Klamath County
Community Wildfire Protection Plan
2016 update

Prepared by Gene Rogers
Wildland Fire Technologies, Inc.
Klamath Falls, Oregon
December 5, 2016

Table of Contents

Cover photo - Oregon Gulch Fire in August 2014, by Oregon Air National Guard

Executive Summary

This document is the 2016 update of the 2007 Community Wildfire Protection Plan for Klamath County, Oregon (KC CWPP). The content of the 2007 KC CWPP was developed to meet the intent of the National Fire Plan (NFP) and the Healthy Forest Restoration Act (HFRA). That document was prepared to support the planning efforts of all agencies and districts that participate in wildland fire management throughout Klamath County. The 2007 KC CWPP compiled analysis of wildland fire hazard for defined WUI (Wildland Urban Interface) communities in Klamath County. This updated CWPP for Klamath County will address the progress made on the goals, objectives and strategy stated in the 2007 KC CWPP. The reader is encouraged to download the 2007 KC CWPP at kcrsg.org. Some applicable portions of that document are used here with edits to bring the reader to 2016.

A common thought among the organizers of the 2007 KC CWPP was that documenting the wildfire risk in the county was not enough. Several CWPP documents for Klamath County communities in the wildland urban interface (WUI) had been produced. A vision for improving the risk information for the rural communities and making it available for tactical firefighting operations and strategic fuels treatment planning was developed by that steering group. That vision has evolved to the results discussed in this CWPP update.

During the summer of 2006 a team of intern students were hired, trained and deployed throughout Klamath County. They gathered property surveys on over 10,000 rural properties. Information collected included several attributes about structures: roof material, siding, decking, presence of firewood or propane tanks and wildland surface fuel conditions, plus many other information points to assess wildfire risk and hazard. The process utilized handheld data recorders, digital cameras, a global positioning system unit (gps) and a software package from a contractor to compile the data. Making this data available for tactical use by fire suppression resources was a continuing goal of the CWPP steering group. Over 2,000 additional rural residential properties have been added to the data to date. This process was noted in the 2007 KC CWPP.

Utilizing GIS software (ArcGIS© by ESRI, Environmental Systems Research Institute, Redlands, CA, www.esri.com), the structure and parcel locations and data were incorporated into printed maps and compact discs (CDs). These maps and CDs were organized into file cases and distributed to officers of the districts and agencies providing wildland fire protection in Klamath County. These kits have proved very useful to responding department and agency personnel on wildland fires in Klamath County. These kits represented the technology available at the time.

The data collection tools used for the property surveys were assembled into structure survey kits. Those kits were prepared to deploy on emerging incidents in locations without structure surveys completed. Some of those kits were placed in the Mobile Command Unit (MCU). Other kits were held for deployment on emerging incidents.

The MCU was acquired in 2006 with Title III grant funds. The MCU was outfitted with work space to allow management, GIS analysis and mapping support for emerging all-risk incidents. An article featured the MCU in Wildland Firefighter magazine: MCU March 07. The MCU was prepared for deployment in 2007. It was first used to provide GIS products and work space to support the Oregon State Fire Marshal (OSFM) Red Team deployed to the Vernonia Flood in December of 2007. Mapping products enabled Incident Management Team personnel to brief local officials on the extent of predicted flooding relative to values at risk. Accurate mapping of the forecast high water line allowed managers and public officials to make better decisions about priorities. The MCU has since supported incident management training exercises in addition to numerous wildfire and all-risk incidents in and out of Klamath County, including large interagency wildland fire incidents.

From 2007 through 2012 efforts were made to increase and update existing structure survey data. Additionally, steering committee members for the KC CWPP update were looking for emerging technology to incorporate the structure data collection process and other desired GIS mapping capabilities to web-connected devices, including smart phones, tablets, notebooks and laptop PCs. This technology vendor search was based on remaining goals and objectives of the steering committee. Consultation with public safety staff from ESRI directed the steering group to two companies. Both companies were evaluated and one was selected to develop the product the steering group envisioned.

From 2013 to the present time the steering group has worked with the selected company, Intterra (intterragroup.com), to incorporate the collected county structure survey data into an application that would work with any web-connected device. Structure and parcel hazard rating processes were improved and the ability to collect the survey data was added to the application.

The application has evolved into two versions: Klamath County Situation Analyst (KC SA) and Situation Analyst Field Tool (SA FT). KC SA is the application used by a web-based device with connectivity to the internet (online). SA FT can be used on a device that is not connected (offline). KC SA has a full array of user tools to allow real time mapping and tracking of resources on emerging incidents. SA FT has less capabilities, but can allow a person to collect data offline for uploading to KC SA when connectivity is available.

Work is continuing to develop the portions of the application that allow responders to manage, organize and document emerging incidents. The goal is live management of resources on an incident with seamless transition of information from initial phases to a more complex and extended incident. This application has greatly increased efficiencies for incident responders. The Oregon State Fire Marshall has adopted the application to support its Incident Management Teams and fire districts throughout the state of Oregon. Many fire districts and agencies have been exposed to the application returning favorable reviews. Many have actively collected structure risk assessment data for their jurisdictions.

The Keno RFPD and Klamath County were selected for a Special Achievement in GIS (SAG) award at the 2015 ESRI International User Conference in San Diego in the Public Safety division. This award was one of less than 200 in the world and was in recognition of the project's importance to public safety and responders on emerging incidents and planning for future incidents. More details are at the link above.

In early 2015 the steering group decided to follow the emerging emphasis on publications for public education about living in the wildland urban interface. They adapted a format from the University of Nevada - Reno. The Lake Tahoe Basin was the subject of an initial version of the concept of fire-adapted communities following the Angora Fire of July, 2007. That wildfire covered 3,100 acres and destroyed 254 homes, plus 75 commercial and other structures. The CWPP steering group and Oregon State University (OSU) Extension worked collaboratively to develop and publish *Fire-Adapted Communities: The Next Step in Wildfire Preparedness for Klamath County, Oregon*. The publication is available to view and download at: www.kcrsg.org.

As of the 2007 KC CWPP the county had experienced an overall emerging economy in real estate. This brought many new residents into the county seeking a more relaxed life style and a home in the trees. The economic recession of 2008 stopped some of the more aggressive development proposals and the local economy stalled for several years. Slight upticks in the last year have been noted. New building permits have been on a slow rise since 2011.

As noted in the 2007 KC CWPP, much of Klamath County is rural. Per July 28, 2016 data Federal owned land in Klamath County accounts for 58% of the landmass. Private timberland holdings make up a significant remainder of the county. Numerous dispersed communities which have no formal structure fire protection exist in the county. A recent check of county records showed 7,385 residential structures that are unprotected. These residential parcels are not within a structure fire protection district. Of these, 940 parcels have improvements with assessed values greater than $10,000. It should be noted that the total assessed value of these 940 unprotected parcels is $91,378,480. Many rural residents falsely assume state or federal structure fire protection is provided. These agencies provide wildland fire protection, but not structure fire protection. Since the 2007 KC CWPP was prepared, 17 residential structures have burned as a result of wildland fire.

Wildland fire is part of the ecosystem throughout most of Klamath County. Natural wildfire ignitions (lightning) and aboriginal fire sources (intentional or not) have played a major role in the forest ecosystems. Wildland fire shaped the vegetative landscape of Klamath County for centuries before settlement. Settlement brought a strong social sentiment to eliminate or reduce the threat of wildfire. Wildland fire suppression has been an influence on the forests of Klamath County for over a century. Wildland fire suppression (or management) is now a necessity as the values at risk increase throughout the Klamath County wildland urban interface. A challenge facing private and public land managers is how to achieve treatments to reduce the impacts of wildfires in forests where fire suppression has been aggressive since the early 20th century.

Photo taken about 1930 near Doeskin Butte, Klamath County (BIA)

Photo taken 2012 of the same site (USFS)

Fire suppression activity leads to increased vegetation and biomass, as evidenced by stocking density (stems per acre) and increased canopy density. Without fire as an agent of stocking control, or forest management activities (thinning, prescribed fire), a stand of trees and/or shrubs will become dense and decadent. This condition represents a high fire hazard. Successful wildland fire suppression efforts over decades have led to wildland fires too intense to suppress, as vegetation continues to develop un-checked.

As stated in the 2007 KC CWPP: Protection of properties, especially residential structures, in a wildland fire environment such as Klamath County requires understanding several points.

- Recognition that fire is part of the landscape.
- Wildland urban interface properties, especially those with structures, need to be managed to reduce the intensity of wildland fire when fire occurs.
- **Fire protection agencies and districts in the county are equipped with the best information available in order to provide the best fire protection decisions.**

The advancements made since the 2007 KC CWPP are the result of focus on the third point above in bold text. Fire protection includes rapid decisions on wildland fire incidents <u>and</u> strategic decisions for effective hazard reduction treatments.

Goals and Objectives

The 2007 Klamath County CWPP was developed to compile documentation that supports the following goals and objectives:

- Protect human life and property from wildfire.
- Increase the capacity for structure fire protection through pre-planning and fuels hazard treatment.
- Inform the public of realities of living in fire ecosystems.
- Develop a plan that can be updated for future needs of the Klamath County fire protection districts, agencies, and the public.
- Develop and update a GIS database that will enable rapid, accurate assessments for future emergency management decisions.
- Improve interagency cooperation through a combined effort on this CWPP.

The steering committee for this 2016 update can state that these goals and objectives have been the focus since the 2007 document. The project accomplishments since 2007 have clearly met these goals and objectives.

Strategy

Before and since the 2007 KC CWPP, Klamath County has experienced large wildland fires and will continue to have large wildland fires that threaten or destroy residential

property. The large portions of the county without formal fire protection are of concern to the Klamath County fire protection districts and agencies. It is well understood that reducing the fire behavior potential of wildland fires increases the protection capacity of firefighting resources. Actions taken by property owners can decrease the likelihood of sustaining damage when a wildland fire occurs. Information about roads, infrastructure, fuels, fire behavior potential and residential property locations is needed quickly during emerging incidents. The strategy of the Klamath County CWPP is as follows:

- Compile a mobile database of properties that have residential structures and/or constructed improvements.
- Assemble for future review the associated documents (agreements, etc.) that enable mutual aid authorities between existing Klamath County fire protection districts and agencies.
- Prepare for future wildland fire and all-risk incidents by use of live field scenarios to test the preparedness of the Klamath County fire protection districts and agencies.
- Continue to find funding sources for fuels reduction work in rural Klamath County communities.

The focus of structure data collection (starting in 2006), adding capacity (the MCU and components), and seeking the technology to effectively put the collected data in the hands of emergency responders clearly demonstrates focus on the 2007 KC CWPP Strategy. That focus is ongoing today and will continue after this CWPP update is released.

Methodology

The 2007 KC CWPP involved an analysis of fire behavior potential and structure information for the defined WUI communities in Klamath County.

The wildland fire behavior potential was developed using fire weather parameters combined with surface and canopy fuels information. These weather and fuels inputs were used in a fire behavior model called FlamMap. FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics (spread rate, flame length, canopy fire potential, etc.) over an entire FARSITE landscape (topography, surface and canopy fuels) using specific weather and fuel moisture conditions. More detail is available in the Wildland Fire Risk chapter of the 2007 KC CWPP.

To support the information available to Klamath County fire protection districts and agencies, a county-wide property and structure survey was conducted during the summer of 2006. The Keno Rural Fire Protection District utilized Title III funds allocated by the Klamath County Commissioners to hire, train and deploy a team to conduct surveys on Klamath County wildland urban interface properties. The survey teams completed over 10,000 residential surveys. These surveys were conducted using a standardized process including collection of property and structure information that

addresses wildland fire susceptibility. Information gathered was moved to a database that was made available to fire protection personnel to make decisions during emerging incidents. This data allowed more rapid dissemination of information to incident personnel in order to provide more efficient protection capability to property owners.

Since that time the advances noted in this update have vastly improved the assessment, access and distribution capabilities of this information. The data previously on CDs and printed maps has evolved to being available on hand-held, web capable devices (smart phones, tablets, notebooks and laptop PCs). In addition, the work-in-progress application includes a variety of capabilities to significantly increase the efficiency and safety of resources assigned to emerging incidents of all varieties.

The KC SA and SA FT applications are discussed in more detail in Chapters 4 and 5.

Action Plan (2007 KC CWPP)

The Klamath County CWPP is being developed under the following action plan:

- List and provide access to existing CWPP products for wildland urban interface (WUI) communities in Klamath County that have formal fire protection.
- Identify wildland urban interface (WUI) communities in Klamath County that do not have formal fire protection.
- Gather detailed information about Klamath County residential properties to address a variety of public safety issues related to wildland fire protection, structural fire protection and emergency medical services.
- Assess the relative fire risk and hazard of WUI communities in Klamath County.
- **Develop a county-wide CWPP that will support tactical needs beyond a hazard assessment process and into the future.**
- **Provide the assembled data for future tactical application by the fire protection districts and agencies in Klamath County.**

All elements of the above Action Plan (2007) have been implemented. The focus since then has been to seek technological advancements for improving the accomplishment of the two elements in bold text. The following action item is added to this 2016 update.

- Provide input and technical assistance to Klamath County planning department, including the information available via KC SA.

Protection Recommendations (2007 KC CWPP)

- Continue to seek opportunities to inform the public of the importance of hazard mitigation. Actively expose WUI home and property owners and/or residents to the value of completing fuels reduction as a way to increase fire protection capacity. Supply related information such as is found in *Living With Fire* to Klamath County WUI residents.

- The 2016 KC CWPP update effort has included the development and publication of a Klamath County specific publication: *Fire-Adapted Communities:* Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon

- As the Federal and State fire management agencies have gone to narrowband radio systems for dispatch center communications, the Klamath County fire districts will need to acquire narrowband capability. A grant proposal has been submitted for this need. For 2007 only tactical frequencies offer interoperability for all Klamath County fire resources.

    - Since 2007 this problem has been addressed. County fire districts, state and federal agencies have added capability to communicate directly. Additional improvements are in progress.

- Fire Defense Board members should work with the Klamath County Community Development, Planning Division to update Article 69 of Chapter 60 and Article 70 of Chapter 70 of the Planning Department Development Standards.

    - No significant changes have occurred since 2007. The CWPP group intends to share inputs with the Klamath County planning department.

- Encourage/Support protection capability organization and development in areas that have structures with no available structural protection.

    - Established fire districts continue to support the development of new fire protection districts and assistance to existing districts through the Klamath County Fire Defense Board.

- Continue to foster development of partnerships between local structure fire districts.

    - This is a work in progress; improvements have been noted. As turnover in Chief positions has occurred, the existing Chiefs offer mentorship to the incoming Chiefs.

- Continue cross-training of employees in wildland and structural firefighting.

    - Improvements in cross-training have occurred and continue to develop. KC SA and SA FT have been periodically demonstrated to a wide spectrum of wildland and structural personnel, particularly as improvements to the system are released. The applicability of the applications to all-risk incidents has been demonstrated to emergency management responders from local, county and state jurisdictions.

- Continue to inventory and monitor water sources, and develop or improve sites as necessary.

    - The applications have vastly improved the ability to locate, map and share location of water sources. Existing mapped locations are pre-loaded in the program to be used in the field, whether the device is connected to the web or not.

- Annually update the Structure Vulnerability Surveys, ensuring that new homes and hazard reduction treatments are recorded.

    - More than 2,000 additional structures have been added to the data base since the original 2006 survey. The structure survey function in the applications makes adding or updating structure surveys a quick task.
    - The public can access the system to observe their existing risk score, assess their own risk and note the score changes if they do work on their property. For example, changing a shake roof to a metal or composition roof. See more at kcrsg.org.

- Acquire needed funding to complete the planning and construction of new fire stations as needed.

    - Chiloquin-Agency Lake Fire District constructed Station 3 in 2007. Klamath County Fire District #1 built Station 5 in 2008.

- Continue to recruit and train additional volunteer firefighters.

    - This is an on-going effort for districts with volunteer firefighters.

- Continue to invest in upgrading essential firefighting equipment such as turnouts, breathing apparatus, radios, and rescue equipment to ensure that the County firefighters have the supplies and personal protective equipment that is required for safe firefighting and rescue missions.

    - Budgeted procurement and funds acquired from grants have kept this process in place.

- Upgrade and replace the older firefighting and rescue vehicles as they become outdated or unusable.

    - Since 2007 new and used equipment has been added to several of the Klamath County districts and agencies.

Hazard Reduction Recommendations

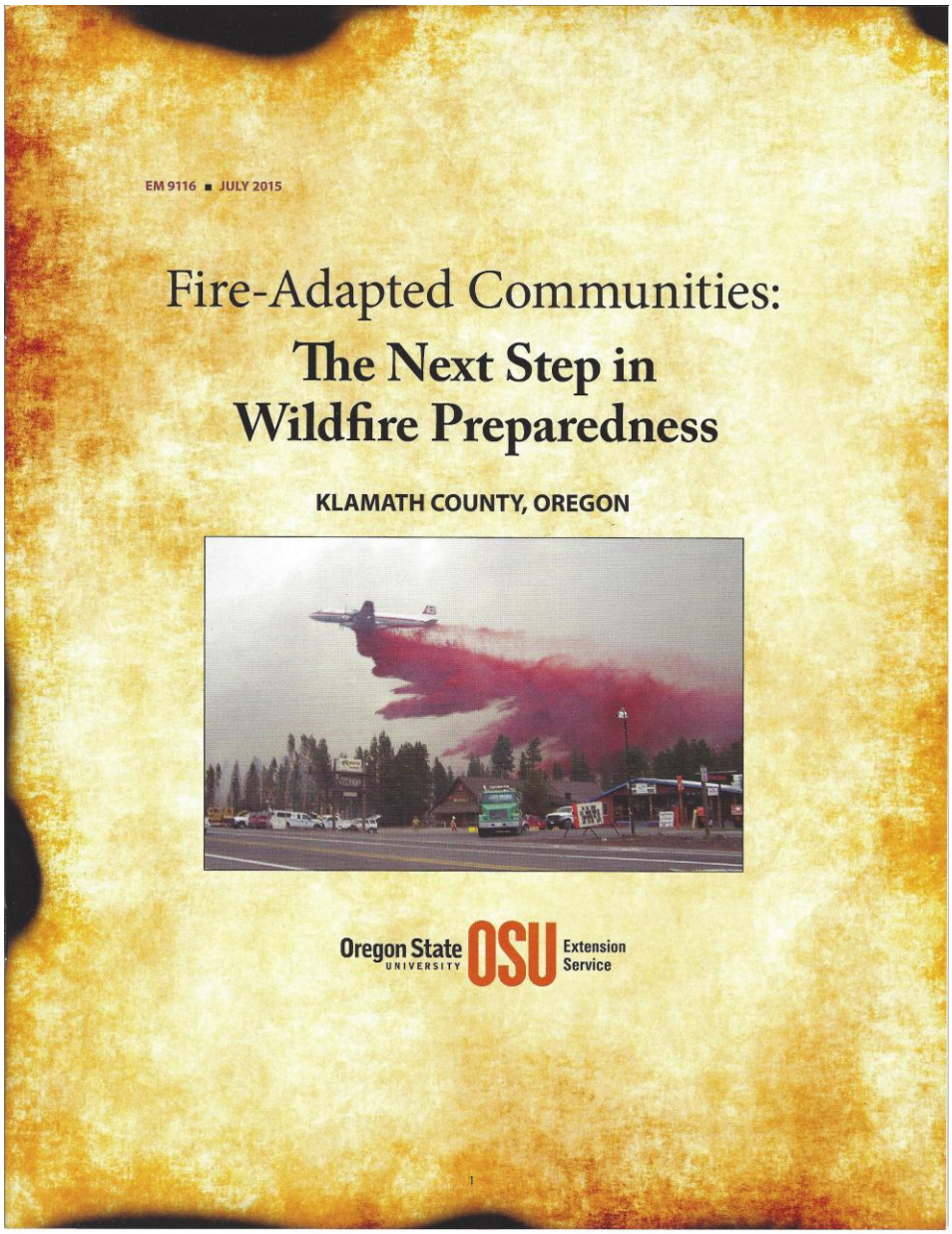
The fire service professionals participating in this planning process recognize the importance of fuel hazard reductions around structures. Increased protection capacity can be attained by fuels reduction work on adjacent properties. Chapters Six and Seven contain more information on this concept. The reader should click the link below entitled: Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon to access detailed information about creating defensible space around homes. Information is available about home construction materials, vegetation types and techniques for reducing the flammability of vegetation or fuels adjacent to structures.

Wildfires can quickly overwhelm the available fire protection resources. Often multiple ignitions will occur during episodes of lightning, further lowering the capacity of local responders. Hazard reduction work is often the difference between a structure surviving a wildland fire or being damaged or destroyed.

Message to the WUI Homeowner and Occupant

This section has been updated from the 2007 KC CWPP to reflect information available on the internet and in printed format that has been developed since the release of the 2007 KC CWPP.

If you own or occupy a home in or near the wildland urban interface (WUI), this section is added for you. Whether you are in a fire protection district or not, the survivability of your home in the event of a wildland fire is a function of the fuels around the home and the physical attributes of the home. If you live in an area without formal fire protection, this information is critical to your home's ability to survive a wildland fire.



Numerous publications are available that discuss how to make your home and property less vulnerable to wildland fire. The one specifically focused on Klamath County, Oregon is shown above. This document summarizes much of the information that can be found elsewhere in this CWPP and its linked references. Even if you only skim read through this CWPP, you should read Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon . It is in Adobe Acrobat format (.pdf) so you can download and/or print a copy if you desire. If you do not have Acrobat Reader software, you can get a free copy by clicking the link. Printed copies are available at local fire districts, the Oregon Department of Forestry and the Oregon State Extension office in Klamath Falls, Oregon.

A wildfire will threaten your home by direct flame contact and/or by showering it with embers and sparks. Wildland fires are often driven by strong winds, which scatter embers over and around your home. Any surface that is combustible can trap these embers and start an ignition. Winds will swirl and roll around the corners of the home and the roof. Even homes with metal roofing can be ignited by the ember shower. It only takes one missed ignition to burn a house down. If your home has a wood shake roof, wood siding, wood decks, nearby firewood piles and other flammable items adjacent to it, the probability of it igniting increases dramatically. There are informative videos on these topics at kcrsg.org at Ready: Prepare My Home.

The further from a fire station you live, the longer the wait will be for the arrival of a fire engine. If your home is among many that are simultaneously threatened by a large wildland fire there will not be enough engines to cover every home. Fire suppression personnel will prioritize homes by their inherent vulnerability. If flammable vegetation and accumulations of dead surface fuels are around your home, the firefighting personnel cannot safely defend your home.

If you mitigate the wildland fire hazards around your home, chances increase that it will survive a wildland fire. Review of the points made in Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon can assist you in determining how much vegetation to clear around your home and property. If you still have questions consult with your fire department (contact information is on the back page of the publication) or a local representative of the Oregon Department of Forestry. Homeowners are encouraged to use the Assess My Risk section at www.kcrsg.org.

Introduction

Background and History (from 2007 KC CWPP, still applicable for 2016 update)

Klamath County contains large expanses of forestland. Forests were responsible for much of the early economic development of the county. Old forest stands with large trees on relatively flat ground offered harvest using a variety of then current technologies. Many logging camps were set up throughout the county and supplied logs to mills in numerous communities. A significant portion of the county population made a living directly or indirectly from the timber industry into the 1980s.

In recent years, property values have increased dramatically, indicating that Klamath County has become a desired location for retirees and others. The increasing demand for residential parcels in a wildland setting brings an increasing burden to the fire protection agencies and districts of Klamath County.

Wildland fire is and has been a regular occurrence in the forests of Klamath County. The forests were shaped by natural and aboriginal fires prior to settlement. Post-settlement philosophy has emphasized fire suppression. As more is learned about fire-dependent ecosystems, such as Klamath County, the role of fire in the balance of flora and fauna is better understood. Wildland fire will always be present and must be managed.

However, human values are added to Klamath County every year in the form of homes and developed properties that present values at risk to a wildland fire. These values at risk drive this planning effort. The efforts completed to mitigate wildland fire hazard by individual property owners will strengthen the wildland fire protection capacities of the local, county, state and federal wildland fire resources.

It is the intent and desire of the core group that developed this CWPP that the reader become more aware of the implications of individual property hazard fuels abatement in the ultimate survivability of that parcel in a wildland fire event. Some communities in Klamath County have been practicing hazard fuel reduction activities, while others have not. The importance of this hazard reduction work cannot be over emphasized. Every parcel that has created its own defensible space is one less parcel that requires the time and efforts of a fire protection system that is limited in capacity.

Klamath County is a wildland fire county. This plan is prepared to make that apparent and to identify communities at risk on a common scale.

Planning Area Boundaries

The 2007 KC CWPP defined communities throughout Klamath County. Those are discussed in Chapter 2. Some communities have organized fire protection, but many do not. Fire district boundaries and contact information are shown on page 23 of Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon. Homeowners not sure of their fire protection status should contact the department nearest their location on the map. Remember that ODF, USFS, BLM and USFWS engines do not provide structural fire suppression.

Fire Policies and Programs

The 2007 KC CWPP followed direction in federal laws (specifically the HFRA and NFP) plus several interagency guiding documents. No significant changes have occurred to alter the applicability to this 2016 update to that document. Detailed information is available at kcrsg.org.

Wildland Fire Behavior Definitions and Descriptions

Fire Behavior Basics

In order to better understand wildland fire behavior, some known principles need to be introduced and considered.

All wildland fires are the product of three components: Fuels, Weather and Topography.

- Fuels must be in sufficient quantity, arrangement and of low enough moisture content to ignite.
- Weather must be warm and dry enough to support combustion. Wind will assist in moving the fire.
- Topography can either supply a path or a barrier to fire spread.

2003 KAGO Fire (Wildland Fire Technologies, Inc.)

Fuels

Fuels are described in four categories: grass, brush, timber litter or slash. The size of a fuel particle is important; fine fuels (< 1/4" diameter) are responsible for the rate-of-spread of a fire. Larger fuel particles are responsible for the intensity and duration of a fire (litter,twigs, limbs, logs, etc.). As with a wood stove, fireplace or campfire, the proper mix of fine and large fuels is needed to start and maintain a fire. Fuel moisture changes daily, even hourly, but a fuel particle only contributes to the combustion process when it is sufficiently dry. Small fuels gain/lose moisture more quickly than large fuels, thus flammability can change throughout any given day. This is why wildland fires are typically most active in the late afternoon.

Fuels may be live or dead. As such, they may be a heat sink or a heat source, depending on the moisture content. Live fuels are either annual or perennial grasses or woody shrubs and trees. A live shrub may contribute rapidly to the combustion process when it is decadent, e.g. old enough to have accumulated dead limbs and litter under the shrub. This condition is exacerbated when pine needles have draped into the shrub foliage. If enough dead needles are draped in the live foliage, the canopy of that shrub burns as dead fuel.

Fuels are arranged on the landscape in both horizontal and vertical patterns. The more continuous the arrangement in either plane or both, the more intensely a fire can burn. Types of fuels are referred to as ground, surface or aerial. Ground fuels are flammable woody material in the ground: roots, duff and peat. Surface fuels include forest litter: leaves, needles, twigs, limbs, tree boles, and shrubs. Aerial fuels are those above the

surface fuels: typically the limbs of trees and taller shrubs. A sufficient pathway from the surface fuels to the aerial fuels is referred to as ladder fuels.

Weather

Weather is a significant factor in fire behavior characteristics. Weather must be conducive for a wildland fire to spread across the landscape. Seasonal weather patterns are referred to as climatology. These patterns are often discussed as normal or deviations from normal. Climatology has great bearing on the vegetation patterns and plant associations of a landscape.

Seasonal patterns and intensity have a direct bearing on fuels. As weather warms and dries, fine fuels, especially the dead fuels, begin to dry sufficiently to carry fire. Curing of live fine fuels follows next as the summer season develops. Woody fuels of increasingly larger diameter lose moisture through the summer and subsequently achieve the lowest fuel moisture content in the fall.

Precipitation plays a major role in fire season severity. Duration of moisture input is far more critical than measured amount. For example: 24 hours of cool weather with drizzle measuring ½" of total rain has more effect on fire behavior potential than 1" of rainfall in a storm lasting an hour. Weather drives the rate of moisture gain or loss in forest fuels.

Winter weather also has a bearing on the intensity of fire season. In general, fire seasons are more severe if a dry, cold snow falls and packs onto forest fuels without a preceding extended period of precipitation as drizzle or rain. The rate of spring thaw can bring "early" fire season conditions to dead fuels. A lack of snow pack or limited snow pack obviously compounds this effect.

Wind is a critical weather element in fire behavior. It dictates the direction and speed of fire spread. Shifts in wind direction due to frontal patterns or daily effects (diurnal) will cause fires to move in different directions. Fortunately, these events are well forecasted.

A particularly critical weather factor is atmospheric stability. This is the atmosphere's ability to allow a parcel of air to rise or drop. When a fire is burning under conditions otherwise ideal for fire spread (dry live and dead fuel moisture content) and the atmosphere is or becomes quite unstable, a fire behavior referred to as "plume-dominated" may occur. Such fire behavior is responsible for many of the larger, and often infamous, wildfires. Fires under this condition exhibit rapid spread and are characterized by a towering, billowing column. The effect is essentially the same as opening the door and damper of a wood stove and watching the fire become severe.

Such a fire is beyond fire suppression capability of personnel and equipment. Spotting fire behavior contributes largely to the final size development, with new ignitions a mile away from the fire front not uncommon. Fires influenced by atmospheric instability events have been known to grow thousands of acres in a few hours. The geographic

scale of such an event makes efforts on the ground with dozers, engines and hand crews negligible. Understanding this level of fire behavior is a continuing science.

A measure of this potential is the Haines Index. This atmospheric stability index is regularly included in Fire Weather Forecasts produced by National Weather Service Offices. The Haines Index is rated with a number system ranging from 1 to 6. A score of 1-3 is assigned to stable atmospheric conditions. As the atmosphere becomes increasingly unstable the following scores apply: 4 - Low, 5 - Moderate and 6 - High. Extreme fire behavior can occur on days with a Haines Index of 1-3, but a strong wind is needed in addition to very dry fuel conditions.

2002 Skunk Fire on the Winema National Forest (USFS)

The photograph above illustrates the classic, billowing column and cloud formation associated with a wildfire under very unstable atmospheric conditions.

Topography

Topography is the overall shape of the landscape. Topography is typically referred to as slope, aspect and elevation. Although flat ground can produce impressive fire behavior given appropriate fuels and weather, the same fire might be even more dramatic given topographic influences.

Fire will be channeled by terrain features such as canyons. Fires run upslope faster than they back down slope. Fire may be slowed or literally stopped by topographic features.

A major topographic feature in Klamath County is the Cascade Mountain Range. Running north to south on the west side of the county, this mountain range influences day and night wind patterns. Another topographic feature that plays a role in Klamath County fire weather patterns is Klamath Lake. Heating and cooling at a different rate than the land around it, this large body of water has a pronounced effect on day and night winds.

Elevation is a topographic component that influences temperature and humidity trends. Their combined effect greatly influences vegetative patterns and thus the fuels on a site. Klamath County has a wide range of vegetative patterns adapted to elevations from less than 3,000 feet, to over 8,000 feet.

Fire Behavior Terminology and How Treatments Modify Fire Behavior

The following are terms that refer to types of fire behavior.

A smoldering fire is burning in ground and surface fuels, often with little or no visible flame. A creeping fire is slowly moving, often backing downslope or against a wind. A creeping fire has a relatively slow moving flaming front. The flaming front is the zone of active flame at the leading edge of a spreading fire.

smoldering fire

creeping fire

A running fire is moving relatively quickly. Often a running fire is driven by the wind, steep slope (upslope) or a combined influence of slope and wind. Spotting is a series of new ignitions occurring as the result of fire brands landing in receptive fuels beyond the current flaming front.

running fire

spotting

Torching or passive crown fire is a term used when an individual or small cluster of trees exhibit ignition of the canopy foliage.

Crowning or active crown fire is when the canopy foliage of many acres or more ignite and the fire moves through the canopy.

torching or passive crown fire

crowning or active crown fire

It is important to understand that fire behavior is modified by topography and the weather. Of these two elements, weather is the most significant element of change in fire behavior. Fuel characteristics complete the equation for fire behavior potential.

Firefighting capability changes inversely as fire behavior characteristics change. A creeping or slow running fire may be easily suppressed by available firefighting resources. An increase of wind on the same fire may result in higher rates of spread and spotting which allow the fire to spread more rapidly than the available firefighting

resources can suppress. A fire exhibiting torching or passive crown fire is on the edge of becoming an active crown fire. Sustained active crown fire is beyond the capability of firefighting resources.

The focus of hazard fuels mitigation is to identify locations where fuel conditions can be changed to prevent the transition from surface fire to passive or active crown fire behavior.

The term crown fire has been used for decades to describe a fire burning in the crown of trees. Crown fuels are the foliage, twigs and branches of an individual tree. Where crown fuels would refer to an individual tree, canopy fuels would refer to the total crown fuels in a stand of trees. A stand of trees can be a few dozen acres to thousands of acres.

Canopy base height is a term that refers to distance from the ground up to the canopy area of a tree that would support the vertical movement of fire. This value requires an estimate on the part of the observer. The higher the canopy base height is in a stand of trees, the less likely a fire is to move into passive fire behavior. Areas where canopy base height is conducive to passive or active crown fire behavior are possible candidates for pruning of limbs, particularly where this condition exists around homes or clusters of homes. By raising the canopy base height by pruning the limbs, a higher intensity fire is required to allow a surface fire to enter the crown or canopy fuels.

Canopy bulk density is defined as the total canopy biomass divided by the area occupied by canopy biomass. The importance of this value is in determining stands with a likelihood of generating and sustaining active crown fire behavior. Wind is also a key element. Due to the scale of Klamath County, it was not possible to develop canopy bulk density data for this CWPP.

Stands with low canopy base heights and high canopy bulk density are the most likely to generate passive and active crown fire behavior, assuming that a surface fuel model generating enough heat is present.

Reduction of surface fuel loadings will lower fire intensity and can be applied to any location, with or without a canopy. Such treatments include mastication, hand and machine piling, pile burning, underburning, broadcast burning and chipping. Reduction of canopy base height is accomplished by pruning. Reduction of canopy bulk density is done by thinning tree density.

Community Profile

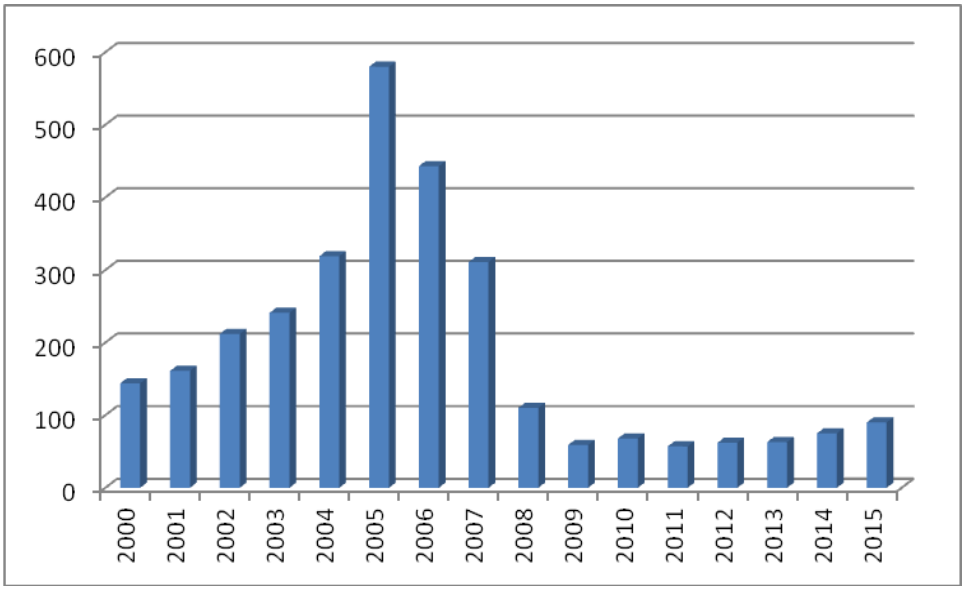
In this update, two additional WUI Communities have been added to the 2007 KC CWPP list. They are Merrill-Malin and Bonanza.

Wildland-Urban Interface (WUI) Areas

- **Bonanza** – Includes surveyed structures and parcels adjacent to wildland fuel within the jurisdictional boundary of the Bonanza Rural Fire Protection District.
- **Bly** – WUI boundary established in completed CWPP includes homes along Highway 140.
- **Chemult** – Created WUI boundary which includes Chemult, Beaver Marsh and Diamond Lake Junction.
- **Chiloquin** – WUI boundary established in completed CWPP, includes Modoc Point, homes along Sprague River Road and the critical infrastructure around Applegate Butte.
- **Crater Lake National Park** - Crater Lake National Park is entirely federal land with 3 main communities: Park Headquarters, Rim Village, and Mazama Village. Crater Lake NP has created a structure protection plan for their communities which does not identify a specific WUI area, so the analysis for Crater Lake was based on the wildland areas around the 3 main communities.
- **Crescent-Odell** – Higher elevation areas around Crescent and Odell Lakes. Included in Walker Range in the 2007 KC CWPP.
- **Keno** – WUI boundary established in completed CWPP includes Worden and the critical infrastructure around Chase and Hamaker Mountains.
- **Klamath Falls** – WUI boundary established in 2007 KC CWPP. Includes the communities of Klamath Falls, Stewart Lennox, Olene, Algoma, the homes along the slopes of Stukel Mountain and Klamath Hills, and those homes located in Poe Valley.
- **Lake of the Woods** – Created WUI boundary includes the summer recreation cabins and camps residing on the Forest Service lands around Lake of the Woods.
- **Lakewoods** – Mountain home subdivision near Lake of the Woods, annexed to the Keno Rural Fire Protection District.
- **Merrill-Malin** – Includes surveyed structures and parcels adjacent to wildland fuel within the Merrill and Malin Fire Protection Districts.
- **Mid County** – Created WUI boundary includes the communities of Sprague River, Moccasin Hills, Bly Mountain, and homes located along Highway 140.
- **Rocky Point** – WUI boundary established in completed CWPP includes the communities of Rocky Point, Odessa and the homes along the Westside Road.
- **Sand Creek** – Created WUI boundary includes the small community of Sand Creek, the homes along the actual creek itself, and homes located along Highway 97.
- **Walker Range** – WUI boundary established in completed CWPP includes the communities of Crescent, Gilchrist, Crescent Lake, and the homes along Highways 97 and 58.

Housing and Development Trends

The chart below shows new house permits for Klamath County from 2000 through 2015. The peak in 2005 preceded the 2007 KC CWPP. The economic recession of 2008 followed the publication of the CWPP. That economic downturn is indicated in the chart. A slow recovery in the last few years has been indicated by rising property values and corresponding tax revenues.



Transportation, Infrastructure and Land Use

Highways and Railroads

Since the 2007 KC CWPP highway traffic, notably trucking, has increased. Highway 97 has experienced the majority of this increase. The Oregon Department of Transportation noted an increase of use between 2011 and 2014 with southbound truck traffic up 40 percent near Klamath Falls. Railroad traffic has similarly increased. Both of these transportation methods represent possible wildfire ignitions, accidents with medical aid needs and hazardous materials. All of the risks and hazards are borne by a limited capacity of fire service and Emergency Medical Service (EMS) resources, particularly in the rural portions of Klamath County.

Utilities

The Ruby natural gas pipeline terminates in Malin, Oregon in Klamath County. It originates in Opal, Wyoming. The 678 mile long pipeline is 42" in diameter. Construction began on July 28, 2010 and the line was in service on July 28, 2011. It is the only gas transmission pipeline added in Klamath County since the 2007 KC CWPP.

Land Use

No significant changes to Land Use regulations have occurred since the 2007 KC CWPP. The CWPP group intends to use the technology developed for this update to assist with amendments to Article 69 and Article 70 in the Planning Department Development Standards.

Insurance Services Office - fire hazard rating and local insurance information

Discussion regarding the Insurance Services Office (ISO) and related fire hazard ratings is in the 2007 KC CWPP. Numerous factors are considered in the rating systems, including distance to fire hydrants and fire stations, type of firefighting equipment and personnel available, and fire department organization. Some of the fire districts in Klamath County have seen ISO rating changes since the previous CWPP. Proximity and volume of water availability (sumps, hydrants and water handling apparatus) is a key part of lowering the fire hazard rating. Homeowners can experience reduced fire insurance premiums from lowered ISO hazard ratings. More information is also available at this link.

Planning Process

The planning process as outlined in the document: A Framework for Community Fire Plans (Oct 2004), and Preparing a Community Wildfire Protection Plan (April 2005) and other CWPP documents and example plans guided the completion of the 2007 Klamath County CWPP. Additional sources of information, both documents and websites, can be accessed from the Appendices page in that document at kcrsg.org. That product received complimentary comments by peer review by subject matter experts outside the Klamath County area.

All project planning for activities since the completion of the 2007 KC CWPP has been guided by three members of the steering committee for that effort. Other individuals with expertise have participated in critical review and testing of the process. This testing was done locally and in other counties with personnel from local fire districts, ODF and federal agencies (BLM, USFS).

Collaboration and Community Outreach

Two of the three steering committee members are active participants of the Klamath County Fire Defense Board (KCFDB). Each has served as President. The third is a past member of the board. This board was a primary organization for distribution of information and solicitation of collaboration to implement the intent of the 2007 KC CWPP. Some members of the steering committee have been engaged in the Klamath County fire service community for nearly 35 years and sought collaboration with their peers during and since the completion of the 2007 KC CWPP. This 2016 update to the CWPP reinforces the original plan's goals and documents the achievement of many of those goals.

Community outreach was a foundational concept for the development of the KC SA and SA FT applications. A development requirement for the contractor was for community members to see their property risk assessment and be able to report changes affecting their risk score to their fire department. An example would be notifying the fire department of the replacement of a wood shake roof with a metal roof. Personal contact with homeowners present during structure risk assessments were excellent opportunities for direct public contact. The preparation and publishing of Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon was an outreach and public education effort. Copies of this publication were widely distributed.

Wildfire Risk Assessment

Fire Hazard

The concepts of wildfire risk have not changed since the preparation of the 2007 KC CWPP. A review of Chapter 4 in that document will be helpful for people that have not seen that document.

Standardized definitions for wildland fire terms have been published by the National Wildfire Coordinating Group (NWCG). Those terms are in The NWCG Glossary of Wildland Fire Terminology Since the 2007 KC CWPP, the Glossary was updated in November 2008 with additional updates occurring in October 2015. The glossary is no longer a downloadable document, but maintained online at the above link. Clicking on "Glossary" at the bottom of the webpage will open the glossary.

Fire danger ratings across ODF and Federal agency protected lands are guided by the South Central Oregon Fire Management Partnership Fire Danger Operating Plan, or SCOFMP FDOP. This document was revised in 2015, replacing the version used when the 2007 KC CWPP was released. This document provides historical weather data analysis and direction on daily fire danger to assist managers make staffing decisions. The plan covers 9.8 million acres overall and applies to state and federal protection lands in Klamath County. It offers valid information to Klamath County fire districts regarding changing conditions that affect wildland fire danger.

Klamath County is naturally a fire ecosystem. It possesses a wide range of fire regimes, from long return interval, high intensity mixed conifer forests in the higher elevations to short return interval, low intensity pine forests. Since settlement these fire regimes have been interrupted by forest management and specifically fire suppression. As previously discussed, this situation has created a higher hazard to wildfire than historically existed. Reduction of fuel hazards is a viable method for WUI homeowners to reduce the hazard on their property.

Fire Occurrence

The 2007 KC CWPP included fire occurrence data from 1986 through 2003. The 2016 update looked at fire occurrence data from the last ten year period, 2006 through 2015. Summary tables were produced and the narrative will describe similarities and departures from the 2007 KC CWPP.

In the last ten years, wildfire occurrence frequency on lands primarily protected by state or federal agencies was similar. State protected lands had 850 wildfires and federally protected lands had 841 wildfires. 23,214 acres burned on state protected lands and 33,452 acres burned on federal protected lands. The combined average for Klamath County is 169 wildfires that burn 5,667 acres per year. This compares to a combined annual average of 107 wildfires that burned 2,805 acres per year as of the 2007 KC

CWPP. These numbers include the occasional very large fires of 5,000 acres or more. Both numbers of fires and burned acreage have increased in Klamath County in the last ten years.

Klamath County fire districts responded to an average of 157 brush fires per year during the last decade. Some of these would be included in the state and federal fire data. A large number of homes and structures are threatened by wildfire every season. The single largest loss of homes and structures was during the 2014 Moccasin Hills fire. Seventeen primary residential structures were destroyed in that fire. A total of 34 structures were destroyed by wildfires during the analysis period.

Klamath County ODF Fire Occurrence 2006-2015					
Fire Size Class	**Description**	**Number of Fires**	**% of Fires**	**Burned Acres**	**% of Burned Acres**
A	0 to ¼ acre	682	80.2%	55.47	0.25 %
B	¼ to 10 acres	141	16.6%	233.08	1.04 %
C	10 to 100 acres	19	2.2%	459.23	2.05 %
D	100 to 300 acres	3	0.4%	315.83	1.41 %
E	300 to 1,000 acres	2	0.2%	0	0 %
F	1,000 to 5,000	2	0.2%	3,938	17.62 %
G	5,000+ acres	1	0.1%	17,352	77.63 %

Klamath County Federal Fire Occurrence 2006-2015					
Fire Size Class	**Description**	**Number of Fires**	**% of Fires**	**Burned Acres**	**% of Burned Acres**
A	0 to ¼ acre	570	68 %	60.2	0.18 %
B	¼ to 10 acres	232	28 %	248	0.74 %
C	10 to 100 acres	23	2.7%	681	2.04 %
D	100 to 300 acres	9	1.1%	1,656	4.95 %
E	300 to 1,000 acres	3	0.4%	1,721	5.15 %
F	1,000 to 5,000	3	0.4%	8,245	24.65 %
G	5,000+ acres	1	0.1%	20,840	62.30 %

The majority of wildland fires are small as they are easily suppressed at initial attack. This is especially the case when single fires occur, allowing more fire suppression resources to be dispatched to that fire. 74% of the wildfires evaluated for this CWPP update were held to less than ¼ acre. 96% were suppressed at less than 10 acres. These statistics are similar throughout the western states regardless of local, state or federal jurisdictions. A very small number of fires are responsible for the vast majority of acres burned. When the environmental conditions of fuels, weather and topography are conducive to rapid fire growth, initial attack efforts can be ineffective. These are the fires that become large multiple-day incidents lasting weeks or longer.

Fire occurrence episodes are when many fires occur on the same day or over a few days. These episodes have a significant effect on fire suppression capacity as fewer resources are available for each fire. Lightning events are typically the cause of these fire episodes, although infrequent arson events have ignited multiple fires in Klamath County. Lightning events in Klamath County are often associated with storms that impact adjacent counties, further reducing the availability of neighboring mutual aid resources. A multiple-fire-starting lightning episode in northern California and southern Oregon was responsible for the 2014 Oregon Gulch Fire. That fire burned 35,093 acres in Oregon and California, of which 17,352 acres were in Klamath County.

Specific fire causes vary on state protected lands and across federal protected lands. For example, lightning caused up to 90% of wildfires on federal land (Crater Lake NP)

and 81% of wildfires on all federal lands in Klamath County. Public lands contain some of the highest terrain in the county and are more prone to lightning ignitions. Lightning accounted for 46% of the wildfires on state protected lands and a significant portion (79%) of the burned acres. Forty-eight wildfires were started by equipment use on state protected lands compared to 9 on federal lands. Debris burning started 172 wildfires on state protected lands and 8 on federal lands. State protected lands include the private industrial forestlands and small woodland ownerships not in a formal fire protection district.

Klamath County ODF Fire Occurrence 2006-2015					
Fire Cause Code	**Description**	**Number of Fires**	**% of fires**	**Burned Acres**	**% of Burned Acres**
1	Lightning	393	46.2 %	17,886	79 %
2	Equipment Use	48	5.6 %	1,427	6 %
3	Smoking	17	2.0 %	5	0.02 %
4	Recreation (campfire)	75	8.8 %	119	1 %
5	Debris Burning	172	20.2 %	188	1 %
6	Railroad	3	0.4 %	0.25	0.001 %
7	Arson	37	4.4 %	425	2 %
8	Children	9	1.1 %	19	0.09 %
9	Miscellaneous	85	10.0 %	26	0.12 %
10	Under Investigation	11	1.3 %	2,985	11%

Klamath County Federal Fire Occurrence 2006-2015					
Fire Cause Code	**Description**	**Number of Fires**	**% of fires**	**Burned Acres**	**% of Burned Acres**
1	Lightning	681	80.6 %	29,748	88.93 %
2	Equipment Use	9	1.1 %	26	.08 %
3	Smoking	14	1.7 %	5	.02 %
4	Recreation (campfire)	70	8.3 %	3,430	10.25 %
5	Debris Burning	8	1.0 %	188	.56 %
6	Railroad	0	0 %	0	0 %
7	Arson	21	2.5 %	15	.05 %
8	Children	0	0 %	0	0 %
9	Miscellaneous	41	4.9 %	39	.12 %
10	Under Investigation	0	0 %	0	0%

Protection Capabilities

The following paragraphs are directly from the 2007 KC CWPP and are still valid for the 2016 update.

In the event of a wildland fire, calling 911 is critical and should be done quickly. However, homeowner fuels and hazard reduction work can save a structure before the firefighting resources arrive.

Fire protection districts are created and staffed to deal with the fire emergency needs of the property owners within the district. Wildland fires that threaten multiple homes simultaneously can quickly overwhelm the available fire resources.

Fuels reduction and hazard mitigation work completed by homeowners greatly increases the protection capabilities of initial response units. When a wildland fire is threatening structures, additional resources are ordered, but may be several hours away. A wildland fire can easily travel into and through a WUI community before additional responding resources can arrive. There simply will not be enough fire engines to protect all the threatened homes. Ultimately, the homes that are less vulnerable to ignition are most likely to survive. A home that is extremely vulnerable may not be able to be protected regardless of protection resources on scene.

Structural Vulnerability

Structure vulnerability to wildland fire can be reduced by treatments in the home ignition zone (HIZ). Home construction materials, such as non-combustible roof and siding, greatly reduce home ignition potential. Removal and/or reduction of surface and canopy fuels around a home can eliminate the path for fire to spread to the home. It should be noted that many reports of homes within subdivisions have burned in the absence of wildfire spread. They were ignited by embers from other homes burning upwind. That phenomenon was well documented in this report, published in June 2008. Several additional sources of information are available at this link.

The structure surveys conducted in 2006 and 2010 provided Klamath County fire districts and agencies with valuable data for protecting WUI properties. Since the 2007 KC CWPP that data has been incorporated into the KC SA and SA FT applications. The previously surveyed structures can be accessed in the applications during emerging incidents. Structures in the path of a wildfire that have not been previously surveyed can be quickly surveyed with the SA FT application to assess vulnerability. The results can be used to make strategic decisions on protection priorities. Fire managers can quickly generate a report listing the homes in an area of interest. This report includes a photo of the home, construction attributes, wildland fuel conditions and the overall risk rating. Homeowners of surveyed structures can see a homeowner report of their home by clicking on *Assess My Risk* at kcrsg.org.

KC SA and SA FT applications were recently used in Crater Lake National Park by structure protection personnel to assess structures during the 2016 Bybee Creek Fire. The applications have a process for collecting residential structure data for WUI homes and a process for structure pre-planning for industrial and commercial buildings. Both of these gather information that increases the efficiency of deploying structure protection resources on incidents. Districts and agencies can greatly increase the capacity of limited firefighting resources by completing structural surveys prior to incidents.

Structure survey data collected prior to the development of KC SA and SA FT software

was imported into the SA application. Modifications to the risk scoring factors were done to better define a structure's risk score.

Values (no updates from 2007 KC CWPP)

People are drawn to the WUI communities in Klamath County because of the rural settings. Living in a forest without the traffic and noise associated with an urban setting is a definite draw. Many residents are seeking more privacy and space to pursue outdoor recreation opportunities. This setting is also the source of the risk to the values represented by home, outbuildings and other, often expensive, improvements to properties.

Some small business/industry properties are scattered around the county. Most of these are related to the wood products industry. A few of these sites are co-located with residences and exist in identified WUI communities scattered across the county.

Many ecological values exist throughout the county. State and Federal agencies have compiled management plans addressing resource issues including habitat, threatened and endangered species, soil and water quality. Environmental assessments and other documents can be accessed at the appropriate agency office. Such values at risk would be assessed during an emerging wildfire event by consultation with the jurisdictional agency representative.

WUI Hazard Rating

The process of assigning overall hazard ratings to the 2007 KC CWPP WUI Communities was based on several criteria. Each WUI Community was rated independently, although the rating elements were the same for all communities. Inputs to the final rating included: surface fire behavior (flame length and rate of spread), crown fire, structural vulnerability, wildland fire frequency and wildland fire intensity. 97th percentile weather values for temperature, relative humidity and wind were used (the 3 % worst days of the year).

Arriving at a numerical score required several discussions and adjustments to the process as individual cases surfaced that did not fit the logic of the process. A weighting process was applied at the end to gain separation of the ratings that was approved by the voting stakeholders. Professional opinion and expertise tempered the process.

<u>Surface Fire Behavior</u>

A rating was assigned based on composite surface fire flame lengths across the WUI: less than 4 foot was rated Low, 4 to 8 foot was rated Moderate, and over 8 foot was rated High.

<u>Crown Fire</u>

Knowing that this is a highly variable element, the group arrived at consensus ratings of the potential for crown fire as displayed by FlamMap outputs. Local knowledge played heavily in this decision, as the FlamMap input data was coarse-scale and lacked canopy fuels layers. Fire behavior experts reviewed the outputs. A rating of Low was given for a WUI with predominantly surface fire. A WUI with some passive crown fire rated Moderate, while a WUI with more passive and active crown fire behavior/potential was rated High.

Structural Vulnerability

This rating generated much discussion before consensus. The structural survey data generated a composite value for each property surveyed. A count of structures by score was compiled after establishing breakpoint scores for a rating of Low, Moderate or High.

Fire Frequency and Intensity

The shareholders reached consensus that only ratings of Moderate or High would be appropriate for Klamath County WUI communities. Variability of fire intensity due to elevation and terrain features complicates this rating. On any given year, the higher elevation sites will tend to exhibit less intensity. WUI communities with 10 or less fires/100,000 acres/year were rated Moderate; those with over 10 fires/100,000 acres/year were rated High.

Weighting Decision

Individual element ratings scored as follows: Low = 1, Moderate = 2 and High = 3. The individual elements were weighted as follows: surface fire behavior = 4, structural vulnerability = 3, crown fire potential = 2 and fire frequency/intensity = 1. This weighting allowed separation while accounting for adequate rating of hazard. For example, much of some WUI communities have only scattered trees, yet are capable of long flame length, rapid spreading fires in grass and shrub fuels. A vulnerable structure in such a fuel condition would receive extra weighting. The same structure with canopy conditions conducive to crown fire would receive more points but on a diminishing relative value due to the weighting. Several variations of composite scoring were evaluated until it was felt that the final rating was appropriate by consensus.

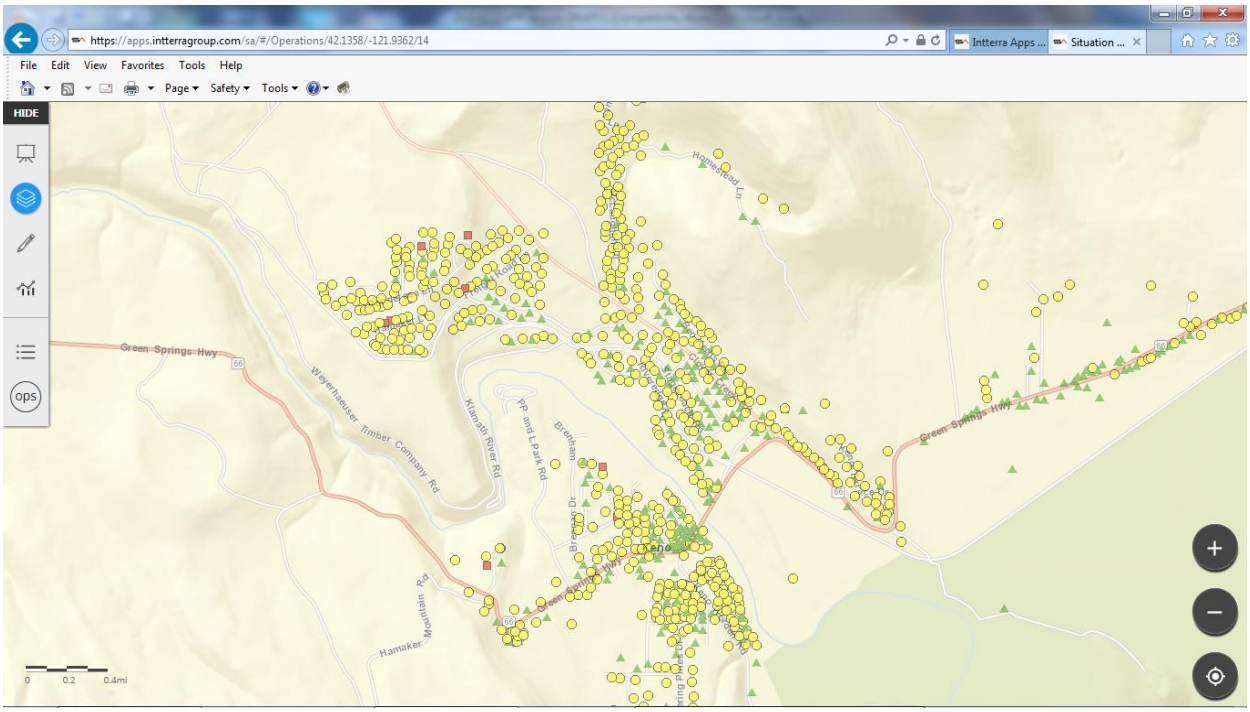
Final Weighted Rating

Review of the final weighted rating revealed some logical breakpoints in the community ratings. Consensus was achieved on the final rating on the first review of the rating table. Low: < 20, Moderate: 20-24, and High: 25+.

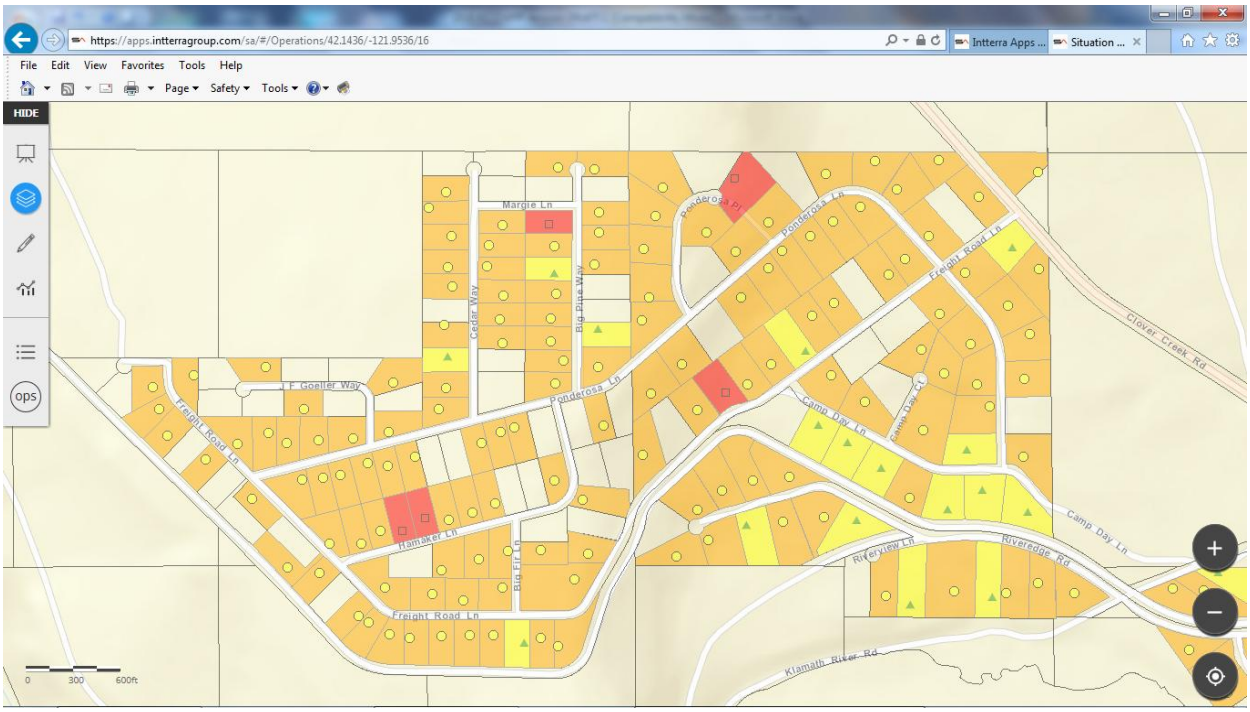
WUI Community	Weighted Points	WUI Adjective Rating
Crater Lake N.P	11	Low
Lake of the Woods	15	Low
Rocky Point	20	Moderate
Lakewoods	21	Moderate
Crescent - Odell	21	Moderate
Klamath Falls	24	Moderate
Bonanza *	24	Moderate
Merrill-Malin *	24	Moderate
Sand Creek	26	High
Bly	26	High
Chemult	26	High
Mid County	29	High
Keno	30	High
Walker Range	30	High
Chiloquin	30	High

In March of 2013 the project group and Intterra personnel re-evaluated the WUI rating system. This was in conjunction with fine tuning the individual structure and parcel risk and hazard rating for the structure data collection application. Parcel fire behavior outputs were derived from Landfire fire behavior layers using the Landfire 2008 fuel landscape. This resulted in an improved scoring process for a WUI Structure Vulnerability rating. The result was numeric score changes for two WUI communities and one change in original adjective rating of Low, Moderate or High. These changes were unanimously supported by the steering committee members. The updated parcel fire behavior is incorporated in the risk ratings displayed in KC SA and SA FT.

Merrill-Malin and Bonanza were added to the WUI Community list in this 2016 CWPP update.



KC SA view showing individual structures
(green: low, yellow: moderate, red: high risk)



KC SA view showing parcel risk rating
(yellow: high, orange: very high, red: extreme risk)

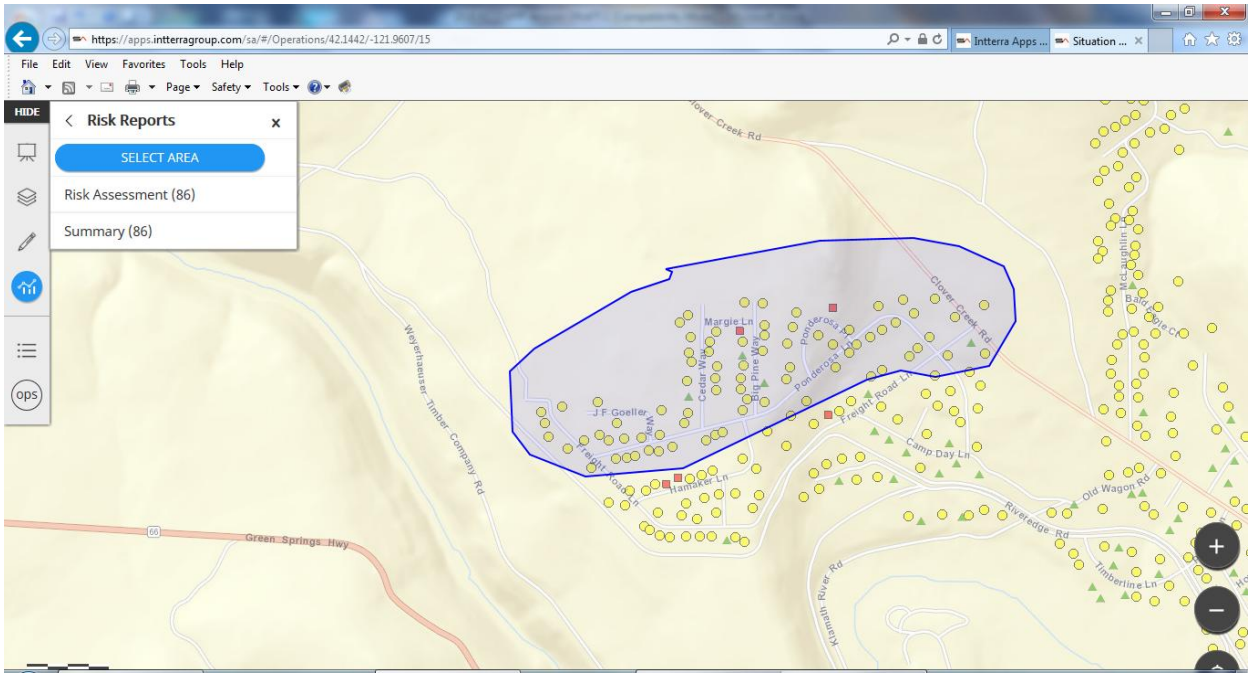
Emergency Operations

Wildfire Suppression Capabilities

While it is important for wildland firefighting resources to arrive at fires in a timely manner, even resources that arrive an hour or two after the fire starts can be of significant value to the suppression efforts on wildland fires. Wildland firefighting resources may have long response times or limited availability during certain times of the year, especially pre and post-fire season. Many wildland firefighting resources may be unavailable or have significantly delayed response time before and after normal working hours. The local structural firefighting resources (fire protection districts) typically provide the initial response to wildland fires during these periods of limited availability.

Klamath County is a large county, resulting in extensive travel times for structure protection resources when responding to the more remote areas. Knowing what structures exist, where they exist, how to access them and their vulnerability to ignition is critical to limited arriving resources. This need for information drove the emphasis for the structural survey system developed in 2006. Making that information more readily available drove the progress since the release of the 2007 KC CWPP.

In areas of the county where structures and parcels have been surveyed, responding fire officials can quickly locate values at risk, prioritize protection objectives and deploy resources in the fire area. This is done with the KC SA application. The arriving fire officer can bring up the structures in the fire area and circle the homes of concern.



By clicking on Summary in the Risk Reports screen, a summary report is generated. This starts with a summary of the selected structures and parcels. Page 1 of the report tells the fire official there are 86 structures and 168 outbuildings in the area of concern. Risk factors are itemized and displayed. Page 2 displays a map of the selected parcels and structures. Page 3 is a list of the structures by address. By printing the three page report, the fire official can hand off the report to law enforcement personnel to use as an evacuation plan. This technology significantly changes the efficiency of planning and executing evacuations. The law enforcement officer(s) can use the list to check off and make notes regarding the evacuation process. Note that the report includes identification of residents with mobility issues or other medical issues.

Summary Wildfire Risk Assessment

People

Special needs households	3
Mobility Impaired	3

Structures

Total Primary Structures	86
Number of Outbuildings	168

Wildfire Risk Assessment Summary

Rating	Structure	Overall
Extreme		2
Very High		82
High	2	2
Moderate	82	0
Low	2	0

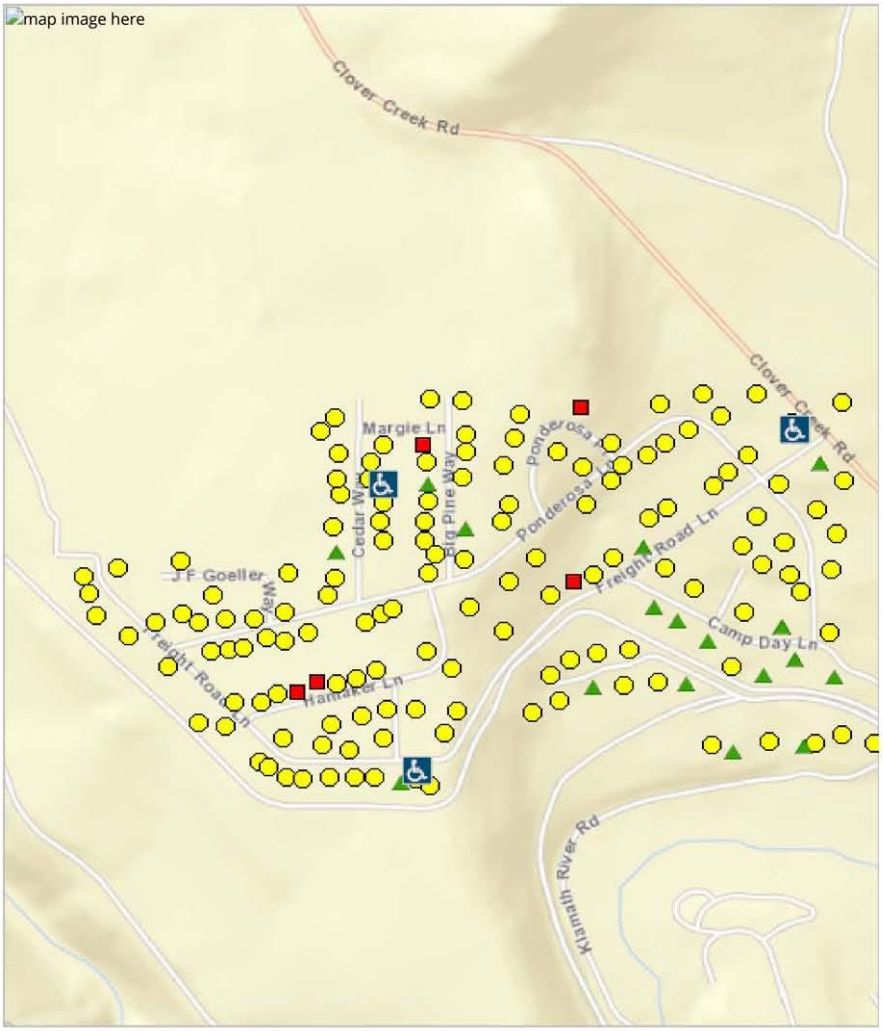
Ingress/Egress to Community

At least 2 ways in and out

Hazards to Firefighter Safety

Total Hazardous Properties	2
Overhead Power Risk	1
Pet Risk	1
Propane or Gas Risk	0
HazMat Risk	0
Solar Electric Risk	0
Access Risk	0
Poor Escape Risk	0
Extreme Hazard	**0**

REMEMBER LCES - DEFEND WITH CAUTION - ALWAYS ACCOUNT FOR FIREFIGHTER SAFETY



REMEMBER LCES - DEFEND WITH CAUTION - ALWAYS ACCOUNT FOR FIREFIGHTER SAFETY

Addresses

8705 BIG PINE WAY
8706 BIG PINE WAY
8805 BIG PINE WAY
8808 BIG PINE WAY
8811 BIG PINE WAY
8812 BIG PINE WAY
8907 BIG PINE WAY
8910 BIG PINE WAY
9008 BIG PINE WAY
9014 BIG PINE WAY
9109 BIG PINE WAY
9112 BIG PINE WAY
9118 BIG PINE WAY
9207 BIG PINE WAY
8714 CEDAR WAY
8806 CEDAR WAY
8812 CEDAR WAY
8813 CEDAR WAY
8908 CEDAR WAY
* 8909 CEDAR WAY
9004 CEDAR WAY
9007 CEDAR WAY
9013 CEDAR WAY
9110 CEDAR WAY
9111 CEDAR WAY
9118 CEDAR WAY
9206 CEDAR WAY
16624 CLOVER CREEK RD
* 16712 CLOVER CREEK RD
16904 CLOVER CREEK RD
16712 FREIGHT ROAD LN
16809 FREIGHT ROAD LN
16917 FREIGHT ROAD LN
17005 FREIGHT ROAD LN
17011 FREIGHT ROAD LN
18216 FREIGHT ROAD LN
18406 FREIGHT ROAD LN
18413 FREIGHT ROAD LN
18418 FREIGHT ROAD LN
18506 FREIGHT ROAD LN
18515 FREIGHT ROAD LN
18520 FREIGHT ROAD LN
18105 J F GOELLER WAY
18208 J F GOELLER WAY
18313 J F GOELLER WAY
17720 MARGIE LN
16747 PONDEROSA LN
16812 PONDEROSA LN
16907 PONDEROSA LN
16910 PONDEROSA LN
16913 PONDEROSA LN
17005 PONDEROSA LN
17008 PONDEROSA LN
17104 PONDEROSA LN
17107 PONDEROSA LN
17112 PONDEROSA LN
17206 PONDEROSA LN
17209 PONDEROSA LN
17310 PONDEROSA LN
17406 PONDEROSA LN
17411 PONDEROSA LN
17412 PONDEROSA LN
17514 PONDEROSA LN
17615 PONDEROSA LN
17708 PONDEROSA LN
17714 PONDEROSA LN
17806 PONDEROSA LN
17905 PONDEROSA LN
18004 PONDEROSA LN
18007 PONDEROSA LN
18010 PONDEROSA LN
18108 PONDEROSA LN
18109 PONDEROSA LN
18114 PONDEROSA LN
18115 PONDEROSA LN
18120 PONDEROSA LN
18211 PONDEROSA LN
18212 PONDEROSA LN
18217 PONDEROSA LN
8713 PONDEROSA PL
8716 PONDEROSA PL
8806 PONDEROSA PL
8811 PONDEROSA PL
8904 PONDEROSA PL
8912 PONDEROSA PL

addresses marked with * indicate special needs

REMEMBER LCES - DEFEND WITH CAUTION - ALWAYS ACCOUNT FOR FIREFIGHTER SAFETY

The KC SA and SA FT applications have many other attributes that have significantly changed the management of emerging incidents of all types. Automatic Vehicle Location (AVL) has been incorporated into the applications. This provides a display of the position of local and responding emergency response vehicles. This information allows an Incident Commander (IC) to see the resources responding to the incident and make decisions about where to deploy those resources before they arrive.

The application allows the IC (and other fire officials) to map the incident: fire perimeter, water sources, staging areas, safety zones, completed fireline and evacuation routes are just a few of the mapping items available. The application allows the fire official in charge of Operations to coordinate aerial delivery of retardant and water with aircraft on the incident. Specific personnel (depending on application permissions) can add features and information for inclusion in the official incident map.

The mapping capabilities of both applications have greatly increased the efficiency and safety of incident management for responders and the public. Another objective of the project steering committee was to capture information from an emerging incident that could easily be passed to an incoming Incident Management Team (IMT). Historically, this phase of transition has been a period of confusion and information may only exist in the notes of an individual. By developing a common platform for information, the applications offer a significant improvement to the emergency response community and the public.

Inventory of Wildland Fire Protection Resources

The list below displays the wildland firefighting resources that are available throughout Klamath County as of 2016. In addition to the resources listed below, numerous private contractor and cooperator fire engines, water tenders, and dozers are also available to respond to wildfires within Klamath County.

Klamath County Wildland Firefighting Resources State and Federal Agencies	
Type	Total *
Wildland Engines	38
Water Tenders	4
Dozers	3
20 person handcrews	1
10 person handcrews	1
8 person handcrews	1
Fire Detection Lookouts	7
* Daily availability varies throughout fire season	

Aircraft and Aerial-Delivered Fire Suppression Resources

It is widely accepted that airtankers are the single most effective initial attack firefighting resources available today. Airtankers and Type 1 helicopters can respond to distant locations in a very short time period. During extreme burning conditions, the availability of aircraft can mean the difference between a fire contained at a few acres and a fire that becomes hundreds or thousands of acres.

The availability of large airtankers and lead planes in the United States has become very limited over the last few years. Many airtankers that were available for decades are now grounded due to new requirements and regulations. This limited availability of firefighting aircraft can play a significant role in the success or failure of future wildfire suppression efforts within Klamath County.

The national airtanker fleet includes a mix of Exclusive Use (EU), Call When Needed (CWN)/On-Call Type 1 and Type 2 airtankers (Large Airtankers or LATs), Very Large Airtankers (VLATs), Single Engine Airtankers (SEATs) and Forest Service owned airtankers.

The Klamath Falls Airtanker Base historically was staffed with two airtankers and a lead plane during fire season. Since the 2007 KC CWPP the staffing is less and subject to local fire danger and aircraft availability based on current aircraft assignments to existing wildfires. All national airtanker bases are considered reload facilities as of 2016. The tanker base at Klamath Falls is now primarily used as a retardant reload base and houses one Type 1 Air Tactical Plane.

The resources listed below are either aircraft or aerial delivered firefighters such as smokejumpers or rappellers that are based in the Southern Oregon and Northern California area during each fire season. The actual number of resources may change from year to year, and personnel are sometimes moved to different locations during fire season.

photo by Keno Chief Ketchum, Royce Butte Fire, Crescent Lake Junction, Klamath County 2008

Klamath Falls Airtanker Base, Klamath Falls
Airtanker reload facility, used as needed
1 – Type 1 Air Tactical Group Supervisor Aircraft

Oregon Department of Forestry, Klamath Falls
1 – Type 3 Helicopter
1 – Type 2 Helicopter
1 – fixed wing recon aircraft

Redmond Airtanker Base, Redmond
Airtanker reload facility, used as needed
3 - Lead Planes – Lead plane with Forest Service Pilot
1 - Type 1 Air Tactical Group Supervisor Aircraft
50 Smokejumpers with 2 smokejumper airplanes

Central Oregon Helitack Base, Prineville
1 – Type 3 Helicopter with 4 helitack personnel
1 – Type 2 Helicopter with 8+ rappellers daily

Lakeview Interagency Fire Center, Lakeview
1 – Type 2 Helicopter with 8+ helitack personnel
2-3 Single Engine Airtankers (SEAT)

Medford Interagency Fire Center, Medford
Airtanker reload facility, used as needed
I – Type 1 Airtanker (ODF contract) shared with other bases

Siskiyou Rappeller Base, Merlin
1 – Type 2 Helicopter with 8+ rappellers, medical module of 4 personnel

Redding Interagency Fire Center, Redding
Airtanker reload facility, used as needed
18 Smokejumpers with 2 smokejumper planes
3 – Lead / Air Supervision Module aircraft

Because of limited numbers and high demand at certain times of the fire season, aircraft are dispatched to incidents depending on the priorities established by the wildland firefighting agencies. Initial attack fires or fires that threaten life or property are always the number one priority for fire suppression aircraft use. Depending on the fire season activity and priorities for aircraft, firefighting aircraft may or may not be available for a particular incident. Aircraft can be staged at different locations throughout the western US, so the exact location of any particular aircraft is constantly subject to change.

Wildfire Detection Capabilities

Quick detection and reporting of wildfire ignitions is key to a successful wildfire suppression program. Wildfires are often reported by private citizens to 911 or other emergency response agencies via increased and improved use of technology such as cell phones, but these individuals are only one method of wildfire detection services. Wildfires in Klamath County are also detected by the use of aerial patrol aircraft or lookout personnel stationed on local mountain tops. Aerial detection aircraft are often used after a lightning storm or during periods of extreme fire danger, but only on an as needed basis. On a daily basis, the primary method of wildfire detection in Klamath County is by the use of lookouts, with most areas of the County being visible from one or more lookouts that are currently staffed each fire season. Increased opportunities in technology have allowed the study of the potential use of Detection Camera Systems to be utilized in strategic locations within Klamath County. Detection Camera Systems use advanced video analytics and precision cameras to detect and locate the first indications of smoke from a wildland fire. System software alerts detection operators to the potential presence of a fire, precisely maps the location, provides live images/video with accurate intelligence and sends the information to dispatch centers and responders in real time.

Structural Fire and Rescue Capabilities

Structure fires and rescue dispatches require rapid response by firefighting resources to save structures and preserve life. Local structural firefighting equipment and personnel from the nearest fire districts will be the primary fire resources responding to structure fires/rescue dispatches within the County.

Klamath County has seventeen organized fire districts and local fire districts. These fire districts have thirty fire stations located throughout the county protecting communities. These fire districts protect all of the population centers but not all structures in the county. Portions of Klamath County containing structures without organized fire protection (un-protected) are at greater risk because of limited or no response, delayed response, untrained personnel, and lack of proper equipment. Residents in un-protected areas should seek fire protection or at a minimum build defensible space around their homes and other structures.

The majority of Klamath County is protected by volunteer firefighters. The only areas protected by on-duty career firefighters are: Klamath Falls and surrounding suburbs (except Stewart-Lennox) and the Kingsley Air National Guard base.

Klamath County can assemble one structure protection task force, possibly two depending on day and time. Klamath County Fire District No. 1, Klamath County Fire District No. 4, Kingsley Field Fire Department, Keno Fire District and Chiloquin Fire and Rescue are the core responders to the initial task force order. A structure task force consists of: four structural engines, one 2,000-4,000 gallon water tender, and a Task Force Leader with vehicle.

The other fire districts in Klamath County will assemble when available and also continue to protect the county. These fire districts are: Central Cascades Fire, Crescent Fire & Ambulance, Oregon Outback Fire District, Chemult Fire District, Klamath County Fire District No. 3, Klamath County Fire District No. 5, Bonanza Fire District, Bly Fire District, Malin Fire District, and Merrill Fire District. There are a total of approximately 300 structure fire personnel in Klamath County.

Water sources such as fire hydrants, lakes, rivers, canals, etc. are an important resource for firefighting agencies. Fire hydrants and other water sources are surveyed for flow, vehicle or aircraft access, total gallons, and seasonal availability.

Inventory of Structural Fire Protection Resources

The table below is a summary of the fire district resources that were available in Klamath County as of 2016.

Klamath County Structural Fire/Rescue/Medical Resources	
Type	Total *
Structural Engines	44
Wildland Engines	39
Water Tenders	32
Medical Ambulance	19
Rescue Vehicle	10
Utility/Truck	6
* Daily availability varies throughout fire season	

Mutual Aid Agreements

Klamath County is a large, mostly rural area. Individual fire districts or agencies can be quickly overwhelmed by a significant wildfire. Supporting neighboring jurisdictions is accomplished by mutual aid agreements. These documents formally identify cooperation between districts and agencies to provide each other with needed resources when an incident exceeds the capacity of the hosting unit.

A Master Cooperative Wildland Fire Management Agreement and related Annual Operating Plan are in place for the Pacific Northwest (Oregon and Washington). These documents detail the cooperation between the USFS, BLM, NPS, FWS, BIA, States of Oregon and Washington, and three Oregon Forest Protection Associations. Subsequent localized agreements and annual operation plans exist, including several in Klamath County. These documents identify the processes to be followed for cooperation, preparedness, operations, cost sharing and reimbursements.

The Oregon Conflagration Act can be invoked by the Governor when fires threaten life and structures. When a local fire chief and the Fire Defense Board Chief determine that an incident is beyond or will overwhelm local capacity, this act enables the deployment of additional structure protection resources, including Oregon State Fire Marshal IMTs.

Training Resources and Needs

Several local entities provide firefighter training, along with the training that each fire district conducts every month. The entities listed below are the primary firefighter training curriculums that are available locally.

Klamath Community College
Department of Public Safety Standards and Training (DPSST)
Oregon State Fire Marshal's Office (OSFM)
Klamath-Lake Fire Training Association
Other neighboring training associations and community colleges

National fire training groups and associations sponsor and/or provide training materials and courses. A few of these are listed below.

National Fire Protection Association, (NFPA)
International Fire Safety and Training Association, (IFSTA)
National Wildfire Coordination Group, (NWCG)
U.S. Fire Administration, (National Fire Academy)

Protection Recommendations

In addition to the recommendations in the 2007 KC CWPP:

- Continue to train responders on the use of the KC SA and SA FT applications. This training will generate broader use and understanding of and improvements to the tool.

- Promote public education through continued distribution of Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon.

- Evaluate the remaining effectiveness of past fuels mitigation treatments. Seek collaborative ways to maintain those treatments and develop new treatments. Regularly update the base maps in the applications to make the treatment information available and current.

Mitigation Action Plan

Current Projects and Policies

The improvement and additional development of the kcrsg.org/ webpage will be a focus item. This site will hold historical and current information regarding the KC CWPP, public education and emerging changes in the KC SA and SA FT applications. It is anticipated that the use and modification of the applications will increase into the next few years.

Community Strategy for Risk Reduction

Klamath County Fuels Strategy

Fuels reduction work in Klamath County should be guided by the following strategic priority.

1. Properties that have residential structures and/or constructed improvements.

2. Properties adjacent to parcels that have residential structures and/or constructed improvements.

3. Properties not adjacent to parcels that have residential structures and/or constructed improvements, but when treated are a segment of a larger treatment zone that offers tactical protection opportunities for the properties in priority 1.

Fuels Reduction

Fuels reduction activities have be on-going in Klamath County since before the 2007 KC CWPP. Coordinated and collaborative efforts have occurred between local, state and federal districts and agencies. A work in progress is the development of consolidated mapping of fuels treatment areas in the county to use as a map layer in KC SA and SA FT applications. Having this information readily available to managers of emerging wildland fires will greatly increase their ability to make decisions to increase suppression effectiveness, reduce costs and increase public and firefighter safety.

Since the 2007 KC CWPP local fire districts, Klamath Falls City Parks, ODF, Walker Range Fire Patrol and federal agencies (USFS, BLM, USFWS and NPS) have treated thousands of acres with fuels reduction activities. Work areas are coordinated for strategic opportunities when practical. By stitching together a series of project areas, a larger area can be created for a future fuel break. Individual residential properties in such a consolidated treatment area gain significant protection from wildland fire threat, specifically more distance from ember production.

Coordination of locations and types of wildland fuel treatments for a base map layer in KC SA is in progress. Making a common data layer will have significant impact on the capacity of fire suppression strategies and tactics. Coordination of past, current and planned wildland fuels treatment areas can be readily shared between jurisdictions using the KC SA and SA FT applications. This will include public and private property projects.

Biomass Utilization

Since the 1980s there have been numerous efforts to utilize biomass in Klamath County. None of the projects have been successful. The economic realities of collecting and moving small logs and slash material to cogeneration facilities have made most proposals unfeasible without significant subsidies.

Most recently an attempt to site a wood-fired electrical generating plant proposal was dropped in June of 2013. Delays in permit processes were cited by the company proposing the facility.

Biomass One, in White City, Oregon was in operation when the 2007 KC CWPP was released. That company is still in operation. It operates a 30-megawatt wood-fired cogeneration plant and offers landscaping materials from an estimated 355,000 tons of wood waste annually.

This company has a mobile tub-grinder that is moved to locations once enough material is collected to defray costs. This grinder periodically comes to the Klamath County landfill to grind up acceptable materials. The grinder can also work in forest harvest areas with sufficient volume of material.

Other business ventures continue to surface in the biomass utilization market. An effort to produce fireplace logs for residential use from juniper is under proposal. It is not in operation as of this writing.

Education and Community Outreach

One of the goals of the development of KC SA and SA FT was to educate the public, as well as provide a way to receive feedback from the public. The website kcrsg.org was specifically designed for public education and outreach. The 2007 KC CWPP, the 2016 KC CWPP update, supporting documents and public education information and videos are on that website.

Monitoring and Evaluation

Prioritization Process / Coordination (as listed in 2007 KC CWPP, still applicable)

During this analysis, numerous variables were considered including:

- Fuel types
- Historic fire occurrence
- Completed and proposed hazard reduction treatment projects
- Vegetation and stand types
- Stand conditions and forest health
- Values at risk, and vulnerability of the values
- Risks to essential infrastructure
- Known areas of high fire hazard
- Access and travel routes
- Evacuation routes
- Limitations on detection capabilities
- Historic prevailing weather conditions

- Protection capabilities
- Structural vulnerability

Priority # 1

Where

The **defensible space** within 100 feet of structures or other improvements that need to be protected from wildfire. This includes lands within all communities of the County.

Why

As discussed numerous times in this plan, the number one priority for hazard reduction treatments is the defensible space within 100 feet of every home within the County. The area around the home must be the first line of defense against wildfire damage as this area provides the most benefit from the least amount of work and dollars spent, and provides the best protection for homes in the WUI.

What

Treatments in this area should focus on:

1) Defensible Space

Priority # 2

Where

High fire hazard private lands comprised mostly of vacant lots and small forested areas adjacent to homes and other improvements. This includes lands within all communities of the County.

Why

These properties are often vacant and owned by persons living outside of the fire district. An adjacent vacant lot may be situated so that it comprises a large portion of a home's defensible space. The neighbor may not have a home on the lot, but the fire hazard should still be treated in order to protect an adjacent home and property. A wildfire starting in one of these high fire hazard areas can place several homes at risk almost immediately. These high fire hazard areas adjacent to homes are often a favorite place for children to play and are close to areas of high human activity; consequently these properties are constantly at risk to human caused fires.

What

Treatments in this area should focus on:

1) Defensible Space

2) 'High' fire hazard areas on vacant lots near homes

3) Complementing planned and completed projects on adjacent federal lands, where applicable.

Priority #3

Where

Wildland areas around communities with a final rating of "high" should receive first consideration. Communities that are rated moderate could still have individual parcels that require mitigation treatment.

Larger land ownerships with fuel loading that would pose a threat to adjacent communities or homes.

Support and foster community involvement and desire to protect homes through landscape modifications and increasing local capacity, i.e. water source improvements, fuel breaks, extra outlets, phone trees, or other means as suggested by community members.

Implementation

Timeline for Project Implementation, Monitoring and Evaluation

Since the release of the 2007 KC CWPP numerous fuels reduction treatments have been conducted by local, state and federal districts and agencies. An on-going effort to map completed treatments and assess the current condition of those treatments is continuing. The development of the KC SA and SA FT applications gives a common platform for sharing that information. Individual jurisdictions have the capability to identify priority areas for treatment emphasis. The process of identifying treatment needs, mitigation actions, and mapping the treatments completed should be a continuous process.

Interagency Collaboration

Since the 2007 KC CWPP was produced the steering committee has focused on the goals identified in that document. Development of the KC SA and SA FT applications has presented a significant opportunity for collaboration among local and distant jurisdictions. A common platform and process for data collection and incident management is the key for sharing the information with local and arriving resources from outside the local area. As is true across the country, numerous changes in

personnel have occurred in the local fire districts and agencies. The data collected in the past is immediately available for new personnel which will increase the efficiency of collaborative efforts between jurisdictions.

Major Incentive Programs Available to Family Forestland Owners in Oregon:

Numerous incentive programs are available to landowners, communities, and other entities to assist with funding for hazardous fuels reduction and community outreach and education projects. Listed below are some of the programs available in Oregon.

Grants and incentives can be found at the ODF website.

More information is available at this federal website.

Forest Stewardship Program (FSP) - cost shares consultant written / ODF approved stewardship plans -- apply with your local ODF Stewardship Forester.

Oregon 50% Under-producing Forest Land Conversion Tax Credit - state tax credit on cost of converting under-producing forestland (brush land and low value / low volume forest) to well stocked forest. Apply by completing tax credit form and submitting it to the local ODF Stewardship Forester. (The form is available on the ODF/Private & Community Forests web site or at the local ODF office.) The state tax credit is available to qualified landowners and projects on a continuous basis. Proposed projects should be pre-qualified by the local ODF Stewardship Forester. more information

Afforestation Incentive (OAR 629-611 Forest Practices Rules) - Provides landowners an incentive to convert parcels of idle land or land in other uses to commercial forest use. Contact the local ODF Stewardship Forester for more information.

Federal Tax Incentive Information can be found at: http://www.timbertax.org/.

Watershed Improvement Grants (OWEB) --- cost shares riparian (usually near stream or in-stream) work - check with local watershed counsel and / or SWCD (Soil & Water Conservation District). Grant applications are available online at OWEB or at the local SWCD office.

Community Fire Assistance:

Volunteer Fire Assistance (VFA): Assistance to Volunteer Fire Districts for equipment and supplies. Contact the local ODF office.

Federal Excess Personal Property program (FEPP): Provides federal excess equipment and supplies to city and rural fire districts for firefighting purposes. Contact the local ODF office.

Title II funding is available from the county for projects to enhance forest objectives. Contact the County Commissioners.

Additional USDA-NRCS programs for non-industrial forest land owners in select counties, in select areas within the counties are available. Contact the local Farm Service Center.

Monitoring

Annual Updates of Progress

The KC CWPP steering committee has been meeting regularly since 2007 in the effort to develop the KC SA and SA FT applications. This 2016 update to the KC CWPP is an opportunity to introduce new personnel from districts and agencies to the existing plan and developments since that planning effort, as well as prepare these new people to carry the process into the future.

An annual report on the collective accomplishments by districts and agencies toward the goals of the KC CWPP should be prepared.

Description of Monitoring and Evaluation

Monitoring is a critical component of all natural resource management programs. Monitoring provides information as to whether a program is meeting its goals and objectives. The purpose of this monitoring strategy is to track implementation of planned activities and evaluate how the goals of the Klamath County CWPP are being met over time. The data gathered will help to determine if the objectives of the plan are being met, if updates need to me made, and if the plan is useful and being implemented as envisioned. This CWPP is a “living” document and must be continually monitored and updated as conditions and community values change.

Each functional element of the KC CWPP (risk assessment, fuels reduction, emergency management, education and outreach) provides monitoring tasks for recommended action items. The table below provides a summary of monitoring tasks for each of these functional areas.

Summary of Monitoring Tasks

Objective	Monitoring Tasks	Who?	Timeline
Risk Assessment	Update fire occurrence and fire perimeter databases, including all state and federal fires that burn within the Fire District.	Local Fire Chief, ODF rep. or Homeowner rep	Annually
	Update the risk assessment with new data as conditions change and new data becomes available.		Annually
	Continue to assess new values at risk and include them in the CWPP as appropriate.		Annually
Fuels Reduction	Identify and prioritize fuels treatment projects on an annual basis.	same	Annually
	Track the total acres treated through fuels reduction measures.		Annually
	Track grants and utilize risk assessment data in new applications.		Annually
	Document number of residents that meet the requirements of Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360).		Annually
	Track fuels reduction grants and defensible space projects occurring on homes of citizens with special needs.		Annually
	Track education programs and document how well they integrate fuels objectives.		Annually
	Evaluate opportunities for biomass marketing and utilization.		Annually
Emergency Management	Track education efforts focused on emergency management.	same	Annually
	Track progress on water source improvements.		Annually
	Review emergency management policies and procedures and Fire District training policies.		Annually
Education and Outreach	Evaluate techniques used to mobilize and educate citizens.	same	Annually
	Review public education and community outreach material and update as necessary.		Annually
	Random sample of "certified" homes to measure whether or not they continue to meet standards.		Annually
	Review progress of "Fire Wise" certification efforts and make adjustments as needed.		Annually

With the implementation of the KC SA and SA FT applications, the opportunity now exists for each district or agency to update the base maps for the software. Periodic updates could be consolidated in an annual county-wide report.

Appendices

Acknowledgement

The continued effort to accomplish the goals and objectives of the original 2007 KC CWPP was guided by a steering group of three individuals: Chief John Ketchum of the Keno Rural Fire Protection District, Dennis Lee of the Oregon Department of Forestry and Gene Rogers of Wildland Fire Technologies, Inc. Several employees of Intterra have contributed to the technology applications, notably David Blankenship, Brian Collins and Jim Wolf. Numerous Klamath County wildland fire managers, fire department personnel and others have contributed time to application testing. OSU Extension Service provided printing services for the publication Fire-Adapted Communities: The Next Step in Wildland Fire Preparedness, Klamath County, Oregon, through the local extension forester Daniel Leavell.

Additional individuals who contributed to the concepts, planning, document review and implementation of updates to the KC CWPP are: GIS Specialists Sam Hamilton and Lasheena Nieves(Keno FD), Randy Baley and Jake Barnett (ODF), Rob Allen and Clint Albertson (Fremont-Winema NF), Chief Mike Cook (Chiloquin Fire and Rescue) and Division Chief Rob Arbini (KCFD#1).

The 2007 KC CWPP appendices contain numerous points of contact and links that are no longer active. The resources in the following list are active as of this 2016 KC CWPP update. Much of the reference material recommended to the reader is found at kcrsg.org.

Klamath County Information

Fire Districts and Agencies

Klamath County Government

Klamath County Museum

Klamath County Information

Oregon Blue Book

2016 KC CWPP Steering Committee and Project Coordinators

John Ketchum - Fire Chief
Keno Rural Fire Protection District
PO Box 10
14800 Puckett Road
Keno, OR 97627
Phone: 541-883-3062
email: firechief@kenofire.com
website: http://www.kenofire.com

Dennis Lee – District Forester
Oregon Department of Forestry
Klamath-Lake District
3200 DeLap Road
Klamath Falls, OR 97601
Phone: 541-883-5681
email: dlee@odf.state.or.us

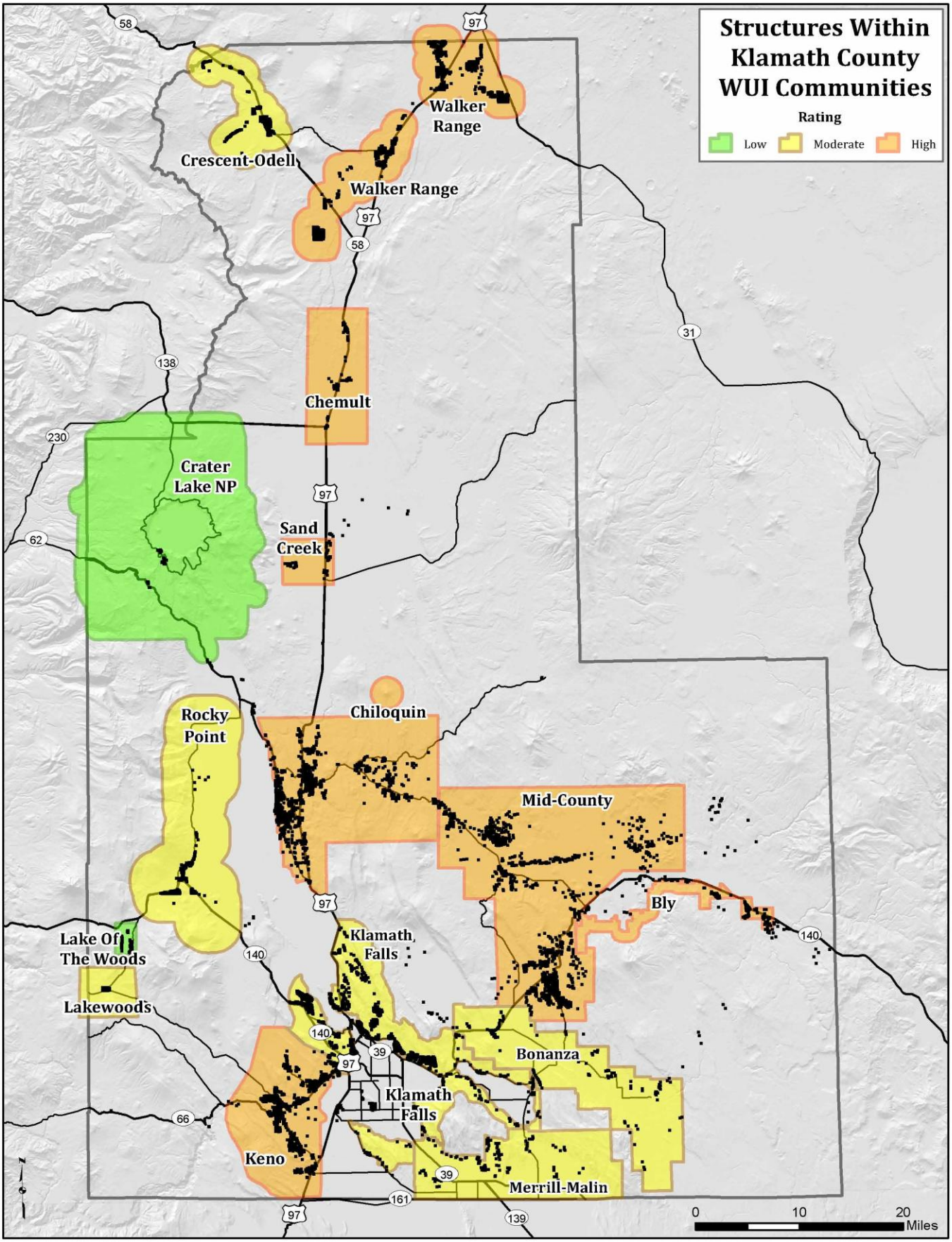
Gene Rogers - President
Wildland Fire Technologies, Inc.
1041 Vista Way
Klamath Falls, OR 97601
Phone: 541-883-2556
email: phyrenut@aol.com

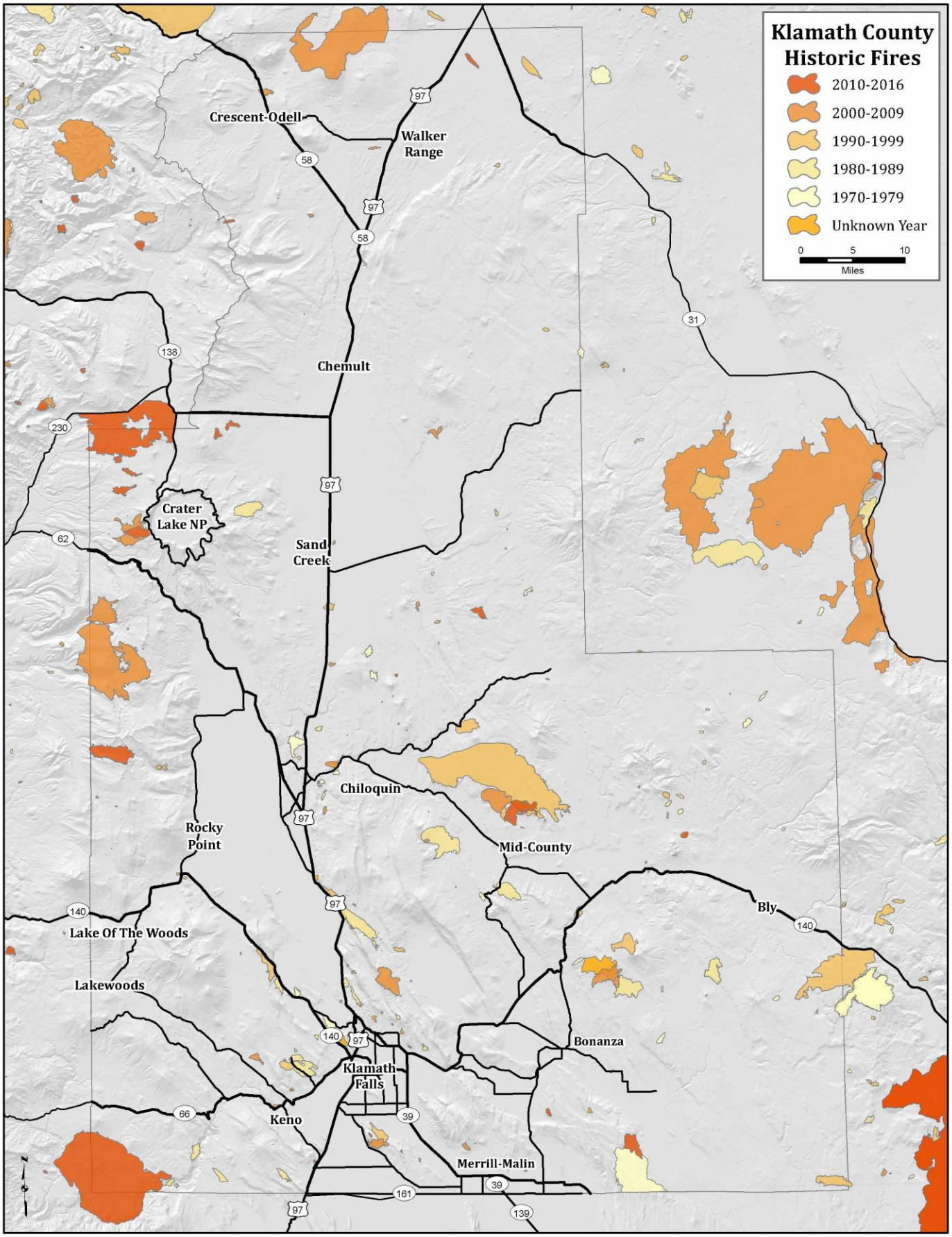
Websites pertinent to this CWPP

Information about The National Fire Plan, The Healthy Forest Initiative and The Healthy Forest Restoration Act. National Fire Plan, HFI and HFRA

HFI/HFRA Interim Field Guide: http://www.fs.fed.us/projects/hfi/field-guide/

The 2014 Farm Bill, USFS, Good Neighbor Authority.


Structures Within Klamath County WUI Communities
Rating
Low
Moderate
High
Walker Range
Crescent-Odell
Walker Range
Chemult
Crater Lake NP
Sand Creek
Rocky Point
Chiloquin
Mid-County
Bly
Lake Of The Woods
Lakewoods
Klamath Falls
Bonanza
Klamath Falls
Keno
Merrill-Malin
58
97
138
230
62
31
140
39
66
161
139
0
10
20
Miles


Klamath County
Historic Fires
2010-2016
2000-2009
1990-1999
1980-1989
1970-1979
Unknown Year
0
5
10
Miles
Crescent-Odell
Walker
Range
Chemult
Crater
Lake NP
Sand
Creek
Chiloquin
Rocky
Point
Mid-County
Bly
Lake Of The Woods
Lakewoods
Bonanza
Klamath
Falls
Keno
Merrill-Malin
97
58
138
230
62
31
140
66
39
161
139

Klamath County Community Wildfire Protection Plan 2019 Addendum

The 2019 Addendum to the 2016 Klamath County Community Wildfire Protection Plan (CWPP) documents a process that is being used in the Chiloquin Community Forest and Fire Project (CCFFP) to collect additional forest and wildfire risk data, conduct collaborative planning, and implement landscape-level treatments. This process is an extension of the CWPP Mitigation Action Plan, and may be considered as a model for future efforts. As dictated by the process, project-specific mitigation needs have been identified for the Chiloquin area to address the functional elements of the CWPP (risk assessment, fuels reduction, emergency management, education and outreach), as shown in the table below. A map of the CCFFP area is included for reference.

Planning and Implementing Cross-Boundary Landscape-scale Restoration and Wildfire Risk Reduction Projects

Through the Klamath-Lake Forest Health Partnership, many partners in Klamath County have worked collaboratively to identify priority landscapes for focused restoration and wildfire risk reduction. The process is documented in Leavell et al. (2018) (https://catalog.extension.oregonstate.edu/pnw707) and includes a combination of 1) landowner outreach and education, 2) private land mapping, assessment, and wildfire response pre-planning, 3) support to private landowners, 4) obtaining grant funds, 5) agreement and authorities to carry out work, and 6) implementation across federal and private land. Where possible, landscape projects are designed in coordination with federal NEPA ready projects to facilitate cross-boundary restoration, and the assessment would include an update to the structure vulnerability surveys. As projects are developed over time, a list of project specific mitigation needs would be presented to the Klamath County Commissioners for approval. If approved, the project specific mitigation items will be added as an addendum to the Klamath County CWPP.

Mitigation Needs for the Chiloquin Community Forest and Fire Project

Below is a table of mitigation items identified in 2018 through the planning and assessment of the Chiloquin Community Forest and Fire Project (CCFFP) following the process described in Leavell et al. (2018). Partners shown may provide technical and/or financial support to address the need, or in the case of capital expenses, may be the owner/operator.

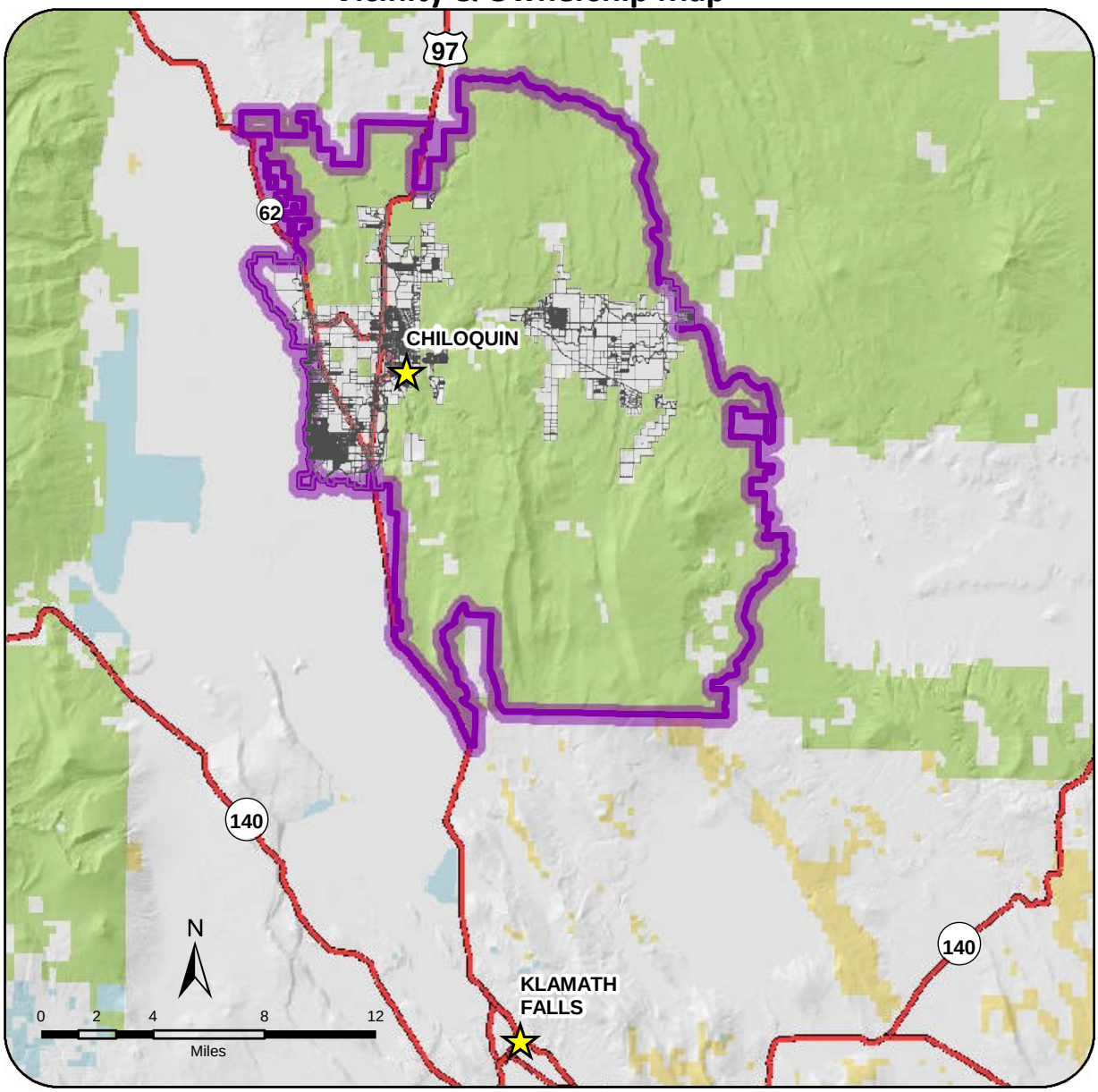
Additional information on CCFFP can be found on the KLFHP website at https://www.klfhp.org/chiloquin/ or in the Leavell et al. publication Chapter 11 p. 47-53 (2018) https://catalog.extension.oregonstate.edu/pnw707.

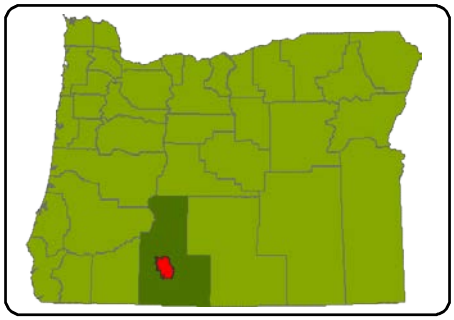
Mitigation Needs	Description	Estimated Cost	Partners*
Water storage	Construction of two temperature controlled indoor 30,000 gallon water facilities. This would provide prompt water supply for fire response.	$60,000	Chiloquin F&R
Skid Steer	To purchase a skid steer to complete and maintain defensible space treatments around structures. Implements should be designed for high-performance cutting and mulching vegetation and undergrowth from typical wooded terrain.	$118,300	KWP ODF Chiloquin F&R

Walk-Behind Rotary Brush Cutter	To purchase a walk-behind rotary brush cutter that can cut and mulch brush and small trees up to 6" DBH.	$15,795	KWP ODF Chiloquin F&R
Portable Air Curtain Burner	To purchase a small portable air curtain burner for the disposal of wood and vegetative waste generated by forestry practices	$53,000	KWP ODF Chiloquin F&R
Landscape fuels treatments	To implement and maintain approximately 20,000 acres on private land and 120,000 acres on federal land of defensible space, fuel break, and forest health treatments at a landscape-scale. This would involve a combination of commercial harvest, small tree thinning, shrub reduction, and prescribed fire.	$8,000,000 (private) $10,000,000 (federal)	USFS ODF NRCS KWP Chiloquin F&R
Continued structure vulnerability assessments	Continues to complete vulnerability assessments of structures.	$5,000/year	ODF KWP OSU Extension
Continued assessment of ingress/egress	Continue to assess ingress/egress.	$10,000	ODF KWP OSU Extension
Inventory evacuation routes and install signage	Inventory evacuation routes for the community and install signage.	$10,000	ODF Chiloquin F&R OSU Extension
Development of a pre-attack plan	Development of a pre-attack plan to ensure the safety of suppression forces taking action on an incident, to protect the local population, residences, structures, and businesses, and to limit damage to private land and natural resources.	$20,000	ODF USFS Chiloquin F&R OSU Extension
Development of evacuation plan	To develop an evacuation plan for the community.	$10,000	ODF Chiloquin F&R OSU Extension
Continued outreach and education	To use multiple methods of outreach and education to encourage landowners to implement defensible space treatments, other fuel reduction treatments, and prepare for evacuation including mailings, workshops, door to door, etc.	$40,000/year	OSU Extension ODF USFS Chiloquin F&R KWP

* Chiloquin F&R – Chiloquin Fire and Rescue
KWP – Klamath Watershed Partnership (501c3, local watershed council)
ODF – Oregon Department of Forestry
OSU Extension – Oregon State University Extension
USFS – United States Forest Service (Fremont-Winema National Forest)

Chiloquin Community Forest and Fire Project
Vicinity & Ownership Map





CCFFP Boundary
CCFFP Participating Tax Lot
BLM
Private
State Lands
USFS National Forest