Community Planning Workshop wishes to thank Nick Lelack, (Community Development Director), Peter Gutowsky (Planning Manager), Peter Russell (Senior Transportation Planner), and Matt Martin (Associate Planner) for their assistance with this project.

**Deschutes Staff Working Group**
- Alison Green, Project Wildfire Coordinator
- William Groves, Senior Planner
- Ed Keith, County Forester
- Matt Martin, Associate Planner
- Peter Russell, Senior Transportation Planner

**Community Planning Workshop Team**
- Robert Parker, AICP, Director
- Michael Howard, AICP, CFM, Program Specialist
- Drew Pfefferle, Project Manager
- Michael DeHart, Research Assistant
- Erin Horan, Research Assistant
- Maureen Jackson, Research Assistant
- Brett Setterfield, Research Assistant
About the Community Service Center

The Community Service Center (CSC), a research center affiliated with the Department of Planning, Public Policy, and Management at the University of Oregon, is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of the CSC is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

About Community Planning Workshop

Community Planning Workshop (CPW) is an experiential program within the Department of Planning, Public Policy and Management at the University of Oregon. Students work in teams under the direction of faculty and Graduate Teaching Fellows to develop proposals, conduct research, analyze and evaluate alternatives, and make recommendations for possible solutions to planning problems in Oregon communities. The CPW model is unique in many respects, but is transferable to any institution that desires to link pedagogy with community service.

About the Oregon Partnership for Disaster Resilience

The Oregon Partnership for Disaster Resilience (OPDR) is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by the Community Service Center at the University of Oregon, the OPDR employs a service-learning model to increase community capacity and enhance disaster safety and resilience statewide.
# Table of Contents

- **SPECIAL THANKS AND ACKNOWLEDGEMENTS** ..................................... II
- **TABLE OF CONTENTS**........................................................................ IV
- **CHAPTER 1: INTRODUCTION** ............................................................ 1
- **CHAPTER 2: STRATEGIES FOR MITIGATING RISK** ......................... 3
- **CHAPTER 3: WILDFIRE HAZARDS** ..................................................... 9
- **CHAPTER 4: FLOOD HAZARDS** ......................................................... 26
- **CHAPTER 5: RECOMMENDATIONS** .................................................. 46
- **APPENDIX A: WILDFIRE CASE STUDIES** ....................................... 49
- **APPENDIX B: FLOOD CASE STUDIES** ........................................... 56
CHAPTER 1: INTRODUCTION

Floods and wildfires are two natural hazards that impact Deschutes County. The Deschutes County Development Code has several provisions that specifically aim to mitigate the effects of these hazards; reduce risk to property, environmental quality, and human safety; and improve recovery time. The code chapters with hazard-specific elements are Title 17: Subdivisions, Title 18: County Zoning, and Title 19: Bend Urban Growth Boundary Zoning Ordinance.

This report includes analysis of the Deschutes County Development Code and the county’s comprehensive plan, how they are interpreted and applied to development, and the implications for natural hazard preparedness. Case studies and model ordinances providing examples of wildfire and flood best management practices are used to support the report’s recommendations.

Background

Deschutes County Community Development Department (CDD) contracted with the University of Oregon’s Community Planning Workshop (CPW) to conduct a review of the Deschutes County Development Code consistent with direction provided in Comprehensive Plan Section 3.5 (Rural Growth/Natural Hazards). The review focused on improving development regulations that address wildfires and flooding.

The intent of this work is to help Deschutes County understand the implications of land-use regulations on development in areas affected by natural hazards and to develop a set of programmatic options on how to best manage those impacts. The project focused on researching best practices for mitigating the effects of wildfire and flood on development.

Strategies to reduce or mitigate risk associated with development in hazardous areas are important to Deschutes County, as the county continues to be the fastest growing in Oregon. Between 2000 and 2013, the population in Deschutes County increased 41% (47,158 people). According to Deschutes County’s population forecast, by 2025 the population is anticipated to grow by 48% (78,300 people), a total population of 240,811. The City of Bend is expected to account for 40% of the population increase, while the rural unincorporated areas of the county are expected to account for 33% of the population increase.

Purpose and Methods

The purpose of this report is to identify and review a range of regulatory standards that Deschutes County can utilize to reduce risk to flood and wildfire hazards. To identify potential strategies, CPW reviewed flood and wildfire ordinances, best practices used to reduce natural hazard risk, and ordinances and programs implemented by other jurisdictions. CPW also identified model ordinances and case studies that include elements applicable and relevant to Deschutes County based on the comparable aspects of the communities and relative similar hazard...
danger. The CPW team then worked with County Staff to target sections of the Deschutes County Development Code where it could incorporate higher development standards and best practices.

**Organization of Report**

The report is organized into five chapters, including Chapter One, and two appendices.

**Chapter 2: Strategies for Mitigating Risk** provides an overview of the nature of risks related to development in hazardous areas.

**Chapter 3: Wildfire Hazards** identifies the extent of wildfire risk in Deschutes County, the rate and location of development within the Wildland Urban Interface (WUI), existing wildfire programs, model ordinances and standards, and presents policy options to strengthen the Deschutes County Development Code as it relates to wildfire hazard.

**Chapter 4: Flood Hazards** identifies the extent of flood risk in Deschutes County, the rate and location of development within the Federal Emergency Management Agency’s (FEMA) defined floodplain, existing flood programs, model ordinances and standards, and presents policy options to strengthen the Deschutes County Development Code as it relates to flood hazard.

**Chapter 5: Conclusions and Recommendations** presents a brief review of the project, summarizes the policy options, and prioritizes the recommended policies options.

This report includes two appendices. Appendix A provides case studies related to wildfire. Appendix B provides case studies related to flood.
CHAPTER 2: STRATEGIES FOR MITIGATING RISK

Chapter 2 frames the role that land use planning has in hazard mitigation and underscores the importance of focusing on flood and wildfire hazards by describing federal and state policies that support and promote mitigation strategies.

The Federal and State Policy Framework

Federal Emergency Management Agency

The pre-disaster mitigation role of the Federal Emergency Management Agency (FEMA) is to provide support and assistance to all communities across the nation to preemptively mitigate and respond to emergencies. FEMA offers financial assistance in the form of grant money through programs such as the Hazard Mitigation Grant Program (HMGP)\(^1\) for long-term hazard mitigation following a major disaster, Pre-Disaster Mitigation (PDM)\(^2\) for hazard mitigation planning and projects, and Flood Mitigation Assistance (FMA)\(^3\) for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP). In the event of a wildfire disaster, the State can request emergency federal assistance from FEMA. FEMA will provide 75% of firefighting costs as part of the Fire Management Assistance Grant Program.\(^4\)

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 requires that state, local, and Indian tribal governments develop and maintain a natural hazards mitigation plan to be eligible to receive mitigation grant assistance. The stated purpose of the act is to “amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act to authorize a program for pre-disaster mitigation, to streamline the administration of disaster relief, to control the Federal costs of disaster assistance, and for other purposes.”\(^5\)

---

1 “Hazard Mitigation Grant Program.” Federal Emergency Management Agency. Available at: https://www.fema.gov/hazard-mitigation-grant-program

2 “Pre-Disaster Mitigation Grant Program.” Federal Emergency Management Agency. Available at: https://www.fema.gov/pre-disaster-mitigation-grant-program

3 “Flood Mitigation Assistance Grant Program.” Federal Emergency Management Agency. Available at: https://www.fema.gov/flood-mitigation-assistance-grant-program

4 “Fire Management Assistance Grant Program.” Federal Emergency Management Agency. Available at: https://www.fema.gov/fire-management-assistance-grant-program

State Policy

Oregon Senate Bill 360

The Oregon Forestland-Urban Interface Fire Protection Act, commonly referred to as Senate Bill 360, enlists property owners in turning fire-vulnerable urban and suburban properties into less-volatile zones where firefighters may more safely and effectively defend homes from wildfires. The law requires property owners in identified forestland-urban interface areas to reduce excess vegetation around structures and along driveways. In some cases, it is also necessary to create fuel breaks along property lines and roadsides.6

Oregon Statewide Planning Goal 7

Planning for natural hazards is an integral element of Oregon’s statewide land use planning program, which began in 1973 with the passage of Senate Bill 100. All Oregon counties and cities have comprehensive plans and implementing ordinances that are required to comply with the 19 statewide planning goals that direct the state’s policies on land use issues. Statewide land use planning Goal 7, Areas Subject to Natural Hazards, calls for local plans to include inventories, policies, and ordinances to guide development in, or away from, hazard areas in order to protect life and property from natural hazards.

Natural hazards considered for purposes of Goal 7 are: wildfires, floods (coastal and riverine), landslides, earthquakes, tsunamis, and coastal erosion. Local governments may identify and plan for other natural hazards as they apply.

Overview of Natural Hazards in Deschutes County

Table 1 below displays the Natural Hazards Mitigation Plan hazard analysis matrix for Deschutes County (updated 2015). The hazards are listed in rank order from high to low. The table shows that hazard scores are influenced by each of the four categories combined. With considerations for historical events, the probability or likelihood of a particular hazard event occurring, the vulnerability to the community, and the maximum threat or worst-case scenario are listed in the table. Wildfire events rank as one of the top hazard threats to the county (top tier), while flood events are listed as one of the lower-ranked hazards in the county (bottom tier). For local governments, conducting the hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with sense of hazard priorities, but does not predict the occurrence of a particular hazard. Both floods and wildfires are considered a top priority by Deschutes County and can be directly mitigated through land use.

---

Table 1 Hazard Analysis Matrix – Deschutes County

<table>
<thead>
<tr>
<th>Hazard</th>
<th>History</th>
<th>Vulnerability</th>
<th>Maximum Threat</th>
<th>Probability</th>
<th>Total Threat Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Storm</td>
<td>20</td>
<td>50</td>
<td>90</td>
<td>70</td>
<td>230</td>
</tr>
<tr>
<td>Wildfire</td>
<td>20</td>
<td>50</td>
<td>80</td>
<td>70</td>
<td>220</td>
</tr>
<tr>
<td>Earthquake (Cascadia)</td>
<td>2</td>
<td>40</td>
<td>100</td>
<td>49</td>
<td>191</td>
</tr>
<tr>
<td>Windstorm</td>
<td>16</td>
<td>20</td>
<td>80</td>
<td>63</td>
<td>179</td>
</tr>
<tr>
<td>Volcano</td>
<td>2</td>
<td>50</td>
<td>100</td>
<td>21</td>
<td>173</td>
</tr>
<tr>
<td>Drought</td>
<td>8</td>
<td>15</td>
<td>70</td>
<td>56</td>
<td>149</td>
</tr>
<tr>
<td>Flood</td>
<td>8</td>
<td>10</td>
<td>40</td>
<td>56</td>
<td>114</td>
</tr>
<tr>
<td>Earthquake (Crustal)</td>
<td>2</td>
<td>5</td>
<td>80</td>
<td>7</td>
<td>94</td>
</tr>
<tr>
<td>Landslide</td>
<td>2</td>
<td>5</td>
<td>40</td>
<td>7</td>
<td>54</td>
</tr>
</tbody>
</table>

Source: Deschutes County NHMP Steering Committee, 2015.

Flooding results when rain and snowmelt creates water flow that exceeds the carrying capacity of rivers, streams, channels, ditches, and other watercourses. In Oregon, flooding is most common from October through April when storms from the Pacific Ocean bring intense rainfall. Most of Oregon’s destructive natural disasters have been floods. Flooding can be aggravated when rain is accompanied by snowmelt and frozen ground; the spring cycle of melting snow is the most common source of flood in the region. The principal types of flood that occur in Deschutes County include: spring/snow melt flooding, warm winter rain-on-snow flooding, ice jams, flash floods, and dam failure. Regular floods have occurred and the principal sources for flood risk in the county include the Deschutes River, the Little Deschutes River, Paulina Creek, Whychus Creek, and Spring River.

Fire is an essential part of Oregon’s ecosystem, but can also pose a serious threat to life and property particularly in the state’s growing rural communities. Wildfires occur in areas with large amounts of flammable vegetation that require a suppression response due to uncontrolled burning. Overgrown forests possess dense fuel loads that burn more intensely and spread more rapidly. Compounding the risk posed by increased fuel loads due to fire prevention efforts is the population growth occurring in forested areas of Deschutes County. As population in the county grows, more residential development is locating in forested lands known as the wildland-urban interface (WUI). Understandably, development within the WUI is associated with significant risk to property and human life in the event of a wildfire.

Climate Change

Current climate models project warmer, drier summers and a decline in typical level of summer precipitation in Oregon. As climate change occurs, lower elevation pine ecosystems in Deschutes County will become increasingly susceptible to the

---

effects of changing precipitation patterns. The lower edges of dry pine vegetative zones are expected to be the first to show impacts of long-term changes in available precipitation. Coupled with projected decreases in mountain snowpack due to warmer winter temperatures, Deschutes County is expected to have more frequent wildfires.

National Marine Fisheries Service and Endangered Species

Recent developments between federal agencies could mean significant changes in the way that local communities implement the NFIP. FEMA and the National Marine Fisheries Service (NMFS) have begun consultations to assign new regulations to floodplain development with respect to endangered species.

FEMA has been sued in several states, including Oregon, for failing to consult with the NMFS or the U.S. Fish and Wildlife Service (USFWS) regarding endangered species listed as under the Endangered Species Act (ESA). The lawsuit deals with certain policies that FEMA promotes, specifically policies regarding development in their Special Flood Hazard Areas (SFHA), can negatively impact certain endangered species.

As a result of a 2010 settlement approved in federal court, the Federal Emergency Management Agency (FEMA) is consulting with NMFS and drafting new rules for communities that participate in the National Flood Insurance Program (NFIP) and have waterways bearing salmon or steelhead. In 2005, the Deschutes River was designated by NMFS as a critical habitat for Middle Columbia River Steelhead. This designation will factor into the ongoing revision of Deschutes County floodplain development ordinances.

Strategies for Risk Mitigation: Regulatory and Non-Regulatory

Programs and policies discussed in this report can be divided into two major subgroups: regulatory (non-voluntary), or non-regulatory (voluntary). This section describes the functional differences between regulatory and non-regulatory risk mitigation strategies and provides high-level summary of strategies currently employed by Deschutes County.

Regulatory

Regulatory strategies are written instruments containing enforceable rules. They create and constrain rights, duties, and responsibilities. In the case of the Deschutes County Development Code, developments within County jurisdiction must gain regulatory approval and abide by the constraints put forth within. Enforcement can be either proactive – requiring a development plan to meet

---

certain standards before construction may begin; or reactive – requiring an inspector to ensure that a development is compliant with relevant regulations.

The broad goal of development codes is to protect the public health, safety and welfare and to provide developers and landowners with transparent rules that reduce the risks associated with development. Regulatory natural hazards mitigation strategies discussed in this report are enforceable elements of the Deschutes County Development Code that dictate the location and characteristics of future development activity.

Regulatory policy options presented in this report are based upon model ordinances, best practices, and case studies from the Federal Emergency Management Agency (FEMA), the International Code Council (ICC), the National Fire Protection Association (NFPA), the National Institute for Standards and Testing (NIST), and relevant sections of development codes from jurisdictions that have addressed natural hazard risks similar to those of Deschutes County.

The role of land use planning in hazard mitigation

Land use planning guides and regulates land use so as to ensure land development is efficient, ethical, and prevents land-use conflicts. By regulating the actions of property owners and developers, land use planning has a decisive influence on development patterns. Often, the most desirable lands for residential development are also the most hazardous. Development along riverbanks is popular for its favorable views and convenient water access. However, it places homes at a greater risk for flood damage. Likewise, wildland-urban interface areas are ideal for residents seeking privacy and access to forested areas, but there is an elevated risk of wildfire damage.

Land use planning can shape development in ways that mitigate risk by prescribing regulatory provisions to types of land that are exposed to the risks of natural hazards. Development codes can prohibit development in dangerous locations or regulate development in a manner that minimizes risk.

A key consideration is that land use plans and their implementing ordinances come into effect at the time of a land use action. The implication is that they only apply to development that is subject to the regulation. Most ordinances do not apply retroactively; existing uses are “grandfathered” in and are often not subject to new regulation. That will likely be the case in Deschutes County where thousands of existing structures in the WUI will not be affected by any code amendments.

Non-Regulatory

Non-regulatory tools serve as guidance rather than law, and are often used to complement regulatory policies. These tools rely on voluntary efforts and public support and participation. They can increase awareness and buy-in to programs and are often developed to increase the effectiveness of regulations through education, outreach, incentives, or interagency coordination.

Non-regulatory strategies to mitigate natural hazards are not dependent upon government oversight, but are achieved primarily through public and community
participation. Non-regulatory strategies may rely on the county government for financial and structural support.

Natural Hazards Mitigation Plan

Natural Hazards Mitigation Plans are a planning requirement for local governments to access funds from the Disaster Mitigation Act of 2000. Although the plan is required for pre-disaster funding, its contents are non-regulatory in nature. Rather, it sets forth voluntary goals, objectives, and actions that can increase disaster preparedness or decrease recovery time.

The aim of the Deschutes County Natural Hazards Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more disaster resistant community. The Deschutes County Natural Hazards Mitigation Plan is intended to serve many purposes. These include the following:

- Provide a methodical approach to mitigation planning;
- Enhance public awareness and understanding of natural hazards;
- Create a decision-making tool for policy and decision makers;
- Promote compliance with state and federal program requirements;
- Assure coordination of mitigation-related programming;
- Create specific hazard mitigation initiatives that can be incorporated into Deschutes County’s Comprehensive Plan to assist with implementation;
- Document resources for risk reduction and loss prevention.  

---

9 Deschutes County Natural Hazard Mitigation Plan 2015 Update.
10 Ibid
CHAPTER 3: WILDFIRE HAZARDS

This chapter identifies the risk wildfire poses to Deschutes County, the extent of risk, and the rate and location of development affected by wildfire hazard. Following are policy options the county can consider to strengthen the Deschutes County Comprehensive Plan and Development Code. Policy options are presented with descriptions of best practices, identification of the applicable county code sections, and details of economic, administrative, health, or environmental impacts of implementing the policy.

Wildfire risk in Deschutes County

Extent of Wildfire risk areas

Wildfires are a natural and necessary component of many ecosystems across the country. Central Oregon is no exception. Historically, wildfires have shaped the forests and wildlands valued by residents and visitors. These ecosystems are significantly altered due to fire prevention efforts, modern suppression activities and a general lack of large-scale fires, resulting in overgrown forests and wildland-urban interfaces (WUI) with dense fuels that burn more intensely than in the past. Wildfires can be divided into three categories: interface, wildland, and firestorms. Interface fires are the most common wildfires in Deschutes County.¹

Interface fires occur where wildland and developed areas meet (the wildland-urban interface). In these locations, both vegetation and structural development combine to provide fuel. The wildland-urban interface can be divided into three categories: classic wildland-urban interface, mixed wildland-urban interface, and occluded wildland-urban interface.²

1. Classic wildland-urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas.
2. Mixed wildland-urban interface is found in areas of exurban or rural development: isolated homes, subdivisions, resorts and small communities situated in predominantly wildland settings.
3. Occluded wildland-urban interface where islands of wildland vegetation exist within a largely urbanized area.

Population growth has occurred in interface areas. The growth in residential development in interface areas increases the risk of wildfires. Fire has historically been a natural wildland element and can sweep through vegetation adjacent to combustible homes. New residents in rural areas are often surprised to learn that

¹ Deschutes County Natural Hazard Mitigation Plan 2015 Update.
² Ibid
moving away from urban areas puts them more at risk of wildfires since there are fewer readily available fire services in rural areas.

Rate and Location of Development

The majority of people across Deschutes County resides in Bend or within the unincorporated areas of the county. Between 2000 and 2013, Deschutes County experienced a 41% increase in population. The County Coordinated Population Forecast projects that by 2025 Deschutes County's population will increase by about 78,300 people, a 48% increase. In 2000, 48,898 people lived in unincorporated areas of Deschutes County. By 2013, that number had grown by 10.2% to 53,870. Forecasts estimate that the population in currently unincorporated areas will grow to nearly 80,000 by 2025.

Unprotected residential development is an important issue for Deschutes County. There are several examples of residential developments that do not have structural or wildland fire protection. These include the Lower Bridge area east of Sisters, and the Brothers and Hampton areas along Highway 20 on the eastern edge of the county (Figure 1). In addition, there are approximately 100,000 acres of privately owned, largely unimproved rangeland east of Bend that do not have wildland fire protection. In 2013, an additional fire district for the unincorporated community of Alfalfa was created and will be running by the end of 2016 (not shown in Figure 1). This region will cover 64 square miles of unprotected development.

Since a large portion of the county has no fire protection and due to abundance of the fuel types present in some areas, wildland fires can grow quite large, often spreading and becoming threatening to protected areas. Deschutes County developed County Code Section 8.21 outlines a system for private landowners in unprotected areas to respond to the wildland fire threat with defensible space and firebreaks.

Emergency response to wildland fire incidents incurs substantial resource commitments and fiscal costs. The impact on local organizations is demonstrated each fire season. Notable incidents that exemplify the impact on local organizations are Pole Creek (2012), Burgess Road (2013), and Two Bulls (2014). The costs associated with multiple day mobilization of law enforcement, search and rescue, structural fire assets and state fire resources can quickly deplete local and state agency budgets. Depending on the scope and specifics of an individual fire, additional agency and non-governmental support organizations may also be mobilized to help mitigate the impact on citizens and community infrastructure.

---

3 Deschutes County Community Development Department, 2014.
4 Deschutes County Natural Hazard Mitigation Plan 2015 Update.
Figure 1 Deschutes County Fire Protection

Source: Deschutes County Forester
Existing wildfire programs

There are several wildfire mitigation programs at the National, State, and County level that are in effect within Deschutes County. While non-regulatory in nature, they provide useful guidance to the County’s decision makers, residents, and developers. These programs provide frameworks for outreach, education, and coordination regarding the mitigation of wildfire risk. This section outlines the general programs, state programs, and county programs that are in effect in Deschutes County.

National Programs

Healthy Forests Restoration Act: Community Wildfire Protection Plans

In 2003, the US Congress passed the Healthy Forests Restoration Act that directed federal agencies to collaborate with communities in the wildland urban interface to create Community Wildfire Protection Plans (CWPP). CWPPs allow communities to identify and prioritize areas needing hazardous fuels treatment. As of 2015, Deschutes County has seven CWPP’s adopted: Greater Bend, Greater La Pine, Greater Redmond, Greater Sisters Country, Sunriver, Upper Deschutes River Coalition, and East and West Deschutes County. Communities with CWPPs are given priority for funding of hazardous fuels reduction projects carried out under the auspices of the HFRA.

These CWPPs provide consistent analysis of existing fuels and WUI conditions along with recommendations and priorities for hazardous fuels reductions treatments on public and private lands. Community Wildfire Protection Plans allow communities to set wildland urban interface (WUI) boundaries and conducted risk assessments for each community.

Table 2 Deschutes County Community Wildfire Protection Plans

<table>
<thead>
<tr>
<th>CWPP Area</th>
<th>Year Updated</th>
<th>Next Expected Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Bend</td>
<td>2011</td>
<td>2016</td>
</tr>
<tr>
<td>Greater La Pine</td>
<td>2015</td>
<td>2020</td>
</tr>
<tr>
<td>Greater Redmond</td>
<td>2011</td>
<td>2016</td>
</tr>
<tr>
<td>Greater Sisters Country</td>
<td>2014</td>
<td>2019</td>
</tr>
<tr>
<td>Sunriver</td>
<td>2015</td>
<td>2020</td>
</tr>
<tr>
<td>East and West Deschutes County</td>
<td>2012</td>
<td>2017</td>
</tr>
<tr>
<td>Upper Deschutes River Coalition</td>
<td>2013</td>
<td>2018</td>
</tr>
</tbody>
</table>

Source: Project Wildfire

Firewise Communities

Firewise Communities USA is a program that nationally recognized communities that have taken an organized approach to wildfire preparedness. Firewise Communities educate community members on how live with the threat of wildfire and encourage neighbors to work together and take action to prevent loss of property and life. Typically, Firewise Communities have defensible space, well-marked evacuation routes, and community cohesion.

State Programs

Oregon Senate Bill 360 Implementation

The Oregon Department of Forestry (ODF) supplies information about fuel reduction standards to property owners. ODF mails each property owner a certification card, which may be signed and returned to ODF after the fuel reduction standards have been met. Certification relieves a property owner of liability of fire suppression costs if a fire were to occur on the property. If a certification card has not been received by OFD, the state of Oregon may seek to recover certain fire suppression costs from a property owner if a fire originates on the owner’s property, the fuel reduction standards have not been met, and ODF incurs extraordinary suppression costs. The cost-recovery liability under the Oregon Forestland Urban Interface Fire Protection Act is capped at $100,000.

For more generalized information regarding Oregon Senate Bill 360, see page 4 of this document or visit the Oregon Department of Forestry’s website: http://www.oregon.gov/odf/pages/fire/sb360/sb360.aspx.

Oregon Ready, Set, Go!

Oregon Ready, Set, Go! is an online wildfire assessment tool that provides awareness and educational materials to property owners in Wildland Urban Interface. The website allows property owners to enter their home address and identify structural and vegetative information to calculate a wildfire risk score. Based on the score, information will be provided to help reduce the home’s risk including building materials or outside landscaping. This is an educational tool for homeowners that can help protect their life and property as well as keep First Responders safe when fighting fires.


Deschutes County Programs

Project Wildfire

Project Wildfire is a long-term wildfire mitigation strategy that provides for disaster-resistant communities. Its mission is to prevent deaths, injuries, property loss and environmental damage resulting from wildfires in Deschutes County. Created by Deschutes County Ordinance 8.24.010, Project Wildfire is the community organization that facilitates, educates, disseminates and maximizes community efforts toward effective fire planning and mitigation. Project Wildfire organizes community events that help educate the community about wildfire protection strategies and techniques.⁵

FireFree Program

Project Wildfire coordinates the FireFree program, which is an educational program that teaches residents how to protect their homes from wildfire.⁶ The FireFree program and fuels reduction projects yield over 40,000 cubic yards of woody debris each year.

Existing Wildfire Model Ordinances and Standards

The following model ordinances and standards were used in the process of reviewing the County’s development code in addressing wildfire hazard mitigation.

National Fire Protection Association

The National Fire Protection Association (NFPA) is a national non-profit organization that sets national fire safety codes and standards. The codes that NFPA provides are standards that range from building, process, service, design and installation. Besides providing national fire safety codes and standards, the NFPA provides training and education about fire safety and standards.

NFPA 1141: Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas

This standard provides guidance on the development of the community infrastructure necessary to eliminate fire protection problems that result from rapid growth and change.


⁵ Project Wildfire and 2015 Deschutes County Natural Hazard Mitigation Plan

NFPA 1144: Standard for Reducing Structure Ignition Hazards from Wildland Fire

This standard provides guidance on individual structure hazards. It requires a new spatial approach to assessing and mitigating wildfire hazards around existing structures and includes improved ignition-resistant requirements for new construction.


This comprehensive wildland-urban interface code establishes minimum regulations for land use and the built environment in designated wildland-urban interface areas using prescriptive and performance-related provisions. It is founded on data collected from tests and fire incidents, technical reports and mitigation strategies from around the world.

http://shop.iccsafe.org/2012-international-wildland-urban-interface-code-soft-cover.html

Policy Options for Deschutes County

This section presents a review of the County’s Comprehensive Plan in regards to land use and wildfire mitigation and identifies potential actions to strengthen current policies. The existing comprehensive plan policy language is shown in *italics* followed by our comments. Model development code language is shown in *italics* and *underlined*.

Review of County Comprehensive Plan Policies

Comprehensive Plan Policy 3.5.11(g):

*Policy 3.5.11(g) Review and revise County Code as needed to: Require new subdivisions and destination resorts to achieve FireWise standards from the beginning of the projects and maintain those standards in perpetuity.*

Comment: The Firewise program is inherently flexible since it is a national recognition program; it is not a certificate program and does not have standards to be met. Deschutes County should consider modifying the comprehensive plan to reflect this distinction.

The Firewise Program is, however, guided by NFPA Standards 1141 and 1144. These standards provide specific mitigation actions that bear relevance to the County Development Code. Rather than including NFPA 1141 and 1144 in the Comprehensive Plan, Deschutes County can look to the following review of County Development Code, which is informed by NFPA standards.
**Review of County Development Code**

This section presents a review of the County’s current development code in regards to land use and wildfire mitigation policies and programs and identifies potential actions to strengthen current codes. In the following section the existing development code language is shown in italics followed by our comments. Model development code is shown in italics and underlined.

**Implement a Wildfire Hazard Combining Zone**

A wildfire hazard combining zone eliminates the need to individually prescribe wildfire provisions for each base zone. The combining zone could include a number of provisions such as building materials, defensible space, developable slopes, and other mitigation requirements.

**Best Practice:** Given the prevalence of wildfire risk within Deschutes County, applying development standards to individual base zones may not efficiently regulate development in hazardous areas. Several wildfire-affected cities and counties in the country, such as Ashland, OR and Jefferson County, CO, have adopted combining zones to broadly identify lands potentially at risk for wildfire and require mitigation measures as part of the land planning and development process. By implementing a combining zone in Deschutes County, development standards that mitigate wildfire risk could be more easily interpreted and applied.

**Applicable County Code:** Title 18 Zoning, 15.04.085 Building and Construction Codes and Regulations in Wildfire Hazard Zones

**Implications:** Implementing a combining zone would eliminate the need to individually prescribe wildfire provisions for each base zone. Wildfire Hazard Zones are currently depicted on the Deschutes County Wildfire Hazard Areas map, and County Code 15.04.085 already implements this map to apply roofing standards in a manner identical to the function of the proposed combining district. Developers and property owners will benefit from clear, consistent requirements that could be found in a single location within Deschutes County Code Title 18. This combining zone would also have implications that include higher wildfire mitigation measures being addressed to the majority of the county instead of only in Forest Zones.

**Prohibit Wooden Shake Building Materials in Wildfire Hazard Zones**

Wooden shake building materials pose a serious risk to residents in the event of a wildfire. Combustible wooden building materials can burn from catching a single ember from an upwind fire. Scientific evidence has shown that a home’s structural characteristics are a primary factor in determining ignitability in wildland-urban
interface fires⁷. Prohibiting wooden shake building materials can reduce the likelihood of structural ignition for homes in wildfire hazard zones.

**Best Practice:** Currently the Deschutes County Code allows wooden shake roofs if they are Class B or higher. To attain a Class B rating, a shake roof must be treated with a fire-resistant material. However, this treatment deteriorates relatively quickly in the county’s climate conditions, and it is uncommon for homeowners to retreat their homes as often as is necessary. The simplest way to address this issue is to prohibit wooden shake building materials in areas of the county identified as Wildfire Hazard Zones. This practice would ideally be included as a provision applied within a Wildfire Hazard Combining Zone.

**Applicable County Code:** 15.04.085 Building and Construction Codes and Regulations in Wildfire Hazard Zones

**Implications:** Although wooden shake building materials can be treated and re-treated to meet Class B standards, explicitly prohibiting new structures from using shake building materials is the most direct form of addressing the hazard inherent to flammable roofing material. Existing structures could be exempted from this requirement unless a homeowner undertook a significant home improvement project. Regulatory or incentive-based approaches could be considered as a means to replace combustible materials with non-combustible materials.

**Requirements for Defensible Space**

Along with a home’s structural characteristics, a home’s surroundings are the other most important factor in determining home ignitability in wildland-urban interface areas⁸. Defensible space is the most effective way to reduce the risk of structural loss from wildfires that spread into residential areas. Although there are voluntary measures that encourage defensible space in Deschutes County, there are currently no efforts to enforce the practice on a countywide scale.

**Best Practice:** Defensible space requirements can currently be found in a handful of places throughout Deschutes County Code. Forest Use Zones 1 and 2 require three zones of defensible space ranging from nonflammable materials in the immediate vicinity of dwellings and structures, to fuel management tactics between 20 and 100 feet. Defensible space is crucial element of wildfire mitigation, and would ideally be included as a provision applied within a Wildfire Hazard Combining Zone.

**Applicable County Codes:** 17.16.030 Subdivision Information Requirements, 17.16.050 Master Development Plan, 18.113 Destination Resorts, 18.36.70 Fire Siting Standards in Forest Use Zones

---


⁸ ibid
Implications: Proper implementation and maintenance of defensible space could significantly decrease risk to residential development. However, if specific requirements were applied to all structures and dwellings within the County’s Wildfire Hazard Overlay Zone, defensible space inspections could become very time consuming for County Inspectors.

Regulate Development on Steep Slopes

Development on steep slopes puts homes at risk to be in the path of fast-moving wildfires. By either restricting development on steep slopes or requiring additional mitigation measures for homes built on steep slopes, the County can reduce the risk posed to lives and property by wildfire. (See Appendix A: Steep Slopes in Rancho Bernardo, CA).

Best Practice: Topography plays a significant role in the spread of wildfire. Fire spreads much more rapidly up slopes than flat ground, which poses a threat to structures situated on steep slopes. Currently, single-family dwellings are allowed on slopes as steep as 40%. The International Code Council’s Wildfire Hazard Severity Form lists any slope greater than 30% as the maximum risk category. The best practice in regards to development on steep slopes is to regulate development above a certain slope threshold. To be consistent with existing code language the county could set this threshold at 25%, the maximum developable slope in Destination Resort Zones.

Applicable County Code: 18.36.070(C) Fire Siting Standards for Dwellings and Structures in Forest Use Zone 1, 18.40.070(C) Fire Siting Standards for Dwellings and Structures in Forest Use Zone 2, 18.113.070 Destination Resorts Zone

Implications: This best practice option, when combined with defensible space measures, can achieve enhanced resilience to wildfires without impinging on private property rights. Landowners and developers should be encouraged to develop on flat terrain to the greatest degree possible, but providing sensible regulations considers the inevitability of development on slopes.

Wildfire Mitigation Planning for Subdivisions and Destination Resorts

By requiring wildfire mitigation plans before allowing the subdivision of land or placement of a destination resort, the county can ensure that NFPA Standards 1141 and 1144 guide development from its earliest stages.

Best Practice 1: National Fire Protection Association 1141: Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas are nationally approved model standards for development of fire protection and emergency services infrastructure in wildland-urban interfaces. These standards include requirements for road access, 30 feet of separation between buildings, adequate levels of water supply, and fire sprinkler systems.

Best Practice 2: National Fire Protection Association 1144: Standard for Reducing Structure Ignition Hazards from Wildland Fire are nationally approved model standards for assessing wildfire ignition hazards around existing structures. The
standards provide requirements for new construction such as wildfire hazard assessments, mitigation and maintenance plan, and defensible space standards.

**Best Practice 3:** Achieve Firewise Standards or Firewise Recognition. Firewise is a non-regulatory program managed by the NFPA that provides principles or standards that include many NFPA 1141 and 1144 standards. They reflect standards to reduce wildfire ignition to the home through building materials and defensible space around the structure. Communities can receive Firewise Recognition by following five steps that include: a wildfire hazard assessment, creating a community task force, holding an annual Firewise Day, spending $2 per capita on Firewise projects, and submitting an annual report to Firewise documenting the community’s progress.

**Best Practice 4:** City of Ashland Municipal Code 18.62.090 requires subdivisions to submit a Fire Prevention and Control Plan with any application for an outline plan, preliminary plat of a subdivision, or application to partition land when in areas designated Wildfire Hazard areas. Plans include the following items: analysis of the fire hazards on site influenced by existing vegetation and topography, a map showing the areas that are to be cleared of dead, dying, or severely diseased vegetation, a map of areas that will be thinned to reduce the interlocking canopy of trees, tree management plan, areas of Primary and Secondary Fuel Breaks, and roads and driveways sufficient for emergency vehicle access, including the slope of all roads and driveways (See Appendix A: City of Ashland, OR).

**Applicable County Code:** Title 17.16.030 Subdivisions: Informational Requirements, 17.16.050 Master Development Plan, and 18.113 Destination Resorts.

**Implications:** The County Code does not address specific wildfire mitigation requirements for Subdivisions or Destination Resorts. Chapter 18.113 for Destination Resorts does require a wildfire prevention, control and evacuation plan but does not include any specifications regarding that plan. The county could decide to include regulations from NFPA 1141 and 1144 to address adequate access for emergency responders, water supply, non-combustible building materials, defensible space, fire-resistant landscaping, and requirements for a mitigation plan as well as maintenance plan. Implementing standards identified from Firewise, or achieving Firewise recognition, would help ensure that communities prepare for wildfire mitigation prior to development and have a maintenance plan to continue to prevent wildfire risk to homeowners and their properties. These additional wildfire mitigation requirements could be viewed as restrictive and cause higher costs to developers. However, achieving these standards can also be used as a successful marketing tool. A Fire Prevention and Control Plan would ensure that subdivisions have clear plans in place before development. Clear standards and requirements for this plan would assist developers in the project planning process and ensure that maintenance of these standards remain in perpetuity.

**Require Fire Protection Proof for Subdivisions**

Requiring proof of fire protection ensures that a fire district will be able to serve new subdivisions before they are permitted. Although this is not a currently
pressing issue, continued population growth into unincorporated areas could exceed the capacity of rural fire districts.

**Best Practice:** Proof of Fire Protection is a best practice found in the Jefferson County, CO Land Development Regulation Section 4.C.18. It requires a written statement from the appropriate fire district indicating that they will serve the property. If the property is not within a fire district, a contract with the district would need to be established indicating that fire protection to the property will be provided.

**Applicable County Code:** Title 17.16.030 Subdivisions: Informational Requirements

**Implications:** The Deschutes County Code does not currently require proof of fire protection for subdivisions. Requiring proof of fire protection from a fire district to serve the development will help ensure that emergency responders will adequately be able to service the property. If a property is not currently provided fire protection service a contract, or annexation into a fire district, will help ensure fire protection can be provided. This policy could be restrictive to developers and cause service problems for fire districts however; it will ensure that adequate protection can be provided before property is developed.

**Wildfire Mitigation Plan for Single-Family Homes**

Including wildfire mitigation plans as part of the site plan review process for single-family homes ensures that homeowners and developers are mindful of and take an active role in mitigating the risks associated with locating in the wildland-urban interface.

**Best Practice:** Due to the frequency with which homes are being built in wildland areas of Deschutes County, requiring Wildfire Mitigation Plans may be a useful addition to the site plan review process. Including Wildfire Mitigation Plans as required contents for the site plan review process could minimize the loss of lives and property from wildfires. A sample Wildfire Mitigation Plan from Kane County, Utah is as follows:

> A site plan, showing 1) the location and extent of structures and other improvements, the defensible space management zones around the structures, the driveway access for emergency vehicles, emergency water supply for fire fighting, and the locations of other specific natural and human created features; and 2) a narrative that describes in detail these same features.\(^9\)

Another sample of code language from Boulder County Land Use Code Article 4-804.C.12 (See Appendix A: Boulder County, CO):

---

A Wildfire Mitigation Plan demonstrating the appropriate site location of structures, construction design and the use of ignition resistant building material, defensible space and fuel reduction around the structures, driveway access for emergency vehicles, and an emergency water supply for fire fighting.

**Applicable County Code:** 18.36.050(A) Standards for Single-Family Dwellings in Forest Use Zone 1 and 2, 18.124.040 Site Plan Review: Contents and Procedure, and 19.76 Site Plan Review.

**Implications:** Wildfire Mitigation Plans would ensure an action and maintenance plan in regards to wildfire be developed prior to construction and occupancy. This would ensure that the homeowner considers wildfire mitigation planning and maintenance before development and in perpetuity. The Plan would ensure the development is built to NFPA standards. It would require additional effort from homeowners and developers prior to development along with the continued maintenance as well as create restrictions to design.

**Wildland Fire Hazard Assessment**

A wildland fire hazard assessment determined through SB360 could be put to use by informing conditional use development in wildland-urban interface areas. If specific mitigation measures should be taken, they would be taken into consideration prior to development.

**Best Practice:** This code does not indicate how the increase in fire hazard, fire suppression costs, or risk to fire suppression personnel would be measured. We suggest the county consider including language stating the fire hazard risk would be determined by a wildland fire hazard assessment. Wildland Fire Hazard Assessments have already been determined through SB360, which could be used to measure the hazard rating and applicable requirements necessary for each parcel. Other examples of this language and assessment can be found in NFPA 1144 Chapter 4, and the ICC International Wildland-Urban Interface Code.

**Applicable County Code:** 18.36.40(B) Conditional Use in Forest Use Zone 1 and 2

**Implications:** A Wildland Hazard Assessment initiated before development would identify the level of risk to a property and ensure adequate mitigation standards are obtained before construction and occupancy. The assessments could require additional staff time; however, they would also provide and educational opportunity to discuss specific mitigation action items for the property to address before development.

**Standards for Road Identification Signs**

Standardized protocols regarding road identification signs and address markers can help emergency responders quickly find their destinations. As population growth into unincorporated areas continues, explicit language can standardize the location and appearance of road and address markers.
**Best Practice:** The Code does not include language to address road identification signs or markers. Proper signage is important for emergency responders to quickly locate and identify a residence. We recommend the County consider including policies on road and address marking. The International Wildland-Urban Interface Code section 403.4 and 403.6 provide specific language addressing road and address marking. The International Wildland-Urban Interface Code section 403.6 includes specific standards for address identification signs that could help emergency responders quickly and easily locate a residence in danger. An example of this language includes:

“All buildings shall have a permanently posted address, which shall be placed at each driveway entrance and be visible from both directions of travel along the road. In all cases, the address shall be posted at the beginning of construction and shall be maintained thereafter, and the address shall be visible and legible from the road on which the address is located.”

**Applicable County Code:** Title 18.36.080 Fire Safety Design Standards for Roads

**Implications:** Clearly identifiable signage for roads and residences helps emergency responders quickly locate and identify residences in time-sensitive situations.

**Wildfire Policy Options Matrix**

The following matrix lists each policy options listed in this document, with a condensed breakdown of applicable county code, a description of the policy option, the issues each policy option addresses, the applicability for Deschutes County, and the implications on the county if it were to adopt the option. Sections that are highlighted in gray are areas that the county may want to initiate its code update review process.
## Table 3 Wildfire Policy Options Matrix

<table>
<thead>
<tr>
<th>Ref. #</th>
<th>Policy Option</th>
<th>Deschutes County Code</th>
<th>Description</th>
<th>Issues Addressed</th>
<th>Applicability</th>
<th>Implications of Adoption</th>
<th>Planning Commission Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Wildfire Hazard Combining Zone</td>
<td>15.04.085 Building and Construction Codes and Regulations: Wildfire Hazard Zones Title 18 - County Zoning</td>
<td>Given the prevalence of wildfire risk within Deschutes County, applying transparent and effective standards to each individual base zone may not be the most effective means of regulating development. By implementing an overlay district in Deschutes County, development standards for mitigating wildfire risk could be more easily interpreted and applied.</td>
<td>Adoption of the Wildfire Hazard Areas map implements the provisions of the Wildfire Hazard Mitigation Section of the Oregon Residential Specialty Code</td>
<td>All new development on private land in Deschutes County</td>
<td>Eliminates the need to individually prescribe wildfire provisions for each base zone. Provides clear, consistent requirements for developers and property owners. Will require most of the County to now follow higher wildfire regulation standards instead of only the Forest Zones.</td>
<td>Commission was interested to see a potential hazard tiering system.</td>
</tr>
<tr>
<td>W2</td>
<td>Building Materials</td>
<td>15.04.085(11) Building and Construction Codes and Regulations: Wildfire Hazard Zones 18.36.070(5) Structural Standards in Forest Use Zone</td>
<td>In order to maintain fire resistance of shake roofs and siding, frequent retreatments are required. Since it is unlikely that homeowners will treat their homes as often as necessary, we recommend the County consider specifically prohibiting shake building materials within 15.04.085.</td>
<td>Wooden shake building materials pose a serious risk to residents in the event of a wildfire. Current County Code allows wooden shake roofs and siding if they are Class B or higher. To attain a Class B rating, a shake roof must be treated with a fire-resistant material. However, this treatment deteriorates relatively quickly in the County’s climate conditions, and it is uncommon for homeowners to retreat their homes as often as is necessary.</td>
<td>New construction; roof replacements. Would require Class A fire rated materials.</td>
<td>Although wooden shake building materials can be treated and re-treated to meet Class B roofing standards, explicitly prohibiting new structures from using wooden shake building materials addresses the hazard inherent to combustible building materials. Existing structures could be exempted from this requirement unless a homeowner undertook a significant re-roofing or siding project. Requires Class A materials.</td>
<td>Commission was very interested in this topic. Retroactive application was a topic of conversation, citing Sunriver’s mandatory Class A fire rated materials for roofing.</td>
</tr>
<tr>
<td>W3</td>
<td>Deep Slopes</td>
<td>18.36.070 Fire Siting Standards for Dwellings and Structures in Forest Use Zone</td>
<td>Set a slope grade threshold above which development requirements, such as augmented defensible space, must be met. To be consistent with existing code language, the County may set this threshold at 25 percent. This threshold and its requirements would ideally be included as a provision applied within a Wildfire Hazard Combining Zone.</td>
<td>Fire spreads much more rapidly up slopes than flat ground, which poses a threat to structures situated on steep slopes. Currently, single-family dwellings are allowed on slopes as steep as 40% in Forest Use Zones. The best practice in regards to development on steep slopes is to regulate development above a certain slope threshold.</td>
<td>Applicable to new developments. There are not many developable properties with slopes greater than 25%, a full analysis has yet to be completed.</td>
<td>This best practice option, when combined with defensible space measures, can achieve enhanced resilience to wildfires without imposing on private property rights. Landowners and developers should be encouraged to develop on flat terrain to the greatest degree possible, but providing sensible regulations considers the inevitability of development on slopes.</td>
<td>No comments were provided.</td>
</tr>
<tr>
<td>W4</td>
<td>Defensible Space</td>
<td>17.16.030C(12) Informational Requirements for Subdivisions 17.16.050 Master Development Plan 18.113.060 Destination Resorts</td>
<td>Requirements currently stated in 18.36.070. Suggestion to include requirements in Subdivisions and Destination Resorts as well as include requirements for fire-resistant landscaping.</td>
<td>Defensible space standards are not mentioned for Subdivisions and Destination Resort requirements. Defensible space standards listed in 18.36.070 for Forest Zones do follow NFPA and Firewise standards but do not include fire-resistant landscaping requirements which is a key proven factor in maintaining effective defensible space.</td>
<td>Applicable to new developments.</td>
<td>Overwrote risk to residential development, however, an increase of staff time to County inspector. Homeowners will be responsible for maintenance of their defensible space.</td>
<td>Commission voiced concern about the 100 to 200 foot buffer zone. Commission was also interested in including defensible space requirements for Subdivisions and Destination Resorts and wanted fire-resistant landscaping to be addressed.</td>
</tr>
<tr>
<td>W5</td>
<td>Subdivision Fire Protection (NFPA 1141)</td>
<td>17.16.030C(12) Informational Requirements for Subdivisions 17.16.050 Master Development Plan 18.113.060 Destination Resorts</td>
<td>The County may want to consider including a provision for Subdivisions and Destination Resorts that requires areas at risk of wildfires to achieve specific NFPA 1141 standards. Standards include requirements for subdivision access, building separation, fire protection, and water supply.</td>
<td>Standards would address national best practices for emergency access requirements, road grades, building separation to reduce the spread of wildfire, water supply, building materials, and wildfire mitigation planning before development.</td>
<td>Applicable to new developments.</td>
<td>Provides additional protection from wildfire risk. Could require additional costs to developers, however, can also be used as a useful marketing and real estate tool.</td>
<td>No comments were provided.</td>
</tr>
</tbody>
</table>

Source: Community Planning Workshop
<table>
<thead>
<tr>
<th>Ref. #</th>
<th>Policy Option</th>
<th>Deschutes County Code</th>
<th>Description</th>
<th>Issue Addressed</th>
<th>Applicability</th>
<th>Implications of Adoption</th>
<th>Planning Commission Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>Structure Ignition Fire Protection (NFPA 1144)</td>
<td>17.06.010(C)(12)</td>
<td>Informational Requirements for Subdivisions</td>
<td>The County may want to consider including a provision for Subdivisions and Destination Resorts that requires areas at risk of wildfires to achieve specific NFPA 1144 standards. Standards include requirements such as reducing structure ignition through defensible space zones, non-combustible construction materials, hazard mitigation assessments, and wildfire mitigation action and maintenance plans.</td>
<td>Applicable to new developments.</td>
<td>Provides additional protection from wildfire risk. Could require additional costs to developers, however, can also be used as a useful marketing and real estate tool.</td>
<td>No comments were provided.</td>
</tr>
<tr>
<td>07</td>
<td>Firewise Recognition</td>
<td>17.06.010(C)(12)</td>
<td>Informational Requirements for Subdivisions</td>
<td>Firewise Recognition or becoming a Firewise Community would help subdivisions create neighborhood action plans to mitigate wildfire from the beginning of development.</td>
<td>Applicable to new developments.</td>
<td>Earns neighborhood national recognition, can reduce insurance premiums, protects community from wildfire risk. Could require additional costs to developers, however, can also be used as a useful marketing and real estate tool.</td>
<td>Commission said this translates well to increased property values and increased safety.</td>
</tr>
<tr>
<td>08</td>
<td>Fire Protection Proof</td>
<td>17.06.010(C)(12)</td>
<td>Informational Requirements for Subdivisions</td>
<td>In addition to requiring a proposed fire protection system it would be beneficial to include Fire Protection Proof. Fire Protection Proof requires the applicant to show proof that the property is located within a fire protection district that will serve the property. (Jefferson County, CO)</td>
<td>Applicable to new developments.</td>
<td>Requiring applicants to prove they are protected by a fire protection district appears to place extra administrative pressure on rural fire districts. However, requiring fire protection information prior to subdivision approval can shed light on potential issues that could arise as a result of overloading a rural fire district.</td>
<td>No comments were provided.</td>
</tr>
<tr>
<td>09</td>
<td>Firewise Protection Standards</td>
<td>17.06.010(C)(12)</td>
<td>Informational Requirements for Subdivisions</td>
<td>Firewise standards include: nonflammable roofing materials, requirements for windows, vents, and attachments, Firewise plants, defensible space, and landscape maintenance.</td>
<td>Applicable to new developments.</td>
<td>Provides additional protection from wildfire risk. Could require additional costs to developers, however, can also be used as a useful marketing and real estate tool.</td>
<td>No comments were provided.</td>
</tr>
<tr>
<td>10</td>
<td>Fire Apparatus Access</td>
<td>17.36.260</td>
<td>Fire Hazard</td>
<td>These requirements would explicitly state higher access requirements to be addressed for subdivisions as listed in the ICC code and in 18.36.260.</td>
<td>Applicable to new developments.</td>
<td>The costs associated with providing additional points of access can be considered by developers as barriers to development. However, higher standards for access help prevent the loss of structures and ensure the safe ingress and egress of fire crews, emergency personnel, and residents.</td>
<td>Commission wanted to clarify that this applies to developments with over 600 dwelling units. Staff will determine the appropriate scale of development to apply this standard.</td>
</tr>
</tbody>
</table>

Source: Community Planning Workshop

Table 3 Wildfire Policy Options Matrix (continued)
<table>
<thead>
<tr>
<th>Ref. #</th>
<th>Policy Option</th>
<th>Deschutes County Code</th>
<th>Description</th>
<th>Issues Addressed</th>
<th>Applicability</th>
<th>Implications of Adoption</th>
<th>Planning Commission Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>W11</td>
<td>Road/Address Identification Signs</td>
<td>18.36.080 Fire Safety Design Standards for Roads in Forest Use Zone 1 &amp; 2</td>
<td>The Code does not include language to address road identification signs or markers. Proper signage is important for emergency responders to quickly locate and identify a residence. We recommend the County consider including policies on road and address marking. The International Wildland-Urban Interface Code section 403.4 and 403.6 provide specific language addressing road and address marking.</td>
<td>This requirement would include requirements for proper signage for emergency responders that currently does not exist and would help identify locations in need of emergency.</td>
<td>Applicable to new developments.</td>
<td>Creates accessible signage for emergency responders to quickly locate and identify residences.</td>
<td>Increases visibility and correct address identification and location in time-sensitive emergency responses. Desire to include same requirement on long private driveways with multiple residences.</td>
</tr>
<tr>
<td>W12</td>
<td>Wildfire Hazard Assessment</td>
<td>18.36.40(B) Conditional Use in Forest Use Zone 1 &amp; 2</td>
<td>A Wildfire Hazard Assessment imitated before development would identify the level of risk to a property and ensure adequate mitigation standards are obtained before construction and occupancy.</td>
<td>Applicable to new single family dwellings.</td>
<td>Additional staff time for individual assessments, provides specific mitigation action items for property to address before development</td>
<td>No comments were provided.</td>
<td></td>
</tr>
<tr>
<td>W13</td>
<td>Wildfire Mitigation Plans</td>
<td>18.36.050(A) Standards for Single-Family Dwellings in Forest Use Zone 1 &amp; 2 18.124.040(D) Site Plan Review</td>
<td>Due to the frequency with which homes are being built in wildland areas of Deschutes County, requiring Wildfire Mitigation Plans may be a useful addition to the site plan review process. We recommend the County consider including Wildfire Mitigation Plans as required contents for the site plan review process could minimize the loss of lives and property from wildfires. (Kane County, UT; Boulder County, CO, NFPA 1144 Chapter 4.3)</td>
<td>Wildfire Mitigation Plans would ensure an action and maintenance plan in regards to wildfire be developed prior to construction and occupancy. This would ensure that the homeowner considers wildfire mitigation planning and maintenance before development and in perpetuity.</td>
<td>Applicable to new single family dwellings.</td>
<td>Creates a wildfire mitigation plan at the time of development. Builds and develops land to NFPA standards. Requires additional effort from homeowners and developers as well as restrictions to design.</td>
<td>No comments were provided.</td>
</tr>
<tr>
<td>W14</td>
<td>Fire Prevention and Control Plans</td>
<td>Section 17.16.050 Master Development Plan</td>
<td>The Master Development Plan does not include a requirement for wildfire treatment in the wildfire hazard zone. Fire Prevention and Control Plans address water supply, access, building ignition and fire-resistance factors, fire protection systems and equipment, defensible space, and vegetation management. (City of Ashland / International Wildland-Urban Interface Code)</td>
<td>Fire Prevention and Control Plans address Subdivisions that did not have clear wildfire prevention plans in place before development. Clear standards and requirements for this plan would help developers with their design plan and ensure that maintenance of these standards remain in perpetuity.</td>
<td>Applicable to new developments.</td>
<td>Provides clear expectations for developers, wildfire planning considered in early phases of planning</td>
<td>No comments were provided.</td>
</tr>
</tbody>
</table>

Source: Community Planning Workshop
CHAPTER 5: RECOMMENDATIONS

Based on our review of current Deschutes County Code, CPW identified several areas where language can be expanded upon, language from model ordinances can be added, and language can be condensed to reduce redundancy. The intent of the code review and identification of policy options was to identify code amendments that can enhance the county’s ability to prepare for and recover quickly following a hazard event. For many issues, CPW identify multiple options. The county should carefully examine each option determine which option is most appropriate. All of policy options identified in this report reflect areas that will add safety measures not explicitly seen in current language.

This chapter presents CPW’s recommendations regarding policy options. Our recommendations were informed through two work sessions with the Deschutes County Planning Commission and one work session with the Deschutes County Board of County Commissioners. We also discussed and reviewed the options with Community Development Department staff. Because the code amendments are legislative changes, the county will be required to conduct public hearings for any amendment. Amendments are also subject to review and acknowledgement by the state Land Conservation and Development Commission (LCDC).

Recommendations

To assist county staff in evaluating the policy options presented in this report, we grouped our recommendations into three areas: (1) combining zones; (2) higher standards; and (3) code requirement clarity. At the direction of staff and the Planning Commission, the recommended policy options are prioritized.

Adopt Wildfire and Flood Combining Zones

To more efficiently regulate development in hazardous areas and consistently apply development standards, CPW recommends that the county draft and adopt a wildfire combining zone. We also recommend the county consolidate the Title 18.96 Flood Plain Zone, Title 18.108.190 Flood Plain Combining District, and Title 19.72 Flood Plain Combining Zone into a single Flood Plain Combining Zone within Title 18 of the County Code (County Zoning).

Implementation of a wildfire combining zone will make interpretation and application of development standards easier when mitigating wildfire risk. The creation of a wildfire hazard combining zone would eliminate the need to individually prescribe wildfire provisions for each base zone. Many of the wildfire-specific best practices and standards presented in this report can be included within a combining zone.

Consolidation of the floodplain zone will help to reduce redundancy in the development code, help to eliminate code interpretation challenges, and reduce the potential for code enforcement errors. Furthermore, developers and property
owners benefit from clear, consistent requirements that can be found in a single location within Deschutes County Code Title 18.

**Adopt Higher Standards**

CPW recommends the County review adopt the recommended wildfire and flood standards to increase the safety and well-being in Deschutes County. Wildfire policy options include adoption of National Fire Protection Association (NFPA) regulations 1141 and 1144 and from the International Code Council. These options include:

- **NFPA 1144 and ICC Wildland Fire Hazard Assessment.** We recommend the county adopt standards that require an assessment be initiated before development to identify the level of risk to a property and ensure adequate mitigation standards are obtained before construction and occupancy.

- **NFPA 1141, NFPA 1144, and ICC’s Fire Prevention and Control Plan.** We recommend the county adopt standards that require subdivisions address water supply, access, building ignition and fire-resistance factors, fire protection systems and equipment, defensible space, and vegetation management.

- **ICC International Fire Code.** We recommend the county adopt standards for road identification signs to improve visibility for emergency responders to locate properties in danger.

CPW recommends the county adopt elements of the NFIP’s Community Rating System as standards. The CRS standards presented to the Board of County Commissioners and county staff include:

- **431.a Protecting Critical Facilities.** Protecting critical facilities is vital to reducing damages caused by flood and improves the county’s ability to respond to the needs of residents during a disaster.

- **432.a.(3) Development Limitations (prohibit hazardous materials).** Prohibiting storage of hazardous materials in the floodplain also reduces adverse impacts by removing materials that may cause contamination during a flood event.

- **432.d Cumulative Substantial Improvements.** Adoption of a substantial improvements policy reduces the future of flood damage by requiring homeowners to bring existing structures into compliance with NFIP regulations. Instead of tracking improvements annually, cumulative substantial improvements track the improvements over the lifetime of the structure.

- **432.e Lower Substantial Improvements Threshold.** The lower substantial threshold standard recommends that the county lower the cost of improvement to less than 50% of the market value structure. Lowering the threshold provides a mechanism that ensures an increased investment in flood hazard areas will receive the needed protection from flood risk.
Increase Clarity in Code Requirements

Increasing clarity in policy requirements for developers and homeowners will reduce potential misinterpretation of the code and ease the process of complying with development requirements.

Wildfire policies that increased clarity include wildfire mitigation plans for subdivisions and single-family homes. Specific wildfire mitigation plans would include requirements such as a wildfire hazard assessment, defensible space standards, emergency vehicle access, and water supply that are clear to developers and homeowners. Lucid policy language for wildfire management plans would help reduce time and costs to prepare the plans and reduce risk to property and lives. Explicit requirements for defensible space and road identification signs are also examples of increasing clarity for developers and homeowners. These policies would also ensure that all applicants consistently comply with the same requirements.

Flood policies that increase transparency include flood definitions. Clear definitions for critical facilities and below-grade-crawlspaces help identify these terms and make standards more transparent for developers and homeowners.

Prioritized Policy Recommendations

This report identifies a range of policy and programmatic options for the county to consider based on model ordinances, best practices, and case studies. Based on input from the Deschutes County Planning Commission and the Board of County Commissioners, CPW prioritizes the policy options in the following order (the policy option is identified within parentheses as found in Tables 3 and 4 above):

• Adopt higher wildfire standards from NFPA 1141, 1144 and the ICC (W5, W6, W14)
• Adopt higher CRS standards: lower substantial improvements threshold, cumulative substantial improvements, protecting critical facilities, and development limitations (F1, F2, F3)
• Implement floodplain and wildfire combining zones (F5, W1)
• Prohibit wooden shake building materials in wildfire hazard zones (W2)
• Require defensible space standards in wildfire hazard zones (W4)
• Apply additional regulations to development on slopes greater than 25% (W3)
• Require Wildfire Mitigation Plans for subdivisions and single-family homes in wildfire hazard zones (W13)
• Require fire protection proof from subdivisions before development (W8)

CPW believes these options will have the biggest impacts in terms of reducing risk from natural hazards of flood and wildfire to property and lives. These model policies, best practices, ordinances, and case studies across the nation and will help the county improve the development process, save costs on rescue efforts, and most importantly reduce risk to the community.
APPENDIX A: WILDFIRE CASE STUDIES

This appendix summarizes case studies from communities around the West that have novel approaches to addressing the wildfire hazard. The following case studies from Boulder County, CO, Ashland, OR and Rancho Bernardo, CA all serve as evidence to support the best practices presented in the body of this document.

Case Studies

Ashland, OR

This case study presents evidence supporting the usefulness of Fire Prevention and Control Plans in hazardous areas. As it is in the same state as Deschutes County, Ashland could serve as a useful example of implementation in Oregon.

Boulder County, CO

This case study describes and evaluates Boulder County’s implementation of Wildfire Mitigation Plans, as well as documents how residents have responded by maintaining defensible space.

Rancho Bernardo, CA

This case study documents the aftermath of a wildfire in Southern California, and demonstrates the dangers of development on steep slopes.
Case Study: City of Ashland, OR

The purpose of this case study is to describe and evaluate the City of Ashland’s use of a Wildfire Hazard Area Zone and Subdivision Fire Prevention & Control Plan. This case study provides a brief background on Ashland’s history of wildfire, describes Ashland’s Wildfire Hazard Area Zone and Subdivision regulations, evaluates the significance of the case study and identifies its relevancy to Deschutes County’s goal of natural hazards mitigation.

Background

Ashland is located in Jackson County in Southern Oregon and is situated in an area of high risk to wildfire. After the region experienced severe losses during the 1987 fire season, the city decided to assess their wildfire risk and develop regulations to mitigate the risk. A site-specific survey was conducted by Ashland’s fire department and Oregon Department of Forestry to map the wildfire hazard areas within the Urban Growth Boundary. It was determined that 1,100 acres in Ashland is categorized as a wildfire hazard area. Some key criteria in the survey included: connectivity of fuel, roofing material, density of vegetation, and slope. Increased development pressure led to a policy change in the wildland urban-interface to their land use code starting in the 1980’s.

Current Regulations/Program

As a result of the wildfire hazard rating mapping process described above, a Wildfire Hazard Zone Overlay was defined in 1992 in land use Chapter 18.62: Physical and Environmental Constraints. The goal of this policy is to provide clear and objective standards regarding wildfire mitigation to property owners. Property owners know exactly what size fuel break they need to install and how to maintain it as well as clear building code requirements. The subdivision code outlines a clear Fire Prevention & Control Plan stressing the need of cooperation between the planning department and fire/emergency management agencies.

Example regulations in Ashland’s Municipal Code 18.62.110 Physical & Environmental Constraints: Development standards for Class E lands (wildfire hazard areas) include:

Ashland Municipal Code 18.62.090 Physical & Environmental Constraints: Development Standards for Wildfire Lands includes subdivision requirements for a Fire Prevention & Control Plan. Elements of this plan include:

- A Fire Prevention and Control Plan shall be required with the submission of any application for an outline plan approval of a Performance Standards Development, preliminary plat of a subdivision, or application to partition lands that contain areas designated as Wildfire Hazard areas.
- Criterion for Approval. The hearing authority shall approve the Fire Prevention and Control Plan when, in addition to the findings required by this chapter, the additional finding is made that the wildfire hazards present on the property have been reduced to a reasonable degree,
balanced with the need to preserve and/or plant a sufficient number of
trees and plants or erosion prevention, wildlife habitat, and aesthetics.

Significance

Since the Wildfire Hazard Zone and Fire Prevention & Control Plan have been in
place, there has not been any loss of property or life to wildfire in that region.
However, this designated wildfire hazard zone is only currently mapped in a small
portion of the city, which is surrounded by many other assessed hazardous areas
without regulation. The City is now requesting for the Wildfire Hazard Area Zone to
be extended to be City-wide so that the entire city would be subject to regulations
such as a ban on wooden shake roofs and use of defensible space and fire-resistant
landscaping.

In 2009, the Siskiyou Fire evacuated 109 home and a school all of which were not
inside the Wildfire Hazard Zone. Again in 2010, the Oak Knoll Fire burned 11
homes, which were also outside the Wildfire Hazard Zone. These wildfires did not
cause any damage inside the Wildfire Hazard Zone, however, were just outside the
border and had the potential to damage other homes. This is the reason why the
City would like to expand this zone to ensure that wildfire does not spread due to
homes not required to follow wildfire prevention measures such as prohibiting
wooden shake roofs and keeping fire-resistant landscaping.

Relevance

Deschutes County currently has stated that the entire county is in a Wildfire Hazard
Zone. The Wildfire Hazard Zone has been defined in the development code in Title
15.04.085, however, there aren’t any regulations associated with it. A Wildfire
Hazard Zone with regulations such as the City of Ashland could be a useful measure
to ensure protection of life and properties from wildfire risk before development
occurs. The County also does not require wildfire mitigation plans prior to
development for subdivisions such as the Fire Prevention & Control Plan with the
City of Ashland. A specific plan requirement with explicit criteria to address would
help developers understand expectations and proactively prevent wildfire risk.

Citations

“City of Ashland, Oregon - Fire – Wildfire Hazard Zone Expansion.” City of Ashland,
http://www.ashland.or.us/Page.asp?NavID=16530

Community Planning Workshop & Oregon Department of Land Conservation &
Development, “Planning for Natural Hazards: Wildfire TRG.” Technical Resource
Case Study: Boulder County, CO

The purpose of this case study is to describe and evaluate Boulder County’s use of a Wildfire Mitigation Plan. This case study provides a brief background on Boulder County’s history of wildfire, describes Boulder County’s regulations, evaluates the significance of the case study and identifies its relevancy to Deschutes County’s goal of natural hazards mitigation.

Background

Boulder County has been facing an increase of population pushing development into the wildland-urban interface. These forested lands have very high risk for wildfire due to fire suppression policies allowing vegetation density to grow to 10-100 times its normal state, steep terrain, drought, high summertime temperatures and high winds. These dangerous conditions along with the increase of population into the wildland-urban interface have increased the challenging ability for emergency responders to protect lives and properties. A devastating fire, the Black Tiger Fire on Sugarloaf Mountain in 1989, burned 2,100 acres, destroyed 44 homes, caused losses of $10 million, and required 500 firefighters to contain the fire. To help reduce the risk of wildfire to lives and properties, Boulder County implemented a requirement in 2000, to all new homes being built in wildfire hazard areas, to include a Wildfire Mitigation Plan.

Current Regulations/Program

The Wildfire Mitigation Plan requirement is for all new homes built in wildfire hazard risk areas. The Plan is to ensure that the home is properly sited before development, creates adequate defensible space, provides for emergency access and water supply, and requires the homeowner to continue routine maintenance around the property to help protect and prevent the spread of wildfire. This Plan is to be submitted with a Building Permit Application and will be part of the review process before a permit is issued.

Significance

Since the implementation of the requirement for Wildfire Mitigation Plans in wildfire hazard risk areas, a 2007 survey found that 97% of residents in Boulder County maintain defensible space. Since the Wildfire Mitigation Plan requirement has been in place, residents have become more aware of the importance of defensible space; and take an active role in mitigating the risks associated with living in wildfire hazard areas.

Relevance

Boulder County and Deschutes County face similar conditions in terms of population change, topography and climate. Like Boulder County, Deschutes County is also facing an increased population moving to the wildland-urban interface into wildfire hazard areas. These hazardous areas contain dense vegetation and sometimes steep slopes. A warmer climate with high summertime
temperatures as well as a newly declared drought has threatened the risk of wildfire.

Currently, Deschutes County does not require homeowners to have a Wildfire Mitigation Plan before development and has only relied on non-regulatory projects from Project Wildfire to reduce dense vegetation. Requiring a Wildfire Mitigation Plan before development with maintenance requirements will help ensure that homes and homeowners are aware and protected in the event of a wildfire.

Citation

Boulder County Community Wildfire Protection Plan. 2011. 
http://www.bouldercounty.org/doc/forest/cwppbooklowres.pdf

http://www.bouldercounty.org/doc/forest/w02wildfiremitigationplan.pdf

http://www.bouldercounty.org/property/forest/pages/blacktigerfire.aspx
Case Study: Steep Slopes in Rancho Bernardo, CA

The purpose of this case study is to describe and evaluate the effectiveness of developing on slopes less than 20% in wildfire hazard areas. This case study provides a brief background on the Witch and Guejito wildfires, describes the correlation between structural loss and slopes greater than 20%, and provides reason for this concept’s relevance in Deschutes County. The evaluation of this wildfire event bears direct significance to wildfire mitigation practices in Deschutes County.

Background

The National Institute for Standards and Technology (NIST) was invited by the California Department of Forestry and Fire Prevention (CAL FIRE) to collect post-incident data from fires occurring in October 2007. The case study is focused on the Trails development at Rancho Bernardo, north of San Diego. There were 270 homes in the Trails community, 242 of which were within the fire perimeter. Of those, 74 homes were completely destroyed and 16 were partially damaged. Field measurements included roof type, defensible space, exposure to steep slopes, and several Firewise treatment techniques. The majority of the hazard mitigation treatments evaluated at the Trails Community appeared to be applicable even if they were not all individually effective.

Effects of Development on Steep Slopes

Among the numerous landscape and structural traits observed after the fires, the NIST found a significant pattern of increased destruction to residential structures with increased exposure to slopes greater than 20%. Increasing slope was associated with an increased likelihood for structural damage or destruction.

Table 5 Statistics on Structural Damage/Destruction during the 2007 Witch and Guejito Fires.

<table>
<thead>
<tr>
<th>Slope Category</th>
<th>Total Number of Structures Damaged/Destroyed</th>
<th>Percentage of Structures Damaged/Destroyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10%</td>
<td>12</td>
<td>8.3%</td>
</tr>
<tr>
<td>10-20%</td>
<td>117</td>
<td>24.8%</td>
</tr>
<tr>
<td>20-30%</td>
<td>74</td>
<td>41.9%</td>
</tr>
<tr>
<td>30-40%</td>
<td>37</td>
<td>73.0%</td>
</tr>
<tr>
<td>40-50%</td>
<td>2</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: National Institute for Standards and Technology.

Relevance

Deschutes County currently regulates development on slopes in Title 18.113 Destination Resorts, as well as Title 18.36 and Title 18.40 Forest Use Zones.
Development in Destination Resort development zones is limited to occur on slopes less than 25%. Development in Forest Use Zones is limited to slopes less than 40%. Development in all other zones appears to be unregulated in regards to steep slopes. Given that much of the residential development in Deschutes County’s unincorporated areas occurs in the wildland-urban interface, preemptive measures should be taken - to the greatest extent possible- to reduce the risk of structural damages or destruction resulting from wildfire events. This case study serves as direct evidence that structures exposed to slopes greater than 20% are more likely to be damaged or destroyed in a wildfire event.

Citation