Section 8:
Wildfire

Why are Wildfires a threat to Yamhill County?

Wildfires are an uncontrolled burning of forest, brush, or grassland. Wildfire has been a natural part of these ecosystems in Oregon and is widespread throughout the State. Oregon has over 41 million acres (more than 64,000 square miles) of forest and rangeland that are susceptible to wildfire. In addition, significant agricultural areas of the Willamette Valley and north and central Oregon contain crops, such as wheat, are prone to wildfire damage. Communities are also at risk from wildfires, and substantial hazards exist for communities at the wildland/urban interface. According to the 2001 Federal Register, 367 Oregon communities are at risk of damage from wildfire. Yamhill County contains such communities.[1]

The majority of wildfires occur in the summer between June and October. Wildfires can occur at other times of the year, however, when weather and fuel conditions combine to allow ignition and spread. Seventy percent of Oregon's wildland fires result from human activity. The remaining thirty percent result from lightning, occurring most frequently in eastern and southern Oregon.

Residential development in forested areas will likely experience fires at some point. A lack of firebreaks surrounding buildings, limited water availability during the high-risk summer months, and fire suppression over the last 100 years contribute to a fire hazard in the forested hillsides of Yamhill County. Suppression of fire has contributed as much to the current vegetation pattern as historically intentional burning. The Yamhill region has significantly more acres of Douglas fir and much less oak savanna and prairie since the end of intentional burning in the middle of the 19th century.[2]

History of Oregon Wildfires

Wildfires have been a feature of the Oregon landscape for thousands of years. These fires resulted from lightning and from the practices of Native Americans. For at least the past four thousand years and possibly as long as ten thousand years prior to Euro-American settlement, humans have systematically burned large sections of the Willamette Valley including the greater Yamhill County area.

Fires in southwestern Yamhill County have resulted from both natural and human-induced causes. Natural fires were mostly the products of lightning strikes “but the frequency of thunderstorms in the Willamette Valley ranks among the lowest in North America.”[3] Thus, the relative frequency of these natural fires is thought to be extremely low.

The indigenous Che-ahm-ill people of the “Yam Hills” area were a subgroup of the Kalapuyan culture. They occupied the Yamhill River basin valley at the time of Euro-American contact.[4] The Kalapuyans intentionally torched large portions of the landscape annually for a number of practical reasons including agriculture, hunting, communication, warfare, visibility, safety and sanitation.[5] Many of these areas otherwise would have supported the Douglas fir forests that

have grown up in these areas over the past 150 years. Native uses of fire, which included trail building, amusement, agriculture, camping and hunting, and logging slash,[6] were replaced with those of Euro-American settlers.

Natural and human-caused wildfires continued to shape the landscape after Euro-American settlement, but in different ways. Between 1840 and 1900, wild land fires burned at least two million acres of forestland in western Oregon. Settlers caused most, if not all of these fires.[7] In the 1850s, the Coast Range forests burned more than they had in previous decades while valley prairies and savannas began to experience less fire and were either turned into field and pasture or began growing into forests. Settlers and their descendants have viewed fire control as necessary to protect timber and property in the region, an approach that continues to this day.

There were many fires in 1902 and 1910.[8] In 1933, the infamous Tillamook burn covered nearly a quarter of a million acres. The Tillamook fire is thought to have caused several localized burns in the Willamina watershed.[9] Since the 1930s, fire suppression crews have become better trained and organized. The largest, well-documented forest fire in Yamhill County history occurred in 1949. On September 29, the *Telephone Register* (now the *News Register*) reported that "18,000 acres of slash and second growth timber" was burned. The fire started in Peavine Canyon and spread to East Creek area, six miles north of Willamina.[10] In the 1950s, a public education campaign through area newspapers urged residents to prevent forest fires. Through the later decades of the 20th century and currently, large fires continue to burn most years in various parts of the West.

In the early 1970s, an increasing number of wildland fires affected or involved homes. Suburban growth continued through the 1980s, and by the early 1990s frequent and destructive wildland interface fires had become a major concern of the State Forester, the State Fire Marshal and the State Legislature. In the 1990s, more than 100 structures burned in wildland fires, thousands more were threatened, and losses and suppression costs skyrocketed. In 1997, the Legislature passed Senate Bill 360, the Oregon Forestland-Urban Interface Fire Protection Act, "to provide a complete and coordinated fire protection system," and recognized that "forestland-urban interface property owners have a basic responsibility to share in a complete and coordinated protection system..."

Fires in 2002 underscored the need for urgent action. Sparked by intense mid-summer dry lightning storms, wildfires burned hundreds of thousands of acres of Oregon forestland. There were ten, Governor-declared conflagrations, with as many as five events running concurrently. More than 50 structures burned and thousands more were threatened; at one point, the entire Illinois Valley in southwestern Oregon, the home of approximately 17,000 people, was under imminent evacuation alert due to the vast Florence/Biscuit Fire. Table 8-1 summarizes major fire events in Oregon between 1848 and 2002.

Table 8-1. Historic Fires in Oregon (1848-2003)

Year	Name of Fire	Counties	Acres burned
1848	Nestucca	Tillamook/Yamhill	290,000
1849	Siletz	Lincoln/Polk	800,000
1853	Yaquina	Lincoln	482,000
1865	Silverton	Marion	988,000
1868	Coos Bay	Coos	296,000
1933	Tillamook	Tillamook/Yamhill	240,000
1936	Bandon	Coos	143,000
1939	Saddle Mountain	Tillamook/Yamhill	190,000
1945	Wilson River/Salmonberry	Tillamook	182,000
1951	North Fork & Elkhorn	Tillamook, Yamhill	33,000
1966	Oxbow	Lane	44,000
1987	Silver	Josephine	97,000
1992	Lone Pine	Klamath	31,000
1996	Skelton	Deschutes	17,700
2002	Biscuit	Josephine/Curry	500,000
2003	B&B Complex	Jefferson/Linn/Deschutes/Marion	80,000

Sources: Atlas of Oregon, William G. Loy, et al, University of Oregon Books, 1976. Oregon Department of Forestry (ODF), Tillamook Burn to Tillamook State Forest, August 1993. Oregon Emergency Management, State Hazard Risk Assessment, 2003. ODF, http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/stats/histfire.asp?id+3070105

During the 2000 fire season, more than 7.5 million acres of public and private lands burned in the US, resulting in loss of property, damage to resources, and disruption of community services. Taxpayers spent more than $1.6 billion to combat 90,000 fires nationwide.[11] Many of these fires burned in wildland/urban interface areas and exceeded the fire suppression capabilities of those areas. The magnitude of wildfires is dependent on two primary factors: (1) severe drought, accompanied by a series of storms that produce thousands of lightning strikes and windy conditions; and (2) the effects of wildfire suppression over the past century that has led to buildup of brush and small diameter trees in the nation's forests and rangelands.[12] Table 8-2 illustrates the fire suppression costs for state, private, and federal lands protected by the Oregon Department of Forestry between 1985 and 2004.

Table 8-2. History of Fire Suppression Costs in Oregon 1985-2004

Year	Suppression Costs in $*
1985	3,268,644
1986	5,847,018
1987	32,080,746
1988	13,192,596

1989	6,394,593
1990	8,279,974
1991	5,381,192
1992	17,000,000
1993	4,023,033
1994	21,100,000
1995	4,360,349
1996	5,066,227
1997	1,210,692
1998	2,056,343
1999	5,320,555
2000	5,750,862
2001	33,792,483
2002	65,255,154
2003	17,352,717
2004	10,493,951

Source: Oregon Department of Forestry
*Costs include District costs, extra costs, private costs, and other costs.

2002 Wildfires

Apple (Umpqua National Forest)

This fire was 21 miles east of Glide, and encompassed 9,800 acres. Twenty residences were threatened.

Tiller Complex (Umpqua National Forest)

This 65,824-acre fire consisted of eight large and numerous small fires, on the Tiller Ranger District and in the Rogue-Umpqua Divide Wilderness Area, 25 miles east of Canyonville. Sixty-seven residences were threatened.

Biscuit Fire (Siskiyou National Forest)

This fire cost more than $160 million to fight, and was located in southern Oregon and northern California. The fire began on July 13, 2002 and reached 500,023 acres in August 2002. Estimated to be one of Oregon's largest wildfires in recorded history, the Biscuit Fire encompassed most of the Kalmiopsis Wilderness. The boundary of the Biscuit Fire stretched from ten miles east of the coastal community of Brookings, Oregon; south into northern California; east to the Illinois Valley; and north to within a few miles of the Rogue River. There were 274 structures threatened by this fire. Four residences and nine outbuildings were lost.[13]

2003 Wildfires

B&B Complex (Deschutes National Forest)

This fire, characterized by extreme plume-dominated behavior, grew to 80,000 acres in September 2003 as the Booth and Bear Butte fires

merged. The entire community of Camp Sherman, approximately 300 residents, was twice evacuated to avoid the fire's danger and Highway 20 was temporarily closed.[14] A total of 2,205 personnel, 82 fire engines and 10 helicopters were employed to battle the fire. Governor Kulongoski invoked the Conflagration Act for the east side of the B&B Complex.[15] The B & B Complex fire burned into a portion of Marion County.

"With more Oregonians than ever living in forests that have grown thicker than ever through decades of strict fire suppression, even modest fires can quickly consume lives, homes, and the millions of dollars it costs to fight them."

The Oregonian, Feb. 26, 2001

Herman Creek Fire (USDA Forest Service & ODF lands)

The 370-acre Herman Creek Fire near Cascade Locks in the Columbia Gorge closed a 47-mile stretch between Hood River and Troutdale and caused traffic problems as far away as Portland. Union Pacific Railroad delayed its trains on the south side of the Columbia River as railroad ties caught fire. Sixty people were evacuated to temporary shelters in Stevens Point, WA as the fire burned within feet of dozens of homes. A bed and breakfast business and an abandoned house and barn burned to the ground.[16]

Wildfire Characteristics

The characteristics of fire are important to understand when trying to mitigate its negative effects on humans and structures. In order for fire to exist, the three components of the fire triangle must be present. The triangle consists of fuel, heat, and oxygen.[17] Most naturally caused fires are initiated by lightning strikes. Human-caused fires, both accidental and deliberate, are produced in many ways, including campfires, chimneys, torches, matches, fireworks, cigarettes, vehicle fires, military ordnance, and smoldering slash piles.[18] In either instance, natural or human-caused, the ignition is started because the fire triangle exists. Fire occurring in natural ecosystems begins as a point of ignition, burns outward into circles and spreads in the direction toward which the wind is blowing.[19] Additionally, when burning occurs on uneven terrain, the fire spreads upslope to eventually form itself into broad ellipses.[20]

Effects of fire on ecosystem resources can represent damages, benefits, or some combination of both, depending largely on the characteristics of the fire site, the severity of the fire, the time period of valuation, and the values placed on the resources affected by the fire.[21] The ecosystems of most forests depend upon fire to maintain various functions. The use of fire for beneficial purposes is considered, where appropriate, in terms of reducing fuel loads, disposing of slash, preparing seedbeds, thinning overstocked stands, increasing forage plant production, improving wildlife habitats, changing hydrologic processes, and improving aesthetic environments.[22] However, despite its beneficial values to ecosystems, fire has been suppressed for years because of its perceived effects on timber harvest and threat to human life. In addition, new

development continues to push its way into what is termed as the "wildland-urban interface."

The Interface

There are three categories of interface fire:[23]

- The classic wildland-urban interface exists where well-defined urban and suburban development presses up against open expanses of wild land areas;
- The mixed wildland-urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings; and
- The occluded wildland-urban interface exists where islands of wildland vegetation occur inside a largely urbanized area.

Unlike most other natural hazards, the wildland-interface is not designated by geography alone. Certain conditions must be present for significant interface fires to occur. The most common are hot, dry, and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation).[24] Once a fire has started, several conditions influence its behavior, including fuel, topography, weather, drought, and development. These combined conditions are the key elements that add to increased wildfire risk. The severity of the wildfire is ultimately affected by the severity of these conditions. For example, if a steep slope (topography) is combined with extremely low humidity, high winds, and highly flammable vegetation, then a high-intensity wildfire may develop.

Since the 1970s, Oregon's growing population has expanded further and further into traditional resource lands such as forestland. The "interface" between urban and suburban areas and the resource lands created by this expansion has produced a significant increase in threats to life and property from fires, and has pushed existing fire protection systems beyond original or current design or capability.[25] Property owners in the interface are often unaware of the problems and threats they face. Therefore, many owners have done very little to manage or offset fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Fuel[26]

Fuel is the material that feeds a fire, and is a key factor in wildfire behavior. Fuel is classified by volume and by type. Volume is described in terms of "fuel loading," or the amount of available vegetative fuel. The type of fuel refers to the species of trees, shrubs, and grass that are present. Oregon, as a western state with prevalent conifer, brush, and rangeland fuel types, is subject to more frequent wildfires than other regions of the nation.

An important element in understanding the danger of wildfire is the availability of diverse fuels in the landscape, such as natural

vegetation, manmade structures, and combustible materials. A house surrounded by brushy growth rather than cleared space allows for greater continuity of fuel and increases the fire's ability to spread. After decades of fire suppression, "dog-hair" thickets have accumulated. These enable high intensity fires to flare and spread rapidly. Structures that are made of combustible material such as shake roofs and wood siding are especially susceptible to fire. Untrimmed bushes near these structures often serve as "ladder fuels" – enabling a slow moving ground fire to climb onto rooftops and into the crowns of trees. A crown fire is significantly more difficult to suppress than a ground fire, and are much more threatening to structures in the interface. Wildfire at the upper end of the wildfire intensity spectrum is likely to spread into the tops of the tallest trees in violent and discontinuous surges.[27] Fire that occurs at this severe end of the spectrum responds to its own convective winds, spreading rapidly as sparks from exploding trees ignite other fires many meters away.[28]

Because of the many different possible "fuels" found in the interface landscape, firefighters have a difficult time predicting how fires will react or spread.

Topography[29]

Topography influences the movement of air, thereby directing a fire's course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces upslope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

Weather[30]

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible.[31] High-risk areas in Oregon share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. Predominant wind directions may guide a fire's path. In addition, many high intensity fires produce their own wind, which aids in the spread of fire.

Drought

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. The term *drought* is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly, less rainfall than normal, can lead to relatively drier conditions, and leave reservoirs and water tables lower. Drought leads to problems with irrigation, and may contribute to additional fires, or

additional difficulties in fighting fires. Most fuel types (not including grasses), however, require two or three years of drought before the fuel becomes dangerously dry. Drought contributes to the frequency and intensity of fires. A February 2001 Oregonian article reported: "Favorable weather last year helped the Northwest emerge largely unscathed from a fire season that scorched other parts of the West. But the forests remain thick with timber and with homes. And this winter has brought the Northwest far less snow and rain than usual, which could give a greater foothold to the flames that are sure to come."[32]

The last statewide drought emergency in Oregon was in September 1992.[33]

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On average over the last several years, Yamhill County has received less precipitation i.e., snow and rain than what is considered normal. A March 2005 *Oregonian* article reported: "Weather experts see problems this summer with fires, power rates, recreation, farming and fish unless spring brings rain."[35] The article continues: "Barring a spring soaking, Oregon and Washington face a drought that could ravage forests, raise power rates and leave fish high and dry."[36]

The following information is from Oregon Governor Ted Kulongoski's "2005 Oregon Drought and Fire Conditions" Website:

> Water conditions in Oregon are close to those experienced in the 1977 drought. Snow conditions are approximately 44 percent of normal statewide, very close to that experienced before the 1977 drought and well below the levels seen in 2001 at this time of year. Precipitation records indicate Northwest Oregon is experiencing the second driest water year on record and accumulated stream flow conditions statewide range in the 35 to 75-percentile level. As of March 1, the Columbia system is projected at 66 percent of normal stream flow, down ten percent from a month earlier. Reservoirs used for irrigation throughout the state are well below normal, and many are not expected to fill. Even if we have a significantly wet March, conditions are not expected to approach normal for this time of year.[37]

Development

Growth and development in forested areas is increasing the number of human-caused structures in the interface in Oregon. Wildfire has an effect on development, yet development can also influence wildfire.

While wildfires have always been a historic part of the ecosystem in Oregon, homes in the interface often lead to human ignition of fire. The combined increase in human development and activity in the interface, with the high content of fuels from years of fire suppression, can create a lethal combination.

Homeowners often prefer lots that are private and have scenic views nestled in vegetation. A private setting may be far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and firefighting difficult. The scenic views found along mountain ridges can also mean areas of dangerous topography. Natural vegetation contributes to scenic beauty, but it may also provide a ready trail of fuel leading a fire directly to the combustible fuels of the home itself. [38]

Wildfire Hazard Assessment

Wildfire Hazard Identification

Hazard identification is the first phase of a hazard assessment, and is the process of estimating the geographic extent of the hazard, its intensity, and its probability of occurrence.[39] This process usually results in a hazard map. Hazard maps can provide detailed information in a clear format that provides public information and can assist in making policy and land use decisions.

Wildfire hazard areas are commonly identified in regions of the wildland/urban interface. Ranges of the wildfire hazard are further determined by the ease of fire ignition due to natural or human conditions and the difficulty of fire suppression. The wildfire hazard is also magnified by several factors related to fire suppression/control, such as the surrounding fuel load, weather, topography, and property characteristics. Generally, hazard identification rating systems are based on weighted factors of fuels, weather, and topography. Indicators of least dangerous to most dangerous, illustrate each category. For example:

Roads and Signage

Steep; narrow; poorly signed	3
One or two of the above	2
Meets all requirements	1

Water Supply

None, except domestic	3
Hydrant, tank, or pool over 500 feet away	2
Hydrant, tank, or pool within 500 feet	1

Location of the Structure

Top of steep slope with brush/grass below	3
Mid-slope with clearance	2
Level with lawn, or watered groundcover	1

In order to determine the "base hazard factor" of specific wildfire hazard sites and interface regions, several factors must be taken into account. Categories used to assess the base hazard factor include:

- Topographic location, characteristics, and fuels;
- Site/building construction and design;
- Site/region fuel profile (landscaping);
- Defensible space;
- Accessibility;
- Fire protection response; and
- Water availability.

The use of Geographic Information System (GIS) technology in recent years has been a great asset to fire hazard assessment, allowing further integration of fuels, weather, and topography data for such ends as fire behavior prediction, watershed evaluation, mitigation strategies, and hazard mapping. As stated in the wildfire characteristics section of this chapter, the interface is not geographic in nature, but is associated with certain characteristics such as slope and vegetation.

Map 6 shows the coverage area for fire districts within Yamhill County.

Vulnerability Assessment

Vulnerability assessment is the second phase of a hazard assessment. It combines the information generated through hazard identification with an inventory of the existing development exposed to wildfire. Vulnerability assessments assist in predicting how different types of property and population groups will be affected by a hazard.[40] Data that includes the location of interface areas in Yamhill County can be used to assess the population and total value of property at risk from wildfire.

Risk Analysis

Risk analysis is the third, and most advanced phase of a hazard assessment. It builds upon hazard identification and vulnerability assessments.

Key factors included in assessing wildfire risk include ignition sources, building materials and design, community design, structural density, slope, vegetative fuel, fire occurrence, and weather, as well as occurrences of drought. The National Wildland/Urban Fire Protection Program has developed a Wildland/Urban Fire Hazard Assessment Methodology tool for communities to assess their risk to wildfire. For more information on wildfire hazard assessment, refer to www.Firewise.org.

Community Wildfire Issues

Characteristics of Growth and Development in the Interface

Residents in rural areas and unincorporated communities in Yamhill County are part of the wildland/urban interface characterized by a diverse mixture of varying housing structures, development patterns, ornamental and natural vegetation, and natural fuels. In the event of a wildfire, vegetation, structures, and other flammables can merge into unwieldy and unpredictable events. Factors germane to the fighting of such fires include access, firebreaks, and proximity of water sources, distance from a fire station, and available firefighting personnel and equipment. Reviewing past wildland/urban interface fires shows that many structures are destroyed or damaged for one or more of the following reasons:[41]

- Combustible roofing material;
- Wood construction;
- Structures with no defensible space;
- Fire department with poor access to structures;
- Subdivisions located in heavy natural fuel types;
- Structures located on steep slopes covered with flammable vegetation;
- Limited water supply; and
- Winds over 30 miles per hour.

Road Access

Of particular concern to firefighters are developments with narrow roadways and few routes of egress, or routes with very limited accessibility. Many new subdivisions are constructed with cul-de-sacs, which contribute to the problem of road access. Most cul-de-sacs do not allow rear access to homes, which can be a significant problem for firefighters and emergency services in defending the structure and ensuring the safety of its inhabitants.

Water Supply

Water supply is a critical factor in the ability to fight wildland fires. Developments lacking an adequate water supply and hydrant taps create extra challenges for firefighting personnel. Another water supply issue is that of small diameter pipe water systems, which are inadequate to provide sustained fire-fighting flows.

Mitigation Plan Goals and Existing Activities

Mitigation Plan Goals

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals following implementation.

The plan goals help to guide the direction of future activities aimed at reducing risk and preventing loss from natural hazards. The goals listed here serve as checkpoints as agencies and organization begin implementing mitigation action items.

Goal #1: EMERGENCY OPERATIONS

Goal Statement: Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.

Goal #2: EDUCATION AND OUTREACH

Goal Statement: Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.

Goal #3: PARTNERSHIPS

Goal Statement: Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts.

Goal #4: PREVENTIVE

Goal Statements:

- Develop and implement activities to protect human life, commerce, and property from natural hazards.
- Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.

Goal #5: NATURAL RESOURCES UTILIZATION

Goal Statement: Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.

Goal #6: IMPLEMENTATION

Goal Statement: Implement strategies to mitigate the effects of natural hazards.

Existing Mitigation Activities

When assessing the risks from natural hazards, established mitigation practices already provide benefits in reduced disaster losses.

Local Programs

Fire Districts Within Yamhill County

Issue public press releases when fire danger is high.

Burning bans go into effect countywide when Oregon Department of Forestry officially establishes the year's fire season. Burning bans include no backyard burning, but excludes agriculturally related burns, which are enforced through state statue.

Yamhill County Land Division Ordinance

With the increase of home sites in the rural areas of Yamhill County, the county found there was a critical need for adequate fire department access. The risk of wildfire and other emergency incidents increase with home density. The county found that many existing driveways do not provide the needed access for emergency apparatus. New homes are expected to fully meet current driveway construction requirements set forth in Section 6.010(8) of the Land Division Ordinance. The county's "Driveway Construction Checklist/Inspection Form" is presented in Appendix D.

State Programs

Oregon Revised Statute 215.730:

ORS 215.730, Additional Criteria for Forestland Dwellings, provides criteria for approving dwellings located on lands zoned for forest and mixed agriculture/forest use. Under its provisions, county governments must require, as a condition of approval, that single-family dwellings on lands zoned as forestland meet the following requirements:

1. Dwelling has a fire retardant roof;

2. Dwelling will not be sited on a slope of greater than 40 percent;
3. Evidence is provided that the domestic water supply is from a source authorized by the Water Resources Department and not from a Class II stream as designated by the State Board of Forestry;
4. Dwelling is located upon a parcel within a fire protection district or is provided with residential fire protection by contract;
5. If dwelling is not within a fire protection district, the applicant provides evidence that the applicant has asked to be included in the nearest such district;
6. If dwelling has a chimney or chimneys, each chimney has a spark arrester; and
7. Dwelling owner provides and maintains a primary fuel-free break and secondary break areas on land surrounding the dwelling that is owned or controlled by the owner.

For more information on forestland zones consult the Oregon Department of Land Conservation and Development; Statewide Goal 4 – Forestlands and Oregon Administrative Rules 660-006.

If a governing body determines that meeting the fourth requirement is impractical, local officials can approve an alternative means for protecting the dwelling from fire hazards.

Oregon Revised Statute 477.015-061

Provisions in ORS 477.015-061, Urban Interface Fire Protection, were established through efforts of the Oregon Department of Forestry, the Office of the State Fire Marshal, fire service agencies from across the state, and the Commissioners of Deschutes, Jefferson, and Jackson Counties. It is innovative legislation designed to address the expanding interface wildfire problem within Oregon Department of Forestry Fire Protection Districts. Full implementation of the statute will occur on or after January 1, 2002. The statute does the following:

1. Directs the State Forester to establish a system of classifying forestland-urban interface areas;
2. Defines forestland-urban interface areas;
3. Provides education to property owners about fire hazards in forestland-urban interface areas. Allows for a forestland-urban interface county committee to establish classification standards;
4. Requires maps identifying classified areas to be made public;
5. Requires public hearings and mailings to affected property owners on proposed classifications;
6. Allows property owners appeal rights;

7. Directs the Board of Forestry to promulgate rules that set minimum acceptable standards to minimize and mitigate fire hazards within forestland-urban interface areas; and
8. Creates a certification system for property owners meeting acceptable standards. Establishes a $100,000 liability limit for cost of suppressing fires, if certification requirements are not met.

478.120 Inclusion of forestland in district.

The authority to include forestland within a rural fire protection district pursuant to ORS 478.010 (2)(c) applies to forestland within the exterior boundaries of an existing district and to forestland on which structures subject to damage by fire have been added after July 20, 1973.

478.140 Procedure for adding land to district by consent of owner.

Any owner consenting to add the forestland of the owner to the district under ORS 478.010 (2)(c) shall do so on forms supplied by the Department of Revenue. The owner shall file the original with the district. The district shall forward a copy to the assessor of each county in which the land is located, within 20 days of receipt.

478.910 Adoption of fire prevention code.

A district board may, in accordance with ORS 198.510 to 198.600, adopt a fire prevention code.

478.920 Scope of fire prevention code.

The fire prevention code may provide reasonable regulations relating to:

(1) Prevention and suppression of fires.

(2) Mobile fire apparatus means of approach to buildings and structures.

(3) Providing fire-fighting water supplies and fire detection and suppression apparatus adequate for the protection of buildings and structures.

(4) Storage and use of combustibles and explosives.

(5) Construction, maintenance and regulation of fire escapes.

(6) Means and adequacy of exit in case of fires and the regulation and maintenance of fire and life safety features in factories, asylums, hospitals, churches, schools, halls, theaters, amphitheaters, all buildings, except private residences, which are occupied for sleeping purposes, and all other places where large numbers of persons work, live, or congregate from time to time for any purpose.

(7) Requiring the issuance of permits by the fire chief of the district before burning trash or waste materials.

(8) Providing for the inspection of premises by officers designated by the board of directors, and requiring the removal of fire hazards found on premises at such inspections.

478.927 Building permit review for fire prevention code.

A district adopting a fire prevention code shall provide plan review at the applicable city or county agency responsible for the issuance of building permits for the orderly administration of that portion of the fire prevention code that requires approval prior to the issuance of building permits.

Senate Bill 360

Senate Bill 360, passed in 1997, is state legislation put in place to address the growing wildland/urban interface problem. The bill has three purposes:

1. To provide an interface fire protection system in Oregon to minimize cost and risk and maximize effectiveness and efficiency;
2. To promote and encourage property owners' efforts to minimize and mitigate fire hazards and risks; and
3. To promote and encourage involvement of all levels of government and the private sector in interface solutions.[42]

The bill has a five-year implementation plan that includes public education and outreach, and the development of rules, standards, and guidelines that address landowner and agency responsibilities. The success of Senate Bill 360 depends upon cooperation among local and regional fire departments, fire prevention cooperatives, and the Oregon Department of Forestry, which means interagency collaboration is vital for successful implementation of the bill. This cooperation is important in all aspects of wildland firefighting. Resources and funding are often limited, and no single agency has enough resources to tackle a tough fire season alone. The introductory language of Senate Bill 360 states: "The fire protection needs of the interface must be satisfied if we are to meet the basic policy of the protection of human life, natural resources, and personal property. This protection must be provided in an efficient and effective manner, and in a cooperative partnership approach between property owners, local citizens, government leaders, and fire protection agencies."

Office of the State Fire Marshal

State Fire Marshall is similar to OEM in that the office has no authority, but advocates and represents fire districts that have authority within communities. The State Fire Marshall is a structural advocate, and works in partnership with ODF.

The State Fire Marshall can provide information about requirements, but cannot force entities and persons to adhere to those requirements, although if entities and persons do not adhere to requirements, then it is less likely that such entities and persons would receive financial or other resource support from the State Fire Marshall. Like OEM, the Office of the State Fire Marshall provides resources, training, leadership and guidance.

Oregon Department of Forestry (ODF)

ODF provides training for local fire chiefs and local fire departments to provide training. Local firefighters can get a range of experience from exposure to wildland firefighting. Local firefighters can also obtain their 'red card' (wildland fire training documentation), and attend extensive workshops combining elements of structural and wildland firefighting, defending homes, and operations experience.[43]

ODF has been involved with emergency managers to provide support during non-fire events and for years, ODF has worked with industrial partners (large timber companies) to share equipment in the case of extremely large fires.[44]

Federal Programs

The proposed role of the federal land managing agencies, such as the U.S. Forest Service and the Bureau of Land Management, in the wildland/urban interface is diverse. Their roles include: reducing fuel hazards on the lands they administer; cooperating in prevention and education programs; providing technical and financial assistance; and developing agreements, partnerships, and relationships with property owners, local protection agencies, states, and other stakeholders in wildland/urban interface areas. These relationships focus on activities before a fire occurs, which render structures and communities safer and better able to survive a fire occurrence.[45]

States must have an approved hazard mitigation plan in place to receive either a Fire Suppression Assistance Grant or a Hazard Mitigation Grant.

Federal Emergency Management Agency Programs

The Federal Emergency Management Agency (FEMA) is directly responsible for providing fire suppression assistance grants and, in certain cases, major disaster assistance and hazard mitigation grants in response to fires. The role of FEMA in the wildland/urban interface is to encourage comprehensive disaster preparedness plans and programs, increase the capability of state and local governments, and provide for a greater understanding of FEMA's programs at the federal, state, and local levels.[46]

Fire Suppression Assistance Grants

Fire Suppression Assistance Grants may be provided to a state with an approved hazard mitigation plan for the suppression of a forest or grassland fire that threatens to become a major disaster on public or private lands. These grants are provided to protect life and improved property, and encourage the development and implementation of viable multi-hazard mitigation measures, and provide training to clarify FEMA's programs. The grant may include funds for equipment, supplies, and personnel. A Fire Suppression Assistance Grant is the form of assistance most often provided by FEMA to a state for a fire. The grants are cost-shared with states. Once the federal grant money is provided to the State, it is then passed along to local jurisdictions. FEMA's US Fire Administration (USFA) provides public education materials addressing wildland/urban interface issues, and the USFA's National Fire Academy provides training programs.[47]

Hazard Mitigation Grant Program

Following a major disaster declaration, the FEMA Hazard Mitigation Grant Program provides funding for long-term hazard mitigation projects and activities to reduce the possibility of damages from all future fire hazards and to reduce the costs to the nation for responding to and recovering from the disaster.

National Wildland/Urban Interface Fire Protection Program

Federal agencies can use the National Wildland/Urban Interface Fire Protection Program to focus on wildland/urban interface fire protection issues and actions. The Western Governors' Association (WGA) can act as a catalyst to involve state agencies, as well as local and private stakeholders, with the objective of developing an implementation plan to achieve a uniform, integrated national approach to hazard and risk assessment and fire prevention and protection in the wildland/urban interface. The program helps states develop viable and comprehensive wildland fire mitigation plans and performance-based partnerships.

"New data from National Forest Service fire ecologists shows that for every dollar spent on prescribed burning, forest thinning and the training of fire-management personnel, seven dollars worth of savings are realized in the costs of having to extinguish big fires. When that ratio is placed in the context of an average $1 billion spent annually over the past decade on fire suppression, the implications of foresighted fire management are profound."

The Nature Conservancy Magazine – May/June 2001

US Forest Service

The US Forest Service (USFS) is involved in a fuel-loading program implemented to assess fuels and reduce hazardous buildup on US forestlands. The USFS is a cooperating agency and, while it does not have jurisdiction within city limits, it still has an interest in preventing fires in the interface, as fires often burn up the hills and into the higher elevation US forestlands.[48] This is especially an

important issue as Yamhill County's larger cities of McMinnville and Newberg consider any annexations of land in the wildland-urban interface in the future.

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Other Mitigation Programs and Activities

Some areas of the country are facing wildland/urban issues collaboratively. These are model programs that include local solutions. One example of this is in Ashland, Oregon. Because of the highly flammable slopes above Ashland, homeowners in the wildland-urban interface face a high risk of encountering a wildland fire. Ashland has partnered with local organizations to help coordinate mitigation strategies with homeowners in high-risk areas. Currently, more than 40 acres have been treated in the interface above Ashland.[50]

Treatment has included thinning of tree stands, removing highly flammable noxious weeds (i.e., Scotch Broom), and the creation of fuel breaks along ridge tops most susceptible to wildland fire. Ashland has contributed approximately $500,000 dollars towards cost shares with homeowners to help reduce fuels near their homes.[51] In California, the Los Angeles County Fire Department has retrofitted more than 100 fire engines with fire retardant foam capability, and Orange County is evaluating a pilot insurance grading and rating schedule specific to the wildland/urban interface. Both are examples of successful programs that demonstrate the value of pre-suppression and prevention efforts when combined with property owner support to mitigate hazards within the wildland/urban interface. [52]

Prescribed Burning

The health and condition of a forest will determine the magnitude of a wildfire. If fuels – slash, dry or dead vegetation, fallen limbs and branches – are allowed to accumulate over long periods of time without being methodically cleared, fire can move more quickly and destroy everything in its path. The results are more catastrophic than if the fuels are periodically eliminated. Prescribed burning is the most efficient method to get rid of these fuels. In 1998, 3,000 prescribed fires were used to burn approximately 163,000 acres statewide.[53]

Firewise

Firewise is a program developed within the National Wildland/Urban Interface Fire Protection Program, and it is the primary federal program addressing interface fire. It is administered through the National Wildfire Coordinating Group whose extensive list of participants includes a wide range of federal agencies. The program is intended to empower planners and decision makers at the local level. Through conferences and information dissemination, Firewise increases support for interface wildfire mitigation by educating professionals and the general public about hazard evaluation and policy implementation techniques. Firewise offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences. The interactive home page allows users to ask fire protection experts questions, and to register for new information as it becomes available.

For more information on the Firewise program, contact:
The Wildland/Urban Interface Fire Program
C/o The National Fire Protection Association
1 Batterymarch Park, Quincy, MA 02269 - http://www.firewise.org

FireFree Program

FireFree is a unique private/public program for interface wildfire mitigation involving partnerships between an insurance company and local government agencies. It is an example of an effective non-regulatory approach to hazard mitigation. Originating in Bend, Oregon, the program was developed in response to the city's "Skeleton Fire" of 1996, which burned over 17,000 acres and damaged or destroyed 30 homes and structures.[54] Bend sought to create a new kind of public education initiative that emphasized local involvement. SAFECO Insurance Corporation was a willing collaborator in this effort. Bend's pilot program included:

For information on FireFree, contact:

SAFECO Plaza T-8,
Seattle, WA 98185, (206) 545-6188
http://www.FireFree.org

- A short video production featuring local citizens as actors, made available at local video stores, libraries, and fire stations;
- Two city-wide yard debris removal events;
- A 30-minute program on a model FireFree home, aired on a local cable television station; and
- Distribution of brochures, featuring a property owner's evaluation checklist and a listing of fire-resistant indigenous plants.

The success of the program helped to secure $300,000 in Federal Emergency Management Agency (FEMA) "Project Impact" matching

funds. By fostering local community involvement, FireFree also has the potential for building support for sound interface wildfire policy.

Wildfire Mitigation Action Items

The mitigation action items for wildfire were formulated through research of regional mitigation plans, natural hazards planning literature, and interviews with local stakeholders. Plan action items were refined through discussions with the mitigation plan steering committee and through an open house at which the county received comments from the public.

The wildfire mitigation action items provide direction on specific activities that organizations and residents in Yamhill County can undertake to reduce risk and prevent loss from wildfires. Each action item is followed by ideas for implementation, which can be used by local decision makers in pursuing strategies for implementation.

This section lists action items identified to reduce the risk from wildfires in Yamhill County. These action items are designed to meet the mitigation plan goals.

Short-term (ST) Wildfire Action Items

Short-term wildfire action items include general mitigation activities that agencies are capable of implementing during the next two years, given their existing resources and authorities.

ST-WF #1: Work with the Yamhill Fire Defense Board in the review of plans and inspection of structures, access and water supply for fire code compliance.

Note: Currently, construction plans for commercial and industrial structures are reviewed, but not residential plans. Identification of areas with lack of experienced fire staff to review plans may be necessary.

Coordinating Organization:	Building Department
Internal Partners:	Public Works, Planning, Emergency Management
External Partners:	Yamhill Fire Defense Board, State Fire Marshal
Timeline:	1 year and on-going
Plan Goals Addressed:	Partnerships; Preventive; Natural Resources Utilization

ST-WF #2: Develop a Community Wildfire Protection Plan for susceptible wildland/ urban interface (WUI) areas in Yamhill County.

Coordinating Organization:	Emergency Management
Internal Partners:	Public Works, GIS, Planning
External Partners:	Yamhill Fire Defense Board, State Fire Marshal, Oregon Department of Forestry
Timeline:	1 to 2 years; on-going
Plan Goals Addressed:	Emergency Operations; Partnerships; Preventive

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ST-WF #3: Advocate water storage facilities with fire-resistant electrical pump systems in developments not connected to a community water/hydrant system.

Ideas for Implementation

- Make such storage facilities accessible by standard firefighting equipment and adequate for the needs of the structure(s) built; and
- Encourage the use of fire-resistant electrical pump systems so water can be replenished during use.

Coordinating Organizations:	Yamhill Fire Defense Board, State Fire Marshal
Internal Partners:	Building, Planning
External Partner:	ODF
Timeline:	On-going
Plan Goals Addressed:	Emergency Operations; Preventive; Natural Resources Utilization; Implementation

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ST-WF #4: Continue to promote public awareness campaigns for individual property owners living in the wildland/urban interface (WUI).

Ideas for Implementation

- Focus on individual community outreach through:
  - Working demonstrations of risk reduction awareness measures (i.e., survivable space around structures; driveway, road and bridge specifications; and landscaping) at the State Fair and the Oregon Garden;
  - Voluntary site visits by fire crews to consult with landowners about specific ways to reduce risk to their property and to identify properties that would not be saved if a wildfire event occurred;
  - Mailings;
  - Public service announcements in the media;
  - Suggest to prospective rural home buyers to ask about the level of fire protection available and fire insurance rating for properties in Yamhill County; and

- Noxious weed abatement.

- Encourage the use of hazard-specific information to identify wildfire hazard areas, and promote the use of mitigation strategies and opportunities to reduce risks; and
- Assess available fire suppression assistance and disseminate information about opportunities to the public.

Coordinating Organization:	Emergency Management
Internal Partner:	Planning
External Partners:	City emergency management, media, OEM, FEMA, DLCD, State Fire Marshal, ODF, insurance and real estate industries, ODA, Oregon Garden, State Fair, Yamhill SWCD
Timeline:	1 to 5 years, on-going
Plan Goals Addressed:	Emergency Operations; Education & Outreach; Partnerships; Preventive; Natural Resources Utilization

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ST-WF #5: Seek funding and labor opportunities to staff fuel-reduction projects throughout wildfire hazard-prone areas in Yamhill County

Ideas for Implementation

- Work on Wildfire Hazard mapping of Yamhill County to identify areas and homes that would most benefit from fuel reduction projects;
- Promote opportunities for landowners to utilize fuel reduction projects;
- Enable communities and agencies to quickly transform grant opportunities to on-the-ground projects; and
- Investigate potential funding opportunities for individual mitigation projects.

Coordinating Organization:	Emergency Management
Internal Partner:	GIS
External Partners:	Yamhill Fire Defense Board, State Fire Marshal, ODF, BLM, USFS, The Confederated Tribes of Grand Ronde, Yamhill SWCD
Timeline:	2 years
Plan Goals Addressed:	Education & Outreach; Preventive; Natural Resources Utilizations

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ST-WF #6: Create incentives and assist landowners in reducing fuel loads on private property.

Ideas for Implementation

- Investigate potential funding opportunities for individual mitigation projects; and

- Develop, approve, and promote cost share and assistance programs for landowners seeking fire mitigation activities and suppression preparedness.

Coordinating Organization:	Emergency Management
External Partners:	Yamhill Fire Defense Board, State Fire Marshal, ODF, insurance companies
Timeline:	1 to 2 years
Plan Goals Addressed:	Education & Outreach; Partnerships; Preventive; Natural Resources Utilization

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ST-WF #7: Increase communication, coordination, and collaboration between wildland/urban interface (WUI) property owners, city and county planners, and fire prevention crews and officials to address inherent risks in WUI areas, existing mitigation (prevention /protection) measures, and federal mitigation assistance programs.

Ideas for Implementation

- Encourage single-family residences in wildfire hazard areas to develop fire plans and promote homeowner wildfire hazard mitigation e.g., practice evacuation routes;
- Encourage fire safety surveys of residential homes by fire districts to increase awareness among homeowners and potential fire responders;
- Require fire department notification of new business applications to ensure that appropriate fire plans have been developed;
- Encourage Planning and Building Departments to work closely with landowners and/or developers who chose to build in the wildland/urban interface area to identify and mitigate conditions that aggravate wildland/urban interface wildfire hazards, including:
    1. Limited access for emergency equipment due to width and grade of roadways;
    2. Inadequate water supplies, and the spacing, consistency, and species of vegetation around structures;
    3. Inadequate water pressure for fire suppression;
    4. Inadequate fuel breaks, or lack of defensible space;
    5. Inappropriate i.e., highly flammable construction materials;
    6. Preexisting, older building lots and subdivisions that are not in compliance with state and local land use and fire protection regulations;
    7. Inadequate entry/escape routes.
- Encourage all new homes and major remodels involving roofs or additions located in the interface to have fire resistant roofs and residential sprinkler systems;

- Provide education and training to the public to assess if their homes meet fire safety performance standards;
- Partner with the Oregon Garden on safe plants for around an interface house. Encourage the Oregon Garden to create a display on defensible space around an interface house.
- Review development and building codes to ensure adequate requirements for sprinkler systems, setbacks, etc. in identified wildland interface areas;
- Encourage the public to evaluate access routes to rural homes for fire-fighting vehicles and to develop passable routes if they do not exist; and
- Close and/or limit access to roads in the forest during high fire hazards.

Coordinating Organization:	Planning, Building
Internal Partners:	Emergency Management
External Partners:	Yamhill Fire Defense Board, ODF, State Fire Marshal; Oregon Garden, OSU Extension, BLM, Timber Industry
Timeline:	1 to 5 years, on-going
Plan Goals Addressed:	Emergency Operations; Education & Outreach; Partnerships; Preventive; Natural Resources Utilization; Implementation

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ST-WF #8: Seek improved information gathering and distribution, and technology for enhancing fire identification, initial response and evacuation if necessary.

Ideas for Implementation

- Update wildland/urban interface hazard maps;
- Conduct risk analysis incorporating data and the created hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities; and
- Encourage development and use of new data and systems to identify hazard areas and better inform firefighters, communities and landowners of wildfire status once a fire occurs.

Coordinating Organization:	Emergency Management
Internal Partners:	GIS, Planning
External Partners:	State Fire Marshal, ODF, Yamhill Fire Defense Board, Confederated Tribes of Grand Ronde
Timeline:	1 to 3 years
Plan Goals Addressed:	Emergency Operations; Education & Outreach, Partnerships; Preventive; Natural Resources Utilization; Implementation

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ST-WF #9: Enhance emergency services to increase the efficiency of wildfire response and recovery activities.

Ideas for Implementation

- Develop a county call list that includes all at-risk urban/wildland interface residents in Yamhill County in order to contact them during evacuations; and
- Inventory bridges on evacuation routes, assess the bridges for their ability to support fire apparatus ingress, and encourage replacement of unstable bridges.

Coordinating Organization:	Yamhill Fire Defense Board
Internal Partner:	Public Works
External Partners:	State Fire Marshal, ODF, telephone companies
Timeline:	2 years
Plan Goals Addressed:	Emergency Operations; Partnerships; Preventive

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ST-WF #10: Educate agency personnel on federal cost-share and grant programs, fire protection agreements, and other related federal programs so the full array of assistance available to local agencies is understood.

Ideas for Implementation

- Investigate potential funding opportunities for individual mitigation projects; and
- Develop, approve, and promote Fire Protection Agreements and partnerships to clarify roles and responsibilities and to provide for fire mitigation activities and suppression preparedness.

Coordinating Organization:	Yamhill Fire Defense Board, Emergency Management
External Partners:	State Fire Marshal, ODF, FEMA
Timeline:	1 to 2 years
Plan Goals Addressed:	Emergency Operations; Education & Outreach; Partnerships; Implementation

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ST-WF #11: Identify funding for and develop an inventory of alternative firefighting water sources and encourage the development of additional sources.

Ideas for Implementation

- Advocate for water storage facilities with fire-resistant electrical pump systems in residential developments outside of fire protection districts that are not connected to a community water or hydrant system;

- Develop a protocol for fire jurisdictions and water districts to communicate all hydrant outages and water shortage information; and
- Maintain access roads and ramps to artificial and natural water sources.

Coordinating Organization:	Emergency Management
External Partners:	Yamhill Fire Defense Board, State Fire Marshal, Oregon Association of Water Utilities (OAWU), irrigation districts, Yamhill SWCD, NRCS, Yamhill Basin Council, cities
Timeline:	1 to 2 years
Plan Goals Addressed:	Emergency Operations; Partnerships; Preventive; Natural Resources Utilization

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ST-WF #12: Identify funding for and develop an inventory of firefighting hardware to be better prepared when attacking wildfires.

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Coordinating Organization:	Emergency Management
External Partners:	Yamhill Fire Defense Board, ODF, USFS, BLM
Timeline:	1 to 2 years
Plan Goals Addressed:	Emergency Operations; Partnerships

ST-WF #13: Identify funding for and develop wildland fire training for fire districts near and/or within WUI communities.

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Coordinating Organization:	Emergency Management
External Partners:	Yamhill Fire Defense Board, State Fire Marshal, ODF, USFS, BLM
Timeline:	1 to 2 years
Plan Goals Addressed:	Emergency Operations; Education & Outreach; Preventive

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Long-term (LT) Wildfire Action Items

Long-term wildfire action items include general mitigation activities that are likely to take more than two years to implement and may require new or additional resources and/or authorities.

LT-WF #1: Promote the expansion of rural fire districts.

Coordinating Organizations:	Yamhill Fire Defense Board, County Assessor
Internal Partner:	Emergency Management

External Partners: Yamhill Rural Fire Districts, State Fire Marshal, ODF
Timeline: On-going
Plan Goals Addressed: Emergency Operations; Partnerships; Preventive

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LT-WF #2: Look for solutions to protect structures located outside of fire districts through partnerships, grant funding or expansion of fire district services.

Ideas for Implementation

- Form community partnerships that are equipped and trained by fire district personnel to combat fires in those areas.

Coordinating Organization: Emergency Management
External Partners: State Fire Marshal, Yamhill Fire Defense Board, ODF; The Confederated Tribes of Grand Ronde
Timeline: On-going
Plan Goals Addressed: Emergency Operations; Education & Outreach; Partnerships; Preventive; Natural Resources Utilization

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LT-WF #3: Reduce wildfire fuels.

Ideas for Implementation

- Identify methods of disposal or utilization of fire fuels removed from individual properties (i.e., prescribed fire application, fuel reduction through grass/timber/brush removal, small diameter forest product-based industries, chipping, etc.);
- Adapt a program similar to the "Firefree" spring-cleaning program in Bend; and
- Adapt a program similar to Deschutes County's "Project Wildfire," which encourages fuel-reduction activities and programs.

Coordinating Organization: Emergency Management
Internal Partner: Planning
External Partners: Yamhill Fire Defense Board, ODF, State Fire Marshal, BLM, USFS, The Confederated Tribes of Grand Ronde
Timeline: 3 to 5 years
Plan Goals Addressed: Emergency Operations; Education & Outreach; Partnerships; Preventive; Natural Resources Utilization; Implementation

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LT-WF #4: Promote and continue support of agricultural uses that reduce fuel loads in WUI areas.

Ideas for Implementation

- Educate the public on how agriculture can help to reduce fuel loads in interface areas; and
- Investigate and seek funding for conventional, chemical and biological fuel reduction and weed control programs.

Coordinating Organization:	Yamhill SWCD
Internal Partner:	Planning
External Partners:	NRCS, Yamhill Basin Council, OSU Extension, ODF, ODA
Timeline:	On-going
Plan Goals Addressed:	Education & Outreach; Partnerships; Preventive; Natural Resources Utilization; Implementation

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LT-WF #5: Maintain and further develop interagency and private industry relationships for continuing strong fire response in Yamhill County.

Ideas for Implementation

- Maintain and enhance protocol for fire jurisdictions, private industry cooperators and landowners to avoid problems during wildfire chaos; and
- Promote and advocate reduction of "red tape" to enable faster private industry assistance (use of vehicles, manpower, etc.) in a wildfire situation.

Coordinating Organization:	Emergency Management
Internal Partner:	Public Works
External Partners:	Yamhill Fire Defense Board, State Fire Marshal, USFS, BLM, Confederated Tribes of Grand Ronde, timber industry, jobs in the woods programs
Timeline:	On-going
Plan Goals Addressed:	Education & Outreach; Partnerships; Preventive; Natural Resources Utilization

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LT-WF #6: Seek funding to develop and implement, or enhance existing outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural hazards.

Ideas for Implementation:

Outreach

- Encourage the hiring of fire prevention and education personnel to oversee education programs;

- Visit urban interface neighborhoods and rural areas and conduct education and outreach activities;
- Conduct specific community-based demonstration projects for fire prevention and mitigation in the urban interface; and
- Perform public outreach and information activities at Fire District fire stations by creating "Wildfire Awareness Week" activities. Fire stations can hold open houses and allow the public to visit, see the equipment, and discuss wildfire mitigation with the station crews.

Education

- Encourage communities in the wildland/urban interface to develop public awareness programs and land use development policies that ensure specific recommendations for wildfire mitigation policies, programs, and community-based activities that will be implemented; and
- Develop a "preventative approach" campaign by educating the public on hazardous human activities that should be regulated and controlled because of the danger of starting fires, including residential pile burning and industrial slash burning, campfires, smoking, and the use of fireplaces without spark arrestors.

Coordinating Organization:	Emergency Management
Internal Partner:	Planning
External Partners:	Yamhill Fire Defense Board, school districts, OEM, ODF, cities
Timeline:	On-going
Plan Goals Addressed:	Education & Outreach; Partnerships; Preventive; Natural Resources Utilization; Implementation

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LT-WF #7: Encourage development and dissemination of maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities, and to help guide emergency services during response.

Ideas for Implementation:

- Identify and establish a data-collection mechanism in coordination with county, state, and local governments, fire agencies, the insurance industry, and the National Fire Protection Association;
- Using collected data and research, assess the nature and scope of the wildland/urban interface fire problem in Yamhill County;
- Conduct risk analysis incorporating data and the county's hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities; and
- Encourage coordination between fire jurisdictions and County GIS to make sure that the most accurate elevation maps are being used.

Coordinating Organization: Emergency Management

Internal Partners:	GIS, Planning
External Partners:	State Fire Marshal, Yamhill Fire Defense Board, ODF, DLCD, cities, insurance industry, National Fire Protection Association, utilities
Timeline:	1 to 3 years
Plan Goals Addressed:	Education & Outreach; Partnerships; Preventive; Natural Resources Utilization; Implementation

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LT-WF #8: Encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.

Ideas for Implementation:

- Employ mechanical thinning and prescribed burning to abate the risk of catastrophic fire and restore the more natural regime of high frequency, low-intensity burns. Prescribed burning can provide benefits to ecosystems by thinning hazardous vegetation and restoring ecological diversity to areas homogenized by invasive plants;
- Use a variety of appropriate tools (prescribed fire application, fuel reduction through grass/timber/brush removal, small diameter forest product-based industries, etc.) to address the complex issue of mitigating wildfire hazards in urban/interface areas; and
- Clear trimmings, trees, brush, and other debris completely from sites when performing routine maintenance and landscaping to reduce fire risk.

Coordinating Organization:	Emergency Management
Internal Partner:	Public Works
External Partners:	Yamhill Fire Defense Board, ODF, Yamhill SWCD, Yamhill Basin Council, utilities, Confederated Tribes of the Grand Ronde, land managers
Timeline:	1 to 5 years, on-going
Plan Goals Addressed:	Education & Outreach; Partnerships; Preventive; Natural Resources Utilization; Implementation

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Wildfire Resource Directory

Regional Resources

Northwest Interagency Coordination Center (NWCC)

The Northwest Interagency Coordination Center serves as the northwest area geographic focal point to provide logistical support and intelligence relative to anticipated and ongoing wildfire activity for all federal and cooperating state wildland fire suppression agencies. The

Center facilitates movement of resources between agencies' units and, concurrently, ensures fire suppression capabilities to support large fire potential by monitoring weather and prescribed burning activity within the area. The Center also responds to requests for support to other geographic areas from the National Interagency Coordination Center at Boise, ID.

Contact: Northwest Coordination Center
Address: 5420 NE Marine Drive, Portland, OR 97218-1007
Phone: 503-808-2720
Fax: 503-808-2789
Email: ornwc@dms.nwcg.gov
Website: http://www.or.blm.gov/nwcc/

State Resources

Department of Land Conservation and Development (DLCD)

DLCD administers the state's Land Use Planning Program. The program is based on 19 Statewide Planning Goals, including Goal 7, related to natural hazards. In order to help local governments address natural hazards effectively, DLCD provides technical assistance such as conducting workshops, reviewing local land use plan amendments, and working interactively with other agencies.

Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: 503-373-0050
Fax: 503-378-6033
Website: http://www.lcd.state.or.us/hazards.html

Oregon Department of Consumer and Business Services

The Building Codes Division of Oregon's Department of Consumer and Business Services is responsible for administering statewide building codes. Its responsibilities include adoption of statewide construction standards that help create disaster-resistant buildings, particularly for flood, wildfire, wind, foundation stability, and seismic hazards. Information about wildfire-related building codes is found through this department.

Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, OR 97309
Phone: 503-378-4133
Fax: 503-378-2322
Website: http://www.cbs.state.or.us/external/bcd

Oregon Department of Forestry (ODF)

ODF's Fire Prevention Unit is involved in interface wildfire mitigation and provides information about Oregon's Wildfire Hazard Zones. The Protection From Fire section of the ODF website includes Oregon-specific fire protection resources. Wildfire condition reports can be accessed on the website as well. ODF's Protection from Fire Program works to do the following:

- Clarify roles of ODF, landowners, and other agencies in relation to wildland fire protection in Oregon;
- Strengthen the role of forest landowners and the forest industry in the protection system;
- Understand and respond to needs for improving forest health conditions and the role/use of prescribed fire in relation to mixed ownerships, forest fuels and insects and disease; and
- Understand and respond to needs for improving the wildland/urban interface situation.

Contact: Oregon Department of Forestry, Fire Prevention Unit
Address: 2600 State Street, Salem, Oregon 97310
Phone: 503-945-7440
Website: http://www.odf.state.or.us/fireprot.htm

Oregon Forest Resources Institute (OFRI)

The Oregon Legislature created the Oregon Forest Resources Institute (OFRI) in 1991 to improve public understanding of the state's forest resources. OFRI provides information on Oregon's forest practices and encourages sound forest management. The Institute is funded by a tax on forest products producers.

Contact: Oregon Forest Resources Institute
Address: 317 SW Sixth Avenue, #400, Portland, OR 97204
Phone: 503-229-6718
Fax: 503-229-5823
Email: **info@ofri.com**
Website: http://www.forestresourceinstitute.com/

Oregon State Police (OSP)-Office of Emergency Management (OEM)

The purpose of OEM is to execute the Governor's responsibilities to maintain an emergency services system as prescribed in Oregon Revised Statutes Chapter 401 by planning, preparing, and providing for the prevention, mitigation, and management of emergencies or disasters that present a threat to the lives and property of citizens of and visitors to the state of Oregon.

Contact: Office of Emergency Management
Address: 3225 State Street, Salem, OR 97301
Phone: 503-378-2911
Fax: 503-373-7833
Website: http://www.osp.state.or.us/oem/

Office of the State Fire Marshal (OSFM)

The Prevention Unit of Oregon's Office of the State Fire Marshal contains 19 Deputy State Fire Marshals located in various regions. The responsibilities of these deputies include public education for local fire districts and inspection of businesses, public assemblies, schools, daycare centers, and adult foster homes. The State Fire Marshal's Community Education Services unit works to keep Oregonians safe

from fires and injury by providing them with the knowledge to protect themselves and their property.

Contact: Oregon State Fire Marshal
Address: 4760 Portland Road NE, Salem, Oregon 97305-1760
Phone: 503-378-3473
Fax: 503-373-1825
Website: http://159.121.82.250/
Oregon Laws Relating to Fire Protection:
http://159.121.82.250/SFM_Admin/firelaws.htm
Email: Oregon.sfm@state.or.us

Office of the State Fire Marshal (OSFM) – Emergency Mobilization

The Office of State Fire Marshal assists and supports the Oregon fire services during major emergency operations through the Conflagration Act (ORS 476.510). The Conflagration Act was developed in 1940 as a civil defense measure and can be invoked only by the Governor. The act allows the State Fire Marshal to mobilize firefighters and equipment from around the state and provides for the funding of resources through state funds. The Conflagration Act is **only** used for fires that involve or **threaten life and structures**.

Website:
http://www.sfm.state.or.us/Em%20Mob_Conflag%20Act/Emergency_Mobilization%20HOME.htm

Federal Resources and Programs

Federal Emergency Management Agency (FEMA)

FEMA's mission is "to reduce loss of life and property and protect our nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response and recovery." FEMA Region X serves the northwestern states of Alaska, Idaho, Oregon, and Washington.

Contact: FEMA, Federal Regional Center, Region 10
Address: 130-228th St. SW, Bothell, WA 98021-9796
Phone: 425-487-4678
Website: http://www.fema.gov/Reg-X/index.htm

Federal Wildland Fire Policy, Wildland/Urban Interface Protection

This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions.

Website: http://www.fs.fed.us/land/wdfire7c.thm

National Fire Protection Association (NFPA)

This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiative's programs and documents. Other members of the initiative include the National Association of State

Foresters, the US Department of Agriculture Forest Service, the US Department of the Interior, and the United States Fire Administration.

Contact: Public Fire Protection Division
Address: 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101
Phone: (617) 770-3000
Website: http://www.nfpa.org

National Interagency Fire Center (NIFC)

The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service, National Weather Service, and Office of Aircraft Services.

Contact: National Interagency Fire Center
Address: 3833 S. Development Avenue, Boise, Idaho 83705-5354
Phone: 208-387-5512
Website: http://www.nifc.gov/

United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)

As an entity of FEMA, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination, and support.

Contact: USFA, Planning Branch, Mitigation Directorate
Address: 16825 S. Seton Ave., Emmitsburg, MD 21727
Phone: 301-447-1000
Website: http://www.fema.gov/mit/wfmit.htm - Wildfire Mitigation Planning
http://www.usfa.fema.gov/index.htm - USFA Homepage
http://www.usfa.fema.gov/wildfire/ - USFA Resources on Wildfire

United States Forest Service (USFS)

The USFS is a federal land management organization established to manage the nation's federally owned forests. As part of the Department of Agriculture, it provides timber for people, forage for cattle and wildlife, habitat for fish, plants, and animals, and recreation lands throughout the country.

The USFS offers a possible link for local jurisdictions to federal grant programs.

Contact: USDA Forest Service - Pacific Northwest Region
Address: 333 SW First Avenue, Portland, Oregon 97204-3440;
P.O. Box 3623, Portland, OR 97208-3623
Phone: 503-808-2468
Website: http://www.fs.fed.us/r6/welcome.htm

Additional Resources

American Red Cross

The American Red Cross is a humanitarian organization led by volunteers that provides relief to victims of disasters and helps people prevent, prepare for, and respond to emergencies. The Oregon Trail Chapter was chartered as a Red Cross unit in 1917. The chapter serves the residents of Clackamas, Clatsop, Columbia, Multnomah, Tillamook, Washington and Yamhill counties. The Oregon Trail Chapter provides a variety of community services, which are consistent with the Red Cross mission, and meets the specific needs of this area, including disaster planning, preparedness, and education.

Contact: American Red Cross, Oregon Trail Chapter
Address: 3131 N Vancouver Ave, Portland, OR 97227-1560
P.O. Box 3200, Portland, OR 97208
Phone: 503-284-1234
Fax: 503-284-4247
Email: info@redcross-pdx.org
Website: http://www.redcross-oregontrail.org

Institute for Business & Home Safety (IBHS)

IBHS was created as an initiative of the insurance industry to reduce damage and losses caused by natural disasters. This website provides educational resources and on-line publications for insurers, businesses, and homeowners who are interested in taking the initiative to minimize future damages and losses.

Contact: Institute for Business and Home Safety
Address: 1408 North Westshore Boulevard - Suite 208 - Tampa, FL 33607
Phone: 813-286-3400
Fax: 813-286-9960
E-mail: info@ibhs.org
Website: http://www.ibhs.org/ibhs2

FireFree Program to Promote Home Safety

In a pioneering effort to address wildfire danger in Bend, Oregon, four local agencies and a Fortune 500 corporation joined together to create "FireFree! Get In The Zone," a public education campaign designed to increase resident participation in wildfire safety and mitigate losses. Spearheaded by SAFECO Corporation, the partnership includes the Bend Fire Department, Deschutes County Rural Fire Protection District #2, Bend City Planning, and The Deschutes National Forest. The Oregon Department of Forestry and a number of local government agencies and businesses have joined the program.

Contact: FireFree
Address: 1212 SW Simpson, Bend, OR 97701
Phone: 541-322-6309
Website: http://www.firefree.org

Deschutes Project Wildfire

Community leaders in Deschutes County formed Project Wildfire in 2002. The mission of Project Wildfire is to reduce deaths, injuries, property, and environmental damage resulting from wildfires in Deschutes County. They seek to involve all communities while creating public-private partnerships that develop and implement pre-disaster strategies and activities. Project Wildfire incorporates a variety of funding sources to add to existing programs and/or build new needed programs. A governing committee sanctioned by the Deschutes County Commission oversees the business, policy and public awareness of Project Wildfire. The OSU Extension Service serves as coordination staff to manage grants and provide accountability to funding entities.

Contact: Teresa Hogue, Project Wildfire Coordinator
Address: OSU Extension, 3893 Airport Way, Redmond, OR 97756
Phone: 541-548-6088
Fax: 541-548-8919
E-mail: teresa.hogue@oregonstate.edu
Website: http://impact.deschutes.org/

Firewise – The National Wildland/Urban Interface Fire program

Firewise maintains a Website designed for people who live in wildfire-prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences.

Contact: Firewise
Address: 1 Batterymarch Park, Quincy, MA 02269
Phone: 617-984-7056
E-mail: firewise@firewise.org
Website: http://www.firewise.org/

Society of American Foresters (SAF)

The Society of American Foresters (SAF) is the national scientific and educational organization representing the forestry profession in the United States. The mission of the SAF is to, in part, advance the science, education, technology, and practice of forestry; and to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society. The Oregon SAF is the largest state affiliate of the national Society. The Capital Chapter serves Yamhill, Polk and Marion Counties.

Contact: Society of American Foresters
Address: 5400 Grosvenor Lane, Bethesda, MD 20814-2198
Phone: 301-897-8720
Fax: 301-897-3690
E-mail: safweb@safnet.org
Website: http://www.safnet.org

Contact: Oregon Society of American Foresters
Address: 4033 SW Canyon Road, Portland, OR 97221
Phone: 503-224-8046
Fax: 503-226-2515
E-mail: rasor@safnwo.org
Website: http://www.forestry.org

Publications

Schwab, Jim, and Stuart Meck. *Planning for Wildfires.* PAS 429/530. Chicago, IL: American Planning Association. 2005.

This report outlines how knowledge of wildfire risks can be incorporated into comprehensive planning and identifies best practices for development in at-risk areas.

Contact: American Planning Association, Planners Book Service
Phone: 312-786-6344
Fax: 312-431-9985
Website: www.planning.org

National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire. National Wildland/Urban Interface Fire Protection Program, (1991). National Fire Protection Association, Washington, D.C.

This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers, and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:

Contact: National Fire Protection Association Publications
Phone: 800-344-3555

Website: http://www.firewise.org

An International Collection of Wildland-Urban Interface Resource Materials (Information Report NOR-X-344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.

This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles, and public education materials. The citation format allows the reader to obtain most items through a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form. To obtain this resource:

Contact: Canadian Forest Service, Northern Forestry Centre
Phone: 780-435-7210
Website: http://bookstore.pfc.dfs.nrcan.gc.ca

Wildland/Urban Interface Fire Hazard Assessment Methodology. National Wildland/Urban Interface Fire Protection Program, (1998), NFPA, Washington, D.C. To obtain this resource:

Contact: Firewise (NFPA Public Fire Protection Division)
Phone: 617-984-7486
Website: http://www.firewise.org

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility. National Wildland/Urban Interface Fire Protection Program. (1998). Washington, D.C.: Author. To obtain this resource:

Contact: Firewise (NFPA Public Fire Protection Division)
Phone: 617-984-7486
Website: http://www.firewise.org

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local staffs and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:

Contact: Natural Hazards Program Manager
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: 503-373-0050
Fax: 503-378-6033
Website: http://www.lcd.state.or.us/hazards.html

Burning Questions. A Social Science Research Plan for Federal Wildland Fire Management, Machlis, G., Kaplan, A., Tuler, S., Bagby, K., and McKendry, J. (2002) National Wildfire Coordinating Group.

The plan covers a wide range of topics and questions related to the human dimensions of federal wildland fire management. Both the beneficial and harmful affects of wild land fire are considered. The plan includes research in the social sciences or anthropology, economics, geography, psychology, political science, and sociology, as well as interdisciplinary fields of research. The plan is national in scale but recognizes the importance of regional variation in wild land fire issues.

Contact: Sheila Williams, National Interagency Fire Center
Phone: 208-387-5203
Email: Sheila_Williams@nps.gov
Website: http://www.nwcg.gov/whatnew.htm or http://www.campusi.com/isbn_0756726158.htm

Forest Fire Risk and Restoration. 2004. Oregon Forest Resources Institute.

This 20-page report, full of color photographs, illustrations and charts, investigates what can be done to enhance the recovery of forest ecosystems that have been damaged by fire. It examines options for reducing the risk of large-scale fires recurring where uncharacteristically intense fires have occurred, and it looks at the short- and long-term consequences of each restoration option versus taking no action at all.

Contact: Oregon Forest Resources Institute
Address: 317 SW 6th Avenue, Suite 400, Portland, OR 97204
Fax: 503-229-5823
Website: http://forestresourceinstitute.com/

The Western Forester (periodical). Society of American Forester's publication.

The *Western* Forester is an official publication of the Society of American Foresters. It is issued bi-monthly by the Oregon and Washington State Societies of American Foresters and is produced by the SAF Northwest Office. The publication promotes a timely exchange of quality resource management information among foresters, resource managers, and those in related disciplines. Each issue focuses on a specific theme in addition to including other articles of interest to foresters.

Contact: Aimee Sanders, Assistant Editor
Phone: 503-224-8046
Email: aimee@safnwo.org
Website: http://www.forestry.org

Wildfire - Endnotes

[1] Federal Register, V. 66, N. 16. August 17, 2001.

[2] Yamhill Basin Council. June 2001. *Chehalem Watershed Assessment*. Yamhill and Polk Counties, Oregon.

[3] Zybach, Bob. 1993. *The Great Fires: Indian Burning and Catastrophic Forest Fire Patterns of the Oregon Coast Range, 1491-1951*. Oregon State University Press. Corvallis, OR.

[4] *Chehalem Watershed Assessment*. June 2001.

[5] Zybach, Bob. 1993. *The Great Fires*.

[6] Id.

[7] *Chehalem Watershed Assessment*. June 2001.

[8] Id.

[9] Yamhill Basin Council. August 2, 1999. *Willamina Watershed Assessment*. Yamhill and Polk Counties, Oregon.

[10] Id.

[11] Wilkinson, Todd. May/June 2001. "Prometheus Unbound." *Nature Conservancy*.

[12] National Interagency Fire Center. May 2001. National Register of Urban Wildland Interface Communities Within the Vicinity of Federal Lands that are at High Risk from Wildfire. http://www.nifc.gov/fireplan/fedreg.html.

[13] http://www.biscuitfire.com/

[14] Garnet, Ley. "Governor Declares State of Emergency." Oregon Public Broadcasting webpage. August 22, 2003. http://www.publicbroadcasting.net/opb/news.newsmain?action=article&ARTICLE_ID=537432

[15] Oregon Department of Forestry Webpage. September 2003. http://www.odf.state.or.us/DIVISIONS/resource_policy/public_affairs/News_Releases/daily/Default.asp

[16] *The Olympian* webpage. http://www.theolympian.com/home/news/20030903/northwest/91088.shtml Accessed September 03, 2003.

[17] DeBano, Leonard, Daniel Neary, and Peter Folliott. 1998. *Fire's Effects on Ecosystems.* Page 21.

[18] Id at 22.

[19] Id.

[20] Id at 49.

[21] Id. at 304.

[22] Id.

[23] Department of Land Conservation and Development. July 2000. *Planning for Natural Hazards: The Oregon Technical Resource Guide*. Chapter 7.

[24] Robert Olson Associates. June 1999. *Metro Regional Hazard Mitigation Policy and Planning Guide*. Portland, OR: Metro.

[25] Introductory language in Senate Bill 360. July 2001. Accessed from the ODF website, http://www.odf.state.or.us/fireprot/sb360.html.

[26] Department of Land Conservation and Development (DLCD). July 2000. *Planning for Natural Hazards: The Oregon Technical Resource Guide*. Chapter 7.

[27] DeBano, L., D. Neary, and P. Folliott. 1998. *Fire's Effects on Ecosystems*. Page 59.

[28] Id.

[29] DLCD. July 2000. *Planning for Natural Hazards.* Ch. 7.

Id.

[31] Id.

[32] *The Oregonian*. February 25, 2001.

[33]Tomlinson, Stuart. "Dry, With a Dismal Outlook." *The Oregonian*. March 11, 2005. http://www.oregonlive.com/news/oregonian/index.ssf?/base/front_page/1110539 25353810.xml

[34] *The Oregonian*, Feb. 25, 2001.

[35] Tomlinson, Stuart. "Dry, With a Dismal Outlook." *The Oregonian*. March 11, 2005. http://www.oregonlive.com/news/oregonian/index.ssf?/base/front_page/1110539 25353810.xml

[36] Id.

[37] Oregon Governor Ted Kulongoski's "2005 Oregon Drought and Fire Conditions" Website http://governor.oregon.gov/Gov/fd/main_drought_fire.shtml. Accessed 23 March 2005.

[38] DLCD. *Planning for Natural Hazards.* Ch. 7.

[39] Burby, R., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land Use Planning for Sustainable Communities.* Washington, D.C.: Joseph Henry Press.

[40] Id.

[41] Colorado State Forest Service. July 2001. http://205.169.13.227.

[42] Oregon Department of Forestry. 1999. *Oregon Forests Report.*

[43] Wolf, J. Oregon Department of Forestry. Personal interview. February 28, 2001.

[44] Id.

[45] Federal Wildland Fire Policy. July 2001. http://www.fs.fed.us/land/wdfire7c.htm.

[46] Id.

[47] Id.

[48] Harvey, M.J.. United States Forest Service. Personal interview. March 1, 2001.

[49] Harvey, M.J. United States Forest Service (USFS). Personal communication, March 1, 2001.

[50] Fleeger, B. Regional Ecosystem Applied Learning (REAL) Corps. Personal interview. June 30, 2003.

[51] Id.

[52] Harvey, M.J. United States Forest Service. Personal interview. March 1, 2001

[53] Id.

[54] http://www.firefree.org/ffreenew/index2a.htm, Accessed August 19, 2004.