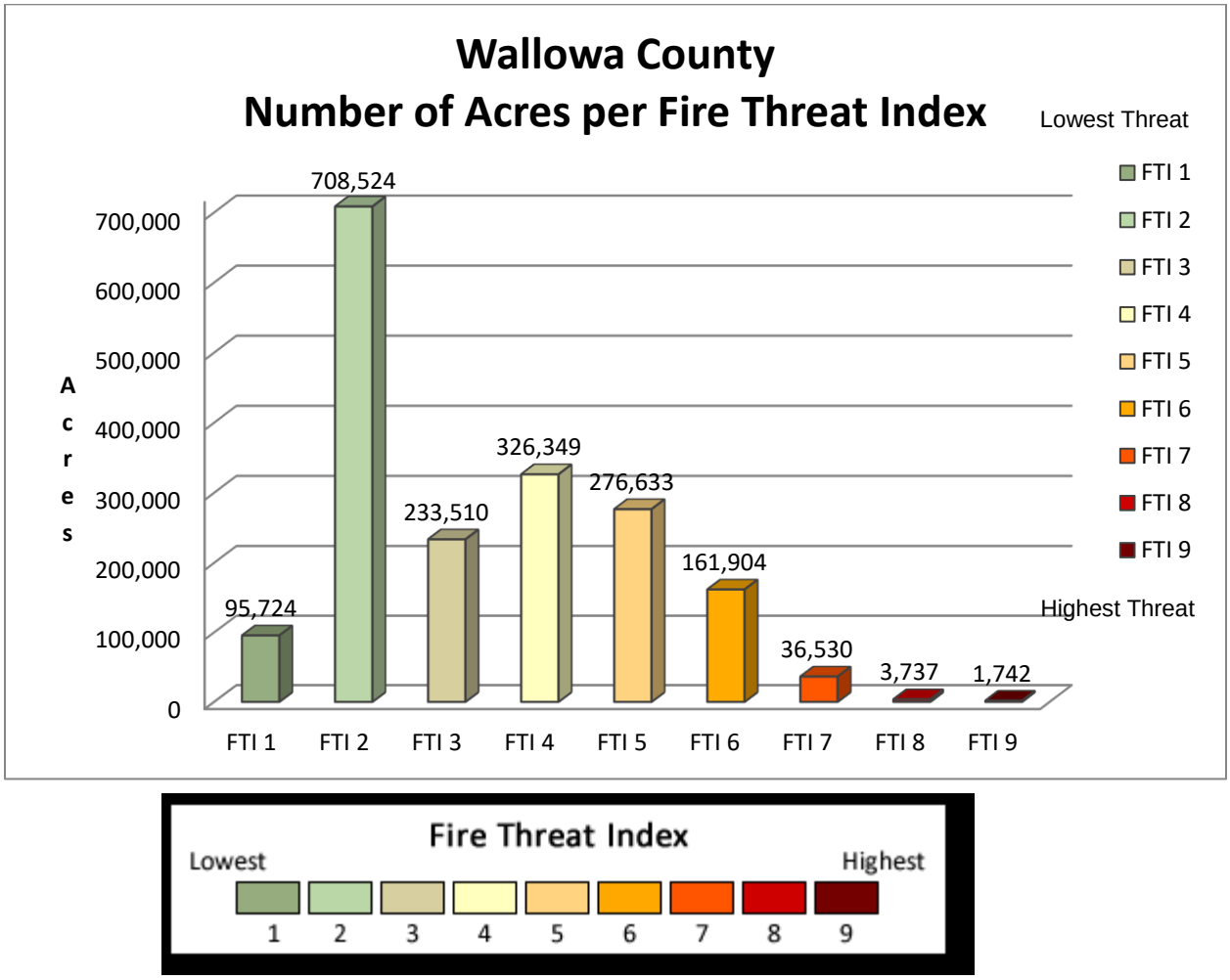


Figure VI – 13. Wallowa County acres by Fire Threat Index class. Data from table in Addendum VI – Oregon County Risk Summaries (ODF-WWRA December 5, 2012).

Fire Threat takes into account the historic fire occurrence and fire size, fuels live and dead, historical weather trends broke out into four weather categories, and topographic features and successful suppression efforts. The landscape distributions of Fire Threat when displayed spatially for Wallowa County are shown in Figure 14. The Fire Threat Index for Wallowa County is the potential of a fire starting and threatening local communities strictly based on existing geographical conditions and historical weather and fires, without consideration of the fire effect or potential loss if a fire should burn through the area.

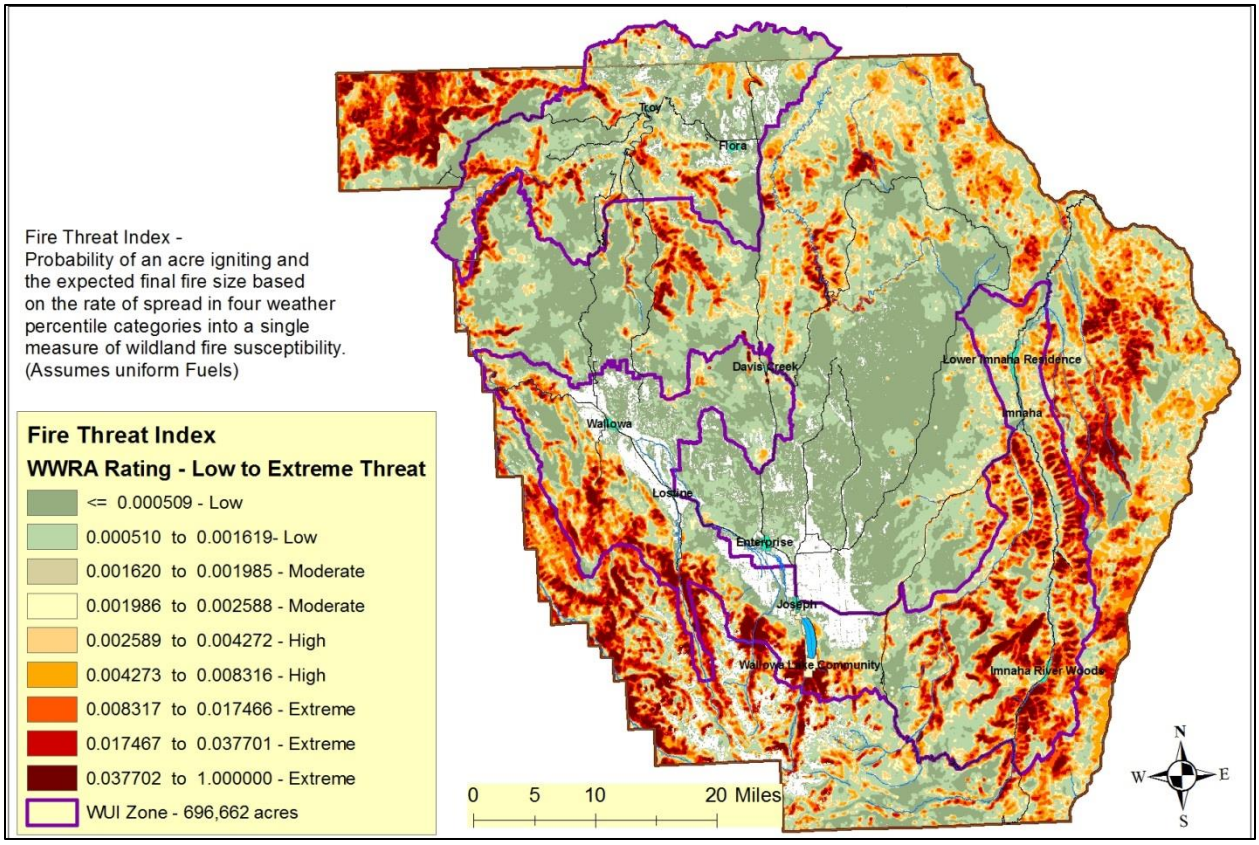


Figure VI – 14. Output of "Fire Threat" to Wallowa County based on fire occurrence, fuels, weather, and topographic conditions.

Fire Effects

Wildland fires interaction with its surroundings can have a variety of effects both short and long term with some degree of impacts ranging from minor to extremely detrimental depending on each individual fire.

Merriam-Webster defines effect as: *"a change that results when something is done or happens: an event, condition, or state of affairs that is produced by a cause".*

It is important to identify areas that have important values that can be impacted by wildfire. Defining a *"value"* can be subjective depending on the audience providing the answer. In an effort to narrow down these important values, the WWRA through the iterative process with the technical team researching and developing identified likely candidates for the values dataset, often assisted by state feedback, and then presented the findings and recommendations to the Project Steering Committee for final approval (ODF-WWRA Final Report 2013).

There were five key values deemed most important should a wildfire change the valued resources current condition based on the West Wide Wildfire Risk Assessment (WWRA) calculation using the input from the individual states. These key values were

assessed and evaluated based on some measure of fire intensity such as flame length to determine:

- how they would be affected by wildland fire (susceptibility and response) referred to as rfs (response function score)
- and/or locations that are costly to suppress to develop Suppression Difficult Rating (SDR) (ODF-WWRA Final Report 2013).

Suppression Difficulty

The final SDR was centered on suppression resources capabilities to produce fireline based on resource type, typical production rates in the specific fuel type measured in chains per hour (1 chain = 66 feet), slope, and composite of scores and weights with input provided by the states to demonstrate the difficulty for fire suppression (ODF-WWRA Final Report 2013). Fuel type (live and dead material) and steepness of slope influence firefighter's ability to effectively flank and control a fire.

Successful fire control can be hindered when the onsite conditions impede suppression resources effectiveness resulting in negative impact to important values. These values play a role in the social, economic, and sustainability of local communities.

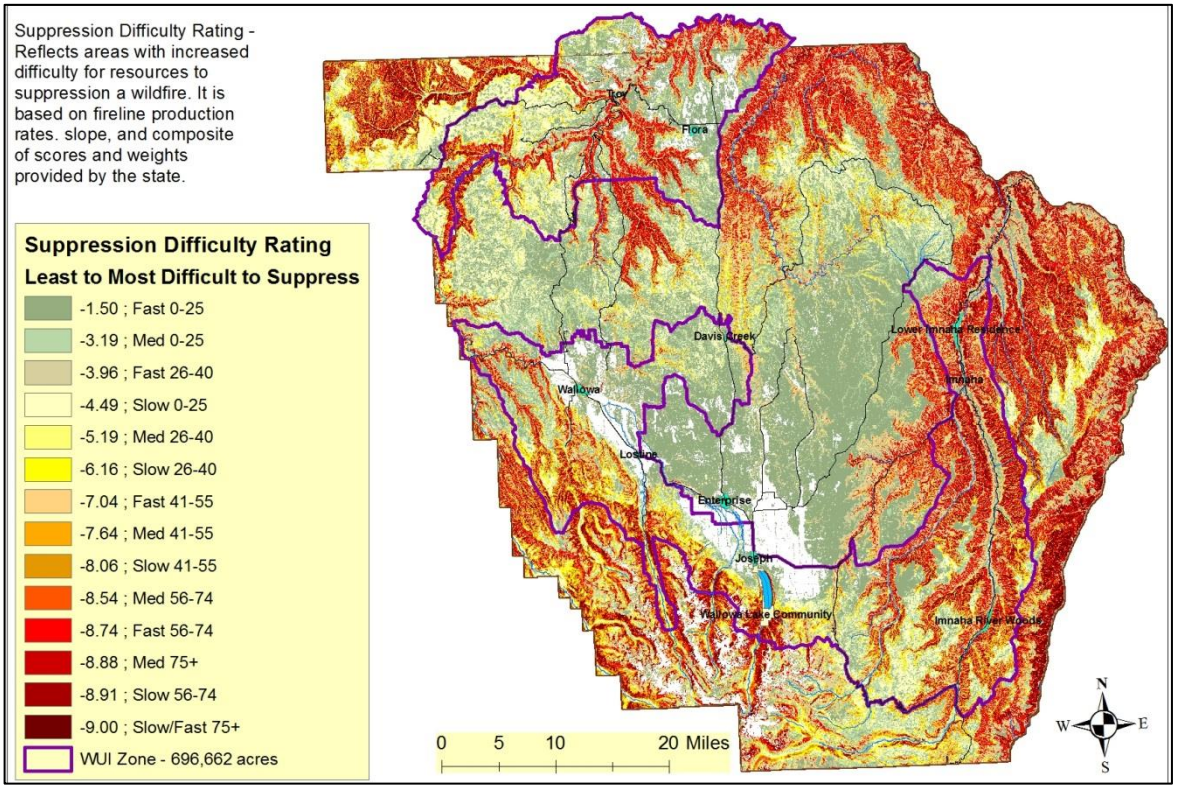


Figure VI - 15. Reflects increased difficulty to suppress a wildland fire. Map demonstrates the level of suppression difficulty in adjacent counties bordering Wallowa County. The more negative the number, the more difficult the suppression of wildfire

Values Impacted Attributes

Values Impacted are a sub-set of the overall Fire Effects Index. Values assessed for potential negative fire effects included Infrastructure, wildland development areas, drinking water importance areas, forest assets, and riparian assets. Loss or damage to these values would have significant undesirable impacts to the local communities as well as larger urban areas, if wildfire were to damage or impede infrastructure use.

The five key values identified as part of the Values Impacted dataset were analyzed, weighted, and mapped in the WWRA for final fire effects. These values were then given a rating of relative importance based on State Official input. This information was incorporated into the Fire Effects Index (FEI) component prior to calculating the final fire risk determination:

1) Infrastructure Assets – This data identifies key infrastructure such as schools, airports, hospitals, roads, and railroads that are susceptible to adverse effects from wildfire.

- Roads included levels 1;mainly interstate highways, 2;mainly state highways;, also key arterial and collector roads. Roads and railroads were buffered by 300 meters.
- Airports, Schools, and Hospitals has a 500 meter buffer.

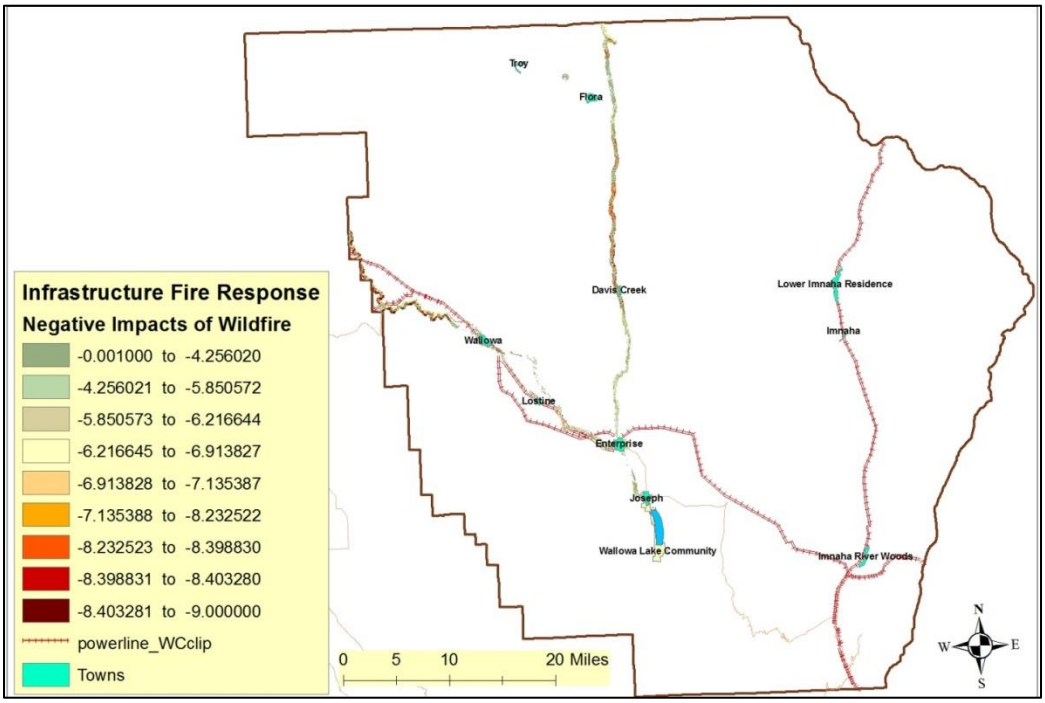


Figure VI – 16. Locations of road and transmission powerline assets and their anticipated negative response to wildfire. Transmission power lines are shown but were not part of WWRA Infrastructure Assets.

2). Wildland Developed Areas – this value describes locations of people living in wildland areas, is represented by the number of housing units on given acreage of land parcel. To maintain consistency over all states population count data from the Department of Homeland Security, HSIP Freedom Dataset was used (ODF-WWRA Final Report 2013). The WWRA through DHS utilized structural light detection was used for structural point locations based on visual light discovery. Categories were set ranging from more than 3 housing units per acre to as low as 1 housing unit per 40 acre parcel. See Figure 18. A corresponding table can be found in Appendix D, page 21 Figure D - 28.

This process did not however take into account additional homes and structures within Wallowa County that went undetected by homeland security. Local data sources revealed a distribution of both residence and non-residential structures in Wallowa County that would potentially increase the Wildland Development Areas. The Wallowa County structure map however does not delineate between out buildings and residential.

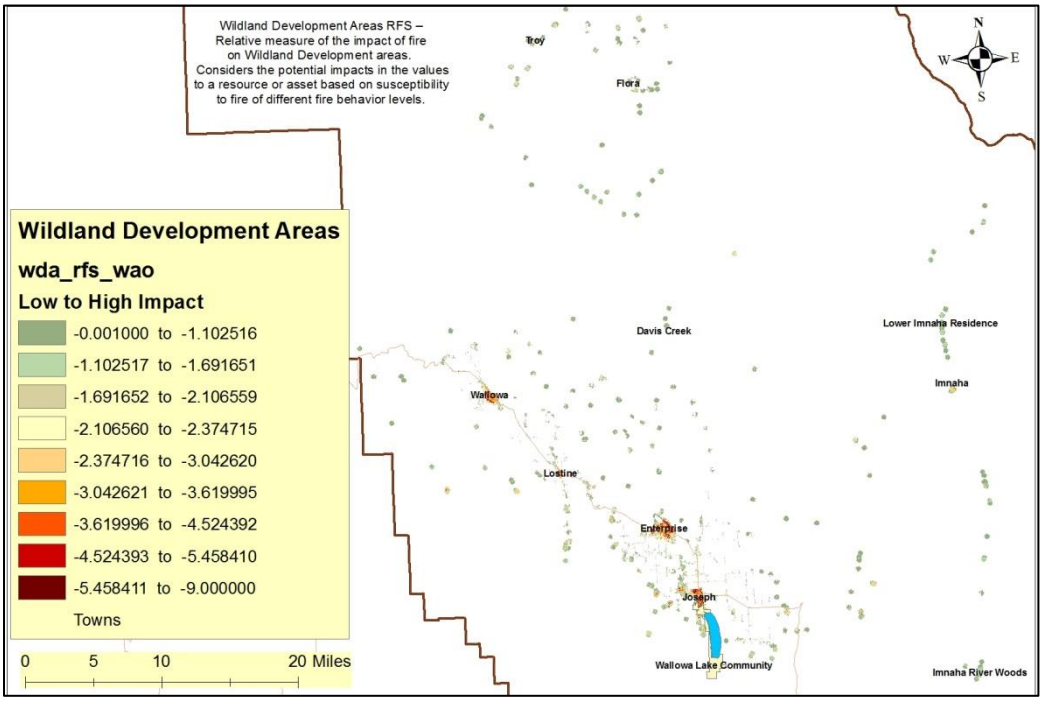


Figure VI – 17. Response function rating outcome used in calculating final Fire Effect Index. Indicates low to high density of where people live.

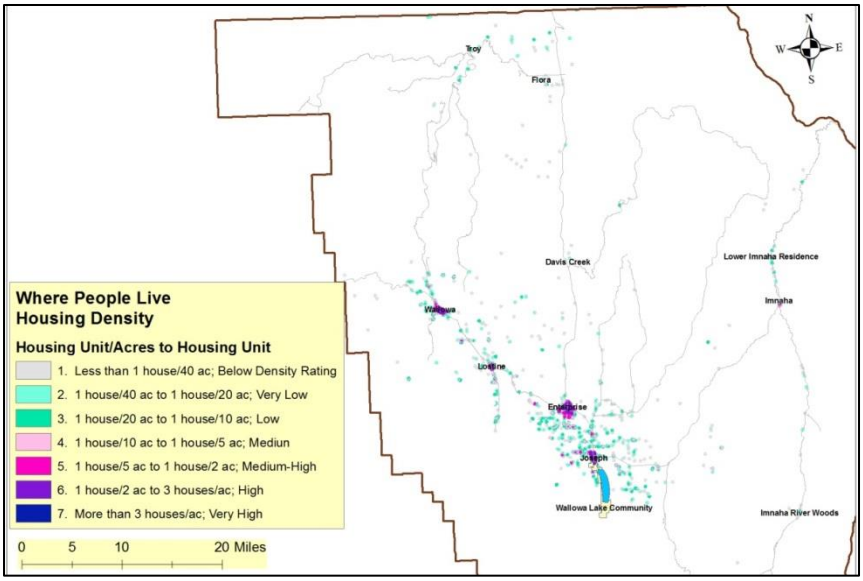


Figure VI - 18. Housing density of residential areas based on Department of Homeland Security , HSIP Freedom Datase (ODF-WWRA Final Report 2013).

Figure 19 has contains the WWRA housing density AND the most recent structure location for Wallowa County that was obtained locally. A zoomed in area of the town of Troy (Figure 20) and vicinity shows a high number of structures represented by red dots, not accounted for in the WWRA. Further review shows several of these structures are residential in nature.

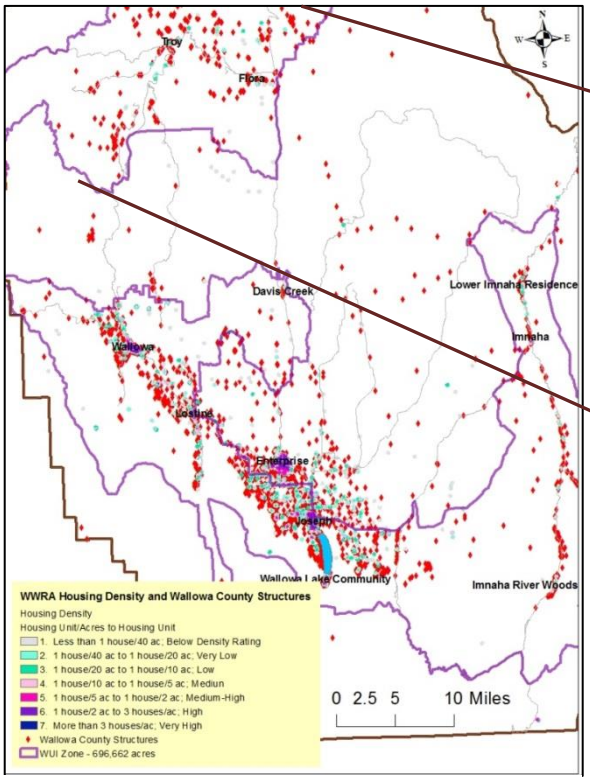


Figure VI - 19. Map displays comparison of WWRA data for housing density and local data of most recent structure locations for Wallowa County. Red dots are structures from Wallowa County local data.

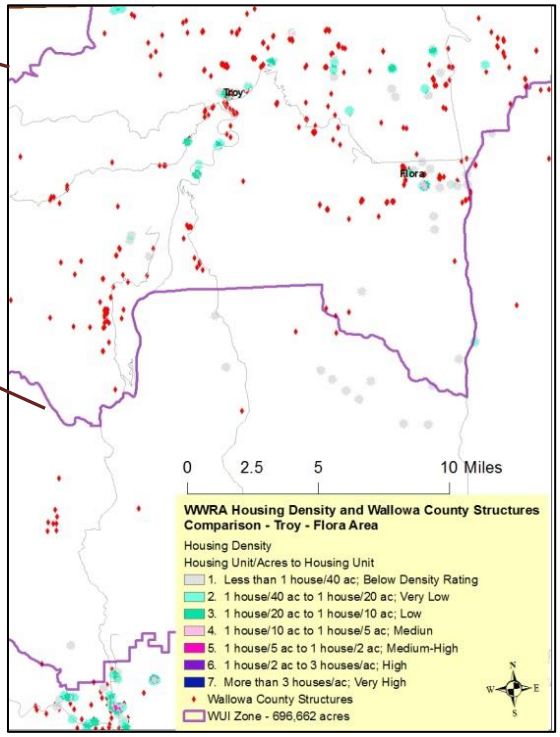


Figure VI - 20. Close up of structures surrounding the communities of Troy and Flora. Compares Wallowa County data-structure points and WWRA. residential data.

A map density of all known structures was then developed based on Wallowa County local data only to show the distribution of buildings ranging from low to high concentrations.

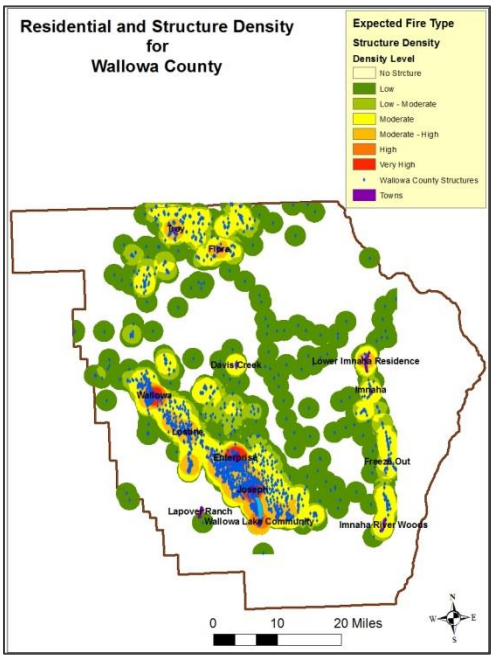


Figure VI – 21. Display of structure density using *only* local data, layer does not differentiate between resident and outbuilding. Does not include WWRA data. Using this data provides additional emphasis to areas of multiple structures that may otherwise be overlooked. Examples include locations such as: Troy, Promise, Allen Canyon.

Figure VI – 21 shows the density distribution of structures in Wallowa County using best available local data. This approach supports OAR 629-044-1060 (1) approach to classification of structures as Moderate, High, Extreme densities. Wallowa County supports 4,097 housing units as of July 2016, according to U.S. Census Bureau for the State of Oregon. Although the structure data does not delineate between the residential and outbuilding it captures approximately 4,819 structures. There is currently an effort to conduct a more accurate tri-county structure assessment that may be beneficial, and should be included as an addendum to this document.

The following Values have been included in Appendix D, pages 16 - 20:

- Forest Assets – this value discusses vegetation susceptibility to wildfire in terms of how they respond ecologically: sensitive, resilient, adaptive. Wallowa County coverage of the three wildfire response is 13%, 84%, and 4%.
- Riparian Assets – two primary functions of riparian; water quality and quantity. Categorized 1 through 3 with 3 having the highest importance.
- Drinking Water Importance Areas – Crucial areas to sustaining quality of drinking water, Oregon Department of Environmental Quality (DEQ) sub-basins with drinking water intakes, and Wallowa County dependence on water such as protection, water rights for commercial and business.

Value Impacted Rating

A spatial distribution of least to most negative impact by wildfire for identified key values assessed in Wallowa County is displayed in Figure VI - 22. The listed outcomes should not be interpreted that those areas of identified as least will not be impacted, but it provides a comparative view at one parcel of ground to the other should a wildfire occur.

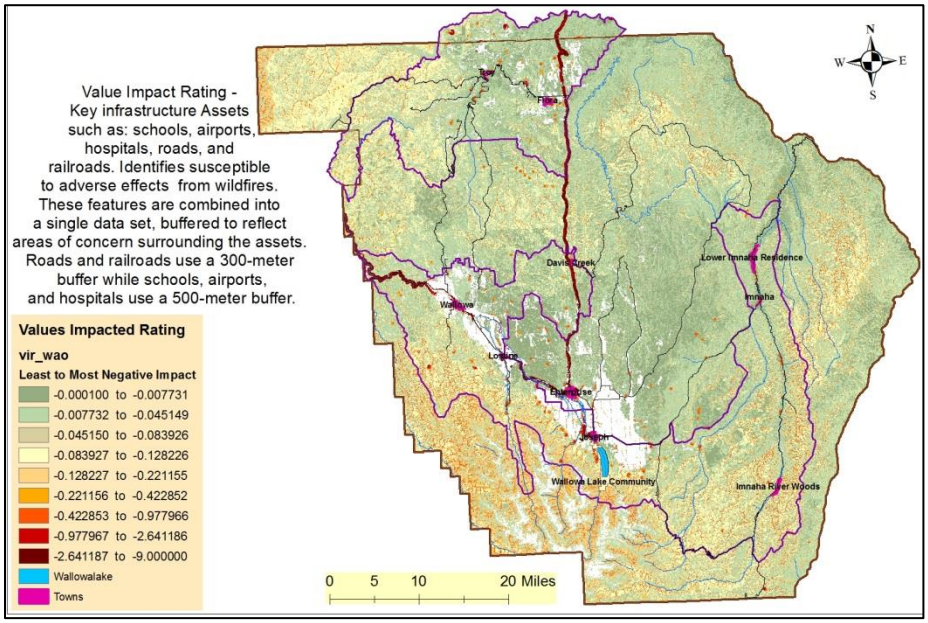


Figure VI - 22. Wildland Developed Areas and Infrastructure were important values that received a higher ranking (weighted percent) followed by Riparian, Forest Assets, then Drinking Water Important Areas. Results displayed above reflect those weightings.

Overall Fire Effects Index

The Values Impacted Rating is *combined* with the Suppression Difficulty Rating to determine the overall Fire Effects Index (FEI) in the West Wide Wildfire Risk Assessment process. The purpose of the FEI is to identify those areas that have important values at risk to wildland fire and/or are costly to suppress. The overall Fire Effects for Wallowa County indicates locations, on the ground, that have a potential for wildfire to have high negative impacts to values overlapped with vegetative and topographic conditions that would make it difficult for suppression resources to be effective. The FEI will be eventually combined with the FTI to calculate the overall Fire Risk Index (ODF-WWRA Addendum VII 2013).

Fire Effects does not take into account the threat (potential for) of a wildfire actually occurring. It strictly evaluates if a fire covered every section of ground where would the most impact occur to values. It was also broken down into 9 levels from lowest to highest negative effects.

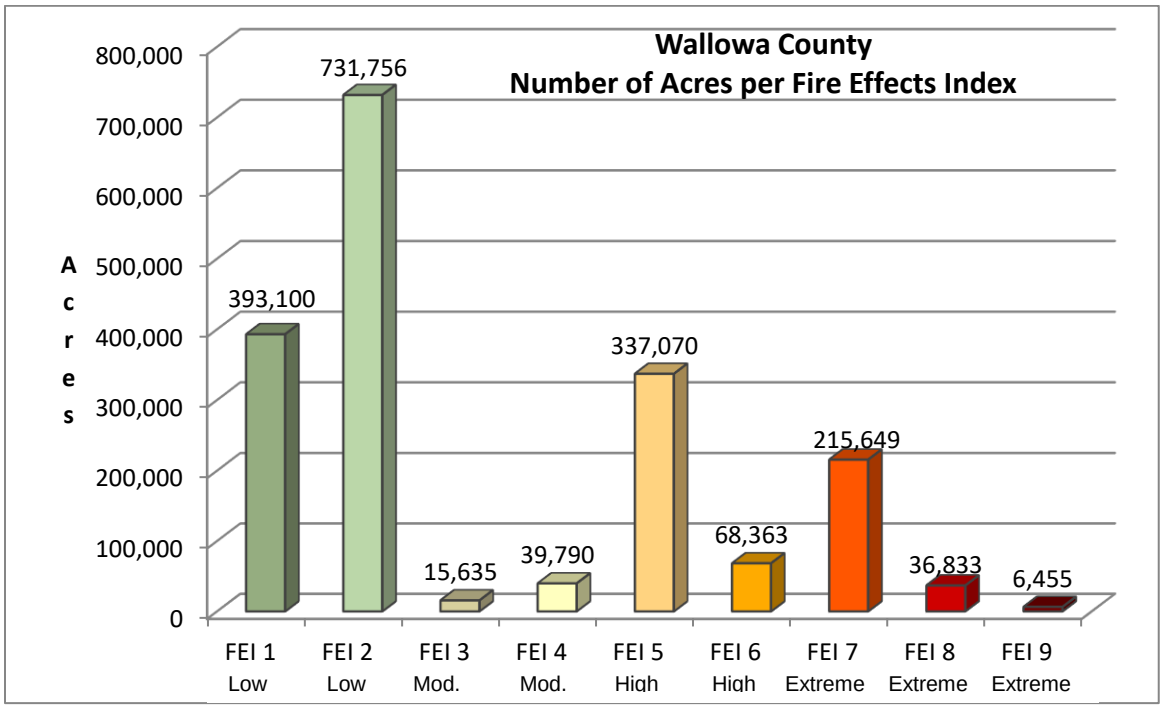


Figure VI - 23. The number of acres from least to most impacted by wildfire. Data from table in Addendum VI – Oregon County Risk Summaries. (ODF-WWRA December 5, 2012).

Knowledge of the number of acres provides an understanding of the overall impacts a fire could have in and around the county. The least negative impact does not imply that there are not negative outcomes to local values. It does however provide fire managers with an indication on how these areas compare to other geographic location in the county and where to set priorities.

Where these areas are located spatially in the county are provided in Figure VI – 24. The Fire Effects acres listed in Figure VI – 23 do not include the northwest corner of the WUIZ that overlaps into Umatilla County.

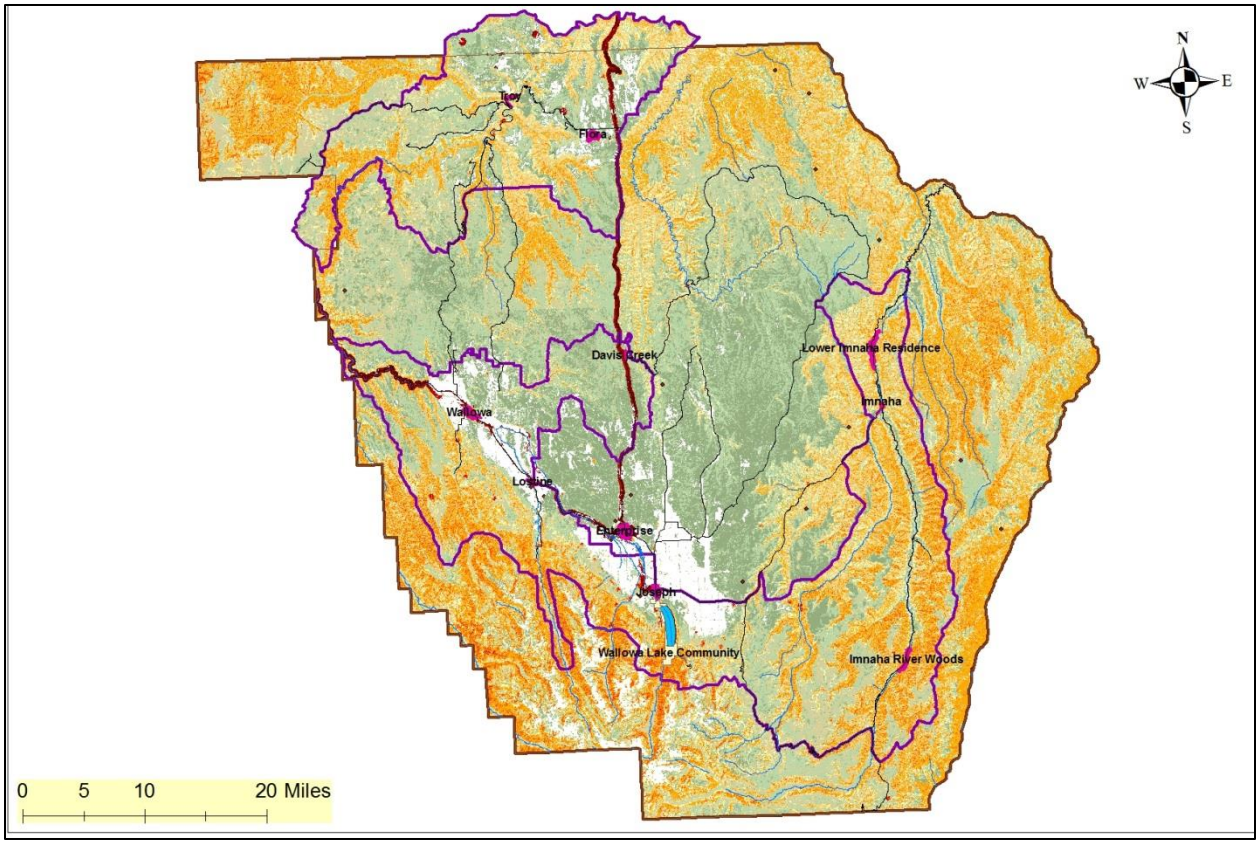
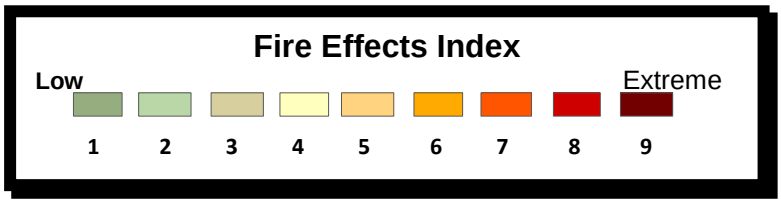


Figure VI - 24



The effects from wildfire are resultant of values present in terms of infrastructure, where people live, riparian and forest assets, and drinking water importance along with locations where the ability to suppress wildfires is easy to most difficult. Buffering of some values were done prior to final outputs.

- Infrastructures were buffered to reflect areas of concern surrounding the asset and watercourses were buffered to create a footprint of the riparian area.
- Wildland developed areas provide information of where people live was based on the number of housing units per acre.
- The forest assets are detailed conditions of stands that respond to wildfire by being resilient, adaptive, or sensitive.
- Resilient stands often retained various degrees of vegetation after a wildfire especially where the overstory is concerned.
- Drinking water importance areas ranged from low to extreme in Wallowa County with the Hurricane Creek and West Fork Wallowa River areas as the most important for the local towns drinking water. The majority of water importance other than drinking use is the local communities dependence on the sub-basins for a number of other uses such as irrigation, livestock support, domestic uses,

commercial and business uses such as: fire protection, power development. (Riparian Assets considers the ecological functions)

- See Appendix D for more information.

Geographic locations where fire suppression is difficult play an important role where potential impacts for values losted during a wildfire are concerned. Areas where ability to fight the fire is impeded, such as steep ground or thick overgrown vegetation and/or heavy down fuels, typically are areas where fire burns hottest and moves fastest. Knowledge of these areas, values they hold and their contributions to fire spread will help fire managers in preplanning strategies. The Fire Effects Index is used along with the Fire Threat Index to determine the overall Fire Risk.

Overall Fire Risk Index

The conditions of Wallowa County have been identified through combining the subsets of Fire Threat and Fire Effects (See Appendix D) then spatially displaying the overall Fire Risk Index through mapping. Knowledge of the likelihood of a fire start and how it will burn (fire threat) combined with the possible negative outcomes based on values threatened and effectiveness of suppression (fire effects) provide the two key components to determine locations of the highest fire risks to Wallowa County.

To better display the final risk of a single area in the county the vicinity of Wallowa Lake, Ski Run, and Hurricane Creek were zoom (Figure VI 25 – 28) in on to display the following conditions:

- Fire occurrence (fire start history and weather influence zones) (
- Fire Threat Index (Fire Occurrence, Fire Behavior, Fire Suppression Effectiveness)
- Fire Effects Index (Values Impacted and Suppression Difficulty)
- Final Fire Risk Index

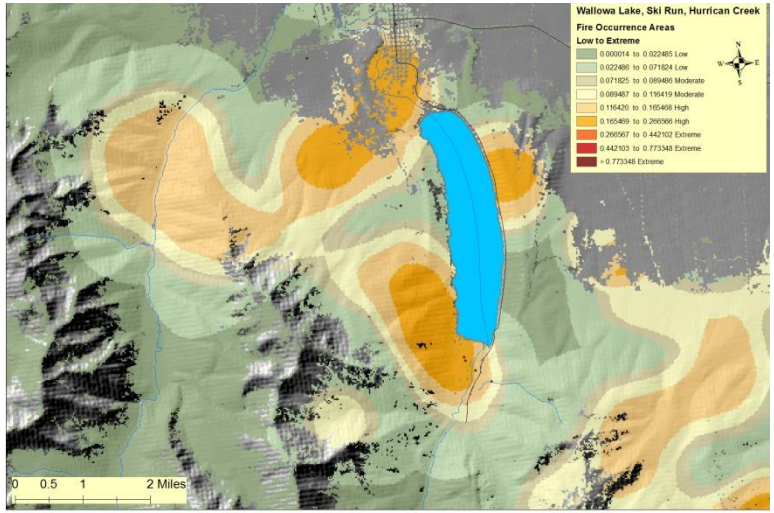


Figure VI - 25. Fire Occurrence for Wallowa Lake, Ski Run, Hurricane Creek area.

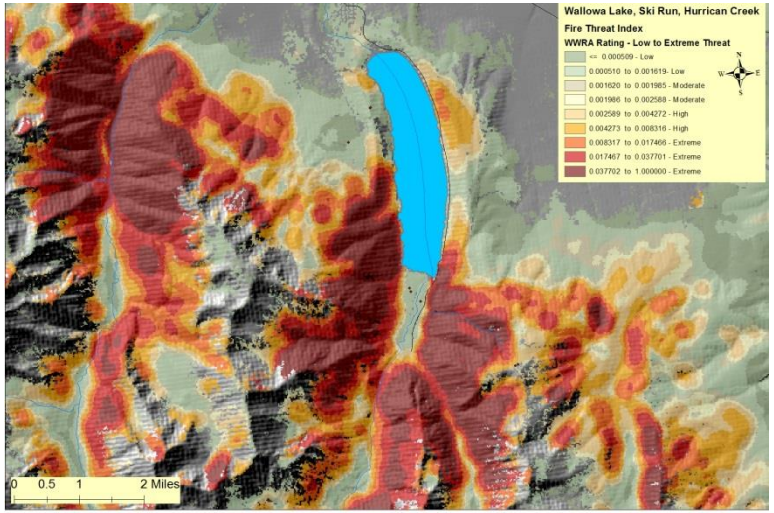


Figure VI - 26. Fire Threat Index for Wallowa Lake, Ski Run, Hurricane Creek area.

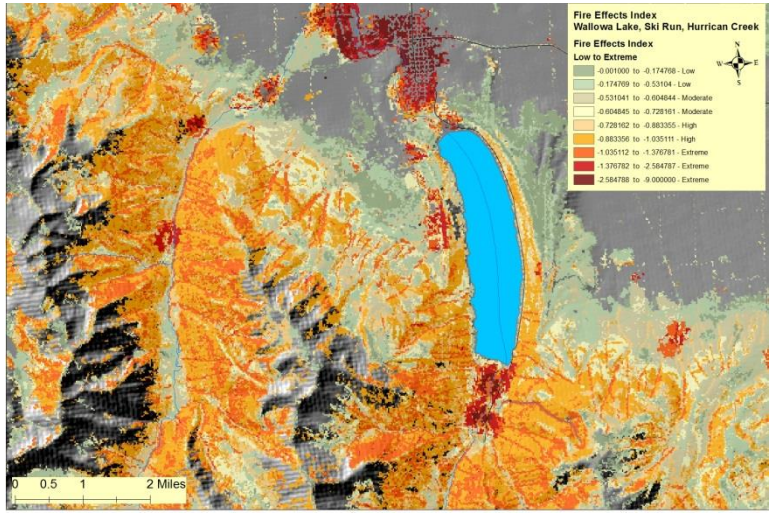


Figure VI - 27. Fire Effects (values impacted) Wallowa Lake, Ski Run, Hurricane Creek area.

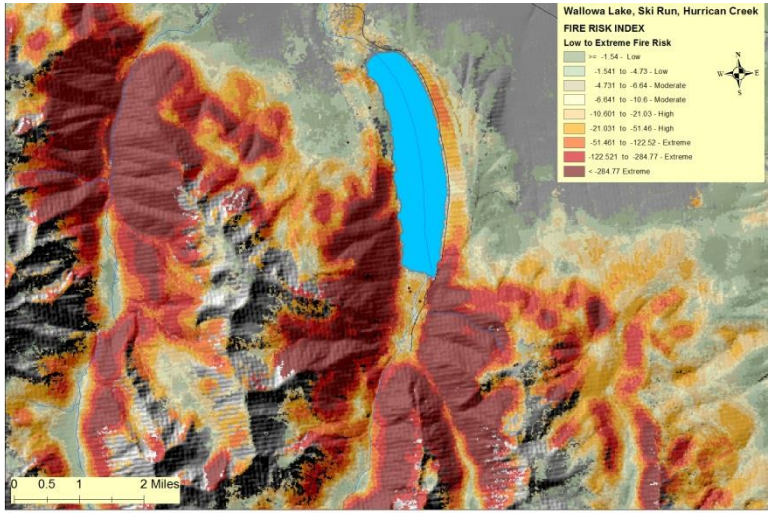


Figure VI - 28. OVERALL FIRE RISK for Wallowa Lake, Ski Run, Hurricane Creek area.

The total distribution of acres for fire risk of Wallowa County is provided in the graph. This does not imply that low fire risk is not a concern but provides a relative comparison of risk throughout the county.

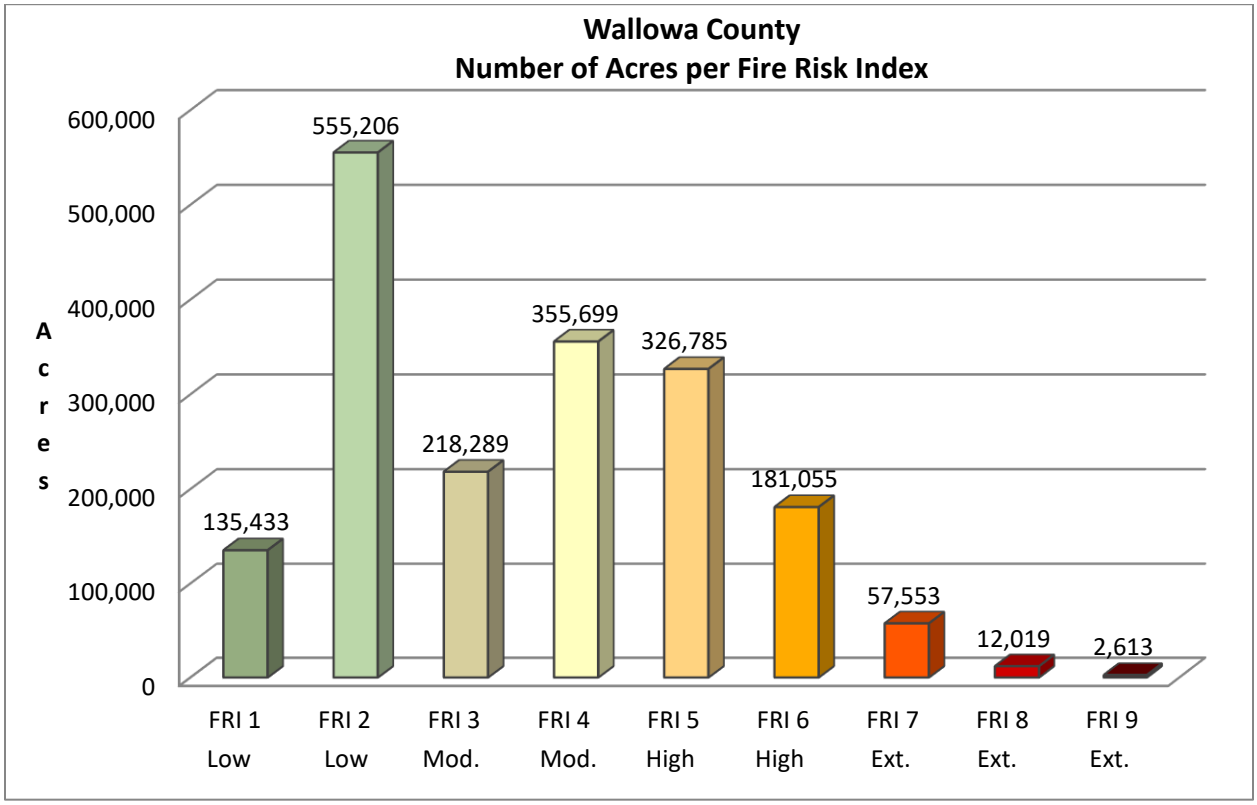


Figure VI - 29. Distribution of Acres for West Wide Risk Assessments 9 levels of Fire Risk Index.

Spatial distribution of risk in Wallowa County shows distribution of areas that will have the highest potential for fire occurrence, fire behavior, likely loss of values, and where fire suppression is difficult to achieve. Because fire does not recognize county lines it is important to understand not only the fire risk within the county but the fire risk that lies just outside the county lines.

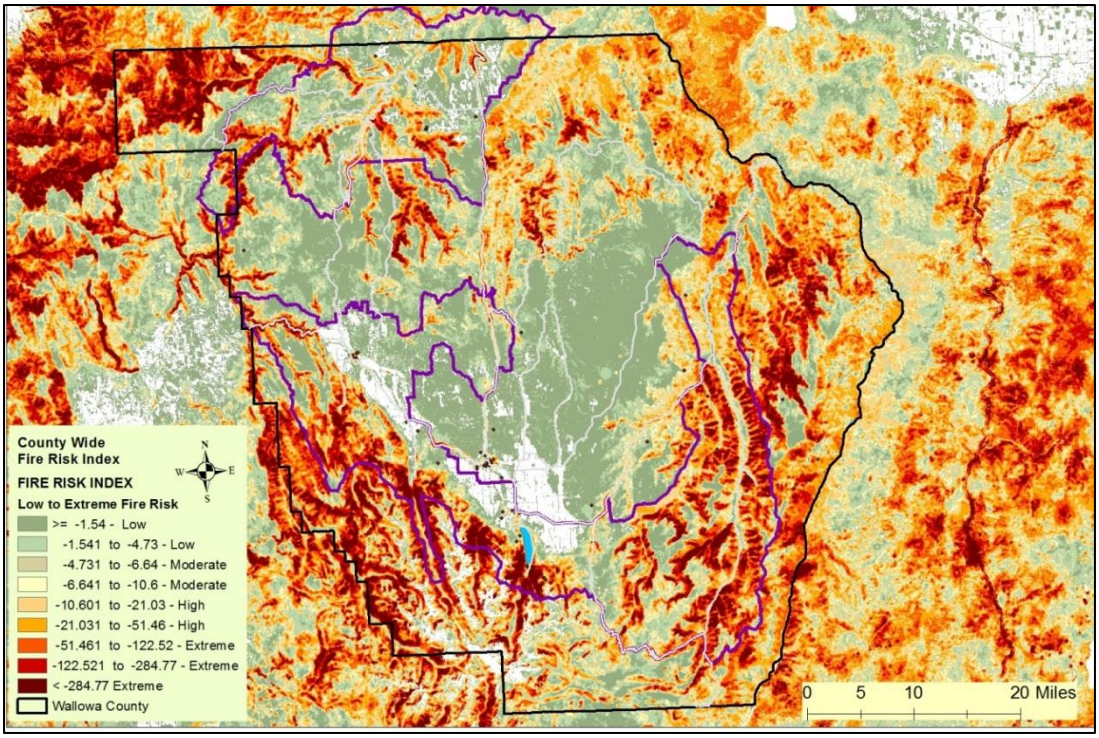
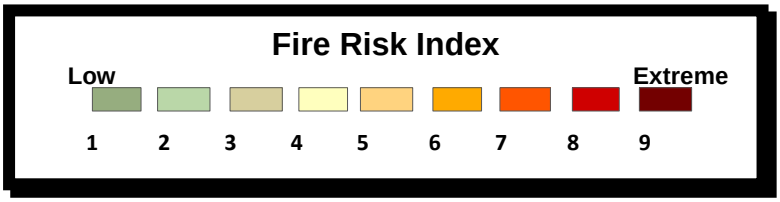


Figure VI – 30.



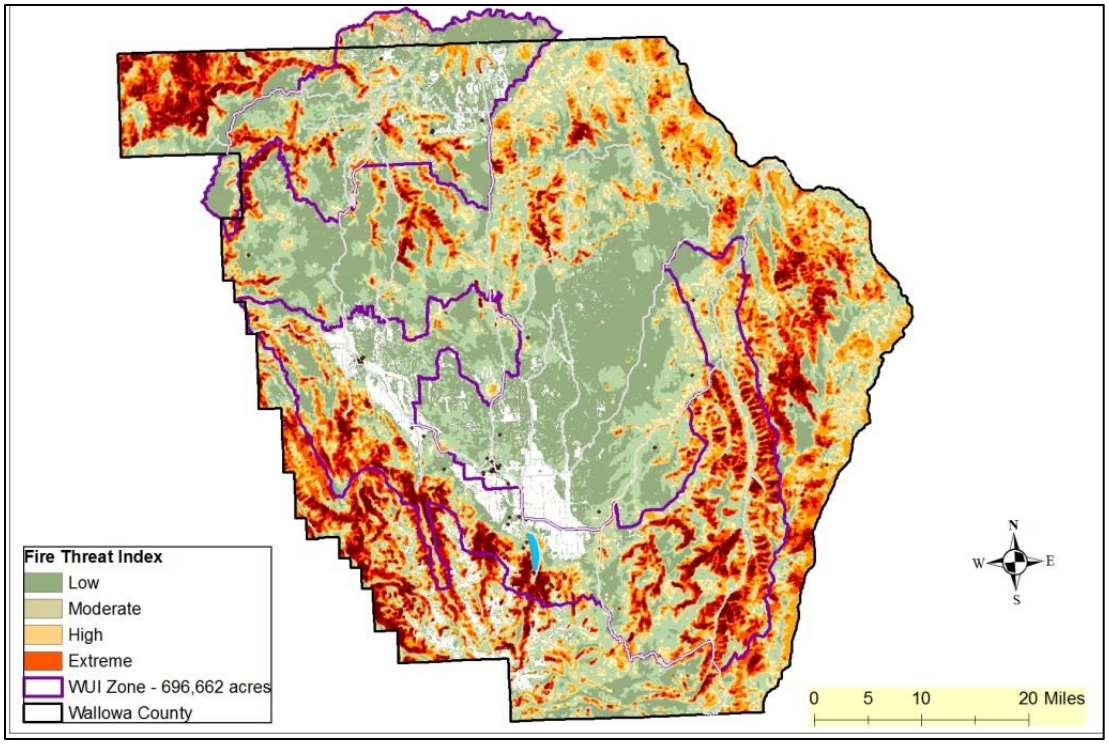
Display of Low, Moderate, High, Extreme Ratings

In working with developers of the Fire Risk calculations for the WWRA logical classifications for four groups were established from the original nine break outs. Acres were broken out into wildland and non-wildland acres. The acres in the following graphs take into account that Wallowa County has approximately 1,844 651 acres considered wildland acres. Wildland areas are areas that could be threatened by a fire burning in wildland fuels. It excludes areas such as core urban areas that are not in a neighborhood or areas not threatened by fire burning in wildland fuels (WWRA 2013).

These four ratings of low, moderate, high, extreme are displayed in both the spatial mapping and total acres. Combining the multiple levels into four key categories meets the OAR direction 477.027 that states, "*The criteria shall recognize differences across the state in fire hazard, fire risk, and structural characteristics within the forestland-urban interface. The criteria shall include not less than three nor more than five classes of forestland-urban interface."*

The following three pages provides maps showing areas that fall into the four ratings of low, moderate, high and extreme with corresponding tables with estimated acres in Wallowa County and locations within the designated WUI Zone.

Fire Threat



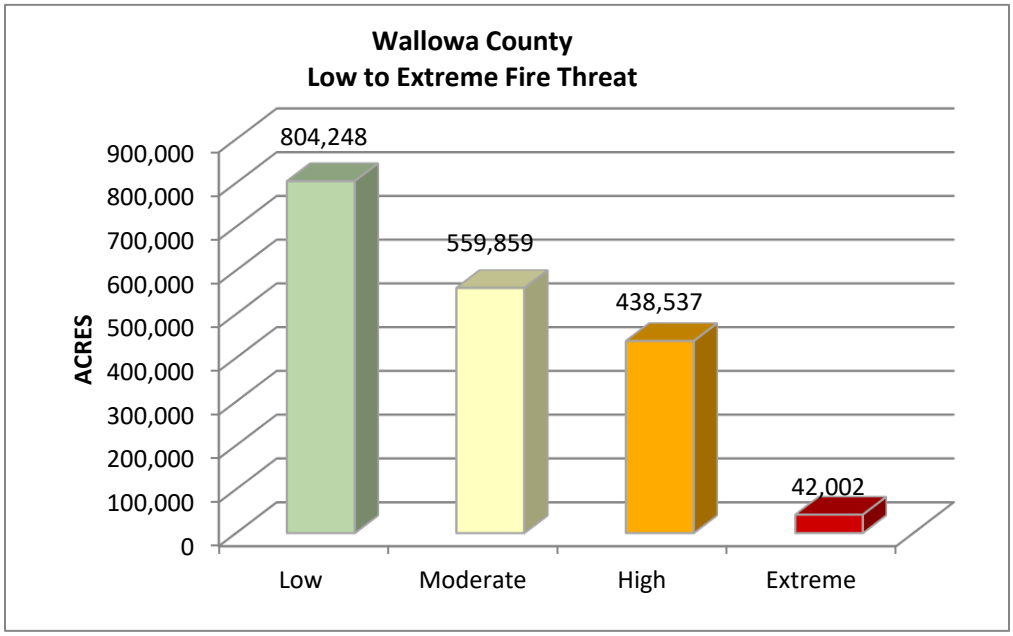
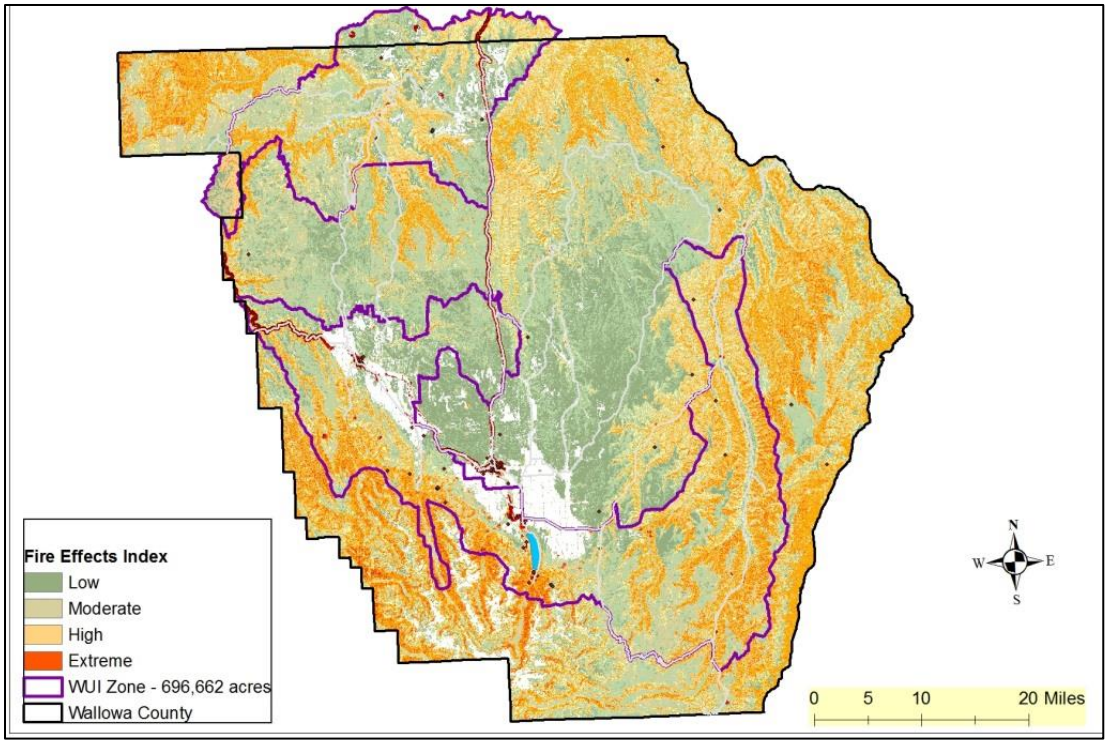


Figure VI – 31. Side by side graph and map of Fire Threat Index.

Fire Effects



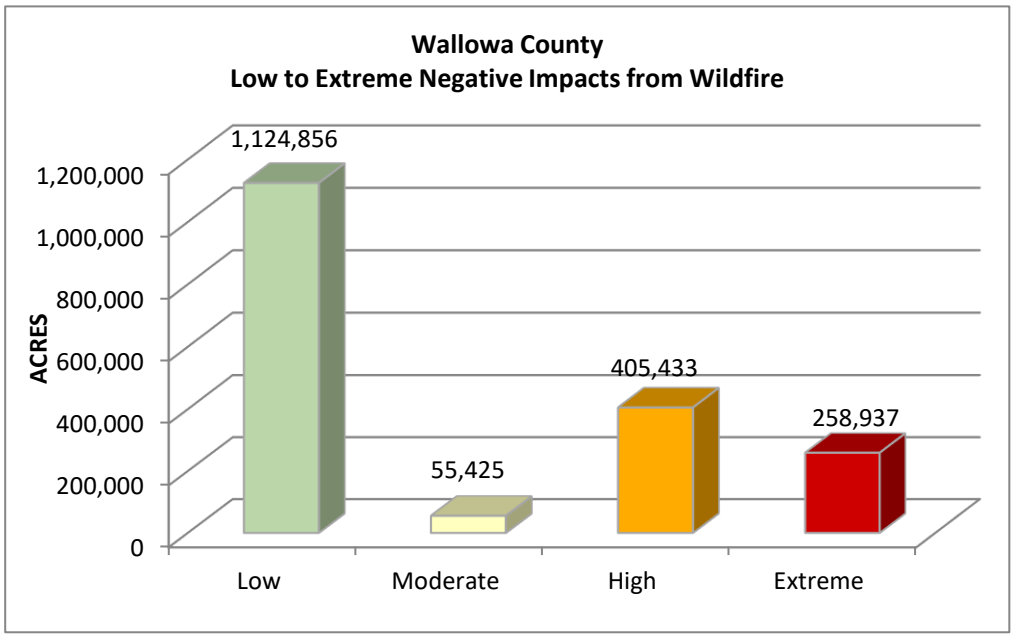
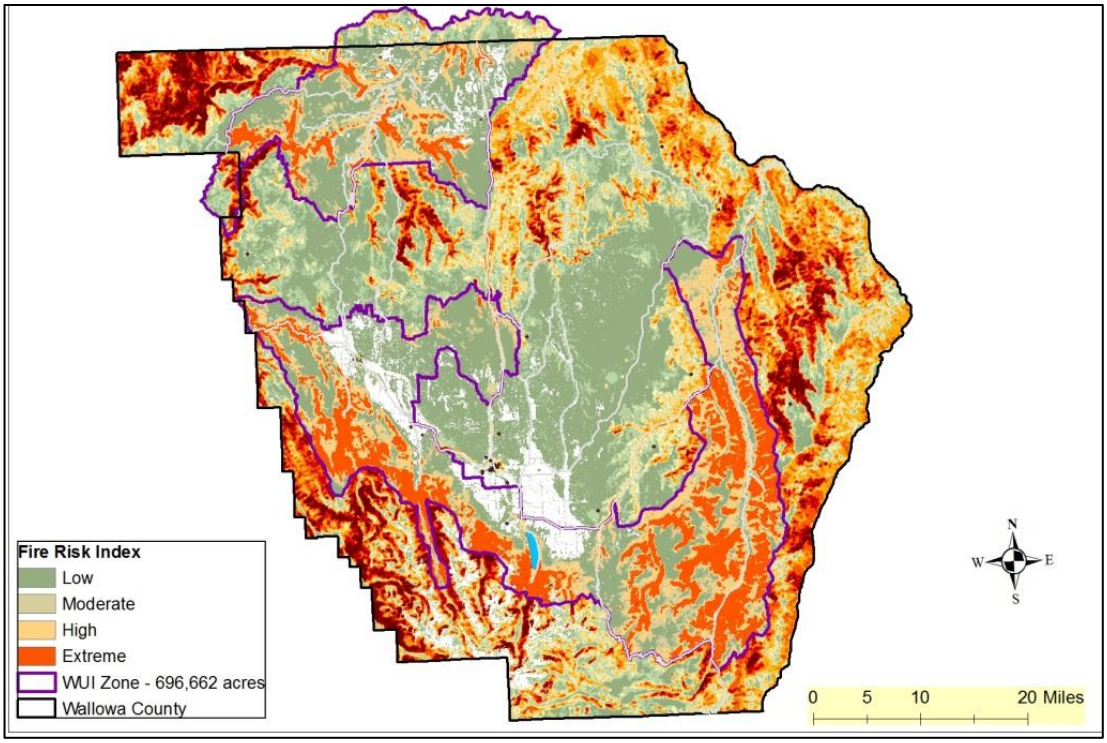


Figure VI – 32. Side by side graph and map of Fire Effects Index.

Fire Risk



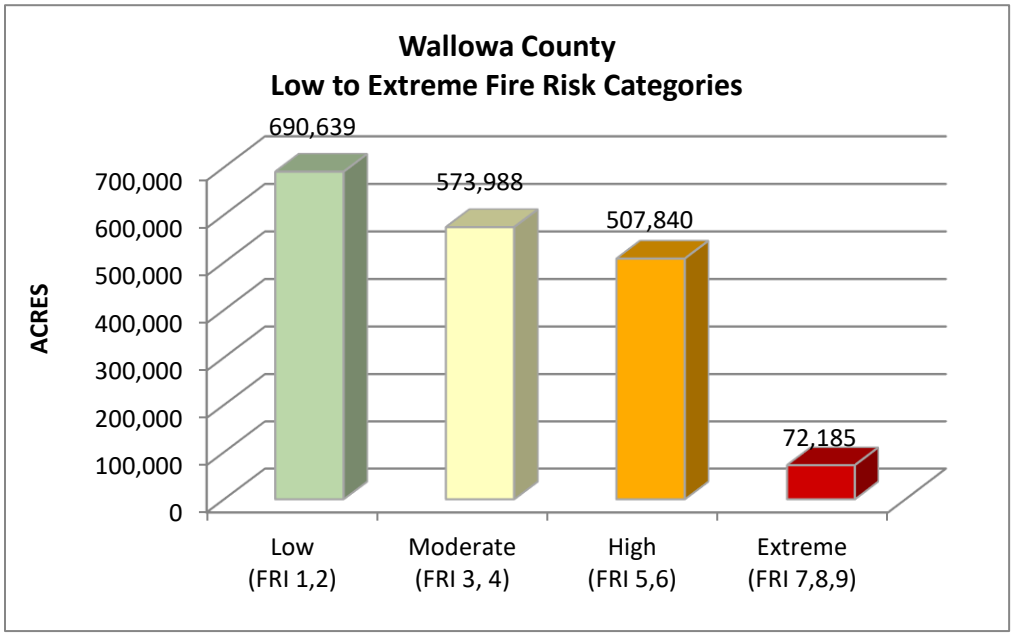


Figure VI – 33 Side by side graph and map of Wildfire Risk Index.

Summary

Wallowa County landscape is a complex intersection of human and ecosystem interaction. Depending on a host of local site conditions fire behavior and post fire impacts can vary from mild to significant. Through decades of successful fire suppression, residential development in wildland areas, and continued extensive drought conditions result in wildfires that continue to pose difficulties for Wallowa County's wildfire response resources. Knowledge of landscape issues provide management with the capacity to work with community members to prepare for, respond to, and recover from a wildfire event.

The Risk Model Framework takes into account a multitude of subsets that characterize Wallowa County. Fire start locations and ignition causation allow managers to focus mitigations where ignitions are most prominent and/or can be prevented. Vegetation types and landscape conditions play a key role in wildfire behavior and is the only branch of wildfire behavior that can be manipulated to alter fire behavior and provide opportunities where suppression resources can be effective.

The potential affects from wildfire are resultant of existing values such as: infrastructure, where people live, riparian and forest assets, and drinking water importance along with locations where the ability to suppress wildfires is most difficult. Knowing where these values lie on the landscape relative to locations where fires occurrence and spread provide places where potential risk is the highest.

The forest assets represent vegetation's interaction with wildfire in terms of resiliency, ability to adapt, or sensitivity. Resilient stands often retained various degrees of vegetation after a wildfire especially in terms of overstory retention. Drinking water importance is significant to Wallowa County particularly in the Hurricane and Wallowa Lake Basins. A significant number of the other watersheds contribute to a number of uses of ecological, economic, and social importance. Water assets benefit areas such as fish habitat, irrigation, livestock support, domestic uses, commercial and business fire protection, power development.

Geographic areas where fire suppression is difficult can impact the potential for values lost during a wildfire. Areas where ability to fight the fire is impeded, such as steep ground or thick overgrown vegetation and/or heavy down fuels, typically are areas where fire burns hottest and moves fastest and where firefighting resources are least effective. Knowledge of these areas and their contributions to wildfire behavior will help fire managers in preplanning strategies to focus on attributes that can be humanly modified.

Sustainability of communities in Wallowa County is reliant on proactive mitigation measures to protect economics, infrastructure, and resource values. Loss of one of more of these attributes can result in years of rebuilding at a significant cost. Combining efforts to maintain investments with new fire risk mitigations will assist in retaining our important values over the long term. These results provide managers with insight on

county conditions when developing mitigation plans to reduce the overall fire risks in the county. Management considerations regarding current conditions are included in the priority assessment in Chapter VII.

The Fire Effects Index is used along with the Fire Threat Index to determine the overall Fire Risk. This assessment provides key attributes that drive the fire risks in the county. It is estimated that 41 percent of Wallowa County's wildland acres is in either high or extreme for negative effects from wildfires, with 14 percent of that in the extreme rating.

One aspect of fire effects that cannot be measured is the emotional and societal impacts especially where personal loss occurs. Each situation is relative to the individual and community being impacted. One thing that is clear making efforts in advance of wildfires provides opportunities to avoid what would otherwise be a devastating situation to both life and properties.

Bibliography

Agee, J. K. 1974. *Fire management in the National Parks*. Western Wildlands **1**:27–33.

Andrews. Patricia L,; Rothermel, Richard C.. 1982. *Charts for Interpreting Wildland Fire Behavior.* Gen. Tech. Rep. INT-131. Intermountain Forest and Range Experiment Station Ogden, UT 84401.

Andrews, Patricia L.; Heinsch, Faith Ann; Schelvan, Luke. 2011. *How to generate and interpret fire characteristics charts for surface and crown fire behavior***.** Gen. Tech. Rep. RMRSGTR- 253. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 40 p.

Barrett, S.; D. Havlina; J. Jones; W. Hann; C. Frame; D. Hamilton; K. Schon; T. Demeo; L. Hutter; and J. Menakis. 2010. *Interagency Fire Regime Condition Class Guidebook. Version 3.0* [Homepage of the Interagency Fire Regime Condition Class website, USDA Forest Service, U.S. Department of the Interior, and The Nature Conservancy]. [Online], Available: http://www.frcc.gov/.

Campbell, Sally; Azuma, Dave;Weyermann, Dale. 2003. Forests of eastern Oregon: an overview. Gen.Tech. Rep. PNW-GTR-578. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Hammer et al., 2007. International Journal of Wildland Fire, *Wildland-Urban Interface Housing Growth during the 1990s in California, Oregon, and Washington* p. 255-265.

Hammer, R.B.; Stewart, S.I., Radeloff, V.C. 2009. *Demographic trends, the wildland-urban interface, and wildfire management.* Society & Natural Resources. 22 (8): 777–782.

Hardy, C.C.; Schmidt, K.M.; Menakis, J.M.; Samson, N.R. 2001. *Spatial data for national fire planning and fuel management. International Journal of Wildland Fire*. 10:353-372.

Heyerdahl, Emily and Jim Agee, 1996. *Historical Fire Regimes of Four Sites in the Blue Mountains, Oregon and Washington*.

Jones, Jeff and Colleen Ryan. 2012. *Fire Regime Condition Class Mapping Tool (FRCCMT) User's Guide*. National Interagency Fuels, Fire, & Vegetation Technology Transfer. Available: www.niftt.gov.

Maruoka, Kathleen Ryoko 1994. *Fire history of Pseudotsuga menziesii and Abies grandis stands in the Blue Mountains of Oregon and Washington*. M.S. thesis. Seattle, WA: University of Washington

(NIFC) National Interagency Fire Center 2014. *Predictive Services Intelligence 2014 Statistical Summary of Wildland Fires*. National Report of Wildland Fires and Acres Burned by State.

Oregon Department of Forestry, 2013. *West Wide Wildfire Risk Assessment, Final Report – Addendum I*, Detailed Technical Methods March 31, 2013. The Sanborn Map Company, 2012

Schmidt, K. M.; Menakis, J.P.; Hardy, C.C.; Hann, W.J.; Bunnell, D.L. (2002). *Development of coarse-scale spatial data for wildland fire and fuel management.* Gen. Tech. Rep. RMRS-GTR-87CD. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 pp.

Scott, Joe H.; Burgan, Robert E. 2005. *Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model*. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Van Wagner, C. E. 1993. *Prediction of crown fire behavior in two stands of jack pine*. Canadian Journal of Forest Research. 23: 442–449.

University of Oregon 2014. *Northeast Oregon Multi-jurisdictional Natural Hazards Mitigation Plan.* University of Oregon's Community Service Center: Resource Assistance to Rural Environments and Oregon Partnership for Disaster Resilience.

Web Links

Barrett, S.; D. Havlina; J. Jones; W. Hann; C. Frame; D. Hamilton; K. Schon; T. Demeo; L. Hutter; and J. Menakis. 2010. *Interagency Fire Regime Condition Class Guidebook. Version 3.0* [Homepage of the Interagency Fire Regime Condition Class website, USDA Forest Service, U.S. Department of the Interior, and The Nature Conservancy]. [Online], Available: http://www.frcc.gov/.

DEQ, Oregon Department of Environmental Quality, 2007. http://www.deq.state.or.us/wq/dwp/swrpts.asp

Jones, Jeff and Colleen Ryan. 2012. *Fire Regime Condition Class Mapping Tool (FRCCMT) User's Guide*. National Interagency Fuels, Fire, & Vegetation Technology Transfer. Available: www.niftt.gov.

LANDFIRE, 2015. http://www.landfire.gov/about.php

LANDFIRE – http://www.landfire.gov/, http://www.landfire.gov/data_overviews.php.

Merriam-Webster 2016. http://www.merriam-webster.com/dictionary/effect

(NRCS) Natural Resource Conservation Service 2015. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/water/watersheds/dataset/?&cid=nrcs143_021623

Oregon Administrative Rule (OAR) 629-044-1045 (4) (a-c). http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_044.html

Oregon Explorer 2014. http://oregonexplorer.info

Oregon.gov 2016. http://www.oregon.gov/odot/td/tdata/pages/gis/countymaps.aspx, Oregon.gov Trans Dev/Transportation Data. Oregon Department of Transportation County Maps.

U.S. Census 2015. https://www.census.gov/quickfacts/table/HSG010215/41061,41

U.S. Forest Service 2015. *USDA Forest Service Pacific Northwest Geographic Information Set*. Malhuer, Umatilla, Wallowa-Whitman National Forest GIS Data Library; Metadata Information. http://www.fs.fed.us/r6/data-library/gis/umatilla

U.S. Forest Service 2016. *FSGeodata Clearinghouse*. http://data.fs.usda.gov/geodata/

WCC 2014. NWCC Annual Fire Report Archive Info. http://gacc.nifc.gov/nwcc/admin/publications.aspx

Wikipedia 2015. Wikipedia the Free Encyclopedia http://en.wikipedia.org/wiki/Blue_Mountains_(Pacific_Northwest).

VII. Communities at Risk and WUI Zone Priority Setting

Introduction

This chapter applies the WWRA Framework components, described in Appendix D, with other pertinent local issues to determine areas of priority, particularly in regard to at-risk communities and WUIZ. This chapter identifies locations with conditions that contribute toward negative outcomes. Additional details describing the prioritization process and data layers used can be found in Appendix F.

Data used to for the prioritization process include:

- **Attributes contributing to Wildland Fire Potential**
  - Likelihood of a fire occurring
  - Wildfire behavior – flame length and rates of spread
  - Probability of a canopy fire
  - Overall Fire Threat
  - Overall Wildfire effects to values
  - Overall Fire Risk
- **Attributes for Fire Protection Capability/Structure Vulnerability**
  - CAR structures and Fire Response times
  - Increased levels of threat to public and Fire Fighters*
  - Protected structures vs. unprotected (all lands under protection)
  - Where people live
  - Values to be protected
  - Community preparedness
  - Suppression difficulty

*The county has a very high level of recreationists and sportsman (fishing / hunting) that may pose increased challenges during wildfire events.

In order to properly address federal, state, and local policies and guidelines it was important to provide an assessment and comparison of conditions for communities both in and outside the WUIZ boundary. The majority of communities addressed are not under rural fire protection, so excluding a community even though it fell outside of the WUIZ would not meet the goals and objectives of this document regarding fire response. All communities were assessed for a relative rating against other communities.

In addition a broader landscape assessment was completed using the WUIZ itself. This provides managers a means to identify landscape conditions in the middle ground areas. The WUIZ assessment provides geographic locations of opportunities for cross-boundary treatment approaches to meet the concept of “all hands, all lands”. Mapping for the WUIZ was developed separately for the North and South WUIZ.

U.S. Department of Agriculture in the Healthy Forest Restoration Act (HFRA) defines wildland urban interface as an area within or adjacent to an at-risk community that has been identified by a community in its wildfire protection plan and the HFRA define a “community at risk” from wildland fire as:

- A group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) in or adjacent to federal land;
- Has conditions conducive to large-scale wildland fire; and
- Faces a significant threat to human life or property because of a wildland fire.

Oftentimes, federally-managed public lands are situated in the middle ground area extending well beyond the boundaries of communities at risk, yet these locations are often the source of natural fires that develop into large wildfires that threaten communities.

This section focuses primarily on Wallowa County Communities at Risk (CAR) and WUIZ with understanding that ALL of Wallowa County was presented for overall Fire Threat, Fire Effects, and Fire Risk. It was necessary to display the Fire Effects portion as a countywide map, since infrastructure and forest assets may extend well beyond the WUIZ.

Mitigation actions (Chapter VIII) and assessment results were primarily applied to locations within the identified WUIZ for Wallowa County and its communities at risk. Mitigation actions outside the WUIZs should be addressed on a case by case basis depending on need for infrastructure protection or other interests; these were not part of this assessment but can be assessed individually. Although the WUIZ and CAR are areas defined on a map, this does not imply that projects should not extend beyond the WUIZ or CAR. In fact it is encouraged to take approaches that make sense in terms landscape treatment strategies when considering risk mitigation, application of funds, multiple goal achievements, etc.

Since the conception of the 2006 Wallowa County CWPP, new developments have occurred regarding fire policies and programs. These policies and programs are designed to provide direction on relatively consistent approaches in determining fire risk assessments when revising Community Wildfire Protection Plans. Some key documents referenced for this process, as instructed by the Oregon Department of Forestry:

1) *West Wide Wildfire Risk Assessment.* Was completed on behalf of Oregon Department of Forestry Council of Western State Foresters with funding from the USDA Forest Service. March 31, 2013.

2) *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* The National Strategy. April 2014.

3) Oregon Administrative Rules 629-044, Oregon Department of Forestry, Criteria for Determination of Wildfire Hazard Zones, June 15, 2016.

4) Fiscal Year 2016 Budget Overview, US Department of Agriculture. Key areas of focus include: restoring resilient landscapes; building thriving communities; managing wildland fires; promoting safety for employees and public. February 2015

5) Senate Bill 357, Report to the Legislature Oregon Department of Forestry. Using stewardship authority to increase the pace of restoration, create jobs, and support local economies. May 2014.

6) U.S. Department of Agriculture (USDA) Forest Service and Department of Interior Bureau of Land Management, Healthy Forests Initiative and Healthy Forests

Restoration Act. This provides improved statutory process for hazardous-fuels reduction projects on certain types of at-risk National Forest System and Bureau of Land Management Lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships (HFRA 2003).

The CWPP document expands the assessment of wildland urban interface issues to include larger areas called communities-at-risk that surround local towns and high resident areas. This CWPP also assesses the conditions of the *middle ground* areas brought forth in the CWS. Wallowa County refers to this area as the Wildland-Urban Interface Zone (WUIZ) that extends into the forest lands well beyond community at risk boundaries.

In Wallowa County, a ***community-at-risk*** is defined as a group of homes or other structures with basic infrastructure (such as shared transportation routes) and services within or near forest land.

- A group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) in or adjacent to forestland;
- Has conditions conducive to large-scale wildland fire; and
- Faces a significant threat or risk to values because of a wildland fire.

In order to understand the fire risks on communities and urban interface areas, it is necessary to recognize the interactions of several elements at the landscape scale level. Wallowa County is approximately 2,017,211 square acres in size, supporting a Wildland Urban Interface Zone (WUIZ) area of 696,662 acres with some shared areas across boundaries in Union County (OR), Asotin (WA), and Garfield (WA) counties. The WUIZ area strictly within the Wallowa County boundary line accounts for 655,156 acres or 32% of the counties land base, leaving 41,506 acres of WUIZ shared with the other three counties.

Risk, in terms of wildfire, incorporates a multitude of elements that could potentially influence how fire interacts with the environment, the likelihood of a fire occurring, the way in which the fire will burn, and values that could be impacted by a fire. Risk includes an array of historical and current information that provides realistic potential outcomes based on expected and past results; particularly fire starts, spread, and size.

The Merriam-Webster defines risk as: "*The possibility that something bad or unpleasant (such as an injury or a loss) will happen; someone or something that may cause something bad or unpleasant to happen".*

Wildfire "risk" for the purpose of this document, is a product of a multitude of interlinked conditions. It goes beyond just the possibility of a wildfire starting by combining the possibility of a bad outcome from a wildfire with contributing factors that play a role once ignition occurs. Factors such as weather, vegetation, ability to fight the fire, and historical fire size, these allow management to understand the level of fire threat in all acres across the county. Factors such as infrastructure, where people live, drinking water, and natural resource values combined with the level of difficulty in suppressing a fire start at any given location, provide insight on the values that potentially could be impacted by fire.
The CWPP approach is consistent with the Northeast Oregon Hazard Mitigation Plan three phases of risk assessment.

- First, hazard identification involves identifying geographic extent of a hazard, its intensity, and probability of occurrence, which in this case is wildfire. This level of assessment typically involves producing a map.
- Second, vulnerability assessment combines the first phase with an inventory of existing property and population exposed.
- Thirdly, risk analysis involves estimating negative impacts (damage, injuries, costs likely to be incurred in geographic areas. These include the magnitude of the harm that may result based on vulnerability; and the likelihood or the probabilities of harm occurring.

The NHMP identifies wildfire as one of six hazards that could have an impact on Wallowa County (NHMP 2014).

Prioritizing Communities at Risk

Sixteen areas have been identified as community at risk areas of concern for wildfire events in Wallowa County, with the remaining residence scattered throughout the county.

Each community was examined using an agreed to set of attributes that could influence the outcome in the event a wildland fire occurs, and the probability of one actually happening. A matrix was developed to evaluate the individual communities and their surrounding areas based on these concerns. Nomenclature ratings of Low, Moderate, High, and Extreme were assigned to compare communities at risk against one another. Numerical values were considered but the detailed numerical analysis of the WWRA data was deemed more than adequate for the final assessment ratings (email with WWRA representative Don Carlton).

1. Wallowa County's communities at risk, for this assessment, fell into one of three criteria.
   a. An area designated by state or federal register with city limits established,
   b. An area designated by state or federal register that did not have city limits established, or
   c. An area that supported a population in a remote place recognized by Wallowa County as a community at risk and has no established city limits. STOPPPP

2. In order to define the communities at risk the CWPP committee reviewed maps for each communities and then assigned a periphery perimeter. This perimeter encompassed the highest populated areas that included city limits or high residential areas extending out to homes in and near forested areas. Boundaries also took a strategic approach by utilizing ridgelines, roads, and other natural barriers. Assessing these areas required the use of the most current data available data that incorporated the highest number of structure locations (including residence) in Wallowa County.

   Because perimeters were based on populated areas, there was no established acreage size for assessed communities. Structure location was based on GIS structure layers and verification of buildings with GoogleEarth2015. The Wallowa County structure layer obtained from the Forest Service contained the highest level of structural accuracy.

3. Once the community perimeters were drafted, meetings occurred to finalize and approve the CAR boundary areas to be analyzed. The approved CARs were then evaluated for the *community* ratings. Power Meadows community was the only CAR that was entirely outside the larger WUIZ. Four other CARs extend both inside and out of the WUIZ. The CAR acreage that fell outside the WUZ boundary totaled 21,950 acres. Community areas identified originally totaled twenty-one. Because some communities shared boundaries and shared similar geographic attributes these areas were combined into a single CAR area. CAR areas combined include, in alphabetical order: Allen Canyon/Bear Creek, Divide/Prairie Creek, Flora/Lost Prairie, Imnaha Corridor (includes Imnaha/Freeze Out/Imnaha River Woods), Wallowa Lake/Ski Run, Troy/Eden and Bartlett Benches, Wallowa/Lostine.

This CWPP addresses CAR prioritization as an additional method to identify and support mitigations needed to meet the three goals of the CWS. Ratings attributes fell within two assessment categories to be used for prioritization and comparison of community attributes against another. Attributes such as high fire occurrence, wildfire rates of spread, flame length, and potential for crown fire were taken into consideration as part of wildfire potential. The “expected” fire behavior data results were used to represent what was likely to occur. It was recognized that down woody fuel and vegetation characteristics are some key influences in wildfire fire behavior and can be viewed individually based on anticipated wildfire behavior. (Fuels information is addressed in Chapter 9 in more detail). Appendix E provides more details in two separate tables. One table of breakpoints for each attribute used for the CAR and the second table is the rating results for each individual CAR. A full description of each CAR attribute, their breakpoints for low through extreme, and the rationale for their use can be found in Figure Appendix F - 1.

Prioritization Attribute Overview

The attributes were divided into two assessment categories concerning wildfire.

1. Wildland Fire Potential – This includes attributes that show the probability of an acre igniting and measure of fire behavior characteristics for flame length and rates of spread. It also provides the three key West Wide Risk Assessment (WWRA) outputs that measure;
    a. Fire Risk Index - the overall wildfire risk based on all current data.
    b. Fire Threat Index - an index related to the likelihood of an acre burning and how the fire would burn once ignited.
    c. Fire Effects Index- addresses important values negatively affected by wildland fire, and/or that are costly to suppress.
2. Fire Protection and Fire Structure Vulnerability – these attributes demonstrate the potential for suppression resource effectiveness in protecting structure and lands in close proximity to homes. Because Wallowa County is highly impacted by recreationists annually, high use areas were also evaluated when it could potentially influence fire protection efforts. In addition, those areas that have important values that could be negatively impacted and landowner preparedness on pre-wildfire treatments was also rated.

Data Sources

CAR data sources included the WWRA and agency data from ODF, Forest Service, and Wallowa County Emergency Service and local landowners. Numerical ratings and the two categories of Wildfire Potential and Fire Protection and Fire Structure Vulnerability allow managers to identify which key mitigation actions that will be most effective in addressing a particular attribute.

Overall Fire Protection Capability/Structural Vulnerability

In order to determine the overall fire protection capabilities and structural vulnerability it was necessary to develop a new category with its own individual sub-tally. Several characteristics were considered when identifying the overall community susceptibility to wildfire. The approach for this category took into consideration seven attribute characteristics that contributed to the final score.

1. The amount of external events (summer camps) or if an area was a common high use location that would potentially increase the threat to public and fire fighter safety in the event of a wildfire. (campers, hikers, sportsman).
2. IS the area currently covered under structure protection responsibility?
3. What is the level of community development within the CAR?
4. Are there additional infrastructure values that may be negatively impacted?
5. What is the current community level of preparedness where structure and lands have or are planned to be treated in advance of a wildfire event?
6. Overall fire suppression difficulty where terrain and fuels influence fire suppression efforts that may result in wildfire spread into the communities.

The table in Appendix E provides a description and rating break points for each attribute and outlines what each rating represents for each attribute examined. Final selection of rating was centered on highest percent of land area that fell into the rating category, unless it was deemed that proximity of an attribute would cause imminent impacts to the community warranting a higher rating. It was determined that use of local knowledge was important in finalizing the ratings for higher accuracy.

Communities at Risk Ranking Results

Wallowa County hosts several small communities and one of the largest tourist attractions in NE Oregon. These CARs are recognized by the Federal Register, the State of Oregon, or Wallowa County as at risk due to wildfire. This assessment provides details on what if any attributes are contributing to wildfire risk.

Once the attributes rating system was finalized, mapping of current conditions was evaluated for communities at risk using local and WWRA data from the Geographic Information System (GIS). Table VII – 1 displays the comparative results of the CAR.

It was important to evaluate communities and surrounding areas by prioritizing areas to assist land managers and community members with a high degree of information for the most

effective use of funds. To meet Oregon Department of Forestry guidelines, the primary final risk maps were given the rankings of Low, Moderate, High, and Extreme.

Communities At Risk	Wildland Fire Potential					Fire Protection and Structure Vulnerability								
	Fire Occurrence	Flame Lengths	Rate of Fire Spread	Probability of Canopy Fire	Fire Threat Index	Potential for increase threat to life of public and FF **	Structure Protected verse non-protected **	Wildland Development Area	Values Impacted	Level of Community Preparedness	Suppression Difficulty	Fire Effects Index		Final Fire Risk Index Rating
Alder Slope	L	H	M	H	H	M	M	M	H	M	H	H		H
Allen Canyon / Bear Creek	M	H	H	H	H	H	H	M	E	M	H	H		E
Davis Creek	M	M	M	H	H	H	E	M	H	H	L	E		H
Divide / Prairie Creek	M	H	M	H	H	H	E	M	H	M	M	M		H
Dry Creek	L	M	M	L	L	M	H	M	M	M	L	L		L
Enterprise	L	L	L	L	L	L	M	H	E	L	L	E		M
Flora / Lost Prairie	H	M	M	L	M	H	E	M	M	M	M	H		M
Hurricane Creek /Ent. Watershed	M	M	L	L	L	M	H	H	E	M	L	E		M
Imnaha Corridor	M	H	H	H	E	E	E	M	E	M	E	H		E
Joseph	H	L	L	L	L	L	M	E	E	L	L	E		H

Communities At Risk Issues	Wildland Fire Potential					Fire Protection and Fire Structure Vulnerability								
	Fire Occurrence	Flame Length	Rate of Fire Spread	Probability of Canopy Fire	Fire Threat Index	Potential for increase threat to life of public and FF **	Structure Protection verse non –protected **	Wildland Development Areas	Values Impacted	Level of community Preparedness	Suppression Difficulty	Fire Effects Index	Fire Effects - CWPP	Final Fire Risk Index Rating
Lostine Canyon	H	E	H	E	E	E	H	M	E	M	E	H		E
Power Meadows	L	L	L	M	L	L	E	L	M	H	L	L		L
Promise	M	M	M	L	L	M	E	M	M	H	M	M		M
Troy, Bartlett – Eden Bench	H	H	H	M	M	E	E	M	M	M	H	M		M
Wallow Lake – Ski Run	H	E	M	E	E	E	H	H	E	H	H	H		E
Wallowa - Lostine	L	M	M	L	L	L	M	M	E	L	L	E		L

Table VII – 1. CAR Rating Chart. Identified communities at risk and their corresponding attribute rankings. ** Does not have a corresponding map for this attribute.

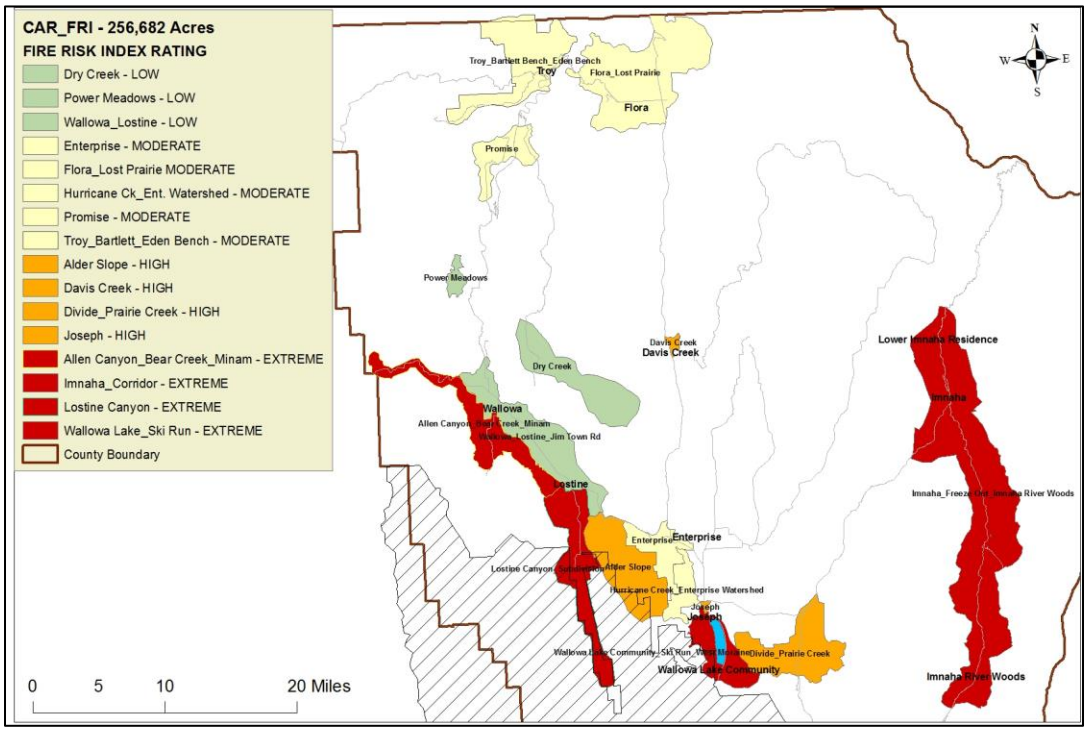


Figure VII - 1. Communities at Risk. Mapped from Low to Extreme based on Wildfire Risk assessment results.

Interpretation of Results

The ratings in Table VII-1 provide insight on both overall conditions and specific issues facing each community. Rating scores provide a means of relative comparison for the CARs, however using only the final fire risk rating as a mitigation rationale in addressing community issues would result in missed acknowledgment of underlying issues. It is important to use this table in combination with the mitigation action items in Chapter VIII.

All attributes rated under the Wildland Fire Potential were derived from the WWRA. Fire Protection and Structural vulnerability included local information. The attributes of Fire Threat and Fire Effects are the primary sub-sets of Fire Risk. The overall Fire Risk accounts for all attributes combined and assessed in the WWRA framework as shown in Appendix F.

Fire behavior attributes are influenced by fuels (live and dead), weather, and topography; human influence is only applicable to fuels in modifying fire behavior. Knowledge of expected fire behavior provides opportunities for fuels modification in advance of an ignition. In areas where flame lengths are High or Extreme, utilization of suppression hand crews alone would be ineffective in fighting fires based on flame lengths over four feet as described in Chapter V Table VII – 3, and would require other resource support such as engines, dozers, and aerial delivery resources. Additionally, knowing flame lengths and the probability of canopy fire provides knowledge of areas where stand conditions are likely to promote the transition of surface fires into canopy fires.

Areas with a lower fire occurrence (likelihood of a fire start), but display high/extreme fire threat and/or fire risk, such as Alder Slope, indicate that while the chances of a fire actually starting in the general area is low, if a fire were to ignite, the outcome could have dire consequences. Emphasis may not be needed in reducing fire ignitions for this location, but funds and efforts might focus on the modification of vegetation conditions that currently support extreme fire behavior conditions or higher negative impacts from a wildfire.

Fire protection and structure vulnerability attributes can be a strong indicator of fire response issues and defensibility conditions facing a CAR. Wildland fire resources are not trained in structure protection limiting their capabilities to the surrounding land around the structure verses extinguishing a structure fire. Several issues influence resource protection capabilities over and above the actual fire itself. Issues such as: the number of structures within the protection area relative to the number of resources available to provide "*structure"* protection; The level of work completed on and around the structures to create adequate defensible space; The increase in population through summer recreation opportunities; Full or limited access to the area as well as response times to the CAR.

Management Considerations

Knowledge of elements that are contributing to the increase in both wildfire potential and vulnerability of the communities provides focal points for reducing the potential for loss during wildfires. Results of the Community at Risk assessment can be beneficial for land managers in a number of ways. Results can be used to:

1. Identify where the most critical wildfire potential is among the CAR.
2. Distinguish between CAR(s) that have fire and structure vulnerability issues in terms of resource response versus those that are more susceptible to extreme wildfire behavior.
3. Decision makers can focus on specific attributes that are contributing to wildfire behavior, thereby influencing reduction of the overall risk to that community.
4. Enables decision makers to take advantage of attributes that present opportunities to expand upon an already existing lower rating.
5. Identifies locations where mitigation actions create a ripple effect, influencing other attributes and possibly expanding the spatial area of treatment.
6. Identifies protection coverage areas and the number of structures ratio faced by rural fire departments in outlying areas, where opportunities for remote sub-stations may exist.
7. Provide opportunities for communicating information with community members about wildfire potential and emphasizing the need for shared responsibility among all landowners in reducing wildfire risk.
8. Demonstrates the level of problems facing CAR and opportunities for distribution of funds to multiple areas facing the issues.

Individual CAR maps displaying each attributes is available as part of Appendix F.

WUI Zone and Middle Ground Assessment

Two distinct areas represent the Wildland Urban Interface Zone (WUIZ). The Northern WUIZ area incorporates 223,222 acres and the southern WUIZ accounts for 473,440 acres. The WUIZ ownership is divided among primarily Forest Service and private lands accounting for 41 percent and 55 percent respectively, with Bureau of Land Management and Oregon State making up the last 4 percent of ownership.

As communities recognize themselves as at risk and approach Federal agencies to work collaboratively, joint development of plans and projects will ensure that investments in hazardous fuel reduction are the most economical and effective ways to reduce risk (HFRA, 2004). HFRA plans and projects are supported by the Memorandum of Understanding (MOU) for The Development of a Collaborative Fuels Treatment Program signed by the U.S. Department of Agriculture, U.S. Department of Interior, the National Association of State Foresters, and the National Association of Counties. Its purpose is to:

a. Provide the framework of a process for these agencies to collaborate on the annual selection of a fuels treatment program of work within their respective jurisdictions to provide for community protection and enhance the health of forests and rangelands.
b. Allow the parties to recognize that fuel treatments should be prioritized and selected through a timely collaborative process, and should be coordinated across ownerships and jurisdictions to effectively protect communities and improve forest and rangeland health.
c. Treatments will be accomplished by concentrating on high priority areas: 1) in the wildland-urban interface and, 2) outside the wildland-urban interface that are in condition classes two and three (MOU 2003).

Additionally, Oregon's National Hazard Mitigation Plan (NHMP) is integrating CWPPs into the it's process. HFRA requires that three entities must mutually agree to the final contents of a CWPP; local government, local fire departments, and state entity responsible for forest management (NHMP 201.6(c)(5).

Identifying areas with conditions that promote potential for high rates of spread, flame lengths, and likelihood of crown fires identifies locations where concentrated efforts can be applied to mitigate fire behavior. Knowing the stand conditions such as surface fuels, canopy closure, canopy base height, and crown bulk density offers insight on the types of vegetation management that may be needed.

Although Fire Risk takes into account both Fire Threat and Fire Effects, it is important when implementing treatments to middle ground areas to also know where and what stand conditions are promoting wildfire behavior and where the likelihood of ignition starts will occur. This provides insight on locations to better prepare the landscape toward resiliency and strategically place treatments to improve opportunities for successful suppression efforts.

The intent of this approach is to concentrate management efforts in areas where funding can achieve multiple objectives, while maintaining consistency with the CWS goals and agency(s) direction. The WUIZ identify locations that strategically make the most sense for resilient landscapes and fire response success, and where environments can realistically be manipulated to meet management objectives across landownerships.

Landscape Conditions

It was important to visually display a breakout of the four rankings – low, moderate, high, and extreme – and to spatially assess where landscape conditions could be compared. This assists in placing treatments in locations to provide the highest resource investment and landscape modification for wildfire mitigation and protection. Treating the worst-case conditions would intuitively make sense; however, it may not be the most appropriate approach in all cases. Treatment of areas may be influenced by biophysical conditions (slope/access), funding limitations, or strategic design for increasing the successfulness of suppression efforts. Examples in which a lower-ranked area that may benefit from treatment are:

a. An area in which investments in vegetation modifications have previously occurred or resource response capabilities have been improved; may warrant the need to retain those initial investments and build upon already established work.
b. An area that has a lessor ranking of conditions and is spatially located where treatments can be strategically placed. This area could be included in higher ranking areas that border it, or an area that would increase opportunities for protection of life and property.
c. An area that provides increased protection of a larger area of natural resources. If there are two highly rated areas and a low area provides the connection between the two.
d. A low rating area that will be more likely to provide successful modifications to wildfire behavior.
e. Areas where CWS goals overlap and landscape treatments benefit both community and natural resources.

This is not to imply that extreme areas would not be a priority. In fact, they are particularly important – especially those anticipated to display high rates of spread, flame lengths, and potential crown fires, with the possibility of spreading in or near a community endangering life and property *or* the resultant fire would have high severity impacts to the ecosystem.

Attributes for Landscape Conditions

The WUIZ assessment is similar to communities at risk, consisting of areas of low, moderate, high, and extreme conditions. A key outcome for middle ground assessment is to provide opportunities for modification of fire behavior and fire effects, thereby reducing the magnitude, severity, and intensity of wildfires when they encounter treated areas. In addition, by reducing the intensity at which a wildfire burns, it provides fire

management suppression resources a higher opportunity for successful suppression efforts in treated areas.

Several attributes were used in assessing WUIZ landscape conditions that lead to the overall Fire Risk. Many of the attributes were obtained from the WWRA, while others were part of agency (or agencies) protocol to be included in the decision making process. A brief description of the attributes used for the WUIZ assessment is below, with a more detailed explanation of the data and process further described in Appendix F.

1. Fire Regime Condition Class – Departure of ecosystems from what is considered historical ranges. Assists Forest Service (FS) and BLM in meeting the Healthy Forest Initiative and Healthy Forest Restoration Act direction. ODF recognizes FRCC as an interagency standardized tool.
2. Fire Threat Sub-Layers
    a. Probability of Occurrence – 10-year historical fire locations from 1999 – 2008
    b. Fire Behavior Layers – topographic and stand conditions
        - Canopy Base Height – Impacts likelihood of vertical fire movement from a surface fire to crown fire
        - Surface Fuel Model – Fuel type, arrangement, and distribution impact both fire behavior and fire suppression. Includes: grasses, brush, timber, and slash.
    c. Probability of Canopy Fire – Indicates areas where a wildfire will likely transition into a wildfire with canopy involvement. Canopy involved fires influence spread rates, spotting potential in advance of the main fire, and safety.
    d. Fire Suppression Difficulty – Reflects areas with increased difficulty for fire suppression. It is based on fireline production rates of typical suppression resources, slope, and a composite of the scores and weights provided by the states (WWRA 2014).

Each of the subsequent WUI Zone condition maps is followed by Management Considerations that correspond to the conditions being displayed. Management considerations are not limited to those presented here, but should be consistent with meeting the three goals of the CWS, the proposed mitigation measures in Chapter VIII, and relevant agency(s) policies. *This CWPP is a fluid plan that provides flexibility to the CWPP committee to make adjustments as needed.*

WUIZ Assessment Results

Fire Regime Condition Class (FRCC)

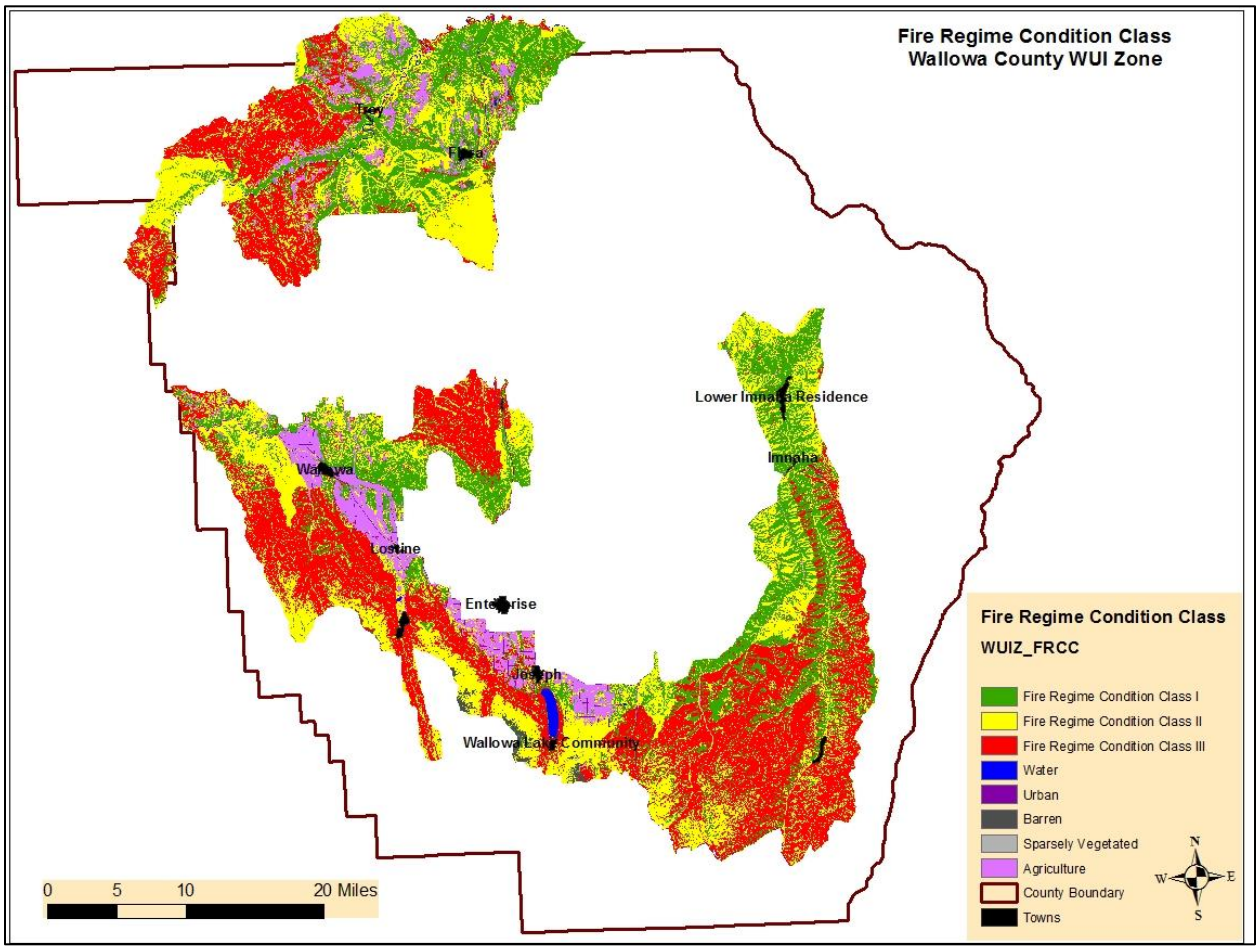


Figure VII – 2. WUI Zone Fire Regime Condition Class (FRCC). Identifies fire frequency of landscape and departure level of landscape conditions from historic conditions. See Appendix B for details on FRCC. Obtained through Forest Service/ Bureau Land Management Ecoshare web site: http://ecoshare.info/category/fire-regime-condition-class/

Management Considerations

1. There is interagency acceptance of the use of FRCC to identify the departure of forest conditions from historic ranges. FRCC is part of the decision-making process for the U.S. Forest Service and BLM under the Healthy Forest Initiative (HFI) and the HFRA direction. The Oregon Department of Forestry data information and reporting for indicators recognizes FRCC as an interagency, standardized tool for determining the degree of departure from natural (reference) conditions vegetation, fuels, and disturbance regimes.
2. This information will aid decision makers in determining whether the HFI and HFRA authorities are supported through FRCC conditions and the application of planned hazardous-fuel reduction projects or whether other authorities should be used.

3. This provides management with the amount of departure of landscape conditions from the natural regime. Departures that involve changes to one (or more) ecological components such as: vegetation characteristics, fuel composition, fire frequency, fire severity and pattern, and other disturbances such as insect and disease, drought, etc.

Fire Threat Attributes

Probability of Fire Occurrence

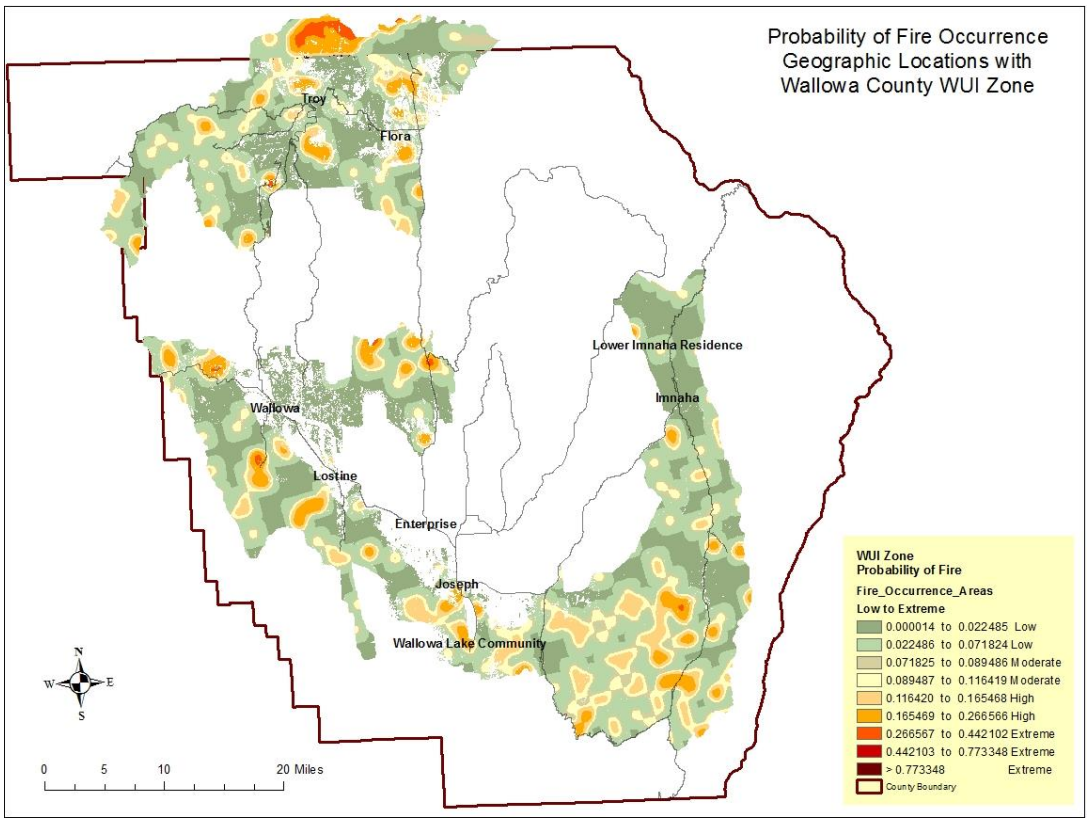


Figure VII – 3. Distribution and probability of fire ignitions in the WUIZ. The closer the numerical value is to the whole number 1, the higher the historic fire density and fire occurrence. WWRA layer clipped to Wallowa County WUIZ.. A subset of Fire Threat Index

Management Considerations

1. Knowledge of concentrated fire occurrence and ignition cause (human starts) allows fire managers to focus attention on public education programs such as: fire prevention and specific mitigations based on fire cause such as hunter fires, campfires, etc.
2. This is a critical attribute in the Fire Threat Index rating. The ability to identify areas on the landscape likely to have ignitions that overlap areas in need of fuel and vegetation management are opportunities for mitigations to change fire behavior.

3. This information provides possible opportunities for preplanning management decisions in advance of fires occurring.
4. Can be useful when combined with other attribute maps such as Values Impacted.

Canopy Base Height

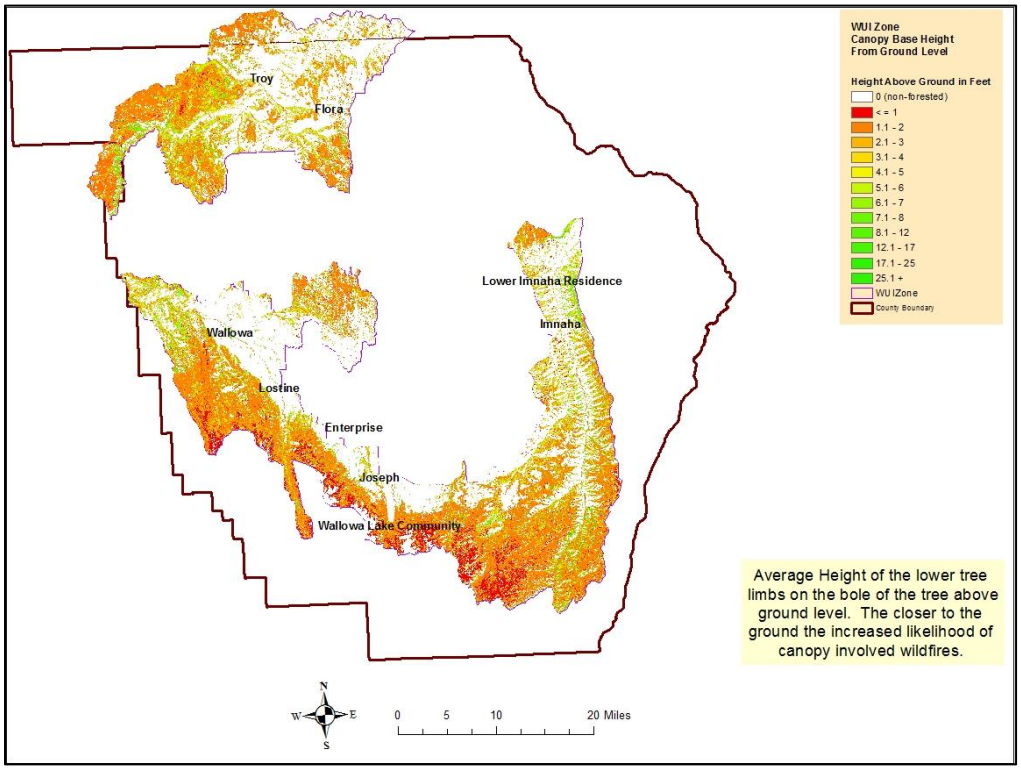


Figure VII - 4. Legend shows approximate height of tree canopy lower limbs from ground level in feet. The closer the limbs are to the ground, the higher likelihood of crown involvement during wildfires. A subset of Fire Behavior – Fire Threat Index.

Management Considerations

Height from the ground to the lower limbs of the live canopy, referred to as canopy base height, can influence what type of fire(s) the area will experience. Stands that have a low canopy base height are more susceptible to torching and canopy involvement during wildfires. Fifty-four percent (376,197 acres) of the *forested* areas in the WUIZ support canopies that are 10 feet or closer to the ground. Low canopy base heights provide conditions that: facilitate ignition of tree canopies; further compound fire spread through spotting; influences the likelihood of potential crown fires; and increase public and firefighter safety concerns.

1. This information is beneficial for assessing stand conditions that contribute toward canopy fires. This attribute is part of the input for fire behavior predictions in the WWRA. Canopy base heights assist managers with landscape locations where tree canopy conditions (of stands or groups of trees) may support or initiate fire movement vertically into the crowns of trees.

2. Provides locations of potential treatments areas, where raising the canopy base height can aid in reducing the likelihood of vertical fire spread.
3. Raising the canopy base height will also assist in meeting the CWS goal of restoring and maintaining the landscape. Historically, stands were frequently pruned naturally be wildfire. Stands that have a higher canopy base height can often withstand higher flame lengths and intensities, decreasing tree mortality in the overstory.
4. Strategically locating treatments may in effect also lower fire suppression costs and increase defensible space options.
5. Where applicable, combination treatments of surface fuels and canopy base height can result in the reduction in potential surface fire behavior and minimize torching potential, in effect lowering the spotting potential and fire spread distance.
6. Connect large open landscapes with neighboring grass slopes, natural barriers, or management created barriers (roads), for increased personnel safety and community protection. Treating overstocked dense landscapes will address the scale of treatment projects thus allowing middle ground areas and community boundaries to be treated simultaneously. Potential additional benefits from treatments include encouraging early seral species and promoting residual tree growth.
7. Creates opportunities for pilot projects that provide first-hand results for future management reference and opportunities for community education.
8. Opportunity for reintroduction of fire through prescribed burning on the landscape, particularly when weather conditions can be more favorable to low-intensity burning, and where middle ground areas can support it.

Surface Fuels

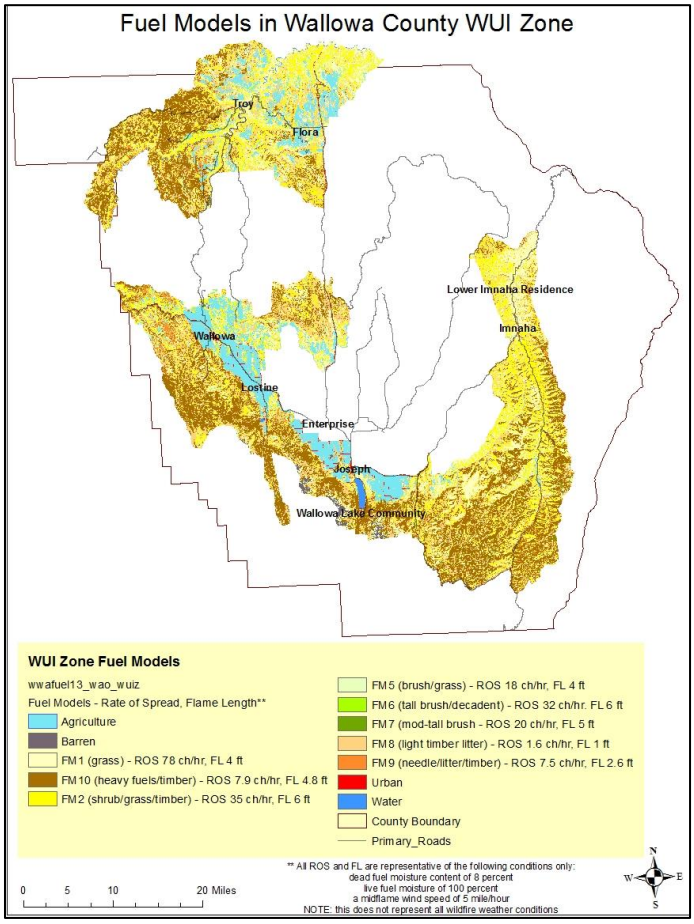


Figure VII – 5. Landscape fuel model distribution in Wallowa County WUIZ. Fire Behavior estimates are based on Hal E. Anderson's 13 Fuel Models for Estimating Fire Behavior, 1982. . A subset of Fire Behavior – Fire Threat Index.

Management Considerations - Surface Fuels

Knowledge of current fuel condition provides management with several options in addressing these issues.

1. Managers can conduct mitigation actions in areas where natural accumulations of down woody fuel loadings and forest surface vegetation are not consistent with historic conditions and contribute to fire behavior that can pose control issues and threaten communities.
2. Focus on areas with high fuel loads that can be a conduit for canopy involvement.
3. Combine treatment efforts to promote utilization of woody material during stand thinning by removing dead and down material.
4. Promote and maintain grass and forbs fuel in strategic areas where suppression tactics are crucial for protection. These fuels often respond quicker to suppression tactics (water application, fireline construction, day and night time

temperatures and relative humidities). Although fire can spread quickly in these fuel types, fire extinguishment often has a high success rate.

5. Provide opportunities for landscape planning to increase stand resiliency against wildfire.
6. Combine cross-ownership treatment of areas.
7. Establish pilot projects that provide first-hand results for future management reference and future opportunities in community education.
8. Connect large open landscapes with neighboring grass slopes, natural barriers, or management created barriers (roads), for increased personnel safety and community protection.
9. Opportunity for reintroduction of fire through prescribed burning on the landscape, particularly when weather conditions can be more favorable to low-intensity burning, and where middle ground areas can support it.

Probability of Canopy Fire

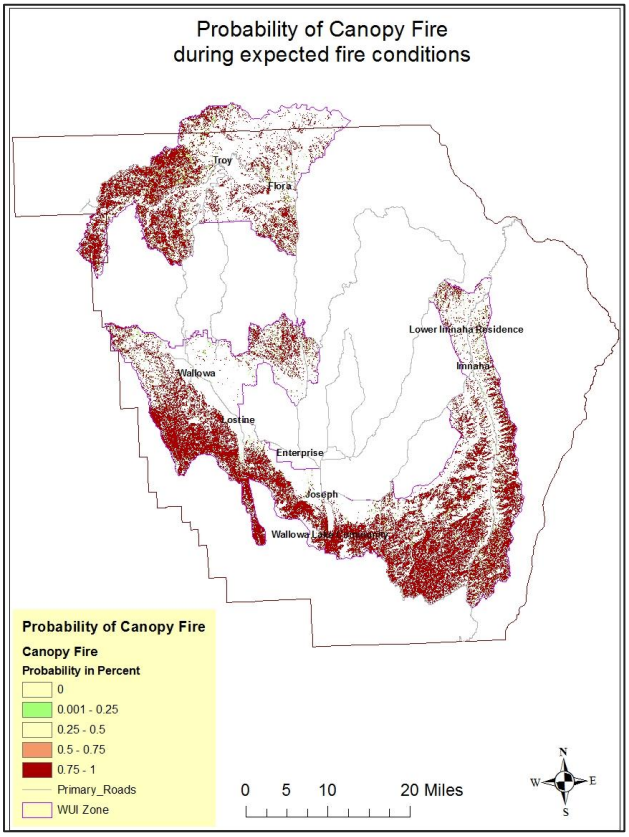


Figure VII – 6. Probability of canopy fire under all four weather percentile conditions. .
A subset of Fire Behavior – Fire Threat Index.

Management Considerations – Canopy Fuels

Probability of canopy fire is directly correlated to canopy base height and surface fuel amounts. Fuels management in forest ecosystems with low and mixed-severity fire

regimes can be designed to improve survivability of trees following wildland fires, restore forest structure, and improve the success of fire suppression efforts.

Knowledge of canopy fuels provide management with several options in addressing these issues.

1. Identifies areas in which lower limbs of overstory trees contribute to and provide a conduit for fire spread into the crowns.
2. Opportunities to treat suppressed understory (ladder fuels) to modify fire behavior, reduce spotting potential, and improve fire containment.
3. Design innovative ways to utilize material whenever possible.
4. Plan projects/treatments strategically where landscape changes will alter fire spread toward communities, providing increased opportunities for successful suppression.
5. Thin stands to break up horizontal continuity of tree crowns, particularly where canopy fires can occur over large areas.
6. As needed, design landscape treatments to facilitate active fire suppression at predetermined locations for all tactics.
7. Collaborative efforts between landowners for cross-boundary mitigation efforts.

Combined Surface and Canopy Fuels Considerations

Managers can develop pre planning options based on expected weather and known topographic conditions, but altering these attributes prior to ignition in an effort to influence fire behavior is unrealistic. Dead woody debris and live vegetation, however, can be manipulated and treated in advance of an ignition to alter fire flame lengths and rates of spread, thus increasing opportunities for suppression resource effectiveness and a more desirable post-fire outcome. Additional information of fuels models and canopy fuels can be found in Chapter VI.

Although behavior and effects of wildland fires can be changed within a particular treatment unit or stand, the behavior and progress of a much larger fire may not be affected by small treatment units (Finney 2004). Approaching fire behavior modifications on a landscape scale is likely to provide the most effective approach. Strategically placed treatments can provide a wider range of landscape impacts, suppression opportunities, and modifications of wildfire behavior. Mark Finney, research forester at the Rocky Mountain Research Station Fire Science Laboratory in Missoula Montana, utilized simulation models as a tool to evaluate the effects of management of vegetation and forest has on large fire growth and behavior (Finney 2004). Finney table below identifies the general relationship of fuels treatment and their intended changes to fire behavior in the following table. A detailed table was developed in Appendix K.

Fuel target	Prescription	Change in fire behavior
Surface fuels (live grass and brush, and dead and downed woody material)	Prescribed burning, mechanical treatments remove, compact, or reduce continuity of surface fuels	Reduced spread rate and intensity, and limit ignition of tree crowns and other aerial fuels

Ladder fuels (small trees, brush, low limbs)	Thinning (small-diameter trees) and prescribed burning (scorching and killing small trees and brush) to decrease vertical continuity between surface and crown fuels	Limit ability for fire to transition from surface to crown fire by separating surface fuels from crown fuels
Canopy fuels (fine fuels like needles, and small twigs in tree crowns)	Thinning to reduce horizontal continuity of crowns (e.g., overstory thin)	Limit spread of crown fire

Table VII - 2. Fuel Treatment and Fire Behavior. This is Table 7 taken from Mark A. Finney's, Chapter 9: Landscape Fire Simulation and Fuel Treatment Optimization of the General Technical Report 610. Table displays the general relationships among fuels, prescriptions, and intended changes to fire behavior from fuel treatments.

Expected Fire Flame Length and Rates of Spread

Since fire behavior is influenced by fuels (live and dead), weather, and topography, management's influence is primarily applicable to fuels in modifying fire behavior. Knowing what the expected fire behavior is provides opportunities for most effective fire behavior modification. Flame length and rate of spread are both subsets of Fire Behavior – Fire Threat Index.

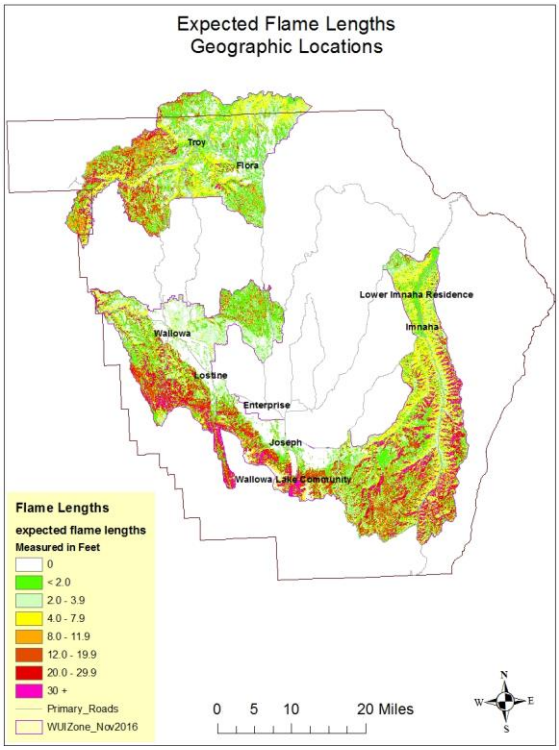


Figure VII – 7. Expected flame lengths under typical weather and fuels conditions. Weighted average of all four weather categories.

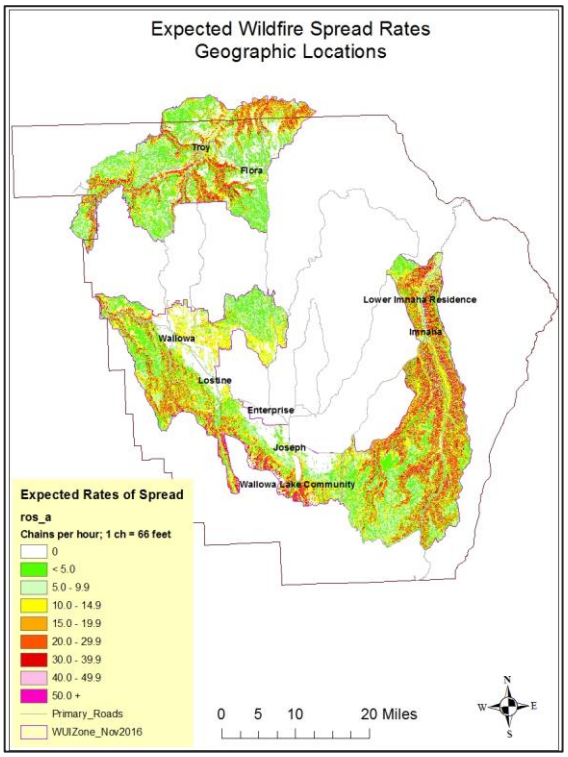


Figure VII -8. Expected fire spread rates under typical weather and fuel conditions. Weighted average of all four weather categories.

Worst Case (Most Extreme) Flame Lengths and Rates of Spread.

Approximately 98 percent of all ignitions in the forests of the northern Rockies and the east Cascade Range for which suppression is attempted are contained by initial attack (M. Finney, pers. comm., 4 February 2011 – Houtman May 2013). As a result, only approximately 2 percent of suppressed fires that escape initial attack spread on the landscape. Because most ignitions escape initial attack during weather events in which fire spread rates are high and fuel moisture is low (Houtman, et.al 2013), it is important to display the worst-case fire behavior during these weather events, based on the WWRA calculations. The WWRA considers extreme weather parameters to account for 1.77 percent of the fire starts with 6.17 percent of fire starts occurring under high conditions for the Wallowa County area. Conditions for how each of the four weather parameters (fuel moisture levels, wind, etc) influence fire behavior can be found in WWRA Addendum I, Weather Influence Zone OR-3508, page I-8.

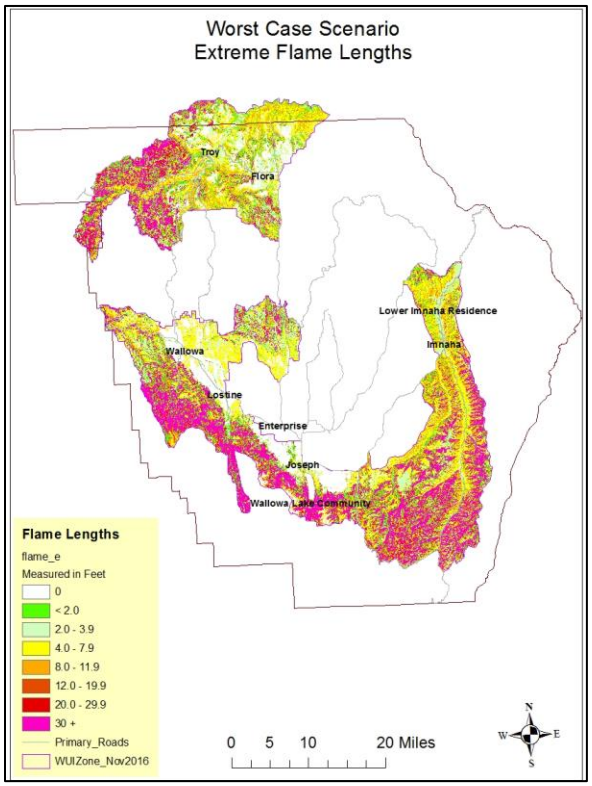


Figure VII – 9. Extreme Flame Lengths. Worst 3 percent of the summer weather conditions days.

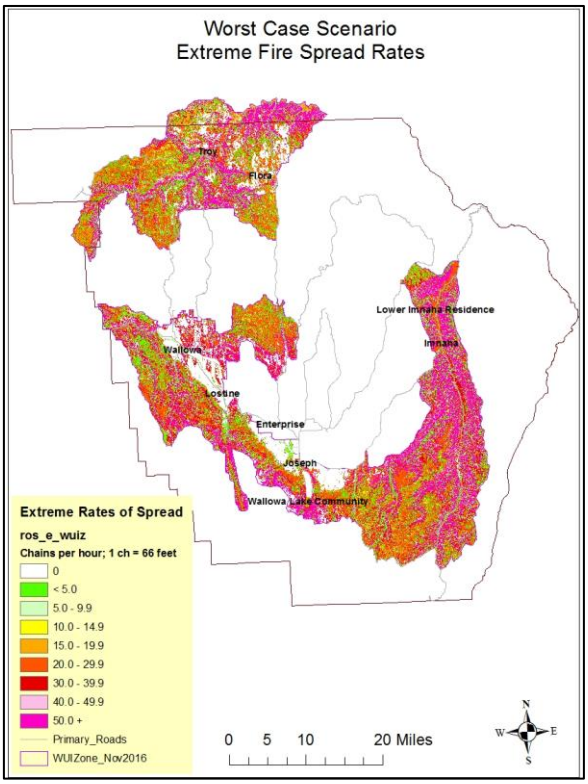


Figure VII – 10. Extreme Wildfire Spread. Worst 3 percent of the summer weather condition days.

The majority of the WUIZ under extreme weather conditions would sustain flame lengths that would prohibit hand crews and engines from successfully containing a wildfire. Live and dead fuel moisture parameters for worst-case conditions can be found in Addendum I of WWRA, weather influence zone (WIZ) OR-3508, page I-8.

Management Considerations

Human influences on fire behavior must focus on change to live and dead fuels on the landscape. Fuels, along with topography and weather, are the primary contributors to wildfire behavior. This leaves fuels as the primary emphasis in altering wildfire behavior. Using expected fire behavior outcomes with the canopy cover and fuels mapping can assist managers in identifying key areas that need attention.

1. Fifty-eight percent of forest/grasslands in the WUIZ are expected to exhibit flame lengths that will render hand crews ineffective and necessitate water engine or equipment type resources. Flame lengths play a significant role in tactical decisions for suppression resources. Flame length and fireline intensity are directly related to the effectiveness of control forces.
2. Flame lengths play a significant role in fire suppression strategies. Surface fires that exhibit flame lengths less than four feet can often be directly attacked by hand crews, meaning close proximity to flames by firefighters can occur and crew-constructed fire lines should hold. When flames are between four and eight feet in length, suppression resources typically include engines, dozers, and aerial support to provide for both firefighter safety and to ensure effective suppression efforts. See Table VII – 3.
3. Flame lengths and fire spread rates compromise safety of firefighters. Exposure limits of firefighters to heat plays an important role in overall suppression.

The following chart displays the impacts of flame length on what type of suppression resource is needed and the effectiveness of the resource. By addressing the various flame length heights, this CWPP adheres to Oregon Administrative Rule (OAR) 629-044-1045 (4) (a-c).

Flame Length Feet	Fireline Intensity BTU/ft/sec	Interpretation
< 4	< 100	 - Fires can generally be attacked at the head or flanks by persons using hand tools. - Hand line should hold the fire.
4 – 8	100– 500	 -Fires are too intense for direct attack on head of fire* by persons using hand tools -Hand line cannot be relied on to hold the fire. -Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 – 11	500 – 1000	 -Fires may present serious control problems due to torching out, crowning, and spotting. -Control efforts at the head* of the fire will likely be Ineffective.
>11	>1000	 -Crowning, spotting, and major fire runs are probable. -Control efforts at head of fire are ineffective.*

Table VII - 3. Fire Haul Chart information from Andrews and Rothermel 1982. Suppression resources are most effective with flame lengths less than 4 feet. Engines, dozers, and air support are needed between 4 and 8-foot flame lengths. * The head of the fire is the side of the fire perimeter exhibiting the highest rates of spread (leading edge), and often associated with the location where continuous flaming combustion is taking place.

Suppression Difficulty

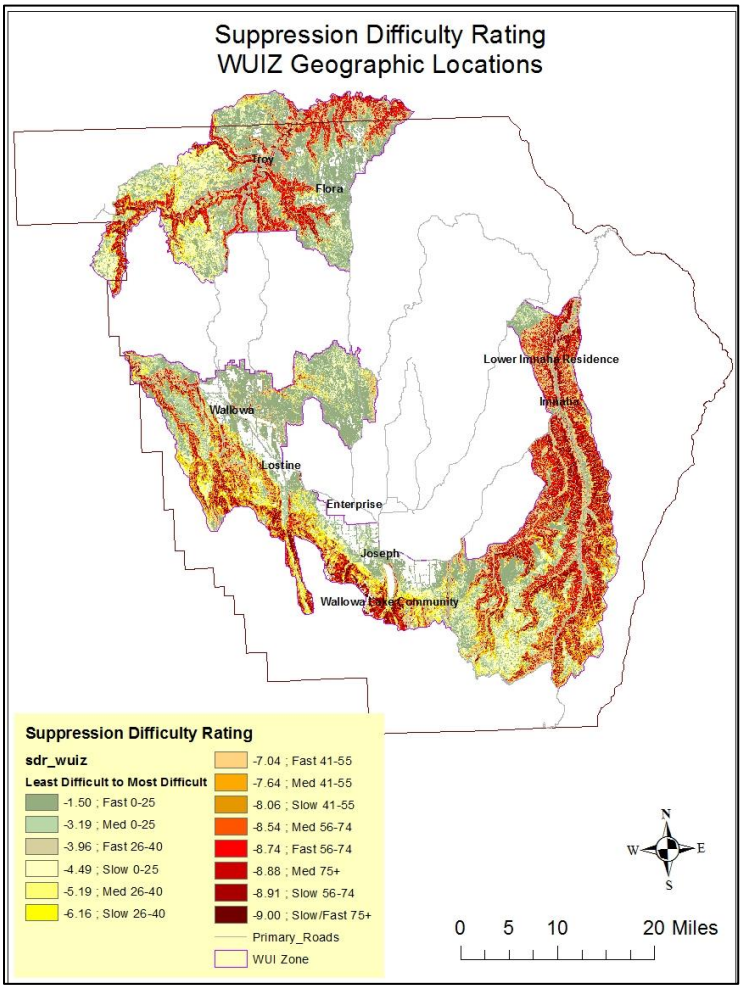


Figure VII-11. Suppression Difficulty Rating. Based on the fireline production rate categories of fast, medium, slow, with five breakouts of slope category combinations. . A subset of Fire Effects Index.

Management Considerations

Wildfire suppression capability of fire resources is primarily influenced by terrain steepness and the fuel type in which the fire is burning.

1. As slopes approach over 35 percent, suppression becomes increasingly difficult regardless of the fuels being consumed. This does not imply that fuels treatments would not be effective in modifying fire behavior but that fire resources have slower fireline production rates and are less effective due to slope steepness. In fact, these areas are particularly important to treat in advance of a wildfire.
2. Modifying wildfire behavior provides a higher success of defensibility at ridge tops and roads on steep slopes.
3. Understanding where the suppression difficulty occurs provides opportunities of preplanning of initial attack resources, particularly where high fire ignitions occur in relation to these difficult areas. A variety of vegetation management tools can be utilized in areas in which forest conditions influence fire behavior and impact

the ability of firefighting resources. Treatment of these areas can be beneficial for:
  - Connecting geographic areas in which suppression difficulty is low and creating opportunities for successful fire containment.
  - Application of diverse treatment types based on slope and fuels.
4. In addition, there is a higher level of successful suppression action when fighting a surface fire versus a canopy-involved fire. Canopy fires often lead to crews and engine suppression resources having to withdraw due to increased safety issues.
5. Knowledge of geographic locations that are critical for community protection in which treatments are not realistic and suppression efforts may be hampered provides opportunities to treat isolated blocks to break up fuel continuity to slow fire progress.

Values Impacted

Values impacted takes into account important aspects of the county that could potentially be negatively impacted from a wildfire. This evaluates five separate sub-layers data sets into a final Values Impact Rating. These layers include (in no specific order):

- Wildland Development Areas which represents where people live.

- Drinking Water Importance Areas includes municipal watersheds and basins that contribute to drinking water.

- Infrastructure Assets takes into account the primary access arterial routes, hospitals, schools, railroads, airports, utilities.

- Forest Assets allow for prioritization of landscapes reflecting assets that would be most adversely affected by fire in terms of how the vegetation will respond to wildfire based on three scenarios; Resilient, Adaptive, or Sensitive.

- Lastly, Riparian Assets identifies riparian areas that provide a variety of important ecosystems services including both terrestrial and aquatic habitat, water quality, water quantity, and other ecological functions (WWRA 2013).

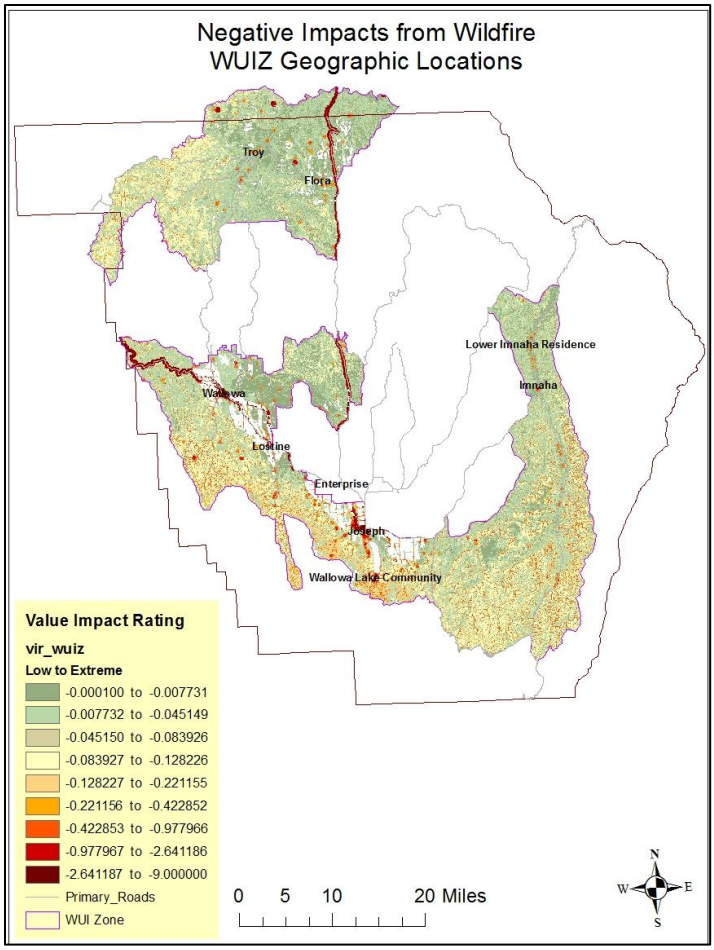


Figure VII – 12. Values Impacted Rating (ODF – WWRA 2013). Consolidation of multiple values such as wildland developed areas, drinking water, infrastructure, and forest and riparian assets. Negative impacts from wildfire increase as the Value Impact Rating moves from low to extreme. A subset of Fire Effects Index.

Management Considerations

Values presented are those areas (5 sub-layers data sets) deemed important and then evaluated to determine locations where they can be most negatively impacted by wildfire. The scores for each data set were combined into a single Values Impact Rating.

1. Provides areas where values will be most impacted. This knowledge allows for proactive mitigation actions to protect and prepare prior to a wildfire event.
2. Relative importance of values was provided by each state. Outcomes are based on Oregon State input.
3. Protection and mitigation can be prioritized by managers based on highest negative impact and locations where multiple values overlap.
4. Many areas identified as highest impacts also have a high potential for compromising public and firefighter safety. Travel routes, communications, and concentration of homes adjacent to wildland forest in particular.
5. Understanding where values will be negatively impacted provides opportunities for preparedness in advance. Knowing locations where wildfires could impede

access or suppression efforts can provide managers opportunities to develop alternatives prior to a wildfire event.

WUIZ and Wallowa County Structure Densities

The WWRA housing density is a key part of the Values Impact Rating. It captures where people live with the majority of the results falling in community areas . Rankings were based on the concentration of house per acre ranging from low to very high as per the WWRA.

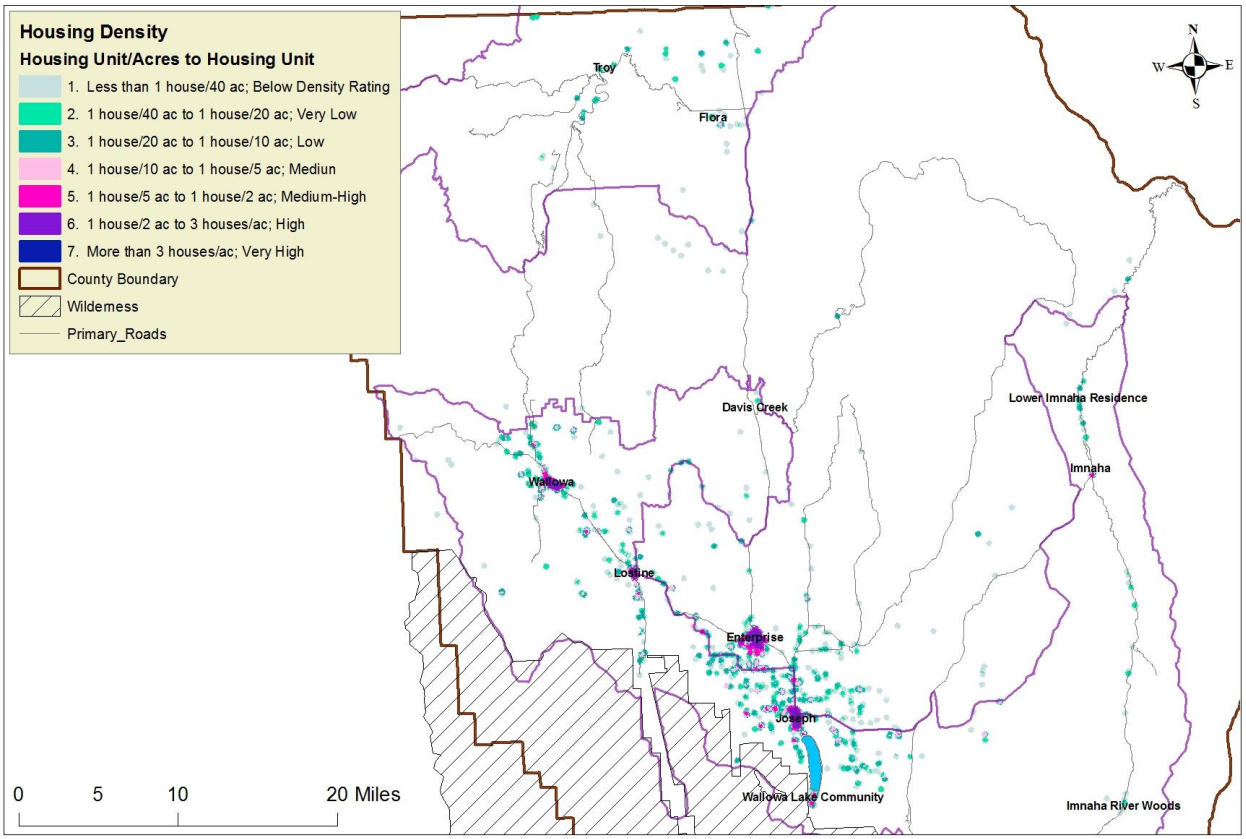


Figure VII – 13. Where People Live (Housing Units per Acre). Depicts the areas where a houses were detected based on LandScan population count data from the Department of Homeland Security, HSIP Freedom Dataset (WWRA 2013). This is a subset of Values Impacted Rating.

Local data provided by Willie Crippen was then examined separately to show the distribution of not only homes but other know structures in Wallowa County. Local data revealed a number of additional homes and outbuildings peppered throughout the county. These concentrations provide a county-wide view of structures not depicted in the WWRA. Figure VII – 14 shows the distribution of structures in Wallowa County using best available data. This approach supports the OAR 629-044-1060 (1) approach to classification of structures as Low, Moderate, High, and Extreme densities.

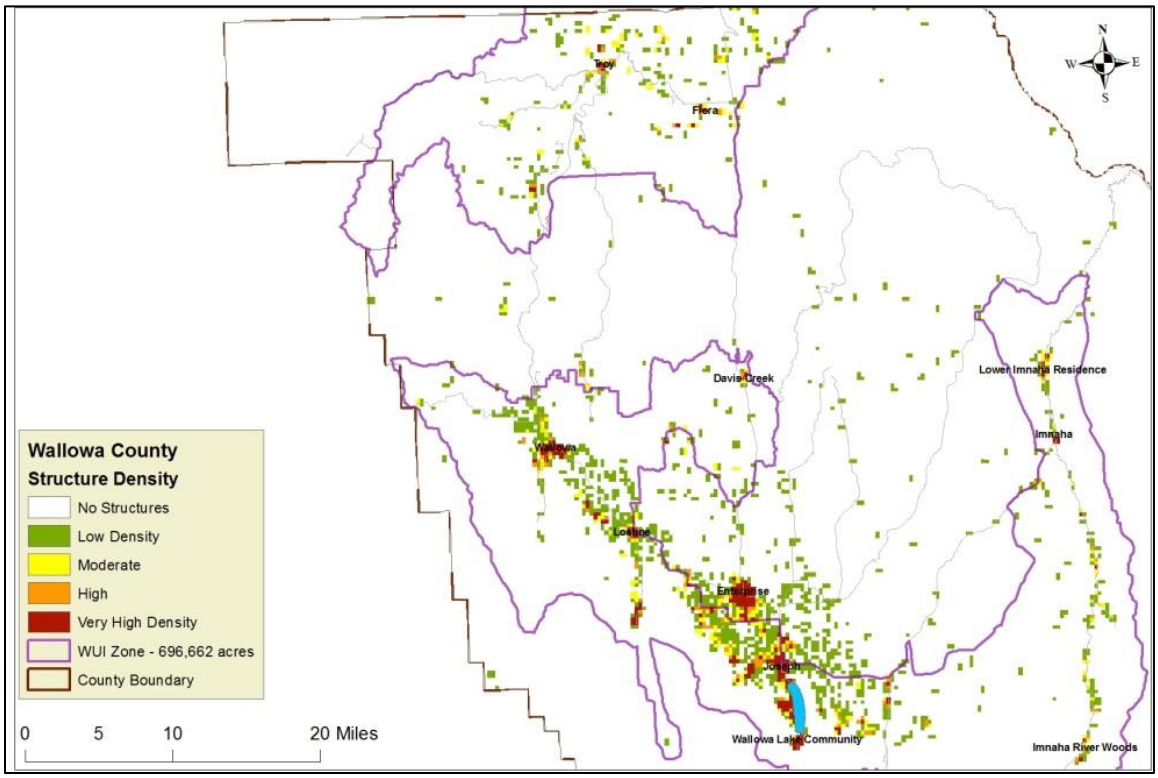


Figure VII - 14. Close up of structures surrounding the communities of Troy, Flora, Promise. Compares Wallowa County data-structure points and WWRA residential data.

Wallowa County has roughly 4,088 housing units, according to U.S. Census Bureau for the State of Oregon 2011 – 2015 five year estimate. Forty-two percent of the county's population lives in rural areas. Although county data does not delineate between the residential and outbuildings, it provides an indication of the number of additional structures peppered throughout the county.

Management Considerations

Residential homes in and near forested lands continues to increase making it increasingly difficult to assess already-existing properties and new construction. Wallowa County recognizes the importance of accurate knowledge of property conditions to better prepare and respond to wildfires. There is currently an effort to conduct a more accurate tri-county structure assessment that may be beneficial as a future addendum to this document.

1. Collaborative efforts with local cooperators, infrastructure companies, and other stakeholders can better prepare communities for emergencies. Offers possibility to combine efforts with those proposed to protect the overall values impacted.
2. As new structures and homes are built, continue to record and update pertinent information that may be beneficial for wildfire preparedness and response. This is

consistent with the Northeast Oregon Natural Hazard Mitigation Plan (NHMP) MH#12 Proposed Action for Wallowa County.

3. Administering programs that require standards for new development within a certain distance of forestland to meet Fire Siting Standards. Develop mitigations consistent with actions proposed in the NHMP for wildfire.
4. Opportunities to utilize a workforce to:
    - Record current residential locations, land conditions, access, and structures to better provide wildfire response. (Example: INTERRA)
    - Maintain records as conditions change.
    - Educate and assist landowners with wildfire mitigation
5. Develop avenues to reach out to homeowners to obtain property information regarding specific wildfire mitigation needs and accomplishments. The best available data leads to a higher level of wildfire response preparedness.
6. Unincorporated areas do not provide accurate data for census; these areas often have the longest fire response times.
7. Current information on residents can potentially change the CAR boundaries leading to changes in fire effects as well as changes in other attributes such as protection boundaries.
8. Administering programs that require standards for new development within a certain distance of forestland to meet Fire Siting Standards. Develop mitigations consistent with actions proposed in the NHMP for wildfire.
9. Opportunities to utilize a workforce to:
    - Record current residential locations, land conditions, access, and structures to better provide wildfire response. (Example: INTERRA)
    - Maintain records as conditions change.
    - Educate and assist landowners with wildfire mitigation
10. Develop avenues to reach out to homeowners to obtain property information regarding specific wildfire mitigation needs and accomplishments. The best available data leads to a higher level of wildfire response preparedness.
11. Unincorporated areas do not provide accurate data for census; these areas often have the longest fire response times.
12. Current information on residents can potentially change the CAR boundaries leading to changes in fire effects as well as changes in other attributes such as protection boundaries.

THREE PRIMARY OUTPUTS –

FIRE THREAT INDEX, FIRE EFFECTS INDEX, FIRE RISK INDEX

Fire Threat Index

This provides an index related to the likelihood of an acre burning. It integrates the probability of an acre burning and the expected final fire size, based on rates of spread in all four weather percentile categories into one single measure of a wildfire threat. It is a valuable input in displaying the "possibility of suffering harm or loss" (WWRA).

Overall Fire Threat

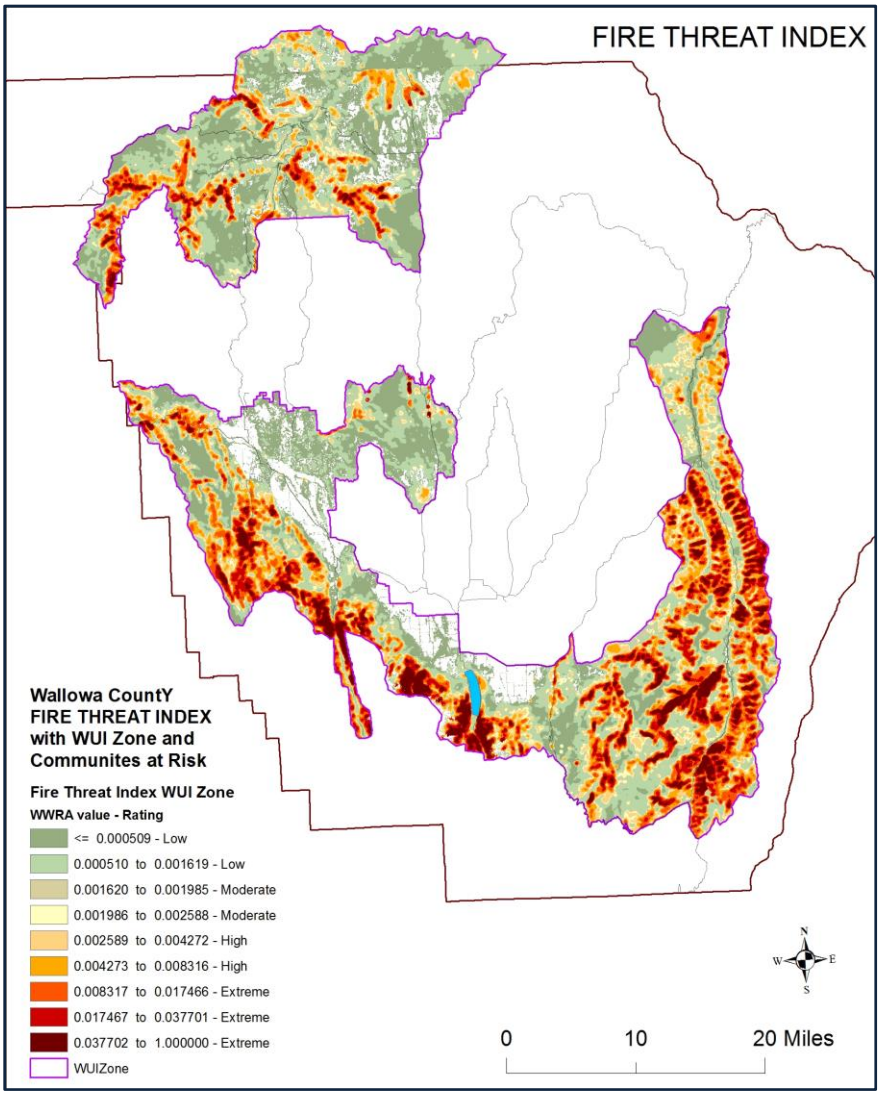


Figure VII – 15. Spatial distribution of low to extreme wildfire threat. Likelihood of an acre burning taking into account Probability of Fire Occurrence, Fire Behavior, and Suppression Effectiveness. Subset of overall Fire Risk Index.

Management Considerations

Weather, fuels, and topography are the three parts of the fire behavior triangle. Although humans can develop plans based on expected weather and topographic conditions, altering them prior to ignition in an effort to influence fire behavior is unrealistic. Dead woody material and live vegetation, however, can be manipulated and treated in advance of an ignition to achieve a more desirable outcome by altering fire flame lengths and rates of spread, increasing opportunities for suppression resources effectiveness.

Fire as a threat has also been identified as one of the hazards facing Wallowa County in the NHMP. The NHMP identifies wildfire as a common event to areas of central and eastern Oregon. It recognizes that wildfire is essential to the ecosystems, but also poses a serious threat to lives and property (Univ. of Oregon 2014).

Knowing where the fire threat exists is an important tool for managers in the decision-making process and provides several pieces of information for fire managers.

It provides knowledge of areas that can:

1. Be treated to reduce or manipulate available fuels to change fire behavior
2. Exhibit the highest threat potential near communities
3. Allow for priority setting by reducing fire ignitions, with focus on high fire start areas particularly where human caused starts occur
4. Highlight locations where fire suppression resources are likely to be most and least effective. This allows for preplanning prior to an ignition.
5. Offer opportunities to address multiple locations when utilizing funding for wildfire mitigations.

Areas of low fire threat *should not* be interpreted that these locations will not ignite and burn, it simply indicates that the threat is lower relative to the other geographic areas.

Fire Effects Index

Fire effects are used to identify those areas that have important values that can be affected by fire as well as to identify those areas that are difficult or costly to suppress. It is a valuable input in displaying the "possibility of suffering harm or loss" (WWRA). Fire effects takes into considerate a total of seven separate attributes that could influence the potential outcome of rating scores based on values impacted and suppression difficulty.

Fire Effects

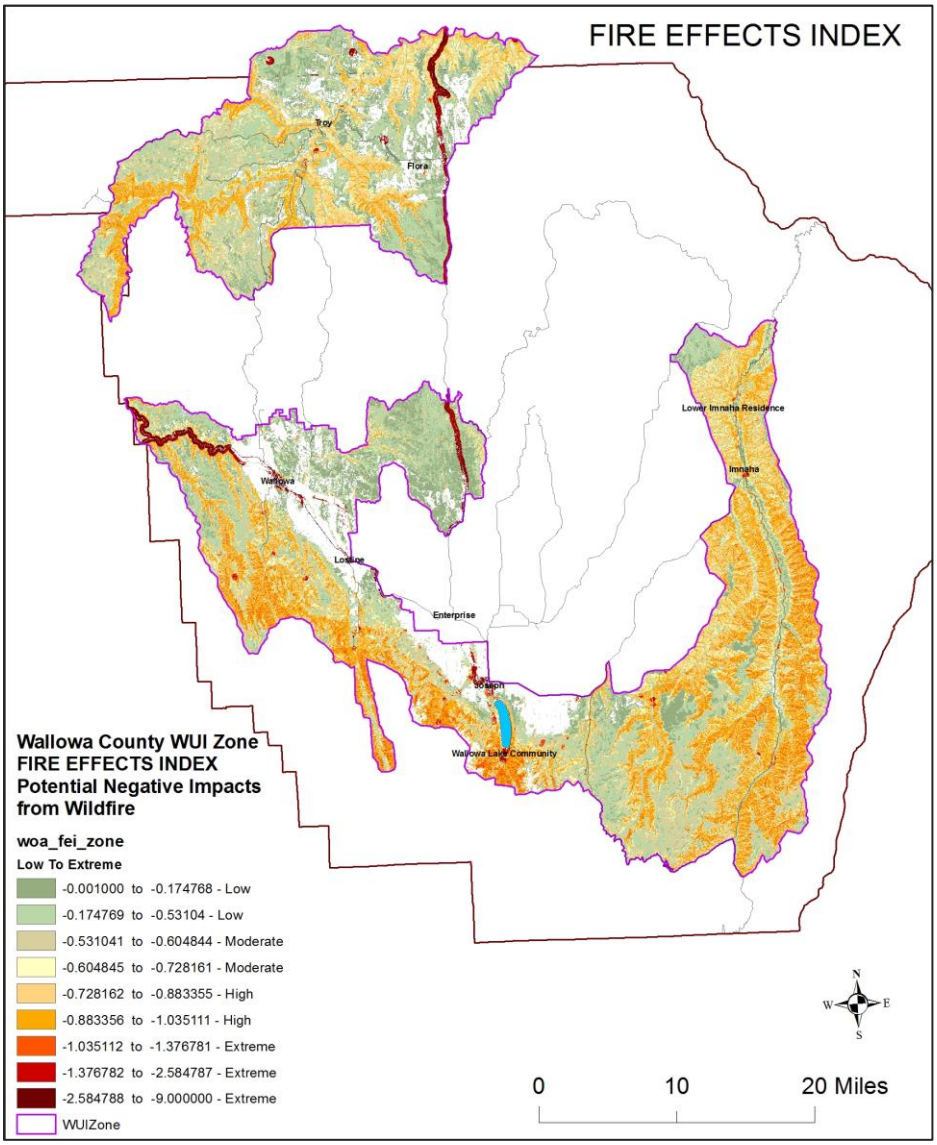


Figure VII – 16. Overall fire effects taking into consideration negatively impacted values and suppression difficulty based on fuels and topography.

Management Considerations

Knowledge of on-the-ground characteristics that impede fire suppression and locations of important values provides opportunities for advanced preparation to protect those values. This index can be used as a standalone tool for fire managers in the decision-making process both prior to and during wildfires for evaluating potential loss of valuable assets. Concentrating efforts to provide increased protection measures in advance of ignition will in turn decrease the likelihood of values lost. Again, fuels and vegetation are a subset of suppression difficulty and can be manipulated by management. Through examining detail mapping of communities and infrastructures, high potential locations can be identified.

Figure VII - 17 is a zoomed-in view of the Wallowa Lake/Ski Run area, pulled from the Fire Effects Index map. It indicates where high potential values and suppression difficulty areas are located, resulting in areas of highest negative impact from wildfires.

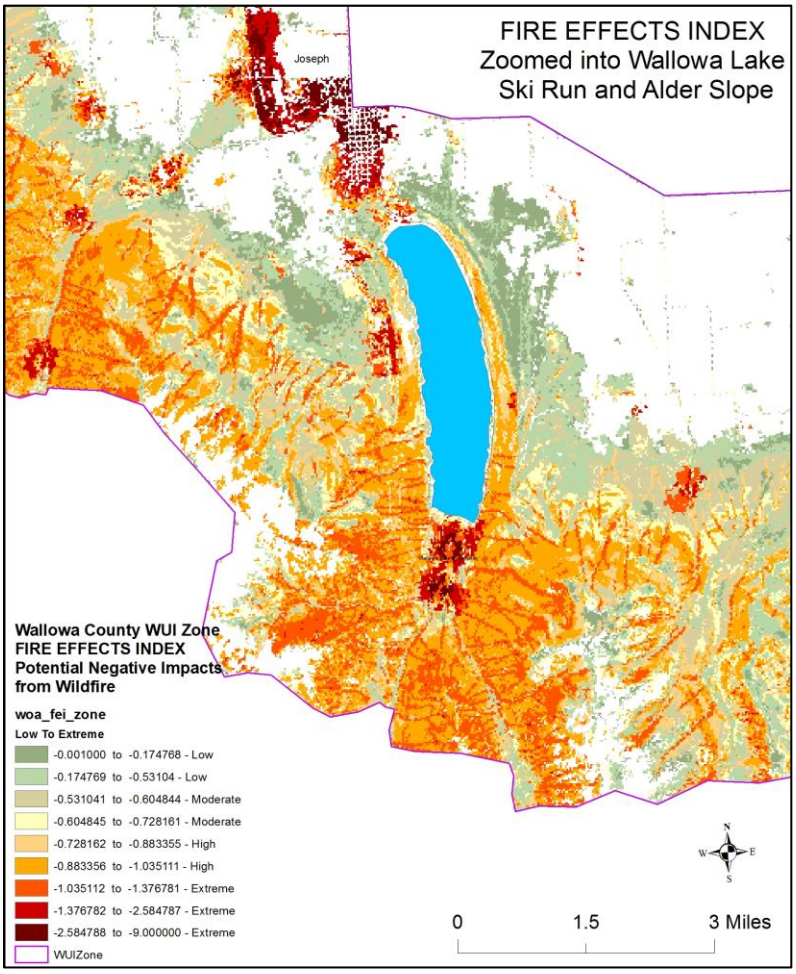


Figure VII - 17. Zoomed in view of Wallowa Lake/Ski Run. Dark red areas indicate highest negative impacts.

Values with the highest potential for loss within the county can give managers a starting point for planning. Knowing crucial areas of possible negative outcomes helps for prioritizing. The Fire Effects Index can allow managers to:

1. Prioritize locations for protection based on highest negative fire impacts to values.
2. Reduce or manipulate available fuels to increase effectiveness of suppression efforts since surface fuels loads and stand conditions are related to line construction rates and flame lengths. (A component of Suppression Difficulty sub-set is fuel type.)
3. Identify communities with highest threat potential for loss.
4. Assess potential for impacts and locations for future infrastructure placement in the county.
5. Recognize outlying infrastructures and wildland-developed areas that may otherwise not be part of an identified community.
6. Communicate and educate stakeholders and partners about high loss areas.
7. Re-evaluate protection protocols with other fire protection agencies.
8. Identify forest assets that are likely to be large-scale losses on the landscape and develop opportunities for breaking up homogenous stands to preserve ecological integrity.
9. Use an approach that supports and is consistent with the NHMP's goal to protect human welfare, property, and natural resources. Combining goals and objectives of this CWPP with the goals of the NHMP allows for consolidated efforts toward natural hazards where wildfire risk mitigation is concerned.

Individually Mapped Fire Risk Index Levels

Fire Risk Index

It accounts for all 19 sets of input data used in the WWRA and provides a final Fire Risk Index displays the measure of OVERALL FIRE RISK. The Fire Risk Index provides a number of opportunities to agencies and landowners.

1. This can be used to identify areas where mitigation options may be of value
2. Allows for agencies and landowners to work together and better define priorities
3. Displays the risks across a complex landscape and potential fire situations
4. Provides a foundation for common knowledge and improved communication for all landowners in addressing priorities and needs.

The overall wildfire risk was separated out into individual maps of each fire risk levels in the WUIZ providing the best visual appreciation of the landscape distribution.

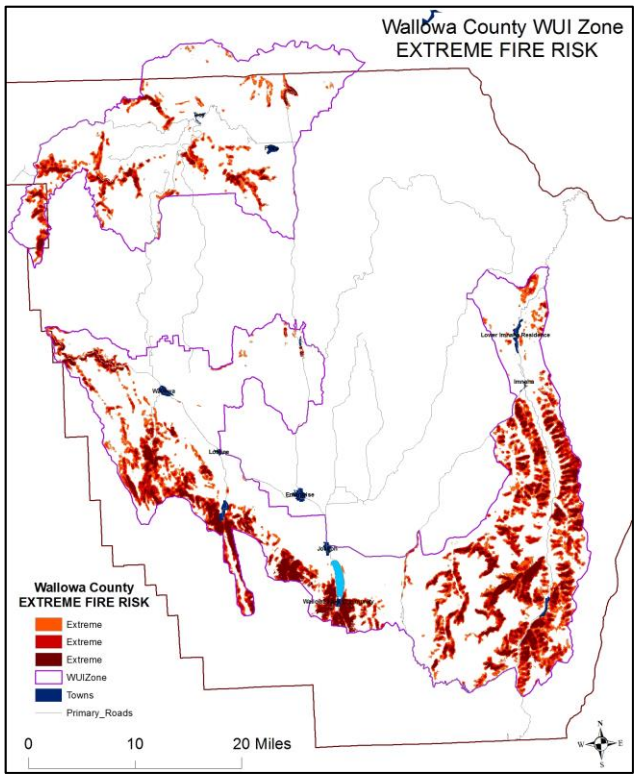


Figure VII - 18. Extreme Wildland Fire Risk within the WUIZ.

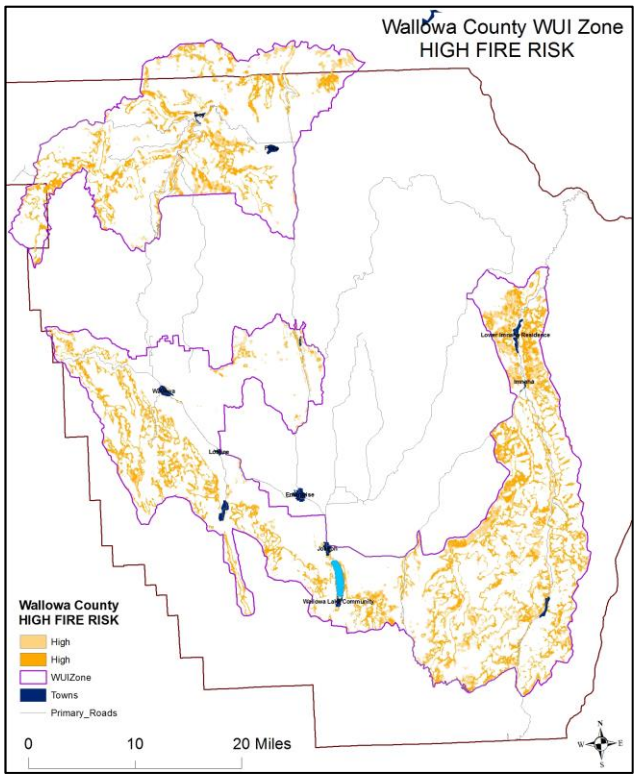


Figure VII – 19. High Wildland Fire Risk within the WUIZ

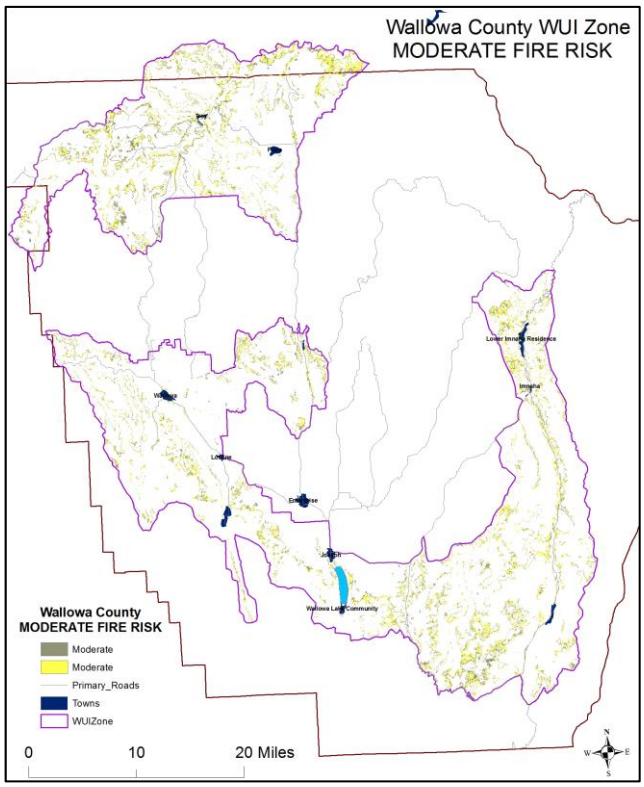


Figure VII – 20. Moderate Wildland Fire Risk within the WUIZ.

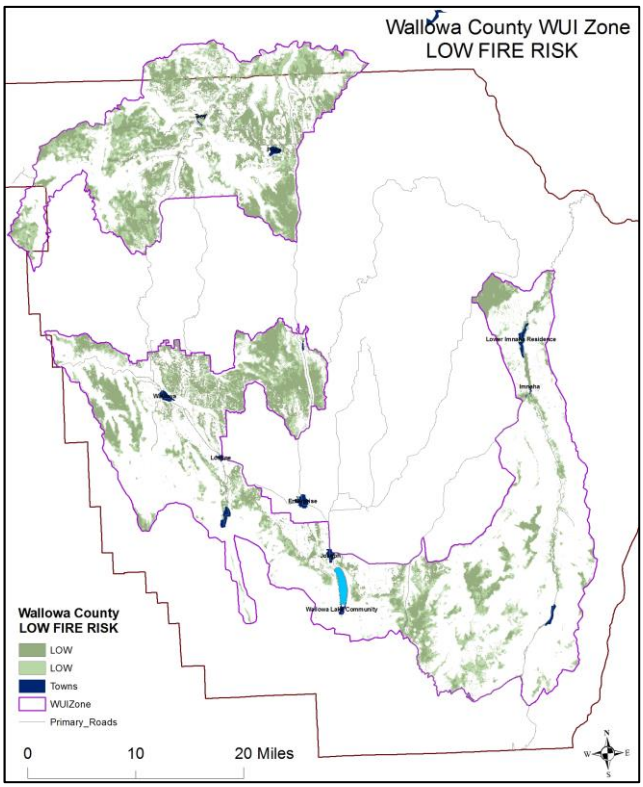


Figure VII – 21. Low Wildland Fire Risk within the WUIZ.

Management Considerations

The FRI can be used for multiple opportunities in efforts to reduce fire risk for the county. This allows for:

- Identifying areas where values and fire threat may be at their highest and mitigation options may be very effective.
- Allowing fire agencies and community members to work together and better define priorities where extreme risk areas flow between ownership.
- Visually communicating with local residents to address community priorities and need for altering fire behavior and protecting values.
- Implementation of mitigation actions where multiple objectives can be achieved.
- A means of developing classifications of low, moderate, high, and extreme for subsets of the three primary outputs of Fire Threat, Fire Effects, and Fire Risk (See next section below).
- Provides rationale and justification for allocation of funds for multiple locations and mitigation purposes.
- Creates opportunities to incorporate maintenance of lower-risk areas with extreme-risk mitigation activities. Protects investments previously made and supports HFRA guidelines.
- Combining efforts with the NHMP (Univ. of Oregon 2014) to address wildfire.
- Provides movement in a direction that accomplishes the goals of this CWPP and the CWS of: Wildfire Response, Fire Adapted Communities, and Restore and Maintain Landscapes.
- Identifies (geographically) areas that would potentially result in a need for post fire rehab and application of fire rehab funds through FEMA and other sources.

These processes provide Federal agencies some opportunities for treating these areas that are consistent with the Health Forest Restoration Act planning direction described below:

- The HFRA identified a WUI as 1 ½ miles from the boundary of an at-risk community. This area does not require the USDA Forest Service and Department of Interior – Bureau of Land Management (BLM) to analyze any alternative to the proposed action as long as the proposed action recommendations meet the general location and basic method of treatments outlined in this CWPP.
- Areas within the Wildland Urban Interface - for Wallowa County CWPP it would be within the WUIZ - but *farther* than 1 ½ miles from the boundary of an at-risk community, the USDA Forest Service and BLM are not required to analyze more than the proposed agency action and one additional action alternative (Section 104(d)(1)), (HFRA 2004). This area meets the "middle ground" locations consistent with the CWS.

To better display some of the important attributes of risk of a single area in the county the vicinity of Wallowa Lake and Ski Run road was used to zoom in and display the following conditions:

- the fire occurrence (fire start history and weather influence zones)
- the Fire Threat Index (Fire Occurrence, Fire Behavior, Fire Suppression Effectiveness).
- the Fire Effects Index (Values Impacted and Suppression Difficulty)
- the final Fire Risk Index

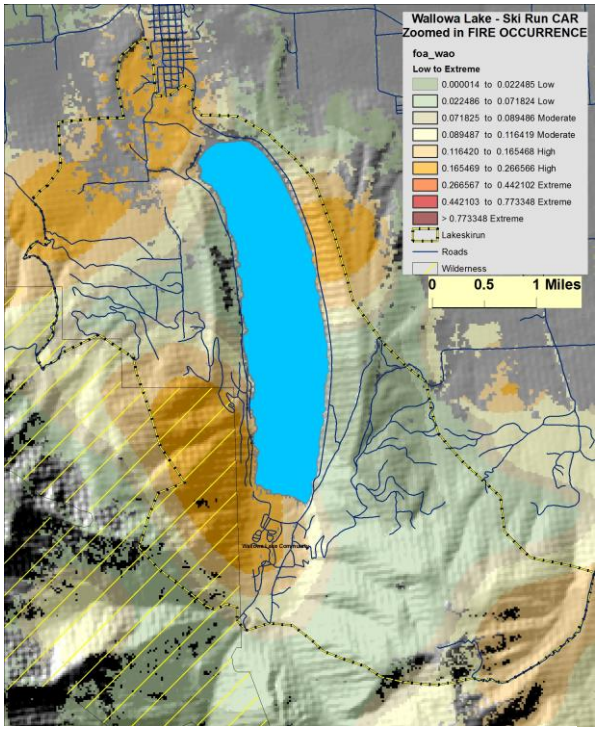


Figure VII – 22. Fire Occurrence Index for Wallowa Lake and Ski Run Community at Risk.

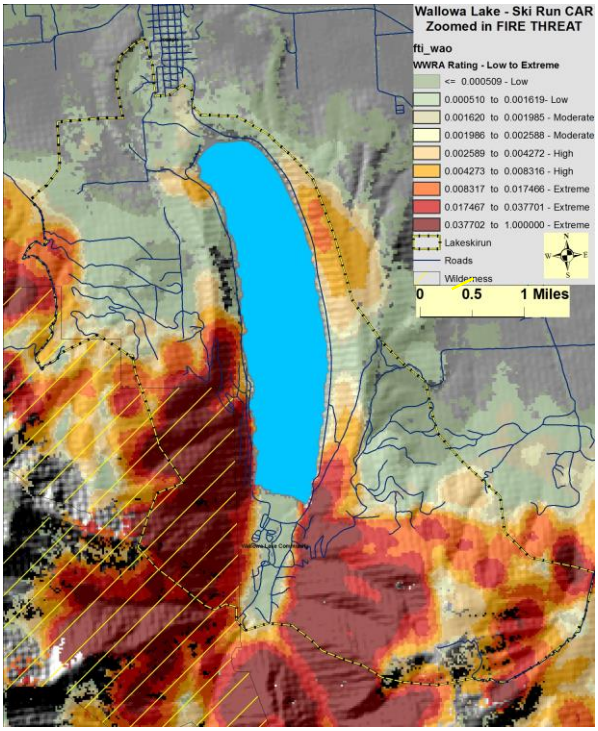


Figure VII - 23. Fire Threat Index for Wallowa Lake and Ski run Community at Risk.

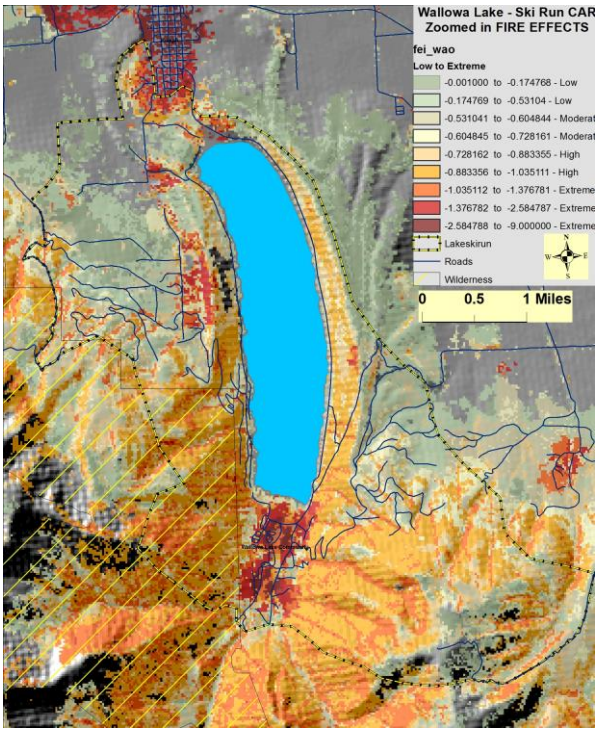


Figure VII - 24. Fire Effects for Wallowa Lake and Ski Run Community at Risk

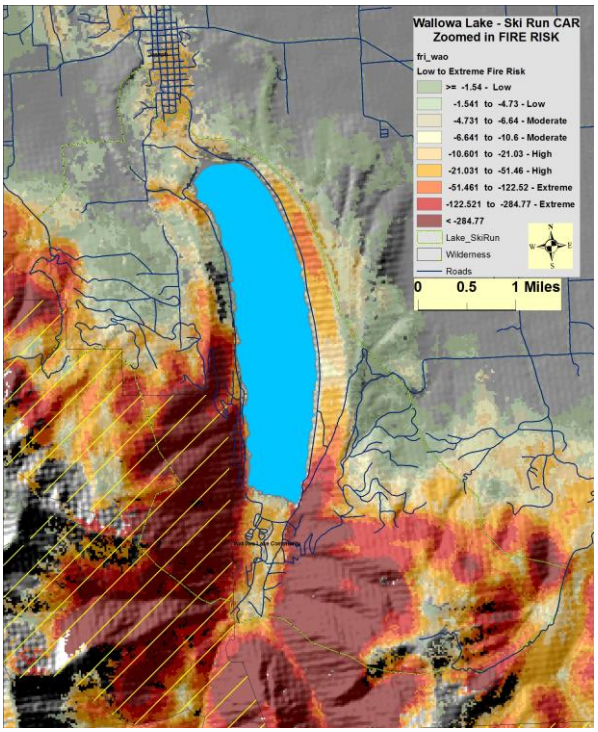


Figure VII - 25. Overall Fire Risk for Wallowa Lake and Ski Run Community at Risk

WUIZ Percent of Land Coverage - Current Condition Level

	WUI ZONE ASSESSMENT												
	Condition Contributing to Fire Behavior Percent (%) of WUI Zone					Wildland Fire Potential Percent (%) of WUI Zone							
Rating Level	Fire Occurrence	FRCC	Fire Type (% of WUIZ)	Canopy Base Height (WUIZ forested areas only)	Suppression Difficulty (Ag land not included)	Flame Lengths (11% of low – Ag . land)	Rate of Fire Spread (13% of low – Ag . land)	Probability of Canopy Fire (62% non-burn or surface fire)	Values Impacted	Fire Threat (Ag land not included)	Fire Effects (Ag land not included)	Fire Risk	
Extreme	6	CC -III 36	Active 27	82	25	21	4	35	2	23	2	27	
High	14	CC - II 31	passive 10	13	21	19	15	0	7	19	36	24	
Moderate	23	CC - I 24	Surface 7	3	22	22	24	0	33	11	22	12	
Low	57	9	No-burn 56	2	32	38	57	3	58	47	40	37	

Table VII - 4. WUI Zone Risk Level Area Coverage. All numbers reflect the % of land area covered by each of the four ratings within the WUI Zone. A breakout of county wide acres for Fire Threat, Fire Effects, and Fire Risk can be found at the end of Chapter VI.

Summary

It was important for the CWPP committee to have the three goals of the CWS as a primary focus to successfully implement this plan. Wildfire resource response can be limited when high spread rates and flame lengths are generated. Fire behavior can also impact resilient landscapes resulting in high severity (high mortality to overstory vegetation) impacts when a fire occurs under high but particularly extreme conditions under current landscape conditions. A collaborative approach to fire adapted communities is needed in order to prevent loss of life and property.

Since fire behavior is directly influenced by fuels, weather, and topography, landowners and fire managers are limited in options making fuels modification key to be effective in changing wildfire behavior. Fuels such as: dead forest woody material, live forest vegetation, structures, and any combustible material that may burn in the event of a wildfire. There are opportunities to modify fuels through a wide range of approaches discussed in the following chapters.

In areas where modifications have occurred emphasis in retaining the investment and stand conditions may supersede a higher risk area if circumstances warrant and rational can be provided particularly in meeting the goals and objectives of this document.

Fire protection and structure vulnerability are central to improving fire adapted communities and wildfire response with some lessor degree of emphasis on resilient landscapes. Mitigation measures tiered to geographic areas will assist fire managers in understanding the areas where application of efforts can be most effective.

CARs are scattered across Wallowa County both in and out of the WUI Zone. Recognizing that these communities, regardless of location, are challenged by their own set of wildfire issues gives protection agencies and landowners insight on application of mitigation tools. Increasing the collaborative efforts between structure protection authorities and land protection authorities will improve fire protection capabilities.

Conditions and issues facing the CARs can be addressed to achieve multiple objectives or as standalone treatment approaches for fire protection. CARs are delineated to meet management direction and identifying fire protection capabilities. It is important however to recognize, like wildfires, that mitigation measures do not stop at property lines and projects should be approached with a landscape concept. Although areas outside the CARs and WUI Zone are not specifically addressed, it does not imply that issues don’t exist, therefor when appropriate expand projects to benefit all of Wallowa County.

Understanding how landscape conditions are linked together to influence fire behavior, suppression success, and public and fire safety can provides critical insight for fire managers and landowners during the decision making process. Landscape characteristics are the building blocks that lead to the various levels of wildfire risk. These landscape characteristic are not standalone issues but provide opportunities to

address multiple underlying attributes that contribute to wildfire risk. To mitigate fire risk, it is important to know which characteristics can and should be modified, and realistically will make a difference once modified, and what the resultant outcome will likely be.

The WUI Zone provides a larger geographic image of conditions, allowing for potential use of single funding sources to be applied in multiple locations on the ground that meet identified criteria. Focusing on areas across the WUI Zone, of similar issues, increases the likelihood of meeting the “all hands all lands” approach. Understanding the “big picture”, land managers should be opportunists taking advantage of areas that; currently meet the low fire risk rating by building on these locations and preserving the lower risk conditions; link nearby low ranked areas with high, extreme risk areas to increase areas of suppression success with likely limited funding sources; are located outside CAR and WUI Zone boundaries to address remaining landscapes of Wallowa County.

Landscape concepts can establish increased opportunities for cross-boundary efforts with minimal funding. Landscape conditions, along with local knowledge can provide the basis for the mitigation actions outlined in the next chapter. Application of mitigation measures can occur where multiple resource objectives can be met or a single objective is achieved to meet the three goals of the CWS.

Bibliography

Andrews, Patricia L. and Rothermel, Richard C. 1982. Charts for Interpreting Wildland Fire Behavior Characteristics. Intermountain Forest And Range Experiment Station Ogden, Up 84401. General Technical Report INT-131. September 1982.

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

M. Finney, pers. comm., 4 February 2011. As per Houtman, R. M., C. A. Montgomery, A. R. Gagnon, D. E. Calkin, T. G. Dietterich, S. McGregor, and M. Crowley. 2013. Allowing a wildfire to burn: estimating the effect on future fire suppression costs. International Journal of Wildland Fire. Journal compilation © IAWF 2013. http://dx.doi.org/10.1071/WF12157

Finney, M.A. 2004. Chapter 9, Landscape fire simulation and fuel treatment optimization. In: J.L. Hayes, A.A. Ager, J.R. Barbour, tech. eds. Methods for integrated modeling of landscape change: Interior Northwest Landscape Analysis System. PNW-GTR-610: 117-131.

Finney, M.A. 2001a. Design of regular landscape fuel treatment patterns for modifying fire growth and behavior. Forest Science. 47(2): 219-228.

HFRA 2004. USDA Forest Service and DOI Bureau of Land Management. The Healthy Forests Initiative and Healthy forests Restoration Act, Interim Field Guide. FS-799.

Houtman, R. M., C. A. Montgomery, A. R. Gagnon, D. E. Calkin, T. G. Dietterich, S. McGregor, and M. Crowley. 2013. Allowing a wildfire to burn: estimating the effect on future fire suppression costs. International Journal of Wildland Fire. Journal compilation © IAWF 2013. http://dx.doi.org/10.1071/WF12157

MOU 2003. Memorandum of Understanding for The Development of a Collaborative Fuels Treatment Program among the USDA Forest Service, US Department of Interior – Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, national Associations of State Foresters, and the National Association of Counties.

Oregon Department of Forestry, 2013. *West Wide Wildfire Risk Assessment, Final Report – Addendum I*, Detailed Technical Methods March 31, 2013. The Sanborn Map Company, 2012.

Oregon Department of Forestry 2014. Senate Bill 357, Report to the Legislature, Federal Forest Management, Oregon Department of Forestry. May 2014.

University of Oregon 2014. *Northeast Oregon Multi-jurisdictional Natural Hazards Mitigation Plan.* University of Oregon's Community Service Center: Resource Assistance to Rural Environments and Oregon Partnership for Disaster Resilience.

US Forest Service 2015. Fiscal Year 2016 Budget Overview. United States Department of Agriculture.

Web Links:

Merriam-Webster 2016. http://www.merriam-webster.com/dictionary/risk

OAR 629 – 044 http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_044.html

U.S. Census Bureau 2017.
https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk

VIII Mitigation Action Items and Opportunities

Introduction

Wallowa County is positioned in an area of Oregon that is considered prone to high wildfire risk based on historic and current data. The weather influence zone (WIZ) that Wallowa County is part of has the second highest number of acres burned annually of all the WIZ's in Oregon according to the Addendum I, Table 1-10 of the WWRA. Since 1985 Wallowa County fire starts average close to 50 per year. Local residents have become accustomed to the fact that thunderstorms in the summer have a high potential for resulting in wildfires on the landscape. This chapter addresses how fire managers and community members can work together to successfully live in a fire adapted ecosystem.

This chapter is designed to disclose risk assessment issues identified within Wallowa County. It covers issues brought forward during collaborative meetings between the CWPP committee and local fire protection agencies, cooperators, and members of the public. These issues helped guide the development of mitigation action items. The overall process is tiered to policies and guidelines that provide directions at the national, state, and local levels. This tier down approach paves the way for implementing wildfire risk mitigation strategies at the local level in order to protect life, property, and ecosystems.

Policies

- National, state, and local policies and guidelines that describe overall goals and objectives regarding wildfires in the wildland urban interface and communities at risk. Addresses the direction and need for wildfire risk assessments and wildfire mitigation through documents such as a Community Wildfire Protection Plan, Hazard Mitigation Plans, or Geographic wildfire risk assessment.

Community Wildfire Protection Plan

- Local community collaborative risk assessment identifying goals, objectives, conditions, and recommendations for wildfire mitigation. Identifies "issues" facing the assessment area that contribute to the inability to meet those goals and objectives.

Wildfire Risk Mitigation

- A process of reducing or alleviating loss of life, property, ecological function, and potential injury resulting from wildland fire, through overall risk assessment, providing strategies addressing temporal and/or spatial efforts, and improving planning and implementation processes in order to meet goals and objectives.

Action Items

- A specific recommendation, project or act/task utilized to achieve an outcome or desired result. These take into account the method by which mitigation strategies are carried out.

Guidance toward Mitigation Measures

The CWS has identified at a national level five basic factors that determine when, where, and how intensely wildfires burn: climate, topography, vegetation, ignitions, and suppression. Of these, three factors can be directly influenced by fire management – vegetation, ignitions, and suppression. Two of the factors, climate and topography, are realistically beyond the influence of wildland fire managers, but they cannot be ignored (CWS 2014).

Nationally there are four challenges that are considered high-priority barriers and critical success factors: managing vegetation and fuels; protecting homes, communities and values; managing human-caused ignitions; and effectively and efficiently responding to wildfire (CWS 2014). These challenges also apply locally when implementing pre and post wildfire mitigations.

Mitigation action items are supported by both local and national plans outlining recommendation and expectations needed to meet the policies and guidelines. These referencing documents are identified below with a description of how each supports the mitigation concepts within the CWPP. Many of the policies and guidelines also support one or more goals of this plan, which are: 1. Wildfire Response, 2. Fire-Adapted Communities, 3. Resilient Landscapes.

Mitigation measures are not exclusive to pre-fire events; part of mitigation is the reduction of short-term and long-term recovery and reconstruction costs and increased potential for state and federal funding for recovery and reconstruction projects (NHMP 2014). Alleviating impacts once a fire has occurred is critical to rebuilding communities. The CWS addresses wildfire recovery as an important part of its three goals. The core of landscape resiliency is sustainability, resistance to, and recovery from disturbance. Another critical concern of the CWS is the capacity of a community to prepare for, respond to, and recover from a wildfire event.

A corresponding number was assigned after each bullet to show which of the three goal(s) is being supported in reference to mitigation efforts.

The National Cohesive Wildfire Strategy

a. Addresses the importance of promoting community and homeowner involvement in planning and implementing actions to mitigate the risk posed by wildfires. (1) (2)
b. Recommends pursuing municipal, county, and state building and zoning codes/ordinances that mitigate fire risk to protect life and property. (1)(2)
c. Uses mitigation strategies that ensure protection of infrastructure and values such as: watersheds, cultural, recreational sites, transportation, utilities, communities, etc. (1) (2)
d. Connects with local experts to *sustain* mitigation efforts. (2)(3)

The Regional Natural Hazards Mitigation Plan for Northeast Oregon has a mission of: "*Create a disaster-resilient Northeast Oregon".* It supports mitigation efforts by:

a. NHMP 201.6(c)(3) – Mitigation Strategy. The plan shall describe goals to reduce or avoid long-term vulnerabilities to identified hazards, shall identify and analyze mitigations actions and projects being considered, and shall describe how identified mitigation actions will be prioritized, implemented and administered. Include an action plan for each CAR to help create more Fire Adapted Communities. (1), (2)
b. Maintaining that mitigation is the responsibility of the "Whole Community" – individuals, businesses/industries, state/local government, federal government. (2)
c. Recognizing the need for pre- and post-disaster mitigation project grants. (1),(2)
d. Reduces the risk from natural hazards by identifying resources, information, and strategies for risk reduction. (1)
e. Wallowa county wildfire probability being ranked at the highest level and ranked a moderate for fire vulnerability according to the Hazard Mitigation Plan. Probability and vulnerability are described on Page iv of the Northeast Oregon NHPMP, 2014.
f. Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short and long term recovery and reconstruction costs.

The National Wildfire Coordinating Group through *Wildland Urban Interface Wildfire Mitigation Desk Reference Guide* 2014

a. Provides a reference to assist with integrating wildland urban interface mitigation principles into national wildland fire training. (1)
b. Promotes common wildfire mitigation language and culture. (1)
c. Recognizes Fire adapted communities, Firewise, Ready Set Go, Living with Fire. (2)
d. Recognizes the national CWS.
e. Promotes the concept of "Whole community approach". (2)
f. To become a fire adapted community is a continuous process that requires maintenance and adaptation to ensure actions are effective. (2)

Presidential Policy Directive/PPD-8, 2011. Directive PPD-8 recognizes wildfire threat as one of priorities of natural disasters and threats to the nation.

a. National Preparedness in terms of threats, including natural disasters encompassing actions taken to plan, organize, equip, train, and exercise to build

and sustain the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats. (1),(2), (3)

b. Identify risk of specific threats and vulnerabilities including objectives to mitigate that risk.
c. Includes integrated planning that covers: prevention, protection, mitigation, response, and recovery. (1), (2), (3)

CRF-2011-title44-vol1-part 206 Federal Disaster Assistance including Subpart N – Hazard Mitigation Grant Program, section 206.431, 206.434, 206.435

a. 206.431 defines *Activity* to mean any mitigation measure, project, or action proposed to reduce risk of future damage, hardship, loss or suffering from disasters. (1),(2),(3)
b. Eligibility includes; 206.434 (c) (5), be cost effective and substantially reduce the risk of future damage, hardship, loss, or suffering resulting from a major disaster. (1),(2),(3)
c. 206.434 (c) (5) (i) addresses a problem that has been repetitive, or a problem that poses a significant risk to public health and safety if left unsolved. (1), (2)
d. 206.434 (d) (2) Eligible activities include projects of any nature that will result in protection to public or private property. (1), (2)
e. 206.435 Project identification and selection criteria. (a) Identification. It is the State's responsibility to identify and select eligible hazard mitigation projects. (b) Selection. (1) Measures that best fit within an overall plan for development and/or hazard mitigation in the community, disaster area, or State: (1), (2)
f. 206.435 (c) Other considerations. Consideration should be given to measures that are designed to accomplish multiple objectives including damage reduction, environmental enhancement, and economic recovery, when appropriate. (1),(2),(3)

The NE Oregon Regional Natural Hazard Mitigation Plan and FEMA define mitigation as:

> *"….the effort to reduce loss of life and property by lessening the impact of disasters…. through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk."*

For the purpose of this document mitigation is:

> *"A process of reducing or alleviating loss of life, property, ecological function, and potential injury resulting from wildland fire, through overall risk assessment, providing strategies addressing temporal and/or spatial efforts, and improving planning, implementation, and recovery processes in order to meet goals and objectives."*

Mitigation strategies include policy changes, projects, modifications of current protocols, education and outreach, long- and short-term approaches, big picture designs, multi-jurisdictional activities, fuel breaks, and vegetation modification.

Mitigation measures were designed with the three goals of the Cohesive Wildfire Strategy (CWS) in mind.

- Restore and maintain landscapes
- Create fire-adapted communities
- Improve wildfire response (CWS 2014)

These three goals are specifically identified as part of the Forest Service Fiscal year 2017 Budget Overview strategy (FS 2017).

Progress Report Forms - Overview

There are multiple forms available in Appendix L that can be used *as an option* to evaluate progress, and identify obstacles or lessons learned during and after the implementation of the mitigation measures and action items. The forms are designed to differentiate which CWS goal(s) is being met.

The annual CWPP evaluation form guides the committee through a process to determine if the overall mission of the CWPP is still being met through those goals and objectives outlined in Chapter II of this document.

Mitigation Progress Report

The Progress Report form is separated to address the three goals of the CWS. It allows for a detailed assessment of individual mitigation measures, its desired outcome, and steps that were taken to reach the desired outcome.

Project Achievement Form

The Project Achievement form focuses on a specific project, how and if it's design met one of the three goals and corresponding mitigation measures. It allows for documenting a project's intent, actions taken, expected verse observed results, funding mechanisms, partnerships, challenges and other pertinent information that may improve future efforts. Funding source block of this form can be helpful when updating the Mitigation Action Items funding source section in the CWPP.

GO/NO GO for a CWPP Evaluation, Revision, or Committee Meeting

This form was designed to evaluate if circumstances guiding the CWPP have changed that would warrant a need for the committee to meet outside of its annual meeting. Examples include: a change in two or more committee members, a significant event has occurred, significant changes in infrastructure that may influence success or failure of suppression efforts, etc. The form questions are designed so if one question is answered "YES" a meeting of the CWPP committee should be highly considered.

Annual CWPP Evaluation Form

This form assesses the individual goals and objectives identified by the committee in Chapter II. This form provides a broad CWPP committee group approach to scoring achievements within the county in relation to the plan document and its intent. It looks at three primary areas of concern for each of the objectives: DEADLINES: expected deadlines of completion, COST: were costs (below cost, at cost, above cost). DESIRED OUTCOME: results were below, met, or exceeded expectations. It records the overall group assessment of the year through a numerical rating and provides opportunities for explanation of the rating and recommendations for amendments and changes during the next update.

Mitigation Action Item Form

The mitigation action item form provides fire managers and counties with wildfire issues identified through the CWPP process. Mitigations and action item are provided on the form that address the specific issue within the CWPP's geographic area of concern. The form is designed to individually address the mitigation needed, the actions to achieve the mitigation, rational supporting the need to mitigate, specific ways to implement the actions, and how it can be funded, a time line of accomplishment and the expected outcome once mitigation has occurred. This form provides a starting point for planners and implementers to get started in the process.

Individual line items in the form are described below and can be changed through the CWPP committee process.

Action Items

Action items are a broad approach to accomplishing the recommended mitigation. Action items are a recommendation, project, act, or task to achieve a desired result. These are *suggested* methods by which the mitigation strategies may be implemented. One mitigation measure could potentially have several recommended action items that strive to achieve the desired outcome.

Action items are not necessarily time-sensitive, spatially restrictive, or automatically consistent with current approaches. It was important to include new, innovative ideas in an attempt to improve efficiency and effectiveness of meeting desired results. Application of action items is achieved through applying more specific *concepts* toward implementation activities. The mitigation measure, action items, and applied concepts all build toward achieving the desired condition and meeting the guiding principles, core values, and the three goals outlined within the National CWS.

The Cohesive Wildfire Strategy outlined 11 guiding principles and core values that support the three primary goals. Four of these (italicized below) clearly support all the CWS goals, with the remaining seven more closely fitting one particular goal:

a. *Reducing risk to firefighters and the public is the first priority in every fire management activity.* Mitigation actions are designed for improving programs and management activities in an effort to create a safe working and living environment in terms of wildfire, shared knowledge and understanding of living in fire prone environments, and emphasis on protection of life first and foremost.

b. *Sound risk management is the foundation for all management activities.* Regardless of the mitigation or action item identified, the outcome for all activities is mitigation/reduction of wildfire risk. Education programs, fire agency improvements, and landscape treatments all have one overarching objective in mind: managing inherent risks and risks identified during this CWPP process.
c. *Fire management decisions are based on the best available science, knowledge, and experience, and used to evaluate risk versus gain.* The CWPP has taken the lead on this, using the most current data for the risk assessment. Information was obtained from multiple agencies, the 2014 West Wide Risk Assessment, recent research and a collective interagency, cooperator, and public knowledge base of county information.
d. *Fire management programs and activities are economically viable and commensurate with values to be protected, land and resource management objectives, and social and environmental quality considerations.* Budget shortfalls have resulted in developing collaborative, economical ways to meet the three goals and establish the mitigation action items outlined in this CWPP. Programs and projects should be designed that take a big picture approach where multiple objectives can be achieved. Often, large scale multi resource management considerations can be economically viable while protecting both ecological and social interests.

Through a collaborative effort, the CWPP Steering Committee identified county wildfire issues, mitigation measures, and action items for addressing wildfire risk in Wallowa County. Once the county issues and mitigations were acknowledged, they were then tiered to one of the three CWS goals, with some showing slight overlaps into more than one overarching goal. **These lists are not final, but are fluid in nature where amendments can be added if a new situation or strategy arises that needs to be addressed.**

Rationale

Relates the need for mitigation and action items back to the County and local communities along with supporting documents that warrant the actions.

Desired Condition

This is the preferred outcome once the mitigation action items have been implemented.

How to implement and apply concepts

A variety of options, not exclusive to those listed, that provide a means implementing the desired actions and meeting the desired outcome. There are multiple ways to reach desired outcomes; the CWPP acknowledges that new avenues and tools will arise during the process.

CAR or area directly in need

To avoid redundancy of addressing the same mitigation action item for each individual CAR this form allows for a listing of which CAR is in need of that specific mitigation action item as well as geographic areas that may be in the WUI Zone.

Locations may change as projects are developed and work is accomplished. Locations listed were brought out during the CWPP process but does not limit the addition of new areas. This section of the mitigation form is a good location to add any additional information such as newly identified locations, CARs, or geographic areas that meet the criteria.

Timeline

Insert a desired time frame for accomplishment. Funding sources are often time-sensitive and can be reflected here, as well as an actual accomplishment date.

Funding Source

This section identifies recommended sources of funds. This provides tracking of funding that is helpful for annual renewal and requests. Completed project achievement forms identify past funding sources used and may be helpful when updating the mitigation action items. **Additional grant and application web sites for funding can be found in Appendix – I Funding Mechanisms.**

Wildfire Response

Goal: ***All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.***

Core values and guiding principles of the wildfire response goal provide a path to developing mitigation action items. Activities that support interagency management decisions and are designed to achieve safe and effective fire management programs within Wallowa County cannot be overemphasized.

Fires that start on public lands and move onto private land, threatening communities, particularly in the west, are a major problem. The vast expanses of area and finite amount of fire protection resources, often less than one fire station per 100 square miles, contributes to the problem (CWS 2014). Core values and guiding principles identified in the CWS that emphasize management decisions of wildfire response include:

a. *Local, state, tribal, and federal agencies support one another with wildfire response, including engagement in collaborative planning and the decision-making processes that take into account all lands and recognize the interdependence and statutory responsibilities among jurisdictions.* The CWPP was built on a collaborative effort forum between fire response agencies, cooperators, and members of the public. Identifying program impediments toward interagency fire support and jurisdiction will create a more effective Wallowa County fire coalition. Developing opportunities such as training to meet standardized qualifications, common radio frequencies, and department upgrades establishes protection capability awareness.
b. *Where land and resource management objectives differ, prudent and safe actions must be taken through collaborative fire planning and suppression response to keep unwanted wildfires from spreading to adjacent jurisdictions.* Shared knowledge of agency fire suppression missions and objectives can minimize confusion for both fire response personnel and agency managers when multi-jurisdictions are involved during wildfires. Preseason exercises and planning provide opportunities to work together, eliminating potential issues during an actual fire incident.
c. *Safe, aggressive initial attack is often the best suppression strategy to keep unwanted wildfires small and costs down.* Coordination of multi-agency resources is vital to aggressive initial attack on wildfires. Thunderstorms rarely deliver a single fire start. Multi-fire start situations can be aggressively suppressed if potential for resource draw down is recognized in advance, reserve personnel and equipment are identified through interagency coordination efforts. Without adequate resources safe effective initial attack may be unattainable. Interagency coordination must include a strategic view of all available qualified resources including federal, state and local resources.

Wildfire response in Wallowa County is comprised of multiple agencies, which include federal, state, county, rural, and city. The private land coverage areas make up approximately 40 % with the remainder as public lands managed by the Forest Service 39% and Bureau of Land Management (1%).

When wildfire conditions exceed local resource capacity additional support is often requested through local dispatch centers. Three air bases relatively close to Wallowa County host a variety

of national shared suppression resources. Depending on fire situations around the country, these resources could be committed elsewhere at times of local, state, and national fires.

- La Grande Airport – is 13 air miles from the county line and 33 air miles to the town of Enterprise. The airport hosts a federal air base comprised of an air-tanker base, seasonally contracted helicopters with buckets, two national repel helicopters with crews, and two national Interagency Type I Hotshot crews.
- Grangeville is 23 miles northeast of Wallowa County from the corner of the county at the Snake River and 63 air miles northeast of Enterprise. Grangeville hosts 2 SEATs – small capacity air-tankers, Air Tanker Base, Air Attack, Type 1 Helicopter – bucket capacity from 1,000 – 3,000 gallons, Smokejumpers (1 jump ship), T2 helicopter – roughly 300 gallon bucket capacity, and a T3 Helicopter – bucket capacity of approximately 100 – 200 gallons.
- McCall is 36 air miles east and slightly south of Hells Canyon Dam and 67 air miles to Enterprise. McCall hosts the following shared resources: Smokejumpers (3 jump ships), 3 SEATs, Air Attack, T1 Helicopter, 2-T2 Rappel Ships and T3 short haul ship.

The county also has a designated 911 dispatch center for members of the public. The local 911 dispatch center primarily pages local city and rural fire resources; it secondarily tracks and supports incidents within the county that include other fire incidents such as: structure, wildland, vehicle, etc., as well as servicing needs of local police and emergency medical systems (EMS).

Oregon Department of Forestry and USFS jurisdictions are serviced by a shared interagency dispatch center located in La Grande, Oregon. The Blue Mountain Interagency Dispatch Center (BMIDC) provides dispatch services to wildland fires tracking both federal and state wildland fire agencies resources. The primary mission of the dispatch center is supporting all wildland fire incidents within the BMIDC footprint. This includes initiating initial attack fire response through interagency-designed protocols and providing support to incidents with personnel, aircraft and equipment at a local, state, and national level. BMIDC also provides large fire support and resource tracking for field-going personnel.

To coordinate response between wildland fire agencies and rural and city fire districts, BMIDC will track all resources responding to wildland fire incidents within the BMIDC footprint, while the 911 center will continue to provide initial paging and additional support as requested by local responding units.

Efforts since the 2006 CWPP have been to initiate action to address several ongoing wildfire response issues. First, there has been work started toward increasing Wallowa County's wildfire response capacity through meeting and updating local department needs. Fire districts receive federal surplus through ODF who has an agreement with the USFS. Secondly, Wallowa County's Fire Prevention Cooperative has structural and wildland agencies participating in the schools and numerous community programs. Third, efforts are being made to increase rural fire department training in wildland fire qualifications to increase county-wide capacity for utilizing local resources when state and federal resources are stretched.

Fire organizations continued to build partnerships in an effort to effectively work together with a safety emphasis on life, natural resources, and property. Meetings with rural fire departments, cooperators, and members of the public have identified a comprehensive list of issues facing the

county in terms of wildland fire. Using the list of issues developed, the CWPP committee identified mitigation measures and action items that support agency guidance as well as expand to new innovative ways to achieve the goals.

The following tables address issues identified in Wallowa County through the collaborative process. The issues and mitigation action items list was separated out based on the three key goals of the CWPP - Fire Response, Fire-Adapted Communities, and Restore and Maintain Landscapes. Some of the issues and mitigations could potentially address more than one of the goals, in which case the mitigation number will be referenced under the additional goal that would apply.

Goal - *Wildfire Response* - Mitigation Action Items

Issue	There is no thorough assessment of all county structures and residences. Current data is not up to date.
Mitigation # 1	**Develop a complete assessment of all structures within Wallowa County.**
ACTION ITEM(s)	1. Develop a centralized database system to input county structure data for easy GIS access 2. Dovetail onto INTERRA 3. Establish a reporting system of NEW residences/structures within the county through various programs: tax lot information, planning, etc. Link structure information to the NE Oregon Natural Hazard Mitigation Plan and Planning Department. 4. Collaboratively gather and map critical information needs of residents to aid in fire response and protection. 5. Obtain equipment to complete and record the assessments - IPADS/Samsung tablets for mapping/storage of structure assessments data; 6. Design protocol/data base for collecting and storing information - create easy access for emergency personnel, Management Teams, etc. during fire incidents.
Rationale	– Many Wallowa County \dwellings are identified by address only. These addresses reflect homes with long driveways and are not indicative of actual home location. – A comprehensive structure map is needed with a plan to provide fire managers and homeowners with key focus points for fire mitigation. – CWS stresses the importance of pursuant of building and zoning codes/ordinances that mitigate fire risk to protect life and property. – Local Hazard Mitigation Plan identifies this through 201.6(b) engagement of parties, 201.6(c)(2) Risk assessment – structure vulnerability in terms of type/number of buildings, infrastructure, critical facilities, establishes a community base map; 201.6(c)(3) Recommendations to reduce structural ignitability.
Desired Condition	A database and mapping system that can be periodically updated through the county tax assessor's information. Updated current home locations and conditions that provide accurate information to assist fire resources during wildfire response.
How to implement and apply concepts	a. Systematically visit all known residences in the county through an integrated agency assessment. b. Create Wallowa County Fire Inspector to accomplish structure assessment. c. Develop conduit to pass information off to non-local protection resources and management teams. d. Develop funding for a position that can input and maintain data. e. Design distribution channels for fire response personnel with current information regarding structures in the area. f. Can be linked to evacuation plans for sheriff's departments for easy home access. g. Design in new construction ordinances and statutes that pertain to new construction and upload of information to database. h. Work collaboratively with University students for opportunities to meet needs of education and county. i. Create a county wide "coordinator" position to facilitate data base management and uploading of intel as it is acquired. j. Design protocol/method for enforcing fire codes (Fire Inspector play play a role). Implement building construction regulations according to Oregon Fire Codes
CAR or areas directly in need	All CAR and WUIZ Entire County
Timeline	
Funding Sources	

Issue	No known decision protocol for identifying when to evacuate residents and activate conflagration act.
Mitigation # 2	**Design a county wide pre-fire suppression plan that includes an evacuation plan, trigger points/management decision points for evacuation orders, and conflagration activation.**
ACTION ITEM(s)	1. Organize a mapping exercise for defining and identifying trigger points. 2. Develop a plan with consistent protocols for interagency use. 3. Create a written plan with maps for interagency and public distribution. 4. Utilize and modify any existing evacuation plans and processes that are designed for multi-agency assistance. 5. Create structure/land information such as INTTERRA utilizing tax lot information local knowledge. Include high recreation use areas. 6. Map and Identify access, turnout/turn around needs, vehicle size accommodations.
Rationale	1. Most fire agency structure protection plans include similar information and often share the same road access as local residence. 2. A pre-designed and shared interagency evacuation plan can minimize confusion during critical incidents for both the public and firefighters thereby improving safety while reducing risk and exposure. Provide plan knowledge to local cooperators that are likely to participate in an evacuation such as law enforcement agencies, American Red Cross, etc. 3. Communicating the Plan with the Blue Mountain Interagency Dispatch Center (BMIDC) and incoming Incident management teams (IMTs) will provide a common and anticipated approach in the event of wildfire evacuation. 4. Presidential Policy Directive/PDD-8, 2011. Recognizes the need to integrate planning that covers prevention. 5. Consistent with the NHMP Multi-hazard Action Item MH # 9 Proposed Action that states, "Develop a warning and emergency evacuation protocol for vulnerable populations." 6. Consistent with the NHMP Wildfire Action Item WF # 1 Proposed Action states, "Actions of the NHMP should be advocated for in the county's CWPP."
Desired Condition	A thorough plan that is tiered to the CWPP wildfire issues that are likely to pose a threat to life and property where pre-designated conditions would initiate evacuations and conflagration. A plan that is interagency, known to the public, and can be included in IMT briefings.
How to implement and apply concepts	a. Increase local support for timeframes of evacuation through open communications well in advance. b. Involve emergency organizations outside of fire: Red Cross, Sheriff Dept., Public Works Department. c. Provides opportunities to link to conflagration act. d. Fire Management Agencies work together to design management action points/trigger points using local knowledge, information within the CWPP, past experiences. Review and consider lessons learned. e. Review protocols and decision points annually through coordinated meetings with homeowners and interagency simulations with the county fire response agencies and involved cooperators. f. Assure logistical procedures are known and in place for people needing assistance. g. Set up knox box access for commercial buildings, gates, PPL and elsewhere to expedite response time.
CAR or areas directly in need	This is applicable to all Communities at Risk areas and the WUIZ where residents and high use areas are located.
Coordinating Organization	
Timeline	At a minimum develop management decision criteria for areas of CAR within the first year of CWPP completion. Develop evacuation decision criteria for high forest use areas within the first two years of CWPP completion. Ongoing Efforts
Funding Sources	

Issue	Rural departments are functioning with minimum required Personal Protective Equipment (PPE) and no surplus materials.
Mitigation #3	**Improve type and amount of available equipment to meet all agencies' requirements, allowing for immediate availability of replacement supplies.**
ACTION ITEM(s)	1. Update and maintain Rural and City departments' wildland PPE/Equipment 2. Improve surplus equipment programs that allow for easy transfer of supplies from one agency to another. 3. Share information between departments/agencies and increase available funding and grant options for equipment acquisition. 4. Create a needs list and fill any gaps with updated equipment. 5. Identify shortages of Interface fire apparatuses.
Rationale	– Past federal surplus fire equipment programs have been of tremendous benefit for local city and rural fire departments. Maintaining and improving upon these types of programs is a win/win for improving and maintaining the collaborative efforts, consistency of equipment, and safety of fire personnel. Equipment is essential for firefighter safety. – Presidential Policy Directive/PDD-8, 2011 emphasizes preparedness in terms of natural disasters, including actions for equipment and sustained capabilities for protection. The NHMP recognizes during fire suppression efforts firefighters have benefited from improved training, coordination, and equipment (NHMP 2014).
Desired Condition	Rural Fire Departments are well furnished with up-to-date tools and equipment to safely do the job.
How to implement and apply concepts	a. Use available grant programs geared toward fire response for Rural Fire Departments. b. Develop collaborative agreements that provide opportunities for equipment transfer between agencies. c. The Rangeland fire Protection Association with support of ODF provides technical support for grants, grant writing, procurement of equipment and firefighting training (NMHP 2014). d. Utilize an existing position or establish one that provides grant writing for the Rural Fire Departments. e. Work through the individual departments and their respective taxing districts to continue to update needed equipment.
CAR or areas directly in need	Rural Fire Departments in particularly but issue can be applied to other fire response agencies.
Timeline	
Funding Sources	Expand use of FEPP and FFP – Utilize Grant Program to acquire funds. **FEMA – Opportunity Title 9: Firehouse Subs Equipment Grant** – dedicated to improving life safety capabilities of emergency-service entities in communities served by Firehouse Subs. **FEMA – Opportunity Title 10**: **Firefighters Charitable Foundations Grant** – provide assistance to local fire/disaster victims, fire prevention education, volunteer fire department equipment purchase, community safety programs. FEMA - **Opportunity Title 14: Georgia-Pacific Bucket Brigade Grant** – supports volunteer and small town fire departments for equipment (water pumps/hoses/nozzles), resources, programming, and safety education materials. **FEMA – Opportunity Title 18: Lacy and Connor Search and Rescue Fund** - Equipment, training, PPE, medical-care equipment. Volunteer Fire Assistance and Rural Fire Assistance Federal Grant Programs. U.S.General Service Administration – Federal Surplus Personal Property Donation Program - https://www.gsa.gov/portal/category/21183 and https://gsaauctions.gov/gsaauctions/aucindx/ State Agencies for Surplus Property contacts https://www.gsa.gov/portal/content/100851 Volunteer Fire Assistance (VFA) Grant – Includes protective gear, Federal Excess Vehicles, Wildland Suppression Equipment, -

Issue	Expand local roles and experiences with wildland firefighting in order to create additional state and federal capacity.
Mitigation #4	**Identify opportunities to integrate local resources with existing Type 3 IMTs and/or develop a local incident management team.**
ACTION ITEM(s)	1. Provide training opportunities to meet Federal Standards for wildland firefighting through uniform and cross-agency training. 2. Increase roles and experience by designing training opportunities while participating on an Incident Management Team. 3. Identify individuals currently with both wildland and structure qualifications to mentor others. 4. Develop incentive programs to encourage cross training. Utilize crosswalk opportunities where applicable and appropriate.
Rationale	– Potential for reduced safety issues with cross training of structure and wildland fire fighting. – Increases understanding of firefighting terminology that allows for common language between fire protection resources. – Increases resource options during times of high draw down of firefighting personnel. – Creates an Interagency fire response that is likely to increase opportunities for successful fire suppression and demonstrates multi-agency cooperation to the public sector. – Wildland Urban Interface Wildfire Mitigation Guide 2014 promotes common wildfire language and culture. – The CWS encourages communication and collaboration of shared information and resources.
Desired Condition	Local Fire Organizations to play an increased role in wildland firefighting. Increase capacity for local rural, state and federal partners.
How to implement and apply concepts	a. Design a list of personnel interested or in need of training and use a rotation of personnel if needed. b. Develop liaison roles to help draw interest and slowly incorporate individuals into the IMT team structure. c. Integrate non-traditional partners into the Type III teams d. Create MOU/agreement where volunteers on federal wildfires are compensated through wages. e. Provide reimbursement for firefighting on Federal Property – see Funding Sources below
CAR or areas directly in need	Requires involvement of all fire agencies to be successful.
Timeline	
Funding Sources	https://www.nal.usda.gov/ric/rural-fire-department-resources-local-officials#FPA Reimbursement for Firefighting on Federal Property - https://www.usfa.fema.gov/grants/ Financial Assistance for National Fire Academy (FNA) - https://www.nal.usda.gov/ric/rural-fire-department-resources-local-officials#TR Gillbrand Fire and Emergency Funding - http://www.gillibrand.senate.gov/imo/media/doc/Gillibrand%20Fire%20and%20Emergency%20Services%20Funding%20Guidebook%202015.pdf

Issue	Wallowa County has few fire districts, current fire districts are concentrated in the Wallowa Valley proper and there are no substations (satellite) stations to provide quicker response times.
Mitigation #5	**Identify specific locations that could host new sub-stations. Fill any identified gaps where stations are needed. Identify new Fire District Designation – expand on current ones.**
ACTION ITEM(s)	1. Fire agencies need to design a plan with maps identifying areas that would provide the highest coverage based on geographic placement. 2. Apply for funding to initiate a needs-based assessment of protection resources that includes: personnel, equipment, facilities, funding, and other key information. 3. Establish protocol for staffing substations while maintaining current staffing levels at primary stations. 4. Determine if sub-station staffing should be linked to already established fire departments or if there is a separate substations in remote areas. 5. Increase fire apparatuses and strategically locate them at an existing site or a new site. Assess level of community interest for facility and personnel staffing. 6. Establish new districts and/or an expansion of an already established protection zone.
Rationale	– Wallowa County has a wide scattering of small communities, however both structure and wildfire resources are solely based in the main Wallowa Valley stretching from the town of Wallowa to Joseph. There is a need to create opportunities to reduce the response time spent by suppression resources in reaching an incident. This would increase the coverage and reduces overextending current resources, particularly in times of high fire occurrence. – Opportunities to provide a presence and further improve public relations in remote areas. – CFR-2011-title44 section 206.434 (d) (2) Eligible activities include projects of any nature that will result in protection to public or private property. – Presidential Policy Directive/PDD-8, 2011. Includes integrated planning that covers protection and response. – Oregon Administrative Rules (2015) 478.260, 478.300 – support the site selection of the location to best service the residents and properties of the district. – NFPA (2017)1141 Standard provides requirements for the development of fire protection and emergency services infrastructure to make sure wildland, rural, and suburban areas have the resources and strategies in place to protect people and property from fire dangers and allow firefighters to do their jobs safely and effectively.
Desired Condition	Provide protection capabilities to all remote communities through satellite stations.
How to implement and apply concepts	a. Utilize outputs from Fire Protection and Fire Structure Vulnerability assessment in Chapter XI and Chapter VII respectively, to aid in determining areas of high and extreme ratings and causal factors. b. Reach out to affected communities to educate them on current protection status and concerns under existing status. Emphasize importance of landowner preparation. c. Search out surplus material/equipment d. OAR 478.260 – the fire board may divide the district into zones or subdivisions and provide adequate system or code of fire alarms, etc. e. OAR 478.300 allows for intergovernmental agreements under ORS chapter 190 for a rural fire protection district or other public body as defined in ORS174.109 may contract with any person for the purpose of affording firefighting, protection or prevention facilities and services. f. Implement Taxing District to help cover costs.
CAR or areas directly in need	Troy – Bartlett and Eden Bench, Imnaha Corridor, and Promise Bar – B Ranch – private fire engine
Timeline	
Funding Sources	National Fire Plan Assistance to Firefighters Station Construction Grants (SCG) FEMA –Opportunity Title 8 and Title 9: E-One Tell Your Story Fire Truck Grant FEMA – Opportunity Title 9: Firehouse Subs Equipment Grant Fire House Subs Foundation - https://firehousesubsfoundation.org/about-us/ USDA Community Facility Grants for Rural Areas and Small Towns

Issue	Water system and water site upgrades/improvements needed. Several water sites have limited access for large apparatuses, and finding alternative sites reduces resources firefighting time.
Mitigation #6	**Improve water systems and sites for more efficient use by firefighting apparatuses**
ACTION ITEM(s)	1. Improve upon existing community water protection infrastructure systems by increasing water capacity and site locations. 2. Eliminate long drafting times. 3. Increase water access points to accommodate all types of apparatuses. 4. Explore opportunities to create dry standpipes.
Rationale	- This mitigation will reduce drafting time and increase site options that will accommodate large engines and tenders - Water access to suppress wildfires and support fire resources can be a deciding factor on fire size. Increased options of fill sites can improve overall firefighting resources efficiency and effectiveness. - Increases response capabilities by decreasing turnaround time when needing to refill engines. - FEMA Executive Order 13728 – Wildland-Urban Interface Federal Risk Mgmt. National Fire Protection Association NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting. It identifies minimum water supply requirements based on multiple criteria including water sources, fire department connections, and dry hydrant design, location, and installation.
Desired Condition	A sufficient number of strategically located water sites that provide adequate supply, access, and drafting capabilities for large engine/tenders.
How to implement and apply concepts	Develop a pressurized system at frequently used filling locations and constructed and natural water sources. Work with landowners/ranchers to create water fill sites in strategic locations. Increase/add large enough turn around spots for large equipment access at existing sites. Installation of additional Fire Hydrants. Ensure agency(s) water source use agreements are in place well in advance. Work with agencies for options to extend boat ramps during low water levels. Provide for back-flow prevention to protect city water systems.
CAR or areas directly in need	All CARs where subdivisions and residential clusters exist. Locations where high fire occurrences overlap with residential areas. Commonly used sites and areas where limited water is available.
Timeline	
Funding Sources	U.S. State Community Development Block Grant (CDB) Programs – funds to eligible communities with annual direct grants that they can use for community projects including fire and life safety protection. – State infrastructure Finance Authority. Volunteer Fire Assistance (VFA) Grants – Includes Installation of Dry Hydrants https://www.grants.dcnr.state.pa.us/Dashboard/VFAGrants

Issue	Some fire agencies (Rural) have little to no technological equipment for more effective geo-referencing that is consistent with other agencies and lack skills to use technology.
Mitigation #7	**Upgrade and acquire mapping technology that is compatible and consistent with other cooperating agencies.**
ACTION ITEM(s)	1. Acquire any surplus up-to-date equipment. 2. Determine the current most commonly used equipment and begin process of acquiring additional equipment. 3. Bulk order with other protection agencies or adjoining counties for lower costs
Rationale	– Provides fire resources the capabilities to access local terrain maps, up-to-date fire perimeter maps, road access points. Increases effectiveness of fire resources in both fire team support and fire line environments. – Provides the ability to pre-load critical information in advance, such as structures, infrastructure, trigger points, escape routes and safety zones. – Provides agencies with access to common information.
Desired Condition	Inter-agency ability to share and view essential information to improve fire response capabilities and safety using up-to-date technology.
How to implement and apply concepts	a. Provide training for fire departments for mapping and geo-reference on site. b. Obtain grant monies for acquiring equipment. c. Collaboratively work among agencies to acquire equipment. d. Federal Assistance for Wildfire Response and Recovery provide avenues for funding through partnerships with state forestry agencies; these programs provide funds for pre-fire community wildfire protection planning and preparation, hazard mitigation, equipment, and personnel training.
CAR or areas directly in need	All affected fire resource agencies.
Timeline	
Funding Sources	Assistance to Firefighters Grants through FEMA

Issue	Availability of training opportunities and increasing qualifications skills for rural and structural personnel to fight wildland fires are limited.
Mitigation # 8	**Consistent training and interagency development training.**
ACTION ITEM(s)	1. Provide opportunities for multi-agency training/experience with fire personnel. 2. Provide qualified instructors to provide training needs where scheduling accommodates volunteers with full time jobs – weekend, evening sessions. 3. Coordinate with local community colleges that conduct weekend training. – TVCC 4. Interagency cross training using simulations. 5. Fire chiefs work with their departments to encourage self-improvement amongst their firefighters.
Rationale	– Deficient fire qualifications and skill levels increase safety concerns in situations that are already inherently risky. A common training platform ensures that all fire resources have a consistent knowledge base. Developing training schedules to meet those with steady jobs increases the likelihood of gaining and maintaining fire qualifications. – The National Wildfire Coordinating Group through *Wildland Urban Interface Wildfire Mitigation Desk Reference Guide 2014* promotes the concept of "whole community approach". – Presidential Policy Directive/PPD-8, 2011. Directive PPD-8 recognizes wildfire threat as a priority and promotes preparedness including training and sustained capabilities. FEMA supports community emergency response through firefighter training.
Desired Condition	To have city, rural, state, and agency firefighters collectively share responsibility between coordinating training and maintaining firefighting qualifications.
How to implement and apply concepts	a. Determine a need-based training of individuals and courses and then identify local instructors qualified to teach classes – FS, ODF, retired, contractor. Establish course dates at least six months in advance of training opportunities for highest attendance. b. Identify the qualification needs for Federal Agencies. c. Identify internship opportunities d. Create a county-wide "coordinator" position to facilitate off hour wildland fire training and coordinate federal and state agency training. e. Provide payment opportunities for attendees who would otherwise volunteer their time. f. Conduct geographic training for a more cost effective program.
CAR or areas directly in need	All fire agencies.
Timeline	
Funding Sources	Assistance to Firefighters Grants through FEMA Opportunity Title 11: Fireman's Fund Heritage Program – national community based providing funds for equipment, fire prevention tools, firefighter training, fire safety education and community emergency-response programs. Fireman's Fund Heritage Program - http://firstrespondergrants.com/frg_grants/grant_view/grant/11

Issue	Wallowa County lacks a designated Emergency Operations Center (EOC)
Mitigation # 9	**Identify and/or create an Emergency Operations Center that is either mobile or permanent.**
ACTION ITEM(s)	1. Review site locations that would be cost effective and centrally located. 2. Co-locate in a location that provides the highest benefit for multi-agencies and cost. 3. Research similar mobile centers for examples that would possibly fit the need for Wallowa County. 4. Evaluate the pros and cons of a stationary versus mobile center. 5. Obtain agencies or surplus equipment that may have center no longer in use.
Rationale	- EOC allows for on-scene command and operations during high risk emergency incidents. Improves overall local community support during Emergency Incidents. - An EOC can serve to ensure response capabilities are maintained and information is disseminated to the general public. - It can also provide decision makers with information to develop strategies, establish priorities, allocate resources, and determine a need for elevating situation levels. - Provides a central location for agency representatives to share information. - Having an EOC improves the ability of local emergency resources in meeting Presidential Directive # 5: to Prevent, prepare for, respond to and recover from major disasters and other emergencies. - FEMA is an advocate for the use of EOC management and operations. FEMA offers online course to prepare decision makers and others to function more effectively in an EOC environment.
Desired Condition	A committed location for an Emergency Operations Center for Wallowa County.
How to implement and apply concepts	a. Search surplus equipment sites that may have mobile center available or equipment that can be modified. b. Identify EOC location and gradually build the center through funding, acquisition of equipment, multi-agency shared efforts. c. Apply for grants and funding d. Hire local contracting skills to assist in EOC design.
CAR or areas directly in need	Wallowa County Emergency Management and local cooperating agencies.
Timeline	
Funding Sources	FEMA - Fiscal Year 2017 Emergency Management Performance Grant Program: FEMA – Apply for Pre-Disaster Mitigation Grant Program. Interoperable Emergency Communications Grant Program (IECGP) - **http://www.fema.gov/government/grant/iecgp/index.shtm** DHS/FEMA – Emergency Operations Center (EOC) Grant Program - **http://www.fema.gov/government/grant/dlsgp/index.shtm**

Issue	It is difficult for rural and city fire departments to recruit and retain quality volunteers from local communities.
Mitigation # 10	**Develop a firefighting recruitment program to increase the level of interest.**
ACTION ITEM(s)	1. Advertise training opportunities available for community members. 2. Firefighting presence at local gatherings (information booth) with displays to draw interest. 3. Develop fun competitions between local fire agencies open to the public, demonstrating cohesiveness within the county. 4. Develop recruitment program designed for various groups including: high school, college, and other community members. 5. Establish a short and long term plan on retention and recruitment
Rationale	– Increasing the numbers of community members as part of fire organizations increases the available personnel to pull from, particularly during times of high draw down level, provides increased connection to local residents, and potential for new information sharing opportunities. Inability to properly staff rural and city fire departments is a high safety matter with potential high cost losses of both life and property. – CRF-2011-title44-vol1-part 206 Federal Disaster Assistance including Subpart N – Hazard Mitigation Grant Program 206.434 (d) (2) Eligible activities includes projects of any nature that will result in protection to public or private property – Presidential Policy Directive/PPD-8, 2011 build and sustain the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats that pose the greatest risk to the security of Nation. Oregon State Fire Marshal Strategic Plan 2015 – 2019. Goal 4 – Recruit, develop, and sustain a professional and diverse workforce – High and Extreme Risk to Acres Ratio: Thirty-six percent of Wallowa County is in High or Extreme for Fire Risk (more than double the entire state) compared to only 14 % for Oregon State – Eleven out of sixteen Communities analyzed were either High or Extreme for Negative Effects from Wildfire.
Desired Condition	To eventually have an adequate pool of individuals that is large enough to provide a surplus of personnel that can be used as backup during critical times.
How to implement and apply concepts	a. Establish a position, add to a current position, or create shared job duties to focus on initiating recruitment ideas and outreach. There is also potential for a small interagency recruitment team to work together throughout the year with bi-annual showings of the local fire agencies. b. Create internship programs that increase interest and opportunities c. Conduct education forums on the importance, benefits, and rewards of being a volunteer. d. Benefits for District Volunteers. OAR 478.390 Investments authorized to fund length of service awards for volunteer firefighters. e. Create agreements/MOUs to provide federal funds for wages when volunteer firefighters work during an emergency on federal lands/incidents. f. Establish incentive programs to retain and increase staffing.
CAR or areas directly in need	All Fire Agencies with emphasis on Rural and Structural Agencies
Timeline	
Funding Sources	Staffing for Adequate Fire & Emergency Response Grants (SAFER) FEMA: Assistance to Firefighters Grants – grant programs - https://www.usfa.fema.gov/grants/ VolunteerFD.org provides a link to grant opportunities https://www.volunteerfd.org/grants/articles/

Issue	Some local roads have access issues that make entry with fire apparatuses difficult or impossible. Including unmaintained vegetation, evacuation routes are the same as emergency access routes, no turnarounds for large apparatuses.
Mitigation # 11	***Maintain* and *increase* public road right-of-ways to minimize risks to life of firefighters and public.**
ACTION ITEM(s)	1. Develop an implementation plan to maintain key public road right-of-ways. 2. Utilize existing roads to create fuel breaks for defensible location. 3. Prioritize roads, including state highways, based on strategic fuel breaks. 4. Built alternative routes for evacuation purposes. 5. Educate and assists community members on evacuation / access during wildfires.
Rationale	Firefighting personnel utilize roads for several reasons, including fire and community access, defensible space, and evacuation routes, all of which involve firefighter and public safety. National Cohesive Wildfire Strategy supports mitigation strategies that ensure protection of infrastructure and values including transportation routes. CRF-2011-title44-vol1-part 206 Federal Disaster Assistance 206.434 (c) (5) (i) promotes addressing problems that are repetitive, or a problem that poses a significant risk to public health and safety if left unsolved. Areas that use the same access for evacuation as emergency vehicle entrance have a higher likelihood of a negative outcome. 4 lives lost in 2001 (Thirty Mile Fire) due to one way in – one way out access resulting in entrapment of fire personnel and public. Oregon Fire Code Chapter 4 sections 403.2, Public Safety Plan and 403.2.1 Content. Also Appendix D of Oregon Fire Code D102.1.1 Access in wildland-urban interface areas.- International Wildland Urban Interface Code NE Oregon Hazard Mitigation Plan MH # 14 states the need to pursue a secondary emergency access route along the west bank of the Wallowa Lake.
Desired Condition	Increase access routes where ingress/egress is limited. Reduce the likelihood of entrapment during wildfires: particularly in areas that have high fire risks or exhibit high to extreme wildfire behavior.
How to implement and apply concepts	a. Reference any existing evacuation plans and property assessments that may provide current road knowledge. b. Utilize any project or property assessment being completed concurrently with road information, county/state road data. c. Use West Wide Risk assessment mapping identifying high fire threat and areas that exhibit as priority locations. d. As projects materialize, address specific road issues within the project to protect lives. e. Address issue during new building construction as statutes for maintaining access. f. Design a data base to track work accomplishments. g. Identify easement / right-of-way locations were evacuation route can be built. h. Utilize lessons learned were access created safety issues for firefighters / public – i.e. Thirtymile Wildfire 2001 is a prime example. i. Educate members of the public on the need for clearance and turnaround to protect structures. j. Include statues in land planning to require homeowners to provide emergency vehicle access. k. Maintain and track treatments of road access; set up a rotating periodic maintenance schedule to ensure initial work and follow through maintenance are completed.
CAR or areas directly in need	Wallowa Lake (west moraine), Lostine Corridor, Bear Creek, Lower Imnaha River, Wallowa Lake Tramway Road, East Moraine-Wallowa Lake Road
Timeline	
Funding Sources	

Issue	Lack of information/equipment regarding structure assessments including but not limited to: critical access roads to structures; structure composition; equipment to complete and record the assessments - IPADS/Samsung tablets for mapping/storage of structure assessments data; roadside/driveway vegetation, ingress/egress, turnarounds (large engines), road composition - surface, width, barriers, and bridge allowance. Overall Structure defensibility.
Mitigation # 12	**Complete a county wide assessment of structures, access roads, and driveways and create an interagency central location where information can be stored, updated, and downloaded for future use. Connect assessment with INTERRA project currently underway.**
ACTION ITEM(s)	1. Design protocol/data base for collecting and storing information - create easy access for emergency personnel, Management Teams, etc. during fire incidents. 2. Provide examples then Conduct questionnaire surveys for homeowners during public forums such as Community Events, County Fair, etc. 3. Consolidate any known assessment(s) already completed through local fire protection agencies during structure and wildland fires. 4. Work with local INTERRA contacts to develop assessment process and complete database. 5. Identify workforce needs to complete assessment.
Rationale	– Road access issues often lead to extended response times in rural areas (CWS 2014). – The federal register describes preliminary criteria for evaluating risk to communities Volume 66, no. 3 page 753 shows Risk Factor 3 Infrastructure, situation #2 for communities is cited as limited access routes and situation # 3 multiple entrances and exits well equipped for fire trucks, and wide loop roads. – Coincides with Mitigation # 11 access – Appendix D of Oregon Fire code addresses Fire Apparatus Access roads. – Establishes compliance with Chapter 4 Wildland-Urban Interface Area Requirements (referenced by Oregon Fire code) regarding: road/driveway access, water supply. – Addresses local Hazard Mitigation Plan needs through 201.6(b) engagement of parties, 201.6(c)(2) Risk assessment – structure vulnerability in terms of type/number of buildings, infrastructure, critical facilities, establishes a community base map; 201.6(c)(3) Recommendations to reduce structural ignitability.
Desired Condition	Emergency fire responders have data uploading access for local road and structure information. Improve upon decision capabilities by having the most current situational awareness where road conditions are concerned.
How to implement and apply concepts	a. Hire personnel to accomplish countywide roads assessment. b. Assign individuals from local fire protection units to accomplish assessment within their specific protection areas. c. Dovetail onto structure assessments where applicable. (INTERRA example) d. Educate landowners on proper structure composition and access needs for large apparatuses. e. Provide self-assessment forms/techniques to landowners to expedite information gathering. f. Meet Oregon's adherence to the Chapter 4 Wildland-Urban Interface Area of the International Wildland-Urban Interface codes adopted by the State of Oregon. Require a *key box* to be installed for emergency vehicle access, meet access dimensions, water supply. g. Work with commercial buildings, gates, other landowners/cooperators to set up Knox Box access during fire emergencies. h. Design protocol/method for enforcing fire codes (Fire Inspector play play a role). Implement building construction regulations according to Oregon Fire Codes
CAR or areas directly in need	County wide. Priority would be all Communities at Risk
Timeline	
Funding Sources	Hazard Mitigation Grant Program (HMGP) – DHS – Federal Emerg. Mgmt. Agency http://www.fema.gov/government/grant/hmgp/index.shtm Pre-Disaster Mitigation (PDM) Grant Program – DHS_ FEMA - http://www.fema.gov/government/grant/pdm/index.shtm

Issue	Develop an all-hands / all-lands approach to wildfire response, including closest forces response and draw down move up across agency boundaries.
Mitigation #13	**Develop a countywide mutual aid agreement that allows for interagency utilization of local resources across the board.**
ACTION ITEM(s)	1. Create a common operating protection plan with all agencies. 2. Identify strength and weaknesses of current collaborative agreements. 3. Develop mutual aid or MOUs.
Rationale	– Rural Fire Departments are currently picked up under ODF on a work agreement in order to be involved with a wildfire under federal agency jurisdiction. Policy Direction supports this action. Taken from the Guidance for Implementation of Federal Wildland Fire Management Policy 2009, Management Intent and Implementation Actions were the following recommendations: 1. Recognize that particular budget processes and external influences will affect capability and capacity. Realize efficiencies by incorporating other federal, tribal, state, and local agencies and nongovernmental organizations to meet peak demands for resources. Preseason agreements are an integral part of preparedness (Management Intent #10 Preparedness). 2. Agencies will develop agreements to efficiently utilize other federal, state, local, and non-governmental resources (Management Intent #10 Preparedness). 3. Agencies will streamline interagency transfer of funds to reduce fiscal inconsistencies. (Management Intent #13 Standardization). OAR 477.406 (1) The forester and a forest protective association may enter into a contract or agreement with each other, or jointly, …… for the prevention and suppression of fire on forestland or on land other than forestlands or both, to prevent and suppress fires.
Desired Condition	To have a streamlined interagency transfer of funds between all fire protection agencies in Wallowa County.
How to implement and apply concepts	a. Develop agreements to clarify jurisdictional inter-relationships and define roles and responsibilities among local, state, tribal, and federal fire protection entities, based on each organization's enabling protection authorities and assistance/mutual aid responsibilities including streamlined fund transfers. b. Review current agreements and make needed modifications. c. Search out already-existing agreements in other geographic areas that meet this need.
CAR or areas directly in need	All fire protection agencies.
Timeline	
Funding Sources	

Issue	Wallowa County Fire Protection Agencies are in need of up-to-date equipment to safely and effectively complete job duties.
Mitigation #14	**Acquire technological equipment to improve public notifications, improve lightning and fire detection accuracy, and hot spotting (handheld infrared units and local aircraft thermal imaging.**
ACTION ITEM(s)	1. Identify available surplus equipment and/or purchase any needed equipment. 2. Bulk order when possible to reduce item costs. 3. Coordinate with other county agencies on equipment needs and resources. 4.
Rationale	– CWPP committee identified at a minimum the following items are needed for a more efficient workforce: Reader boards/signs for emergency notification for public; local aircraft with thermal imaging; lightning sensors/improve lightning strike accuracy; handheld infrared units for hot spotting; radios with interagency compatibility to work between agencies/across state lines/with Incident Management Teams – Hazard Mitigation Plan 201.6(c)(3) Mitigation Strategy – CWPP should Identify local response capability needs. – The NE Oregon Hazard Mitigation Plan identifies communication networks as a lifeline between communities and critical services. 2013 Action Item MH # 6 of the Hazard Plan identified Enhance communication and response coordination between all the incorporate areas in the county. – The CWS places a priority on safe and effective response to protecting the safety and health of public and firefighters. Regional and National strategies should include equipment and personnel to improve the ability to respond, coordinate, communicate, and train to enhance preparedness capabilities.
Desired Condition	To be fully equipped with up-to-date technology to provide highest level of safety for both public and firefighters during all phases of wildfire. (pre, during, and post fire)
How to implement and apply concepts	a. Identify/design a Fire Coordinator position for county and or shared between counties with duties of grant writing, acquisition of equipment, and filling agency equipment needs. Review current agreements and make needed modifications. b. Purchase items identified by the CWPP committee: Reader boards and signs, Thermal imaging for aircraft, lightning sensors, hand held infrared units, etc. c. Upgrade systems to be similar to Union County Technology and reporting systems.
CAR or areas directly in need	All fire protection agencies.
Timeline	
Funding Sources	Volunteer Firefighting Grants https://www.volunteerfd.org/grants/articles/ See Appendix I

Issue	Radio compatibility and radio/communication towers are not always operative between agencies and from remote locations. Communication is key during emergency situations to maintain the highest safety of firefighters.
Mitigation #15	**Acquire communication equipment compatible between agencies, across state lines, with Incident Management Teams and communication towers/Mobile communication Vehicle (with repeaters). Fill areas void of communications in the county.**
ACTION ITEM(s)	1. Identify available surplus equipment and/or purchase any needed equipment. 2. Coordinate with other county agencies on equipment needs and resources. 3. Install relay/repeater equipment to fill voids in geographic locations where resources cannot communicate with dispatch and other emergency resources. 4. Purchase Mobile Communication Vehicle with repeaters 5. Acquire compatible handheld radios and mobile radios that provide interagency communications.
Rationale	– CWPP committee has identified a need for communication networks with interagency compatibility to work between agencies, across state lines and with Incident Management Teams due to increase safety risks to public and Firefighter safety. – NE Oregon Hazard Mitigation Plan Table ES-2 list of Highest Priority Actions identified specifically Wallowa County under MH #6 Enhance communication and response coordination between all of the incorporated areas in each county. – The CWS places a priority on safe and effective response to protecting the safety and health of public and firefighters. Regional and National strategies should include equipment and personnel to improve the ability to respond, coordinate, **communicate**, and train to enhance preparedness capabilities. – 2016 Oregon State Fire Marshall Mob Plan includes objective (b) to promote effective communication among agencies during the preparation for, progress of, and demobilization from a fire suppression operation or other emergency response activity.
Desired Condition	
How to implement and apply concepts	a. Identify/design a Fire Coordinator position with duties of grant writing, acquisition of equipment, and filling agency equipment needs. Review current agreements and make needed modifications. b. Bulk order as interagency group or multi-county when possible to reduce item costs. c. Use Baker County's Mobile Comm. Vehicle as a template to develop/purchase one for Wallowa County. d. Implement Funding Public Safety Communications System – SAFECOM – suggestions from pdf in Funding Sources: Apply one or more DHS funding Mechanisms: Utilize multi funding mechanisms such as: State and local bonds, Public/-Private Partnerships, User Fees, 9-1-1 Surcharge fees, Equipment leasing,
CAR or areas directly in need	CAR – Wallowa Lake-Ski Run, Lostine Corridor, All Agencies. Areas void of communications specifically identified in CWPP process are North, East, Wallowa Lake Area, Lake Basins in the high use areas of Wilderness. Add others as they are identified.
Timeline	
Funding Sources	Homeland Security Grant Program - https://www.oregon.gov/OMD/OEM/Pages/plans_train/grant_info.aspx List of Emergency Communication Grants SAFECOM -identified on page 3 Grants: https://www.dhs.gov/sites/default/files/publications/Funding%20Mechanisms_TechEdit_11202015_1.pdf See Appendix I

Fire Adapted Communities

Goal: *Human populations and infrastructure can withstand a wildfire without loss of life and property.*

The Cohesive Wildfire Strategy (CWS) has identified some guiding principles and core values to direct fire and land management activities in terms of fire adapted communities. Included in these are:

a. *Reducing risk to firefighters and the public as a first priority.* Working with members of the public and sharing information will provide across the board knowledge prior to a wildfire incident that could potentially save lives. Through pre-fire actions such as the reduction of structure flammability and property fuels-vegetation treatment measures, an environment is created for safer suppression actions, ingress and egress of both the public and firefighters.
b. *Improve and sustain both community and individual responsibilities to prepare for, respond to, and recover from wildfire through capacity-building activities.* Collaboratively working with communities in understanding how land and structure preparation ahead of time can provide them with a degree of comfort, knowing steps were made to improve the likelihood of structure survivability. Wildfire impacts can have a tremendous emotional impact if unprepared to respond during a potential wildfire threat.
c. *Rigorous wildfire prevention programs that are supported across all jurisdictions.* Developing a cooperative, multi-agency prevention program that works with members of the public in an effort to reduce the number of human caused fires will in turn reduce the fire response calls particularly at the height of fire season.

During a wildland-urban interface fire a home ignites from two possible sources: directly from flames (radiant and convective heat) and/or from firebrands accumulating directly on the home (Cohen 1991). Structure survival involves several factors that influence fire ignition; and if an ignition occurs, the survival of a structure involves factors that influence fire suppression (Cohen and Saveland 1997). Structure survivability is impacted by a number of conditions including: pre-wildfire preparation in and around the properties to reduce structure ignitability; the effectiveness of suppression resources in terms of their availability, firefighting capabilities, and accessibility options to the structures and properties.

Homes in and near forested lands in the west are increasing at rapid rate. Over the past 50 years there have been 220 million acres identified as WUI in the United States, with populations exceeding 120 million people residing in 50 million housing units. This has created a growth rate of 300 percent in the WUI, more than the general population growth rate for the same time period (IAWF 2013).

Wildfires in the west are increasingly costly in many aspects from suppression efforts to stop the fire, to the loss of life and property that is occurring annually. Suppression costs alone have increased over the last 30 years from $240 million to $2.1 billion in 2015 (NIFC 2015). This does not take into account the loss of life, homes, resource values, and infrastructure. In 2015, California lost 475 homes in the Butte Fire of 70,868 acres. The Valley Fire burned 76,067 acres destroying 1,280 single-family homes and 27 multi-family residences (FEMA 2015). The California Department of Insurance released an article indicating that these two fires alone totaled $1 billion

in insured losses as of January 2016. The $1 billion does not include all surplus insurance fire claims or damages to public infrastructure such as roads and utilities. Oregon, Washington, and Idaho also experienced a number of wildfires involving structures, such as the Lawyer Complex in Idaho that lost 50 homes and 75 outbuildings while the Okanogan Complex in Washington destroyed 154 structures and cost three firefighters their lives. Oregon's Canyon Creek Complex near the town of John Day also lost over 89 structures while over 900 residences were threatened.

Wallowa County was no exception in 2015. Several wildfires plagued northeast Oregon including the Grizzly Fire, which started on August 13th. At 83,148 acres, the fire threatened approximately 127 structures, the unincorporated town of Troy, and miscellaneous structures dispersed in the Eden and Bartlett Bench area north and west of Troy. Evacuation levels were put at "ready" with an estimated fire cost to date (March 2017) of $20.9 million dollars, including post-fire.

Title I of the HFRA – Hazardous-Fuels Reduction on Federal Land identifies the need for setting priorities collaboratively. Collaboration will be used to establish priorities, cooperate on activities, and increase public awareness and participation to reduce the risks to communities and surrounding lands (HFRA 2004). Additionally, the NHMP, section 201.6(b) states that it is ideal to reach out to high-priority Communities at Risk (CAR) to educate them on their risk and mitigation opportunities.

Increasing losses and suppression costs over the years have shifted emphasis for both structural and wildland fire managers to expand work in order to speed up establishing fire adapted communities throughout the west. A concerted effort involving fire agencies, cooperators, and members of the public is essential to its success. It is the desire of this CWPP to provide collaboration-based efforts that build toward living in fire prone environments and strive for adapting processes that create and maintain properties that can withstand a passing wildfire and allow for safe, defensible options for fire suppression resources to provide protection.

Public input was welcomed during the process through surveys and meetings. This input was incorporated into the mitigation action items listed below. It was found that since the first 2005 CWPP, local community protection projects in and near landowners homes have drawn a higher degree of interest and participation. Proximity of proposed treatment projects to homeowner property appears to play a key role in generating public interest.

Several members of the CWPP committee were also involved in a Cohesive Wildfire Strategy sponsored fire simulation in the spring of 2016, with various members of the local cooperators where additional issues were recognized during the simulation process.

The public survey forms provided concerns through input by those who participated. The Community Wildfire Protection Plan committee incorporated meeting results where emphasis was put on creating fire adapted communities within the county. The following issues, mitigations, and action items are a cumulative list developed from the multiple venues.

Goal - *Fire Adapted Communities* - Mitigation Action Items

Issue	Several responsibilities/duties have been identified with no known capacity or individual assuming the duties to ensure follow through with community and fire agencies.
Mitigation #1	**Develop a position of County Fire Coordinator that can accomplish multiple missions.**
ACTION ITEM(s)	1. List specific duties and responsibilities that need managing: such as database upkeeps. 2. Create job description that provides highest level of coordination between agencies or reach out to other counties currently supporting a Fire Coordinator Position 3. Pursue funding opportunities through multi-agency and/or grant monies. 4. Identify organization that would be best suited to host a position.
Rationale	– There are several programs that are currently being administered by multiple individuals and agencies. By having a coordinator, consistency can be accomplished in training fire qualifications, training programs, up to date resource inventories and databases, and plan developments. This position can take an active role in assisting with prevention, planning, and emergency response. Position could: – Create a single contact for public and fire agencies in all hands all lands implementation – Update CWPP on new information and completed actions. – Coordinate with adjacent counties on cross boundary information sharing or position sharing. – Coordinate training to increase rural certifications increasing overall wildfire response capacity. – Coordinate prevention and education efforts to include federal, state and local efforts that complement the NE Oregon NHMP and its identified Action Items MH # 8 Table 3 – 1 and Table 3 – 2. – MH#8 identifies the need to create a position for a Regional Hazards Mitigation Project Coordinator for Wallowa County.
Desired Condition	Integrates federal, state and local wildfire training, prevention and response.
How to implement and apply concepts	a. The position can be hosted by a local fire management organizations or consider a multi-county position to improve funding opportunities. b. Apply for two-year funding for a pilot position first. c. Reach out to geographic areas that currently support a similar position. d. Modify a current position description to meet the needs of Wallowa County.
CAR or areas directly in need	Countywide or multi-county wide with all agencies and community members
Timeline	
Funding Sources	**http://www.fema.gov/government/grant/iecgp/index.shtm**

Issue	Wallowa County Fire Prevention coop Program needs to send a consistent clear message in School Programs, prevention booths at public venues, human caused fire statistics and home owner education.
Mitigation #2	**Create a countywide multi-agency position to continue fire prevention work and build on the existing program to include home owner education.**
ACTION ITEM(s)	1. Develop a multi-agency funding mechanism to continue the position. 2. Develop a multi-level organizational structure for positions so community programs can continue to move forward with fire education. 3. Establish a Joint Information Center for all agencies. 4. Identify job share responsibilities for existing positions in one or more agencies.
Rationale	Having a multi-agency position allows for a common terminology and message for delivery to the public. In Wallowa County, human-caused fires made up 18 percent of all fires from 1999 to 2008 and 23 percent of all fires within the WUI Zone area. Potential benefits of this position would be to increase community connections; reduce the number of human caused fires through education and prevention programs; design a joint information center; involvement in the local Type III Incident Team Organization; prioritize and maintain an interagency blog. Presidential Policy Directive/PPD-8, 2011 recognizes actions taken to prevent natural disasters through integrated planning. This is consistent with the guiding principles of the National Cohesive Wildland Fire Management Strategy – rigorous wildfire prevention programs are supported across all jurisdictions. This position can develop a fire ecology message that can be presented jointly with fire prevention (CWS 2014).
Desired Condition	Reduce the number of human-caused fires within the county, increase the wildfire education, and provide fire adapted community solutions to the public through a multi-agency forum.
How to implement and apply concepts	a. Involve all agencies in developing an agreement to fund and manage this position. b. Seek out other positions of this type that can be tiered to meet Wallowa County needs. c. Possibly look at adjoining counties in developing a sub-regional/multi-county position to increase likelihood of a position and evaluate the needs of splitting it in the future. d. Incorporate responsibilities into a County Fire Coordinator position should one be approved.
CAR or areas directly in need	The WUI Zone is a high priority for reducing human caused fires. Entire county is desired.
Timeline	
Funding Sources	**Fire Prevention & Safety Grants through FEMA** -The Fire Prevention & Safety (FP&S) Grants are part of the Assistance to Firefighters Grants (AFG) and support projects that enhance the safety of the public and firefighters from fire and related hazards. Volunteer Fire Assistance (VFA Grants) Oregon.govWildland - Urban Interface (WUI) Grants

Issue	Low interaction and awareness of home owner regarding living in fire prone ecosystems. Need for a clear consistent multi-agency message.
Mitigation #3	**Develop public education programs regarding wildfire impacts on infrastructure and homeowner risks, options, and funding opportunities.**
ACTION ITEM(s)	1. Create a team designed for outreach that includes fire agencies and local residents to work with members of the public. 2. Identify successful case studies both in and outside the county and identify guest speakers who are home owners and have experienced wildfire. 3. Create educational programs tiered toward fire risk mitigation in specific communities. 4. Conduct field trips to areas that have already taken initiative – case studies, pilot projects, etc. 5. Support homeowners with "boots on the ground" concepts to provide onsite assistance. 6. Utilize recent wildfire issues that played a key role in protecting life and property. i.e.: road access, structure composition, property treatments.
Rationale	Collaboration of fire management agencies, cooperators, and residents within the county is vital to creating a true fire adapted community. Understanding existing conditions that lead to fire risk is essential in creating defensible space, home survivability, and safe deployment of fire-fighting personnel. Oregon State Fire Marshal Strategic Plan 2015 – 2019, Goal 1 – Engage communities and stakeholders in Office of State Fire Marshal programs and services. The CWS provides a National Communication Framework for implementing communication that enhance and sustain collaboration. HFRA, CWS, and NHMP place emphasis on collaboration with Communities at Risk and landowners to develop the most effective mitigation plans and highest level of public awareness regarding wildfire risks. Consistent with NE Oregon NHMP Multi-Hazard Action Item MH#4: Develop and implement education and outreach programs to increase public awareness of the risk associated with natural hazards (including wildfire).
Desired Condition	An all-inclusive community understanding and involvement in wildfire risk reduction and fire education.
How to implement and apply concepts	a. Work with local fire science programs at high school and college level to design an accredited course (even one hour credit) to draw interest. b. Utilize a Public Information/Fire Prevention position to take lead and work with fire agencies in getting the message out to communities. c. Use Mailer messages as a venue to get the word out. d. Provide opportunity for members of the public to observe wildfire simulation exercises to better understand the process and complexity. e. Utilize existing programs such as FIREWISE, Ready-Set-Go, Wildland Urban Interface Toolkit, Roles in Fire-Adapted Communities (FEMA)
CAR or areas directly in need	Wallowa County Cooperators and Landowners Initial focus should be the Extreme Risk CARs – **Allen Canyon/Bear Creek, Imnaha, Lostine Corridor, Wallowa Lake/Ski Run**; then High, Moderate, and Low unless specific attributes warrant immediate attention within those CARs
Timeline	
Funding Sources	Grants for Mitigation and Assistance to Communities https://www.fema.gov/hazard-mitigation-grant-program

Issue	Multiple locations throughout the county both in and outside CAR boundaries where high recreationists or groups gather on an annual basis.
Mitigation #4	**Develop individual fire plans, evacuation plans, and defensible space plans for these locations.**
ACTION ITEM(s)	**1.** Work with activity organizers on annual dates and extent of geographic areas used. **2.** Educate landowners/organizers on fire risk develop individual Fire Plans that include fire risk mitigations, Ready-Set-Go, Specific evacuation protocols; contacts; etc. **3.** Address each agencies mission and priority for protection with a focus on the protection of life, resources, and property. **4.** Overlap location of events with protection status to determine a lead agency.
Rationale	Several areas throughout the county receive high visitor use during the height of fire season. Many of these areas support week-long summer camp style settings for children and young adults. Some of these sites are high recreation/visitor use areas located a distance from protection resources. With limited fire resources, these plans can provide preparedness opportunities. A fire plan will provide for some common knowledge protocols outlining protection of life as the number one concern. CWS stresses the importance to promote community and homeowner involvement when planning and implementing actions to mitigate the risk posed by wildfires. Presidential Policy Directive/PPD-8, 2011 recognizes wildfire preparedness in terms of actions taken to plan, respond to and recover from wildfire threat. Consistent with the NE Oregon Regional NHMP – Multi-Hazard Action Item MH #9 that states: Develop a warning and emergency evacuation protocol for vulnerable populations.
Desired Condition	Each gathering site should have an individual plan designed to reduce fire risk and protect life and property.
How to implement and apply concepts	a. The agency with protection authority for the area should take the lead on the coordination and plan development. b. If the area is not under protection authority, determine a lead in cooperation with local fire agencies. (Prevention personnel, County Coordinator) c. Onsite visits and opportunities for public education could be incorporated with fire risk mitigation reduction efforts. d. Assist landowner and/or event coordinator in completing a fire plan that can be shared with publics, gathering groups, protection agencies, and local dispatch units. e. Conduct practice drills involving key participants in the event of plan implementation.
CAR or areas directly in need	Chief Joseph Summer Camp, Structures and Trails at the top of Wallowa Lake Tram; Lostine Corridor Trail Head; 3900 Road between Salt Creek Summit and Halfway;
Timeline	
Funding Sources	Grants for Mitigation and Assistance to Communities https://www.fema.gov/hazard-mitigation-grant-program **Fire Prevention & Safety Grants through FEMA** -The Fire Prevention & Safety (FP&S) Grants are part of the Assistance to Firefighters Grants (AFG) and support projects that enhance the safety of the public and firefighters from fire and related hazards. Volunteer Fire Assistance (VFA Grants) Oregon.govWildland - Urban Interface (WUI) Grants

Issue	There is limited coordination for fire risk and fire emergency with local cooperators. i.e.: utility companies.
Mitigation #5	**Develop relationships with companies/cooperators that are likely to increase risks during a wildfire event (gas/powerlines) or be involved in fire suppression situations.**
ACTION ITEM(s)	1. Utilize cooperators list developed during CWPP process. 2. Conduct several additional meetings revolving around cooperators' potential impacts to fire suppression efforts. 3. Identify fire suppression role cooperator may be involved with at time of a fire. 4. Continue to improve relations and incorporate cooperators into the fire simulations in advance of fire season to educate all involved on potential interactions. 5. Include changes and information in the CWPP updates.
Rationale	During May 2016, some cooperators participated in the fire simulation conducted by Wallowa County fire management agencies. This resulted in education of all parties on both the impacts of fire suppression and the overall likely involvement by cooperators. Some cooperators were involved only initially while others were involved for the entire fire duration. Current unforeseen risks can be communicated by working with cooperators ahead of time, providing opportunity for corrective actions prior to a fire incident. CWS supports mitigation strategies that ensure protection of infrastructure and values such as transportation, utilities, etc. The NHMP 201.6(c) (2) and (c) (3) – Identifies the need to described and involve infrastructure and critical facilities in hazard areas. The NHMP link to the CWPP states the CWPP should include critical human infrastructure as part of the planning process and if the projects protect infrastructure or community values.
Desired Condition	Cooperators are involved in both fire prevention efforts, supporting suppression efforts, and post fire restoration.
How to implement and apply concepts	a. Send out letters to local cooperators identified in CWPP process. b. Increase cooperator types and numbers in the Fire Simulations. c. Conducted annual meetings with cooperators to share information on changes to cooperator coverage areas, fire protection coverage, and/or lessons learned from past fire experiences. d. Update agreements, plans, and CWPP to address new information. e. Develop opportunities for fire prevention; examples include railroad fires, powerline fires. f. Establish company/cooperator roles in advance of wildfire events to avoid confusion.
CAR or areas directly in need	(Idaho, Avista, and Pacific) Power companies, Gas companies, American Red Cross, Local and State Law Enforcement, Railroad. High Power Transmission lines run through the entire county servicing as the city of Spokane Washington, population 200,000 plus.
Timeline	
Funding Sources	U.S. Fire Administration Grants: https://www.usfa.fema.gov/grants/ FireGrantsHelp.com

Issue	Home composition is a contributing factor to ignitability and many structures are at risk.
Mitigation #6	**Wildfire Managers and land planning in the County continue to work closely to include and develop new protocol for addressing existing home conditions and new home construction to improve wildfire survivability.**
ACTION ITEM(s)	1. Educate the public in structure vulnerability and simple modifications that improve chance of positive outcome during wildfires. 2. Review codes for Fire Siting Standards via Planning Department to educate homeowners on required practices. New home construction considerations should include wildfire mitigation. 3. Work with interested landowners to be an advocate and local spokesperson on the importance of home preparations. Develop home improvement checklists for easy use.
Rationale	– The number of structures located in forested/grassland areas is continually increasing in comparison to the stagnant level of protection resources. In an effort to increase home protection and structure survivability fire siting standards should be applied to new construction. . Wallowa County Land Use Planning Section 25.080 Natural Hazards (including wildfire) and Fire siting standards provide information for new construction. – CWS - The management option of developing building codes where ordinances will have a positive effect on reducing home loss was likewise considered. – Oregon NHMP & CWPP Integration Guide recommends the reduction of structural ignitability as part of Established Fuels Reduction Priorities. – OAR 477.059 Obligation of landowner to comply with standards….(A) Fire hazards or risks on land within a forestland-urban interface due to the presence of structures or the arrangement or accumulation of vegetative fuels (B) Other fire hazards or risk or combination. Oregon Forestland Urban Interface Fire Protection Act enlists the aid of property owners to turn fire-vulnerable urban and suburban properties into less-volatile zones where firefighters may more safely and effectively defend homes form wildfires.
Desired Condition	Decrease potential for structure loss through ignitability and improve defensibility of structures throughout the county that provides a safer defensive zone for firefighters.
How to implement and apply concepts	a. Boots on the ground working with landowners. b. Establish future home construction building specifications. c. Conduct field trips and/or case studies to reinforce the concepts of defensibility. d. Continue to provide information on Firewise and other tools for reducing fire risk. e. Utilize Senate Bill 360 – Residential Assessment Checklist f. Reference Oregon.gov ODF-Fire Prevention Checklists and FEMA Fact Sheet for Federal Insurance and Mitigation Administration on g. Identify, create a list, and meet with homeowners associations and communities h. Provide financial incentives to treat property through biomass utilization, free dump days, and debris pick up sites.
CAR or areas directly in need	Priority should be CARs with Extreme Fire Risk Ratings – **Allen Canyon/Bear Creek, Imnaha Corridor, Lostine Canyon, Wallowa Lake/Ski Run** – followed by High, Moderate, Low ratings. Standalone attributes that rank out as Extreme and contribute to potential structure loss may be addressed individually. All communities and residents.
Timeline	
Funding Sources	Wildland-Urban Interface (WUI) grants

Issue	There is a lack of communication in conveying the current conditions of fire season (threat) and getting the message out for fire prevention and restrictions.
Mitigation #7	**Look at establishing an AM Radio station for summer fire weather forecasts, Public Fire Use Restrictions, and Wildfire Updates. Create a consistent and a clear communication that provides consistent message with a focus on Wallowa County.**
ACTION ITEM(s)	1. Follow Process outlined in the Federal Communications commission on How to Apply for a Radio or Television Broadcast Station. 2. Establish an interagency team to Obtain Radio Frequency and handle logistics of the Radio Station – building location, personnel needed, message template etc. 3. Utilize additional message outlets to get the information distributed: web sites, blogs, Facebook, etc. 4. Look at all options including an internet radio station. 5. Research other areas that have developed a radio station and gather information from other successful projects. 6. Improve sign program throughout the county to provide messages and updates.
Rationale	– This creates a collaborative effort on informing the public on fire information. The public is often confused on the rules and regulations of fire restrictions between agencies. Federal and state guidelines are not consistent across boundaries and utilize different protocols to band debris burning, campfires, and forest use. There is a lack of education and understanding of the rationale behind the regulations. – The National Wildfire Coordinating Group through *Wildland Urban Interface Wildfire Mitigation Desk Reference Guide* 2014 promotes common wildfire mitigation language and culture. – Oregon State Fire Marshal Youth Fire Prevention and Intervention Unit emphasize a collaborative fire service and community agencies program to develop and distribute prevention education. Cooperate with local, state, and national organizations to support professional and program development. – OAR 477.406 (1) The forester and a forest protective association may enter into a contract or agreement with each other, or jointly, …… for the prevention and suppression of fire on forestland or on land other than forestlands or both, to prevent and suppress fires.
Desired Condition	Fire agencies send a clear consistent message to forest users during fire season. A public radio station that provides up to date, accurate fire information to reduce confusion and questions about fire use restrictions and local wildfires.
How to implement and apply concepts	a. Work with local PIOs/Prevention Officer to incorporate radio information in workshops and school education programs. b. Seek interest in local members of the public that are interested in volunteering in their community or retired fire personnel in the community. c. Develop Message Outline Templates that are "fill in the blanks" and can be modified with changing conditions. d. Assign duties to an already established position within the county or a group to oversee the communications. e. Provide opportunities for college internships to help with workload.
CAR or areas directly in need	Wallowa County and communities.
Timeline	
Funding Sources	Collaborative Operations and Services Grant Program - http://www.cpb.org/grants/collaborative-operations-and-services-grant-program The Grant Center for Public Media - http://www.apts.org/grantcenter

Issue	Wallowa County's economic stability could be significantly impacted by a wildfire. It is a high concern that the local economy could be severely impacted long term if large scale, high intensity fires occur in the county.
Mitigation # 8	**Preserve and sustain wood products, view sheds, and recreation opportunities throughout the county.**
ACTION ITEM(s)	1. Treat "middle ground" areas within the WUI Zone aggressively through a landscape approach where homogeneity can promote large scale wildfires. 2. Develop new utilization opportunities during vegetation treatment projects. 3. Explore creative project and implementation plans for fuels and vegetation treatments across ownerships lines. 4. Ensure wood products meet local needs through pace and scale while benefitting CWPP goals: firewood, biomass, timber, and forest products.
Rationale	– Wallowa County is reliant on a healthy land conditions in order to sustain economic stability. Local economics rely on highly diverse forest products such as timber, firewood, post and pole, forestry education programs, recreation (hunting, fishing, hiking/biking, and sightseeing), ranching, and product gathering. Visitor spending is in the millions annually, with a high percentage coming from forest-related uses. **(See Chapter IV)** – CRF-2011-title44-vol1-part 206 Federal Disaster Assistance 206.435 (c) Other considerations. Consideration should be given to measures that are designed to accomplish multiple objectives including damage reduction, environmental enhancement, and economic recovery, when appropriate. – Oregon Department of Forestry continually invests in Oregon's environment to grow healthy forests. Using sustainable forest management tools that protect, maintain, and restore forest health to ensure Oregon's forest will remain a valuable asset. – CWS identifies West as needing landscape-scale changes in vegetative structure and fuel loading to significantly alter wildfire behavior, reduce wildfire losses, ensure firefighter and public safety, and improve landscape resiliency (CWS 2014).
Desired Condition	To have Wallowa County community economic stability designed to anticipate and meet current and future needs under a multi-year program.
How to implement and apply concepts	a. Landscape treatments should include multiple treatment tools, including biomass utilization, timber products, etc. b. Develop Pilot Projects or Study areas to implement and evaluate success/comparison of treatment methods. c. Expand on across-boundary treatments to create a larger wildfire risk mitigation area. d. Although high risk areas exhibit poorer vegetation conditions or a higher fire threat, provide opportunities to *maintain* low risk areas and *improve* moderate risk areas concurrently during project planning and implementation. e. Accelerate plan development; provide and streamline opportunities on both private and public lands that benefit local economies. f. Considerations of public input during planning in an effort to reduce comments later in the process. g. Create firewood programs that include both live and dead products, particularly where ladder fuel reduction is a fire mitigation objective.
CAR or areas directly in need	CARs that rank as Extreme Fire Risk – **Allen Canyon/Bear Creek, Imnaha Corridor, Lostine Canyon, and Wallowa Lake/Ski Run.** Including the WUI Zone "middle ground" areas surrounding the CAR. Remaining WUI Zone and communities at risk should be next priority. Areas beyond the WUI Zone and CAR should be considered if it logistically and economically makes sense for implementation. Remaining location in the county that are not listed in the criteria above.
Timeline	
Funding Sources	Biomass Grant Resources - https://www.oregon.gov/ODF/ForestBenefits/Pages/Biomass.aspx Search engine for Grants - Grants.gov

Issue	There is lack of education in communities on citizen's responsibilities. There is a need to improve a collaborative approach in taking ownership for fire risk mitigation, and create a post-fire rehabilitation program.
Mitigation # 9	**Design an education campaign that is all-inclusive in terms of wildfire preparedness, prevention, evacuation, post-fire restoration efforts and assistance, and living in a fire prone ecosystem.**
ACTION ITEM(s)	1. Present the benefits of being in a fire protection program, tier this to Fire Adapted Communities Mitigation # 6 for the education campaign. 2. Educate citizens on any individual fire and/or evacuation plans that may be developed for their community. Provide information to homeowners for better understanding of Evacuation protocols 3. Educate public, agencies, and cooperators of Post Fire measures a property owner can take to expedite recovery efforts. Include potential financial, ecological, and emotional impacts. 4. Provide the public with a current assessment of the county's fire threat, fire effects, and fire risk. 5. Provide multiple education forums throughout the year to that cover: all hands all lands concepts, landowner responsibilities, what to expect pre/during/post fire.
Rationale	– The 2015 fire season (Grizzly Fire) provided an example of overwhelming support by the community for our firefighting personnel, and yet illustrated lack of preparedness pre, during, post wildfire. – Promotes partnerships between landowners, fire agencies, community members, to improve understanding of living in a fire prone ecosystem. – CWS identifies the following national objectives to be a focus at the local level; promoting evidence-based wildland fire prevention communications and education; improve stakeholder and public knowledge of wildland fire fundamentals. – FEMA has teamed with Firewise communities, the Federal Alliance for Safe Housing, and the Institute for Business and Home Safety to provide a resource for rebuilding after a wildfire. – The National Wildfire Coordinating Group through *Wildland Urban Interface Wildfire Mitigation Desk Reference Guide 2014* Recognizes Fire adapted communities, Firewise, Ready Set Go, Living with Fire (2) and whole community approach – Consistent with NE Oregon NHMP Multi-Hazard Action Item MH#4: Develop and implement education and outreach programs to increase public awareness of the risk associated with natural hazards (including wildfire).
Desired Condition	A thorough consistent message presented to the public. Have an overwhelming high level of knowledge in communities of necessary steps to living in fire prone environments.
How to implement and apply concepts	a. Provide case studies, conduct site visits, use community volunteers to provide success examples. b. Utilize the local PIO/Prevention Officer to organize outreach and education forums. c. Share Checklists provided on Oregon.gov for fire prevention, fire programs and post fire land assistance. d. Develop activities within the community that involve local firefighting resources to build trust and public relations. For example, Monthly drawings for free mitigation treatments to promote boots on the ground, awareness, support and visibility of fire agencies. Design meetings and booths around public gatherings that draw large crowds. e. Integrate information into education through public forums/school programs/prevention workshops. f. Use FireWise, Ready-set-go concepts, Keep Oregon Green are some avenues to use to help mitigate public confusion before, during, and after a wildfire event.
CAR or areas directly in need	All CARs
Timeline	
Funding Sources	Grant search engine - Grants.gov

Issue	There is a lack of understanding on smoke management issues and emission trade-off between prescribed burning, field burning, and wildfire.
Mitigation # 10	**Include smoke emissions information in public education forums on wildfire mitigations, project development, and treatment tools.**
ACTION ITEM(s)	1. Provide understanding and education on differences between prescribed burning and wildfire smoke emissions. 2. Build countywide awareness and flexibility regarding nuisance smoke during prescribed burning activities. 3. Review state smoke regulations that may currently impede successful implementation and achievement of wildfire mitigation objectives. 4. Educate the public on cost benefits of prescribed burning where removal is not an economically viable option.
Rationale	Emissions trade-offs through utilizing management-ignited fire over wildfire has shown that fewer emissions occur from management ignitions. Prescribed fires generally produce two to four times less smoke than wildfires (Ottmar, 1996). Additionally, the cost of fuels reduction through prescribed burning will be significantly less than wildfire suppression, and increases the likelihood of successful future suppression efforts in those areas. The HFRA assessments should evaluate the potential for vegetation treatments, such as mechanical treatments and prescribed fire, to reduce the risk. Prescribed fire is one tool resource manages use to reduce fuel and improve forest and range conditions.
Desired Condition	Leniency of smoke emissions released during management-ignited fires where objectives are related to wildfire mitigation, community protection, and future emissions reduction.
How to implement and apply concepts	a. Oregon.gov education management tools: brochure, guides, opportunities. b. Provide case studies and field visits pre and post burning for understanding of burning effects compared to wildfire effects. c. Initially focus prescribed burning in areas such as “middle ground” locations or where there is individual landowner interest. d. Develop allowances for smoke impacts when fire mitigation is the primary purpose. e. Acquire and place additional smoke emission detection systems throughout the county to display comparisons of prescribe burning and wildfire emission. f. Team with Oregon Prescribed Fire Council in support of EPA’s Exceptional Events Rule (EER) changes of language in the revisions regarding management-ignited fires that meet pre-planned objectives. (including proposed rules: FR 72866, FR 75384 g. Establish research opportunities for individuals such as Roger Ottmar from Seattle lab that specializes in emissions. h. Provide landowners with multiple treatment options and their impacts on emissions.
CAR or areas directly in need	Wallowa County and local communities.
Timeline	
Funding Sources	

Restore and Maintain Landscapes

Goal: ***All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.***

In 2013 Thomas Tidwell, Chief of USDA Forest Service presented a Wildland Fire Management status before the Committee of Energy and Natural Resources, U.S. Senate on June 4, 2013. He provided a definition of restoration as:

> *"By restoration, we mean restoring the functions and processes characteristic of healthier, more resistant, more resilient ecosystems, even if they are not exactly the same systems as before.*
>
> *Approaches to restoring fire-adapted ecosystems often require treatment or removal of excess fuels (e.g. through mechanical thinning, prescribed fire, or a combination of the two), reducing tree densities in uncharacteristically crowded forests, and application of fire to promote the growth of native plants and reestablish desired vegetation and fuel conditions."*

The CWS and CWPP goals recognizes that many geographic areas support ecosystems that are dependent on fire disturbance as an influencing agent not only for florae, but for all biotic life, including wildlife, aquatics, and insects. Guiding principles and core values outlined in the CWS make saving lives its number one priority yet recognize the importance of taking into consideration the need to sustain fire resilient ecosystems. These principles and values include:

a. *Reducing risk to firefighters and the public as the first priority in every fire management activity.* Designing large scale management activities that mitigate fire risk on the landscape will not only provide opportunities for successful fire suppression but change fire behavior where fire crew personnel can actively engage in suppression.
b. *Actively manage the land to make it more resilient to disturbance, in accordance with management objectives.* A resilient landscape achieves multiple fire management objectives, including restoration of ecosystem functions, opportunities to alter fire behavior for effective suppression efforts, overstory vegetation retention post fire, maintenance of previous management investments, and move stands to a more historical condition.
c. *Wildland fire, as an essential ecological process and natural change agent, may be incorporated into the planning process and wildfire response.* The Blue Mountains, which include Wallowa County, supports a mean fire return intervals in dry and mesic forest types of 23 years (Heyerdahl 1997, Powell 2011), which in ecological terms is a very short interval. Planning projects, particularly in the "middle ground" locations of the WUI Zone should be designed with this in mind.

Decades of successful fire suppression have provided opportunities for ecosystems to become overstocked, in effect elevating the level of ecosystem damage on landscapes. Managing for landscape resiliency improves overstory sustainability post-wildfire, providing opportunities for natural regeneration and modification of wildfire behavior.

Landscapes throughout the United States, particularly in the west, have seen significant changes in forest conditions. Millions of acres of forestlands in the Western United States contain a high accumulation of flammable fuels compared to fuel conditions prior to the 20th century, which in turn have posed an increasing fire hazard for many decades (GTR 120, Skinner and Chang 1996, Covington and Moore 1994, Arno and others 1997, Hann and others 1997, Swetnam and others 1999). Fire exclusion over the last century has resulted in substantial buildup of surface fuels and increase in forest structure layers brought on by overstocking of forest trees. These changes have increased the susceptibility of once fire resilient stands. These conditions provide a ladder fuel, in which surface fires can transition into crown fires resulting in unprecedented fire behavior, stand mortality, and increased safety issues for firefighters and members of the public. Crown fire initiation is often influenced by fuel alignment from the ground to the canopy, with increased likelihood when sufficient fuel is available.

Prior to the 20th century, human and lightning caused fires frequently burned with low severity in most dry ecosystems throughout the west. In landscapes, the natural patterns of dry forest structure and composition favored low or mixed severity fires by maintaining a semi-predictable mosaic, which spatially isolated conditions that supported high-severity fires (Hessburg 2005). Hence, severe fire behavior and fire effects were uncharacteristic of dry forest-dominated landscapes (Hessburg and Agee 2003; Hessburg et. al., 1999a). High frequency, low severity fires acted as a cleansing agent for forest ecosystems by accomplishing several actions:

a. A control agent for regeneration, often promoting only the fire-tolerant, healthy trees.
b. Prevented forest fuels and biomass buildup
c. Maintained a low stand density by promoting open forest structures
d. Low densities promoted healthy stands, in turn lowering potential impacts from insects and disease
e. Promoted landscape and biodiversity through natural disturbance, creating heterogeneous ecosystems STOPPP

Large areas of western grasslands and fire-adapted forests are in need of restoration. The forest and rangeland health problems in the West are widespread and increasing, affecting wildlife habitat, water quality and quantity, and long-term soil productivity, while providing conditions for uncharacteristically large, severe, and costly wildfires, with increasing threats to human life and property (CWS 2014).

Forty-one percent of the WUI Zone is managed by the Forest Service, which comprise the highest single ownership portion of middle ground area. The U.S. Forest Service is governed by a variety of laws it must follow in carrying out federal forest policy. Included among these are, but not limited to: the National Forest Management Act, the National Environmental Policy Act, and the Endangered Species Act. All told, the United States Department of Agriculture (USDA) reports that more than 90 separate statutes affect management within the Forest Service. Tom Tidwell, the Chief of the Forest Service addressed the Committee on Agriculture Conservation and Forestry Subcommittee in the United States House of Representative concerning our national forest system and active forest management. Many of the mitigation action items developed by the CWPP committee were found to be consistent with issues brought forth in Chief Tidwell's address.

Issue	There is a need for creating both a resilient landscape and defensible space in the "middle ground" areas to increase protection opportunities for firefighter and community members.
Mitigation # 1	**Design projects that provide defensible space for suppression resources and communities while retaining ecosystem integrity in fire prone environments.**
ACTION ITEM(s)	1. Use the all hands – all lands approach to project planning 2. Collaboratively work together to develop landscape projects that's primary objective is saving lives with additional objectives that promote fire prone ecosystems. 3. Design projects for successful suppression in the middle ground area well beyond Communities at Risk. Combine these efforts with structure protection efforts. 4. Create a heterogeneity (diverse) landscape that is fragmented where landscapes and wildfire behavior are more representative of pre-suppression conditions that interrupt fire spread and promote surface fire spread. 5. Develop *landscape* fire behavior simulations to display any modification in fire behavior: example - Mark Finney FARSITE modeling
Rationale	– Wallowa County's ecosystems are fire prone. Proactive aggressive treatments in the middle ground areas that protect both ecosystems and communities are needed. This area between communities and more distant wildlands provides fire managers with key strategic opportunities in fire suppression. Because of the vast lands in the west, including Wallowa County, increasing the success of sustaining both ecosystems and communities in the event of a wildfire is imperative. The CWS 2014 and U.S. Forest Service Chief Tom Tidwell 2015, both clearly addresses the need for large landscape-scale changes in vegetation structure and fuel loadings to significantly alter wildfire behavior, reduce wildfire losses, ensure firefighter and public safety, and improve landscape resiliency. – Seventy-seven percent of the fires in the WUI Zone are lightning caused. Most lightning fires ignite outside of the communities creating opportunity for increased fire momentum toward communities. Grizzly Fire 2015, Canal Fire 1989, Falls Creek 2015. – This approach is consistent with the FS mission to sustain the health, diversity, and productivity of the Nation's forest and grasslands to meet the needs of the present and future generations (FS2017 budget overview).
Desired Condition	A landscape that provides opportunities for successful fire suppression well beyond communities and long-term ecosystem benefits.
How to implement and apply concepts	***a.*** Identify treatments that compliment objectives for both resilient landscapes and defensible space. ***b.*** Address attributes that could potentially impede suppression success such as fuels, topography, access, and home location. ***c.*** Encourage projects that promote survivability such as: strategic placement of fuel breaks and use of natural barriers; strategic types of treatments (encouraging fire tolerant species); maintenance of public road right-of-ways for defense. ***d.*** Present projects to Forest Collaborative to promote forward movement on implementation. ***e.*** Look at opportunities for including previously treated areas AND other county acres (big picture). Allows for maintenance of previous investments on the landscape and help avoid missed opportunities of areas outside CAR and WUI Zone. ***f.*** Develop Pilot Projects and/or work with University Students for research.
CAR or areas directly in need	WUI Zones surrounding CAR with Extreme ratings: Allen Canyon/Bear Creek, Imnaha Corridor, Lostine Canyon, Wallowa Lake/Ski Run. Attributes within the WUI Zones and CAR that contribute to crown fire potential, extreme fire rates of spread and flame lengths then the remainder of the county: Alder Slope, Davis Creek, Divide/Prairie Creek, Troy – Bartlett/Eden Bench,
Timeline	
Funding Sources	Good neighbor Authority – 2014 Farm Bill. Title IV –Omnibus Public Land Management Act of 2009 – promotes Collaborative Landscape Approaches

Issue	Current landscape conditions are conducive to large scale wildfire. There is a need for increased and new tool and treatment options that will maintain and promote the County's *economic* stability while protecting landscapes and communities for the future.
Mitigation # 2	**Explore project opportunities and consider a variety of treatment tool options during implementation. Promote utilization and a means to reduce potential economic impacts of wildland fire while protecting communities.**
ACTION ITEM(s)	1. Develop and promote new utilization opportunities of fuels and vegetation 2. Maintain all hands-all lands concept for resilient landscapes 3. Retain allotments and grazing opportunities 4. Preserve and sustain view sheds and other recreation opportunities 5. Increase pace and scale of projects. 6. Promote Biomass Utilization (small diameter wood materials) and community gathering programs.
Rationale	– Local forests provide significant economic stability from timber, firewood, recreation, hunting/fishing, and gathering, as described in Chapter IV. – Infrastructure (mills/contractors) support is essential for forest restoration of all types – The average Environmental Impact Statement, which is used for large forest management projects, takes 37 months (McClintock 2015). – Agencies need to continue to advance the Cohesive Strategy and treatment of landscapes through collaboration and the Accelerated Restoration Strategy to increase the number of acres and watersheds restored across the system, while supporting jobs and increasing annual forest products sales (Tidwell 2013). Simplify processes to expedite treatment within WUI Zone boundaries. – Consistent with FS approach of their value to communities. America's forests, grasslands, and other open spaces are integral to the social, ecological, and economic fabric of the Nation. People and the communities they live in depend on natural resources from forests and grasslands for their livelihoods and well-being (FS2017 Budget Overview)
Desired Condition	Restoration and retention of forested lands that encourage visitor use, allow for wood products, and sustain fire resilient ecosystems across the landscape.
How to implement and apply concepts	a. Utilize the Collaborative Forest Landscape Restoration (CFLRP) Program to restore large landscapes. CFLRP projects that will emphasize restoration across large-scale landscapes in order to reestablish natural fire regimes and reduce the risk of uncharacteristic wildfire. Reach agreement prior to decision. b. Table 9 of ODF - SB 357 Report to the Legislature on Federal Forest Management recommends promoting mechanisms that use small diameter material including: construction of infrastructure, renewable energy production standards/credits, Transportation credit for small diameter material. c. Attempt to utilize and provide local community members and infrastructures with wood products including firewood (live and dead), biomass, and timber. d. Continue to use natural and management prescribed fire inside the wilderness where current plans allow; develop Land Management prescribed fire plans for other areas where prescribed fire would benefit creating resilient landscapes.
CAR or areas directly in need	WUI Zone where Communities of High and Extreme risk are located. Remaining WUI Zone and CAR where restoration contributes to life and community protection. Other geographic areas in Wallowa County not specified as part of WUI Zone or CAR
Timeline	
Funding Sources	2014 Farm Bill expands the tools to support the Forest Service ability to accomplish restoration work on the ground (Tidwell 2015); http://www1.eere.energy.gov/financing/grants.html ; Oregon Governor's *Dry-Side Forest Health Collaboration Funding Package* 2013

Issue	Current planning processes are limited in project size. Resulting in ineffectiveness of fire behavior modification, ecosystem restoration, or improving suppression resource success in middle ground areas.
Mitigation # 3	**Increase Pace (speed) and (Scale) size of project planning and implementation.**
ACTION ITEM(s)	1. Produce watershed level planning that takes in big picture concepts to avoid multiple, small planning areas. 2. Identify NEPA obstacles. Lobby for and identify policies that support accelerating projects toward the implementation phase. 3. Take advantage of opportunities of similar treatments across jurisdictional boundaries. 4. Utilize categorical exclusions if appropriate to expedite planning without sacrificing project landscape approach. 5. Take collaborative approach to planning to reduce objection and litigation potential.
Rationale	– The average Environmental Impact Statement, which is used for large forest management projects, takes 37 months (McClintock 2015). Government Accounting Office provides successes of several Forest Service project managers for increase restoration project pace and scale. – There are currently efforts to identify and implement process improvements and efficiencies that help with increasing pace and scale of restoration, while also engaging the public and developing well-planned projects (Tidwell 2015). – Approximately 580,025 acres of Wallowa County are High or Extreme Fire Risk accounting for 31 % of the area. Budget Package 381 – Federal Forest Restoration Program states projects should increase restoration through collaboration and partnership; Collaborative Support should occur to increase the scale and quality of restoration projects: State and Federal Partnership will help increase the pace of project implementation (February 1, 2017). – Provide Categorical Exclusions where appropriate. Expedited and develop landscape scale projects whenever possible to achieve multiple CWPP objectives. Section 428 of the 2012 Consolidated Appropriations Act – authorizes the Agency to establish a pre-decisional objection process for projects.
Desired Condition	Landscape Scale projects will be the common approach for wildfire risk mitigation projects where restoring and maintaining landscapes is the primary goal!
How to implement and apply concepts	a. Use Good Neighbor Authority – 2014 Farm Bill. Allows the Forest Service to enter into cooperative agreements or contracts with States to allow the States to perform watershed restoration and forest management services on National Forest Systems (NFS) lands. b. Allows the Utilize the Collaborative Forest Landscape Restoration (CFLR) Program to restore large landscapes. CFLR projects that will emphasize restoration across large-scale landscapes in order to reestablish natural fire regimes and reduce the risk of uncharacteristic wildfire. Provide opportunities for input during the project planning phases. c. Approach projects through all hands – all lands concept. Create connectivity across diverse lands regardless of ownership (FS 2017). Continue to work with local landowners for a all-inclusive approach. d. Provide opportunities for external professionals where resource specialist's workloads may exceed capacity to be efficient. e. Use Land Management direction to its fullest to provide the best overall restoration and multi-objectives projects when and where appropriate.
CAR or areas directly in need	Extreme Wildfire Risk CARs – **Allen Canyon/Bear Creek, Imnaha Canyon, Lostine Corridor, Wallowa Lake/Ski Run and surrounding WUI Zone acres.** High Wildfire Risk CARs – Alder Slope, David Creek, Divide/Prairie Creek, Joseph, CAR and WUI Zone areas High and Extreme Fire Threat/Effects. Aggressive middle ground treatments.
Timeline	
Funding Sources	2014 Farm Bill expands the tools to support the Forest Service ability to accomplish restoration work on the ground (Tidwell 2015). Competitive grants and technical assistance contracts – Budget Package 381

Issue	Some areas have been previously treated, with no plans for maintenance of initial investment. These areas are ideal for increasing landscape diversity and retaining initial fuels reduction investments at lower costs.
Mitigation # 4	**These areas may not all be exhibiting a high or extreme fire risk, however planning opportunities should include previously treated areas to avoid unnecessary expenditures on additional analysis in the future and provides consistency with landscape approaches.**
ACTION ITEM(s)	1. Identify ALL previously treated areas falling within and in proximity to newly proposed landscape projects. 2. Incorporate previously treated areas into newly proposed treatment projects. 3. Include maintenance across all ownership. 4. Identify current shelf stock (Projects/NEPA) to be included and/or referenced in landscape planning analysis that already provides for maintenance.
Rationale	– Once treatments are achieved to move ecosystems to a more sustainable condition it is imperative to retain not only the investment, but the ecosystems themselves into the future. – The Healthy Forest Restoration Act Section 102(g) (8) requires the USDA Forest Service and DOI BLM to develop a process for monitoring the need to maintain treated areas over time. The HFRA Section 102. 16 U.S.C 6512 Authorized projects 5 (B): authorizes hazardous fuel reduction if the project will provide enhanced protection from catastrophic wildfire for the T&E species; and (g) (8) Monitoring and Assessing Forest and Rangeland Health - monitor the need for maintenance of treated areas, over time, in order to preserve the forest health benefits achieved. – Federal Wildland Fire Management Policy 2009 – Ecosystem sustainability. Agencies should use a full range of fire management options to sustain healthy ecosystems. – Cohesive Wildfire Strategy identifies as one of its primary goals – "Restore and Maintain Landscapes" Landscape treatments, regardless of tool used, must have a plan included for maintenance of investments for the future. Where allowed and feasible, manage wildfire for resource objectives and ecological purposes and continue and expand the useof prescribed fire to meet landscape objectives, improve ecological conditions and reduce the potential for high-intensity wildfires (CWS 2014). – Maintenance acres often can be treated at lower cost than initial entry.
Desired Condition	An organized plan and process of *long term* treatment rotations, across jurisdictions, that provide re-entry opportunities to maintain initial investments and sustain healthy ecosystems.
How to implement and apply concepts	a. Develop a pilot project or research opportunity to evaluate the cost benefit of retaining initial investments. b. Outline a schedule of maintenance treatments into the annual program of work (USFS and DOI- HFRA, p. 38). c. Look for opportunities for volunteer groups to assist with private landowner maintenance. d. Utilize local contractors on second entry prescribed burning where initial treatments have been completed, providing agency personnel to focus on first entry. e. Continue to use natural and management prescribed fire inside the wilderness where current plans allow; develop Land Management prescribed fire plans for other areas where prescribed fire would benefit creating resilient landscapes.
CAR or areas directly in need	WUI Zone and All Communities at Risk Areas within Wallowa County
Timeline	
Funding Sources	Pre-Disaster Mitigation (PDM) Grant Program – mitigation planning and projects primarily addressing natural hazards. (FEMA) 44 CFR 201 Mitigation Planning. https://www.fema.gov/pre-disaster-mitigation-grant-program

Issue	Deficiency of public education forums focusing on ecosystem restoration and sustainability.
Mitigation # 5	**Develop education and information sharing opportunities that address local landscape values and opportunities to collectively protect and improve upon those values.**
ACTION ITEM(s)	1. Establish education programs or customize already-developed programs to meet local needs. 2. Collaboratively work together with the county to reach out to a diverse audience. 3. Improve and expand communication between knowledgeable experts, scientists, program managers, and stakeholders to ensure the best information is conveyed. 4. Create local community-based partnerships to focus on resilient landscapes. 5. Provide a variety of actual case studies of successful management projects that have been implemented.
Rationale	- Destructive wildfires have occurred in both the Pacific Northwest and Southwest over the last decade. As a result, the public's perception of the fire environment is based on worst-case scenarios. Fire prone environments and ecosystem dependency on wildfires is not commonly discussed with community members and there is a need for education on ecosystem benefits and restoration treatments. - Current ecosystem conditions are continually posing a safety threat to fire-fighting personnel and members of the public. Demonstrating how past successes have changed the outcome of wildfires and where treatments have benefited not only defensible space but landscape resiliency is key to program accomplishments. - Increase knowledge of the goals, guiding principles, core values, and national priorities in fire and land management organizations; expand other stakeholder knowledge and understanding: improve stakeholder and public knowledge of wildland fire fundamentals. Improve/expand communications between scientists, managers, and stakeholders to ensure best available science and proven professional practices are used. (CWS 2014) - Effective collaboration at the community level is a cornerstone of all HFRA activities (HFRA). As communities identify themselves as at risk and approach Federal agencies to work collaboratively, joint development of plans and projects will ensure that investments in hazardous fuel reduction are the most economical and effective ways to reduce risk (HFRA). Managing the Impacts of Wildfires on Communities and the Environment – 2000 states, " work directly with local communities to improve community fire-fighting capacity and coordination, implement restoration and fuel reduction projects, and expand education and risk mitigation efforts in the WUI."
Desired Condition	A collaborative program geared toward living in fire prone ecosystems that creates an informed public of all ages.
How to implement and apply concepts	a. Develop a program of fire prone ecosystems into a comparable forum similar to the fire prevention program. Combine efforts with adjoining counties and landowners. b. Capture successes of treatments vs. wildfires in non-treatment areas to demonstrate effectiveness of management. c. Consider using local PIOs and County Fire Coordinator (if created) to work together in the county. d. Provide a comparison of costs of treatments verses suppression. e. Work with local communities, county, and colleges for guest speaker opportunities. Identify local and educational platforms that are open to guest speakers and/or subject matter experts. f. Start with internal education of agencies in order to provide consistent message. g. Develop pilot projects with landowners and/or provide on-site visits to managed areas that were successful.
CAR or areas directly in need	Wallowa County
Timeline	
Funding Sources	FEMA -Citizen Corps Program (CCP) bring community and government leaders together in emergency preparedness, planning, mitigations, response, and recovery. http://www.fema.gov/government/grant/hsgp/index.shtm#5

Issue	Lack of public understanding of importance of prescribed fire use and smoke management trade-offs where wildfires are concerned.
Mitigation # 6	**Educate community members of importance of fire in the ecosystem and associated smoke emissions.**
ACTION ITEM(s)	1. Collaboratively work together to provide consistent messages of why, how, when, and who should utilize prescribed fire. 2. Provide smoke emission comparisons for various types and stages of treatments against wildfire emissions. Look at both pre and post treatments on the landscape. 3. Develop a Pilot project website and a system for internal and external communications and public relations (Blue Mnt. CWS) 4. Collaboratively work with Oregon Smoke Management on emissions flexibility for prescribed burning.
Rationale	– Fire prone environments and ecosystem dependency on wildfires is not commonly discussed with community members and there is a need for education on benefits of "management prescribed fires" and smoke emissions tradeoffs. Prescribed fire is identified as a management tool that is not as severe under active prescribed fire regimes. Prescribed fire is one of the three primary means for managing fuels for ecological purposes and resource objectives. (CWS 2014). – Some areas within Wallowa County are non-accessible via motored vehicles and fit the characteristics where prescribed fire would be the appropriate management tool. – Prescribed fire is a specific management option identified in the CWS. Prescribed fire is on of the more effective and cost-effective and cost-efficient means of managing vegetation for multiple purposes, including hazard reduction, ecosystem restoration or maintenance, silviculture, and others. It is an effective tool in areas with fire-adapted or fire-dependent vegetation has evolved with fire (CWS 2014).
Desired Condition	Public understanding of importance of fire's role in the ecosystem and their role in living in fire prone ecosystems.
How to implement and apply concepts	a. Identify areas where prescribed fire is most appropriate during planning process. b. Invite subject matter experts to speak at local forums on emissions trade-offs. (Roger Ottmar – Seattle – PNW lab – 40 years research). c. Utilize Oregon Prescribed Fire Council to visit the county and work with local managers on getting message out to the public. d. Assess internal perspectives and educate agency personnel prior to public meetings for a clear consistent message. e. Provide information on living with fire and summer wildfire emissions verses prescribed fire emissions. f. Provide workshops, community meetings on benefits and role of fire in ecosystems through multiple venues: Wallowaology, local science classes, guest speakers (Paul Hessburg), etc.
CAR or areas directly in need	Middle ground area of WIU Zone and areas where landowners may have an interest in applying prescribed fire as a tool. Case by case basis. Other geographic areas in Wallowa County not specified as part of WUI Zone or CAR
Timeline	
Funding Sources	FEMA -Citizen Corps Program (CCP) bring community and government leaders together in emergency preparedness, planning, mitigations, response, and recovery. http://www.fema.gov/government/grant/hsgp/index.shtm#5 FEMA – Opportunity Title 10: Firefighters Charitable Foundations Grant – provide assistance to local fire/disaster victims, fire prevention education, volunteer fire department equipment purchase, community safety programs.

Issue	Wildfire Recovery often requires significant restoration work and funds not identified in local, state, or federal budgets.
Mitigation # 7	**Develop wildfire recovery information that identifies potential negative impacts from wildfire, potential locations of those impacts, lessons learned from past wildfires, and funding sources.**
ACTION ITEM(s)	1. Use CWPP mapped locations to display impact levels from wildfire. (Fire Effects Index mapping) 2. Include information on pre-fire planning and preparation measures (FEMA) being taken under the CWPP. 3. Develop protocols for process to acquire recovery funds based on variety of impacts and landownership. (Infrastructure, homeowners, erosion, re-vegetation, etc) 4. Design recovery information that is multi-jurisdictional to eliminate redundant efforts and confusion. 5. Use lessons learned on recent local recovery efforts. 6. Design recovery plans that are multi-resource multi-agency in nature that could be provided to Incident Management Teams to expedite recovery process.
Rationale	- Recovery from a wildfire can be emotionally and financially stressful for communities and landowners – providing recovery assistance is a key part of collaboration. - Wallowa County considers post-fire mitigations and rebuilding very important to minimize further impacts to life, property, and infrastructure. - Wallowa County is part of the Natural Hazard Mitigation Plan for NE Oregon that supports pre and post disaster mitigation project grants. This CWPP, the NHMP, and FEMA consider wildfire recover mitigations extremely important. - The National Cohesive Wildfire Strategy recognizes the need for planning for post-fire rehabilitation. - USFS and US Dept. Interior, *Community Wildfire Desk Guide and Toolkit* (2009), recognizes the importance of adequate post-fire resources. - By partnering with state forestry agencies there are numerous federal programs that provide grants to states and local governments to plan, prepare (mitigation measures) for wildfire emergencies.
Desired Condition	Collaboratively work together to expedite the healing process for landowners and landscape. Provide a conduit for communities to obtain often needed financial assistance during the wildfire recovery process.
How to implement and apply concepts	a. Utilize CWPP, West Wide Risk Assessment Values at Risk and Fire Effects Index maps to locate geographic areas of concerns and resource/value impacted. Reference FEMA protocols for Burned Area Emergency Response. b. For Technical and financial assistance for restoration activities at a minimum reference the Emergency Watershed Protection Program (NRCS), the Emergency Conservation Program, and Emergency Forest Restoration Program (both Farm Service Agency). c. Take advantage of Healthy Forest Initiative and HFRA's Categorical Exclusions for rehabilitation projects after a fire to proceed in full compliance with NEPA, but without the lengthy environmental and sociological documentation (HFRA page 4, 8).
CAR or areas directly in need	First focus on high and extreme (worse case weather) scenarios that would result in highest negative impacts, then low and moderate. All CARs and WUI Zone Then high and extreme effects in Entire County
Timeline	
Funding Sources	- FEMA provides grants and training for firefighting and for community responses to natural disasters. Projects to reduce the risk of future fires may also be eligible under FEMA's Pre-Disaster Mitigation Program. FEMA also provides support for states, counties, local fire departments, and communities to prepare for and recover from wildfires (CWS 2015). (Fed. Assist. For Wildfire Response and Recovery. 2015) - FEMA – Opportunity Title 10: Firefighters Charitable Foundations Grant – provide assistance to local

	fire/disaster victims, fire prevention education, volunteer fire department equipment purchase, community safety programs. - USDA, Farm Service Agency / US – loans and grants. https://www.fema.gov/news-release/2016/04/29/wildfire-recovery-update-federal-disaster-assistance-may-surpass-170-million - U.S Small Business Administration - https://www.sba.gov/loans-grants/see-what-sba-offers/sba-loan-programs/disaster-loans - Disaster Assistance - https://www.disasterassistance.gov/get-assistance/assistance-by-category

Summary

It was a acknowledged that wildfire suppression will continue to be a priority; as a result there is the need for preparation in advance of wildfires through agencies and landowners proactive actions toward structure composition and landscape scheme, adjacent vegetation treatments, and infrastructure design. Each of the goals of this CWPP plan was assessed for existing issues within Wallowa County, particularly in the WUIZ and Communities at Risk. Mitigation measures were developed based on those existing issues.

Fire management direction continues to emphasize the need for collaborative efforts when addressing wildfire issues. Goal achievement can be accelerated through education and collaboration. Identifying issues and solutions creates a shared ownership in achieving the three goals. During CWPP process several issues were brought forward through public meetings, stakeholder groups and committee discussions. Each issue fell within one of the three goals of this CWPP.

By designing current issues based on local fire management, cooperator, and public needs, the county was able to create opportunities by way of mitigation action items to mitigate wildfire risk while meeting the CWPP goals and objectives. Action items tiered to the mitigations is designed with the desired outcome in mind. It is also important to recognize that as conditions change, both spatially and temporally; modifications to the mitigations will and should occur as needed as new issues arise.

Several local, state, and federal policies and guidelines stress the importance of designing mitigation measures to reduce wildfire risk and protect life and property. This CWPP recognizes wildfire mitigation recommendations with reference to those policies and guidelines.

It is important to recognize that the primary initial focus should be the identified Communities at Risk and the WUI Zone lands. However, when projects are designed, areas adjacent to the CARs and WUI Zone must be considered as well to avoid missed opportunities of a full landscape approach project.

Bibliography

California Department of Insurance 2016. http://www.insurance.ca.gov/0400-news/0100-press-releases/2016/release009-16.cfm

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Ecological Restoration Institute. 2013. *The efficacy of hazardous fuel treatments: A rapid assessment of the economic and ecologic consequences of alternative hazardous fuel treatments: A summary document for policy makers*. Northern Arizona University

Federal Assistance for Wildfire Response and Recovery 2015. Congressional Research Service 7-5700 www.crs.gov R41858 Katie Hoover. Analyst in Natural Resources Policy September 18, 2015

FEMA 2015. http://www.fema.gov/news-release/2015/10/08/federal-disaster-assistance-tops-6-million-california-wildfire-recovery

Hessburg, Paul F.; Agee, James K.; Franklin, Jerry F. 2005. *Dry forests and wildland fires in the inland Northwest USA: Contrasting landscape ecology of the pre-settlement and modern eras* USDA Forest Service, Pacific Northwest Research Station, 1133 N. Western Avenue, Wenatchee, WA. College of Forest Resources, University of Washington, Seattle, WA

Hessburg, P.F., Agee, J.K., 2003. An environmental narrative of Inland Northwest US forests, 1800–2000. Forest Ecol. Manage. 178, 23–59, Fire Aquat. Ecosyst. (Special Feature).

Hessburg, P.F., Smith, B.G., Kreiter, S.G., Miller, C.A., Salter, R.B., McNicholl, C.H., Hann, W.J., 1999a. Historical and current forest and range landscapes in the Interior Columbia River Basin and portions of the Klamath and Great Basins. Part 1: linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. General Technical Report PNW-GTR-458. U.S. Department of Agriculture Forest Service, Pacific Northwest Research Station, Portland, OR, 357 p.

USFS 2004 and DOI Bureau of Land Management 2004. *The Healthy Forests Initiative and Healthy Forests Restoration Act, Interim Field Guide.*

IAWF International Association of Wildfire

Ottmar, Roger; Schaaf, Mark D.; Alvarado, Ernesto 1996. *Smoke Considerations for Using Fire in Maintaining Healthy Forest Ecosystems*

McClintock, Tom. 2015. Subcommittee on Forest Lands. Oversight hearing titled, *"State, Local, and Tribal Approaches to Forest Management: Lessons for Better Management of our Federal Forests."*

Tidwell, Tom 2013. Chief of the USDA Forest Service Statement before the House Committee on Appropriations, Subcommittee on Interior, Environment, and Related Agencies Concerning
President's Fiscal Year 2014 Proposed Budget for the USDA Forest Service April 26, 2013

Tidwell, Tom 2015. Chief of the USDA Forest Service. Statement before the Committee on Agriculture Conservation and Forestry Subcommittee, United States House of Representatives. Concerning The National Forest Systems and Active Forest Management April 29, 2015.

Websites

International Widland-Urban Interface Code, 2015. International Code Council, INC. 4051 West Flossmoor Road, Country Club Hills, Il 60478. http://codes.iccsafe.org/app/book/toc/2015/I-Codes/2015%20IWUIC%20HTML/index.html

OSFM 2015. Oregon State Fire Marshal Strategic Plan 2015 – 2019. http://www.oregon.gov/osp/SFM/docs/Administration/1156907_OSFM_Strategic%20Plan_2015-19-WEB.pdf

OAR 2016. Oregon Administrative Rules. https://www.oregon.gov/ODF/Pages/LawsRules.aspx

Oregon Fire Codes. 2014 COPYRIGHT © 2014 by INTERNATIONAL CODE COUNCIL, INC. ALL RIGHTS RESERVED. This 2014 Oregon Fire Code contains substantial copyrighted material from the 2012 International Fire Code, Fourth Printing, which is a copyrighted work owned by the International Code Council, Inc. http://ecodes.biz/ecodes_support/free_resources/Oregon/14_Fire/14_ORFire_main.html

FEMA 2017. United States Fire Administration- Wildland Urban Interface toolkit: NFPA 1142 and 1141 codes and standards https://www.usfa.fema.gov/wui_toolkit/wui_codes.html and http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1142

IX. Forest Conditions and Fuels Treatment Options

Introduction

Fire is an important regulatory phenomenon in forest communities of the Blue Mountains as well as most areas of the intermountain western United States (Gast et al. 1991). Historically, in pre-European settlement periods, the Blue Mountains burned with relative frequency in a variety of forest types. Forest types ranged from drier including ponderosa pine/Douglas-fir stand structures to moist mixed conifer type forests. Today's vegetation composition may not have necessarily be the same as vegetation that would have developed with historic disturbance regimes (Stine et al 2014). Drier sites generally experienced fires every 0 – 25 years, retaining predominately fire-tolerant species, while the historical vegetation of the moister mixed forest was controlled by frequent to moderately frequent fires (every <20 to 50 years) that burned with mixed severity, containing both low- and high-severity patches (Stine et al 2014).

During the dry season, wildland fires frequented the landscapes of Eastern Oregon, giving the area a blue tint from the smoke and haze, earning the mountains east of the Columbia Basin the Blue Mountains name. Many sites of the low and mid elevation areas where these fires burned, forests were park-like, dominated by fire-resistant pine, and on wetter sites, western larch (Mutch et al. 1993). Nearly every pioneer journals from in the nineteenth century described the Blue Mountains section of the Oregon Trail as lacking underbrush, wide open grassy areas with magnificent pine trees (Wickman 1992).

Fire disturbance on the landscape is an important component for ecological process and promoting healthy forests. Through history, wildfire acted as a cleansing mechanism, shaping stand structures and characteristics across the landscapes. Historically, fire interaction in Wallowa County's ecosystems accomplished several things.

1. Fire consumed dead material on the forest floor and prevented build-up of large quantities of forest debris.
2. Acting as a cleansing agent, fire killed some newly established regeneration, naturally thinning stands and preventing overstocking of landscapes and high competition for water.
3. Historic fires often burned as surface fires pruning lower limbs off the overstory trees thereby raising the height of the tree crown above the ground level (canopy base height). This sets the stage for future fires to actively burn with very little impact to overstory tree crowns.
4. Spatial extents of fires were often left unchecked, creating burning patterns that were mosaic, covered large areas with low intensities, and set the stage for minimal impact when another fire occurred in the area.
5. Frequent fires are often associated with lower smoke emissions due to shorter burning duration in grasses and fine fuels, versus current fires that exhibit high emissions from heavy ground fuels and fire-involved canopies.

6. Wildfires pre-1910 conducted periodic maintenance of the landscapes by killing non-fire tolerant species through natural thinning, leaving species that were fire resilient.

The wildland fire environment is directly related to fuel availability, which is directly related to fire frequency. Successful fire suppression brought to the forests in Wallowa County and throughout the northwest an absence of wildfires that historically acted as a cleansing agent by removing both live and dead fuel. A good analogy of the removal of fire from the environment would be similar to a homeowner to go 100 years without vacuuming floors the results would be a significant buildup of material.

When early explorers, missionaries, and settlers first entered the Blue Mountains in the mid-1800s, they encountered a vegetation mosaic that was the result of long-term wildfire interaction. Many areas were dominated by open, park-like forests of ponderosa pine, often with a luxuriant undergrowth of tall grasses reaching as high as their horse's belly. Those attractive landscapes had been created and maintained by low-intensity surface fires occurring at frequent intervals, usually every 8–20 years (Agee 1993, Anderson and others 1987, Cooper 1961, Franklin and Dyrness 1973, Hall 1977, Marouka 1993, Weaver 1947b).

The western United States has seen several shifts in the wildland fire environment. In 1910 large landscape wildfires occurred throughout the Northwest causing a change in fire suppression policies across the west. Wildfire starts were under the guidance of full suppression removing its interaction from the ecosystem. Through the mid-1970s to the present, there has continued to be a level of successful fire suppression. Forests that historically were accustomed to frequent low intensity surface fires were suddenly left without a cleansing mechanism.

However, those that do escaped initial attack (about two percent) today are exhibiting unprecedented fire behavior, resulting in stand replacement fires in locations that once supported low surface fires. As a result, Northeast Oregon currently has an overwhelming number of acres in need of forest management to transition the ecosystems to a closer representation of pre-European settlement open forests.

Forest Health Conditions

Fire exclusion in forests of the Blue Mountain Region of northeast Oregon has resulted in significant changes since European-American settlement. The forests of the Blue Mountains have evolved in the context of a disturbance regime dominated by fire (Agee 1996). Fire suppression over the past 80 years has led to significant accumulation of fuel, increasing the probability of catastrophic wildfire over much of the Blue Mountains landscape (Gast et al. 1991, Agee 1996). Inadvertently, the absence of fire over an 80 to 100-year period allowed Douglas-fir, grand or white fir to take over the forests, slowly replacing the pine and larch (Oester, et al. 1992. Forest Health in eastern Oregon).

A drastic change in the ecology of the Blue Mountains ecosystems began as a consequence of fire suppression, which became increasingly effective after the 1930s (Agee 1990). Changes to landscape environments over the last several decades resulted in unprecedentedly poor ecological conditions today. These negative impacts are often interrelated, producing a ripple effect resulting in multifaceted contributing factors. These factors include: encroachment of shade-tolerant, fire-intolerant species, stands at very high stocking levels in spaces which historically were open with a low number of trees per acre, high tree stress due to competition for water, and widespread impacts from insect and disease. Exacerbated by an extended drought in the Blue Mountains, they have led to unprecedented wildfire behavior on the landscape. The most recent of these occurred locally in 2015 near the town of Troy and at the same time also near Baker City. See Figure IX - 1 and Figure IX – 2.

Figure IX – 1. Photo of the Grizzly fire near the town of Troy. Oregon 2015. Photo by USFS

Figure IX - 2. The Windy Cornet fire outside of Baker City Oregon, 2015. Photo by USFS

Overstocking created ideal microclimate conditions across the Blue Mountains for insect infestation and disease. As early as the 1980s, landscape conditions in northeast Oregon experienced a budworm outbreak with high levels of tree mortality. In northeast Oregon, including Wallowa County, 655 million board feet of timber were lost to bark beetle between 1986 and 1991. An estimated 4 million acres were defoliated in 1991 alone by the western spruce budworm (Oester et. al 1992).

The lack of fire activity on the landscape allowed for additional increases in both stand density and fuels accumulation. Stand structure composition and spatial patterns on the landscape have also shifted. Today's landscapes are now more consistently uniform in nature, with most timbered stands exhibiting characteristics that contribute to extreme fire behavior.

Patch sizes of high severity have increased, leaving less low and moderate severity patterns on the landscape. Fire intensity (amount of heat energy generated) has increased, surpassing the past fire-intensity range, because of fuel buildup and "ladder" fuels enabling surface fires to move into the canopy (Agee 1994). Landscapes that were

once accustomed to surface fires are now experiencing thousands and thousands of acres of stand replacement fire. The Windy/Cornet fire south in Baker County, and the Grizzly Fire north in Wallowa/Umatilla County both burned with extreme fire behavior and exceeded 40,000 acres. If left untreated, stands will continue to experience larger patches of torching and crown fires and the potential for non-historical unprecedented extreme fire behavior.

Eliminating wildfire from the landscape is not realistic, particularly in a fire prone ecosystem where natural fires are the predominate source of ignition. Changing how fire burns on the landscape, however, is possible. A century of fire suppression, low pace and scale, delays in project implementations, treatment restrictions based on land base and limited commercial logging opportunities have compounded landscape conditions. Proactive management toward the goals of this CWPP will provide mechanisms for living with fire.

Influence of Fuels on Wildfires

Wildland fuel has always been classified as vegetative material that will burn. These fuels include dead and down material, live vegetation (trees, shrubs), lichen, mosses, and organic material such as duff (organic material immediately above the soil) and roots. Recently however, the increase of homes in forested areas has compounded an already complex fuel composition. As a result, fire and land managers have combined efforts to address the increasing difficulties of pre-fire planning, fuel modifications, and fire suppression.

Landscape fuels play a significant role in wildland firefighting. Stand and fuels structure influence several aspects of the wildfire environment such as: the likelihood of a fire ignition, fire behavior characteristics on the land including flame lengths and rates of spread, and how fire will spread on the landscape once an ignition does occur. In the wildland fire setting, fuel is the only constant in both the fire triangle requirements for ignition (heat, fuel, oxygen) and the fire behavior triangle (fuel, weather, and topography), referencing the influences of wildfire behavior characteristics.

Fire Triangle

Fire Behavior Triangle

Figure IX – 3. Fire Triangle – components needed for an ignition to occur. Fire Behavior Triangle – components that dictate how a fire will burn. Fuel is the common denominator between the two.

Even more importantly, fuel is the one component of both fire triangles where management activities can manipulate part of the fire equations and influence the fires

interaction on the landscape through planning and implementation well in advance of an ignition. It is important to know how fuel arrangements can affect fire behavior and what impacts fuels modifications can have on wildfire behavior. There are several layers of a forest fuel bed that influence wildfire.

Ground Fuels

- Duff - organic matter just above the soil such as some rotten logs and needle mat
- Mosses, litter, needle cast

Surface Fuels

- Woody fuel – small limb wood, logs, dead down fuels (large quantities can act as ladder fuels)
- Low vegetation – grasses, shrubs, herbs

Aerial Fuels

- Ladder Fuels - Tall shrubs/brush, suppressed understory
- Tree canopy – dominant and codominant overstory, suppressed understory, snags

Each of these fuel layers can be can be manipulated to create a change in the fire behavior environment. However, the focus of this document is on how management can play a role in altering the influence of surface fuels and aerial fuels on fire behavior.

Surface Fuels

Surface fuels consist of grasses, shrubs, litter, and woody material lying on, or in contact with the ground surface (Sandberg and others 2001). These fuels are often used as indicators of surface fire spread rates. Dead woody material is critical in predicting fire potential because they are controlled exclusively by their exposure to environmental conditions such as humidity, shading, proximity to soil that influence fuel moistures levels.

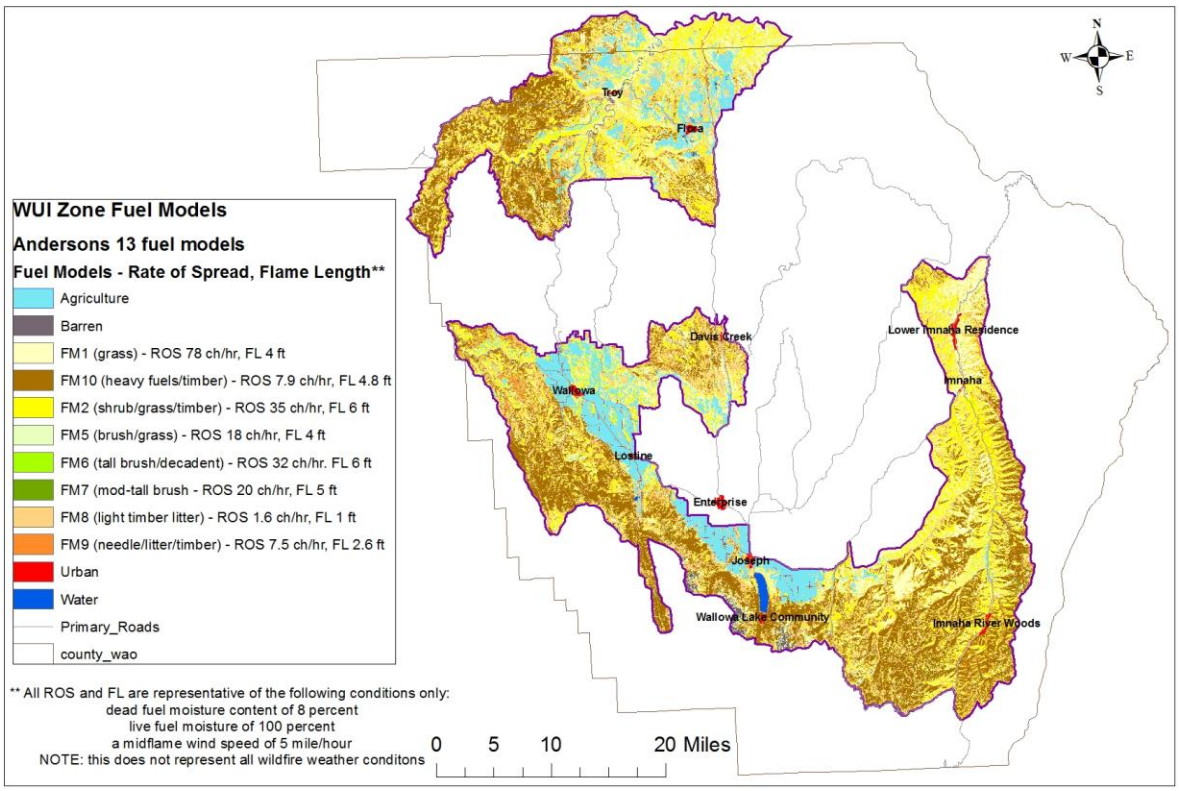


Figure IX-4. Fuel Model composition within the WUIZ. Data from the WWRA. Fire Behavior is based on Anderson 1982. Aids to Determining Fuel Models for Estimating Fire Behavior.

Live fuels in are considered a dynamic type fuel because fuel moisture levels will differ depending on which growing season phase is occurring. Live fuels have a high fuel moisture content in the spring growing season and begin to lose moisture and/or cure throughout the fire season, eventually losing most if not all their moisture content by mid-summer into the fall season. Many of the live surface fuels, particularly grasses, eventually transition into the dead woody material category increasing the available dead fuel available for burning and potential fire behavior as the season progresses.

Because there has been a shift in stand conditions, there has been a direct effect on fuel loadings. As stands become denser, there is more available woody material to contribute to the forest floor (Oliver et al., 1996). The shifting of stand conditions has contributed to higher than historic accumulations of dead, down woody material. Stand characteristics are directly related to and influence the amount, size and arrangement, and distribution of surface fuels at ground level, both live and dead. These surface fuels are often at the heart of crown fires since most ignitions initially begin as ground fires and transition to the canopy.

Different fuel treatment approaches can be designed for targeting various components of the fuel bed and stand structures. Prescribed burning or piling and burning woody debris will target surface fuels, while pruning and stand thinning will mainly target aerial fuels.

Fuel models are broken out into four groups: grasses, brushes, timber, and slash. Surface fuel mapping shows approximately 98 percent of the WUIZ is comprised of a variety of fuels including: grass, grass/brush, brush or timber litter with a down woody fuel component. Nineteen percent of the WUIZ is non-timbered grass or brush with the remaining 69 percent of the surface fuel nestled within timber. Wildland fuels makeup roughly 88 percent of the WUI Zone area leaving approximately 12% split between Agricultural (10.5%), Urban (.4%), Water (.4%), and Barren (.5%).

Timbered stands that have been allowed to transition, through the last 80 years, without disturbance have a higher likelihood of exhibiting a fuel model 10. This fuel model supports the highest component of fuel size classes with a high level of large fuels.

Fuel model 10 often displays greater fire intensity than the other timber models. The larger quantities of both fine fuels (0 – 3 inch) combined with greater amounts of large woody material from three inches in diameter to large logs increase fire behavior. Stands that support large woody material size and amounts also exhibit long residence times (when a fire sustains itself in one location for extended periods), resulting in possible additional fire effects in terms of destruction of organic soil material (soil sterilization), an increase erosion potential, and the loss of site productivity.

Sixty-nine percent of the WUIZ is timbered, of which 48 percent of the timber fuel loads that are outside of historic conditions. Crowning out, spotting, and torching of individual trees are all more frequent in this fuel situation, leading to potential fire control difficulties (Anderson 1982). Figure IX - 4 displays the landscape distribution of fuel model 10 within the WUIZ.

Aerial Fuels

Heavy down fuels, ladder fuels, and poor health of the overstory are prime conditions for high-severity fires. Crown fires caused by excessive fuel accumulation are generally a severe threat to ecological and human values as well as to infrastructure; they pose a major challenge to fire management (USDA Forest Service 2003).

Identifying attributes that contribute to torching/crowning prior to wildfire is important in order to successfully create conditions that allow for protection of life and property, create resilient landscapes, and satisfy the three goals of the Cohesive Strategy.

Aerial fuels are typically trees and other vegetation suspended above the ground, often in the form of tree foliage such as branches, needles, lichen, leaves, tall bushes, etc. Tree boles are included, but often play less of a role in fire behavior. Stand characteristics such as tree canopy cover, canopy cover distribution, tree crown ratio, and forest composition interact and influence the amount, composition and distribution of live and dead ground-level vegetation (Barnes and others 1998, Oliver and Larson 1990).

Historically, fires pruned the lower limbs of maturing trees or killed the trees entirely, leaving primarily healthy stands where large spacing occurred from tree to tree and open spaces from lower tree limbs to the ground. Suppressed understory, when allowed to persist in stands, creates a continuous fuel bed both horizontally and vertically across the landscape. The lower limb distance from the tree boles to the ground is known as the canopy base height. As fire-intolerant vegetation continues to accumulate on the landscape, forest stands become increasingly denser, creating a homogeneous low crown base heights resulting in an increased potential for crown fires in many forests of the Western United States (Cooper 1960, Dodge 1972, Van Wagner 1977, Parsons and DeBenedetti 1979, Bonnickesen and Stone 1982, Arno and Brown 1991, Agee 1993, Mutch and others 1993, Hann and others 1997). Changes in structure and composition have dramatically altered how wildfires now burn in these forests versus how they burned historically (Graham et al. 2004).

An increase in stand density also creates an increase of available fuels suspended above ground. These continuous aerial fuels escalate the likelihood of sustained crown fires, whereas breaks in stand continuity and structure can interrupt fire spread. The closer the gap from surface fuels to aerial fuels, the higher the potential for canopy involvement during wildfires. The greater the distance between surface fuels and the base of tree crowns, the more difficult it is for surface fires to torch trees or become crown fires. The increase in canopy bulk density (available canopy fuel in a stand) will increase the potential for a crown ignition to become an “independent” crown fire in which surface fuels no longer are needed to generate crown fire spread.

Photo 1

Photo 2

Figure IX - 5. Heavy crown fuels and low canopy base height provide pathway for overstory mortality and crown fire (photo 1), compared to high canopy base height and lower crown density (photo 2) where stands are likely to withstand a wildfire.

Ladder Fuels

Ladder fuels can be comprised of both surface and aerial fuels. Heavy down woody material, brush, understory growth, or overstory with low hanging foliage can provide a path for fire to move from a surface spread into the canopy. These stand characteristics can be a single contributory factor to canopy involvement during wildfires, or as more

commonly seen, they can function as one of multiple conditional factors working in concert to generate canopy involvement.

The shrub/small tree stratum is also involved in crown fires by increasing surface fire line intensity (heat/energy release) and serving as “ladder fuels” that provide continuity from the surface fuels to canopy fuels, thereby facilitating crown fires. These intermediary fuels essentially bridge the vertical gap between surface and crown strata. The size of this vertical gap is critical to ignition of crown fire from a surface fire below (Van Wagner 1977).

Down Woody (Fuel Model 10)

Combination brush/second growth

Figure IX - 6. Examples of ladder fuels that promote the transition of surface fires to crown fires. Photos taken in Wallowa County

A century of widespread fire exclusion combined with the reduction of active forest management has resulted in a buildup of surface fuels and the overstocking of forests with trees and ladder fuels (CWS 2014). As a result, forest and rangeland health problems in the West are widespread and increasing, affecting wildlife habitat, water quality and quantity, and long-term soil productivity, while providing conditions for uncharacteristically large, severe, and costly wildfires, with increasing threats to human life and property (CWS 2014).

Wallowa County’s WUIZ is comprised of an extensive amount of area with a canopy base height in close proximity to the surface fuels at ground level. Sixty-nine percent of the WUIZ is forested and 31 percent of the WUIZ is non-forested.
The forested lands is comprised of a high percentage of low forest canopy vegetation. Forested areas within the WUIZ were broken out based on lower limb height above ground level and revealed the following:

- forests that support a very low canopy near the forest floor of two feet (24 inches) or less above ground accounts for 61 percent of the forested areas,
- 20 percent of the forested areas were between two and four feet above ground,
- 10 percent between four and six feet ,
- 5.5 percent between six and 10 feet

- only 2 percent of forested areas had lower limbs between 10 and 20 feet above ground
- with an additional 2 percent extending 20 feet or more above ground level. Figure IX-5.

A fuel model 10 heavy down woody material, exhibits an average of 4.8 feet flame length based on environmental conditions given in Figure IX – 4. This indicates that in very dry summer conditions the flame lengths can be expected to be much higher. This combined with roughly 91% of the timbered stands supporting low canopy base heights, tree crown involvement during a wildfire is highly likely.

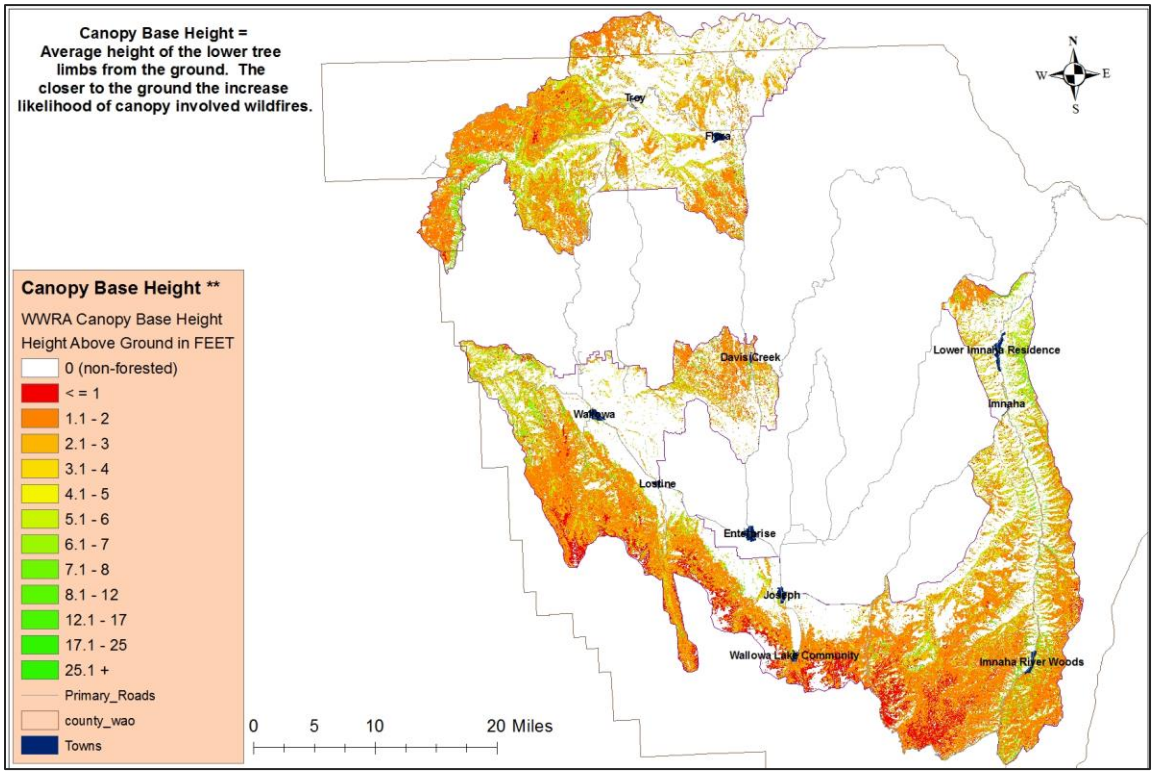


Figure IX - 7. The closer the canopy base height is to ground level, the higher the probability of canopy involvement during wildfire events.

A forest with heavy down woody material in combination with low canopy base heights not only has an increased potential for canopy involvement during wildfires, but also has a higher likelihood of long range spotting and large scale landscape fires. Upon examination of the locations timbered stands that support heavy dead and down fuels (Fuel Model 10) in Figure IX - 4 it also represents stands that have a low canopy base height. This combination of conditions exemplifies the fire behavior displayed in the Troy area in 2015, a year after the release of this information.

The probability of a canopy fire in or near the county communities ranges from low to very high, as well as widely distributed throughout the WUIZ (Figure IX – 8). This is particularly concerning in and near the south end of Wallowa Lake for a number of

reasons: 1) thousands of visitors flock to this area of the lake for both day and overnight stays. 2) The Tramway leaves a number of people vulnerable on top of Mount Howard daily with the tram as the primary transportation to and from the top of the mountain. 3) There is one access road to Wallowa Lake's south end limiting both the ability for a smooth evacuation and emergency vehicles to quickly enter the area.

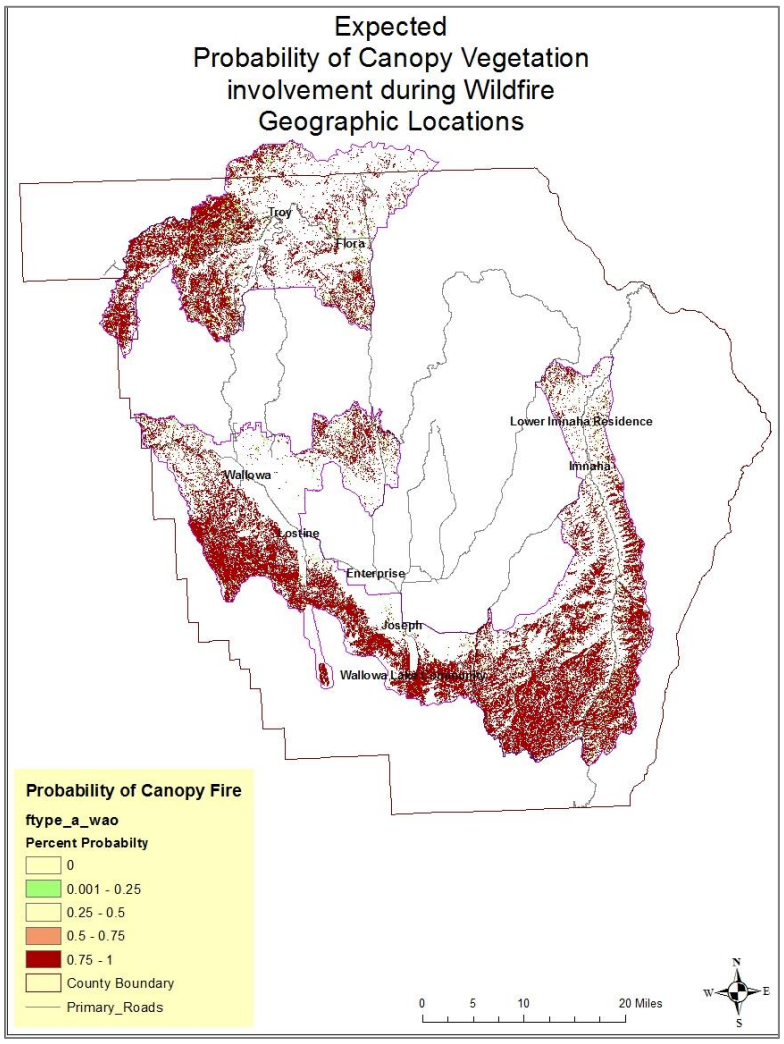


Figure IX - 8. The highest probability of canopy fires account for 60 percent of WUI Zone.

Fuels Treatment Options

Modification of any dead down woody fuel or live vegetative layers has implications for fire behavior, fire suppression, and fire severity (Graham et al. 2004). Active forest management, including thinning, reduces flammability in the midstory and overstory, while treating surface fuels, including those resulting from thinning, decreases surface fire potential (Forest Service, 2003). The most effective strategy for reducing crown fire occurrence and severity is to (1) reduce surface fuels, (2) increase height to live crown,

(3) reduce canopy bulk density, and (4) reduce continuity of the forest canopy (Agee 1996, Graham and others 1999, Scott and Reinhardt 2001, Cruz and others 2002).

WUIZ and Communities at Risk assessments show a need for treatment for several reasons, including expected fire flame lengths, fire spread rates, and probability of canopy fire, as outlined in Chapter VII of this CWPP. These expected behaviors *do not* reflect the worst-case weather conditions; under extreme weather it is expected that behaviors will be further extreme.

Again, fire behavior is a reflection of the weather, topography, and fuels (burnable material). Manipulation of fuels is the option that can be realistically accomplished through management efforts. Fuels treatment to alter fire behavior is supported by several case studies, scientific communities, research laboratories, fire management, leaders of federal, state, and local agencies and community members. A detailed table of the implication of stand conditions and fuel types along with wildfire behavior and management considerations is located in Appendix K.

Wallowa County is part of the Pilot Project for the National Cohesive Wildfire Strategy. The Northern Blue Mountain-Cohesive Strategy Pilot Project Action Plan has recommended actions for fuels management in an effort to meet the goals of the Cohesive Wildland Fire Management Strategy. Actions associated specifically with fuels management are identified below. Tasks to accomplish these actions are located in The Northern Blue Mountain-Cohesive Strategy Pilot Project Action Plan:

1. **Action:** Promote forest restoration/fuels treatment in and around communities. Also promote wildfire mitigation efforts in the “middle ground” further from communities.
2. **Action:** Promote collaborative forest management and restoration planning.
3. **Action:** Identify and Prioritize Landscapes for Treatment.
4. **Action:** Improve efficiencies and economics of forest biomass removal and marketing; improve understanding of biomass utilization resources, opportunities, and challenges; and improve understanding, acceptance and support and of biomass utilization as a tool for enhancing forest health and fuels reduction.
5. **Action:** Seek understanding, acceptance and support for managed wildfire (prescribed and natural).

There are several fuels management options available to modify fire behavior and reduce crown fire occurrence and overstory post burn severity. Appendix K describes the influence of fuel characteristics on fire behavior and management considerations. Current fuel characteristics have multiple influences on fire behavior that are counterproductive to meeting the CWS goals. Management considerations should include a variety of treatment objectives intended to improve suppression efforts, modify fire behavior, and mitigate fire effects while working toward a sustainable community that is designed to adapt to fire-prone environments.

Landscape treatments of stand characteristics have proven successful in modifying fire behavior. Some vegetation treatments may solely focus on one or more fuel stratums (layers) while other options may change live and dead fuels both horizontally and vertically. Management treatments may also focus on altering forest species composition and stand structure to improve landscape resiliency by promoting healthy stands that include fire-tolerant early seral species that can survive after a wildfire.

Four principles exist when considering treatments of forest fuels for fire resistant ecosystems, in dry forest types like Wallowa County's: reduce surface fuels, reduce ladder fuels, reduce crown density, and retain large fire-tolerant tree species (Agee and Skinner 2005). These principles also apply to altering fire behavior for protection of life and property and creating fire adapted communities.

Several case study reports are included in the CWPP files for reference. These include:

- The Hayman Fire Case Study where wildfire burned into previously treated mechanical and prescribed burning units.
- The Mountain Fire burned through approximately five types of fuels treatment. The document discusses how effectively fuels treatments reduced fire behavior or immediate effects on vegetation and soil.
- The Cone Fire, Blacks Mountain Experimental Forest burned over 2000 acres in an area where a large project was being conducted to study ecological responses to different stand structures. All treatments were less than 6 years old when the wildfire occurred.
- Evaluation of fuel treatment effectiveness and suppression costs. The case study focuses on the landscape on the Deschutes National Forest.

Aerial Vegetation Treatment

Thinning

The term "thinning", for the purpose of this document, refers to stand treatments designed to modify standing vegetation where residual stems are distributed in such a manner that wildfire behavior and its effects on overstory vegetation is reduced and where suppression resources have increased opportunities for successful fire suppression. Ladder and overstory vegetation stratum are often the target layers within a stand where thinning occurs, including: overstory, second growth or co-dominant species, suppressed understory, and brush. Several types of approaches or combinations of approaches may be needed to accomplish management objectives. Depending on desired results, these include: cleaning, sanitation, selection cuttings, thinning from below, pre-commercial thinning, overstory harvest, species modification/eradication, etc. These applied approaches can alter fire behavior by meeting objectives that prevent surface fires from causing isolated tree torching or transitioning to crown fires. These treatments interrupt fire spread across the landscape by breaking up the homogenous stands and continuity, decreasing mortality of overstory from wildfire, and preventing insect infestation and disease, which contribute to the

available dead fuel component. Available tool options to meet management objectives include hand tools, machinery, prescribed fire, or a combination of methods..

Timber stand thinning of both commercial and noncommercial material is prudent for changing wildfire behavior on the landscape. High density canopy fuels if ignited can result in a spreading crown fire than low density canopies (Graham et. al. 2004). Canopy base height (distance of lower limbs from ground level), canopy bulk density (canopy weight for a given volume), and canopy continuity (continuous) are key characteristics of forest structure that affect the initiation and propagation of crown fires (Albini 1976, Rothermel 1991). Mechanical thinning is a more precise method that can target specific stand structures. It allows for accuracy in selecting both removal and retention of stand components. Used alone, mechanical thinning, especially emphasizing the smaller trees and shrubs, can be effective in reducing the vertical fuel continuity that fosters initiation of crown fires (Graham et. al. 2004). Thinning to reduce continuous canopy horizontally can interrupt crown fire spread and reduce spot fire ignition probability.

Stand thinning modifications should be conducted in conjunction with follow up treatments of surface fuels. Without follow up treatment there is potential for an increase surface fuels loadings from thinning. Therefore, when considering stand thinning, due to the high percentage of heavy fuel loads within the WUIZ stands, treatments may require multiple methods to address residual surface fuels that may have previously existed or were generated during thinning. Unless the resultant thinning fuels slash is removed or treated, fire behavior could potentially increase in some areas.

Combining stand thinning with surface fuels reduction is the most effective approach in altering fire behavior on the landscape. The most appropriate fuel treatment strategy is usually thinning (removing ladder fuels and decreasing tree crown density) followed by prescribed fire, piling and burning of fuels, or other mechanical treatments that reduce surface fuel amounts. This approach reduces canopy, ladder, and surface fuels, thereby reducing both the intensity and severity of potential wildfires (Graham et al. 2004).

Pruning

Torching occurs when the surface flame length provides convective heating to tree limbs, and moisture content in the crown and the vertical distance to live crown from the ground supports ignition. This distance from ground to lower crown height of the tree is called canopy base height. Historically, low-intensity fires would burn as surface fires through the stands and scorch lower tree limbs, leaving the majority of the tree crown intact. Natural pruning has been largely absent from forests for more than 80 years due to successful fire suppression and a lack of active management.

Thinning of small-diameter material and pruning branches are more precise methods, although more expensive, for reducing the likelihood of a surface fire transitioning into a tree crown or stand canopy. Manually pruning trees is a viable option in and near communities and structures. Prescribed burning is beneficial for targeting ladder fuels

and surface fuel components at the same time, especially in the middle ground areas. The effect of removing ladder fuels is that surface fires burning through treated stands are less likely to ignite the overstory canopy fuels (Graham et. al. 2004).

Surface Fuel Reduction

Models and observations of landscape-scale fire behavior and the impacts of fuel treatments clearly suggest that a landscape approach is more likely to have significant overall impacts on fire spread, intensity, perimeters, and suppression capability than an approach that treats individual stands in isolation (Graham et. al. 2004). Application of fuel reduction techniques prior to a wildfire can affect fire behavior.

Reducing the amount of fuel and changing its arrangement before a wildfire erupts can affect fire behavior. Recent examinations of wildfires in the West show that where fuels have been reduced beforehand, fire intensity and severity are usually reduced. Thus, removing or reducing fuels in strategic locations can lower fire risk and help make properties more resistant to wildfire.

Surface fuel reduction alone can change fire behavior; however, in cases where stand structures support low canopy base height and high crown density, a combination of thinning and surface fuel reductions may be needed. Environmental conditions in steep areas with limited access may limit the treatment tool options available due to management direction, remoteness, and cost effectiveness.

Prescribed Fire

Prescribed fire is a useful tool that can effectively alter potential fire behavior by influencing multiple fuel bed characteristics (Graham et al. 2004). Frequently used and cost effective, prescribed fire treatment is highly effective for surface fuel reduction, raising the canopy base height, and promoting fire tolerant species. Fire can be applied under specific management-identified environmental conditions that apply to weather and fuel (moisture) conditions allowing for control of the prescribed burn verse multiple natural ignitions during the peak of fires where conditions are ideal for severe fires.

Prescribed fire can target the surface fuels, increase canopy base height by scorching lower tree bole limbs, and reduce the amount of ladder fuels. It also has benefits through promoting fire-tolerant species and groundcover vegetation such as grass and forbs over woody debris that support the CWS goals.

Figure IX - 9. Yellow arrow indicates the canopy base height (1-3 feet) of the stand prior to prescribed burning; white arrow indicates post-burn canopy base height (25 – 30 ft). Photo was taken in the Minam wilderness approximately six years (2010) after burning.

Biomass Utilization

The forests in Wallowa County continue to exhibit an overabundance of material considered to be forest biomass, with a great percentage of this material in the form of woody residues such as tree tops, limbs, non-merchantable logs, small-diameter trees and heavy down woody fuels. Forest biomass is generated through natural accumulation over time and by management activities such as harvesting, non-commercial thinning, timber stand improvement (TSI) where there is lack of treatment of generate debris. Non-commercial thinning includes pruning, tree removal or thinning designed to help shape and guide development of forest stands, and ladder fuel reduction. It generally does not result in removal of trees that can be used to manufacture products, but it could be used in renewable energy production (heat, steam, electricity, and fuel). Timber activities on public land often prescribed whole tree yarding methods which results in very little limb wood left in the treated areas.

Concerned about the health of Oregon's forestlands, increasingly large and frequent wildfires, and associated expenditures and impacts, the 2005 Oregon Legislature passed Senate Bill 1072 (Chapter 772, Oregon Laws, 2005). In November of 2005 the Oregon Forest Biomass Working Group (OFBWG) was established to meet the directives established by that bill and subsequent law, as well as to accomplish the biomass goals in then-Governor Kulongoski's 2005 Renewable Energy Action Plan (Oregon.gov 2005).

The utilization of woody biomass has the potential to provide Wallowa County with both direct and indirect societal, economic, and environmental benefits according to the U.S. Forest Service, 2016. A list of these benefits can be found on their website link https://www.fs.fed.us/woodybiomass/benefits.shtml. A few if these include:

- Reduces the threat and impact of wildfires on communities.

- Utilize activities as a learning tool to create awareness of forest restoration to promote fire risk mitigation, forest management, and to reduce costs by finding new markets for material.
- Improves air quality, lessen impacts on public health.
- Decrease unnaturally severe wildland fires in forest and grasslands; reduce post fire effects – erosion and watershed damage
- Attract investments of new industry and markets; provide economic stability and employment to rural, forest dependent communities
- Encourages economic development by supplying material to local mills, and creates opportunities for innovative/new infrastructure for processing and using the material.
- Increases the availability of renewable fuel through bioenergy
- Avoid direct fire suppression costs and those related to long term recovery

Wallowa County lost all of its traditional saw mills over the period 1994-2007, but it currently supports a unique small log processing plant (Integrated Biomass Resources LLC), a few mobile saw mills (the largest being JayZee Lumber LLC), and a few commercial firewood producers. This local infrastructure plays a small but important role in the forest restoration economy. Integrated Biomass Resources (IBR) was specifically designed to process the by-product of forest restoration and fuel reduction treatments, as well as non-sawlog component of traditional timber sales. Coupled with the other small proprietorships, IBR improves the cost-effectiveness of restoration projects, generating more value non-sawlog volume, and significantly reducing haul costs for this lower value material.
Located on the outskirts of the town of Wallowa, the facility has an expansion in progress to include the production of wood bricks at Integrated Biomass Resources in Wallowa County next to a post-and-pole plant owned by Community Smallwood Solutions (Davis et. al. 2010).

The Northeast Oregon Economic Development Corporation is focusing business recruitment efforts on transportation equipment manufacturing and forestry and wood products sectors. The strength of these sectors is largely influenced by environmental regulations. The forestry and wood products sector (including biomass and other diversification strategies) could grow if more timber resources were harvested from federal forests (NEOEDD 2013 – 2018).

Most of the material generated from fuels reduction activities is not suitable for commercial wood products manufacturing, so many times the biomass from these activities is left on site and burned. There is currently a strong push in Oregon by county commissioners, industry leaders, local businesses, agencies, landowners, and some conservation groups to create opportunities from forest biomass while achieving the goals of the community wildfire protection plan for fire risk reduction.

In 2012 a comparison of mechanical treatment with biomass removal with hand thinning, piling, and burning (hand treatment) was conducted with the cooperation of the U.S. Forest Service. Cost per acre revealed that removing biomass mechanically was

approximately $296 while hand treatment cost between $300 - $900 dollars an acre (David et. al. 2012).

There is also a volunteer local firewood program that distributes firewood to limited capacity citizens across in Wallowa County. Unfortunately, the program utilizes only a small percentage of the biomass generated and usually utilizes smaller projects.

Public Opinion on Fuels Reduction

The survey described in Chapter V asked Wallowa County residents to rate their concern of creating defensible space around their home in terms of aesthetic value and their comfort level for a variety of fuels management activities used to mitigate fire risk. Figure IX - 8 and Figure IX - 9 displays the results of these survey questions:

The majority of people were more concerned with creating defensible space and less worried with their property aesthetics when it came to wildfire risk mitigation. Fifty-one percent of those surveyed have very little concern about their properties appearance when it came to increasing options for wildfire protection. An additional thirty-two percent were somewhat concerned suggesting that treatments to reduce the likelihood of adverse fire impacts far outweighed their properties visual appearance.

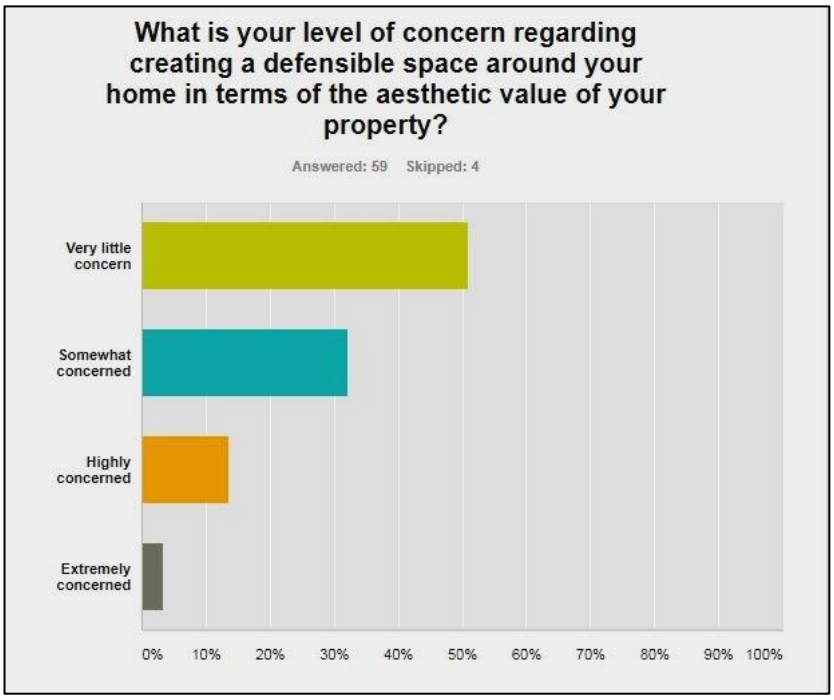
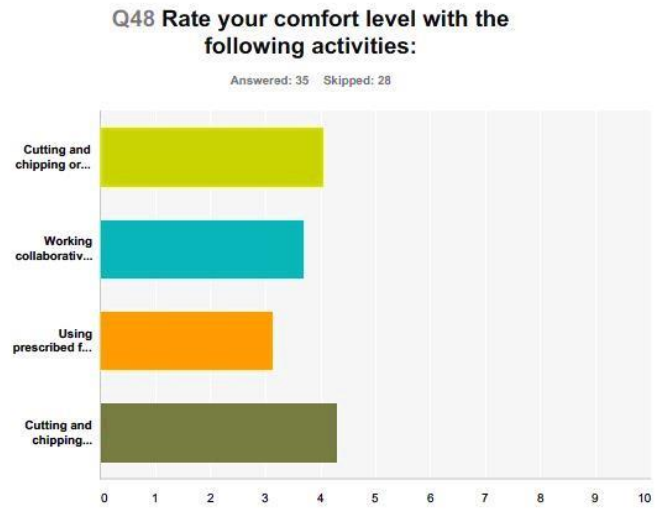


Figure IX - 10. Concern for Aesthetics. Fifty-one percent had very little concern while thirty-two percent were somewhat concerned.



	Very low	Low	Moderate	High	Very High	Total	Weighted Average
Cutting and chipping or burning hazardous fuels and open space areas	2.86% 1	2.86% 1	11.43% 4	51.43% 18	31.43% 11	35	4.06
Working collaboratively with other homeowners to create fuel breaks to stop or slow wildfires before they reach your property	5.71% 2	8.57% 3	25.71% 9	31.43% 11	28.57% 10	35	3.69
Using prescribed fire to reduce fuels and improve ecological conditions	20.00% 7	14.29% 5	22.86% 8	17.14% 6	25.71% 9	35	3.14
Cutting and chipping hazardous fuels (trees, brush, tall grass) within 100 feet of my home.	2.86% 1	0.00% 0	14.29% 5	28.57% 10	54.29% 19	35	4.31

Figure IX - 11. Comfort level based on types of treatment activities. Results are part of county wide survey conducted during the course of the CWPP plan development.

Interestingly enough when asked to rate their comfort level with types of treatment activities most of the individuals had either a high comfort to very high comfort level for all activities. Use of prescribed fire had the lowest with approximately 43% having a high to very high comfort level. Preforming work within 100 feet of their home resulted in 83% of participants with a high or greater comfort level. This is a good indication that fire risk mitigations will likely take precedence over the scenic concerns even though 71% of the respondents put scenic/beauty as their top valued attribute for living here.

Hand and Machine Piling

When fuels cannon be removed hand and machine piling are effective ways to achieve surface fuel and ladder fuel reduction that is not marketable. Hand piling even though not the most cost effective, can be very effective in fuels reduction. Hand piling often requires manual labor with chainsaws, handsaws, and a substantial workforce making it more time consuming. This option allows choices on pile placement to reduce damage to residual vegetation. Machine piling can handle larger numbers of acres, and is more cost-effective than hand piling, however it requires machinery large enough to be efficient and still have maneuverability within designated areas. Residual trees can be preserved with machinery but some damage may occur. Debris piles are typically larger than hand piles and emit more radiant heat. Pile burning often takes place after a fire season ending moisture event or snow fall making it a viable options.

In urban interface areas, piling of fuels is a common approach to reducing surface and small-diameter ladder fuels near structures. This is beneficial particularly in areas where smoke issues are present or prescribed burning is not a favored option.

Summary

Three primary components impact how a fire behaves on the landscape: fuels, weather, and topography. Management efforts are most effective through altering fuels composition and characteristics. There are multiple tools available, based on stand conditions, providing options for diverse treatments. In order to protect our firefighters, communities, and natural resources a “one shoe fits all” approach cannot be used. A variety of vegetation mitigation methods should be considered and utilized to promote the three goals of the CWS. Emphasis should be placed on landscape-level projects, maintaining the local mill, and skilled workforce infrastructure.

Continuing to use and improve treatment methods through new and innovative approaches will help advance Wallowa County’s fire management efforts in wildfire mitigation. Developing treatments that can be tailored to meet local needs increases opportunities for homeowner and community to be proactive.

Fuels treatment has an added benefit beyond reducing fire risk issues. Thinning overstocked stands will increase tree diameter growth and enhance tree vigor. Healthier trees are more resistant to pests, disease, and increase in value both ecologically and commercially. Treatment should be site- and species-specific, while keeping the CWS goals in mind. The new Forest Service directive titled, “Ecosystem Restoration Policy” states a variety of way to achieve ecosystem restoration:

- Ecosystem restoration can be achieved by a range of management activities, such as forest thinning to reduce tree density, prescribed fire to reduce fuel buildup, replacing culverts to better connect streams, or fencing to restrict disturbances.
- Ecosystem restoration may include manipulating or protecting terrestrial and aquatic ecosystems to assist in their recovery or adaptation to changing environmental conditions. Monitoring and evaluation of restoration projects are essential adaptive management steps for achieving sustainable ecosystems.
- Ecosystem restoration is a process that can help to achieve the multiple-use mission of the Forest Service, but not all management activities on National Forests and Grasslands require a restoration objective. For example, hazardous fuels reduction to reduce wildfire risk to communities may require a silvicultural treatment that is not restoration.
- The expectation is that forest restoration treatments will lead to forest resilience and a lower probability of a catastrophic disturbance.

Forests are dynamic, and reducing competition often promotes increases in diameter, height, and crown width. Fuels reduction activities that include thinning are very beneficial for modifying fire behavior, but thinning without consideration for maintenance efforts and forest health doesn't provide the benefits of resilient landscapes. Management for risk reduction should be linked to a future maintenance program to protect first entry investments.

The National Strategy's first and highest priority is safe and effective response preparedness. The second priority, also the most challenging, is vegetation and fuels management. Fuels management approaches that are strategically placed to interrupt fire spread across the landscape (CWS 2014) provide opportunities for successful suppression and lessen negative impacts. Several supporting case studies have proven successful in which previously managed areas have had a crown fire encountered a treated area, resulting in fire transition to a surface fire in pre-treated areas. Learning from others' success stories can provide Wallowa County with a foundation for landscape treatments.

Bibliography

Abella, S. R., W. W. Covington, P. Z. Fulé, L. B. Lentile, A. J. Sánchez Meador, and P. Morgan. 2007. Past, present, and future old growth in frequent-fire conifer forests of the western United States. *Ecology and Society* 12(2): 16. [online] URL: http://www.ecologyandsociety.org/vol12/iss2/art16/

Agee, J.K., 1990. The Historical Role of Fire in Pacific Northwest Forests. Oregon State University Press, Corvallis, OR

Agee, James K. 1993. Fire ecology of Pacific Northwest Forests. Washington, DC: Island Press. 493 p.

Agee, James K. 1994. Fire and weather disturbances in terrestrial ecosystems of the eastern Cascades. Gen.Tech. Rep. PNW-GTR-320. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 52 p. (Everett, Richard L., assessment team leader; Eastside forest ecosystem health assessment; Hessburg, Paul F., science team leader and tech. ed., Volume III: assessment.

Agee, J.K. 1996. The influence of forest structure on fire behavior. In: Proceedings, 17th Annual Forest Vegetation Management Conference. Redding, CA. January 16-18, 1996: 52-68.

Agee, J. K. 1996a. Fire in the Blue Mountains: a history, ecology, and research agenda. In: Jaindl, Raymond G.; Quigley, Thomas M., eds. Search for a solution: sustaining the land, people, and economy of the Blue Mountains. Washington, DC: American Forests, Blue Mountains Natural Resources Institute: 119-145.

Agee, J.K.; Skinner, C.N. 2005. Basic principles of forest fuel reduction treatments. Forest Ecology and Management. 211(2005): 83-96. College of Forest Resources, Box 352100, University of Washington, Seattle, WA 98195, USA b USDA Forest Service, Pacific Southwest Research Station, 3644 Avtech Parkway, Redding, CA 96002, USA

Anderson, Hal E. 1982. Aids to Determining Fuel Models For Estimating Fire Behavior. USDA Forest Service Intermountain Forest and Range Experiment Stations, Ogden, Utah 84401. General Technical Report INT-122

Anderson, Leslie; Carlson, Clinton E.; Wakimoto, Ronald H. 1987. Forest fire frequency and western spruce budworm outbreaks in western Montana. Forest Ecology and Management. 22: 251–260.

Arno, S.F., and Brown, J.K. 1991. Overcoming the paradox in managing wildland fire. Western Wildlands 171: 40-46.

Barnes, Burton V.; Zak, Donald R.; Denton, Shirely R.; Spurr, Stephen H. 1998. Forest Ecology 4th edition. New York: John Wilely & Sons, Inc. 774 p.

Bonnicksen, T.M. and Stone, E.P. 1982. Reconstruction of a pre-settlement giant sequoia mixed conifer forest community using the aggregation approach. Ecology 63: 1134-1148.

Cooper, C.F. 1960. Changes in vegetation, structure and growth of southwestern pine forest since white settlement. Ecological Monographs 30: 129-164.

Cooper, Charles F. 1961. The ecology of fire. Scientific American. 204: 150–158.

Cruz, M.G., Alexander, M.E., and Wakimoto, R.H. 2002. Predicting crown fire behavior to support forest fire management decision-making. Forest Fire Research and Wildland Fire Safety. Millpress, Rotterdam, p. 1-10.

CWS 2014. Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Davis, Emily Jane; Moseley, Cassandra; Nielsen-Pincus, Max; Abrams, Jesse; Brady, Cullen; Christoffersen, Nils; Davis, Chad; Enzer, Maia J.;Gordon, Josef; Goulette, Nick; Jungwirth, Lynn; Jungwirth, Jim; Kauffman, Marcus; McCarthy, Tyler; Shannon, Patrick; Sundstrom, Shiloh. 2010. The State of the Dry Forest Zone and its Communities. https://scholarsbank.uoregon.edu/xmlui/handle/1794/10802

Dodge, M. 1972. Forest fuel accumulation-A growing problem. Science 177: 139-142.

Forest Service, USDA 2003. Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects. An Overview.

Franklin, Jerry F.; Dyrness, C.T. 1973. Natural vegetation of Oregon and Washington. Gen. Tech. Rep. PNW–8. Portland, OR: U.S.Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 417 p.

GAO 2015. United States Government Accountability Office, Report to Congressional Requesters. Forest Restoration – Adjusting Agencies' Information-Sharing Strategies Could Benefit Landscape Scale Projects. GAO-15-398. April 2015.

Gast, William R., Dr. Donald Scott, C. Schmitt, D. Clemens, S. Howes, Dr. Charles G. Johnson, R. Mason, F. Mohr, R. A. Clapp. 1991. Blue Mountain Forest Health Report "New Perspectives in Forest Health" Portland, OR: USDA Forest Service, Pacific Northwest Region, Malheur, Umatilla, and Wallowa-Whitman National Forests.

Graham, Russell T.; McCaffrey, Sarah; Jain, Theresa B. (tech. eds.) 2004. Science basis for changing forest structure to modify wildfire behavior and severity. Gen. Tech. Rep. RMRS-GTR-120. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 43 p.

Gruell, George E. 1983. Fire and Vegetative Trends in the Northern Rockies: Interpretation from 1871-1982 Photographs. Intermountain Forest and Range Experiment Station Ogden, Utah. General Technical Report INT-158.

Hall, Frederick C. 1977. Ecology of natural underburning in the Blue Mountains of Oregon. R6–ECOL–79–001. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 11 p.

Hann, W.J., Jones, J.L., Karl, M.G.S., Hessburg, P.F., Keane, R.E., Long, D.G., Menakis, J.P., McNicoll, C.H., Leonard, S.G., Gravenmier, R.A., and Smith, B.G. 1997. Chapter 3: Landscape dynamics of the Basin. In: Quigley, Thomas M.; Arbelbide, Sylvia J. Tech. Eds. An assessment of ecosystem components in the Interior Columbia Basin and Portions of the Klamath and Great Basins: Volume II. Gen. Tech. Rep. PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 338-1055.

Maruoka, Kathleen R. 1993. A fire history survey in selected *Pseudotsuga menziesii* and *Abies grandis* stands in the Blue Mountains of Oregon and Washington. Preliminary Results. Report Prepared for

USDA Forest Service Coop. Agreement No. PNW92–0179. Seattle, WA: University of Washington, College of Forest Resources. 28 p.

Mutch, Robert W.; Arno, Stephen F.; Brown, James K.; Carlson, Clinton E. 1993;
NEOEDD 2013 – 2018. Northeast Oregon Economic Development District. Comprehensive Economic Development Strategy 2013 – 2018.

Mutch, R.W., Arno, S.F., Brown, J.K., Carlson, C.E., Ottmar, R.D., and Peterson, J.L. 1993. Forest health in the Blue Mountains: a management strategy for fire-adapted ecosystems. USDA Forest Service Pacific Northwest Research Station General Technical Report PNWGTR-310. Portland, OR.

Northeast Oregon Economic Development District - NEOEDD, September 24, 2013. *Comprehensive Economic Development Strategy*, 2013 – 2018

ODF 2014. Oregon Department of Forestry, Senate Bill 357 Report to the Legislature, Federal Forest Management

Ottmar, Roger D.; Peterson, Janice L. 1993. Forest health in the Blue Mountains: a management strategy for fire-adapted ecosystems. Gen. Tech. Rep.

Oester, P.T.; Fitzgerald, S.A.; Emmingham W.H.; Cambell 3rd, A.; Filip, G.M. 1992. Forest Health in eastern Oregon, November 1992. Oregon State University Extension Service.

Oliver, C. D.; Larson, B. C. 1990. Forest stand dynamics. New York: McGraw-Hill Inc. 467 p.

Oliver, C.D.; Larson, B.C. 1996. Forest stand dynamics. Updated edition. New York: John Wiley and Sons, Inc. 520 p.

Parsons, D.J. and DeBenedetti, S. 1979. Impact of fire suppression on a mixed-conifer forest. Forest Ecology and Management 2:21-33.

PNW-GTR-310. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 14 p. (Quigley, Thomas M., ed, Forest health in the Blue Mountains: science perspectives).

Sandburg, D. V.; Ottmar, R. D.; Carlson, G. H. 2001. Characterizing fuels in the 21st century. International Journal of Wildland Fire. 10: 381-387.

Scott, J. H. and Reinhardt, E.D. 2001. Assessing crown fire potential by linking models of surface and crown fire behavior. USDA Forest Service Rocky Mountain Research Station Research Paper RMRS-RP-29. Fort Collins, CO.

Stine, Peter; Hessburg, Paul; Spies, Thomas; Kramer, Marc; Fettig, Christopher J.; Hansen, Andrew; Lehmkuhl, John; O'Hara, Kevin; Polivka, Karl; Singleton, Peter; Charnley, Susan; Merschel, Andrew; White, Rachel. 2014. The ecology and management of moist mixed-conifer forests in eastern Oregon and Washington: a synthesis of the relevant biophysical science and implications for future land management. Gen. Tech. Rep. PNW-GTR-897. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 254 p.

Tidwell, Tom 2013. Before the House Committee on Appropriations, Subcommittee on Interior, Environment, and Related Agencies Concerning President's Fiscal Year 2014 Proposed budget for the USDA Forest Service April 26, 2013.

USDA Forest Service 2003. Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects, an Overview. United States Department of Agriculture, Forest Service May 2003.

Van Wagner, C.E. 1977. Conditions for the start and spread of crown fire. Canadian Journal of Forest Research: 7: 23-34.

Weaver, Harold. 1947b. Management problems in the ponderosa pine region. Northwest Science. 21 (4): 160–163.

Weaver, Harold. 1957. Effects of prescribed burning in

Wickman, Boyd E. 1992. Forest health in the Blue Mountains: the influence of insects and diseases. Gen Tech. Rep PNW-GTR-295 Portland, OR: U S Department of Agriculture, Forest Service, Pacific Northwest Research Station 15 p. (Quigley, Thomas M., ed.; Forest health in the Blue Mountains science perspectives)

Web sites:

Boise Cascade, 2016. http://www.bc.com/locations/

Senate Bill 1072, http://www.oregon.gov/Pages/index.aspx#search?q=Senate%20Bill%201072

H.R. 2647. 2015. House of Representative - Resilient Federal Forests Act of 2015, House-Agricuture; Natural Resources | Senate – Agriculture, Nutrition, and Forestry https://www.congress.gov/bill/114th-congress/house-bill/2647

Oregon.gov Oregon's Renewable Entergy Action Plan, Oregon Department of Energy for Governor Ted Kulongoski. https://www.oregon.gov/energy/P-I/docs/FinalREAP.pdf

U.S. Forest Service, 2016. Benefits of Woody Biomass Utilization https://www.fs.fed.us/woodybiomass/benefits.shtml

X. Accomplishments and Challenges

Introduction

Since 2006 Federal, State, and private landowners have joined forces in an effort to begin mitigating wildfire risk and improve protection efforts. Fuels projects included hazardous and ladder fuels reduction, raising canopy base height, and reducing stand densities. Protection efforts include the fuels projects as well as equipment acquisitions, protection agreements, and training opportunities. Multiple funding mechanisms provided the county extensive work of reducing wildfire risk in Wallowa County.

The 2006 CWPP provided avenues for funding for treatments in Wildland Urban Interface (WUI) areas with much of the revenue designated toward a specific WUI area. These WUI areas were limited to locations where structures and other human development met or intermingled with wildland fuels (WC CWPP 2006).

The new WUI Zone provides some added flexibility for funding distribution toward multiple areas meeting the same criteria. This allows funds to be distributed throughout the County's WUI Zone giving fire managers increased opportunities for fire mitigation using a landscape approach. Cross boundary treatments along property lines with multiple landowner involvement, creates the most effective defensible space for suppression resources. Treatments within the middle ground areas, away from communities, are often a single landowner or just two ownerships. Opportunities for large-scale projects are possible under both scenarios however proximity to private lands can play a role in treatment options. The middle ground locations often provide more diverse options for treatments such as landscape prescribe burning.

A variety of treatment tools were used on private lands depending on the fire mitigation need. Treatments that involved treating the live tree component of the stands included commercial and noncommercial thinning as well as pruning. Down woody fuels were either the result of natural accumulation or limb wood – breakage from the timber treatments (slash). A variety of approaches was used to mitigate the fuels hazard. The most common approaches on private land has been piling by machine or hand pile then burn the piles; masticating and slash busting was the second most used technique. Forest Service lands utilized the same types of treatments, however depending on treatment location prescribed fire was also used as a means of fuels reduction and stand pruning.

Accomplishments

Oregon Department of Forestry and Private Lands

Oregon Department of Forestry in cooperation with private landowners has accomplished approximately 10,722 acres of work throughout the county. Nearly

8,776 of these acres are within the new WUIZ with the remaining 1,946 acres primarily concentrated in the vicinity of Akers Buttes. Accomplishment dates for the work vary from 2005 to as recently as 2016. Approximately 7,099 acres has multiple type treatments which usually entailed timber thinning then follow up slash reduction.

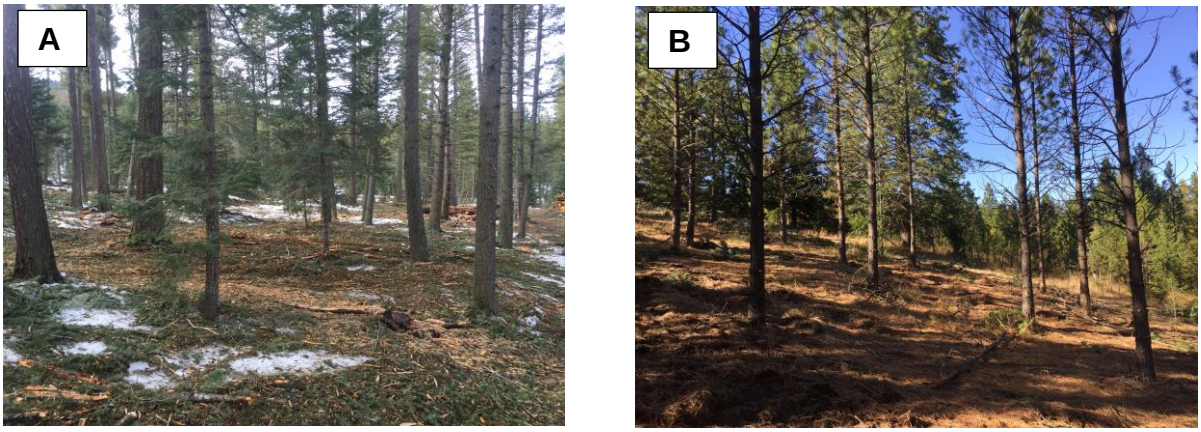


Figure X - 1. Private land fuels reduction project. Photo **A** was accomplished using brush-hog and small skid steer to mow down thick vegetation and down woody debris. Photo **B** was treated by a thinning hand crew and a small dozer piled debris for later burning. Photos provided by ODF.

The more concentrated patchwork of activities have occurred on private lands near the foothills of the Wallowa Mountains stretching from Reavis Creek east to Wallowa Lake totally approximately 1,868 acres. Another 2,060 acres of treatment occurred from the Wallowa Lake Community eastward to Griffith Creek.

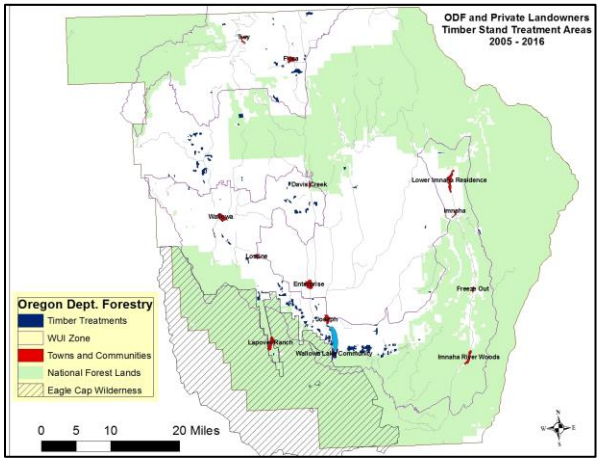


Figure X - 2. Oregon Department of Forestry . Treatments areas that involved the vertical stand typically live tree component.

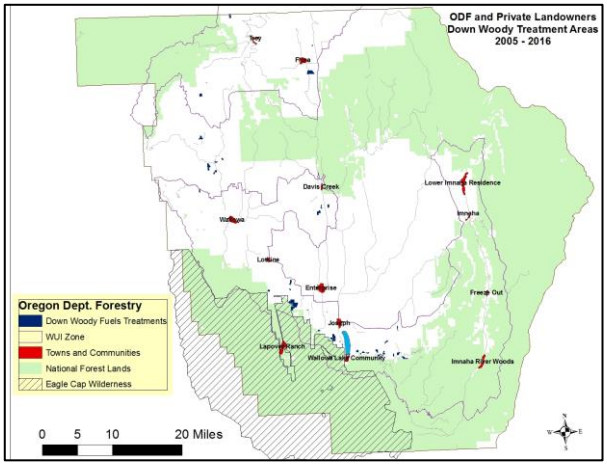


Figure X - 3. Oregon Department of Forestry . Treatments areas that involved the down woody fuels both natural and activity slash.

Wallowa-Whitman National Forest

The Forest Service public lands in Wallowa County are managed by the Wallowa Mountains Office (WMO). The WMO is a combination of three management zones that include the Eagle Cap Ranger District, Hells Canyon National Recreation Area, and Wallowa Valley Ranger District.

The bulk of the treatment areas have occurred on the Wallowa Valley Ranger District in locations where the forest management designation is identified as timber production. Public lands treatment areas in and near communities and has complemented private landowner efforts with some additional cross-boundary fuels and vegetation management projects. Project location and management direction played a role in how and what treatments were used. Most projects were planned with both fuels and stand vegetation management activities in mind.

Treatment activities were designed for the following purposes: modifying fire behavior potential, reducing surface fuel loadings and ladder fuels, reducing overall canopy density, improving firefighting opportunities by creating and maintaining defensible space along private lands, improving firefighter and public safety, and protecting resource and property values at risk on private and public lands.

Recent projects that supported these treatment activities include:

- Mount Howard, 2005; Mount Howard
- Mount Howard "L" Project, 2010; Mount Howard
- Green McCoy Project, 2008; Bear Creek and Deer Creek
- Arroz Project, 2008; Chesnimnus

Figure X - 4. Mount Howard "L" WUI project (Forest Service photos). Photo on the left is pre-treatment taken October 2012 and photo on the right is post treatment taken July 2016 – photos were taken in vicinity of each other.

Treatment activities near homes are designed with protection of life and property in mind, resulting in multiple activities occurring on the same section of ground to toward a single goal. For example, fire risk mitigation, depending on site conditions, may require

several treatment activities including overstory thinning, ladder fuel reduction, down woody fuels treatment, with a final treatment of prescribed or pile burning. Since 2005, there have been approximately 7 different types of treatment activities implemented for fire risk mitigation on public land that are within 1 mile of private lands.

Treatments associated with down woody fuels account for 5,012 acres, such as machine or hand piling followed by pile burning or thinning for fuels reduction followed by prescribed burning. Since 2005 vegetation activities associated with aerial fuels treatments within 1 mile of private lands account for 1,840 acres. Treatments included fuels modification through overstory and ladder fuel thinning, precommercial and/or commercial thinning. The new WUI Zone contains 5,837 of the combined treatment acres.

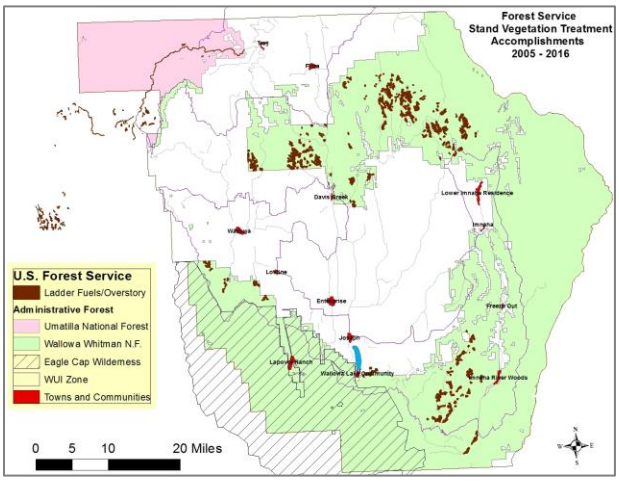


Figure X - 5. All treated acres under timber management/veg. management from 2005 – 2014 (USFS FACTS 2016). CWPP fall within the current WUIZ. Treatments include: overstory thinning, ladder fuels reduction, pre-commercial thinning, etc.

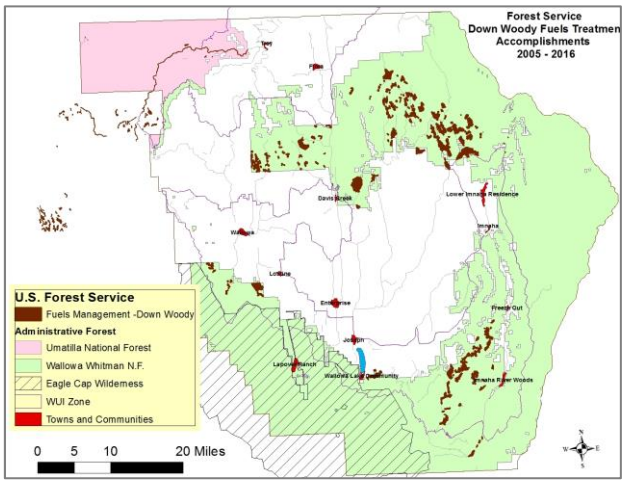


Figure X - 6. All surface fuels treatments locations between 2005 – 2014. Some locations receiving more than one treatment type (USFS FACTS 2016).

Many of the treatment acres received both crown density and down woody fuels reduction activities in order to achieve the highest level of defensible space and wildfire behavior modification. Crown density and ladder fuel reduction occurred under Figure X - 5 with some areas shown in Figure X - 6 as followed up by some type of down woody fuels reduction treatment such as under burning, fuels removal/rearrangement, or machine/hand pile and burn. Treatment activities are designed to complement one another to meet the overall goal of fire risk mitigation.

Umatilla National Forest

The northwest of Wallowa County extends hosts approximately 123,713 acres of the Umatilla National Forest lands, which has accomplished 1,351 acres of fuels and vegetation project since the year 2005. The majority of project activity is identified as a firebreak along the 6200 road that connects Tollgate with Troy.

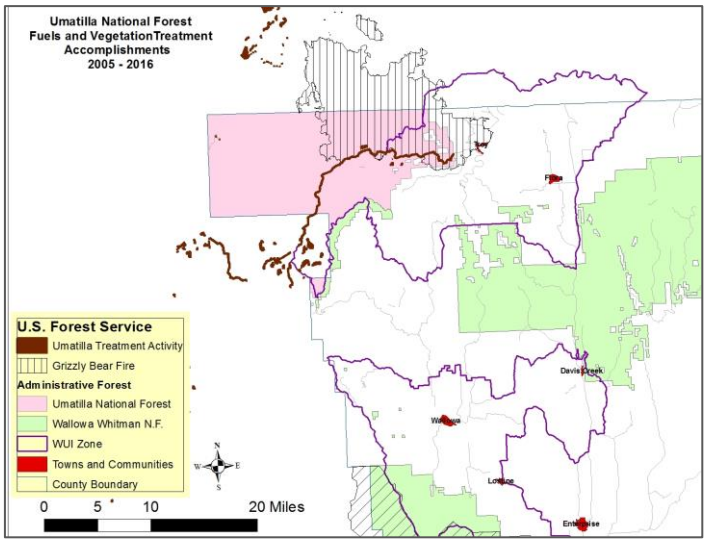


Figure IX - 7. Fuels and vegetation activities accomplished by Umatilla NF adjacent to private lands and identified as fire breaks.

It is worth mentioning once again that the Grizzly Bear Fire has had a significant impact on stand and fuels conditions to the west of the town of Troy. Although efforts to minimize fire risk have been initiated, the 6200 road identified as a fire break provided a control line for the Grizzly Fire in 2015. Agencies involved with the Grizzly Bear Fire were the Forest Service (Umatilla and Wallowa-Whitman), Oregon Department of Forestry, Wallowa County Emergency Services, and Washington Department of Natural Resources. Meetings with the community of Troy occurred during and after the fire resulting in an ODF engine stationed in Troy for initial attack on wildland fires.

Equipment

Fire response is one of the three primary goals of this CWPP. In order to provide safe and effective response to wildfire the appropriate apparatuses are needed.

One of the programs that assist in equipment acquisition is the Federal Excess Personal Property (FEPP). It creates an avenue for Forest Service owned property to be loaned to State Foresters for the purpose of wildland and rural firefighting. The State Forester may place the equipment with local departments to improve local fire programs. Enterprise Fire obtained a Type 6 engine through the FEPP program. The Federal Firefighting Program allowed the county to obtain a D-7 dozer for wildland fires in and around the county landfill, as well as a 2002 Fire Rescue Unit .

The Oregon Department of Forestry also has a co-op engine at its disposal that belongs to the Forest Service but is staffed by ODF. This provides additional wildland coverage during the peak of fire season.

Challenges

Project Planning, Pace and Scale

Over the last decade, the issues of pace and scale continue to be at the forefront as millions of acres of forest lands are blackened annually from wildfires. According to Tom Tidwell, Chief of the USDA Forest Service while addressing the House Committee on Appropriations in 2013, "Between 65 and 82 million acres are in need of fuels and forest health treatments—up to 42 percent of the entire National Forest System."

Federal agencies, including those in eastern Oregon continue to face challenges when attempts are made to increase pace and scale. In 2014, the Oregon Department of Forestry presented Oregon Senate Bill 357, a report to the state legislature on, Federal Forest Management. Section 1(1) of SB 357 requests, *"The identification of potential approaches to diversifying revenue sources and improving the level of revenue available to increase the pace and scale of federal forest management."* In other words, finding ways to expand funding sources and the availability of funds is crucial to increasing the timeliness and size of forest management projects. The report also indicates the amount of NEPA completed is a limiting factor for increasing the pace and scale of restoration work on federal forest lands. Projects that are implemented are often found to be too small of acreage size or the treatment prescribed is not extensive enough for overall wildfire mitigation upon first entry. Other contributing factors include reduced staff, extensive detailed environmental analysis to avoid litigation, competing priorities (ODF 2014) or actual litigation.

Litigation of projects continues to occur for many Federal Agency projects. In 2015 a U.S. Government Accountability Office (GAO) provided, *A Report to Congressional Requesters*, on Forest Restoration. Agencies reviewed by the GOA were the Forest Service (FS), Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), Fish and Wildlife Service (FWS), and National Park Service (NPS). Part of the challenges of project litigation for federal agencies occurs from stakeholders that opted out of collaboration invitations, were not involved from the local area, or from the collaboration participants within the group itself. Litigation is time consuming, costly, strains agency/stakeholder relationships, delays or limits restoration activities and can discourage participation in future projects (GAO 2015).

The GAO report also reviewed 34 collaboration landscape-scale forest restoration projects (projects larger than 50,000 acres with a focus on forests) that occurred over a 10 year period, from 2004 through 2014. The Forest Service reported conducting 24 of the 34 projects; BLM, 8; and NPS, 2. Several project managers in the GAO reported that *upfront collaboration* during planning resulted in increased pace and scale, however large-scale projects continued to be subject to litigation just like small

projects. Litigation often arrives when commercial logging is a key component of fuels reduction projects, however, changing fire on the landscape is ineffective and/or hindered when litigation slows project implementation particularly when mortality rates have increased due to overstocking leading to insect and disease. First entries must be aggressive not only in pace and scale but in thoroughness of treatment applications to avoid the need for additional entries in the near future.

The vulnerability of federal lands is occurring from a wide range of impacts that include, increase in wildfires and drought, stressed forests and vulnerability to insect and disease, and potential loss of critical habitat some of which is being contributed to climate change according to a May 2013 GOA report. As a result, there is growing agreement among land managers that efforts to restore forests should be undertaken at a scale commensurate with the scale at which disturbances, such as unnaturally severe wildfires that burn millions of acres annually, are occurring—that is, at a landscape scale (GAO 2015). The Blue Mountains of eastern Oregon historically experienced a surface fire, resulting in 25% or less mortality in the upper canopy of ponderosa pine plant associations, that burned an estimated 75% of the Fire Regime Condition Class I areas prior to Euro-American settlement (pre 1850). Wallowa County falls primarily within Fire Regime I, II, or II as per Chapter VII. To fully meet the GOA's pace and scale recommendations sub-basin or larger approaches would be needed to adequately address conditions of Wallowa County. Wallowa County CWPP supports landscape scale approaches for both restoration and fire mitigation that not only promote the three goals of the Cohesive Wildfire Strategy, but also provide sustainable forests, recreational opportunities, and economic stability for the community in the future.

The House of Representatives H.R.2647 passed the Resilient Federal Forests Act of 2015, on July 9, 2015. Title I of the Act is designed to expedite environmental analysis and availability of categorical exclusions to accelerate forest management activities. Forest management activities for NEPA included under this act are those developed through collaboration, a resource advisory committee, or covered by a community wildfire protection plan. Primary purposes of the activities include: insect and disease infestation, reduction of hazardous fuel loads, protection of municipal water sources, maintain, enhance, or modify critical habitat to protect it from catastrophic disturbances; increase water yield or any combination of these. The bill is currently awaiting Senate approval.

Maintenance

Many older environmental documents and some recent documents fail to include a plan for maintaining treatment investments. Acknowledgement of retaining post treatment site conditions in plans will preserve accomplished fire mitigation measures and reduce future costs when follow-up activities to sustain initial investments of treatments are needed. Designing a plan to maintain treatment accomplishments and protect costs is identified in Section 102(g) (8) of the Healthy Forest Restoration Act

(HFRA) that requires the USDA Forest Service and DOI BLM to develop a process for monitoring the need to maintain treated areas over time. Proposed actions and alternative descriptions should include an estimated maintenance treatment schedule and cost (USDA 2004). The Forest Service issued a directive that became effective in April 27, 2016 titled Ecosystem Restoration policy. This policy includes restoration activities that will complement management to maintain conditions in areas with ecological integrity. The policy also states that restoration activities will complement management to maintain conditions in areas with ecological integrity (USDA, Forest Service 2016).

Since 2005, Federal, State, and private landowners have joined forces in an effort to begin mitigating wildfire risk. Projects have included hazardous and ladder fuels reduction, raising canopy base height, and reducing stand densities.

Although efforts to minimize fire risk have been initiated, wildfire risk often requires a multiple-phase approach to fully accomplish wildfire risk mitigation. Post-treatment site visits will be needed to assure activities on the ground have met expectation of wildfire mitigation and over time to evaluate the need for maintenance. Ecosystems are not stagnant in nature but dynamic requiring a need for treated areas to be re-visited to avoid changes that increase fire risk. Fire mitigation work is an ongoing effort to protect investments.

The length of time before treated areas require re-treatment is dependent on several inter-related factors including:

- Past treatment level (e.g., how much biomass [fuel] was removed initially in the under story and over story);
- Site productivity;
- Rate of fuel accumulation;
- Fuel structure (i.e., condition class)
- Historic fire regime;
- Desired fire behavior (for effective control)
- Climatic regime.

Developing a rotational monitor program that allows for periodic site visits and updating of the CWPP fuels layer allows managers to review risk reduction efforts. The mapping of initial treatment information and fire regime assists in future CWPP updates identifying changes in risk.

Ninety-four percent of wildlands across the conterminous United States is dependent on wildfire as a fundamental ecological component (Stein et. al. 2012). Limited funds and workforce can leave fire managers with critical decision for application of treatments. New wildfire mitigation actions must be augmented with maintenance in previously treated areas in order to provide the highest level of success. There is broad consensus that active management of some type is needed in such forests (Allen et al., 2002; McKelvey et al., 1996), and that such treatment will be needed as a continued maintenance activity (Skinner/Agee).

Projects that have occurred are often too small to be effective, treatments are too passive, and sites are not re-entered for several decades, resulting in lack of progress toward changing fire behavior on the landscape. Designing projects of adequate size and thoroughness in management approaches can provide the highest level of community benefit and safety. Recent wildfires have displayed destructive behavior, and management must be aggressive in order to prevent further landscape damage.

Land Management Designation

Wallowa County supports 1.1 million acres of forest with approximately 73% under federal ownership, 14% in private ownership, 12% in family forest ownership with the remaining 1% under state ownership. Wallowa County's federal forests have a significant portion protected under management designation. Roughly 286,000 acres (36%) are in active management designations intended to produce commercial products and other benefits. Protected lands account for approximately 505,000 acres (64%) of the federal forests and 344,000 acres (43%) of the federal forest lands are highly protected through wilderness area, research are, or wild and scenic designations (Christoffersen 2017). These protected lands include inventoried roadless areas, designated wildernesses, Hells Canyon National Recreation Area, wild and scenic rivers, and research areas.

Inventoried Roadless Area (IRA)

The Wallowa-Whitman National Forest supports a dispersion of designated roadless areas. Inventoried roadless areas make up approximately 343,112 acres of public lands within Wallowa County. There is a total of roughly 269 miles of boundary where roadless areas borders private property in Wallowa County.

Roadless areas within the Communities at Risk (CAR) include 32,071 acres of which roughly 85 miles boarder private lands located primarily in the Imnaha Corridor. Forest Service lands within the new WUIZ support close to 94,975 acres of IRA with 155 miles of boundary next to private land, again with the bulk of the private property and roadless area interface, 76 miles of bordering edge, occurring in the Imnaha Corridor. (Figure X - 8)

In examining the IRA areas with the overall fire risk index a great deal of the IRA were found to be at either extreme or high fire risk. The results show that 43% are in extreme fire risk conditions, 35% in high, 9% in moderate leaving approximately 13% of the IRA in a low risk.

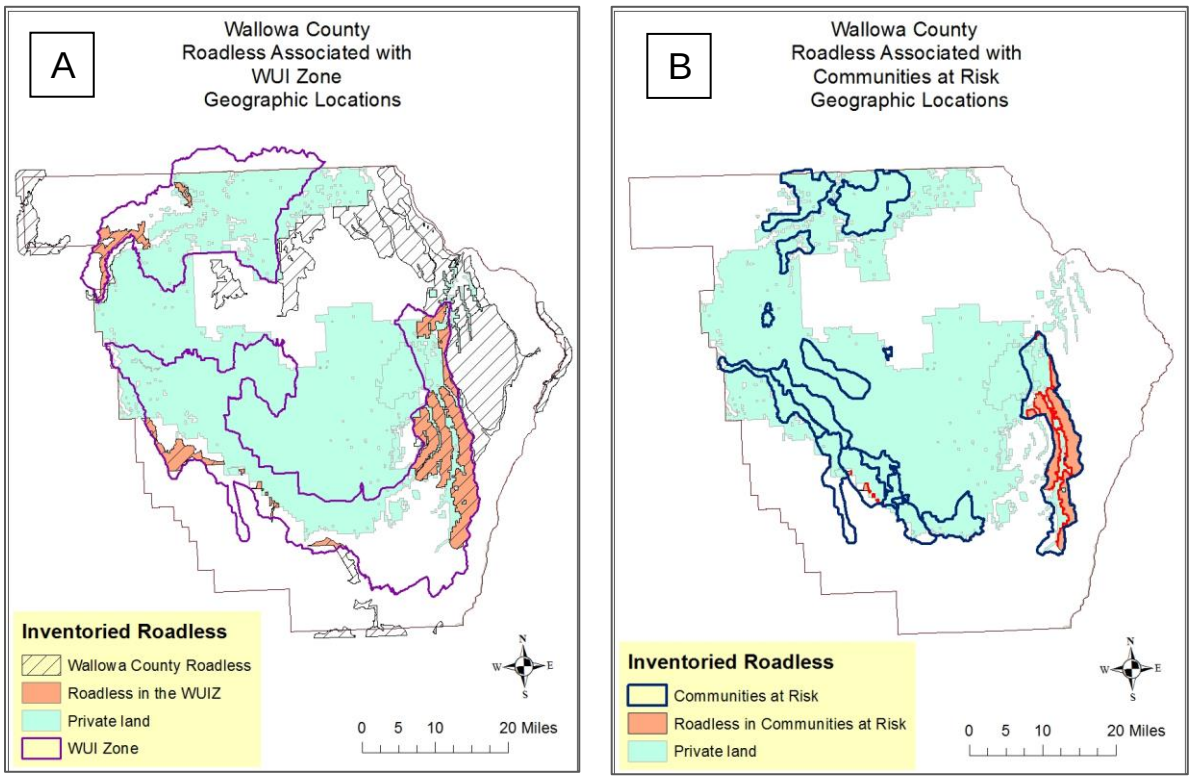


Figure X – 8. Image A = Proximity of Inventoried Roadless to private lands both outside and inside the WUI Zone. Image B = Roadless areas relative to communities at risk boundaries.

The interface of IRA areas and private lands presents several challenges when attempting to meet the national fire policies for reducing wildfire risk in wildland urban interface areas in order to protect communities at risk. Some of the key challenges include:

- Several roadless areas are displaying some of the highest fire risk ratings. The Imnaha Corridor is significantly impacted by roadless areas exhibiting extreme fire risk and are located directly adjacent to the private lands (Figure X – 9). Costs associated with wildfires moving from public lands (roadless in this case) on to private lands are anticipated to be far higher than providing advance treatments.
- There are additional planning and implementation considerations (legal, social, ecological) and costs for planning and analysis could increase.
- Costs to treat across roadless boundaries could above costs compared to timber management allocation so there is less incentive to include these areas in planning. Between 2005 and 2015, according to Forest Service activity

records, vegetation treatments in Inventoried Roadless Areas total 43 acres of thinning hand pile and burn and 495 acres of prescribed burning of which 481 were for wildlife habitat north of Thomason Meadows Guard Station.

- According to May 31, 2012 letter from the Chief of the Forest Service, Road management activities and timber harvest within roadless areas must generally be approved by Chief or the Regional Foresters. This requires extra steps and roadless treatments may need to be a separate project to prevent slowing project in timber management allocated areas.

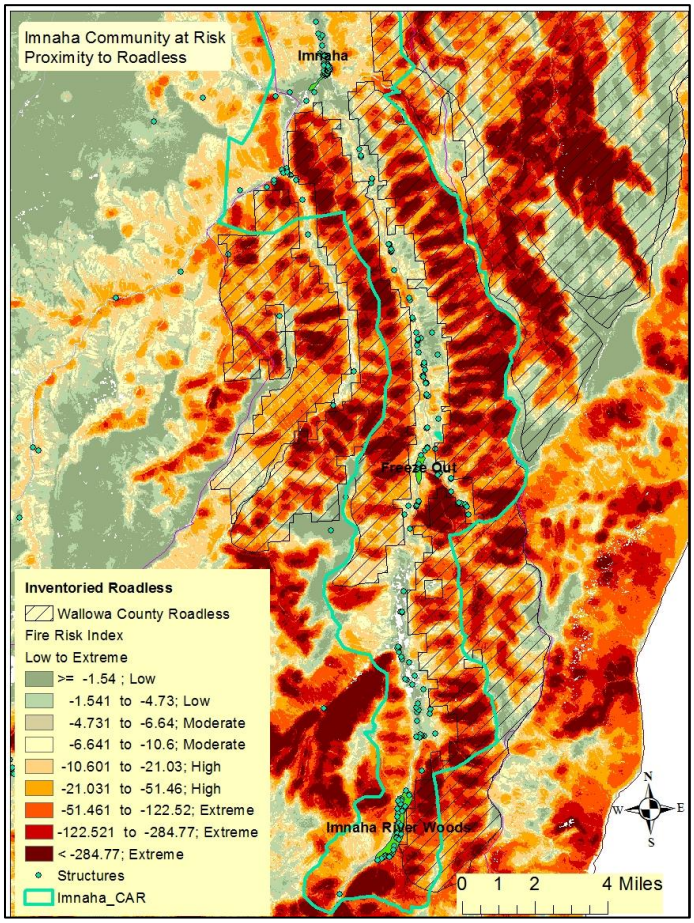


Figure X - 9. Private land fuels reduction project. Photo **A** was accomplished using brush-hog and small skid steer to mow down thick vegetation and down woody debris. Photo **B** was treated by a thinning hand crew and a small dozer piled debris for later burning. Photos provided by ODF.

Policies and guidelines provide direction on treatments types, material for removal, road construction, and authorities to approve entries within the IRAs. Roadless is not indicative to no entry. The Forest Service 1900 Manual, Chapter 1920 – Land and Resource Management Planning, lists exceptions regarding the need for approval at the Chief or Regional Forester level in inventoried roadless areas including:

- The removal of small diameter material to maintain or restore the desirable characteristics of ecosystem composition and structure to reduce the risk of uncharacteristic wildfire effects (FS Manual 1925.04a – Chief).
- The cutting, sale, or removal of timber is incidental to the implementation of a management activity and not otherwise prohibited under the land and resource management plan (FS Manual 1925.04a – Chief).
- Decisions when a road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event, that without intervention would cause the loss of life or property (FS Manual1925.04b – Regional Forester).

In order to truly meet the three goals of this plan, opportunities of treating roadless areas should be evaluated with protection of lives as a key motivator. A local roadless treatment project was conducted on the Umatilla National Forest. The project is described in the following text. In 2010, the Umatilla National Forest pursued entering roadless as part of a fuels reduction project. The roadless area northwest of Elgin is identified in the Federal Register Vol. 75. No 201, October 19, 2010 as part of the Oregon Tollgate Fuels Reduction Project. The Lookingglass IRA is part of the Forest Service proposal to treat targeted areas along the edge of the IRA boundary where it coincides with private inholdings and Forest Road 6400 (Federal Register 2010). According to the Record of Decision signed in 2014, treatments types were limited in the Lookingglass Potential Wilderness Area (LG PWA) to trees less than 8 inches in diameter and timber stand thinning changed from commercial treatments to non-commercial treatments. The Lookingglass IRA was modified from a commercial option to no commercial component with restrictions of treating trees only less than 8 inches in diameter and with removal of down woody material less than 14 inches in diameter (Umatilla NF 2014).

Wallowa County's 155 miles of roadless areas bordering private lands presents a number of challenges for both the Forest Service and adjacent landowners. These challenges must be addressed through a collaborative and a responsible program that puts firefighters and public lives first, while improving ecosystem characteristics that support wildfire disturbance. Retention of the current characteristics of the roadless areas is at times contrary to wildland urban interface protection objectives, direction manuals, and ecosystem management direction outlined in the Cohesive Wildfire Strategy.

Wilderness

The Wallowa-Whitman and Umatilla National Forests both host wilderness areas that are within Wallowa County directly bordering private lands. The Wenaha-Tucannon Wilderness is approximately 5 miles to the northwest of the town of Troy with a small section (2.4 miles) against private lanes. The Eagle Cap Wilderness is situation in the southwest of the county with approximately 22.7 miles of boundary adjacent to private

lands. Wilderness acres within the WUI Zone account for 1,324 acres of the Wenaha-Tucannon and 22,110 acres of the Eagle Cap Wilderness.

There is approximately 554 structures within 1 mile of the two wilderness boundaries. The Wallowa Lake – Ski Run Community at risk contains approximately 359 of the structures and is also one of four CAR rated as extreme fire risk. Along this boundary, Wallowa lake visitors and local residents use these structures primarily during peak fire season, thus compounding the concern over public safety. According to Elliot Hinmann of Oregon State Parks and Recreation Department, Wallowa Lake State Park statistics show the for July of 2015 and 2016, visitor days for those months total 119,742 and 103,544 respectively. See Chapter IV for additional information.

The challenges of fire mitigation are partly due to the restrictive nature of the management direction in the wilderness leaving very few options available to fire managers to create defensible space in the middle ground locations. Listed below are a few possible actions that can be taken to mitigate loss in these areas:

- Focus a higher effort on fire mitigation on adjacent private lands through fuels treatment, increase of water sources, and structure vulnerability.
- The Eagle Cap Wilderness has a prescribed fire plan in place that allows for management ignited prescribed fire within the wilderness boundary. As with all fire there are risks involved however having the ability to implement a prescribed burn does the following:

    - Prescribed fire provides fire managers with the ability to dictate the weather and fuels conditions under which the fire will be burning. These can be milder than fire season conditions allowing for a higher level of fire control.
    - Provides a modification in fire behavior outside of fires season reducing potential for an unprecedented wildfire in the wilderness near private lands.
    - Management ignited fire can occur during a time of year where majority of personnel are available to support the burn and provide high protection.
    - Prescribed fire is more likely to retain overstory vegetation and create a mosaic on the landscape.
    - Managers can dictate the amount of acreage burned at one time by identifying and managing the size of the burn.

Between 2002 and 2006 the Wallowa Mountains Office conducted prescribed fires in the Eagle Cap Wilderness in the Minam River corridor. Fuels Management objectives for the project were:

- Reintroduce fire on the landscape in a controlled setting

- to reduce the amount of ladder fuels (understory) beneath the overstory trees in order to raise the canopy base height above the ground to avoid loss of stand in the event of a wildfire;
- reduce the down woody fuel to modify wildfire spread and
- provide a level of protection of the fire tolerant overstory species. Figure X - 10 shows photos of two separate locations 7 and 8 years after the prescribed fires.

Figure X - 10. Photos show 8 and 7 years after a Eagle Cap Wilderness prescribed fire in the Minam drainage. The management ignitions were implemented in 2002 and 2003 respectively. Photos were taken by US Forest Service monitoring crew in June of 2010.

Access routes

Wildland firefighters operate under guidelines called the 10 standard fire orders and 18 situations that shout watch out. These Orders and Watchout Situations provide firefighters with key areas that must be followed while engaging any wildfire. Escape route and safety zones are recognized as a key to safety in both. Multiple escape routes decrease the likelihood of injury or loss of life.

Wallowa County is faced with a variety of access issues that could compromise fire fighter and public safety in a number of locations. Several high use local areas are facing potential safety issues due to ingress – egress problems. Below lists three of the key areas identified during the course of this CWPP planning:

- Lostine Corridor – This area averages 2 wildfire starts annually, yet has one access route and is highly used by members of the public. A secondary exit route is not realistic, providing adequate (large enough) safe areas and fire mitigation treatments in the corridor is critical.
- South end of Wallowa Lake – This area is the highest tourism location receiving over 100,000 visitor days in the State Park alone for the month of July. There is currently only one way in/one way out from this location. There is an access road on the west Moraine of the lake that could provide evacuation relief if used as a secondary route during emergencies. A recent meeting occurred with landowners on the west moraine to discuss the possibility of opening the road to

be used only during emergencies. Unfortunately, a small minority was against opening or gating the road on the west moraine. It is the recommendation of this document to further pursue this option.

- Mount Howard Tramline – The tramline is a gondola line that supports 4 passenger gondola cars from the south end of Wallowa Lake at 4,450 feet elevation to 8,150 feet at the top. Approximately 32,000 visitors use the tramline between mid-May to the end of September. The Tramline cable extends 3.6 miles above wildland vegetation along a ridgeline where it transports visitors to hiking areas. Once at the top there are limited access routes for evacuation: a 15 minute ride back down the gondola; a hiking trail from the top to the bottom; or an old access road off the top into McCully Creek. A review of the Tramlines safety plan is a recommended first step followed by any follow-up means to provide adequate evacuation and safety for visitors and staff.

Figure X - 11. View at lunch site of fire crossing access road on the Thirtymile Fire 2001. Photo taken by K. Cannon Figure 9 of Thirtymile Investigation Report.

The Thirtymile Fire started in Chewuch River Canyon on the Okanagan-Wenatchee National Forest in July 2001. The Chewuch River Canyon had a one way access road. Fourteen crewmembers and two civilians were involved in the entrapment. The firefighters were working on a human caused fire when it started another fire (spot fire) down canyon cutting off their access routes. Two civilian hikers had returned to their vehicle at the time of the incident and took refuge with a firefighter in a shelter as the fire overtook them (USFS 2001).

Ten of the personnel and two civilians survived the burnover while four firefighters died during the fire (USFS 2001). The full report can be found in the CWPP reference folders.

The Chewuch River runs down a deep “V” canyon with little elevation change along the bottom with both sides of the canyon having slope steepness of 70 to 100% (USFS 2001).

The significance of mentioning the Thirtymile Fire in this CWPP is it is important to take lessons learned from a previous fire situation and apply that information to locations in Wallowa County in an attempt of making every effort to avoid a second occurrence of similar outcomes.

Infrastructure

Wallowa County no longer supports a lumber mill but hosts a post and pole facility in Wallowa. The presence of the mill provides higher efficiencies to properly developed management projects. Transportation costs are a significant limiting factor in many forest management strategies. The CWPP committee recognizes the importance of maintaining this small woods infrastructure for the success of future management projects. Significant emphasis should be placed on management strategies that maintain this resource and address haul costs to the closest lumber mill in Elgin. Infrastructure challenges are often associated with material size, haul distance, limited contractors with appropriate equipment for the job, and assurance of products over long term.

Eastern Oregon has very little infrastructure that are capable to utilize biomass. Several challenges exist for biomass usage, including: potential start-up fees for new companies, hauling fees of removing the material from site to the facility, limited contractors with appropriate equipment for the job, and limited assurance of product supply over the long term. Initiating the project is often based on estimates of available supply when considering a business plan and facility. This is often expressed as an assurance that a supply will be available from private, state, and federal lands within a realistic haul radius. The timeliness at which restoration activities occur on much of the public land has been slow due to lack of agreement on forest management, limited funding, and a shortage of staffing in the Forest Service and BLM (Davis et al 2010).

Additionally, finding contractors willing to work with biomass can be difficult partially due to the low value of the product, cost of removal, and in many areas the haul distance to processing sites. Because markets for commercial biomass products such as pellets, mulch, firewood, and animal bedding are limited, it is of little economic value to stewardship contractors, who could otherwise offset the agency's costs of restoration by taking the value of the biomass as full or partial payment for their work (GAO 2015).

Air quality Concerns

Air quality is important for aesthetic, public health, and many outdoor community events. Some project managers, in the GAO report identified prescribed burning as one of the primary methods for forest landscape restoration but it continues to be a challenge do to air quality and safety concerns.

Public perception of air quality standards and lack of education on smoke emissions trade-offs compared to wildfire, limits the opportunities of prescribed burning in an already restrictive program. In many areas smoke emissions constraint are implemented during community events further limiting the number of days a burn may be within the legal parameters of the burn plan.

A 2010 the state of Oregon Department of Environmental Quality (ODEQ) released a five year monitoring assessment. The Forest Service office site that was once in Enterprise hosted a nephelometer (an instrument for measuring smoke) to record the amount of smoke density particulates in the air and the composition of smoke. The ODEQ considers any city over 25µg/m3 to be at risk of violating the National AAQS The monitoring assessment showed from 2007 – 2009 that Enterprise was at 20 µg/m3, well below the daily standard for that time period of 35 µg/m3 (ODEQ 2010.)

Tradeoffs between smoke generated by a prescribed burning under which management-designed prescription conditions are provided, with specific weather and fuels parameters, and summer wildfires in which fire location and conditions are unpredictable are significant. Smoke emission tradeoffs are beneficial where prescribed fires managed at specific times of year produce less particulate than wildfires that burn during the peak of fire season. Roger Ottmar, one of the leading researchers on fire effects, fuel consumption, emissions production, and impacts on air quality and human health uses the following graph (Figure X - 12), during a Forest Service smoke management class, displaying the amount of particulate matter (PM) emitted from both wildfires and management prescribed fire.

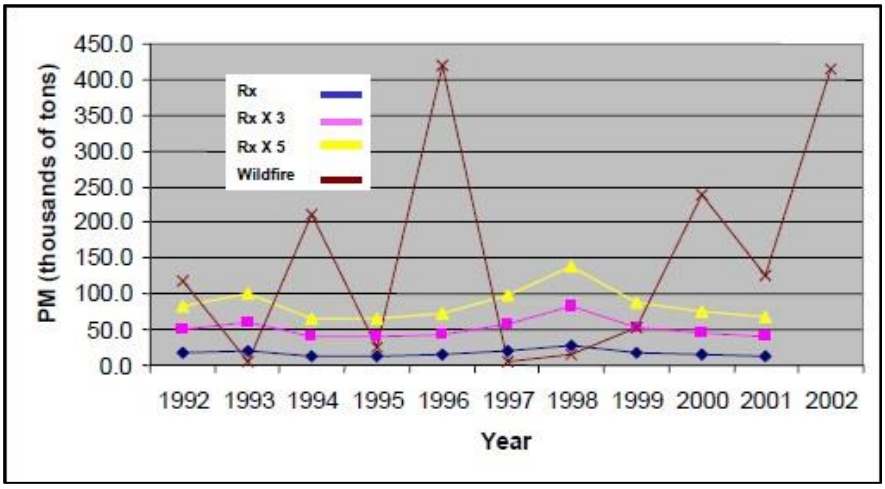


Figure X - 12. Prescribed fires consume less fuel, producing 2 to 4 times *less* smoke. Prescribed fires can be planned when meteorological conditions are favorable for dispersion, and can include smoke reduction strategies (Ottmar 2002).

The Eagle Cap Wilderness is a Class I air shed that has visibility compliance in regard to smoke. When burning in or near the wilderness consideration should be given to minimize long term smoke that impairs visibility within the Class I airshed (ODEQ 2017).

There are multiple options available outside of the wilderness to further reduce smoke emissions to support air quality concerns and impacts to community health. These include:

- Woody biomass utilization
- Mechanical processing/removal

- Firewood programs
- Burn fuel concentrations, creating mosaic burns, pile and burn
- Grazing
- Converting an area; heavy timber into timber/grass
- Burn in advance of precipitation
- Portable incinerators (Ottmar 2002).

Beyond the WUI Zone

This CWPP emphasizes lands within the identified WUIZ for the best protection of local communities, but wildland fire issues do not stop at the WUIZ boundary. Wallowa County is 2,017,280 acres in size, encompassing a WUIZ of 696,662 acres, and 21,950 acres of CAR outside the WUIZ, leaving an additional 1,298,668 acres outside the *primary* focus of this document. However, consideration must be given to outlying areas not within the WUIZ that may need ecosystem restoration or fire mitigation.

In 2013, Phase III of the National Cohesive Wildland Fire Management Strategy (NCWFMS) was developed called the Western Regional Action Plan. This plan was developed with stakeholder input and is a science-based roadmap to provide a truly western approach to wildland fire that addresses the three goals of the CWS (NCWFMS 2013). An important element of the Action Plan is, *"the emphasis on fuels treatments from the community outwards, into the middle lands and toward the wildlands."*

When appropriate, allowance for the incorporation of areas outside the CARs and WUI Zone that support the mitigation actions of this plan can further increase a holistic approach to the CWS goals. Identifying complementing actions that promote a collective and responsible approach to wildland fire mitigation is necessary. This type of approach will assist managers in several ways. It will:

- Reduce the need for separate project planning funds for areas elsewhere in the county when those areas can be included during mitigation planning outside the WUIZ.
- Expand upon the WUIZ edges when it meets a wildland risk or ecological objective.
- Contribute to the overall landscape-scale approach.
- Increase the protection for structures not included within the WUIZ.
- Allow for local, state, tribal, federal agencies as well as the community to support one another by taking into account all lands and acknowledging the interdependence of actions (keeping in mind the differing land and resource management objectives).
- Increase the economic viability of projects through single NEPA planning and taking a big picture approach to meeting the goals of this CWPP.

With wildland urban interface areas as a focus for agency fuels reduction budgets, there is an increased need for creative approaches in spending. This includes approaches during planning and implementation.

Summary

Since 2005, several thousand acres of fuels reduction have been accomplished in Wallowa County for wildland fire mitigation near communities. This marks the first step for local agencies and landowners in progress toward collectively working together for a common cause. This cause must be carried forward to areas that are still at risk while preserving investments already established.

Through the Cohesive Wildfire Strategy's emphasis on the inclusion of middle ground areas, the west has the ability to expand fire mitigation actions beyond the initial wildland urban interface areas. This ability to expand into middle ground areas combined with the degree of departure of western fire regimes from historic conditions supports the need for landscape scale projects. Wildland conditions in Wallowa County mirror those fire regimes and ecosystem departures of the western forests prompting a need for action.

This philosophy of scale provides several benefits for suppression resources, communities, and ecosystems. A balance of both utilization and consumption of fuels will address many concerns from air quality, economic stability, and fire risk mitigation. Through a diverse use of management tools, a variety of treatments can be applied toward management objectives.

However, several issues continue to challenge agencies and landowners in their efforts to reduce wildland fire risk. Small projects are a starting point but are not effective in cost or timeliness against the continued possible threat of severe wildfires. Large-scale approaches that mimic historical landscape disturbance where a diversity of management tools can be utilized will provide not only success in suppression efforts near communities, but support for economic and ecological resiliency in Wallowa County.

Bibliography

Agee, James K. and Ski nner, Carl N., 2005. Basic Principles of Forest Fuel Reduction Treatments., Forest Ecology and Management 211 (2005) 83-96.

Allen, C.D., Savage, M., Falk, D.A., Suckling, K.F., Swetnam, T.W., Schulke, T., Stacey, P.B., Morgan, P., Hoffman, M., Klingel, J.T., 2002. Ecological restoration of southwestern ponderosa pine ecosystems: a broad perspective. Ecol. Appl. 12, 1418–1433.

Davis, Emily Jane; Moseley, Cassandra; Nielsen-Pincus, Max; Abrams, Jesse; Brady, Cullen; Christoffersen, Nils; Davis, Chad; Enzer, Maia J.;Gordon, Josef; Goulette, Nick; Jungwirth, Lynn; Jungwirth, Jim; Kauffman, Marcus; McCarthy, Tyler; Shannon, Patrick; Sundstrom, Shiloh. 2010. The State of the Dry Forest Zone and its Communities. https://scholarsbank.uoregon.edu/xmlui/handle/1794/10802

Federal Register. October 19, 2010. Notices: Department of Agriculture, Forest Service, Umatilla national Forest, Walla Walla Ranger District; Oregon Tollgate Fuels Reduction Project

GAO Government Accountability Office, April 2015. Report to Congressional Requesters: Forest Restoration, Adjusting Agencies' Information-Sharing Strategies Could Benefit Landscape Scale Projects. Graham, Russell T.; McCaffrey, Sarah; Jain, Theresa B. (tech. eds.) 2004. Science basis for changing forest structure to modify wildfire behavior and severity. Gen. Tech. Rep. RMRS-GTR-120. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 43 p.

McKelvey, K.S., Skinner, C.N., Chang, C., Erman, D.C., Husari, S.J., Parsons, D.J., van Wagtendonk, J.W., Weatherspoon, C.P., 1996. An overview of fire in the Sierra Nevada. In Sierra Nevada Ecosystem Project: Final report to Congress, vol. II: Assessments and scientific basis for management options. Water Resources Center Report No. 37. Centers for Water and Wildland Resources, University of California, Davis, pp. 1033–1040.

NCWFMS, 2013. Phase III of the National Cohesive Wildland Fire Management Strategy

Oregon Department of Forestry May 2014. Senate Bill (SB) 357.

Ottmar, Roger. 2002. PDF slide show of RX-410 Smoke Management Techniques. Fire and Environmental Research Applications, Fire Science Laboratory, United States Forest Service.

Stein, S.M.; Menakis, J.; Carr, M.A.; Comas, S.J.; Stewart, S.I.; Cleveland, H.; Bramwell, L.; Radeloff, V.C. 2013. Wildfire, wildlands, and people: understanding and preparing for wildfire in the wildland-urban interface—a Forests on the Edge report. Gen. Tech. Rep. RMRS-GTR-299. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Stine, Peter; Hessburg, Paul; Spies, Thomas; Kramer, Marc; Fettig, Christopher J.; Hansen, Andrew; Lehmkuhl, John; O'Hara, Kevin; Polivka, Karl; Singleton, Peter; Charnley, Susan; Merschel, Andrew; White, Rachel. 2014. The ecology and management of moist mixed-conifer forests in eastern Oregon and Washington: a synthesis of the relevant biophysical science and implications for future land management. Gen. Tech. Rep. PNW-GTR-897. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 254 p.

Tidwell, Thomas. June 4 2013. Chief of Forest Service statement before the Committee on Energy and Natural Resources, U.S. Senate. Wildland Fire Management

USDA 2004. United States Department of Agriculture; U.S. Forest Service; U.S. Department of Interior; Bureau of Land Management. The Healthy Forests Initiative and Healthy Forests Restoration Act, Interim Field Guide.
U.S. Forest Service 2001. Thirtymile Fire Investigation

U.S. Forest Service. Umatilla National Forest 2014. Record of Decision for Tollgate Fuels Reduction Project. Walla Walla Ranger District, Umatilla and Union Counties, Oregon.

Web Links:

Forest Service 2016. Wallowa-Whitman National Forest Current and Recent Projects.
http://www.fs.usda.gov/projects/wallowa-whitman/landmanagement/projects

Oregon Department of Environmental Quality 2017. Regional Haze Plan.
http://www.oregon.gov/deq/aq/Pages/Haze.aspx

Oregon State Department of Forestry, 2016. Division 48 Smoke Management, Oregon Administrative Rule 629-048-0140. http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_048.html

Oregon State 2016. Oregon Administrative Rules, Department of Forestry Division 48 Smoke Management 2016. http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_048.html

Senate Bill 1072, http://www.oregon.gov/Pages/index.aspx#search?q=Senate%20Bill%201072

H.R. 2647. 2015. House of Representative - Resilient Federal Forests Act of 2015
https://www.congress.gov/bill/114th-congress/house-bill/2647

USDA Forest Service 2016. Ecosystem Restoration Policy April 27, 2016. Federal Register Volume 81, NO. 81 / Wednesday, April 27, 2016 / Notices Page 24785
https://www.federalregister.gov/documents/2016/04/27/2016-09750/ecosystem-restoration-policy

XI. Emergency Management

Introduction

Regardless of protection authority, all lands in Wallowa County are susceptible to wildland fire. It has been important for local agencies to collectively agree upon how agencies will respond in providing mutual aid and cost effective fire protection for public lands, private lands, and surrounding communities. It is also important that community members are actively involved in risk mitigation preparations prior to a wildfire event.

Wallowa County hosts several emergency services with protection jurisdiction that play a key role in actively responding to, participating, or supporting wildfire events. Depending on incident size, involvement during fire emergencies are federal, state, city, rural firefighters, law enforcement, and emergency management, making saving lives their number one priority.

Wallowa County communities under an “average” occurrence of wildfire, are likely to have more than 10 percent of their populations and property affected, giving them a HIGH in community vulnerability (U of O 2014).

Fire protection capabilities are most often challenged during the summer months, when thunderstorms can initiate multiple fire starts over a matter of hours or days. This type of multi-occurrence quickly depletes available local resources, requiring out of area assistance. Unfortunately these storms often originate over east central Oregon, leaving numerous fire starts in their wake prior to reaching Wallowa County, resulting in limited available outside resources for assistance. Because of frequent multiple fire start events and limited fire suppression resources, a cooperative effort with landowners to protect their structures through mitigation measures will increase structure survivability.

Infrastructure

Infrastructure plays an important role not only in Wallowa County’s local economy, but is also critical during disasters and emergency events for proper functioning and response capabilities. Facilities such as police, fire, hospitals, and government are important to successful wildfire emergency response. Support infrastructures such as airports, utilities, and transportation systems provide an important role in the overall fire mission.

Damage to or loss of infrastructure services can negatively affect a community’s ability to cope, respond, and recover from a wildfire situation. Communication during wildfire events is key to coping with events and preparing for post situations. Wallowa County has one radio station and no television stations making cell phone and computers the highest forms of information flow. Highways are the primary means of shipping access in and out of the valley for goods and supplies. Protecting and maintaining infrastructures is essential for a higher degree of wildfire suppression success. Firefighting supplies often arrive via state and federal highways.

There are two key access highways into Wallowa County and one scenic byway that is open during the summer-fall season only. The two key highways are highway OR82 that connects Wallowa County with Union County to the west and highway 3 that travels from Enterprise north to Clarkston, Washington. Highway 82 is a two lane road that winds along the Wallowa River with steep inaccessible slopes on both sides. Highway 82 is the major arterial access route used for general and product transportation purposes. The Union-Wallowa County Line occurs at mile post 33. Oregon Department of Transportation (ODOT) 2015 traffic volumes for OR82 has an average daily use of anywhere from 1700 to 4000 between the county line and the town of Joseph. Based on the snow conditions in the winter and the level of recreation numbers recorded during the summer months the majority of traffic use occurs at the peak of fire season. Figure XI - 1 shows the annual average daily traffic use on Wallowa County highways according to ODOT.

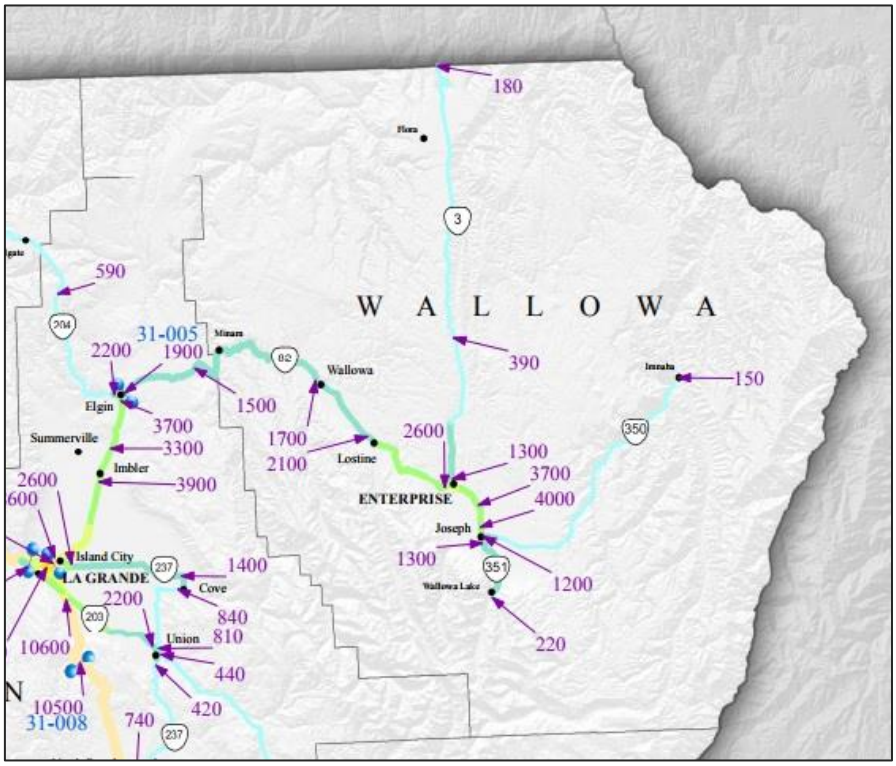


Figure XI - 1. Traffic Flow Map 2015 – clipped. Oregon State Highway system. Volumes shown are numbers of all vehicles. Annual Average Daily Traffic. ODOT 2015. http://www.oregon.gov/ODOT/Data/Documents/Flow_Map_2015.pdf

Highway 3 is the second key access route in and out of Wallowa County. This route extends north out of Enterprise into Washington State. Highway 3 is a popular route used by many locals to access the towns of Lewiston, Idaho and Clarkston, Washington as well as visitors coming into the county from those areas. The two lane highway dissects the northern part of the county while meandering through general forest until it breaks off into Buford Grade in the breaks of the Grande Ronde River Canyon. Buford Grade is known for its remoteness, steepness, and negotiating curves as the highway descends from

4400 feet near Flora down to 1300 feet at the Grande Ronde River, all over a 10 mile stretch.

These two primary access routes are key infrastructure year round for Wallowa County with the highest traffic use occurring during the summer months coinciding with the highest fire potential.

Wallowa County has roughly 123 miles of state highway in both rural and urban Wallowa County.

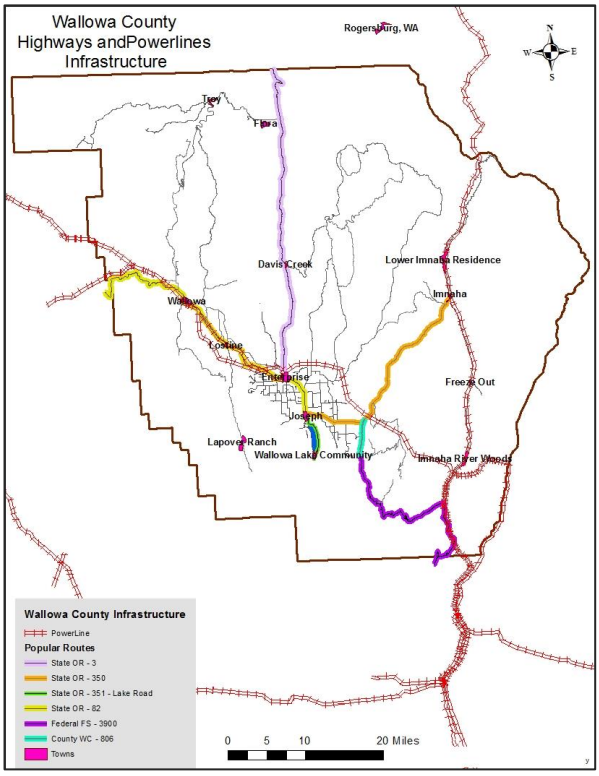


Figure XI - 2. Important access routes and high power transmission lines in Wallowa County.

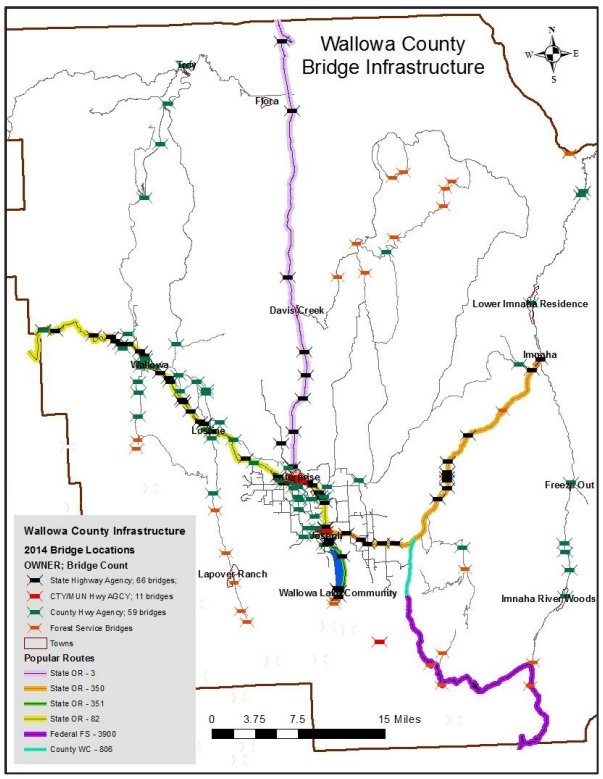


Figure XI - 3. Access roads with bridge infrastructure by management agency.

There is 136 primary bridge infrastructures managed by the state, county, city with each agency having 66, 59, and 11 respectively. State bridge custodian consist of 3 State Park/First Reserve, 3 other State Agency with the remainder falling under Oregon State Highway Agency. The Forest Service has approximately 25 bridges associated with a variety of road access routes with the highest use routes in the Lostine Canyon, Chesnimus Creek area, and on the 3900 scenic byway route to Halfway, Oregon.

Wallowa County has approximately 120 miles of high power transmission lines that provide service to cities of Spokane, Washington and Boise, Idaho. Three companies that utilize the lines are: Avista lines run north of Imnaha to Spokane, Washington; Idaho Power utilizes the lines south of Imnaha into the Snake River going south and paralleling the 3900 scenic byway road both leading into Baker County eventually servicing Boise,

Idaho; and Pacific Power lines run between the Snake River west into Union County eventually connecting to Pendleton and Portland, Oregon.

Wallowa County hosts a number of other miscellaneous type infrastructures that are primarily situated in forested areas. These are often located either at a high point where fire will burn rapidly uphill toward its location, or in a narrow canyon where fire will be funneled due to surrounding terrain and wind patterns. These areas often have limited access, making evacuation and firefighting difficult. These areas include:

- Fire detection lookouts in use: Harl Butte (FS), Hat Point (FS), Howard Butte (ODF), Long Ridge (private coordinated with ODF), and Courtney Butte (private), Oregon Butte (Umatilla NF – Wenaha), Lookout Mountain (Umatilla), Mule Peak (Eagle Cap Wilderness)
- Communication Repeaters include Howard Butte, Courtney Butte, Tope Lookout, Buckhorn, Sheep Ridge
- Fire detection Lookouts not in use: Buckhorn (FS), Redhill (FS),
- Fish Hatcheries: Wallowa Hatchery along Spring Creek in Enterprise, Big Canyon at confluence of Deer Creek and Wallowa River, and Little Sheep Creek along Imnaha Highway and a Fish Weer located just off 3900 road on the upper Imnaha River
- Multiple developed campgrounds: Wallowa Lake State Park, Upper Imnaha – multiple camp sites, 12 – overnight campgrounds Hells Canyon/Wallowa Valley; 21 overnight campgrounds in Wallowa Mountains/Eagle Cap Area (Forest Service, 2017)
- Numerous scattered farm/ranch communities and grazing allotments
- Guard Stations: Lick Creek, Billy Meadows, Sled Springs
- Hells Canyon Dam and facility, Pacific Power Hydro – head of Wallowa Lake

Wallowa County has a numerous variety of communication methods (166) located throughout the county in the form of AM/FM, Land Mobiles to cell towers. Listed below is the type and number identified by the West Wide Risk Assessment (WWRA) data:

Communication Source	Number of Licensee	Communication Source	Number of Licensee
AM	1	Land Mobile - Private	86
Antenna Structure Registration (ASR)	7	Microwave	55
Cellular	3	Paging	2 Asotin/Troy
FM	5	TV	6
Land Mobile – Commercial	4		

Table XI – 1. Listing of Wallowa County communication types and number of licenses issued.

Fire Protection

Wallowa County recognizes the importance of interagency efforts in wildland fire situations. Wildland fire protection is included in the county's Emergency Operations Plan, section 4.2 that addresses the phases of emergency management: (1) mitigation and prevention: (2) preparedness: (3) response: and (4) recovery.

In 2009 the Wallowa County Emergency Services updated the *Wallowa County Emergency Operations Plan*. There are identified agencies for Emergency Support and Emergency Incident extensions. In the Emergency Operation Plan chapter 3 outlines the roles and responsibilities of the different agencies that may be involved in an urban/wildland interface fire, with the main goal of protecting life of emergency responders, members of the public, then prevention and mitigation of major property damage that present an immediate danger to human life (WCEOP 2009).

In Wallowa County fire protection falls within two categories of protection:

1. Wildland Protection – wildlands are protected from human and natural fire starts by either Forest Service, Oregon Department of Forestry, or rural fire departments with assistance of city fire departments. When structures are threatened that are outside of city-rural protection boundaries or not under a protection contracts with the city departments a conflagration act may be initiated.
2. Dual protection occurs where rural fire protection districts overlay with wildland fire protection from the Oregon Department of Forestry. The city and rural fire departments have primary responsibility when structures are involved. Current training qualifications do not allow for Federal and State fire resources to engage a building on fire.

Wildland Protection

Wallowa County fire protection has changed since the original CWPP. In 2010, there was a large re-classification of lands resulting in an additional 200,000 acres to wildland fire protection. In 2015 a five year review was conducted looking at the interior area that was classified as Forestland but previously not assessed. The County Commissioners and Emergency Services recommended moving to wildfire land protection within the center of the county. The results were to classify and assess forestland. A total of 131,000 acres were added to wildland protection as forestland. This resulted in ALL Forest land in the county falling under some type of wildland fire protection.

Structure protection is provided within agency protection areas for City and Rural Fire Departments. Areas outside the city limits residence must complete a subscription for service for city to respond to structures. Enterprise, Lostine, and Joseph both have structure contracts for individual homeowners.

These lands are delineated in Figure XI – 4, displaying areas of unprotected, single protection, and dual protection.

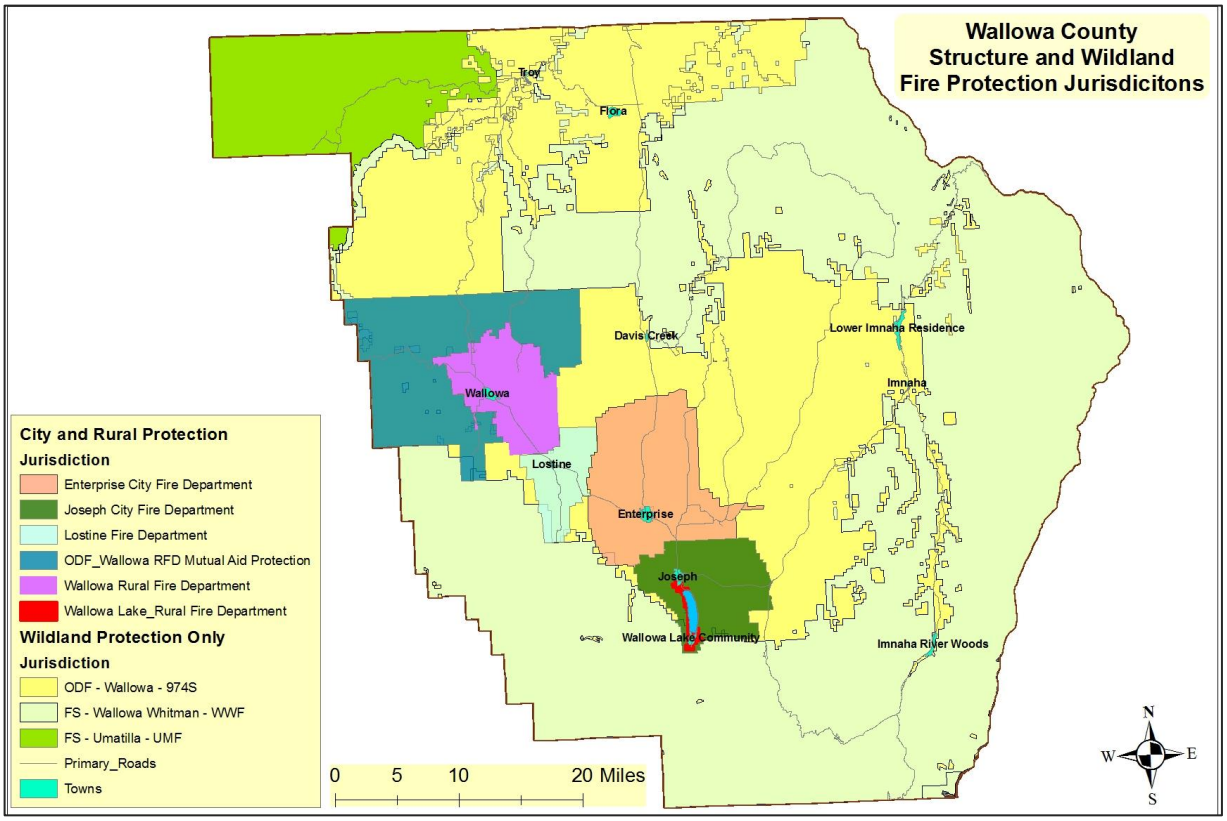


Figure XI – 4. Wallowa County Protection Authority. Geographic coverage for Wallowa County fire protection agencies. Types of coverage include land only, structure only, and dual protection of both land and structures. All lands within Wallowa County are under some type of protection.

Land Protection Without Structure Protection

Properties without structural protection are primarily private lands; while federal lands are without structure protection there are few buildings in comparison to private lands. Both, however, encompass the largest contiguous blocks of land in the county. One of the overlying issues facing the county is these lands have unincorporated small communities scattered throughout with no structure protection, as well as some scattered farm and ranch dwellings without structure protection. Lack of structure protection is compounded by response distance and time for structure protection resources to assemble, travel, and take action in these areas. An example is the Grizzly Fire in 2015 that began on the Umatilla National Forest during a multiple ignition thunderstorm event. Initially the fire spread was kept in check and priorities had to be made, however as weather conditions worsened the fire grew significantly threatening the towns of Troy and Flora. Response times to this area exceeded an hour from Enterprise.

Travel to some populated communities at risk without structure protection are listed in the figure below, listing the point of origin as the closest responding City or Rural Fire

Department with structure protection capabilities. Not included are home clusters spread out around the county that lack a community name. Access to some areas may be on gravel or dirt roads, steep grades, and/or windy roads so times may differ even though distances are similar.

Structure protection response in non-structural protected areas			
Closest city/rural Fire Dept.	Destination Community/area	Distance (miles)	Estimated drive time (minutes)
Enterprise / Joseph	Alder Slope	3 - 5	15 - 25
Lostine	Allen Canyon / Bear Ck	2 - 5	15 - 30
Enterprise	Davis Creek	15	25 - 35
Joseph	Divide / Prairie Creek	5 - 10	20 - 35
Wallowa	Dry Creek	7 - 18	30 -
Enterprise/Wallowa	Flora	37	50 - 70
Enterprise Joseph	Hurricane / Enterprise Watershed	2 - 5 1 - 4	15 - 25 15 - 25
Joseph	Imnaha Corridor	30 - 50	45 - 90
Lostine	Lostine Canyon	1 - 6	15 - 30
Wallowa	Power Meadows	7 - 18	40 - 60
Wallowa	Promise	15- 30	45 - 90
Enterprise	Troy / Bartlett – Eden Bench	50 - 60	120 - 180
Joseph / Wallowa Lake	Ski Run (portion of Wallowa Lake – Ski Run)	2 - 6	15 - 40

Table XI - 2. Response time estimates are average travel only.. Times may vary depending on road surface conditions, or other circumstances.

The majority of the small, unincorporated communities have very few population statistics available except at the county level. Many areas increase in population during the peak of the summer months as a result of tourism.

Oregon Department of Forestry Protection (ODF)

All rural - city structure protection and the bulk of the non-protected structures are located within the ODF *wildland* protection jurisdiction. Non-federal Forestlands are protected by statue by ODF. Oregon Department of Forestry has the largest block of single land protection that is not publicly owned. These non-federal owned lands are within the Wallowa Unit, Oregon Department of Forestry's protection jurisdiction.

Non-federal forestlands extends from the Washington state line north of Troy southwest into the Minam River canyon then east over to Zumwalt Prairie. These private lands takes into account much of the valley's foothills, agricultural lands, and grass prairies and overlaps with all city and rural protection areas accounting for 741,808 acres of wildland protection.

WUI Zone coverage for ODF includes the majority of the northern WUI Zone (75% - 136, 030 acres) and 238, 997 acres (55%) of the southern WUI Zone. The southern WUI Zone has 141,150 acres of wildland - structure protection overlap.

ODF protected lands with unprotected structures are primarily located in Troy and Flora and the Imnaha Corridor. Some additional areas include:

- Davis and Dry Creek areas
- Griffith Creek area of the Divide / Prairie Creek CAR
- The Elk Mountain, Crow Creek, and a pepper of structures from Crow Creek east to Zumalt Prairie.

The State of Oregon also provides access to 10 person inmate crews to assist with wildfires. The closest inmate crew is located in Baker City, Oregon. These crews work within a 90 mile radius of the institution, are considered low risk, and provide a service while receiving job skills. These crews are often used on contained fires that have little likelihood of escaping containment. Utilizing these crews makes regular fires crews available for new assignments.

Forest Service Protection

The Forest Service protected public lands include the Wallowa-Whitman and Umatilla National Forests with approximately 1,043,140 and 123,714 acres respectively, of which 35,907 acres of Umatilla N.F. lands are within the northern WUI Zone area. These public lands are dissected with rivers, deep canyons, and ridge top plateaus primarily surrounding the Wallowa Valley agricultural lands. Forest Service protection extends from the foothills near communities into large forested land blocks that included the Eagle Cap Wilderness, Hells Canyon National Recreation Area, Hells Canyon Wilderness and the Umatilla National Forest west of Troy. Structures within the public lands are primarily associated with administrative sites, Tramway Restaurant, privately owned small land parcels, and such areas as developed campsites, guard stations, lookouts, and communication facilities.

Forest Service lands in the northern WUI Zone include 35,907 acres of Umatilla and 10,310 acres of the Wallowa-Whitman National Forest. Public lands under Forest Service protection coverage in the southern WUI Zone total 234,288 acres with no overlapping of structural protection agencies. The southern WUI Zone extends into the Eagle Cap wilderness and accounts for 22,110 acres.

Unprotected structures are scattered throughout the WUIZ with the Imnaha Corridor supporting the highest concentration and most extreme fire risk out of all the non-protected structures.

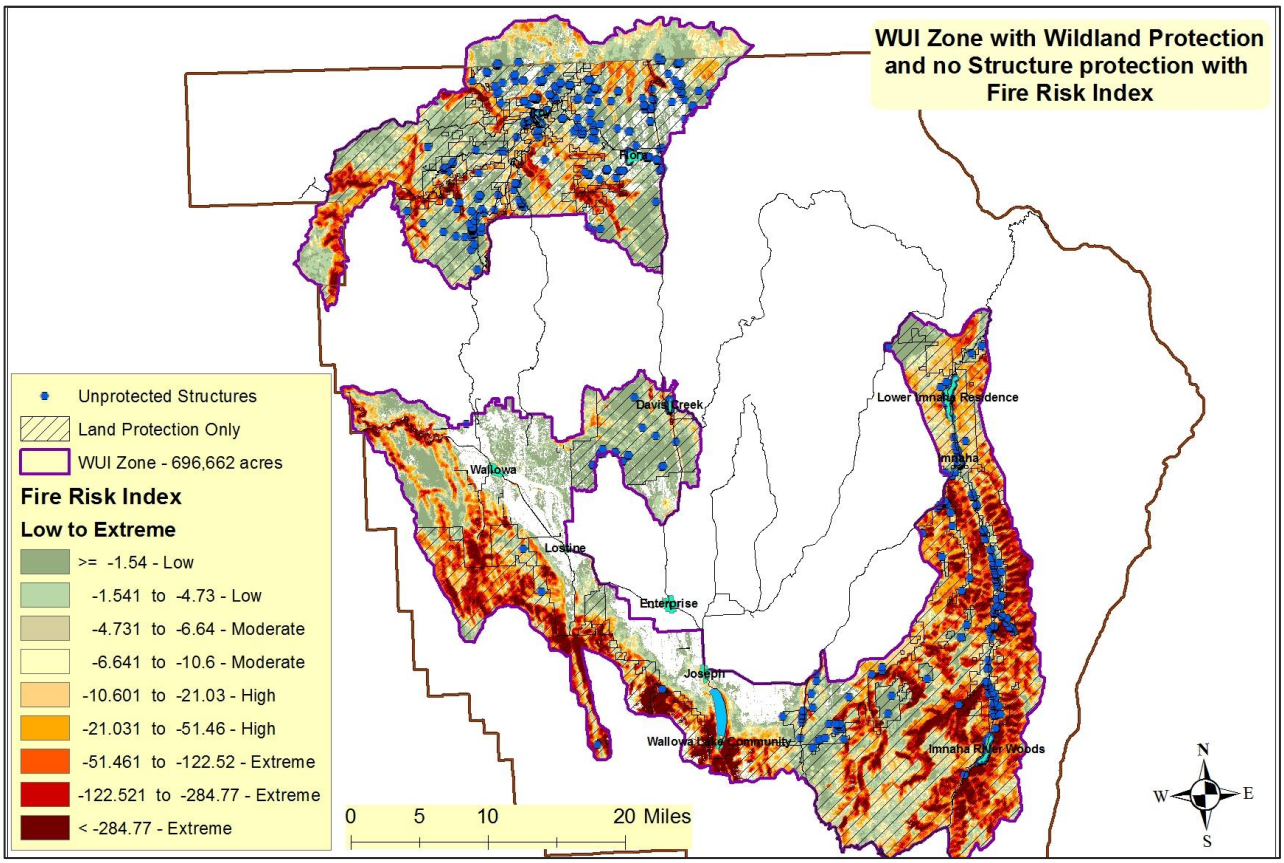


Figure XI - 5. Unprotected Structures within the WUIZ and Fire Risk Index. Wildlands are protected with absence of structure protection (blue dots).

Protection Capabilities

Structure Protection

Structure protection is provided within each agency's protection jurisdictions for City and Rural Fire Departments with agreements in place to assistance neighboring departments when needed. Areas outside the city limits residence must complete a subscription for structure protection service by individual landowners entering into a protection contract. These contracts in effect expand structural protection response districts. There is currently roughly 500 residences in the county under contracts for structure protection.

As of 2010 Wallowa County and it's sub-areas had 4,108 housing units (PSU 2016), this equates to approximately 12% of local homeowners under a protection contract. The two protection districts that have structure protection contracts available to homeowners are Enterprise and Lostine.

Dual Protection Areas

Dual protection ONLY occurs where a Rural fire Protection District (Wallowa and Wallowa Lake) overlap with ODF jurisdiction. These blocks of land are primarily associated with the rural and city protection areas.

Wallowa Lake and Wallowa Rural are the only true mutual aid protection areas covered by tax districts. The remainder of the county is under full wildland protection and a more centralized structure protection within Wallowa Valley.

Wallowa County has a vast landscape of forest and a finite amount of fire protection resources. The limited resources challenge local fire managers because of extended response times, the need to prioritize during multiple ignitions, and putting a higher emphasis on pre-fire mitigation treatments. There are a total of 3,152 square miles in Wallowa County with 5 rural/city fire protection districts, with ODF and Forest Service providing the primary wildland protection. The county's vastness results in less than one fire station per 450 square miles. Structure protection facilities are all located in the Wallowa Valley proper. There are currently no substations located outside the valley for structure protection. Response times range from 15 minutes to two hours, depending on availability of personnel, proximity to station, single or multiple fire starts, draw down levels of local resources and the availability of resources outside the county.

Additionally, the US Forest Service (USFS) and the Oregon Department of Forestry (ODF) provide strictly fire protection for wildland ignitions. These agencies resources include engines, dozers, and fire hand crews. The Forest Service protection in Wallowa County includes Wallowa-Whitman National Forest and the Umatilla National Forest. Walla Walla and Pomeroy Ranger Districts on the Umatilla both overlap into the northwest corner of Wallowa County. The numbers in Table VI - 4 reflect both districts. The paid part time employees include both permanent seasonal (PSE) and temporary firefighters.

Though many rural fire protection districts are certified in wildland firefighting, wildland firefighters are not equipped or trained in structural protection. The Bureau of Land Management (BLM) also manages land in Wallowa County, but is in agreement with the USFS for initial attack responsibilities on BLM land.

Protection capabilities are influenced by both response time and staffing issues. The County's five rural fire departments (RFD) are 100 % fully staffed by volunteer firefighters. State and Federal firefighters are either permanent full time year round employees, permanent part-time employees, or part-time seasonal employees which are brought on particularly for a specific time frame such as fire season. (Table XI - 3).

The following table lists Wallowa County's Fire Resources, their protection area, number of staff, and pay status at each protection district.

Fire Department/ Agency	Protection Area in Sq. Miles	No. of Stations	Number of Staff					Estimated Structure Count
			Firefighters (FF)			Non-FF		
			PFT	PPT	V	P	V	
Enterprise City	116	1			22			1405
Joseph City	69	1			17			1519 Numbers reflect Wallowa Lake structures also
Lostine RFD	33	1			14			296
Wallowa RFD Mutual Aid Protection with ODF	62 150	1			16			743 25
Wallowa Lake RFD	2	1			0		2	371 Under contract Protection from Joseph City
Umatilla N.F. Pomeroy Walla Walla	193	1	4	23	0		4	0
		2	4	20	0			0
Oregon Dept. Forestry		3	5	19 1 -D		1		4771 Outside of Structure Protection areas
Wallowa-Whitman N.F. Wallowa Fire Zone	1624	1*	16	22		10		161 Misc. Scattered Buildings

Table XI - 3. Non-government firefighters consist of 100 percent non-pay status volunteers. * Numbers do not reflect nationally shared resources such as hotshots, helitack rappel crews, seats. PFT = Paid Full Time, PPT = Paid Part-time, V = Volunteer, P = Paid, 1 – D = dozer. Forest Service and ODF numbers include fire hand crew personnel. See chapter IV for city populations. RFD sq. miles include mutual protection with ODF.

In rural Oregon, when fires occur in woodlands near homes, those first to arrive are often friends and neighbors acting as volunteer firefighters. Oregon rural areas, particularly Wallowa County, is dependent on volunteer firefighters to maintain service to the local communities. However, recruitment both nationally and in Oregon has fallen. Between 2005 and 2010, Oregon's volunteer firefighting numbers were in line with a national decrease of 12 percent. Oregon has 10,000 firefighters, of which approximately 8,000 (four-fifths) are volunteers (Oregonlive.com 2011). A 12 percent drop in volunteers would reduce the numbers by 960 individuals.

Volunteer firefighter retention is difficult due to the lack of pay, outside responsibilities, and changes in population demographics. Portland State University sees a change in Wallowa County population age from 2016 to 2035. It is expected the population 65 or older will grow from roughly 29 percent to about 42 percent (PSU 2016). The aging population base is partly due to a transition of individuals from the age group of 15 – 64 years of age, which is expected to drop by nearly 10 percent over the same time period.

Change in workforce age and volunteer numbers is being felt in other states leaving fire departments with the inability to respond to calls. Pennsylvania in the mid-1970s had about 300,000 volunteer firefighters, that number is down to 50,000 resulting in an 80% drop according to Tim Solobay, Pennsylvania fire commissioner and former Washington County state senator (FireRescue1 2016). The average age of Pennsylvania firefighter is 45, most families require both parents to hold full time jobs, and fire departments are responding to as many as 4 times more medical calls making volunteer recruitment difficult.

According to the Oregon Volunteer Firefighter Association (OVFA) there are also a number of issues facing it's program and emergency services as a group:

- funding,
- meeting legislative requirements without adequate funding, and
- time required for individuals to continue as a volunteer (OVFA 2017).

Additionally, many of the current volunteer firefighters in Wallowa County are required to maintain full time jobs elsewhere, resulting in fire delayed responses or inability to fully staff at optimum levels, Wallow Lake Community has a fire house but has no personnel to staff it and the community has an agreement with the City of Joseph for protection services.

A variety of topics surfaced during the meeting with county fire chiefs. A complete list on needs and concerns is provided in Appendix A and mitigation actions for these can be found in Chapter VIII. The following is a brief list of key items.

1. Staffing of personnel and equipment is needed. Multiple positions must be filled and protocols followed to meet safety standards for firefighting, i.e.: pump operator, Incident commander, safety officer, span of control, work rest protocol, etc.
2. Not all volunteers can respond to all individual calls for service
3. 72 to 80 hours minimum of training for entry-level. If training is typically during the week, causing the volunteer to miss paid work, but a weekend would require the volunteer to forgo home responsibilities.
4. Interface technology equipment for emergency response would be helpful: mapping, home assessments.
5. An Emergency Operations center (mobile or stationary) would be highly beneficial and service all emergency incidents.
6. Troy, Imnaha, Promise are in need of structure protection – sub-stations would fit this need.

7. The county has multiple ingress/egress issues for both evacuation and emergency equipment access. Areas such as: Lostine Canyon, Bear Creek, south end of Wallowa Lake, inadequate driveways/turn arounds.
8. Improvements on Public Communication, Education and Involvement

In an attempt to attract new firefighters from the local area, this CWPP identified it as a mitigation measure with corresponding action items in Chapter VIII, to develop a firefighting recruitment program to increase level of interest. The firefighting capacity is not commensurate with the local fire workload and risks levels posed by wildfire in Wallowa County. Investments into new equipment and increased firefighting workforce in conjunction with wildfire mitigations must occur to improve firefighter and public safety and successful initial attack efforts.

Protection Compliance

Should a wildfire reach the threshold for declaring a conflagration (per the Oregon Conflagration Act), the Wallowa County fire chief will request assistance and support for structure protection. The Governors Conflagration Act allows for movement of structure protection resources, however, the conflagration act is designed for land within a structure fire protection district, and typically conflagration requests occur when a fire is already posing a serious threat to the communities. In order to meet the criteria in 2016 Fire Service Mobilization Plan set forth by the Office of the State Fire Marshall for conflagration declaration, Wallowa County is currently compiling this plan in accordance with the following:

1. National Cohesive Wildland Fire Management Strategy 2014
2. 2009 Guidance for Implementation of Federal Wildland Fire Management Policy
3. Oregon Senate Bill 360 (The Act of 1997)
4. Health Forests Restoration Act, 2003
5. FEMA National Fire Plan
6. The 10-year Comprehensive Strategy
7. Regional Natural Hazard Mitigation Plan (Baker, Grant, Union, and Wallowa Counties)
8. Wallowa County Emergency Operations Plan
9. Federal Register, 2001 listing High Risk WUI Communities
10. Oregon Administrative Rules Chapter 477, Fire Protection of Forests and Vegetation

Wallowa county protection resources work closely together to provide the highest level of protection possible. There are times during fire season that multiple fire starts and active fire behavior near communities warrant the need for outside aid. Since 2000, Oregon's Governor has declared 3 conflagration fires in Wallowa County.

Wallowa County Conflagration Fires					
Wildfire Name	Community Threatened	Date	Acres	Structures Threatened	Structures Lost
Carrol Creek	SE Joseph & Thompson Meadows	8/28/2000	3179	20	2
Horse Creek	Imanha	8/17/2001	16,456	25 +	0
Grizzly Bear Complex	Troy & Flora	8/20/2015	76,475	405 - residence 98 - misc. structures	25

Table XI - 4. Wallowa County conflagration acts since 2000. All conflagrations occurred mid-late August.

Mitigation Action Plan for Emergency Services

The focus of this section is Wallowa County's Emergency Services participation and efforts regarding wildland fire. County led efforts are centered on fire fighter and public safety; increasing opportunities to promote community awareness and involvement; collaboratively working with local agencies to improve emergency response.

Information Dissemination

Wallowa County has many public information options today designed to educate the public on several emergency fronts, including wildland fire. Emergency Services has set up a system called AlertSense that issues texting alerts and reverse 911 system. This alert system detects all cell phones that have utilized local cell towers and those phones receive the emergency message. Individuals and organization can now sign up for the service to alert their own staff on any changing conditions.

Wallowa County web site, http://co.wallowa.or.us, has a link to Emergency Services under the menu tab of Public Safety that provides access to the a number of documents and links including the Northwest Interagency Coordination Center that provides Oregon State large fire situation and map information, resources committed to these fires, and a variety of other useful information.

A blog site called, Blue Mountain Fire Information has been established for information regarding current wildfire activity in the Blue Mountains areas of northeast Oregon and southeast Washington. This site is hosted by the Blue Mountain Interagency Dispatch Center, Oregon Department of Forestry's Northeast Oregon District, Umatilla National Forest, and Wallowa-Whitman National Forest. This site provides recent news releases

as well as real time forest fire conditions, local and regional wildfire conditions, current activities planned, and links to several agencies' Facebook pages and websites.

Northeast Oregon Department of Forestry and Wallowa Fire Department both have facebook pages providing up to date fire information in the local area.

Wallowa County emergency services and fire agencies use a variety of additional methods to get information out to the local residents. The county, when necessary, will conduct public service announcements, hold public meetings, post message boards, and issue news releases in order to reach the highest number of residence and visitors as possible.

County Wide Fire Simulation Scenarios

County emergency and fire management agencies, along with local cooperators, have been proactive in preparing for wildfire events. In May of 2016, Emergency Services hosted a wildfire simulation event with 80 individuals in attendance. The simulation involved a variety of attendees such as: 7 cadre members, 4 simulation command staff, 9 community leaders, 7 public information officers, 41 emergency services personnel, and 12 observers of which 7 were from neighboring counties. Emergency services personnel consisted of 21 support or infrastructure representatives leaving the remaining 20 individuals representing search and rescue, medical, fire, or law-enforcement. A complete list of attendees can be found in Appendix H.

The simulation provided opportunities to filter out potential issues in advance of an actual wildfire threat. Simulations are planned to occur every three years, with the expectation of increased cooperator involvement at each mock event.

Wallowa County Planning Commission

During the CWPP development process a representative of the Wallowa County Planning Commission was present at all CWPP meetings with the intent of utilizing the new assessment information as a supporting document to the Natural Disaster and Hazards Mitigation Plan and the Wallowa County Comprehensive Plan.

The updated county Comprehensive Plan was designed to support a number of Fire Management Policies/Plans regarding wildfire such as: the Northeast Regional Natural Hazards Mitigation Plan, 2017 Community Wildfire Protection Plan, Oregon Department of Forestry's "Recommended Fire Siting Standards for Dwellings and Structures and Fire Safety Design Standards for Roads.

In April of 2017 the Wallowa County Planning Department presented a memorandum of recommendations for amendments to the Wallowa County Zoning Ordinance. It was presented at a public hearing held by the Wallowa County Planning Commission. The amendment was #17- 01 with a proposal to amend Article 25 of the Wallowa County Zoning Ordinance to create a new Wildfire Hazard Overlay (WHO) zone, and further

amend the Wallowa County Comprehensive Plan – Chapter VII Natural Disaster and Hazards to include wildfire hazards. The new WHO criteria would replace existing wildfire hazard regulations in other articles of the Zoning Ordinance (Winterowd, 2017).

The primary focus for the new zoning and standards is the CAR and WUI Zone identified in this CWPP document. The purpose of the WHO would be to minimize wildfire risk to life and property and to implement the wildfire policies in Chapter VII Areas Subject to Natural Disasters and Hazards the Wallowa County Comprehensive Plan. The WHO zone is proposed to apply to the CWPP's CAR and the WUI Zone unincorporated areas.

This supports the Cohesive Wildfire Strategy that emphasizes a need for assessing urban interface growth, land development, and zoning laws where communities can be proactive in developing defensible space and wildland fire risk reduction actions during new development (CWS 2014). Maintenance of previously completed fire risk reduction should also be an important topic during zoning assessments (CWS 2014).

Fire Siting/Zoning Standards information

Wallowa County Planning Department has added Section 25.090 Wildfire Hazard Overlay Zone to its document. The purpose of this WHO is to minimize wildfire risk to life and property and to implement wildfire policies in Chapter VII Areas Subject to Natural Disasters and Hazards based on this CWPP document (Winterowd, 2017). These changes are consistent with the Cohesive Wildfire Strategies (CWS 2014) success factor: Growth Management, Land Development, and Zoning Laws which states:

> *"There is a need for growth management, land development, and zoning laws that require defensible space and wildland fire risk reduction actions as communities develop; and the maintenance of wildland fire risk reduction practices, e.g., defensible space, fire-resistant construction, hazard reduction, etc. "*

The proposal identifies several 07. Level 1 Fire Safety Design Standards identifies the following standards shall apply to (a) all new private businesses and dwellings, (b) to accessory structures greater than 1000 square feet, and (c) public and private infrastructure projects (Winterowd, 2017).

- Access roads and driveways to accommodate all fire equipment passage and turn around according to 07. Level 1 Fire Safety Standards, (A)
- Dwelling, business or public buildings shall have more than one functioning entrance/exits to the structure 07. Level 1 Fire Safety Standards, (A).
- Primary structures of 100 square feet or greater shall meet the requirements of the primary and secondary fuel break dimensions unless the Planning Director sees the need to meet the International Fire code Institute Urban Wildland Interface Code according to 07. Level 1 Fire Safety Standards, (C).
- No structures on slopes 40 percent or greater 07. Level 1 Fire Safety Standards, (C) (5).

- New or expanded structures shall have roofs of non-flammable material, screened vents, and chimney spark arrestors 07. Level 1 Fire Safety Standards, (D).
- A dwelling shall be located upon a parcel within a fire protection district or shall be provided with fire protection by contract 07. Level 1 Fire Safety Standards, (E).

Fire siting standards are just one of the tools this CWPP identifies to meet its goals and provide support for many action items proposed in Chapter VIII's mitigation measures. Interlinking the agency documents regarding fire protection is key to an all hands all lands concept and promotes a more collaborative approach to reducing wildfire risks in Wallowa County.

Defensible Space

Defensible space is an area designed to improve structures' chances of surviving a wildfire. Defensible space provides an area that increases options for firefighting resources during a wildfire event. It includes areas in which vegetation has been altered or reduced in an effort to modify fire behavior, reduce structure ignition, and increase opportunities for firefighters to defend structures or critical infrastructure. It often increases the probability of structure survivability, even at times when fire conditions limit engagement of firefighting tactics.

There are four primary objectives when considering developing defensible space:

1. Create safer locations for firefighters to engage wildfires.
2. Modify fire behavior through modifications of vegetation characteristics and type.
3. Design projects that provide opportunities to stop fire spread prior to reaching communities, in effect reducing fire size, values lost, and commitment of firefighting resources.
4. Take a landscape "middle ground" approach to fragmenting vegetation continuity, which in effect accomplishes the first three mentioned above.

Residential defensible space takes many forms that could include planting and maintaining a lawn, thinning/clearing underbrush and dense stands, and providing adequate road access for firefighting equipment. Residential defensible space is often in close proximity to structures. Different treatments and maintenance can occur depending on location, existing conditions, and guiding policies. The size of a defensible space will vary, and is dependent on many factors such as slope, fuels, climate, and fire history.

The 2017 updated Fire Siting Standards – Wildland Fire Implementation #6 identifies that a primary and *a secondary fuel break* should be required around new structures (Winterowd, 2017). This reinforces the need for creating a more effective area of defense for structure protection, improve safety of personnel, and increase survivability of structures.

Defensible space in the middle ground can also provide advantages to firefighting by changing fire behavior well outside the residential areas in an effort to avoid direct threats to communities. The primary purpose of a fuel treatment is to modify fire behavior in the

event a wildfire should enter a fuel-altered zone, thus lessening the fire impact to communities as well as ecosystems. This change in fire behavior is often quantified as a reduction in flame length (intensity) or fire spread. Additionally, by changing vegetation structure with a fuels reduction approach fire severity (overstory mortality) is typically lowered, particularly when ladder and surface fuels are reduced.

Changing landscape fire spread is best achieved by fragmenting the fuel complex and repeatedly disrupting or locally blocking fire growth, thus increasing the likelihood that suppression will be effective or until weather conditions change (Finney 2001). In other words, by treating areas on the landscape in order to break up the fuel continuousness of both standing live and dead down material, these treated areas will disrupt the wildfire behavior and modify the fire growth to allow suppression resources to be effective. Vertical and horizontal vegetation treatments, vegetation modification along primary roads, and strategically placing treatments as part of a defensible plan all provide a means of fragmenting the fuels to disrupt fire spread. The focus of mitigation measures in Chapter VII's goals of Fire Adapted Communities and Restore and Maintain Landscapes provides a number of action items designed to work together to achieve defensible space.

Structures with properly maintained defensible space usually require less resource commitment times and result in lower negative impacts to important values. Wallowa County is prone to multiple lightning fire starts and has the potential for a major fire in a WUI, thus, supporting resource efforts through creation of defensible space will be a priority in an effort to defend as much property as possible.

Interoperability Between Dispatch Centers

The county currently has two primary dispatch centers that notify emergency resources, including wildland fire, of needed assistance at an incident. The Blue Mountain Interagency Dispatch Center (BMIDC) is designed with wildland fire in mind. The Dispatch Center employs personnel from both the U.S. Forest Service and ODF, who handle both wildfire initial attack dispatching and wildfire logistical support.

The Communications Division for Wallowa County includes the emergency 9-1-1 center for dispatching both emergency and non-emergency calls for service including Enterprise Police Department, all Fire and Ambulance and Wallowa County Law Enforcement Offices. The 9-1-1 Center is the 9-1-1 Public Safety Answering Point (PSAP) for all of Wallowa County and provides emergency dispatch services for Enterprise Police S, SO, FED FS Law Enforcement, Fire and EMS agencies throughout the County.

A Computer Aided Dispatch (CAD) link between dispatch centers *does not currently exist*, and as wildland fire response continues to evolve to include more interagency involvement CAD connections are needed at a minimum. The development of compatible computer systems and/or software between Wallowa County and the Blue Mountain Interagency Dispatch Center will assist emergency services in a number of ways.

- Allows for real time information between Emergency 911 and wildland fire dispatch offices.

- Provides for a centralized data base where all information can be obtained
- Increases efficiency in communication between the county, state, and federal agencies.
- Disseminates consistent information between dispatch centers and fire response agencies.

Training

Wildland fires occur either on State protected private lands or Federal lands, which often results in reciprocal agreements between agencies on training requirements to qualify for wildland firefighting. This provides consistent training qualifications for wildland fires. The Forest Service and ODF offer a variety of opportunities to help rural firefighters with wildland fire training. The National Fire Protection Association (NFPA) training is cross walked with reference to Northwest Fire Training qualifications and standards to ensure that rural fire departments stay current in their wildland credentials. Local county rural fire personnel are trained through ODF and FS to improve wildland fire response capabilities.

The State of Oregon has the Department of Public Safety Standards and Training that serves career and volunteer structural fire fighters, providing entry-level, specialized, leadership, and maintenance training to Oregon's fire service professionals (Oregon State 2016).

The U.S. Forest Service, BLM, and ODF provide a wide range of courses for wildland fire professionals to update their knowledge and skills. Many of these courses are interagency in nature and can be conducted at the local level (300 level and down) if agency instructor qualifications are met. The Federal and ODF both recognize the training standards and guidelines found at https://nationalfiretraining.nwcg.gov . The Oregon Department of Forestry Fire section also provides links to the Federal Wildfire Coordination Group and the Pacific Northwest Interagency Training Center.

Oregon State has additional direction for fire personnel under Division 9 Fire Service Professionals. Section 259-009-0062 provides the requirements needed to be certified as a fire service professional including training needs for various wildland fire fighting positions.

Rural Fire Departments are hired for fire response and training under the State of Oregon because no avenue exists for the Forest Service to develop a mutual response agreement with Rural fire departments. Currently, Rural Fire departments cannot be hired directly by the Forest Service which creates obstacles when Rural Fire departments are the closest resource for initial attack on public lands, resulting in inefficient uses of resources, slowed response times, and more acres burned.

Rural fire departments are trained by qualified instructors from either the Forest Service or ODF or they may get sponsors to conduct classes or pay for classes at local community colleges. This requires time and money for individuals who are also holding down other full-time jobs. Local trainings where rural departments can maintain and

increase their qualification benefits the local, state, and federal partners. Designing a program through the Northwest Coordination Training Group (NWCG) to include rural firefighters would be highly beneficial during fire responses.

Wallowa County fire response may differ depending on agency and burnable material involved, however, to assist on publicly owned lands, federal wildland fire standards for training must be met. This training provides consistent safety procedures, language, processes, and knowledge.

Summary

There is potential for significant consequences if highway access were closed due to a wildfire. Wallowa County has two key access routes as ways in and out of the area. Highway 82 is the most often used route with up to 2000 vehicles per day and the section just north of the town of Joseph supporting up to 4000 vehicles per day. The only other access route maintained year round is highway 3 north to Clarkston. Although less used, Highway 3 averages 390 vehicles daily. State highways cover approximately 123 miles with 62 state bridges in rural and urban areas.

Part of Wallowa County infrastructure is 120 miles of high power transmission lines that provide service to a number of large cities throughout the northwest. Impacts to these infrastructures within the county can have a significant ripple effect felt as far away as Portland, Oregon.

The size of Wallowa County, its access issues, remote communities and relative fire risk compared to the rest of the state along with its popularity for tourism reinforces the need to increase fire response and structure protection capabilities. The larger percentage of infrastructure and communities are centered within Wallowa Valley and its surrounding foothills all within close proximity to land and structure protection resources, while the outlying communities currently have no structure protection or have emergency response times that increase chances for a negative result. The lack of structure protection in Wallowa County is of high concern particularly where areas of extreme fire risk support both communities and key infrastructure (Imnaha Corridor).

The only structure protection in Wallowa County is provided by 5 city and rural fire departments that are 100% staffed with volunteers. Oregon Department of Forestry and the Forest Service are all paid employees and provide the highest level of wildland protection with assistance from city and rural fire. Taking efforts to improve protection capabilities brought forward by the county fire chiefs can address a number of issues facing fire response resources in the county.

Building on collaborative efforts to educate, assist, and partner with homeowners prior to a wildfire event will decrease the likelihood of an adverse outcome to personal safety, structures, and infrastructures. Several opportunities exist through this CWPP that will improve fire emergency response capabilities. Collaboratively working together to advance information sharing, fire siting, communications, and training can save lives and provide property protection.

Bibliography:

Cohesive Wildfire Strategy, April 2014. The National Strategy: *The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy.* A collaborative effort by Federal, State, Local, Tribal Governments, non-government partners, and public stakeholders.

Finney, Mark A. 2001. *Design of Regular Landscape Fuel Treatment Patterns for Modifying Fire Growth and Behavior.* Forest Science 47(2) 2001. Research Forester, USDA Forest Service, Rocky Mountain Research Station, PO Box 8089, Missoula MT 59807

Portland State University. Population Research Center; Ruan, Xiaomin; Proehl, Risa; Jurjevich, Jason R.; Rancik, Kevin; Kessi, Janai; Tetrick, David; and Michel, Julia, "Coordinated Population Forecast for Wallowa County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2016-2066" (2016). *Oregon Population Forecast Program.* Paper 13. http://pdxscholar.library.pdx.edu/opfp/13

U of O 2014. University of Oregon, February 2014. *Regional Natural Hazards Mitigation Plan Northeast Oregon,* Counties of Baker, Grant, Wallowa, and Wallowa and Addenda for Baker City, Enterprise, Halfway, John Day, and La Grande. Northeast Oregon Multi-jurisdictional Natural Hazards Mitigation Plan.

Winterowd, Greg. 2017. Winterbrook Planning Wildfire Management. Proposed Zoning Ordinance Amendments April 28, 2017. Recommendations for Amendments to the Wallowa County Zoning Ordinance

Web Links:

Fire Department.net.
http://www.firedepartment.net/nearest-fire-department#location=Wallowa+County%2C+OR

Forest Service 2017. https://www.fs.usda.gov/activity/wallowa-whitman/recreation/camping-cabins/?recid=51353&actid=29

National Interagency Fire Center 2016. https://www.nifc.gov/training/training_main.html

Oregonlive. 2011. http://www.oregonlive.com/news/index.ssf/2011/04/shrinking_ranks_of_volunteers.html

Oregon 2015. https://www.oregonlegislature.gov/bills_laws/ors/ors477.html

Oregon 2016. http://www.oregonlaws.org/ors/chapter/476

Oregon State 2016. http://www.oregon.gov/dpsst/FT/pages/index.aspx and http://www.oregon.gov/DPSST/Pages/index.aspx

Oregon Volunteer Firefighters Association 2017. http://ovfa.org/

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