

**VOLUME III: JURISDICTIONAL AGENDA**

## Introduction

This document serves as the City of Bend's Addendum to the Deschutes County Natural Hazard Mitigation Plan (NHMP). The City's Addendum is considered part of the county's multi-jurisdictional plan, and meets the following requirements: (1) Multi-jurisdictional Plan Adoption §201.6(c)(5), (2) Multi-jurisdictional Participation §201.6(a)(3), (3) Multi-Jurisdictional Risk Assessment §201.6(c)(2) (iii), and (4) Multi-jurisdictional Mitigation Strategy §201.6(c)(3) (iv).

A description of the city specific planning and adoption process follows, along with detailed community specific action items; for detailed information see Volume IV, Appendix B. Information about the city's risk relative to the county's risk to natural hazards is documented in this addendum's Hazard Analysis and Issue Identification section. The section considers how the city's risk differs from or matches that of the county's; additional information on Risk Assessment is provided within Volume I, Section 2 of this NHMP.

## How was the Plan Developed?

The NHMP was developed by the Deschutes County Natural Hazard Mitigation Plan steering committee, while this addendum was created by the City of Bend steering committee. The Deschutes County Emergency Manager was designated as the NHMP's convener and will take the lead in implementing, maintaining and updating the plan. Locally, the City of Bend Senior Planner convened a local steering committee for the purpose of developing the city's addendum.

The local steering committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. The local steering committee met once formally on April 28<sup>th</sup>, 2021 (see Appendix B for more information). Steering committee members contributed data and maps, reviewed and provided guidance towards the community profile, risk assessment, mitigation strategy (action items), and implementation and maintenance plan. The addendum reflects effort from the formal meeting and during subsequent informal meetings and communications between members of the steering committee and with Central Oregon Intergovernmental Council (COIC).

An open public involvement process is essential to the development of an effective plan. In order to develop a comprehensive approach to reducing the effects of natural disasters, the planning process should include opportunities for the public, neighboring communities, local and regional agencies, as well as private and nonprofit entities to comment on the plan.<sup>1</sup> COIC provided a publicly accessible project webpage for the general public in order to make meeting materials and contact information available throughout the update process.

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<sup>1</sup> Code of Federal Regulations, Chapter 44. Section 201.6, subsection (b). 2015

In addition, COIC administered a public opinion survey to obtain additional input from the public regarding the county’s risks, vulnerabilities, hazards history, and mitigation strategies. See Volume IV, Appendix F for more information.

Updating the mitigation plan is a requirement to gain eligibility for the Federal Emergency Management Agency’s Pre-Disaster Mitigation, Hazard Mitigation, and Flood Mitigation Assistance grant programs. This project is funded through the Federal Emergency Management Agency’s (FEMA) FY20 Pre-Disaster Mitigation Competitive Grant Program (PDMC – PL-10-OR-2012-002).

**The Bend Addendum to the Deschutes County NHMP was adopted on [DATE] and approved by FEMA on [DATE]. The Deschutes MNHMP was approved by FEMA on [DATE], the plan is effective for Deschutes County and Bend through [DATE].**

For more information on the composition of the steering committee and the process see this NHMP’s Volume I, Acknowledgements and Executive Summary, and Volume IV, Appendix B.

## **Action Item Matrix**

The City’s action items were first developed through a two-stage process during the 2015 by the local steering committee, facilitated by Oregon Partnership for Disaster Resilience (OPDR). In 2021, the local steering committee, facilitated by Central Oregon Intergovernmental Council, updated the status of existing action items and added one new action item. In addition, there are 25 County Action Items that include Bend as an “Affected Jurisdiction.” For additional information see the discussion near the end of this document.

The City’s actions are listed below in matrix format. For more detailed information on each action, see the action forms within Attachment 1 of this addendum.

**Table BA-I City of Bend Action Items**

2021 Action Item	High Priority	Mitigation Action Title	Lead Agency	Partner Organization(s)	Timeline	Status
<b>Multihazard #1</b>		Identify, improve, and sustain collaborative programs focusing on the real estate and insurance industries, public and private sector organizations, and individuals.	Community Development	<u>Internal:</u> Police Department, Fire Department <u>External:</u> Deschutes County Emergency Services, RFPD #2	Long-Term	Ongoing
<b>MH #2</b>		Develop public and private partnerships to foster natural hazard program coordination and collaboration.	Community Development	<u>Internal:</u> Police Department, Bend Fire Department <u>External:</u> Deschutes County Emergency Services, RFPD #2	Short-Term	Ongoing
<b>MH #3</b>	X	Develop inventories of at-risk buildings and infrastructure, and prioritize mitigation projects based on those providing the most benefit (at the least cost) to the population of the City of Bend.	Community Development	<u>Internal:</u> Public Works, Engineering and Infrastructure, Bend Airport <u>External:</u> Deschutes County Emergency Services; OEM, DOGAMI, FEMA, IFA	Long-Term	Deferred
<b>MH #4</b>	X	Strengthen emergency services by maintaining the City of Bend Emergency Operations Plan, linking emergency services with hazard mitigation programs, and enhancing public education.	Bend Fire	<u>Internal:</u> Police, Fire, Public Works, City Administration <u>External:</u> Deschutes County Emergency Services; Bend Park and Recreation District	Ongoing	Ongoing
<b>MH #5</b>		Use technical knowledge of natural ecosystems and events to link natural resource management and land use organizations to mitigation activities and technical assistance.	Community Development	<u>Internal:</u> - <u>External:</u> Deschutes County Emergency Services, Forester; DOGAMI, WRD, ODF	Long-Term	Deferred
<b>MH #6</b>		Develop benchmarks for a disaster-resistant and resilient community.	Community Development	<u>Internal:</u> Police Department, Fire Department <u>External:</u> Deschutes County Emergency Services, Community Development	Short-Term	Deferred
<b>MH #7</b>		Develop and implement, or enhance, strategies for debris management for natural hazard (winter storm, wind, flood, etc.) events.	Public Works	<u>Internal:</u> Police, Fire, Public Works Departments <u>External:</u> Deschutes County Emergency Services, RFPD #2, Road Department; ODOT	Short-Term	Ongoing
<b>Earthquake #1</b>		Seismically retrofit vulnerable facilities and infrastructure to increase their resiliency to seismic hazards. Consider both structural and non-structural retrofit options.	Public Works/Utilities	<u>Internal:</u> Community Development, Engineering and Infrastructure Planning, Public Works <u>External:</u> Deschutes County Community Development; Bend Metro Park and Recreation District, Bend – LaPine Schools, Deschutes County Library	Long-Term	Ongoing
<b>EQ #2</b>		Improve local capabilities to perform earthquake building safety evaluations and to record and manage building inventory data.	Community Development	<u>Internal:</u> Community Development, Engineering and Infrastructure Planning <u>External:</u> Deschutes County Community Development, Emergency Services	Long-Term	Deferred
<b>Flood #1</b>		Identify critical public infrastructure and facilities located in flood hazard areas and implement mitigation and preparedness measures for those facilities.	Public Works/Utilities	<u>Internal:</u> Public Works, Engineering and Infrastructure Planning <u>External:</u> Deschutes County Community Development, Emergency Services, Road Department; ODOT	Long-Term	Ongoing
<b>FL #2</b>		Identify floodway obstructions and implement mitigation measures to remove obstructions.	Community Development	<u>Internal:</u> Engineering and Infrastructure Planning <u>External:</u> Deschutes County Community Development, Emergency Services, Roads; DSL, ODFW	Long-Term	Deferred

Source: City of Bend NHMP Steering Committee, 2021

**Table BA-I City of Bend Action Items (continued)**

2021 Action Item	High Priority	Mitigation Action Title	Champion	Partner Organization(s)	Timeline	Status
FL #3		Develop strategies to enhance the use of open space within the floodplain for flood mitigation, fish habitat, and water quality issues.	Community Development	<u>Internal:</u> Engineering and Infrastructure Planning, Community Development <u>External:</u> Deschutes County Community Development; Bend Park and Recreation District; DSL, ODFW, DLCD	Long-Term	Deferred
Volcano #1		Identify critical facilities and industries that may be affected by ash fall and develop and implement ash fall emergency response and mitigation projects.	Community Development	<u>Internal:</u> Engineering and Infrastructure Planning, Utilities, Streets <u>External:</u> Deschutes County Community Development, Emergency Services	Long-Term	Ongoing
VE #2		Collaborate with the USGS's Cascade Volcano Observatory and related agencies to create ash fall warning messages that are more appropriate for Bend.	Community Development / Communications	<u>Internal:</u> Communications, Police, Fire <u>External:</u> Deschutes County Emergency Services, Communications, 911; USGS, OSU-Cascades, OEM	Long-Term	Deferred
Wildfire #1		Inventory alternative firefighting water sources and encourage the development of additional sources.	Bend Fire	<u>Internal:</u> Fire Department, Engineering and Infrastructure Planning <u>External:</u> Deschutes County Forester, Emergency Services, 911; Project Wildfire,	Short-Term	Complete
WF #2	X	Encourage creation and adoption of wildland-urban interface maps to direct development requirements that assist wildfire mitigation.	Bend Fire	<u>Internal:</u> Fire Department, Community Development, Information Technology (GIS) <u>External:</u> Deschutes County Forester, Community Development, Emergency Services, 911; Project Wildfire	Short-Term	Deferred
WF #3		Increase communication, coordination, and collaboration between wildland-urban interface property owners, city and county planners, and fire prevention crews and officials to address inherent risks in wildland-urban interface areas, available prevention/ protection measures, and federal mitigation assistance programs.	Community Development	<u>Internal:</u> Community Development; Fire Department <u>External:</u> Deschutes County Forester, Community Development; RFPD #2, Emergency Services; Project Wildfire	Short-Term	Ongoing
WF #4		Implement fire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.	Code Enforcement	<u>Internal:</u> Community Development, Engineering and Infrastructure Planning <u>External:</u> Deschutes County Forester, Community Development; Project Wildfire; DLCD, ODFW; USFS, BLM	Short-Term	Ongoing
WF#5	X	Wildfire mitigation for critical water and sewer infrastructure.	Utilities / Community Development	<u>Internal:</u> Engineering, Bend Fire <u>External:</u> County Planning, Deschutes County Forester, Deschutes County Emergency Services, ODF, USFS, OEM, DLCD	Medium-Term	NEW

Source: City of Bend NHMP Steering Committee, 2021

## How Will the Plan be Implemented?

The City Council will be responsible for adopting the City of Bend addendum to the Deschutes County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the city addendum is considered part of the county plan, the city will look for opportunities to partner with the County to maintain the plan, and coordinate mitigation efforts through the implementation of action items, etc. The City’s steering committee will convene after re-adoption of the City of Bend addendum annually with the county every spring. For more details on the meeting schedule and process, see Volume I, Section 4 of the county plan. The City’s Senior Planner will serve as the convener and will be responsible for convening the local steering committee. The convener will also remain active in the County’s planning process. The steering committee will seek to involve senior staff and decision makers throughout the duration of the five-year implementation and maintenance of the NHMP addendum.

### Implementation through Existing Programs

Many of the Natural Hazards Mitigation Plan’s recommendations are consistent with the goals and objectives of the city’s existing plans and policies. Where possible, the City of Bend will implement the NHMP’s recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, allowing them to adapt to changing conditions and needs. Implementing the NHMP’s action items through such plans and policies increases their likelihood of being supported and implemented.

The City of Bend currently has the following plans that relate to natural hazard mitigation:

**Table BA-2 Existing Plans**

Jurisdiction	Document	Year
City of Bend	Comprehensive Plan	2016
City of Bend	Bend Development Code 2.7.640 (Flood Plain Combing Zone)	2014
City of Bend	Emergency Operations Plan	2016
City of Bend	Transportation System Plan	2020
City of Bend	Greater Bend CWPP**	2016
City of Bend	Water Public Facility Plan**	2013
City of Bend	Sewer Public Facility Plan	2018
City of Bend	Stormwater Public Facility Plan	2014

*\*\*Update forthcoming in 2021*

Source: City of Bend

The steering committee and the community’s leadership have the option to add or implement action items at any time. This allows the steering committee to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of the highest priority. When new actions are identified, they should be documented

using an action item form (see Attachment 2). Once a proposed action form has been submitted to the convener, the action will become part of the City's addendum.

## **Continued Public Participation**

Keeping the public informed of the city's efforts to reduce the city's risk to future natural hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. The City Addendum along with the County Plan will be posted on-line on the Central Oregon Intergovernmental Council website, the County website, and the City of Bend Website so that the public may view the plan at any time.

In addition, natural hazards information dissemination is conducted throughout the year when opportunities present themselves via the city offices and website.

## **Plan Maintenance**

The Deschutes County Natural Hazards Mitigation Plan will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

The remainder of this addendum includes three sections:

1. Community Profile and Asset Identification,
2. Hazard Identification and Risk Assessment, and
3. Mitigation Strategy section.

# COMMUNITY PROFILE

## ASSET IDENTIFICATION

This section provides city-specific asset identification. For information on the characteristics of Bend, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume IV, Appendix C, *Community Profile*. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city-specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

We live in a place with a varied geography and communities. We would like to recognize and acknowledge the indigenous land of the Confederated Tribes of Warm Springs, Molalla, Paiute, Klamath, Modok, Yahooskin Band of Snake Indians, and Tribes of Middle Oregon. We want to recognize the people that came before us and honor their traditions and stewardship of the land. Acknowledgement is a simple, powerful way of showing respect for Indigenous People's history and culture.

### Asset Identification

The following assets were identified by the steering committee in 2021:

#### Critical and Essential Facilities

- City Hall – 710 NW Wall Street, Bend, OR 97701
- Public Works:
  - Transportation – 1375 NE Forbes Road, Bend OR 97701
  - Utilities Business Office – 62975 Boyd Acres Road, Bend, OR 97701
  - Water Reclamation Facility – McGrath Road in unincorporated Deschutes County
  - Bridge Creek water intake facility – Skyline Road (unincorporated Deschutes County)
- Police Department and Municipal Court – 555 NE 15th Street
- Fire Department – offices and fire stations in Bend:
  - Administration – 1212 SW Simpson Ave, Bend, OR 97702
  - Station 301 – 1212 SW Simpson Ave, Bend, OR 97702
  - Station 302 - 19850 4th St, Bend, OR. 97701
  - Station 303 – 61080 Country Club Dr, Bend, OR 97702
  - Station 305 – 63377 SW Jamison Street, Bend, OR 97701
  - Station 306 – 425 NE 15th St, Bend, OR 97701
- Bend Municipal Airport – 63136 Powell Butte Road, Bend, OR 97701



## **Deschutes County Critical and Essential Facilities (Bend):**

- Administration – 1300 NW Wall St
- Deschutes County Sheriff's Office Work Center and, Adult Community Justice – 63360 NW Britta St, Building 2
- Deschutes County Sheriff's Office Search and Rescue, and Emergency Services - 63360 NW Britta St. Building 3
- Deschutes County Sheriff's Office Automotive Unit - 63360 NW Britta Building 4
- 9-1-1 Services – 20355 Poe Sholes Drive
- Adult Corrections (Jail) 63333 Highway 20
- Community Development – 117 NW Lafayette Ave
- County Annex, Health Dept. – 1128 NW Harriman St
- Juvenile Community Justice Center – 63360 NW Britta St, Building 1
- County Courthouse Building (District Attorney) – 1164 NW Bond Street
- Deschutes County Sheriff's Office Complex – 63333 Highway 20
- Health Services Building – 2577 NE Courtney Drive
- Justice Building – 1100 NW Bond Street
- KIDS Center (Health Services) 1375 NW Kingston
- Mike Maier Building (Children and Families Commission) – 1130 NW Harriman St
- Property & Facilities/Information Technology Building – 14 NW Kearney Ave
- Recovery Center - 20370 Poe Sholes
- Road Department – 61150 SE 27th Street
- Rosie Bareis Community Campus – 1010 NW 14th St
- School Based Health Center – 2150 NE Daggett Lane
- Stabilization Center - 633111 NE Jamison St.
- Williamson Building (Health Services) - 1550 NE Williamson Blvd.
- Wall St Services Building (Health Services) – 1340 NW Wall Street

## **Critical Infrastructure**

- Pacific Power – electric power utility
- Cascade Natural Gas – natural gas utility – 64500 OB Riley Road
- Bend Broadband (cable, landline phone, internet provider) – 63090 Sherman Road
- CenturyLink (cable, landline phone, internet provider) – 19550 Amber Meadow Dr. Suite 130136

## **Bend-La Pine School District (schools located in Bend)**

- Elementary Schools:
  - Amity Creek – 437 NW Wall Street
  - Bear Creek – 51 SE 13th St
  - Elk Meadow – 60800 Brookwood Boulevard
  - Ensworth - 2150 NE Daggett Lane
  - High Lakes – 2500 NW High Lakes Loop
  - Highland Magnet – 701 NW Newport Avenue
  - Juniper Elementary – 1300 NE Norton Avenue
  - Lava Ridge - 20805 Cooley Road
  - North Star - 63567 NW Brownrigg Lane

- Pine Ridge – 19840 Hollygrape St
- RE Jewell Elementary – 20550 Murphy Rd
- Silver Rail - 61530 SE Stone Creek Lane
- Westside Village Magnet – 1101 NW 12th St
- William E. Miller – 300 NW Crosby Drive
- Middle Schools in Bend:
  - Cascade – 19619 Mountaineer Way
  - High Desert - 61000 Diamondback Lane
  - Pacific Crest - 3030 NW Elmwood Lane
  - Pilot Butte – 1501 NE Neff Road
  - REALMS (Rimrock Expeditionary Learning) – 63175 OB Riley Road
  - Sky View – 63555 NE 18th St
- High Schools in Bend:
  - Bend – 230 NE 6th St
  - Bend Technical Academy– 1291 NE 5th St
  - Caldera High School - SE 15th Street/Knott Rd
  - Mountain View – 2755 NE 27th St
  - REALMS (Rimrock Expeditionary Learning) - 20370 Brinson Blvd
  - Skyline - 20730 Brinson Blvd
  - Summit – 2855 NE Clearwater Drive

## Colleges and Universities

- Central Oregon Community College – 2600 NW College Way
- Oregon State University, Cascades Campus:
  - Graduate & Research Center – 650 SW Columbia St
  - Main Campus - 1500 SW Chandler Way

## Social Service Providers

Included below is a list of social service providers. For additional service providers, visit <https://centraloregonresources.org/full-directory> or contact Deschutes County Sheriff's Office Emergency Management.

- Deschutes County Health Services – 2577 NE Courtney Drive, Bend, OR
- Neighbor Impact – 20310 Empire Ave, #A100, Bend, OR 97701
- Housing Works
- American Red Cross, Mountain River Chapter – 815 SW Bond, Suite 110, Bend, OR 97702
- Salvation Army, Deschutes County – 515 NE Dekalb Ave, Bend, OR 97701
- St. Vincent De Paul – 950 SE 3rd, Bend, OR 97701
- Or Department of Human Services – Self Sufficiency Program – 1300 NW Wall St, Suite 101, Bend, OR 97701
- State of Oregon – Seniors and People with Disabilities – 1300 NW Wall Street, Suite 102, Bend, OR 97702
- Emergency shelters:
  - Bethlehem Inn – 3705 N. Highway 97, Bend, OR 97701
  - Cascade Youth and Family Center – 19 SW Century Drive, Bend, OR 97702

- Saving Grace – 1425 NW Kingston Ave, Bend, OR 97701
- Two shelters that are confidential and provide shelter for homeless, pregnant, and/or parenting teens
- The Shepherd’s House
- Child programs:
  - Boys and Girls Club of Central Oregon – 500 NW Wall Street, Bend, OR 97701
  - Alyce Hatch Center – 1406 NW Juniper, Bend, OR 97701
  - Cascade Youth and Family Center – 19 SW Century Drive, Bend, OR 97702
  - Central Oregon Family Resource Center – 1130 NW Harriman St, Suite B, Bend, OR 97701

## Population

Bend’s estimated population as of July 1, 2020 is 92,840 people. The city’s population has grown an estimated 16,201 people or 21.3% since the 2010 Census.<sup>2</sup> The Population Research Center (PRC) at Portland State University has prepared population forecasts for Bend’s UGB from 2018 to 2068. The PRC projects Bend’s population will reach 109,338 by 2025 and 153,696 by 2040.

Bend’s population growth has occurred in all parts of the city, with more occurring on Bend’s west side and in southwest Bend. The groups that have seen the largest increases in household growth include Latino and Hispanic households and households composed of members 65 years and older.

## Land Use

The City of Bend’s acknowledged comprehensive plan is the Bend Area General Plan. The Oregon Land Conservation and Development Commission first acknowledged the plan in 1981. The City last completed a major update of the plan in 1998. Since that time, the City has updated the plan chapters on demographics and population (2004); economic development (2005); transportation (2013), and public facilities and services (2013-2014). The City implements the plan through the Bend Development Code, which was adopted in 2006.

In September of 2016, the City of Bend and Deschutes County approved a 2,380 acre expansion of Bend’s urban growth boundary (UGB). In addition to the UGB expansion, the City Council approved a number of updates to the Bend Comprehensive Plan. The Council adopted a new Transportation System Plan (TSP) in 2020, and expects to adopt an Integrated Water System Master Plan in 2021, followed by updated Collection System and Stormwater Master Plans by 2023.

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<sup>2</sup> Portland State University, Population Research Center, "Annual Population Estimates", 2020.

## Bend Park and Recreation District

The Bend Park and Recreation District operates and maintains 82 parks and open spaces, and 88 miles of trail.<sup>3</sup> The district has its own tax district and is governed by a five-member elected board of directors that is managed by an Executive Director. The district's parks include 36 neighborhood parks (155 acres), 24 community parks (543 acres), 3 regional parks (954 acres), and 18 natural areas (906 acres) and more than 24 facility buildings.<sup>4</sup>

## Tourist Locations

This list includes the top tourist locations of interest in the event of a natural hazard, but is not comprehensive. For more information on tourism locations in Bend, go to

<https://www.visitbend.com/>

- Drake Park – adjacent to flood plain
- Pilot Butte – Highway 20
- Shevlin Park
- Pine Nursery Park
- Farewell Bend Park adjacent to Old Mill District
- Several public golf courses:
  - River's Edge
  - Awbrey Glen
  - Bend Golf and Country Club
- Old Mill District (shopping & entertainment) 450 SW Powerhouse Drive #2
- Deschutes River
- The Pavilion

## Economy

Bend is the largest city east of the Cascade Mountains, and the seventh largest in Oregon. As such, it serves as a large regional hub for retail sales, health care, higher education, and leisure, hospitality, and tourism. The growing traded sector industries in Bend include:

- Bioscience;
- Health and Hospital Care;
- Aviation and Aerospace;
- Outdoor Recreation Equipment and Apparel;
- Software;
- Specialty Manufacturing;
- Corporate and Administrative Offices, and;
- Brewing and Distilling.

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<sup>3</sup> Bend Park and Recreation District website, <http://www.bendparksandrec.org>, accessed April 14, 2021.

<sup>4</sup> Bend Park and Recreation District, "Parks, Recreation, and Green Spaces Comprehensive Plan", February 2012 update.

The seasonally adjusted unemployment rate for Deschutes County (in which Bend is the largest city and county seat) was 8.6% for 2020.

## Cultural and Historic Resources

The sites (Table BA-3) and structures (Table BA-4) listed below represent the city’s official list of historic places compiled by the city and county, and approved by the Oregon Land Conservation and Development Commission.

**Table BA-3 Historic Sites**

Sites Designated with Plaques	Location
A.M. Drake Homesite	Drake Park
Foley Landmark	Pilot Butte State Park
1813 Rock	129 NW Idaho Street
Bend School Landmark	Drake Park
Central Oregon Pioneers' Landmark	Pioneer Park
Johns Landmark	Drake Park
Oregon Trunk Freight Warehouse Site	Railroad tracks & NW Division
Pilot Butte Inn Site	1133 NW Wall Street
Shevlin-Hixon Mill site	Shevlin Center near dam
Weist Homesite Landmark	1315 NE Third Street
Brooks Scanlon Craneshed building	721 SW Industrial Way

Source: City of Bend

**Table BA-4 Historic Structures**

<b>Historic Structure</b>	<b>Location</b>
A. J. Tucker Blacksmith Shop	200-202 NW Greenwood Avenue
Bend Athletic Club Gymnasium	520 NW Wall Street Bend
August Nelson Building	838 NW Bond Street
Charles Boyd Homestead	20410 Bend River Mall Drive
Cozy Hotel	327 NW Greenwood Avenue
Delaware Grocery	845 NW Delaware Avenue
Deschutes County Library Building	507 NW Wall Street
Downing Hotel	1033 NW Bond Street
Evan A. Sather Home	7 NW Tumalo Avenue
First Presbyterian Church	157 NW Franklin Avenue A.L.
A. L. French Home	429 NW Georgia Avenue Hoover's
George Palmer Putnam House	606 NW Congress Street
H. E. Allen House	875 Brooks Street Bend
James E. Reed House	45 NW Greeley Avenue
John I. West Building	130 NW Greenwood Avenue
Kenwood School	701 NW Newport Avenue
Keyes House	912 NW Riverside Boulevard
Liberty Theatre	849-851 NW Wall Street
Lucas House	42 NW Hawthorne Avenue
Mountain View (Mayne) Hospital	515 NW Kansas Avenue
N.P. Smith Pioneer Hardware Building	935-937 NW Wall Street
Nels and Lillian Andersen House	63160 Nels Anderson Road
Niswonger House	44 NW Irving Avenue
O'Donnel Building	921-933 NW Wall Street
O'Kane Building	115 NW Oregon Avenue
Old Bend High School Building	520 NW Wall Street
Old Clinic	731 NW Franklin Avenue
Old U.S. Post Office	777 NW Wall Street
Pierson Blacksmith Shop	211 NW Greenwood Avenue
Bend Railroad Depot	1160 NE Division Street Bend
Reid School	129 NW Idaho Avenue

Source: City of Bend

**Table BA-4 Historic Structures (continued)**

<b>Historic Structure</b>	<b>Location</b>
Sawyer House	434 Drake Road
Shevlin-Hixon Executive House	545 NW Congress Street
Spheir Building	901 NW Bond Street
St. Francis Catholic Church	494 NW Lava Road
Stover House	1 Rocklyn Road
Thomas McCann House	440 NW Congress Street
Trinity Episcopal Church	469 NW Wall Street
Steidel and Tweet irrigation dam	Division St. near Yale Avenue
Hoover's Universal Garage	124-128 NW Greenwood Avenue Steidl
Bend Water & Light Co. Powerhouse/dam	Foot of Vermont Street Bend
Bend Woolen Mill	1854 NE Division Street
Wright Hotel	215 NW Greenwood Avenue

Source: City of Bend

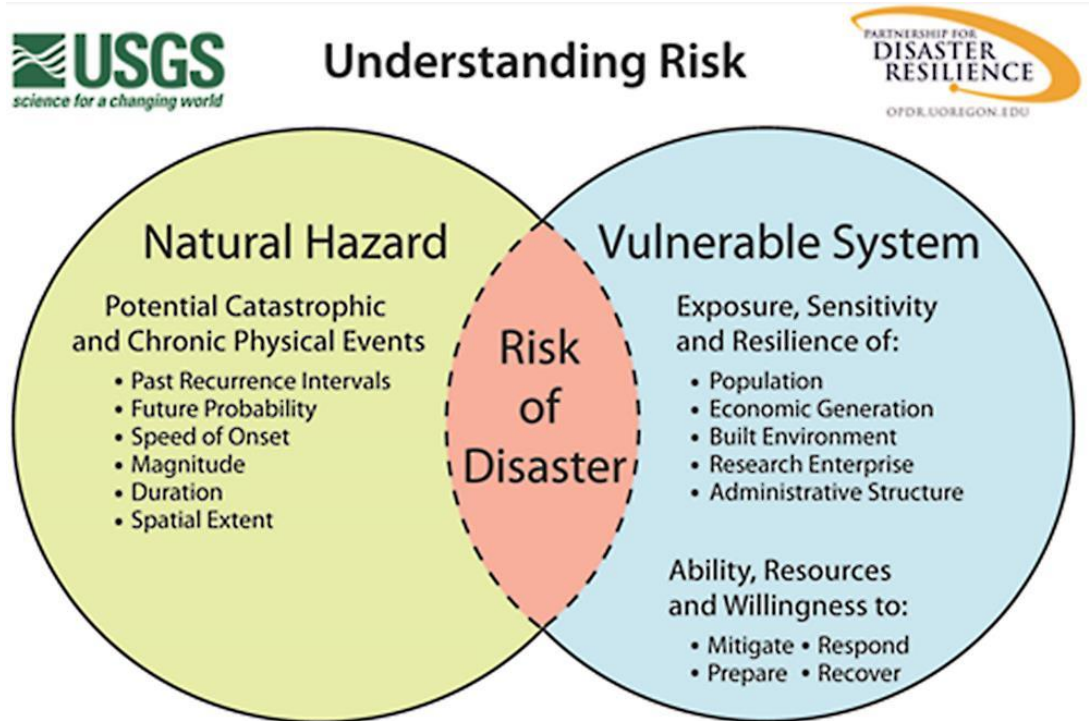
# RISK ASSESSMENT

This section of the NHMP addendum addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazard risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The information presented below, along with hazard specific information presented elsewhere in this addendum, within the Hazard Annexes (Volume II), and community characteristics presented in the Community Profile (Appendix C), will be used as the local level rationale for the risk reduction actions identified in this addendum. The risk assessment process is graphically depicted in Figure BA-1 below. Ultimately, the goal of hazard mitigation is to reduce the area where hazards overlap vulnerable systems.

**Figure BA-1 Understanding Risk**



Source: Oregon Partnership for Disaster Resilience



## Hazard Analysis Methodology

This NHMP utilizes a hazard analysis methodology that was first developed by FEMA circa 1983, and gradually refined by the Oregon Military Department's Office of Emergency Management over the years.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible). Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

This method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

In this analysis, severity ratings, and weight factors, are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario), and probability as shown in the table below. See Volume I, Section (3 Risk Assessment) for more information.

## Hazard Analysis

On February 11<sup>th</sup>, 2015, the City of Bend addendum steering committee developed their hazard vulnerability assessment (HVA), which was then updated on April 28<sup>th</sup>, 2021, using the County's HVA as a reference. Changes from the County's HVA were made where appropriate to reflect distinctions in vulnerability and risk from natural hazards unique to the City of Bend, which are discussed throughout this addendum.

Table BA-5 shows the HVA matrix for Bend showing each hazard listed in order of rank from high to low. 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 a sense of hazard priorities, but does not predict the occurrence of a particular hazard.

**Table BA-5 Hazard Analysis Matrix – City of Bend**

Hazard	Maximum				Total Threat Score	Hazard Rank
	History	Vulnerability	Threat	Probability		
Wildfire	20	50	100	70	240	# 1
Winter Storm	20	50	90	70	230	# 2
Windstorm	20	25	80	70	195	# 3
Drought	20	15	70	70	175	#4
Volcano	2	50	100	21	173	#5
Earthquake (Cascadia)	2	40	100	7	149	#6
Flood	16	25	50	56	147	# 7
Earthquake (Crustal)	2	25	80	7	114	# 8
Landslide	2	15	20	7	44	# 9

Source: City of Bend NHMP Steering Committee, 2021

Three chronic hazards (wildfire, winter storm, and windstorm) and one catastrophic hazard (Cascadia earthquake) rank as the top four hazard threats to the city (Top Tier). The volcano, drought, and flood hazards comprise the next three highest ranked hazards (Middle Tier), while crustal earthquake and landslide hazards comprise the lowest ranked hazards (Bottom Tier).

Table BA-6 categorizes the probability and vulnerability scores from the hazard analysis for the city and compares the results to the assessment completed by the Deschutes County NHMP Steering Committee (areas of differences are noted with **bold** text within the city ratings).

**Table BA-6 Probability and Vulnerability Comparison**

Hazard	Bend		County	
	Probability	Vulnerability	Probability	Vulnerability
Drought	High	Low	High	Low
Earthquake (Cascadia)	Low	High	Low	High
Earthquake (Crustal)	Low	Moderate	Low	Moderate
Flood	High	<b>Moderate</b>	High	Low
Landslide	Low	Low	Low	Low
Volcano	Low	High	Low	High
Wildfire	High	High	High	High
Windstorm	High	<b>Moderate</b>	High	High
Winter Storm	High	High	High	High

Source: City of Bend NHMP Steering Committee and Deschutes County NHMP Steering Committee, 2021

## Drought

A drought is a period of drier than normal conditions that results in water-related problems. Drought occurs in virtually every climatic zone, but its characteristics vary significantly from one region to another. Drought is a temporary condition; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate. The extent of

drought events depends upon the degree of moisture deficiency, and the duration and size of the affected area. Typically, droughts occur as regional events and often affect more than one city and county.

The steering committee determined that the city's probability for drought is **high** (which is the same as the county's rating) and that their vulnerability to drought is **low** (which is the same as the county's rating).

The city has ample high quality surface and groundwater supplies fed primarily by the Bridge Creek watershed and from the Deschutes regional aquifer. Groundwater supplies are utilized as a supplemental water source when snowmelt or heavy precipitation increases the surface water turbidity. In addition, the City of Bend actively reclaims water and encourages water conservation through their WaterWise program.

*For more information on the Drought Hazard (including history and extent) see the Drought Annex in Volume II.*

## Earthquake

Oregon and the Pacific Northwest in general are susceptible to earthquakes from four sources: 1) the off-shore Cascadia Fault Zone; 2) deep intra-plate events within the subducting Juan de Fuca Plate; 3) shallow crustal events within the North American Plate; and 4) earthquakes associated with volcanic activity.<sup>5</sup>

The areas most susceptible to ground amplification and liquefaction have young, soft alluvial sediments, found along river and stream channels. The extent of the damage to structures and injury and death to people will depend upon the type of earthquake, proximity to the epicenter and the magnitude and duration of the event.

The steering committee HVA evaluated both crustal earthquakes and a Cascadia earthquake. The steering committee determined that the city's probability of experiencing a crustal earthquake is **low** (which is the same as the county's rating) and that their vulnerability to a crustal earthquake is **moderate** (which is the same as the county's rating). The steering committee determined that the city's (and State's) probability of experiencing a Cascadia earthquake is **low** (which is the same as the county's rating) and that their vulnerability to a Cascadia earthquake is **high** (which is the same as the county's rating).

The concentration of residents, businesses, and infrastructure within the City of Bend is greater than anywhere else in the county. Additionally, much of the city's critical infrastructure is constructed of un-reinforced masonry (which is especially vulnerable to seismic events) and built prior to the current seismic safety standards of the 1990s. Although there are several faults located in the Bend vicinity (Table II-6), the city is not particularly susceptible to liquefaction, and is not expected to experience very strong to violent shaking in an earthquake event (see Tables II-5 and II-6). As such, the city's greatest vulnerability to earthquakes has more connection to the age of the city's infrastructure and buildings than to the particular geology of the area. The city considers itself to have high vulnerability to a Cascadia earthquake event due to secondary effects of the hazard,

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<sup>5</sup>Taylor, George H. and Chris Hannan. *The Oregon Weather Book*. Corvallis, OR: Oregon State University Press. 1999

including access to transportation routes, energy resources, communications, and the need to assist with refugees from the damage that is expected west of the Cascades.

As noted above the city has a high concentration of buildings built prior to 1990, which increases the city's vulnerability to the earthquake hazard. Information on specific buildings' estimated seismic resistance, determined by DOGAMI in 2007, is shown in Tables BA-6 to 8 below. The tables below display the rankings of all facilities within the city's jurisdiction; each "X" represents one building within that ranking category.

Table BA-7 shows evaluated school facilities. Of the school facilities evaluated by DOGAMI using RVS, two (2) have very high (100% chance) collapse potential, and 18 buildings have high (greater than 10% chance) collapse potential. It is important to note that the Rapid Visual Survey Scores have not been updated by DOGAMI since 2007. However, collapse potential for new buildings can be assumed low, given new building codes.

**Table BA-7 Rapid Visual Survey Scores: Schools**

Facility	Level of Collapse Potential			
	Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
<b>Elementary Schools</b>				
Amity Creek Elem. School (437 NW Wall St, Bend)			XX	
Bear Creek Elementary School (51 SE 13th St, Bend)	XXX	XXX		
Buckingham Elementary School (62560 Hamby Rd, Bend)			X	
Elk Meadow Elementary School (60880 Brookwood Blvd, Bend)			X	
Ensworth Elementary School (2150 NE Dagget Ln, Bend)	X			
High Lake Elementary School (2500 NW High Lakes Lp, Bend)	X			
Highland School at Kenwood Elem. School (701 NE Newport, Bend)			XX	
Juniper Elem. School (1300 NE Norton St, Bend)		XXXX	X	X
RE Jewell Elementary School (20550 Murphy, Bend) - Addition Admin Office (Aug. 2008) - Remodel Admin Office (Aug. 2008)			X	
Lava Ridge Elementary School (20805 Cooley Rd, Bend)	X			
Pine Ridge Elementary School (19840 Hollygrape St, Bend)	X			
Tumalo Elementary School (19835 2nd St, Bend)	X	X	XXXXX	
Westside Village Magnet School at Kingston Elementary School (1101 NW 12th St, Bend)	X			
<b>Middle Schools</b>				
Cascade Middle School (19619 Mountaineer Way, Bend) - Addition of Gymnasium, Admin office (Aug. 2008) - Remodel Admin Offices, bathrooms (Aug. 2008)			XX	
High Desert Middle School (61111 27th St, Bend)			X	
Pilot Butte Middle School (1501 NE Neff, Bend)	XX	XXX		X
Sky View Middle School (63555 NE 18th St, Bend)	X			

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment.

**Table BA-7 Rapid Visual Survey Scores: Schools (continued)**

Facility	Level of Collapse Potential			
	Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
<b>High Schools</b>				
Bend Senior High School (230 NE 6th St, Bend)	X	XXXXXXX	X	
Marshall High School (1291 NE 5th St, Bend)		XX		
Mountain View Senior High School (2755 NE 27th St, Bend) - Addition Classroom (435 sf) (Aug. 2008) - Remodel Classroom (898 sf) (Aug. 2008)	XX	XXXX	X	
Summit High School (2855 NW Clearwater Dr, Bend)	X			

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment.

Table BA-8 shows evaluated community college facilities. Of the buildings evaluated by DOGAMI using RVS, none have very high (100% chance) collapse potential, and nine (9) buildings have high (greater than 10% chance) collapse potential. It is important to note that the Rapid Visual Survey Scores have not been updated by DOGAMI since 2007. However, collapse potential for new buildings can be assumed low, given new building codes.

**Table BA-8 Rapid Visual Survey Scores: Community College**

Facility	Level of Collapse Potential			
	Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
<b>Central Oregon Community College - Bend Campus</b>				
Bookstore	X			
Boyle Education Center			X	
Cascade Hall	X			
Grandview Student Union Center			X	
Juniper		X		
Library	X			
Mazama Gym			X	
Modoc (Old Library)			X	
Ochoco Hall			X	
Pence			X	
Pinckney Art Center			X	
Pioneer Hall			X	
Ponderosa			X	

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment.

Table BA-9 shows evaluated public safety and hospital facilities. Of the buildings evaluated by DOGAMI using RVS all have low (< 1% chance) collapse potential. It is important to note that the Rapid Visual Survey Scores have not been updated by DOGAMI since 2007. However, collapse potential for new buildings can be assumed low, given new building codes.

**Table BA-9 Rapid Visual Survey Scores: Public Safety and Hospital**

Facility	Level of Collapse Potential			
	Low (< 1%)	Moderate (>1%)	High (>10%)	Very High (100%)
<b>Public Safety</b>				
Bend Police Department (555 NE 15th St, Bend)	X			
Bend FD - East Station 304 (62420 Hamby Rd, Bend)	X			
Bend FD - South Station 303 (61080 Country Club Rd, Bend)	X			
Bend FD - Tumalo Station 302 (19850 4th St, Bend)	X			
Bend FD - West Station 301 (1212 SE Simpson Ave, Bend)	X			
Deschutes County RFPD #2 (63377 Jamison St, Bend)	X			
Deschutes County Sheriff's Office/ EOC (63333 W Hwy 20, Bend)	X			
<b>Hospitals</b>				
St. Charles Medical Center - Bend (2500 NE Neff Rd, Bend)	XX			

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment.

*For more information on the Earthquake Hazard (including history and extent) see the Earthquake Annex in Volume II.*

## Flood

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.<sup>6</sup> 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

<sup>6</sup> Taylor, George H. and Chris Hannan. *The Oregon Weather Book*. Corvallis, OR: Oregon State University Press. 1999

of flood that occur in Bend include: spring/snowmelt flooding, warm winter rain-on-snow flooding, Ice jams, flash floods, and dam failure.

The steering committee determined that the city’s probability for flood is **high** (which is the same as the county’s rating) and that their vulnerability to flood is **moderate** (which is higher than the county’s rating).

The city’s high ratings are due to the fact that Bend is bisected by the Deschutes River which is susceptible to various winter and spring flood events including ice jamming. Ice jams on the Deschutes and Little Deschutes rivers have created flood conditions in the past and will continue to do so due to local topography. Ice jams commonly happen during the winter and early spring, while the river is still frozen. Sudden warming at higher altitudes can melt waters resulting in increased runoff of water and ice into large reaches of frozen river below. On the way downstream, the ice can “jam” in narrow places on the river or against a road crossing, effectively damming the river, sometimes followed by a sudden breach and release of the water and ice. In addition, the city is concerned that changes in the character of the river channel (sediment buildup) will affect river flooding if a large event occurs. Short duration flash floods also impact the community’s stormwater system, including the ability of pipes and ditches to convey short precipitation, causing damage and economic impacts. Action items are included to address the concerns with ice jamming and the changes to river character.

### National Flood Insurance Program (NFIP)

The Deschutes County Flood Insurance Rate Maps (FIRMs) were modernized in 2007. The table below shows that as of April 2021, Bend has 60 National Flood Insurance Program (NFIP) policies in force and five (5) paid claims. The city’s last Community Assistance Visit (CAV) was July 20, 1994. The city is not a member of the Community Rating System (CRS). The table displays the number of policies by building type and shows that the majority of residential structures that have flood insurance policies are single-family homes (50) and that there is one (1) non-residential structure with flood insurance policies. Additionally, there is one property that is a minus rated A-zone property.

The community repetitive flood loss record for Bend does not include any repetitive flood loss, or severe repetitive flood loss, buildings and has not had any repetitive loss claims.

**Table BA-10 Flood Insurance Detail**

Jurisdiction	Current FIRM Date	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type				Minus Rated A Zone
					Single Family	2 to 4 Family	Other Residential	Non-Residential	
Bend	9/28/2007	9/4/1987	60	21	50	3	1	1	1
Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Repetitive Loss Buildings	Severe Repetitive Loss		CRS Class Rating	Last CAV
						Buildings	Amount		
Bend	\$21,792,700	5	4	0	0	0	\$50,392	NP	7/20/1994
* Portion of entire county under county jurisdiction									
NP - Not Participating NA - Information not Available/ Not Applicable									

Source: Information compiled by Department of Land Conservation and Development, April 2021.



*For more information on the Flood Hazard (including history and extent) see the Flood Annex in Volume II.*

## **Landslide**

A landslide is any detached mass of soil, rock, or debris that falls, slides or flows down a slope or a stream channel. Landslides are classified according to the type and rate of movement and the type of materials that are transported. In a landslide, two forces are at work: 1) the driving forces that cause the material to move down slope, and 2) the friction forces and strength of materials that act to retard the movement and stabilize the slope. When the driving forces exceed the resisting forces, a landslide occurs.

The steering committee determined that the city's probability for landslide is **low** (which is the same as the county's rating) and that their vulnerability to landslide is **low** (which is the same as the county's rating).

The city has had no problems with landslides in city limits in known history and is located in a generally stable area (the city is generally located on basalt with six-inches of topsoil). A few neighborhoods within the city (Awbrey Butte, etc.) are located on steep hillsides but have not experienced problems in the past.

*For more information on the Landslide Hazard (including history and extent) see the Landslide Annex in Volume II.*

## **Volcano**

The Pacific Northwest lies within the "ring of fire," an area of consistent volcanic activity surrounding the Pacific Basin. Volcanic events occur regularly along the ring of fire, in part because of the movement of the Earth's tectonic plates. Volcanic events have the potential to coincide with numerous other hazards including ash fall, earthquakes, lava flows, pyroclastic flows, lahars, debris flows, and landslides.

The steering committee determined that the city's probability for volcanic event is **low** (which is the same as the county's rating) and that their vulnerability to volcanic event is **high** (which is the same as the county's rating).

Were a volcanic event to occur in the Cascades region of Oregon, Bend could be at risk for ash fall, depending on the severity of the event and the direction of the wind. Due to Bend's proximity to the Three Sisters and Newberry Crater, in relation to other areas within eastern Oregon, the effects of a volcanic event may be more disruptive to normal business, economic activity, and health.

*For more information on the Volcano Hazard (including history and extent) see the Volcano Annex in Volume II.*

## **Wildfire**

Wildfires occur in most areas across the county, often these fires require a suppression response due to uncontrolled burning or threats to homes and infrastructure. Fire is an essential part of Deschutes Counties ecosystem, but can also pose a serious threat to life

and property particularly in growing rural communities. The point at which the wildland and urban growth intersect is the Wildland Urban Interface (WUI). Much of Deschutes County including Bend, is considered WUI. The increase in residential development in interface areas has resulted in greater wildfire risk. Fire has historically been a natural wildland element that has shaped the landscape and vegetation here in Central Oregon. With the expansion of homes into the wildland interface these homes are often threatened by wildfire. New residents in remote locations are often surprised to learn that in moving away from built-up urban areas, they have also left behind readily available fire services providing structural protection.

The steering committee determined that the city's probability for wildfire is **high** (which is the same as the county's rating) and that their vulnerability to wildfire is **high** (which is the same as the county's rating).

The city experiences the effects of wildfire frequently (example, Two Bulls Fire in 2014 and Awbrey Hall in 1990; see Wildfire Annex Figure II-19 for a map of the large wildfire history). The Greater Bend Area Community Wildfire Protection Plan (CWPP, August 2016, to be updated in 2021) relies upon (1) the Oregon Department of Forestry Assessment of Risk Factors and (2) the classification ratings of individual areas under the Oregon Forestland-Urban Interface Fire Protection Act of 1997 (Senate Bill 360) to determine fire risk within the Greater Bend Wildland-Urban Interface (WUI). According to the Senate Bill 360 ratings, Bend's East UGR and West UGR are rated as High fire risk, and according to the ODF Assessment all areas within the Greater Bend WUI are rated with a High probability of wildfire risk occurring and Extreme vulnerability (except for East UGR which is rated High).<sup>7</sup> In addition to general concerns for the safety of residents and structures, the city's primary drinking water is sourced from the Bridge Creek watershed (west of the city) and is considered vulnerable to wildfire. Goals, objectives and accomplishments in reducing the risk from wildfire are included in the Greater Bend CWPP. This includes fuels treatments in the surrounding forest west of Bend and on rangelands to the East of Bend where fire is also an integral recurring part of the ecosystem. For more information on wildfire risk and fuels reduction projects see the Greater Bend Area CWPP and visit the Project Wildfire website: <http://www.projectwildfire.org/>.

*For more information on the Wildfire Hazard (including history and extent) see the Wildfire Annex in Volume II and the Greater Bend CWPP.*

## **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. A windstorm will frequently knock down trees and power lines, damage homes, businesses, public facilities, and create tons of storm related debris.

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<sup>7</sup> The ODF Assessment considers the likelihood of a fire occurring, hazard rating, protection capability, human and economic values protected, structural vulnerability to determine the overall score. For detailed information review the CWPP available on the Project Wildfire website: <http://www.projectwildfire.org/>

The steering committee determined that the city's probability for windstorm is **high** (which is the same as the county's rating) and that their vulnerability to windstorm is **moderate** (which is the lower than the county's rating).

Historical wind events have uprooted trees, damaged roofs and windows, and damaged utility lines. Windstorms have not caused disastrous local damage but are a persistent problem. Windstorms are often associated with microbursts (thunderstorms). A primary windstorm vulnerability for the community is damage to utility lines, including fiber optics, which are key to the economic sectors of the community.

*For more information on the Windstorm Hazard (including history and extent) see the Windstorm Annex in Volume II.*

## **Winter Storm**

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting Deschutes County typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

The steering committee determined that the city's probability for winter storm is **high** (which is the same as the county's rating) and that their vulnerability to winter storm is **high** (which is the same as the county's rating).

Bend is located at a higher elevation east of the Cascades, which is a major contributor to winter storms. Major winter storms can and have occurred in the Bend area, and while they typically do not cause significant damage; they are frequent and have the potential to impact economic activity. Road closures on Highway 97, or the passes to the Willamette Valley (Highways 58 and 126), due to winter weather are a common occurrence and can interrupt commuter and large truck traffic. The city budgets funds for seasonal winter storm needs, such as clearing roads.

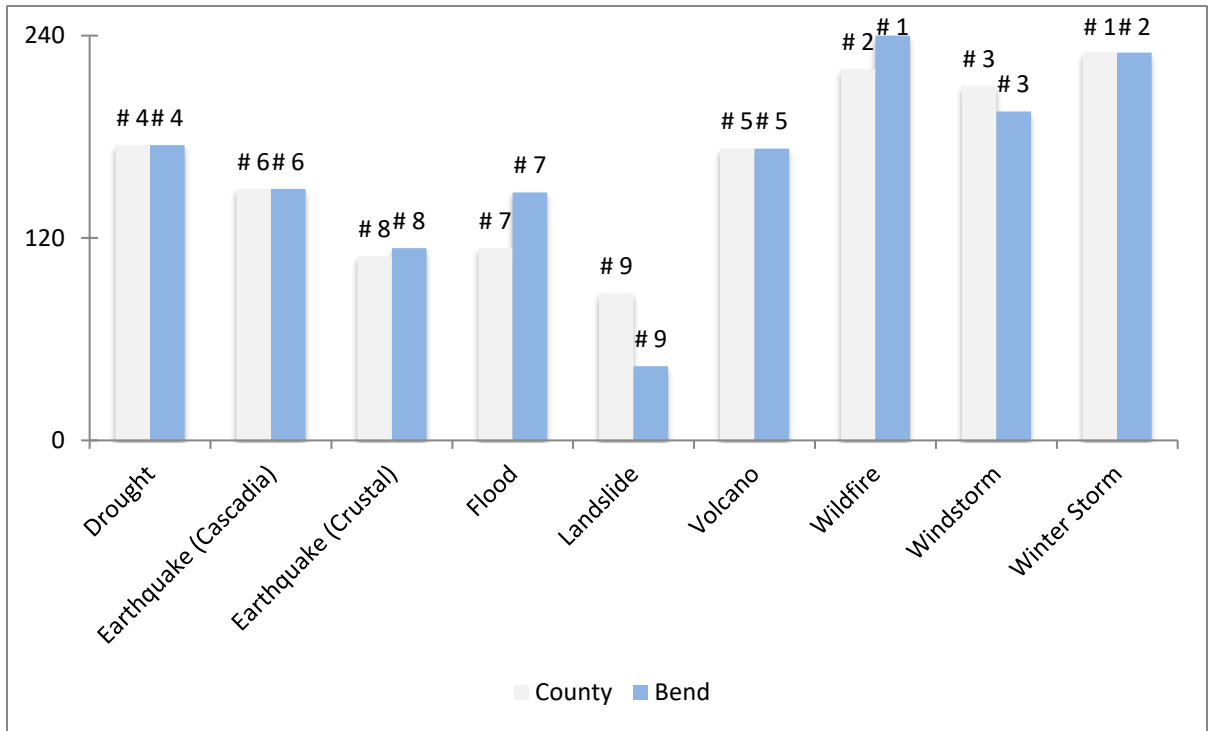
*For more information on the Winter Storm Hazard (including history and extent) see the Winter Storm Annex in Volume II.*

## **Summary**

The figure below presents a summary of the hazard analysis for the City of Bend and compares the results to the assessment completed by the Deschutes County NHMP Steering Committee.

In terms of history, probability, vulnerability, and maximum threat, the city overall rated their threat to the wildfire hazard higher than the county. The top three hazards for the city and the county are wildfire, winter storm, and windstorm.

**Figure BA-2 Overall Hazard Analysis Comparison – Bend and Deschutes County**



Source: City of Bend NHMP Steering Committee and Deschutes County NHMP Steering Committee, 2021

## Mitigation Plan Mission

The plan mission states the purpose and defines the primary functions of Deschutes County's NHMP. It is intended to be adaptable to any future changes made to the plan and need not change unless the community's environment or priorities change.

The mission of the Deschutes County NHMP is:

*To promote sound public policy designed to protect people, 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 Bend steering committee reviewed the 2021 NHMP plan mission statement and agreed it accurately describes the overall purpose and intent of this plan. The Steering Committee believes the concise nature of the mission statement allows for a comprehensive approach to mitigation planning.

## Mitigation Plan Goals

Mitigation plan goals are more specific statements of direction that Deschutes County citizens, and public and private partners can take while working to reduce the county's risk from natural hazards. These statements of direction form a bridge between the broad mission statement and particular action items. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

The Bend Addendum steering committee reviewed and agreed to the 2021 Deschutes County NHMP plan goals. All the plan goals are important and are listed below in no particular order of priority. Establishing community priorities within action items neither negates nor eliminates any goals, but it establishes which action items to consider to implement first, should funding become available. Below is a list of the 2021 NHMP goals:

*Goal 1 - Protect life and reduce injuries resulting from natural hazards.*

*Goal 2 - Minimize property damage from natural hazards.*

*Goal 3 - Minimize damage to critical or essential infrastructure and services from natural hazards.*

*Goal 4 - Enhance the ability of Deschutes County's economy to rebound quickly from the effects of natural hazard events.*

*Goal 5* - Minimize project impacts to the environment and utilize natural solutions to protect people and property from natural hazards.

*Goal 6* - Enhance the County's capability to implement a comprehensive County wide natural hazards mitigation strategy.

*Goal 7* - Motivate the "whole community" to build resilience and mitigate against the effects of natural hazards through engagement, listening, learning, information-sharing, and funding opportunities.

*Goal 8* - Eliminate development within mapped hazardous areas where the risks to people and property cannot be practicably mitigated.

*Goal 9* - Minimize damage to historic and cultural resources from natural hazards.

*Goal 10* - Enhance communication, collaboration, and coordination among agencies at all levels of government, sovereign tribal nations, and the private sector to mitigate natural hazards.

*Goal 11* - Mitigate the inequitable impacts of natural hazards by prioritizing and directing resources and investments to build resilience in the most vulnerable populations and the communities least able to respond and recover.

*Goal 12* - Develop, integrate, and align natural hazards mitigation and climate adaptation efforts based on the evolving understanding of the interrelationships between climate change and climate-related natural hazard events.

*Goal 13* - Reduce repetitive and severe repetitive flood losses.

*Goal 14* - Minimize or eliminate potential impacts from dams posing the greatest risk to people, property, and infrastructure.

(Note: although numbered the goals are not prioritized.)

## **Mitigation Plan Action Items**

Short- and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. They address both multi-hazard (MH) and hazard-specific issues. Action items can be developed through a number of sources such as steering committee work sessions, stakeholder input, etc. A description of how the plan's mitigation actions were developed is provided below.

## **Action Item Worksheets**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described within Volume I, Section 3 (Mitigation Strategy). The City specific action item worksheets are located in Attachment 1, *Action Item Forms*.

The City is also a party to several actions described in the County NHMP; each jurisdiction listed on the County Action Item forms as an “Affected Jurisdiction” will contribute to and work towards completion of that action as it pertains to their jurisdiction. **There are 26 County Action Items that include Bend as an “Affected Jurisdiction.”** For detailed information on each County level action item form see Volume I, Section 3, *Mitigation Strategy* and Volume IV, Appendix A, *Action Item Forms*.

## **Action Item Development Process**

Development of action items was a multi-step, iterative process that involved brainstorming, discussion, review, and revisions. Action items were developed by the steering committee and were influenced by actions first identified in the City of Bend Emergency Operations Plan (2009). A number of actions identified by the County steering committee include the City as an affected jurisdiction; these actions are broad actions that include implementation components at both the county and city level. All actions were reviewed by the committee and revised as necessary before becoming a part of this document.

# ATTACHMENT I: ACTION ITEM FORMS

## Action Item Forms

The action item forms portray the overall action plan framework and identify linkages between the plan goals, partnerships (coordination and partner organizations), and actions. Table BA-11 provides a list of actions for the city. The pages that follow include individual forms for each mitigation action.

**Table BA-11 Mitigation Actions**

Action Item	High Priority	Timeline	Status	Related Hazards							
				Drought	Earthquake	Flood	Landslide	Volcano	Wildfire	Windstorm	Winter Storm
MH #1		Long-Term	Ongoing		X	X	X	X	X	X	X
MH #2		Short-Term	Ongoing	X	X	X	X	X	X	X	X
MH #3	Yes	Long-Term	Deferred		X	X	X	X	X	X	X
MH #4	Yes	Short-Term	Ongoing	X	X	X	X	X	X	X	X
MH #5		Long-Term	Deferred	X	X	X	X	X	X	X	X
MH #6		Short-Term	Deferred	X	X	X	X	X	X	X	X
MH #7		Short-Term	Ongoing		X	X	X	X	X	X	X
EQ #1		Long-Term	Ongoing		X						
EQ #2		Long-Term	Deferred		X						
FL#1		Long-Term	Ongoing			X					
FL #2		Long-Term	Deferred			X					
FL #3		Long-Term	Deferred			X					
VE #1		Long-Term	Ongoing					X			
VE #2		Long-Term	Deferred					X			
WF #1		Short-Term	Complete						X		
WF #2	Yes	Short-Term	Deferred						X		
WF #3		Short-Term	Ongoing						X		
WF #4		Short-Term	Ongoing						X		
WF #5	Yes	Medium-Term	New						X		

Source: City of Bend NHMP Steering Committee



<b>Mitigation Action: Multi-hazard #1</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Identify, improve, and sustain collaborative programs focusing on the real estate and insurance industries, public and private sector organizations, and individuals.		<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important to raise awareness about hazard mitigation with professions who regularly interact with homebuyers, home sellers, and those who finance real estate transactions.						
<b>Ideas for Implementation (How will it get done?):</b>				<b>Action Status Report</b>		
Provide background pieces, white papers, and/or information to local builder and realtors associations, local government communications professionals, and presentations to governing bodies.				Added in 2015; Ongoing in 2021		
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Police Department, Fire Department			Deschutes County Emergency Services, Deschutes County Rural Fire Protection District #2			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>		<b>Timeline:</b>		
OEM (Public Private Partnership), DLCD, Local Funding Resources				<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)		
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Multi-hazard #2</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Develop public and private partnerships to foster natural hazard program coordination and collaboration.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important to ensure all agencies charged with or choosing to pursue natural hazards mitigation planning are coordinating efforts to be more effective and prevent duplication of efforts.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
			Added in 2015; Ongoing in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Police Department, Bend Fire Department			Deschutes County Emergency Services, Deschutes County Rural Fire Protection District #2			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>		<b>Timeline:</b>		
Local Funding Resources, County Emergency Manager				<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)		
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Multi-hazard #3</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Develop inventories of at-risk buildings and infrastructure, and prioritize mitigation projects based on those providing the most benefit (at the least cost) to the population of the City of Bend.		<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> Yes
		<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input checked="" type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
DOGAMI RVS (2007), City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
<p>Retrofitting of vital infrastructure, such as schools, emergency service, and other community buildings, provides important improvements that reduce hazard exposure and the cost and time associated with recovery (Source: American Planning Advisory Service Report Number 483/484).</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community, particularly to buildings and infrastructure [201.6(c)(3)(ii)]. Identifying critical and essential facilities for retrofit will help to identify major infrastructure issues and appropriate mitigation actions to protect critical and essential facilities.</p>						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Conduct detailed structural evaluation that outlines recommendations for building deficiencies, and provides a cost estimate			Added in 2015; Deferred in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Public Works, Engineering and Infrastructure, Bend Airport			Deschutes County Emergency Services, OEM, DOGAMI, FEMA, IFA			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Seismic Rehabilitation Grant Program, Flood Mitigation Assistance Grant Program, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program, Resource Assistance for Rural Environments					<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Deferred				

<b>Mitigation Action: Multi-hazard #4</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Strengthen emergency services by maintaining the City of Bend Emergency Operations Plan, linking emergency services with hazard mitigation programs, and enhancing public education.		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
The City of Bend last adopted the emergency operations plan or EOP in 2009. This action is important to update and maintain the plan so the City is prepared to respond effectively to natural hazards.						
<b>Ideas for Implementation (How will it get done?):</b>				<b>Action Status Report</b>		
Update the 2009 Bend EOP.				Added in 2015; Ongoing in 2021		
<b>Champion/ Responsible Organization:</b>		Bend Fire				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Police, Fire, Public Works, City Administration			Deschutes County Emergency Services, Bend Park and Recreation District			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources, County Emergency Management/ NHMP Steering Committee					<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Multi-hazard #5</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Use technical knowledge of natural ecosystems and events to link natural resource management and land use organizations to mitigation activities and technical assistance.		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important to help inform the next update to the Community Wildfire Protection Plan (CWPP). The CWPP was last updated in 2011. The recent work on the Bend urban growth boundary remand has highlighted the need to better link planning for natural hazard mitigation (e.g. wildfire) with long range planning for the City.						
<b>Ideas for Implementation (How will it get done?):</b>				<b>Action Status Report</b>		
				Added in 2015; Deferred in 2021		
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
			Deschutes County Emergency Services, Deschutes County Forester, DOGAMI, Oregon Water Resources, Oregon Department of Forestry			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources, County and City staff					<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Deferred				

<b>Mitigation Action: Multi-hazard #6</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Develop benchmarks for a disaster-resistant and resilient community.		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input checked="" type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
The State of Oregon the Oregon Resilience Plan in 2013, and is working to complete the State's Natural Hazards Mitigation Plan this year. This action is important to ensure consistency in benchmarking for hazard mitigation and resilience planning.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Coordinate with County Community Development and cities to update comprehensive plans to include benchmarks in their Goal 7 plan elements			Added in 2015; Deferred in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Police Department, Fire Department			Deschutes County Emergency Services, Deschutes County Community Development			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>		<b>Timeline:</b>		
Local Funding Resources, County and City staff, UO Community Service Center/ OPDR, OSU Cascades				<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)		
<b>Form Submitted by:</b>	2015 NHMP Committee					
<b>Action Item Status:</b>	Deferred					

<b>Mitigation Action: Multi-hazard #7</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Develop and implement, or enhance, strategies for debris management for natural hazard (winter storm, wind, flood, etc.) events.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
Debris from natural hazards can be a potential threat to citizens, interfere with travel, and act as an attractive nuisance.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Collaborate with County to create a joint debris removal plan.			Added in 2015; Ongoing in 2021			
<b>Champion/ Responsible Organization:</b>		Public Works				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Police, Fire, Public Works Departments			Deschutes County Emergency Services, Deschutes County Rural Fire Protection District #2, Deschutes County Road Department, ODOT			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources, County Road Department, and City Public Works					<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Earthquake #1</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Seismically retrofit vulnerable facilities and infrastructure to increase their resiliency to seismic hazards. Consider both structural and non-structural retrofit options.		<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input checked="" type="checkbox"/> 9	<input type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Conduct structural evaluations of critical and essential facilities (including historical buildings), and infrastructure and make recommendations (structural and non-structural) for fix.  Align projects with regular maintenance programs.			Added in 2015; Ongoing in 2021			
<b>Champion/ Responsible Organization:</b>		Public Works/Utilities				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Community Development, Engineering and Infrastructure Planning, Public Works			Deschutes County Community Development, Bend Park and Recreation District, Bend – La Pine Schools, Deschutes County Library			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Seismic Rehabilitation Grants (IFA), Local Funding Resources					<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				



<b>Mitigation Action: Earthquake #2</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Improve local capabilities to perform earthquake building safety evaluations and to record and manage building inventory data.		<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important to ensure new construction and remodeling of existing buildings and structures can be constructed to withstand potential earthquakes.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Coordinate training for local building officials, including plans examiners and building inspectors, to perform earthquake safety evaluations.  Provide similar training to private building and home inspectors			Added in 2015; Deferred in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Community Development, Engineering and Infrastructure Planning			Deschutes County Community Development, Deschutes County Emergency Services			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources, partner with County and Oregon Building Codes Division (BCD)					<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Deferred				

<b>Mitigation Action: Flood #1</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Identify critical public infrastructure and facilities located in flood hazard areas and implement mitigation and preparedness measures for those facilities.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
The City has completed recent updates to its transportation (2013), water (2013), and sewer collection (2014) system plans. Completing this task will help inform the next round of updates to these plans that are expected to take place after the City completes work on the UGB Remand Project.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Coordinate with County, ODOT, utilities, and irrigation districts to develop inventory of critical public infrastructure.  Identify and program improvements to these facilities for mitigating flood hazards			Added in 2015; Ongoing in 2021			
<b>Champion/ Responsible Organization:</b>		Public Works/Utilities				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Public Works, Engineering and Infrastructure Planning			Deschutes County: Community Development, Emergency Services, Road Departments; Oregon Department of Transportation			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources for identification, consider application for FEMA non-disaster mitigation grant					<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Flood #2</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Identify floodway obstructions and implement mitigation measures to remove obstructions.		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
			Added in 2015; Deferred in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Engineering and Infrastructure Planning			Deschutes County Community Development, Emergency Services, Roads; Oregon Department of State Lands, Oregon Department of Fish and Wildlife			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>		<b>Timeline:</b>		
Local Funding Resources, Department of State Lands, Oregon Department of Fish and Wildlife				<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)		
<b>Form Submitted by:</b>	2015 NHMP Committee					
<b>Action Item Status:</b>	Deferred					

<b>Mitigation Action: Flood #3</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Develop strategies to enhance the use of open space within the floodplain for flood mitigation, fish habitat, and water quality issues.		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009)						
<b>Rationale for Proposal (Why is this important?):</b>						
Under Oregon planning law, the City's General Plan must address and satisfy Goals 5 (Open Spaces, Natural Areas, Habitat) and Goal 7 (Natural Hazards). This action is important because it provides an avenue for the City to address two goals with a set of strategies focused on flood mitigation.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
			Added in 2015; Deferred in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Engineering and Infrastructure Planning, Community Development			Bend Park and Recreation District; Deschutes County Community Development; Oregon Department of State Lands, Oregon Department of Fish and Wildlife, DLCDC			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>		<b>Timeline:</b>		
Local Funding Resources (City and County Planning with technical assistance from DLCDC)				<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)		
<b>Form Submitted by:</b>	2015 NHMP Committee					
<b>Action Item Status:</b>	Deferred					

<b>Mitigation Action: Volcano #1</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Identify critical facilities and industries that may be affected by ash fall and develop and implement ash fall emergency response and mitigation projects.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009), Central Cascades Volcano Coordination Plan (2007) to be updated in 2015						
<b>Rationale for Proposal (Why is this important?):</b>						
Do not currently review volcanic activity						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
Collaborate with owners/ operators of critical facilities and industries on ash fall emergency response and mitigation projects			Added in 2015; Ongoing in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Engineering and Infrastructure Planning, Utilities, Streets			Deschutes County: Community Development, Emergency Services			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources, OSU Cascades, DOGAMI, USGS					<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Volcano #2</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Collaborate with the USGS's Cascade Volcano Observatory and related agencies to create ash fall warning messages that are more appropriate for Bend.		<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009), Central Cascades Volcano Coordination Plan (2007) to be updated in 2015						
<b>Rationale for Proposal (Why is this important?):</b>						
While not eminent, creating warning messages now will ensure the City and coordinating partners are ready to respond to a volcanic event.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
			Added in 2015; Deferred in 2021			
<b>Champion/ Responsible Organization:</b>		Community Development/Communications				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Communications, Police, Fire			USGS, OSU-Cascades, OEM, Deschutes County Emergency Services, Deschutes County Communications, Deschutes County 911			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>		<b>Timeline:</b>		
Local Funding Resources, OSU Cascades, DOGAMI, USGS				<input type="checkbox"/> Ongoing <input type="checkbox"/> Short Term (1-2 years) <input checked="" type="checkbox"/> Long-Term (3-5 years)		
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Deferred				

<b>Mitigation Action: Wildfire #1</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Inventory alternative firefighting water sources and encourage the development of additional sources.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009), Greater Bend CWPP (2011)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important because it will help inform updates to both the Bend EOP and the Bend CWPP. The CWPP is intended to be updated every five years, with the next update coming up in sometime between 2016 and 2017.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
			Added in 2015; Complete in 2021			
<b>Champion/ Responsible Organization:</b>		Bend Fire				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Fire Department, Engineering and Infrastructure Planning			County Forester, Project Wildfire, Deschutes County Emergency Services, Deschutes County 911			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources (City/ County)					<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Complete				

<b>Mitigation Action: Wildfire #2</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Encourage creation and adoption of wildland-urban interface maps to direct development requirements that assist wildfire mitigation.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009), Greater Bend CWPP (2011)						
<b>Rationale for Proposal (Why is this important?):</b>						
HB 3623, encouraging the amendment to create inventories that expand beyond private lots development – i.e., Wildfire boundaries may be more expansive and not a clean line.						
<b>Ideas for Implementation (How will it get done?):</b>				<b>Action Status Report</b>		
Incorporate this work as a task in the next Community Wildfire Protection Plan for Bend (update 2011 CWPP)				Added in 2015; Deferred in 2021		
<b>Champion/ Responsible Organization:</b>		Bend Fire				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Fire Department, Community Development, Information Technology (GIS)			Deschutes County Forester, Project Wildfire, Deschutes County Community Development, Deschutes County Emergency Services, Deschutes County 911			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
Local Funding Resources, Project Wildfire, Greater Bend CWPP					<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Deferred				



<b>Mitigation Action: Wildfire #3</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Increase communication, coordination, and collaboration between wildland-urban interface property owners, city and county planners, and fire prevention crews and officials to address inherent risks in wildland-urban interface areas, available prevention/protection measures, and federal mitigation assistance programs.		<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009), Greater Bend CWPP (2011)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important to improve communication and collaboration between agencies and staff involved with land development and planning (e.g. city and county planners) and those professionals working in wildfire mitigation and response. This is an opportunity to update the respective comprehensive plans and land use regulations of the cities and Deschutes County to ensure future development in wildland urban interface areas can occur to reduce and mitigate risks of wildfire.						
<b>Ideas for Implementation (How will it get done?):</b>				<b>Action Status Report</b>		
				Added in 2015; Ongoing in 2021		
<b>Champion/ Responsible Organization:</b>		Community Development				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Community Development; Fire Department			Deschutes County Forester, Project Wildfire, Deschutes County Community Development; Deschutes County Rural Fire Protection District #2, Deschutes County Emergency Services			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
ODF, Local Funding Resources, FEMA and other federal grant funding					<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Mitigation Action: Wildfire #4</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>				<b>High Priority Action Item?</b>
Implement fire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> Yes
		<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	
		<input type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11		
<b>Alignment with Existing Plans/Policies:</b>						
City of Bend EOP (2009), Greater Bend CWPP (2011)						
<b>Rationale for Proposal (Why is this important?):</b>						
This action is important to carry out any future mitigation developed through an updated to the Community Wildfire Protection Plan (CWPP). The CWPP was last updated in 2011. The next update should begin and be completed 2016-2017.						
<b>Ideas for Implementation (How will it get done?):</b>			<b>Action Status Report</b>			
			Added in 2015; Ongoing in 2021			
<b>Champion/ Responsible Organization:</b>		Code Enforcement				
<b>Internal Partners:</b>			<b>External Partners:</b>			
Community Development, Engineering and Infrastructure Planning			Deschutes County Forester, Project Wildfire, Deschutes County Community Development, Oregon Department of Land Conservation and Development, Oregon Department of Fish and Wildlife, USFS, BLM			
<b>Potential Funding Sources:</b>			<b>Estimated cost:</b>		<b>Timeline:</b>	
ODF, Local Funding Resources, FEMA and other federal grant funding, USFS, BLM					<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Short Term (1-2 years) <input type="checkbox"/> Long-Term (3-5 years)	
<b>Form Submitted by:</b>		2015 NHMP Committee				
<b>Action Item Status:</b>		Ongoing				

<b>Action Item: WF#5</b> (What do we want to do?)		<b>Alignment with Plan Goals:</b>			<b>High Priority Action Item?</b>	
Wildfire Mitigation for Critical Water and Sewer Infrastructure		1 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>	☑Yes
		5 <input checked="" type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	
		9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>		
		12 <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>		
<b>Alignment with Existing Plans/Policies:</b>						
City Water System Master Plan						
<b>Rationale for Proposed Action Item (why is it important?):</b>						
The City of Bend's water treatment facility and wastewater treatment facility are both located in areas with high wildfire risk. The water treatment facility is located within the Deschutes National Forest, and at risk for a forest fire. The sewage treatment facility is located north and east of Bend, and located in an area at risk for a brush fire. Both types of fire present risks to this critical infrastructure. The rationale for this action item is to identify and take steps to mitigate this risk around these facilities, and to take steps to also ensure facilities are fires resistant and can keep operating during a fire.						
<b>Ideas for Implementation (how will it get done?):</b>			<b>Action Status Report</b>			
City currently working on developing a new water system master plan. This idea can be incorporated as an implementation step to include in City's CIP for water projects. City starting work on updating facility plan for wastewater treatment plan later this year; this project provides the opportunity to evaluate wildfire risk to the treatment plant during the facility plan development.			Added in 2021			
<b>Potential Funding Sources:</b>		<b>Estimated Cost:</b>	<b>Timeline:</b>			
Local, state, federal Utility rate funded projects through CIPs			<input type="checkbox"/> Ongoing <input type="checkbox"/> Long (6+ years) <input checked="" type="checkbox"/> Medium (2-5 years) <input type="checkbox"/> Short (0-2 years)			
<b>Coordinating/Lead Organization:</b>		Bend Emergency Manager				
<b>Internal Partners:</b>			<b>External Partners:</b>			
City Public Works, Engineering Department			Deschutes County Planning, local fire departments, OEM, DLCD			
<b>Form Submitted by:</b>		Damian Syrnyk, City of Bend				
<b>Action Item Status:</b>		NEW				

## ATTACHMENT 2: ACTION ITEM FORM TEMPLATE

<b>Action Item:</b> (What do we want to do?)	<b>Alignment with Plan Goals:</b>	<b>High Priority Action Item?</b>
	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/> 13 <input type="checkbox"/> 14 <input type="checkbox"/>	<input type="checkbox"/> Yes
<b>Alignment with Existing Plans/Policies:</b>		
<b>Rationale for Proposed Action Item (why is it important?):</b>		
<b>Ideas for Implementation (how will it get done?):</b>	<b>Action Status Report</b>	
<b>Potential Funding Sources:</b>	<b>Estimated Cost:</b>	<b>Timeline:</b>
		<input type="checkbox"/> Ongoing <input type="checkbox"/> Long (6+ years) <input type="checkbox"/> Medium (2-5 years) <input type="checkbox"/> Short (0-2 years)
<b>Coordinating/Lead Organization:</b>		
<b>Internal Partners:</b>	<b>External Partners:</b>	
<b>Form Submitted by:</b>		
<b>Action Item Status</b>		