Volume II: Hazard Annex
Wildfire

Community Wildfire Protection Plan

The Marion County Community Wildfire Protection Plan (CWPP) was developed in 2008, and is the result of a countywide effort initiated to reduce wildland fire risk to communities and their citizens, the environment, and quality of life within Marion County. Citizens, fire districts, county staff or elected officials, and agency representatives worked together to create a plan that would be successful in implementing fuels reduction projects, fire prevention education campaigns, and other fire related programs. The plan was developed by the local coordinating group comprised of rural fire protection districts, local government, state and federal agencies, and community-based organizations. Each year the coordinating group evaluates progress on implementing the CWPP and develops an annual action plan for implementation.

The 2008 CWPP expanded on the 2006 version of Marion County's Natural Hazards Mitigation Plan's wildfire chapter. The CWPP was designed to supplement information in the mitigation plan, and relevant information has been integrated into this chapter. However, the Marion County CWPP will remain the primary plan for wildfire mitigation in Marion County. For a complete copy of the CWPP, please see Marion County's website.

Causes and Characteristics of Wildfires

Fire is an essential part of Oregon's ecosystem, but it is also a serious threat to life and property particularly in the state's growing rural communities. Wildfires are fires occurring in areas having large areas of flammable vegetation that require a suppression response. Areas of wildfire risk exist throughout the state with areas in central, southwest and northeast Oregon having the highest risk. The Oregon Department of Forestry has estimated that there are about 200,000 homes in areas of serious wildfire risk.

The impact on communities from wildfire can be huge. In 1990, Bend's Awbrey Hall Fire destroyed 21 homes, causing $9 million in damage and costing over $2 million to suppress. The 1996 Skeleton fire in Bend burned over 17,000 acres and damaged or destroyed 30 homes and structures. Statewide that same year, 218,000 acres were burned, 600 homes threatened and 44 homes were lost. The 2002 Biscuit fire in southern Oregon affected over 500,000 acres and cost $150 million to suppress.

Wildfire can be divided into three categories: interface, wildland, and firestorms.

Interface Fires

Essentially an interface fire occurs where wildland and developed areas come together with both vegetation and structural development combining to provide fuel. The wildland/urban interface (sometimes called rural interface in small communities or outlying areas) can be divided into three categories.

- The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas.
- The mixed wildland/urban interface is more typical of the problems in areas of exurban or rural development: isolated homes, subdivisions, resorts and small communities situated in predominantly in wildland settings.
- The occluded wildland/urban interface where islands of wildland vegetation exist within a largely urbanized area.

Wildland Fires

A wildland fire's main fuel source is natural vegetation. Often referred to as forest or rangeland fires, these fires occur in national forests and parks, private timberland, and on public and private rangeland. A wildland fire can become an interface fire if it encroaches on developed areas.

Firestorms

Firestorms are events of such extreme intensity that effective suppression is virtually impossible. Firestorms often occur during dry, windy weather and generally burn until conditions change or the available fuel is consumed. The disastrous 1991 East Bay Fire in Oakland, California is an example of an interface fire that developed into a firestorm.

Conditions Contributing to Wildfires

Ignition of a wildfire may occur naturally from lightning or from human causes such as debris burns, arson, careless smoking, and recreational activities or from an industrial accident. Once started, four main conditions affect the fire's behavior: fuel, topography, weather and development.

Fuel is the material that feeds a fire. Fuel is classified by volume and type. As a western state, Oregon is prone to wildfires due to its prevalent conifer, brush and rangeland fuel types.

Topography influences the movement of air and directs a fire's course. Slope and hillsides are key factors in fire behavior. Unfortunately, hillsides with steep topographic characteristics are also desirable areas for residential development.

Weather is the most variable factor affecting wildfire behavior. High risk areas in Oregon share a hot, dry season in late summer and early fall with high temperatures and low humidity.

The increase in residential development in interface areas has resulted in greater wildfire risk. Fire has historically been a natural wildland element and can sweep through vegetation that is adjacent to a combustible home. New residents in remote locations are often surprised to learn that in moving away from built-up urban areas, they have also left behind readily available fire services providing structural protection.

History of Wildfire in Marion County

Marion County has experienced two large fires since Euro-American settlement and several smaller fires that occur almost annually. The largest fire to date was the 1865 Silverton fire that burned 988,000 acres of forest near Silverton. However, due to the few settlements in Oregon at that time, there was little damage to property that occurred.

The more recent B&B complex fire in 2003 caused extensive damage in eastern Marion County, Deschutes County, and Jefferson County. The B&B complex fire was 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 evacuated twice to avoid the fire's danger and Highway 20 was temporarily closed.[220] 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.[221] The B & B Complex fire burned into a portion of Marion County.

Marion County also experiences several smaller fires, which are depicted in Table 2 below.

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

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

Table 2: Statistical Fires within Marion County (2000 to 2009)

General Cause	Number of Fires	% of Total Fires	Acres
Lightning	8	5%	0.57
Equipment use	40	23%	1.41
Recreationist	17	10%	0.49
Smoking	4	2%	0.02
Debris Burning	58	34%	31.83
Arson	4	2%	0.06
Miscellaneous	40	23%	11.8
Total # of fires	**171**	**100%**	**46.18**

Source: Oregon Department of Forestry. Statistical Fires. Accessed online at http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/fires/SeasonFireStats.asp

Risk Assessment[222]

One of the core elements of a community fire plan is developing an understanding of the risk of potential losses to life, property and natural resources during a wildfire. This risk assessment adopts the approach produced by Oregon Department of Forestry (ODF) under the National Association of State Foresters (NASF) guidance which includes the following three risk objectives:

- Identify Communities-at-Risk and the Wildland-Urban Interface
- Develop and conduct a wildfire risk assessment of all land in Marion County.
- Identify and prioritize hazardous fuels treatment projects for all land in Marion County.

The Marion County wildfire risk assessment is the analysis of the potential losses to life, property and natural resources. The analysis takes into consideration a combination of factors defined below:

Risk: the potential and frequency for wildfire ignitions (based on past occurrences) Hazard: the conditions that may contribute to wildfire (fuels, slope, aspect, elevation and weather)

Values: the people, property, natural resources and other resources that could suffer losses in a wildfire event.

Protection Capability: the ability to mitigate losses, prepare for, respond to and suppress wildland and structural fires.

Structural Vulnerability: the elements that influence the level of exposure of the hazard to the structure (roof type and building materials, access to

[222] Taken from Chapter 3, 2008 Marion County Community Wildfire Protection Plan.

the structure, and whether or not there is defensible space or fuels reduction around the structure.)

How are Hazard Areas Identified?

To determine Communities at Risk, Marion County first had to define "community." State and federal guidance included a range of alternatives, from "a group of people living in the same locality and under the same government" (National Association of State Foresters) to "a body of people living in one place or district and considered as a whole" or "a group of people living together and having interests, work, etc. in common" (Firewise Communities/USA).

There are many ways to define community, particularly in Marion County. There are cities, rural communities, neighborhoods and groups of people drawn together by common threads – whether it is their post office, grocery store, community center, or fire station. Communities-at-Risk, for the purposes of this plan, are those areas within city or Rural Fire District boundaries of the fire department that provide fire protection services for the community. The Communities-at-Risk are surrounded by an additional area identified as the "Wildland Urban Interface" (WUI). The area where forest fuel can be modified to reduce fire behavior and spread so that wildland agencies can use the area to more effectively manage suppression fires from spreading to communities at risk and other important infrastructure.

Methods for identifying communities at risk require assessing:

1. Residential density: based on 1 structure per 40 acres with a minimum of 4 residences and ¼ mile buffer; and
2. Fire District. (In Marion County, there are 22 fire districts that provide structural fire protection.)

While several of Marion County's communities are listed as "unprotected," it is important to note that these communities are NOT without fire service. Several Rural Fire Protection Districts provide contract structural fire protection services throughout the unprotected areas of Marion County. It is important to note that these communities are not within a taxing fire district.

The Marion County CWPP identifies the following communities at risk based upon the methodology described above:

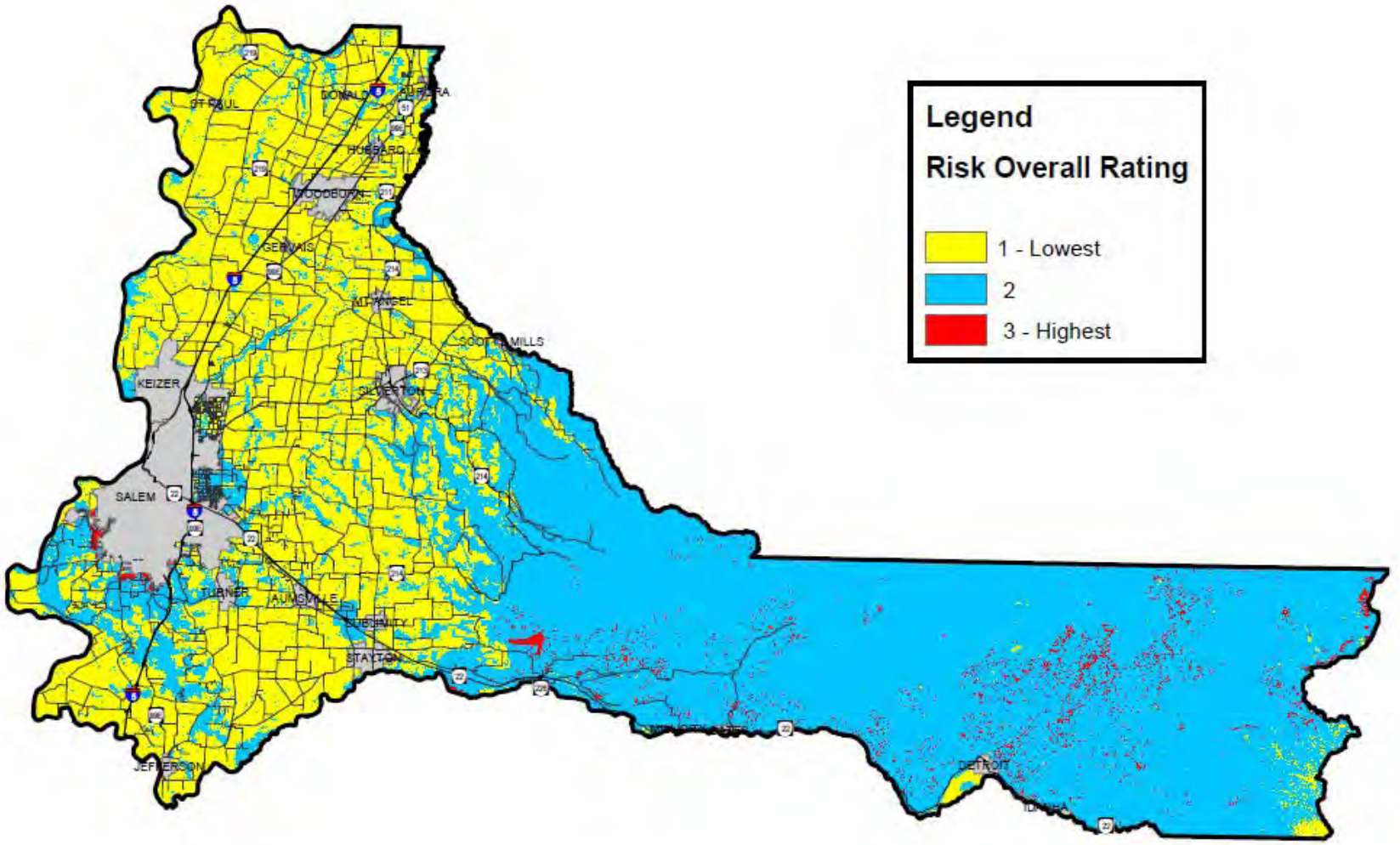
- Breitenbush
- Detroit
- Drakes Crossing
- Elkhorn (Little North Fork; Santiam Canyon)
- Gates
- Idanha
- Jefferson
- Lyons

- Marion
- Mehama
- Mill City
- Salem, south and east
- Scotts Mills
- Silverton
- Stayton
- Sublimity Fire District, outside city limits
- Turner

The extent of damage to these communities from wildfires is dependent on a number of factors, including temperature, wind speed and direction, humidity, proximity to fuels, and steepness of slopes.

General areas in Marion County that are at risk to wildfires are depicted in figure 1 below.

Figure 1 Marion County Areas at Risk to Wildfire.



Probability of Future Occurrence

The natural ignition of forest fires is largely a function of weather and fuel; human-caused fires add another dimension to the probability. Dry and diseased forests can be mapped accurately and some statement can be made about the probability of lightning strikes. Each forest is different and consequently has different probability and recurrence estimates. Wildfire always has been a part of these ecosystems and sometimes with devastating effects. The intensity and behavior of wildfire depends on a number of factors including fuel, topography, weather, and density of development. There are a number of often-discussed strategies to reduce the negative impacts of these phenomena. They include land-use regulations, management techniques, site standards, building codes, and a recently passed Oregon Forestland-Urban Interface Fire Protection Act (1997). All of these have a bearing on a community's ability to prevent, withstand, and recover from a wildfire event.

Marion County's historical incidence of wildfire events resulting in substantial losses indicates significant wildfire events likely within a 35-75 year range. Based on this information, the Marion County steering committee determined that the probability of wildfire is **moderate**, meaning one wildfire is likely to occur in a 35 to 75 year period. This probability rating is also consistent with the 2006 Marion County Hazard Analysis.

Vulnerability Assessment

Wildfires are a natural part of forest and grassland ecosystems. Past forest practices included the suppression of all forest and grassland fires. This practice, coupled with hundreds of acres of dry brush or trees weakened or killed through insect infestation, has fostered a dangerous situation. Present state and national forest practices include the reduction of understory vegetation through thinning and prescribed (controlled) burning.

Each year a significant number of people build homes within or on the edge of the forest (urban/wildland interface), thereby increasing wildfire hazards. Many Oregon communities (incorporated and unincorporated) are within or abut areas subject to serious wildfire hazards, complicating firefighting efforts and significantly increasing the cost of fire suppression. Marion County has several communities that are considered at risk to wildfires (see "How Are Hazard Areas Identified" above). However, because these communities are relatively small, the Marion County steering committee determined that the county has a **moderate** vulnerability to wildfire, meaning that 1 to 10% of the community's population or assets would be impacted by a wildfire. This vulnerability rating is consistent with the 2006 Marion County Hazard Analysis.[223]

[223] Region 3: Mid/Southern Willamette Valley Regional Profile. January 2009

Risk Analysis

The Marion County CWPP has developed a risk analysis for the communities at risk based on three risk factors: fire behavior, values, and infrastructure. Each factor was given a situation rating ranging from 1-3. Descriptions for each risk factor and their situation ratings are below. Situation ratings for individual communities and their overall risk to wildfire are depicted in table 3.

Risk Factor 1-Fire Behavior

Situation 1: In these communities, continuous fuels are in close proximity to structures. The composition of surrounding fuels is conducive to crown fires or high intensity surface fires. There are steep slopes, predominantly south aspects, dense fuels, heavy duff, prevailing wind exposure and/or ladder fuels that reduce fire-fighting effectiveness. There is a history of large fires and/or high fire occurrence.

Situation 2: In these communities, there are moderate slopes, broken moderate fuels, and some ladder fuels. The composition of surrounding fuels is conducive to torching and spotting. These conditions may lead to moderate fire fighting effectiveness. There is a history of some large fires and/or moderate fire occurrence.

Situation 3: In these communities, grass and/or sparse fuels surround structures. There is infrequent wind exposure, flat terrain with little slope and/or predominantly a north aspect. There is no large fire history and/or low fire occurrence. Fire fighting generally is highly effective.

Risk Factor 2 –Values at Risk

Situation 1: This situation most closely represents a community in an urban interface setting. The setting contains a high density of homes, businesses, and other facilities that continue across the interface. There is a lack of defensible space where personnel can safely work to provide protection. The community watershed for municipal water is at high risk of being burned compared to other watersheds within that geographic region. There is a high potential for economic loss to the community and likely loss of housing units and/or businesses. There are unique cultural, historical or natural heritage values at risk.

Situation 2: This situation represents an intermix or occluded setting, with scattered areas of high-density homes, summer homes, youth camps, or campgrounds that are less than a mile apart. This situation would cover the presence of lands at risk that are described under State designations such as impaired watersheds, or scenic byways. There is a risk of erosion or flooding in the community if vegetation burns.

Risk Factor 3 – Infrastructure

Situation 1: In these communities, there are narrow dead end roads, steep grades, one way in and/or out routes, no or minimal fire fighting capacity,

no fire hydrants, no surface water, no pressure water systems, no emergency operations group, and no evacuation plan in an area surrounded by a fire-conducive landscape.

Situation 2: In these communities, there are limited access routes, moderate grades, limited water supply, and limited fire fighting capability in an area surrounded by a scattered fire conducive landscape.

Situation 3: In these communities, there are multiple entrances and exits that are well equipped for fire trucks, wide loop roads, fire hydrants, open water sources (pools, creeks, and lakes), an active emergency operations group, and an evacuation plan in place in an area surrounded by a fireproof landscape. The federal land management agencies will work collaboratively with States, Tribes, local communities, and other interested parties to develop a ranking process to focus fuel reduction activities by identifying communities most at risk. Public input is welcome on the form a ranking system should take, as is input on measures that may be useful to assess the impacts of fuels treatment projects.

At-Risk Community Ratings

Table 3 below provides the community ratings for each of the communities at risk tow wildfire.

Table 3 At-Risk Communities' Level of Risk

Community	Listed on Federal Register	Interface Category	Risk Factor 1 Fire Behavior Potential	Risk Factor 2 Value at Risk	Risk Factor 3 Infrastructure	Composite Risk Priority
Breitenbush	Yes	1	1	2	1	Extreme
Detroit	Yes	1	1	1	1	Extreme
Drakes Crossing	No	2	1	2	1	Extreme/High
Gates	Yes	1	1	1	1	Extreme/High
Idanha	Yes	1	1	1	1	Extreme
Jefferson	No	2	2	2	1	High/Moderate
Lyons	Yes	1	1	1	2	Extreme/High
Mill City	Yes	1	1	1	1	Extreme/High
Salem	No	2	2	1	3	Moderate/Low
Scotts Mills	Yes	1	1	2	1	Extreme/High
Silverton	No	2	2	2	2	High/Moderate
Stayton	No	2	2	2	2	Moderate
Turner	No	2	1	2	1	High/Moderate
Silver Falls State Park	No	NA	2	2	1	Moderate
Detroit State Park	No	NA	2	2	2	Moderate
Mangold State Park	No	NA	2	2	2	Moderate
North Santiam State Park	No	NA	2	2	2	Moderate
Willamette Mission State Park	No	NA	2	2	2	Moderate
Champoeg Heritage Area	No	NA	2	2	2	Moderate
Willamette Greenway	No	NA	2	2	2	Moderate
Ankeny Nat'l Wildlife Refuge	No	NA	3	2	2	Moderate

Source: 2008 Marion County Community Wildfire Protection Plan.

Community Hazard Issues

What is susceptible to damage during a hazard event?

The effects of fire on ecosystem resources can include damages, benefits, or some combination of both. Ultimately, a fire's effects depend largely on the characteristics of the fire site, the severity of the fire, its duration and the value of the resources affected by the fire.

The ecosystems of most forest and wildlands depend upon fire to maintain various functions. These benefits can include, depending upon location and other circumstances, reduced fuel load, disposal of slash and thinned tree stands, increased forage plant production, and improved wildlife habitats, hydrological processes and aesthetic environments. Despite these potential benefits, fire has historically been suppressed for years because of its effects on timber harvest, loss of scenic and recreational values and the obvious threat to property and human life.

Marion County's wildland/urban interface is 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:[224]

- 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.

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.

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

Water supply is a critical factor in the ability to fight wild land 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.

Populations living in wildland/urban interface communities are particularly vulnerable to wildfires. These populations are found in communities such as Breitenbush, Detroit, Drakes Crossing, Elkhorn (Little North Fork), Santiam Canyon, Gates, Idanha, Jefferson, Lyons, Marion, Mehama, Mill City, Salem (south and east), Scotts Mills, Silverton, Stayton, the Sublimity Fire District outside the city limits, and Turner.[225] The South Salem Hills was identified as an area of particular concern because of its potential for future development along steep forested slopes.[226]

The Marion County steering committee identified several cultural and natural resources that are also vulnerable to wildfires. These include Silver Creek Falls State Park and the vast national forests in the eastern portion of Marion County. Silver Creek Falls is a major tourism draw for Marion County, and the forested eastern portion of the county provides timber, agriculture, and recreational opportunities. Any agricultural properties located near forested areas can also suffer damage from wildfire events.

Existing Hazard Mitigation Activities

The Marion County Board of Commissioners adopted the Marion County Community Wildfire Protection Plan in January of 2008. The CWPP is the result of a countywide effort initiated to reduce wildland fire risk to communities and their citizens, the environment, and quality of life within Marion County. Upon adoption, the Community Wildfire Protection Plan became a part of the Marion County Natural Hazard Mitigation Plan. Marion County Emergency Management provides oversight for implementation and maintenance of the CWPP and is responsible for coordinating with the CWPP steering committee to implement wildfire action items.

Wildfire Mitigation Action Items

The following actions have been identified by the Marion County steering committee, and are recommended for mitigating the potential effects of wildfires in Marion County. Please see full action item worksheets in Appendix A.

WF1: Implement existing action items contained in the 'Action Plan' section of the *Marion County Community Wildfire Protection Plan* (Pgs. 37-43).

WF2: Collaborate with county environmental health for immediate warnings to communities about degraded air quality following large-scale

[225] Marion County, Oregon Community Wildfire Protection Plan, 2008
[226] Ibid.

fire events, particularly in areas with high concentration of vulnerable groups (e.g. retirement facilities and schools).