

# 7

## Natural Hazards





## Opportunities, Challenges, and Considerations

Central Oregon is a dynamic region formed and shaped by the powerful forces of nature. Deschutes County residents and visitors rely on the County and its partners to plan for hazardous events and limit harm to people and property.

Continued rapid population growth, development in wildfire-prone areas, and an increased frequency of natural hazard events make planning for and mitigating risks ever more important. As temperatures rise globally, Central Oregon will face challenges due to drought, wildfire, heat events, and storms. The impacts a major Cascadia Subduction Zone earthquake would have on Deschutes County would be substantial as well.

In order to plan for and address natural hazards, Deschutes County has partnered with local jurisdictions to create its Natural Hazards Mitigation Plan (NHMP). Additional opportunities exist to create greater defensible spaces, encourage fire hardening, utilize grant programs, and pursue education measures to reduce these impacts over time.

According to the NHMP, the hazards with greatest risk in Deschutes County are:

- **Winter Storm.** Destructive storms producing heavy snow, ice and cold temperatures occurred throughout the County's history. Increases in population and tourism make potential impacts to shelter, access to medical services, transportation, utilities, fuel sources, and telecommunication systems more acute. The relative frequency of these events combined with their widespread impacts make winter storms the highest-ranked hazard in the NHMP.

- **Wildfire.** Historically, wildland fires have shaped the forests and wildlands valued by residents and visitors. These landscapes, however, are now significantly altered due to increased rural development, warmer and drier conditions, and a general lack of large-scale treatments due to outdated forest management practices, resulting in increased event of wildfires that burn more intensely than in the past.

Statewide Planning Goal 7 requires local comprehensive plans to address Oregon's natural hazards. Protecting people and property from natural hazards requires knowledge, planning, coordination, and education. Good planning does not put buildings or people in harm's way. Planning, especially for the location of essential services like schools, hospitals, fire and police stations, is done with sensitivity to the potential impact of nearby hazards.

- **Windstorm.** A windstorm is generally a short duration event involving straight-line winds and/or gusts in excess of 50 mph. Although windstorms can affect the entirety of Deschutes County, they are especially dangerous in developed areas with significant tree stands and major infrastructure, especially above ground utility lines.
- **Drought.** Periods of drought can have significant impacts on public health, agriculture, and industry. Many counties in eastern Oregon are experiencing more frequent and severe droughts than is historically the norm, and many climate predictions see this trend continuing into the future.
- **Earthquake.** The Pacific Northwest is located at a convergent plate boundary, called the Cascadia Subduction Zone, where the Juan de Fuca and North American tectonic plates meet. This fault line is subject to rare but potentially very large

earthquakes. Such an event would impact Deschutes County communities both directly through damage to infrastructure and property, as well as economically and socially as the broader region recovers from the disaster.

### Context

Informed by an understanding of natural hazards, Deschutes County can reduce the risks to property, environmental quality, and human safety through land use planning and review of specific development proposals. The County's policies provide the framework for the County's natural hazards review program. This includes: identification of areas subject to natural hazards, regulations for evaluating land use actions for how they may result in exposure to potential harm from natural hazards, and programmatic elements including partnerships and funding opportunities to support natural hazard risk reduction.

Deschutes County has taken on a number of proactive projects, including:

- 2021 Natural Hazards Mitigation Plan (NHMP)
- 2019 Wildfire Mitigation Advisory Committee
- Project Wildfire, a County-led wildfire education and mitigation program has been in operation since 2012 and has been very successful in changing attitudes towards wildfire and prevention.
- Community Wildfire Protection Plans (CWPP) for many communities, including:
  - » Greater Bend CWPP (2016, expected revision 2021)
  - » Greater La Pine CWPP (2020, expected revision 2025)
  - » Greater Redmond CWPP (2018, expected revision 2023)
  - » Greater Sisters Country CWPP (2019, expected revision 2024)



- » Sunriver CWPP (2020, expected revision 2025)
- » East and West Deschutes County CWPP (2018, expected revision 2023)
- » Upper Deschutes River Coalition CWPP (2018, expected revision 2023)

In addition, dozens of neighborhoods are pursuing or have received FireWise certification through the National Fire Protection Association. The County also supports the Heart of Oregon and Youth Conservation Corps crews in fuels reduction work and other mitigation efforts, with financial assistance from other entities.

### Wildfire

According to the Natural Hazards Mitigation Plan, wildfire is the second most significant hazard to the county (after winter storms) and was the most discussed natural hazard discussed during outreach events. Throughout the 20<sup>th</sup> century, the years with warm and dry conditions corresponded with larger fires that have burned greater areas. Overall increases in heat will also lengthen growing seasons - building greater fuel loads and decreasing soil and fuel moisture, thereby increasing the likelihood of larger fires. By mid-century, the annual potential for very

large fires is projected to increase by at least 350% over the 20<sup>th</sup> century average.<sup>1</sup>

The annual frequency of very high and extreme fire danger days is expected to increase by 10-15 additional days per year by mid-century<sup>4</sup> (up from 36 currently). These trends are due to exacerbated conditions with a combination of high air temperatures and very low fuel moisture, which increases the likelihood of fire starts that can spread. As Deschutes County communities have experienced, increased fire activity - even at quite a distance - will impact air quality, increasing public health risks and impacting aspects of everyday life.

Research indicates that in regions where fire has moved through the landscape with increased severity, regrowth is changing the species composition of the forests, which are likely to be more resilient to future fires.<sup>2</sup> Other compounding factors, like drought and pest outbreaks, will continue to build fuel loads in the forests and change the forest's composition. Post-fire landscapes in Deschutes County will likely see increases in the prevalence of invasive and pioneer tree species, and a reduction in fire-susceptible species such as western hemlock, subalpine fir, and some spruce. Fire resistant species like mature Douglas fir and western larch will have greater survival capacity to fire,<sup>3</sup> but perhaps not to other stressors. Larger fires that occur over shorter intervals will negatively impact seed dispersion capacity, and reduced moisture available in ponderosa forest regions will be vulnerable to reforestation failures, leading to conversion to other ecosystem types. In the mountain forests, the average yearly area burned is expected to nearly double by mid-century, while the area burned in the grass/shrub plateau areas is likely to decrease slightly by mid-century. This is partly due to extended



<sup>1</sup> Halofsky, J. Peterson, D, Harvey, B. "Changing Wildfire, changing forests: the effects of climate change on fire regimes and vegetation in the Pacific Northwest, USA. Fire Ecology. 2020.

<sup>2</sup> Sebastian U. Busby, Kevan B. Moffett, Andrés Holz. High severity and short interval wildfires limit forest recovery in the Central Cascade Range. Ecosphere, 2020; 11 (9) DOI: 10.1002/ecs2.3247

<sup>3</sup> 6 Halofsky et al. 2020.

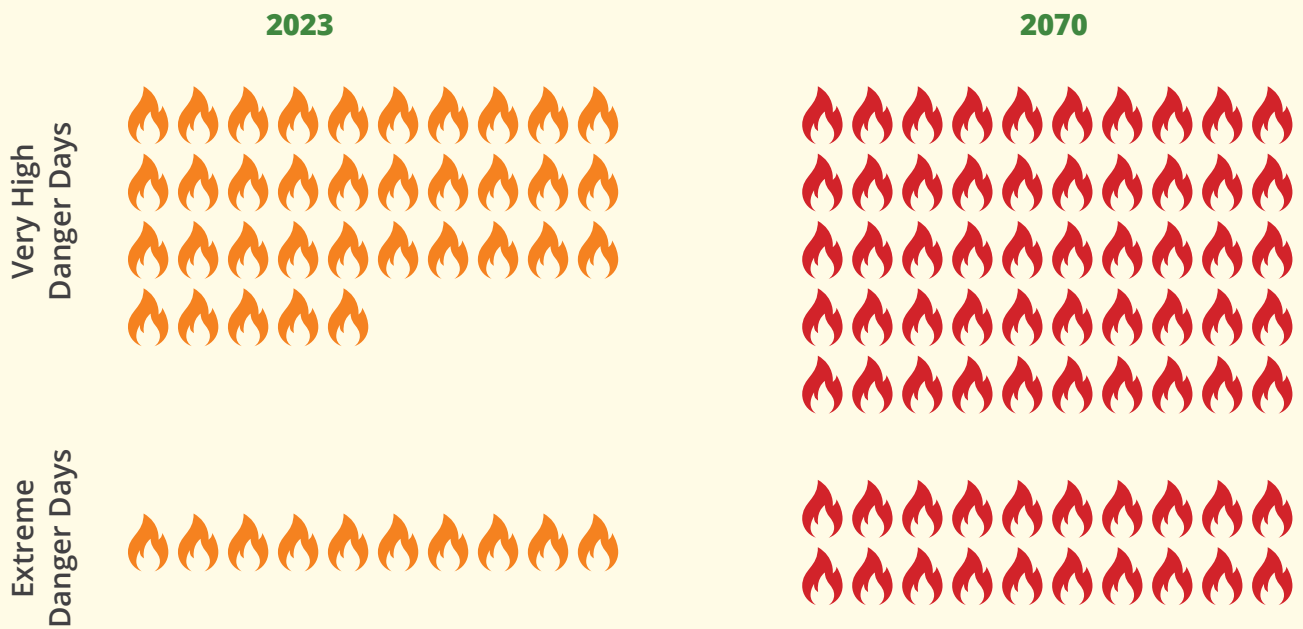
drought decreasing plant growth and therefore available fuel. The risk of unusually severe fires is expected to increase across large swaths of Oregon, including Deschutes County.<sup>4</sup>

**WILDFIRE AND HEAT**

By the middle of this century, increasing temperatures are expected to drive increasing wildfire risk, especially in the Cascades. The yearly percentage of area burned is likely to increase in the mountains and the interval of return (years between fires) is expected to decrease across the county. Both the highest and lowest summer temperatures will increase, leading to more extreme heat days and reducing the historical nighttime cooling effect of the high desert.

Under all change projections, there will be an increase in the number of days with a heat index above both 90° and 100°F by mid-century.<sup>8</sup> By 2100, Deschutes County can expect summer maximum temperatures to be 12°F hotter than current highs. Overall, extreme heat is not considered a human health risk in Deschutes County because of low night temperatures and the low humidity in the region. However, the Redmond airport, which sees the hottest temperatures in the county, will likely start to see occasional temperatures above 105° every few years by mid-century, and at least once a year by 2100. In addition, summer night lows are likely to increase by up to 5° degrees by mid-century, reducing the cooling effect of the high desert climate.

**Fire Danger near Mt. Bachelor Village**



4 Oregon Forest Resources Institute Fact Sheet

## Key Community Considerations

Community conversations related to natural hazards have centered around the following topics:

- **Impacts of Climate Change.** Throughout the community engagement process, community members spoke to the importance of recognizing and addressing the impacts of climate change in Deschutes County and its relationship with natural hazard events.
- **Education and Communication.** Providing information about potential risks to residents and visitors can help the community as a whole be more prepared for natural hazards.
- **Development Code Regulations and Incentives.** Some community members expressed a desire for stricter regulations and additional incentives about “fire-wise” construction and defensible space practices.
- **Limiting Development in hazard-prone areas.** Increased development in remote areas of the County, where life-saving services may be scarce and human impacts may exacerbate risks, was a concern for some.

## Vulnerable Populations

The socio-demographic qualities of the community population such as language, race and ethnicity, age, income, and educational attainment are significant factors that can influence the community’s ability to cope, adapt to and recover from natural disasters. A disproportionate burden is placed upon special needs groups, particularly children, the elderly, the disabled, minorities, and low-income persons. Population vulnerabilities can be reduced or eliminated with proper outreach and community mitigation planning. For planning purposes, it is essential that Deschutes County and the cities of Bend, La Pine, Redmond, and Sisters consider both immediate and long-term socio-demographic implications of hazard resilience.



## Goals and Policies

**Goal 7.1:** Develop policies, partnerships, and programs to increase resilience and response capacity in order to protect people, property, infrastructure, the economy, natural resources, and the environment from natural hazards.

**Policy 7.1.1.** Partner with county, state, and regional partners to regularly update and implement the Deschutes County Natural Hazards Mitigation Plan.

**Policy 7.1.2.** Collaborate with federal, state, and local partners to maintain updated mapping of high wildfire risk areas, floodplains, and other natural hazard areas within the county.

**Policy 7.1.3.** Communicate and cooperate with federal, state, and local entities to clarify responsibilities regarding wildfire mitigation and suppression to improve fire protection services.

**Policy 7.1.4.** Use the development code to provide incentives and regulations to manage development in areas prone to natural hazards.

**Policy 7.1.5.** Work with agency partners to address and respond to increased episodes of poor air quality resulting from wildfires in the region.

**Policy 7.1.6.** Protect wildlife with wildland fire mitigation measures on private lands.

**Policy 7.1.7.** Address wildfire risk, particularly in the wildland urban interface.

**Policy 7.1.8.** Identify all areas not protected by structural fire protection agencies and promote discussions to address fire protection in unprotected lands in the County.

**Policy 7.1.9.** Support forest management practices that reduce wildfire risk.

**Policy 7.1.10.** Support local fire protection districts and departments in providing and improving fire protection services.

**Policy 7.1.11.** Continue to review and revise County Code as needed to:

- a. Ensure that land use activities do not aggravate, accelerate or increase the level of risk from natural hazards.
- b. Require development proposals to include an impact evaluation that reviews the ability of the affected fire agency to maintain an appropriate level of service to existing development and the proposed development.
- c. Minimize erosion from development and ensure disturbed or exposed areas are promptly restored to a stable, natural and/or vegetated condition using natural materials or native plants.
- d. Ensure drainage from development or alterations to historic drainage patterns do not increase erosion on-site or on adjacent properties.
- e. Reduce problems associated with administration of the Floodplain Zone.
- f. Require new subdivisions and destination resorts to achieve FireWise Standards or other currently accepted fire mitigation standards from the beginning of the projects and maintain those standards in perpetuity.

**Goal 7.2:** Ensure the County's built environment and infrastructure are adequately prepared for natural disasters.

**Policy 7.2.1.** Increase the quality, resiliency, diversity, and redundancy of utility and transportation infrastructure to increase chances of continued service following a natural disaster.

**Policy 7.2.2.** Prohibit the development of new essential public facilities and uses that serve vulnerable populations from being located within areas at high risk of flooding and wildfire, and aim to relocate existing uses in these areas.

**Policy 7.2.3.** Support siting of Central Oregon Ready, Responsive, Resilient (CORE3) regional coordinated emergency services training facility.

**Policy 7.2.4.** Coordinate with emergency service providers when new development is proposed to ensure that response capacity can meet the needs of the new development.

**Policy 7.2.5.** Require new development to follow home hardening, defensible space, and other resilient design strategies in areas prone to wildfires and other natural hazards.

**Policy 7.2.6.** Encourage and incentivize development that exceeds minimum building code standards and promote retrofitting of existing development for better natural disaster resiliency.

**Policy 7.2.7.** Require development to be designed to minimize alteration of the natural landform in areas subject to slope instability, drainage issues or erosion.

**Policy 7.2.8.** Regulate development in designated floodplains identified on the Deschutes County Zoning Map based on Federal Emergency Management Act regulations.

- a. Continue evaluation of participation in and implementation of the Community Rating System as part of the National Flood Insurance Program.
- b. Cooperate with other stakeholders to identify alternatives for acquiring and/or relocating existing structures prone to flooding.

- c. Continue to coordinate with stakeholders and agency staff to correct mapping errors.

**Goal 7.3:** Develop programs that inform the public about the increased risks from natural hazards.

**Policy 7.3.1.** Identify high risk, high need populations and ensure equitable access to emergency preparedness and recovery services.

**Policy 7.3.2.** Increase outreach and education for hazard awareness and natural disaster preparedness, especially for low-income, elderly, non-English speaking, and other vulnerable populations.

**Policy 7.3.3.** Expand partnerships with government agencies, utilities, and other groups that can help Deschutes County residents prepare for natural disasters.

**Policy 7.3.4.** Work with regional partners to establish and maintain adequate support for a Deschutes County Community Emergency Response Team (CERT) to aid in responding to natural hazard events.

**Policy 7.3.5.** Promote and support business resilience planning.

