

Community Wildfire Protection Plan

For the

City of Cascade Locks

January, 2005



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Executive Summary

This Community Wildfire Protection Plan covers the City of Cascade Locks and its urban growth boundary. The purpose of the plan is to identify and assess wildfire hazards, wildfire risk factors, and to develop a strategy to reduce the potential for wildfire damage in the planning area. Major findings of the planning process are:

- Approximately two-thirds of the planning area is considered to have a high wildfire hazard rating. These areas generally have large trees with heavy brush underneath. The underbrush is often thick providing a ladder fuel effect which would help fire reach into the crowns of the larger trees. Only about three percent of the planning area is rated as having a low wildfire hazard.
- There are serious wildfire risk factors in the planning area: the railroad, I-84, fireworks, lightning, power lines, debris burning, discarded cigarettes, and house fires.
- Creating a defensible space around individual homes is the most important action homeowners can take to improve the odds of saving their property during a wildfire event.
- About 30 percent of the homes in the planning area are considered to have a high hazard rating. Most homes within the planning area need some form of fuel treatment to make them more fire-resistant during a wildfire.
- Many homes have construction material which would make them vulnerable in a wildfire situation.
- Some residential areas are served by only one means of access presenting serious limitations for escape during a wildfire emergency.

Several action items, or projects, designed to reduce wildfire hazards are presented. The plan recommends the creation of a City Wildfire Protection Council to oversee and provide leadership in the implementation of wildfire hazard reduction projects. Other projects include the creation of defensible space for individual homes and developments, access improvements, establishment of a brush disposal site, hazard reduction along the railroad and on adjacent National Forest System lands, and the creation of materials to better inform citizens about wildfire hazards.

This plan offers advice to homeowners and local officials on how to make the planning area less vulnerable to wildfires. Some of the strategy presented would be accomplished with available public funding and some would be done by individuals taking responsibility for the work on their property. The plan recommends adoption by the city of wildfire protection standards for existing homes and new developments.

I. Introduction

This Wildfire Protection Plan for the City of Cascade Locks was prepared through a Title III grant from Hood River County. The planning process was designed to meet the guidance in the National Fire Plan and the Healthy Forest Restoration Act of 2003 (HR 1904). The primary purpose for the plan is to provide information to property owners and city officials within the planning area which will provide them an opportunity to be better prepared for a wildfire event. The plan identifies high risk areas and individual parcels that would be vulnerable during a wildfire occurrence. It offers a strategy and methods designed to reduce the potential loss of property values and threat to human life from wildfires.

The residential portion of Cascade Locks represents a Wildland Urban Interface¹ situation with strong potential for a catastrophic wildfire event that could destroy homes and threaten human life. The following conditions are found throughout, or in certain portions of, the planning area. Some areas have all, or most, of these conditions:

- High wind situations (Columbia River Gorge conditions) during much of the fire season and lasting into the late fall (west winds during summer and east winds in the fall).
- Light flashy fuels consisting of brush and, or, uncut grass.
- Heavy fuel loads of mature conifer and hardwood trees with brush underneath.
- Vehicle access problems including one means of ingress and egress, narrow drives, and turning radius limitations.
- Homes with no, or very limited, defensible space.
- Numerous homes with combustible construction materials, i.e. shake roofs, cedar siding, wood decks.
- High risk factors including a railroad and interstate highway through the length of the city, National Forest land with heavy fuel loads on the south side of the city, recreation users on the Pacific Crest Trail and along the Columbia River shoreline, and city and BPA power lines.

There have been frequent fires in, or around, the city in recent years. In September of 2003, a wildfire started when a tree fell on a power line at the east end of the city. Driven by strong easterly winds, it traveled more than a mile burning approximately 300 acres on both sides of I-84 and threatened the downtown area. Two residential structures were destroyed and many more were threatened. No one was killed or injured but residents had to be evacuated. Fortunately, the wind dissipated and firefighters were able to control the fire before it reached the commercial area of the city.

¹ "The urban-wildland interface community exists where humans and their development meet or intermix with wildland fuel." This definition is found in the Federal Register Vol. 66, Thursday, January 4, 2001, Notices; and in "Fire in the West, the Wildland/Urban Interface Fire Problem," A Report for the Western States Fire Managers, September 18, 2000. http://www.bianifc.org/fuels/fuels_pa.html.

Conditions throughout the city continue to exist for another wildfire event which could destroy many homes and threaten lives. Each year the situation becomes worse as vegetation in vacant parcels and around homes grows. Community leaders recognize the problem and wish to take action to limit the potential for a wildfire with serious effects to property and human safety. While some individuals realize there is a problem, many are not aware of the situation, or are not prepared to take action to reduce hazardous situations on their property.

The planning area for the purpose of this study includes the entire area within the urban growth boundary of the City of Cascade Locks.

II. Planning Process

In the spring of 2004, the City of Cascade Locks received a Title III grant from Hood River County to complete a Community Wildfire Protection Plan. The City hired a contractor, Jim Hulbert, to conduct the planning process. The planning process used was patterned after the handbook for Wildland-Urban Interface Communities titled, Preparing a Community Wildfire Protection Plan. The following steps were followed:

Step one: Convene decision makers

A Core Team designed to act as an advisory committee was formed to work with the contractor. The Core Team met several times during the planning process. The team helped establish the planning process and reviewed and critiqued planning documents. The Core Team consisted of representatives from the following entities:

- City of Cascade Locks
- Hood River County
- Oregon Department of Forestry
- USDA Forest Service (Columbia River Gorge National Scenic Area office)
- Cascade Locks Fire Department
- Hood River County Fire Chief's Association
- Port of Cascade Locks
- Interested citizens

Step two: Establish planning area boundary and planning goals

The Core Team decided the planning area would include the City of Cascade Locks and its Urban Growth Boundary. The planning area covers approximately 1,430 acres. It includes the Port of Cascade Locks industrial property on the northeast portion of the city.

The following goals for the Community Wildfire Protection Plan were agreed to by the Core Team:

- Provide information to homeowners and city officials on how to be better prepared for a wildfire event. Information includes ideas on how homeowners can create a defensible space around their home and about construction materials for their homes to help make them more fire-safe.
- Identify and rate high, medium and low hazard areas within the planning area and rate individual homes as to their degree of vulnerability to wildfire threats.
- Develop a strategy designed to reduce the threat to homeowners, businesses, and the city infrastructure from wildfires.
- Make the community more competitive for available funding assistance for hazard fuel reduction projects.
- Involve community members in the planning process through city newsletters and one or more town hall type meetings.

The Core Team established a goal of completing the plan by October 1, 2004

Step three: Establish a Community Base Map

A community base map was developed using the GIS system developed by Hood River County. A color orthophoto map (approximately 1 inch equals 400 feet) showing parcel boundaries was built from 2002 aerial photos. This base map was used to delineate low, moderate, and high risk zones in the planning area. It also displayed individual high risk ownership parcels. A slope map showing 0-10, 10-20, 20-30, and greater than 30 percent slopes was also developed.

Step Four: Hazard Assessment

An assessment of wildfire hazards was completed using the orthophoto base map and field observations. The assessment was done on an area basis and for individual home sites. Hazardous fuel type and amount, proximity to risk factors, and percent slope were the primary criteria used to rate hazard zones. Low, medium, and high hazard ratings were identified on an area basis and for individual parcels. The mapped hazard areas are not necessarily uniform in condition. For example, within areas rated as medium, there are some portions that could be considered high hazard and some that might be called low hazard. However, overall the conditions would be considered medium. The same would be true with low and high hazard areas.

Criteria developed as part of the NFPA-299 survey assessment program were used to establish hazard ratings for individual home sites. Individual home surveys were completed by a Hood River County crew in August of 2004. The criteria used to rate individual parcels are in Appendix C. Overall, there was a continuum from a fire-safe condition up to a high hazard situation; every property had a unique set of conditions.

Step Five: Establish Community Priorities and Recommendations

The Core Team considered the results of the hazardous fuel situation assessment both from an area basis and for individual parcels and then established a list of priority projects within the planning area. The type of projects considered includes:

- Hazardous fuel reduction measures,
- Reducing structural ignitability,
- Improving fire response capability,
- Information/education efforts directed toward individual homeowners,
- Compartmentalization of fuel situations.

Criteria used in selecting priority projects include:

- Likelihood for acceptance by property owners,
- The best chance for successful implementation,
- The best cost-benefit ratio,
- Likelihood of getting funding assistance for implementation.

Step Six: Communicate Wildland Protection Plan information to property owners.

A strategy to effectively communicate information from the plan was devised. A combination of news letters, public meetings, TV slots and handout material designed to reach the maximum number of property owners in the planning area was identified.

III. Community Profile

Historical

Cascade Locks is located on the Oregon side of the Columbia River about 35 miles west of Portland. It is bordered by the Columbia River on the north and the Columbia River Gorge National Scenic Area to the south. Interstate 84 and the Union Pacific Railroad parallel the river and run the length of the community. The Columbia River Gorge Historic Highway makes up the main street of the downtown area.

The city has a long and colorful history, much of it centering on transportation on and along the Columbia River. It is one of the oldest towns on the Columbia River, originating in 1853 when three white families settled alongside Indian families already living there. Lewis and Clark visited and passed by Cascade Locks during their trip to, and return from, the Pacific Ocean in 1805-1806. Prior to that event, Indians lived and traded in this part of the Gorge for more than 11,000 years. Early on the community was called "Whiskey Flats", a place known for its taverns and other unsavory businesses that catered to sailors and travelers on the sternwheeler boats.

A large rapid near the present day community was an important fishing and trade site for the Indians. The great rapids were 2½ miles long and were formed by the "Bonneville Slide". This massive slide resulted when, around 1700, the sides of two mountains on the

Washington side of the river collapsed into the Gorge. This so called “Bridge of the Gods” is where the present day interstate bridge derives its name.

In 1880, the Corps of Engineers started work on navigation locks at the rapids so that the sternwheeler river boats could safely pass as they traveled back and forth from the Pacific Ocean, Portland, and The Dalles. The city got its present day name from these locks. The great rapids were completely submerged in 1937 when Bonneville Dam was completed raising the water level behind the dam more than 60 feet. Even though the rapids are gone, the locks are preserved in a marine park operated by the Port of Cascade Locks. The locks are on the National Register of Historic Places.

Economy

From the 1950’s to the 1980’s, Cascade Lock’s economy was strong. Timber from the Mount Hood and Gifford Pinchot National Forests was an important part of the economy.



Downtown Cascade Locks looking east.

In the 1950’s, work began on an interstate highway through the Gorge (I-84) and the Corps of Engineers began constructing a second powerhouse at Bonneville Dam in the 1970s. During these three decades, wood products processing, construction activities on I-84, Bonneville Dam, and a federal fish hatchery plus tourism provided a variety of jobs for Cascade Locks residents.

In the 1980s, the large construction projects in the area were completed and an important lumber mill was closed. In recent years the community has shown signs of stagnation and decline. Its unemployment rate is high, the industrial park has not yet attracted new investments or jobs, and its downtown area is marked by a growing number of vacant storefronts and a lack of new development. There are no medical facilities or financial services available in Cascade Locks. The nearest hospital and bank are in Hood River, 20 miles to the east.

The city's population growth has not matched the growth of the State or even Hood River County over the past decade. The community has long recognized that it is a special place but it needs renewal if it is to survive and prosper. Population levels in Cascade Locks, Hood River, and Hood River County follow:

	Population					
	1980	1990	1998	1999	2000	2001
City of Cascade Locks	838	930	1095	1085	1115	1130
City of Hood River	4,329	4,632	5,130	5,135	5,831	6,020
Hood River County	15,835	16,903	19,500	19,700	20,411	20,600



Downtown Cascade Locks looking west.

Today, the economy of Cascade Locks is slowly shifting to that of a tourism base. The community has dining, lodging, camping, an airport, marina & boat launch, automotive

services, groceries and a few retail shops. It is known as one of the best sailing venues in the world for small class sailboats. One of the sailing magazines recently rated Cascade Locks as one of the ten best places to sail in the world. Besides sailing, there is windsurfing, hiking, biking, fishing, and other outdoor activities. It is a quiet and scenic mountain village only thirty minutes from Portland.

Employment

The major employment sectors in Cascade Locks are:

Employer—Product/Service	No. of Full Time Employees
Cascade Wood Components-Lumber	42
Bear Mountain Forest Products-Wood Fuel Pellets	34
Port of Cascade Locks – Economic Development	24
Chinook Sailing Products-Light Manufacturing	20
Cascade Locks School-Education	21
Green Hill Lumber Co., Inc-Wood Products	20
Columbia River Inn-Tourism	13
City of Cascade Locks - Various	12

The total labor force in Cascade Locks during 1999 was 537. Of these, 495 were employed and 39 unemployed, a 7.3 percent rate of unemployment.

The medium household income for Hood River County is about seven percent below the average for the state of Oregon. The City of Cascade Locks will complete a medium income survey in the fall of 2004.

County and State Median Household Income: 2000

State and County	Estimate	90% Confidence Interval
Oregon	\$41,662	\$39,856 to \$43,468
Hood River County	\$38,916	\$36,099 to \$41,953

The average annual wage in Hood River in Hood River County was \$22,600 in 2002 as compared with 33,685 for the state of Oregon. A recent income survey in the city showed that more than 50 percent of Cascade Locks residents fall in the low to moderate income category.

Forty-eight percent of Cascade Locks students were on the free and reduced lunch program in 2003 as compared with 39% statewide in 2003. The 2004 student population in Cascade Locks is 80% of the 2002 population.

Housing

There were 949 homes existing in Cascade Locks in the year 2000, of these 315 (66 %) were one-unit dwellings and 109 were mobile homes. A total of 327 or 69 percent of the homes existing in the year 2000 were built before 1980. From 1990 to 2000 there were 100 new homes constructed, or an average of 10 per year.

The fact that so many of the homes existing in the City of Cascade Locks were constructed before 1980 is significant. Vegetation around homes and in vacant parcels has grown significantly over the past 25 to 30 years. Vegetation is typically smaller in size with newer homes as compared with more established residents. Landscaping generally occurs with construction and after 25 or 30 years it often has grown significantly. The result for many parcels is a much heavier fuel load today than what existed during the time of construction.

Fire Occurrence History

The number of fire related incidences reported for the Cascade locks Fire Department varies from year-to-year. Recorded incidences are supposed to be sent to the State Fire Marshall's Office each year. The following number of incidences reported for Cascade Locks are taken from the Fire Marshall's annual reports from 1998 to 2003. It appears that incidence reports for the years 2000 and 2003 are incomplete.

Number of incidences reported by year for the Cascade Locks Fire Department

Year	Total Reportable Fires	Total Rescue	Total Mutual Aid	All Other Incidences	Total Incidences Reported	Fire as % of Incidences
2003	3	0	0	0	3	100
2002	8	16	0	4	28	28.5
2001	7	36	0	15	58	12.1
2000	4	0	0	2	6	66.6
1999	0	0	16	0	16	0
1998	3	14	0	73	90	3.3

Fire Protection

Cascade Locks has a volunteer fire and emergency services department with a total of 21 members. The Fire Chief position is paid part-time position. The department has mutual aid agreements with the Oregon Department of Forestry and several communities: Stevenson, Carson, North Bonneville, Hood River, and Corbett.

The City of Cascade Locks has a Fire Protection Classification Rating of five. The classification system is from one to ten with a one being the best rating and having the

lowest premium rates. To receive a rating of five, a residence must be within five miles of the fire department and within 1000 feet of a fire hydrant.

IV. Wildfire Hazard Assessment

Wildfire hazard conditions on an area-wide basis were mapped and rated as low, moderate, or high within the planning area (see Appendix D). Criteria for the ratings were mainly fuel type, arrangement, volume, condition and location. Slope, aspect and wind are other factors affecting wildfire ignition and resistance to control and are discussed in this section as well. Ratings were mapped on a large scale basis and within each rated area there are likely to be some enclaves that do not necessarily conform to the overall rating for the area. For example, an area rated as moderate may likely have some portion of it that would be considered as low or high. It would not have been practical or useful to map all of these smaller areas as individual units.

A wildfire risk rating for individual parcels with homes on them was also assigned using National Fire Protection Association (NFPA) 299 criteria (Appendix E). Parcels were rated as low, moderate, high or extreme. Criteria for assigning ratings included access, defensible space, and construction materials. A complete list of the criteria is in Appendix C. The risk rating for individual parcels is an indication of the survivability of the home during a wildfire event threatening it. Importantly, ratings of individual parcels do not necessarily conform to the hazard rating for the area within which it is located. As an example, an individual home may have a high risk rating but be located within a moderate wildfire hazard area.

Low Wildfire Hazard Areas (55 acres or 3.1%)

Five small areas making up 3.1 percent of the planning area (55 acres) were mapped as having a low wildfire hazard rating. These areas have a low incidence of trees and/or brush vegetation and are located on slopes of less than ten percent. Much of the 55 acres is made up of parking lots or has irrigated lawns. One area is residential containing 20 parcels with homes on them. Of the 20 individual parcels, eight were rated as low and 12 as moderate hazard ratings; none were rated as high. Areas rated as a low wildfire hazard risk would be expected to have a high chance of survivability during a wildfire situation.

Moderate Wildfire Hazard Areas (424 acres or 29.6%)

Moderate hazard areas contain more vegetation in the form of brush and trees as compared with low hazard areas, but less when compared with areas rated as high. Generally speaking, moderate rated areas tend to have patches of trees rather than large blocks of them as seen in the high rated areas. The downtown commercial zone and most, but not all, of the residential areas with the city have been rated as moderate. Also included as moderate is the Port of Cascade Locks industrial property. Properties located within moderate rated areas would stand a better chance of surviving a wildfire situation, but would be more susceptible to fire damage when compared to areas rated as low.

Some of the area rated as moderate was burned during the September, 2003 wildfire. Much of this burned area currently has standing dead trees. The wildfire hazard was reduced as result of the wildfire because much of the available fuel was burned.

However, as the dead trees weaken and begin to fall, and brush grows up, the wildfire hazard will gradually increase. It is expected that the wildfire hazard will be high on a good portion of this burned area in five to ten years, unless action is taken to remove the dead material.

High Wildfire Hazard Areas (951 acres or 67.3%)

Areas rated as high make up slightly more than two-thirds of the planning area. These are generally large and continuous blocks of mature forested lands with large trees and in places, heavy under brush. The area south of I-84 is almost all rated as a high wildfire hazard. In addition to heavy fuel loads, much of this area has steep slopes adding to the potential for wildfires which would be difficult to control and could threaten Cascade Locks. The southern boundary of the city adjoins the Mt. Hood National Forest which also has heavy fuel loads adding to the potential for future problems. This portion of the National Forest is a part of the Columbia River Gorge National Scenic Area (CRGNSA) and zoned as a Special Management Area with strong limitations on vegetative management.

East of the downtown portion of Cascade Locks is the Herman Creek drainage running in a south to north direction and leading into the Columbia River. Much of this drainage area has a heavy fuel load, although it was modified and reduced somewhat during the 2003 wildfire.

Portions of the area burned in the 2003 wildfire are rated as a high wildfire hazard. While the fire did reduce the fuel loads over most of the area burned, this reduction should be considered temporary in nature. Unless the fire-killed trees are removed soon, the wildfire hazard level will increase during the next five to ten years as the trees deteriorate and fall down creating a heavy surface fuel situation. Even standing dead trees pose a serious wildfire hazard since they represent a significant fuel load and are prone to cause spotting during a wildfire.



Fire-killed trees (2003 wildfire) within the city limits.

The Union Pacific Railroad runs the entire length of the city and makes up its northern boundary for most of the way. The railroad right of way (ROW) is rated as a high wildfire hazard area for its entire length, with the exception of about one-half mile along the marina. The railroad ROW has heavy brush and/or trees for most of its length within the planning area. In some areas, branches from adjacent trees actually hang over the rails. Also, there are piles of old railroad ties left along the ROW in places. On some portions of the rail line there is no access road for firefighting vehicles. The railroad does some vegetative management to reduce wildfire hazards, but serious wildfire hazards continue to exist.



Discarded railroad ties along the railroad ROW.

Some residential developments are located within high wildfire rated areas. The development along Jackson Roberts Road/Lucy Lane is of particular concern as is the small development on Sadie Avenue. The fuel loads in the Mountain View Drive area were reduced in the 2003 wildfire but fuel loads could become more of a concern if the dead wood is not treated. All of the developments mentioned above have but one means of ingress and egress causing an extra concern during a wildfire situation.

The wood processing plant at the east end of the city has large sawdust piles which would be a serious problem if they were to catch on fire. The piles are located close to the railroad ROW and there is a large propane tank between the ROW and the piles adding to the hazard.



Propane tank next to railroad and sawdust piles.

In summary, the downtown and residential area of Cascade Locks is nearly surrounded by areas considered to have a high wildfire hazard rating. This high rating is the result of heavy fuel loads and in some cases, steep slopes. These conditions have created a hazardous situation for residents of Cascade Locks and their property.

Hazard Ratings for Individual Homes

As part of the assessment of wildfire hazards within the planning area, individual homes and their surroundings were surveyed and rated using NFPA 299 criteria. The main rating criteria involved the amount and type of vegetation around the residence, access options, and the type of construction materials making up the house. A complete list of the rating criteria is in Appendix C.

The results of the survey are as follows:

- A total of the 434 parcels with homes were surveyed.
- Of the homes surveyed, 130 (30%) were considered to have a low wildfire hazard rating. Those dwellings with a low rating generally have a good defensible space around them, are made of fire resistant material, and have good options for ingress and egress.
- One hundred seventy five homes (40%) were rated as moderate. Homes considered as a moderate risk have some degree of resistance to wildfires but still need work to reach a low wildfire hazard rating. In many instances, work required to make them a low hazard is minor and could be done relatively inexpensively and quickly. For example, some homes may only need the trimming or removal of a few plants or trees.
- One hundred twenty eight homes (30%) were in a high hazard category, and one had an extreme rating. Homes in the high hazard category have a serious

need for action to reduce the potential for loss during a wildfire situation. Generally, homeowners would have to modify the vegetation within a given distance of their home to provide a defensible space allowing firefighters an opportunity to protect the dwelling during a wildfire. Other needs involve altering home construction material and vehicular access options to help move the parcel from a high to a moderate or low rating. Each home situation is different and may involve a different approach to reduce the wildfire hazard rating.

As previously noted, the low, moderate, high, or extreme rating assigned to individual homes/parcels is somewhat independent of the low, moderate rating for an area. In some cases such as the Riverview Drive area which has a low wildfire hazard rating, the individual homes are all rated as either low or moderate as to their risk during a wildfire. In other situations such as in the Ruckel Street area rated as moderate, there is a mixture of low, moderate, and high rated individual homes/parcels. Generally, homes located within low rated areas are in a low to moderate rating, but that does not always hold true.

The following table illustrates how the individual home ratings fell within the area ratings:

Hazard rating comparison

Individual Home Rating	# Homes in Low Hazard Area	# Homes in Moderate Hazard Area	# Homes in High Hazard Area	Total Homes
Low	16	113	1	130
Moderate	8	141	26	175
High	0	97	31	128
Extreme	0	0	1	1
Total	24	351	59	434



High wildfire hazard home in Cascade Locks.

Slope

The rate of wildfire spread becomes faster as the percent of slope increases.² It is estimated that the rate of spread is twice as fast on a 30 percent slope as compared with a level surface. Combustion is accelerated on steep slopes because of increased heat transfer through radiation and convection.³ Fuels on the upslope side of a fire are warmed faster through radiant energy since they are closer to the source of heat. Additionally, these fuels are heated by convection currents which tend to raise upslope because of their lighter weight.

Much of the area within the planning boundary is located on slopes of 20 percent or less. This includes most of the area east of Edgewood Street and north of I-84 to almost Government Island. Exceptions within the area include the zone along the railroad ROW, the Herman Creek drainage and portions of the Riverview Drive Neighborhood. Slopes in the downtown portion of the city west of Edgewood Street range from less than 10 to more than 30 percent. The steeper slopes are mainly in the western portion of the downtown area.

² Davis, Kenneth Pickett. 1959. Forest fire control and use. McGraw-Hill Book Co. New York. 584 pps.

³ Barrows, J.S. 1951. Fire behavior in northern Rocky Mountain forests. Northern Rocky Mountain Forest and Range Experiment Station. Station Paper No. 29. USDA Forest Service. Missoula, Montana. 103 pp.

Much of the planning area south of I-84 has slopes exceeding 30 percent. Exceptions are John Quincy Court east to the state weight station and the area around the Herman Creek drainage. The steeper slope areas are coupled with heavy fuels helping to account for the high wildfire hazard for much of the area south of I-84.

Wind

While wind does not fit within the definition of a wildfire hazard, it is an element which must be factored in the consideration of wildfire behavior in the planning area. Increased wind velocity, like increased percent slope, accelerates wildfire rate of spread. Like slope, the rate of fire spread increases as the wind speed increases. This effect is attributed to three factors. First, wind induces a forward lean of the flame front, which reduces the distance between the flame and un-ignited fuel. Second, increased wind speed increases the rate of convective heat transfer between the heated air and the un-ignited fuel particles. Third, wind passing through the interior of the fuel bed speeds the loss of moisture in the fuel particles, reducing the energy required for ignition. All of these effects are greatest in the prevailing direction that the wind is blowing.⁴

The planning area is strongly affected by wind during much of the wildfire season. During the summer strong westerly winds from 15 to 30 mph are typical. These winds are produced by pressure gradients between cooler coastal marine air and the hot, dry desert air east of the planning area. Winds tend to be strongest in the afternoon hours when temperatures are highest and vegetation has its lowest moisture content adding to the potential for large and fast moving wildfires.

In the fall and winter, easterly winds are more common and can affect fire behavior as well. While temperatures are generally cooler during this time of the year, much of the vegetation has cured, increasing the ease of ignition. Easterly winds have been an important factor affecting the rate of wildfire spread on many wildfires in the gorge in recent years. The large and fast moving wildfire affecting Cascade Locks in September of 2003 was driven by east winds.

Aspect

In general, south-facing slopes receive more direct sunlight throughout the day in comparison to north-facing slopes. The ambient fuel temperature on a southwest-facing slope will be significantly higher in the late afternoon because of the increased radiant solar energy received by fuels at these aspects. As a result, fuel particles on southwest-facing slopes are at an elevated temperature and require less energy to be raised to their ignition temperature.

Most of the planning area south of I-84 is on a north facing aspect and does not receive the direct sunlight as lands would experience on a south facing aspect. Therefore, temperatures tend to be somewhat cooler on these heavy fuel load areas. Aspect is not a strong factor affecting fuel temperatures on much of the planning area north of I-84 as result of the more level ground conditions there. However, some smaller zones within

⁴ Morais, Marco. Fire Behavior Variables, 2001.
www.physics.ucsb.edu/~complex/research/hfire/fbehave/fbehave/_variable.html.

this larger area are on more of a north facing aspect and do experience cooler conditions during the day. These north facing zones tend to have heavier fuel conditions.

Summary

The planning area contains significant wildfire hazards in the form of large blocks of heavy forest fuels, lighter brush and grass areas (flash fuels), and landscape-type vegetation around homes. In many cases these hazards are in close proximity to occupied homes presenting a serious threat in the event of a wildfire. Wildfire hazards areas are mapped and rated as low, moderate, and high on the community planning map (Appendix D): few areas with a low rating exist. Wind is a strong factor affecting fire behavior during the summer as well as, the fall and winter months. Slope also influences wildfire behavior on a portion of the planning but aspect is not a strong factor.

V. Wildfire Risk

Wildfire risk refers to the chance of a wildfire starting. It is determined by the presence and activity of causative agents. For the planning area, the causative agents are primarily: the railroad, I-84, power-lines, fireworks, lightning, debris burning, discarded cigarettes, and house fires.

Railroad

The Union Pacific (UP) Railroad runs the length of the northern boundary of the planning area paralleling, and for most of the distance, adjacent to the Columbia River. This busy railroad has the potential of starting a wildfire which could spread outside the railroad ROW and affect homes and residents in the planning area. Railroad maintenance activities, especially track grinding, has a high potential for starting fires. The railroad has taken steps to decrease the number of fires from maintenance activities including the use of herbicides and a track mounted water tanker which they keep in the vicinity of maintenance activities. However, during periods of high winds, hot temperatures, and dry conditions, there is still a strong potential for a railroad ignited wildfire. Railroad officials have expressed an interest in working with the City of Cascade Locks in a wildfire prevention effort.

The UP has a Fire Prevention Plan which addresses fire prevention procedures for rail grinding, in-track welding, open-flame rail heating, and brush cutting operations. Workers are required to have certain fire fighting tools and water available during these operations, especially during periods of high fire danger. Rail grinding is usually scheduled for periods outside of the usual high fire danger periods but these schedules can be disrupted for various reasons.

The railroad annually treats vegetation along the ROW for fire prevention purposes. A combination of herbicide and pre-emergence sprays are used along with mechanical removal of vegetation. The railroad is somewhat limited in the type, amount, and timing of chemical spray use because of environmental concerns.

Interstate 84

This busy roadway is considered a high risk factor for wildfire starts. Risk factors include vehicle accidents and discarded cigarettes. An accident involving a burning

vehicle could easily start a fire in the grass and brush along the highway ROW which could spread into nearby areas with heavy fuel conditions. There is only a short distance between the driving surface and adjacent vegetation. One positive factor is that drivers are not allowed to stop along the interstate, except for emergency purposes. This factor reduces the chance of drivers starting a fire while taking a break along the roadway. Another risk factor involves maintenance activities by ODOT. The agency annually mows grass along the ROW and this activity could start a fire if the mowing blade were to strike a rock or metal object. ODOT does require a vehicle with water to follow the mowing operation during high fire danger periods.



I-84 looking east.

Fireworks

The use of fireworks can quickly lead to the ignition of a wildfire within the planning area. Oregon restricts the type of fireworks allowed but there is not a seasonal prohibition as in some areas in the state of Washington. Fireworks that explode, fly, or behave in an uncontrolled manner may not be sold in Oregon. However, illegal use of fireworks still occurs occasionally and is considered a serious wildfire risk factor. Fireworks illegal in Oregon are readily available across the Columbia River in Washington. A person choosing to use these illegal fireworks will likely select a more remote location which may have a high wildfire hazard situation.

Persons possessing illegal fireworks in the city of Cascade Locks could be cited under a city ordinance. In most situations, illegal fireworks discovered in the city are just confiscated unless their use results in a fire.⁵

⁵ Conversation with Cascade Locks Fire Chief, 10-12-04.

Power lines

There are city and BPA electrical power lines within the planning area and branches or trees falling on them could ignite a wildfire. The large wildfire which affected the city in September of 2003 started as a result of a tree falling on a power line. There is also potential for a wildfire start from a vehicle accident striking a power line.

Lightning

Lightning could potentially ignite a wildfire in the planning area, although this has not been a major factor in recent years. There is no way to predict where a lightning strike might occur. Fortunately, most of the lightning that does occur in the planning area is connected with rain events, as contrasted with “dry” lightning which is a much bigger problem. Also, because the planning area is fairly heavily populated thought-out, a lightning strike would most likely be noticed and reported quickly.

Debris Burning

Open burning is allowed during daylight hours in Cascade Locks, unless a closure order is issued by the State Department of Forestry. Open burning is typically restricted during periods of high fire danger. The Cascade Locks Fire Chief coordinates with the state on open burning bans. Debris burning in open barrels is allowed outside of closure periods.

Discarded Cigarettes

Cigarettes, tossed from a moving vehicle, are a potential source of wildfire ignition in Cascade Locks. There are many miles of roads within the planning areas so this risk factor could come into play almost anywhere. The potential may be greatest in the more rural portions of the planning area where there is no curb and gutter or sidewalks to act as a fire barrier.

House Fires

House fires could easily be an ignition source for a wildfire in the planning area. Fires which get a good start in a house can easily sent firebrands onto nearby vegetation. Some residents in Cascade Locks rely on wood burning stoves for heat and a chimney fire is another source of firebrands. This risk factor is more of a problem in the rural portions of the planning area because of the higher fuel loads present.

Other Risk Factors

There are other risk factors to consider in addition to the major ones discussed above. Forest fires beginning outside of the planning area could spread into the area. Fire caused by an arsonist is a risk factor as is children playing with matches. Although unlikely, an airplane crash could occur resulting in a wildfire situation.

Summary

There are numerous risk factors presenting the potential for wildfire ignition within the planning area including: railroad related activities, vehicle accidents, house fires, fireworks, lightning, power lines, debris burning and discarded cigarettes.

VI Emergency Preparedness

Hood River County Emergency Management

The Hood River County Hazard Identification and Vulnerability Analysis identifies hazards posing a threat to Hood River County. Adjective descriptors (High, Moderate, Low) are established for each identified hazard's probability and vulnerability. Probability is the likelihood of occurrence within a specified time period and vulnerability refers to the percentage of population and property likely to be affected. An overall risk rating is assigned based on a subjective estimate based a combination of probability and vulnerability. The risk rating is assigned on the probability of a hazard occurring over the next 50 years. The intent is to focus the emergency management program on the hazards of greatest risk.

The plan identifies wildfire in Hood River County as having a high probability of occurrence with a moderate vulnerability rating. The combination of these two ratings results in a high risk rating assignment. Some conclusions reached in the plan include:

- People start the vast majority of forest fires. Prevention, education, and enforcement programs can significantly reduce the number of forest fires.

- Early detection and emergency communications are essential.

- A warning system with an evacuation plan showing primary and secondary escape routes is important.

- Fire safe development planning and wildfire mitigation strategy should be done by local jurisdictions and should address;

 - Fuel-free areas around structures,

 - Fire resistant roofing materials,

 - Adequate two way routes and turnarounds for emergency response units,

 - Water supplies and backup power generation equipment,

 - Local ordinances to control human-caused fires; i.e. debris burning, fireworks, campfires, etc.

- Home addresses must be visible to first responders.

- Adequate escape routes must be available.

Creating a Defensible Space

In the event of a major wildfire, there may not be enough firefighting resources available to defend every threatened home. In this case, firefighters would make decisions about which homes they can safely and effectively protect. Homes with dense vegetation, highly combustible building materials, and, or, limited access may be lower priority for protection. Homes with an effective defensible space and non-combustible roofs are many times more likely to survive a wildfire. Under extreme conditions, almost any house can burn. But having a defensible space will significantly improve the odds of a home surviving a wildfire. The most important person in protecting a house from

wildfire is the homeowner and actions taken by them before a wildfire occurs (such as creating a defensible space) is critical.

Defensible space is the area between a home and an oncoming wildfire where vegetation has been modified to reduce the wildfire threat and to provide an opportunity for firefighters to effectively defend the house.⁶ Nearby vegetation can greatly influence the survivability of a home in a wildfire situation. All vegetation is potential fuel for a wildfire. Properly modified and maintained vegetation can slow the spread of a wildfire, keep flame lengths low, and reduce the level of heat, all of which allow firefighters a better opportunity to protect a nearby structure.

The optimum size of each home-owner's defensible space depends on the type of vegetation growing near the house and the steepness of the terrain. It varies from about 30 feet to as much as 200 feet. On flat to gently sloping ground surrounded by mainly grass, the recommended defensible space is 30 feet. In situations with very steep slopes (more than 40 percent) and surrounded by heavy forest vegetation, a 200 foot defensible space may be needed. Homeowners should seek assistance from their local fire department or the Oregon Department of Forestry (ODF) to help determine a proper defensible space for their particular situation. The "Living with Fire" guide available from the ODF has a section called "Creating an Effective Defensible Space" which describes how landowners can create a defensible space on their property.

To create an effective wildfire barrier within their defensible space, a home-owner should modify and maintain vegetation in the following manner:

- Remove all dead vegetative material including: standing and down trees, shrubs, grasses, wildflowers, weeds, needles, leaves, branches, cones, firewood.
- Remove all, or most, live trees and shrubs within 30 feet of the home. Note: advice from the local fire department and, or, the WDNR is strongly recommended. Some trees may be retained or the 30 foot distance may have to be increased, depending on slope and vegetative conditions.
- Wildfire threat is directly related to the density and continuity of vegetation. Homeowners can decrease their wildfire risk by providing cleared space between plants.
- Use fire resistive, high moisture content varieties of vegetation for landscaping. All plants will burn under extreme fire weather conditions such as drought. However, plants burn at different intensities and rates of consumption. "Fire-resistive" plants burn at a relatively low intensity with slow rates of spread and short flame lengths. Plants that ignite readily and burn intensely are "fire-prone" plants. Favor low growing herbaceous plants (non-woody) including grass, clover, groundcover, bedding plants, perennial flowers, and conservation grasses. Emphasize the use of rock, concrete sidewalks, brick patios, and asphalt driveways. Favor short deciduous shrubs

⁶ Living With Fire, A Guide for Homeowners. Pacific Northwest Wildfire Coordinating Group

and trees over coniferous trees. Avoid juniper, arborvitae, mugo pine and tall exotic grasses. See Appendix B for a detailed list of fire resistant and fire prone plants and their characteristics.

- Remove or thin overcrowded or weakened trees beyond the 30 foot distance from the home and up to 200 feet away depending on slope and vegetative conditions. Work with adjacent neighbors if necessary to get proper spacing from affected homes. Prune lower branches (6-10 feet above ground or 1/3 height of smaller trees) to keep ground fires from reaching upper branches.
- Stack wood, construction debris, and other flammable materials at least 30 feet away from your home. Keep flammable vegetation 10 feet away from woodpiles.
- Clean pine needles, leaves and debris from roof, gutters, decks and yard. Clean up after storms. This is especially important during the dry summer months when a single spark can ignite a fire.
- Dispose of cuttings and debris material promptly. Consider alternative disposal methods like composting or recycling to get rid of yard and garden debris.
- Do not keep combustible material under decks or elevated porches. Make trellises of non-combustible material.
- Keep lawn area mowed, watered and green. Maintain irrigation system in good working order. Consider establishing an alternative water source, pump and power source for fire suppression purposes.
- Remove tree branches within 15 feet of a chimney.
- Design driveways and walkways to serve as fuel breaks.
- Annually maintain vegetative modifications to keep defensible space effective.
- When conducting open burning with barrels (where allowed and with proper burning permits) clear flammable material at least 10 feet around the barrel and cover the top with a screen (1/4 inch or smaller mesh).

Structural

While no man-made structure should be considered “fire proof”, fire resistive home construction materials can greatly decrease the chance of a wildfire starting a house on fire. The following should be considered during new home construction, or during remodeling or maintenance activities:

- The roof is the most vulnerable part of a house in a wildfire situation. Wooden shake roofs should be replaced with a class C or better fire resistant roof as soon as possible. Treating wooden shake roofs offers some level of protection, but the benefit is typically short-lived.

- With new home construction, use fire resistive or non-combustible material for sidings, roofs, and decks. Siding materials which resist heat and flames include cement, plaster, stucco, and concrete masonry such as stone, brick, or block.
- Exposure to heat can cause windows to fracture and collapse providing an opening for flames or firebrands to enter and ignite the interior of a structure. Glass products that can withstand convective and radiant heat will reduce this risk. Tempered glass can withstand much higher temperatures than plate glass and is recommended for large windows, especially if they overlook steep or heavy vegetation. Double pane glass is slightly more resistant to heat than single pane glass.
- Homes must have smoke detectors and should have fire extinguishers. Sprinkler systems in the home provide an extra level of protection.
- Keep garden tools like rakes, hoses and shovels easily accessible. Make sure everyone in your home knows where this equipment is, and how to call for help in the event of an emergency.
- Maintain at least two ground-level doors as safety exits. Each room should have two means of escape via a door or window combination.
- Prevent sparks from entering the house by covering vents with wire mesh (maximum of 1/8" openings).
- Enclose overhanging eaves and decks.
- Maintain spark arresters on chimneys.
- Locate butane and propane tanks at least 30 feet from any structure and provide 10 feet of clearance around them.
- Locate new homes at least 30 feet from all property lines to assure the opportunity to develop and maintain an effective defensible space. Build away from ridge tops, canyons, and areas between high points on a ridge.
- For homes with their own wells, maintain an emergency generator to operate the pump during a power failure.
- Make sure electric service lines, fuse boxes and circuit breakers are installed and maintained according to code. Have qualified service people perform electrical maintenance and repairs.
- Bridges should be constructed to support the weight of emergency vehicles.

Access

- Maintain at least two means of ingress and egress (each with two-way traffic) for emergency purposes.
- Identify at least two emergency exit routes from the neighborhood.

- Identify dead-end roads and weight and height restrictions with clear signs. Provide wide areas at the end of dead-end roads to allow emergency vehicles to turn around. Construct turnouts along one-way roads.
- Assure driveway access is wide enough for emergency vehicles and with ample room for turnarounds.
- Clear flammable material at least 10 feet from roads and five feet from driveways. Remove overhanging branches above roads.
- Mark houses and driveways with house numbers clearly visible from the road. Assure streets are named and marked with clear signs at each intersection.

Safety Zones

Safety zones are pre-arranged areas where persons threatened by wildfire can meet and safely wait until the fire emergency passes. Such areas must have more than one high standard access road and ideally have adequate parking for vehicles, an indoor meeting place, bathrooms, and access to telephones and, or, computers with internet access.

The Weighmaster Station along I-84 may offer the best option for a safety zone in Cascade Locks. Other options are the Cascade Locks School and the Port's Marina Headquarters. However, the school is in close proximity to heavy fuels to the east and access to the marina is limited.



Oregon Department of Transportation Weight-Master Station.

Evacuation Routes

During a wildfire emergency, an incidence command organization would be assembled to manage the fire. The Incident Commander would make the decision to evacuate residents if it were necessary from a safety standpoint. The Incident Commander and his/her staff would coordinate with the Hood River County Sheriff's Office to determine evacuation routes, should they be needed. The Sheriff's department would carry out the evacuation process. It is not possible to predetermine evacuation routes because every wildfire situation will be different and require decisions based on the particular situation. Evacuation routes would depend on the origin of the fire, the direction the fire is advancing, fire behavior, wind conditions, time of day, etc. Some points to consider regardless of the fire situation:

- During a large wildfire, some roads including I-84 may be closed to accommodate fire fighting equipment.
- WaNaPa and Forest Lane are the primary access routes serving residents within the city. I-84 is the logical, and may be the only, means to get people out of the city.
- Evacuation of residents across the Bridge of the Gods to the Stevenson, Washington area may be considered during situations with a wildfire in the eastern portion of the city. Evacuation to the Hood River area may be a consideration with a wildfire in the western portion of the city.
- As a last resort, the Sternwheeler at the Marine Park may be a means of leaving the city if all escape routes were closed.

Fire Assistance Agreements

The Cascade Locks Fire Department has mutual aid agreements with several communities: Stevenson, Carson, North Bonneville, Hood River, and Corbett. Depending on the type of fire and severity, these departments will respond and assist the Cascade Locks Fire Department and vice-versa. The USDA Forest Service and the Oregon Department of Forestry will also assist if the lands they protect are threatened. During the September 2003 wildfire which threatened the city, fire departments from Portland actually came to help.

Response Capability

Cascade Locks has a volunteer fire and emergency services department with a total of 21 members. Of the 21 members, six are from the Dotson-Warrendale area. The Fire Chief position is paid part-time position. The department has mutual aid agreements with several communities: Stevenson, Carson, North Bonneville, Hood River, and Corbett.

The department has two type 1 engines and one type-6 brush vehicle. One type-1 engine has a 1,000 gallon and the second has 1,250 gallon capacity. The brush vehicle is stored at Dotson-Warrendale. The department would like to have another brush vehicle for Cascade Locks and a tanker. Presently, there would not be space to store an extra vehicle in the fire department building. There is a real need to construct a new Emergency Services building to house fire department equipment.

Water for firefighting purposes is an issue in portions of Cascade Locks. Water pressure in the west end of the city is inadequate and needs to be improved.

Developing a Personal Emergency Plan for Wildfire Protection⁷

The following checklist may be used to help develop a personal Emergency Wildfire Plan. Residents should ask their local fire department officials for advice and discuss with neighbors about tools, equipment and other resources they could share in an emergency.

Elements of Plan

- Evacuation Plan. Early evacuation is the safest way to avoid injury or death. Timing and other factors can vary so widely that each household needs its own specific plan, including options to cover anything that might happen.
- Escape Routes. Normal and alternate escape routes.
- Safety Zones. Locations of and routes to large areas with little or no vegetation or other fuels where family members can wait out the fire if it is too late to evacuate.
- Communication. Pre-arrange normal and alternate ways to stay in touch with family members, even if phones are out. Family members might "check in" with a friend or relative in another area as soon as they are able.
- Assignments. Who is to do what when in an emergency.

Provide Equipment

- Hoses. Pre-connected to faucets.
- Ladder. Long enough to reach the roof easily.
- Fire Extinguishers. One or more 5-pound multipurpose type, readily available.
- Protective Clothing. For anyone who is unable to evacuate before the fire arrives. This includes a cotton long-sleeved shirt or jacket and trousers, a handkerchief to provide minimum protection for the lungs (avoid inhaling smoke or hot gases!), leather boots, gloves, a helmet or other head covering and goggles. Cotton clothing is a "must." Synthetic fabrics can melt onto your skin.

⁷ FEMA Region VIII, Living in Wildfire Hazard Areas, 2003
(<http://www.fema.gov/regions/viii/livingwithfire.shtml>)

When Caught in Wildfire

If you see a wildfire, call 911. Don't assume that someone else has already called. Describe the location of the fire, speak slowly and clearly, and answer any questions asked by the dispatcher.

Before the Fire Approaches Your House

- Evacuate. Evacuate your pets and all family members who are not essential to preparing the home. Anyone with medical or physical limitations and the young and the elderly should be evacuated immediately.
- Wear Protective Clothing.
- Remove Combustibles. Clear items that will burn from around the house, including wood piles, lawn furniture, barbecue grills, tarp coverings, etc. Move them outside of your defensible space.
- Close/Protect Openings. Close outside attic, eaves and basement vents, windows, doors, pet doors, etc. Remove flammable drapes and curtains. Close all shutters, blinds or heavy non-combustible window coverings to reduce radiant heat.
- Close Inside Doors/Open Damper. Close doors inside the house to prevent draft. Open the damper on your fireplace, but close the fireplace screen.
- Shut Off Gas. Shut off any natural gas, propane or fuel oil supplies at the source.
- Water. Connect garden hoses. Fill any pools, hot tubs, garbage cans, tubs or other large containers with water.
- Pumps. If you have gas-powered pumps for water, make sure they are fueled and ready.
- Ladder. Place a ladder against the house in clear view.
- Car. Back your car into the driveway and roll up the windows.
- Garage Doors. Disconnect any automatic garage door openers so that doors can still be opened by hand if the power goes out. Close all garage doors.
- Valuables. Place valuable papers, mementos and anything "you can't live without" inside the car in the garage, ready for quick departure. Any pets still with you should also be put in the car.

Preparing to Leave

- Lights. Turn on outside lights and leave a light on in every room to make the house more visible in heavy smoke.

- Do Not Lock Up. Leave doors and windows closed but unlocked. It may be necessary for firefighters to gain quick entry into your home to fight fire. The entire area will be isolated and patrolled by sheriff's deputies or police.

Survival in a Vehicle

- This is dangerous and should only be done in an emergency, but you can survive a firestorm if you stay in your car. It is much less dangerous than trying to run from a fire on foot.
- Roll up windows and close air vents. Drive slowly with headlights on. Watch for other vehicles and pedestrians. Avoid driving through heavy smoke.
- If you have to stop, park away from the heaviest trees and brush. Turn headlights on and ignition off. Roll up windows and close air vents.
- Get on the floor and cover up with a blanket or coat.
- Stay in the vehicle until the main fire passes.
- Stay in the car. Do not run! Engine may stall and not restart. Air currents may rock the car. Some smoke and sparks may enter the vehicle. Temperature inside will increase. Metal gas tanks and containers rarely explode.

If You Are Trapped at Home

Stay calm. As the fire front approaches, go inside the house. You can survive inside. The fire will pass before your house burns down.

After the Fire Passes

- Check the roof immediately. Put out any roof fires, sparks or embers. Check the attic for hidden burning sparks.
- If you have a fire, get your neighbors to help fight it.
- The water you put into your pool or hot tub and other containers will come in handy now. If the power is out, try connecting a hose to the outlet on your water heater.
- For several hours after the fire, maintain a "fire watch." Re-check for smoke and sparks throughout the house.

If Caught in the Open

- The best temporary shelter is in a sparse fuel area. On a steep mountainside, the back side is safer. Avoid canyons, natural "chimneys" and saddles.

- If a road is nearby, lie face down along the road cut or in the ditch on the uphill side. Cover yourself with anything that will shield you from the fire's heat.
- If hiking in the back country, seek a depression with sparse fuel. Clear fuel away from the area while the fire is approaching and then lie face down in the depression and cover yourself. Stay down until after the fire passes!

VII. Action items

The following projects are intended to reduce the potential for a large and devastating wildfire in the planning area. The projects could be implemented individually, or in any combination thereof, depending on available resources.

Project: Establish a city-wide Wildfire Protection Council – High Priority

City leaders will appoint a community based committee to oversee and provide leadership in the implementation of Wildfire Protection Plan projects. The committee will look for ways to keep interest and enthusiasm high for reducing wildfire hazards within the city. They will identify project priorities and seek funding in the form of grants to help achieve projects which cannot be accomplished by individual home owners. The committee will identify and utilize Firewise experts who can assist the local fire department in giving advice to homeowners as to the development of defensible space on their property and how to use fire resistant building material to make their homes more fire safe. Ideally, the committee should have representatives from the local fire department, Oregon Department of Forestry, City Council, Port of Cascade Locks, ODOT, Forest Service, Cascade Locks School and interested citizens. Information gathered as part of the assessment of individual homes in Cascade Locks using NFPA 299 criteria will be available to help identify high priority parcels for the development of defensible space and the use of fire resistant building materials.

Project: Community-wide Wildfire Awareness Week – High Priority

Organize an annual Wildfire Awareness Week in Cascade Locks. Recruit “Neighborhood Captions” to assist with the promotion and implementation of the community campaign. Conduct Firewise programs for individual neighborhoods. Have local firemen visit homes and ask the homeowner to participate in the event and ask for a verbal commitment emphasizing their responsibility to do so. Combine this visit with an assessment of the home and recommendations to reduce wildfire hazards and to develop an effective defensible space. Emphasize the idea that the homeowner will be helping to reduce the risk of injury to firefighters who may have to defend their property. The city-owned television station is a good media to advertise the event.

Project: Establish a brush disposal site – High Priority

City leaders will work to establish a site where residents can bring woody material for disposal. The intent is to provide a site where residents can easily dispose of small trees and brush removed as part of establishing an effective defensible space around their homes. The material would either be chipped and bagged for use as mulch, or burned on site. This service will make it easier for many home-owners to dispose of woody materials and would reduce the risk of having the material burned on individual parcels

across the city. The disposal site should be located on a site large enough to accommodate a large volume of material. City leaders might approach Port of Cascade Locks officials to see if there would be an acceptable location on Port property for the site.

Project: Establish a demonstration project, or projects – Moderate Priority

City officials will establish one, or more, demonstration projects within the city to show how an effective defensible space can be created around a home-site. Before and after pictures will be taken. Homeowners who cannot afford to, or can't physically, do the hazard reduction work may present a good opportunity for such a project.

Project: Explore fire insurance incentives for hazard reduction efforts – Low Priority

Contact insurance companies at the local and state level to explore the possibility of incentives for home-owners who create an effective defensible space around their homes. Some car insurance companies offer discounts to clients who complete defensive driving courses. The same might be possible for fire insurance and wildfire hazard reduction efforts. Incentives may include rebates on fire resistant construction materials applied to homes as part of remodeling efforts.

Project: Produce Firewise type materials for Channel 23 – High Priority

The city of Cascade Locks owns and operates its own television station, Channel 23. This service is used by many residents and is an excellent means to provide information to city residents. The city will facilitate the development of a series of videos designed to show the importance of wildfire hazard removal, and how it can be accomplished. The videos should be short (5-10 minutes long) to keep viewers attention. They should be professionally done to hold viewers attention. They can be shown many times to assure everyone has an opportunity to experience them.

Project: Help homeowners who need assistance to become fire-safe– High Priority

Identify homeowners who desire to improve their defensible space around their homes, or who want to replace building construction material with more fire resistant material, but are unable to physically do the work and cannot afford to have it done. Seek ways to assist these homeowners in accomplishing their goals for making their homes more fire-safe.

Project: Railroad related hazards – High Priority

The city Wildfire Protection Council will work with the Union Pacific Railroad Track Maintenance Supervisor to accomplish the reduction of wildfire hazards connected with railroad operations.

Projects to work on include:

Reduce hazard fuels along the railroad ROW. The railroad has an annual vegetative maintenance program including the use of chemical sprays designed to discourage vegetative growth within the ROW. The effectiveness of the program varies from year-to-year. Higher priority needs to be placed on portions of the rail line that are

less accessible to fire fighting equipment and to those zones with heavy fuel loads on adjacent property.

Remove, or prune, conifer trees within the railroad ROW. Crown fires prone to long-range spotting are more likely to occur in conifer trees as compared with most deciduous trees. Pruning conifer trees reduces ladder fuels and the potential of a wildfire to carry from surface fuels into the crowns of trees. Some branches of conifers currently overhang the rails presenting the possibility of wildfire ignition by sparks from the exhaust of engines.

Remove discarded railroad ties from the ROW. Currently, there are numerous piles of old ties adjacent to the rail line. These ties are a serious wildfire hazard which could be easily ignited and provide a situation that would be difficult to suppress.

Require hazardous maintenance activities including rail grinding, in-track welding, open-flame rail heating, and brush cutting operations to occur only during periods of low potential for wildfire ignition. Explore options available to the city or county to mandate this type of scheduling.

Investigate the potential for providing an access route for firefighting vehicles where it does not presently exist.



Railroad near Dry Creek looking west.

Project: Dispose of fire-killed trees and brush – Moderate Priority

The September 2003 wildfire in Cascade Locks left large areas of fire-killed trees and brush. The wildfire may have initially reduced the overall fuel load in much of the burned area. However, as the fire-killed trees deteriorate and begin to fall down, surface fuel loads will increase and may present an even worse wildfire hazard. Fire-killed vegetation is easier to ignite and can burn with more extreme fire behavior as compared with live vegetation including some, or all, of the following: long flame lengths, high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. These conditions make wildfire suppression difficult and hazardous for fire fighters. Some of the fire-killed vegetation has been removed, but much remains to be treated. Portions of the remaining dead wood may be utilized as fire wood by city residents and this may be an incentive for getting it removed.



Example of fire-killed trees (2003 wildfire) being disposed of in Cascade Locks.

Project: Interstate 84 – Moderate Priority

Highway maintenance actions by ODOT offer opportunities to reduce wildfire hazards within their ROW. Some modifications of their practices may help reduce wildfire hazards:

Pruning: ODOT removes trees or prunes branches within the clear zone which is approximately 30 feet outside of the fog line. This clear zone is maintained for safety purposes in case a vehicle were to go off the highway surface. Pruning is only done on one side of the trees. ODOT will consider pruning trees on all sides within the city limits of Cascade Locks. This practice would help reduce ladder fuels and make suppression of fires ignited from highway activities more likely.

Project: Improve access for fire fighting equipment and escape routes – High Priority

Several neighborhoods within the city are served by only one means of ingress and egress. This presents a dangerous situation during a wildfire emergency and limits the options for getting fire fighting equipment in and out during a wildfire. During an emergency, people may panic and accidents could occur blocking the only means of escape. Also, a fast moving fire could block the only route out of danger.

Neighborhoods with only one means of ingress/egress include: Mountain View Drive, Lucy Lane, Sunset Avenue, Edgewood Avenue, John Quincy Court, Sadie. This list is not meant to be inclusive of all situations in the city with access problems. There are additional roads leading to just one or two homes as well such as the Jackson Roberts road, Gravel Road and the drive which leads across the Port of Cascade Locks property on the southwest end of the city.

Options should be explored for providing at least one additional means of access for these types of neighborhoods. In some cases, it may be possible to connect two or more of the neighborhoods to provide access options. This could be a part of the city’s transportation planning process. The City Wildfire Protection Council should encourage the city to conduct this type of study and could offer advice on priorities.

Project: Wildfire hazard reduction on adjacent National Forest System Lands – Moderate Priority

The city of Cascade Locks borders National Forest System lands for most of its southern boundary. These lands are part of the Mt. Hood National Forest and are included in the Columbia River Gorge National Scenic Area (CRGNSA). They have special provisions to protect scenic, natural, and other resources. The lands are forested with heavy fuel loads presenting a potential wildfire threat to the city.

The Healthy Forests Restoration Act (HFRA),⁸ provides administrative procedures for hazardous-fuel-reduction projects on National Forest System lands in Wildland Urban Interface (WUI) areas of communities considered “at-risk” from wildfire threats. The act encourages the development of Community Wildfire Protection Plans under which communities will designate their WUIs, and where HFRA fuel reduction projects may take place. Federal agencies and their State and local cooperators must be prepared to provide information and services to support these communities.

The City of Cascade Locks is a Community at Risk as listed in Federal Register.⁹ **National Forest System lands, for a distance of one and one-half miles south of the city’s southern boundary, should be considered a Wildland Urban Interface (WUI) as defined in the HFRA.** Further, the city has long standing water rights on Dry Creek from which it has relied for its domestic water source in past years and has plans to re-instate that use. The Dry Creek watershed is considered a watershed at risk from the threat of wildfire as defined in the Healthy Forest Restoration Act. Under provisions of

⁸ (Public law 108-148, 2003).

⁹ Federal Register/Vol 66, No. 160/Friday, August 17, 2001.

the Healthy Forests Restoration Act, the City of Cascade Locks should ask the Forest Service to conduct the following:

- Identify and map the fire regime and fire regime condition class, or classes, in the WUI and in the Dry Creek watershed.
- Assess the threat of a wildfire beginning on National Forest System lands to the City of Cascade Locks and the Dry Creek watershed.
- Assess the likely effects on water quality, sediment delivery, and water supply system infrastructure if a wildland fire occurs in or adjacent to the Dry Creek watershed. This assessment should be conducted at the appropriate scale for determining the risk that a wildland fire event may pose to the quality of the municipal water supply or to maintenance of the system.¹⁰
- Collaborate with the City of Cascade Locks to develop a long term program to reduce fuel loads and wildfire hazards on National Forest System lands within the WUI. Potential wildfire hazard reduction projects should include the removal of fire-killed trees from the 2003 wildfire and the creation of shaded fuel breaks within one-half mile of the National Forest System boundary.

Project: City Ordinance changes – Moderate Priority

The Cascade Locks City Council will review its city ordinances to see what changes should be made to help reduce wildfire hazards within the city. The City Council should consider the following as potential ordinance changes.

New Construction

- Require fire resistant roofing materials.
- Require vents and openings to be screened.
- Require decks to be screened or enclosed.
- Adopt recommended standards for fuel breaks, roads and driveways to meet the requirements of OAR 660-06-035, and OAR 66006-040 (see Oregon Department of Forestry, Land Use Planning Notes. Number 1, March 1991. These standards

¹⁰ The HFRA authorizes projects that reduce the risk wildland fires pose to the quality of a municipal water supply or to its maintenance. Specifically, in Sections 102(a)(2) and (3), the HFRA provides for expedited vegetation treatments on National Forest System lands in Condition Class 3 in all fire regimes and in Condition Class 2 in Fire Regimes I, II, or III that are: "... in such proximity to a municipal water supply system or a stream feeding such a system within a municipal watershed that a significant risk exists that a fire disturbance event would have adverse effects on the water quality of the municipal water supply or the maintenance of the system, including a risk to water quality posed by erosion following such a fire disturbance event."

address: fuel breaks, roads and driveways (widths, curve radius, vertical clearance, Cul-de-Sacs, bridges and culverts, grades, identification, turnouts, dead-end situations) and are outlined in Appendix D.

Existing Homes

- If feasible, locate woodpiles a minimum of 20 feet from any home or outbuilding.
- Require fire resistant material for the replacement of roofs.
- Require the clear posting of property address.

Project: Hazard fuel reduction south of I-84 – High Priority

Most of the land between I-84 and the National Forest boundary is heavily forested with mature conifers and scattered hardwoods with a brushy under story. Almost all of the area has a high wildfire hazard rating. Ownership is mainly private but there is some National Forest, City of Cascade Locks, Port of Cascade Locks, State Parks and ODOT lands. Over time, much of these lands will be developed for residential purposes which will tend to reduce the fuel load. However, there is presently a need to treat the fuel situation to reduce the potential for wildfires entering the city from the south. Landowners should be encouraged to thin their stands of timber and create shaded fuel breaks in an effort to break up the continuity of fuels. Opportunities for funding assistance to support these efforts should be made available to private landowners.

Project: Hazard fuel reduction along the BPA right-of way – High Priority

The city and the Forest Service should work in partnership with the BPA to reduce fuel levels on the BPA right-of-way. This right-of way strip could provide a partially effective fuel break if treated properly. The city and the Forest Service should meet with BPA Officials to evaluate their right-of-way maintenance program and discuss methods to provide an effective fuel break.

VIII. Monitoring and Evaluation

The Community Base Map delineates the low, medium and high hazard areas along with the low, moderate and high hazard parcels. These ratings establish a base, or the existing condition. As the city implements the projects designed to reduce the wildfire hazard danger within the planning area, these ratings will be reduced. As projects are completed, the Community Base Map should be revised to reflex the resulting changes.

Vegetative changes occur continuously but these incremental changes are somewhat difficult to notice over time. To help document changes, before and after pictures should be taken of the project areas. The pictures can be utilized to demonstrate the effectiveness of the project and the changes from year-to-year. Photo points should be established at selected locations within project areas and ideally, identified with GPS coordinates. The after pictures should be maintained in a dedicated file and periodically compared with current conditions to demonstrate changing situations.

Appendix

Appendix A. Fire-Resistive Plant Material

All plants will burn under extreme fire weather condition such as drought. However, plants burn at different intensities and rates of consumption. Fire-Resistive plants burn at a relatively low intensity, slow rates of spread and with short flame lengths. The following are characteristics of fire-resistive vegetation:

Growth with little or no accumulation of dead vegetation (either on the ground or standing upright).

No Resinous plants (willow, poplars).

Low Volume of total vegetation (for example, a grass area as opposed to a forest or shrub-covered land).

Plants with high fuel moisture (plants that contain a large amount of water in comparison to their dry weight).

Drought tolerant plants (deeply rooted plants with thick heavy leaves).

Stands without ladder fuels (plants without small, fine branches and limbs between the ground and the canopy of overtopping shrubs and trees).

Plants requiring little maintenance (slow-growing plants which, when maintained, require little care).

Plants with woody stems and branches that require prolonged heating to ignite.

Plants that ignite readily and burn intensely are Fire-Prone plants and typically share the following characteristics:

Are water stressed

Usually accumulate fine, twiggy, dry or dead material

Have leaves and wood containing volatile waxes, fats, terpenes, or oils.

Are typically aromatic (crushed leaves have strong odors).

Have gummy, resinous sap with a strong odor.

Are usually blade-leaf or needle-leaf evergreens.

Have stiff, leathery, small or fine lacy leaves.

May have pubescent (hair covered) leaves.

May have loose or papery bark.

Are plants that flame (not smolder) when preheated and ignited with a match.

Below is a partial list of potentially available fire-resistive plants; there are many other species that would fit the criteria for fire-resistiveness that are not listed here. If the species has the characteristics of a fire-resistive plant and will be properly maintained then it should work in landscaping to protect property from wildfires.

GROUND COVERS

Succulents:

Botanical Name

Sedum spp.

Common Name

Stone crops

Non-Succulents:

Botanical Name

Achillea tomentosa

Ajuga reptans

Arctostaphylos uva-ursi

Armeria maritima

Cerastium tomentosa

Cotoneaster apiculatus

Cotoneaster dammeri

Euonymus fortunei 'Coloratus'

Potentilla tabernaemontanii (verna)

Thymus praecox arcticus

Mahonia repens

Common Name

wooly yarrow

carpet bugle

kinnikinnick

sea pink, thrift

snow in summer

cranberry cotoneaster

bearberry cotoneaster

winter creeper

spring cinquefoil

mother of thyme

creeping Oregon
grape

PERENNIALS

Botanical Name

Achillea millefolium

Achillea ptarmica 'The Pearl'

Achillea tomentosa 'Nana'

Coreopsis lanceolata

Coreopsis verticillata

Geranium visicosissimum

Iris cristata

Iris missouriensis

Iris species

Common Name

western yarrow

yarrow 'The Pearl'

woolly yarrow

lance-leaved
coreopsis

coreopsis

sticky purple
geranium

crested iris

rocky mountain iris

bearded iris

Lupinus sericeus	silky lupine
Oenothera caespitosa	desert evening primrose
Oenothera missourensis	ozark sundrops
Penstemon deustus	hot rock penstemon
Penstemon venustus penstemon	blue mountain

VINES

<u>Botanical Name</u>	<u>Common Name</u>
Campsis radicans	trumpet vine
Parthenocissus quinquefolia	Virginia creeper
Vitis spp.	Grapes
Wisteria spp.	Wisteria

LOW SHRUBS, 1 ½ to 4 feet

<u>Botanical Name</u>	<u>Common Name</u>
Caryopteris x clandonensis	blue-mist spirea
Cornus ericea	red osier dogwood
Cotoneaster adpressus var praecox	creeping cotoneaster
Cotoneaster apiculatus	cranberry cotoneaster
Cotoneaster horizontalis	rock cotoneaster
Mahonia aquifolium 'Compacta'	compact Oregon grape
Pachistima canbyi	dwarf mountain lover
Prunus laureocerasus 'Zabeliana'	Zabel's laurel
Rhododendron 'Dora Amateis'	Dora Amateis rhododendron
Rhododendron 'Ramapo'	Ramapo rhododendron
Rhododendron 'Scarlet wonder'	scarlet wonder rhododendron

Rhododendron impeditum	impeditum/cloudland rhododendron
Rhododendron species (Azalea)	Deciduous Azalea
Symphoricarpos albus	snowberry
Yucca spp.	Yucca

MEDIUM TO TALL SHRUBS 4 to 15 FEET

<u>Botanical Name</u>	<u>Common Name</u>
Buddleia davidi	butterfly bush or summer lilac
Cotoneaster acutifolius	peking cotoneaster
Cotoneaster divaricatus	spreading cotoneaster
Cotoneaster horizontalis	rock cotoneaster
Mahonia aquifolium	Oregon grape
Philadelphus coronarius	sweet mockorange
Philadelphus lewisii	syringa
Philadelphus x virginalis	virginal mockorange
Prunus glandulosa	dwarf flowering almond
Prunus laurocerasus 'Otto Luyken'	Otto Luyken laurel
Prunus subhirtella 'Pendula'	weeping higan cherry
Prunus tomentosa	Nanking cherry
Prunus triloba	flowering almond
Prunus x cistena	purple -leaf sand cherry
Rhododendron 'Cunningham's White'	Cunningham rhododendron
Rhododendron 'Daphnoides'	daphnoid rhododendron
Rhododendron 'PJM'	'PJM' rhododendron
Rhododendron (species)	Rhododendron
Rhododendron: Exbury hybrids	Exbury / knaphill azaleas
Rhododendron Northern lights	northern lights azaleas

Ribes alpinum	alpine currant
Ribes aureum	golden current
Ribes sanguineum	red-flowering currant
Salix purpurea	blue arctic willow or purple osier
Salix scouleriana	Scouler willow
Viburnum trilobum	cranberry bush

SHRUB/SMALL TREES 10 to 30 FEET

<u>Botanical Name</u>	<u>Common Name</u>
Acer campestre	hedge maple
Acer circinatum	vine maple
Acer ginnala	amur maple
Acer glabrum	Rocky Mountain maple
Acer griseum	paperback maple
Acer palmatum	green Japanese maple
Acer palmatum 'Atropurpureum'	red Japanese maple
Amelanchier alnifolia	serviceberry
Cornus alternifolia	pagoda dogwood
Cornus florida 'Cherokee Chief'	red flowering dogwood
Cornus florida 'Cherokee Princess'	white flowering dogwood
Cornus florida 'Rubra'	pink flowering dogwood
Cornus florida 'Welchii'	tricolor flowering dogwood
Cornus kousa	kousa dogwood
Cornus mas	cornelian cherry
Fagus sylvatica 'Pendula'	weeping beech
Prunus cerasifera	purple leaf plum
Prunus cerasifera 'Newport'	Newport flowering plum

Prunus cerasifera ‘Thundercloud’	Thundercloud flowering plum
Prunus sargentii	sergeant cherry
Prunus serrulata ‘Kwanzan’	Kwanzan Japanese flowering cherry
Prunus serrulata ‘Shirotae’	Mt. Fuji flowering cherry
Prunus virginiana	chokecherry
Prunus x blireiana	Blireiana flowering plum
Rhamnus purshiana	cascares buckthorn

TREES 30 FEET AND HIGHER

Deciduous

<u>Botanical Name</u>	<u>Common Name</u>
Acer platanoides	Norway maple
Acer pseudoplatanus	sycamore maple
Acer rubrum	red maple
Acer saccharinum	silver maple
Aesculus hippocastanum	common horse chestnut
Aesculus x carnea	red horse chestnut
Alnus rubra	red alder
Catalpa speciosa	western catalpa or northern catalpa
Fagus sylvatica	European beech
Fraxinus pennsylvanica	green ash
Fraxinus pennsylvanica ‘Marshall’	Marshall seedless ash
Gleditsia triacanthos var. inermis	thornless honey locust
Populus nigra ‘Italica’	Lombardy poplar
Populus tremuloides	quaking aspen
Populus trichocarpa	black cottonwood
Quercus palustris	pin oak
Quercus rubra	red oak

Quercus shumardii	shumard oak
Salix alba var. tristis	golden weeping willow
Salix babylonica	weeping willow
Salix matsudana 'Tortuosa'	corkscrew willow

CONIFERS

The conifer species are not considered good trees for fire protection (due to resinous compounds in the needles). However, with some pruning and thinning you can use the native conifers in landscaping. These recommendations apply to your thin and trim zone around the house, which may extend up to 200 feet, depending on conditions around your home.

Follow these suggestions to help local conifer trees survive a fire and protect your home:

Prune all branches 10 feet high, or one-third the height of the tree on smaller trees.

Thin trees until there is a 10-foot spacing between crowns.

Remove trees that are dead, diseased or dying.

The above list was adapted from Landscaping for Wildfire Prevention – Protecting homes on the Wildland/Urban Interface, 1998. Yvonne Carre, Chris Schnepf, and W. Michael Colt.

REFERENCE:

Backyard Forest Stewardship, 1996. Washington State Department of Natural Resources.

Landscaping for Wildfire Prevention – Protecting homes on the Wildland /Urban Interface, 1998.

Yvonne Carre, Chris Schnepf, and W. Michael Colt.

Urban-Wildland Interface Code, 1997. International Fire Code Institute.

Appendix B. Glossary

Canopy: The stratum containing the crowns of the tallest vegetation present, (living or dead) usually above 20 feet.

Combustion: The rapid oxidation of fuel in which heat and usually flame are produced. Combustion can be divided into four phases: pre-ignition, flaming, smoldering, and glowing.

Conflagration: A raging, destructive fire. It is often used to connote a fire with a moving front as distinguished from a fire storm.

Control a fire: To complete control line around a fire, any spot fire there from, and any interior island to be saved; burn out any unburned area adjacent to the fire side of the control lines, and cool down all hot spots that are immediate threats to the control line, until the lines can reasonably be expected to hold under foreseeable conditions.

Cooperating agency: An agency supplying assistance including but not limited to direct tactical or support functions or resources to the incident control effort (e.g. Red Cross, law enforcement agency, telephone company, etc.).

Crown fire: A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

Dead fuels: Fuels with no living tissue in which moisture content is governed almost entirely by absorption or evaporation of atmospheric moisture (relative humidity and precipitation).

Debris fire: In fire suppression terminology, a fire spreading from any fire originally ignited to clear land or burn rubbish, garbage, crop stubble, or meadows (excluding incendiary fires).

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

Fire cause: For statistical purposes fires are grouped into broad cause classes. The nine general causes used in the U.S. are lightning, campfire, smoking, debris burning, incendiary, machine use (equipment), railroad, children, and miscellaneous.

Fire damage: Detrimental fire effects expressed in monetary or other units, including the unfavorable effects of fire-induced changes in the resource base on the attainment of organizational goals.

Fire danger: Sum of constant danger and variable danger factors affecting the inception, spread, and resistance to control, and subsequent fire damage; often expressed as an index.

Fire hazard: A fuel complex, defined by volume, type, condition, arrangement, and location that determines the degree of ease of ignition and of resistance to control.

Fire management plan: Statement, for a specific area, of fire policy, objective, and prescribed action; may include maps, charts, tables, and statistical data.

Fire prevention: Activities, including education, engineering, enforcement and administration, that are directed at reducing the number of wildfires, the costs of suppression, and fire-caused damages to resources and property.

Fire risk: The chance of fire starting, as determined by the presence and activity of causative agents

Firebreak: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fuel treatment: Manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling and burning).

Fuel type: An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.

Ground fire: Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.

Hazard: A fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.

Initial attack: The actions taken by the first resources to arrive at a wildfire to protect and property, and prevent further extension of the fire.

Ladder fuels: Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Mutual aid: A system wherein two or more fire departments, by prior agreement, operate essentially as a single agency to respond routinely across jurisdictional boundaries to render mutual assistance in combating fire emergencies.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards (fuels management).

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

Retardant: A substance or chemical agent which reduces the flammability of combustibles.

Suppression: All the work of extinguishing or confining a fire beginning with its discovery.

Surface fire: Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.

Surface fuel: Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.

Wildfire: A fire occurring on wildland that is not meeting management objectives and thus requires a suppression response.

Wildland/Urban Interface: The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Appendix C. NFPA 299 Criteria

NFPA Point totals and what they account for.

Ingress & Egress

Two or more Ways In / Out 0

One Way In / Out 7

Primary Road width

Greater than 24 Feet 0

Between 20 & 24 Feet 2

Less than 20 Feet 4

All Season Road Condition

Surfaced, Grade < 5 % 0

Surfaced, Grade > 5 % 2

Non Surfaced, Grade < 5 % 2

Non Surfaced, Grade > 5 % 5

Other than All Season 7

Fire Service Access

< = 300 Feet, with Turnaround 0

> = 300 Feet, with Turnaround 2

< = 300 Feet, No Turnaround 4

> = 300 Feet, No Turnaround 5

Street Signs

Present (4 inches & Reflectorized) 0

Not Present 5

Vegetation (Fuel Models)

Light (Grasses, Forbs, Sawgrasses.) 5

Medium (Light Brush & Small Trees.) 10

Heavy (Dense Brush, Timber & Hardwood 20

Slash (Timber Harvest Residue) 25

Defensible Space

More than 100 Feet of Treatment from Buildings 1

Between 71 – 100 Feet of Treatment from Buildings 3

Between 30 – 70 Feet of Treatment from Buildings 10

Less than 30 Feet 25

Topography (Slope)

Less than 9 % 1
Between 10 & 20 % 4
Between 21 & 30 % 7
Between 31 & 40 % 8
Greater than 40 % 10

Additional Rating Factors

Topography that adversely Effects Fire Behavior
0 – 5

Areas with History of Higher Fire

Occurrence 0 – 5

Areas of Unusually severe Fire Weather

& Winds 0 – 5

Separation of Adjacent Structures 0 - 5

(Construction Material)

Class A Roof (Metal, Tile) 1
Class B Roof (Composite) 3
Class C Roof (Wood Shingles) 15
Not Rated 25

**Building Construction
(Materials)**

Non combustible Siding / Deck 0
Non Combustible Siding / Wood Deck 5
Combustible Siding and Deck 10

Setback from Slopes > 30 %)

More than 30 Feet to Slope 1
Less than 30 Feet to Slope 5
Not Applicable 0

**Available Fire Protection
(Water Source Availability – on site)**

500 GPM Hydrants < 1000 Feet Apart 0
250 GPM Hydrants < 1000 Feet Apart 1

More than 250 GPM Non Pressurized	
2 Hour Supply	5
Less than 250 GPM Non Pressurized	
2 Hour Supply	10

Water Source Availability – off site)

Sources within a 20 min. Round Trip	1
Sources within a 21 – 45 min. Round Trip	5
Sources > 46 min. Round Trip	10

Utilities (Gas & Electric)

All Underground	1
One Underground, One Above Ground	3
All Above Ground	5

Point totals

- Low Hazard < 39 Points
- Moderate Hazard 40 – 69 Points
- High Hazard 70 – 112 Points
- Extreme Hazard > 113 Points

Appendix D. Recommended Wildfire Siting Standards for Dwellings and Structures

1. Fuel Break

Primary Safety Zone

The primary safety zone is a fire break extending 30 feet in all directions around structures. The goal in this zone is to remove fuels that will produce flame lengths in excess of one foot. Vegetation in this zone could include green lawns and low shrubs (less than 24 inches in height). Trees should be spaced with greater than 15 feet between the crowns and pruned to remove dead and low (less than 8 feet) branches. Accumulated leaves, needles, limbs, and other dead vegetation should be removed from beneath trees. Nonflammable materials (i.e. rock) instead of flammable materials (i.e. bark mulch) should be placed next the house. As slope increases, the primary safety zone should increase away from the house, parallel to and down the slope. The additional safety zone would increase by 50 feet for a 10 percent slope, 75 feet for a 20 percent slope, 100 feet for a 25 percent slope and 150 feet for a 40 percent slope.

Secondary Fuel Break

The secondary fuel break extends a minimum of 100 feet in all directions around the primary safety zone. The goal in the secondary fuel break should be to reduce fuels so the overall intensity of any wildfire would be lessened and the likelihood of crown fires and crowning is reduced. Vegetation should be pruned and spaced so that fire will not spread between tree crowns. Small trees and brush growing underneath larger trees should be removed to prevent spread of fire into the crowns of larger trees. Dead fuels should be removed.

2. Roads

Right-of Ways

Roads should be built and maintained to provide a minimum 20 foot width of all-weather surface capable of supporting gross vehicle weights of 50,000 pounds, a minimum curve radius of 48 feet and a vertical clearance of 13'6".

Cul-de-Sacs

Cul-de-Sacs should be defined as dead-end roads over 150 feet in length. They should have turn-a-rounds of not less than 48 feet radius at a minimum spacing of 500 feet between turn-a-rounds. All turn-a-rounds should be marked and signed as "No Parking".

Bridges and Culverts

Bridges and culverts and other structures in the road bed should be constructed and maintained to support gross vehicle weights of 50,000 pounds.

Road Grades

Road grades should not exceed 8 percent, with a maximum of 12 percent on short pitches.

Identification

Roads should be uniquely named and numbered and visibly signed at each road intersection. Letters and numbers should be a minimum of three inches in height and constructed of reflectorized material.

3. Driveways

Roadway

Driveways should be built and maintained to provide a minimum 12 foot width of all-weather surface capable of supporting gross vehicle weights of 50,000 pounds, a minimum curve radius of 48 feet and a vertical clearance of 13'6".

Turnouts

Driveways in excess of 200 feet should provide 20-foot wide by 40-foot long passage space (turnouts) at a maximum spacing of $\frac{1}{2}$ the driveway length or 400 feet, whichever is less. Where visibility is limited, these distances should be reduced appropriately.

Dead-end-driveways

Dead-end-driveways are defined as dead-end roads over 150 feet in length serving a single residence. They should have turn-a-rounds of not less than 48 feet radius.

Bridges and Culverts

Bridges and culverts and other structures in the road bed should be constructed and maintained to support gross vehicle weights of 50,000 pounds.

Road Grades

Road grades should not exceed 8 percent, with a maximum of 12 percent on short pitches.

Identification

Driveways should be marked with the residence's address unless the residence is visible from the roadway and the address is clearly visible on the residence. Letters and numbers should be a minimum of three inches in height and constructed of reflectorized material.

Appendix E. Map with wildfire hazard ratings by area.

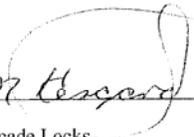
Appendix F. Map with hazard ratings for individual parcels

Community Wildfire Protection Plan

Prepared for
City of Cascade Locks

This plan is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photocopied, or similarly reproduced in total or in part without the expressed written consent of the client and James H. Hulbert.

Approved by:



Ralph Heggard
Mayor, City of Cascade Locks

3-17-05
Date



Bob Young
Central Oregon District Forester
Oregon Department of Forestry

2/1/05
Date

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