

GOAL 7

NATURAL HAZARDS

The residents of Benton County recognize the importance of nurturing and sustaining public infrastructure and human systems that address adequate and affordable food, shelter, transportation, education, health care, public safety, and other vital services.

Benton County Comprehensive Plan Value Statement

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NATURAL HAZARDS

Overview

In Benton County, natural hazards include flooding, landslides and slope erosion, stream erosion and deposition, earthquakes, and wildfire.

Informed by an understanding of natural hazards, Benton County can reduce the risks to property, environmental quality, and human safety by planning broad land use patterns and site-specific development. The policies in this section of the Plan provide the framework for evaluating land use actions for their exposure to potential harm from natural hazards. The policies guide the identification of areas subject to natural hazards, regulation of development in those areas, and protection of citizens, property and the environment from the effects of natural hazards. The protection methods prescribed by these policies include prevention and preparedness, land use regulation, use of natural systems to mitigate hazards, public education, and collaboration with other organizations. These policies also guide the development of the County's Pre-Disaster and Natural Hazards Mitigation Plan.

A primary reference for development of these policies was the 2002 Benton County Hazard Analysis, the official assessment of potential natural and human-caused hazards affecting Benton County, prepared by the Benton County Emergency Management Division. This analysis indicates that flooding, wildfire, and landslides are the natural hazards most likely to occur in Benton County. Severe weather (excluding flooding) and earthquake risks are rated highest for the need for emergency preparedness.

In developing these policies, the Steering Committee also reviewed information from other county, state and federal programs and departments and from the background report to the 1979 Comprehensive Plan. The publication "Planning for Natural Hazards: Oregon Technical Resource Guide" (Department of Land Conservation and Development) is a particularly useful tool in planning for hazards.

Related Plans and Documents

- Benton County Pre-Disaster and Natural Hazards Mitigation Plan.
- Benton County Hazard Analysis
- Benton County Geological Hazards Study (DOGAMI)
- Benton County Emergency Operations Plan
- Corvallis Stormwater Master Plan
- Benton County's Floodplain Management Program
- Water-Induced Landslide Hazard Map (DOGAMI)
- Relative Earthquake Hazard Maps

Cross-References

Additional policies related to this goal:

- Goal 5 Natural Resources
- Goal 6 Air, Water & Land Resource Quality

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Statewide Planning Goal 7

To protect people and property from natural hazards.

Local governments shall adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards.

Natural hazards for purposes of this goal are: floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfires.

Local governments may identify and plan for other natural hazards.

PLANNING GUIDELINES

1. In adopting plan policies and implementing measures to protect people and property from natural hazards, local governments should consider:

a. the benefits of maintaining natural hazard areas as open space, recreation and other low density uses;

b. the beneficial effects that natural hazards can have on natural resources and the environment; and

c. the effects of development and mitigation measures in identified hazard areas on the management of natural resources.

2. Local governments should coordinate their land use plans and decisions with emergency preparedness, response, recovery and mitigation programs.

Excerpt from
OAR 660-015-0000(7)

Benton County Goal

Natural Hazards

To protect Benton County citizens, critical public facilities and infrastructure, private property, and the environment from natural hazards, and to guide the county toward building a safer, more sustainable community.

Policy Sections

7.1 General Policies

7.2 Floodplain

7.3 Earth Movement and Slope Erosion

7.4 Earthquake

7.5 Stream Erosion and Deposition

7.6 Wildfire

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Policies

- 7.1.1 Benton County shall protect property and lives by encouraging or requiring homes, business, infrastructure, and critical facilities to be resistant to losses from natural hazards.
- 7.1.2 Benton County shall use the most current hazard assessment inventories to discourage development in hazardous areas and promote preventative measures for existing development to minimize risk to life, property, and the environment.
- 7.1.3 Benton County shall increase public awareness of the risks associated with natural hazards.
- 7.1.4 Benton County shall integrate watershed management, natural resource management, and natural hazard mitigation into its land use planning process. Public education shall be a high priority.
- 7.1.5 Benton County shall develop programs to preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.
- 7.1.6 Benton County shall strengthen emergency preparedness and operations for addressing natural hazards by maintaining a Pre-Disaster Mitigation Plan.
- 7.1.7 Benton County shall develop mechanisms to address liability for development in high-risk areas (fire, flood, earthquake, landslide) so that property owners and the insurance industry bear the costs of the risks incurred, thereby avoiding public liability to the maximum degree possible.

7.1 General Policies

County Boards & Committees

Emergency Medical
Advisory Committee

Defined Terms

- 100-year flood
- floodplain
- habitat
- landslide
- mitigation
- natural hazard
- watershed
- wetland

See Appendix for definitions

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7.2

Floodplain



Alsea-Deadwood Highway

Policies

- 7.2.1 Benton County's floodplain management policies and actions will continue to emphasize more preventive than corrective measures. Flood damage prevention methods shall be non-structural to the degree possible, and include a combination of land use and code regulations, non-regulatory practices such as incentives, and a comprehensive emergency preparedness program.
- 7.2.2 Benton County shall allow accessory structures to be constructed within the floodplain; however, new primary structures shall not be allowed within the floodplain unless a parcel has insufficient buildable land outside the floodplain. Accessory structures shall not be located in the floodway.
- 7.2.3 Benton County shall only allow land divisions within the floodplain when it can be demonstrated that each buildable lot or parcel has a suitable site for development outside of the floodplain boundary. Non-residential uses shall be excepted.
- 7.2.4 Benton County shall strive to maximize open and undeveloped land in the 100-year floodplain to achieve flood mitigation, fish and wildlife habitat, and water quality objectives.
- 7.2.5 Benton County shall work to ensure that harmful runoff is not discharged directly into streams.
- 7.2.6 Benton County shall adopt standards to reduce peak runoff from impervious areas and not exceed pre-development storm flows.
- 7.2.7 Benton County shall establish parameters and/or objectives for managing stormwater drainage and shall encourage new development to use vegetated swales or open channels as an alternative to piping, where appropriate.
- 7.2.8 Benton County shall take measures to assure that wetland mitigation does not compromise existing stormwater functions of the land being used for the mitigation.
- 7.2.9 Benton County shall develop stream corridor width and other standards and programs to preserve the properly functioning condition of streams. These standards can be varied by reach or basin and shall be based on functional objectives.
- 7.2.10 Benton County shall restrict development for human occupancy in those areas where access by standard emergency vehicles such as fire or ambulance is prevented by flood waters of 100-year flood levels.

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Policies

- 7.3.1 To minimize risk to life, property, and the environment, Benton County shall prohibit or restrict development on steep hillsides that have landslide or slope erosion hazards.
- 7.3.2 Benton County shall develop and maintain new land use regulations for siting dwellings, other structures, and infrastructure based on the best available mapping and other information concerning landslide hazards.
- 7.3.3 To protect citizens of Benton County from natural disasters and geologic hazards, Benton County shall work with the Oregon Department of Forestry and Department of Geology and Mineral Industries (DOGAMI), and make efforts to share information and coordinate land use and development decisions in areas identified as high landslide risk locations.
- 7.3.4 Benton County shall allow development in areas of known or suspected landslide or on steep slopes only when a geotechnical report concludes such areas can be safely developed through engineering and other methods.
- 7.3.5 To minimize surface water runoff, prevent erosion, and reduce landslide hazards, Benton County shall regulate development activities that create major disturbance to soil and vegetation in flood and slide prone areas.
- 7.3.6 Benton County shall require properly designed protective measures for proposed land uses on sites that have severe use limitations because of soil conditions described in the Benton County Geological Hazards Study or soil surveys.

7.3 Landslide and Slope Erosion



Alsea Slide

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7.4 Earthquake

Policies

- 7.4.1 Benton County shall use the most current information from geologic research relative to seismic hazards in the county, and shall encourage careful study and design of development in areas such as along the Corvallis Fault.

7.5 Stream Erosion and Deposition

Policies

- 7.5.1 Benton County shall minimize the damaging effects of stream erosion and deposition by limiting alterations of the natural stream channels. To avoid increase in flood heights and velocities and avoid risk from stream meandering and braiding, building setbacks shall be required, riparian vegetation shall be retained, and partnerships encouraged with soil conservation agencies such as the Benton Soil and Water Conservation District and watershed councils to restore natural stream characteristics. Streambank hardening tends to shift erosion problems rather than solve them; therefore, non-structural or non-bank-hardening solutions shall be given preference.



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- 7.6.1 Benton County shall work with the Oregon Department of Forestry and fire agencies to identify high wildfire hazard areas.
- 7.6.2 Benton County shall reduce fire risk to life and property, using non-regulatory and regulatory programs that respond to local and state uniform fire codes.
- 7.6.3 Benton County shall identify and map all areas within the county that are unprotected by structural fire protection agencies.
- 7.6.4 Benton County shall work together with Oregon Department of Forestry and the Benton County Fire Defense Board to develop a Wildfire Protection plan.
- 7.6.5 Benton County shall require that plans for new development adequately provide for fire protection.
- 7.6.6 Benton County shall adopt standards for wildfire protection of structures and resource land.

7.6 Wildfire



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Findings and References

7.1 General

7.1.a The 2002 Benton County Hazard Analysis was prepared as the first part of the County's Emergency Operations Plan and is the official assessment of potential natural and human-caused hazards affecting Benton County.

Adopted June 25, 2002

7.1.b Flooding, wildfire, and landslides are natural hazards that are most likely to occur in Benton County. Severe weather (excluding flooding) and earthquake risks are rated highest for emergency preparedness.

Background Report
Benton County Hazard Analysis, 2002

7.1.c Benton County's Emergency Management program is preparing a Pre-Disaster and Natural Hazards Mitigation Plan.

Benton County Emergency Services

7.1.d A need exists for more collaboration between the City of Corvallis and Benton County in the urban interface area; for example, lack of inclusion of the Jackson-Frazier Wetland in the city's natural features inventory is a concern.

Benton Co. Natural Areas & Parks Department

7.1.e In Benton County there are no active faults that have been identified to be significant earthquake sources. Earthquake activity on the Corvallis Fault is uncertain. The probability of activity on the Corvallis Fault is not clearly established, "perhaps very low."

Department of Geology and Mineral Industries
(DOGAMI), 2001

7.2 Floodplain

7.2.a The 1964 event was a 100-year flood. Throughout the Willamette Valley, it caused \$157 million in damages and 20 persons lost their lives. The 1996 flood on the Willamette River at Salem was recorded as a 44-year flood event. The Benton County Emergency Management Office states that damage to Benton county residences was estimated at \$1.2 million. As a result of this flooding, 33 claims were filed under the Federal Emergency Management Agency (FEMA) from Benton County residents and businesses.

Benton Co. Community Development Dept.

7.2.b A combination of rapid snow melt and prolonged, heavy rainfall has caused flash flooding, numerous road washouts, and substantial property damage due to several floods over the last 30 years. These events have created overflow of the Willamette and Marys Rivers, flash flooding from quickly rising streams, and overflow of storm sewer systems.

Background Report; Benton County Hazard
Analysis, 2002

7.2.c Filling, grading, dredging, and other development may increase flooding and flood damage. Development within the floodway fringe (the part of the floodplain having a one percent per year chance of being flooded, also known as a 100-year floodplain) is subject to hazards to life and property from flooding. Special precautions may reduce these hazards.

Background Report
1979 Benton Co. Comp Plan

7.2.d Flood hazard areas are subject to periodic inundation that has potential to result in loss of life and property, health and safety hazards, disruption of commerce and

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governmental service, extraordinary public expenditures for flood protection and relief, and impairment of the tax base; all of which adversely affect public health, safety and general welfare.

Federal Emergency Management Agency, 2000

7.2.e Benton County is a participant in the National Flood Insurance Program. FEMA Flood Insurance Rate Maps for Benton County and subsequent amendments are the official data source for determining if a property is within a flood hazard area. Some areas of the county are subject to flooding but not mapped; more site-specific information may be required to determine presence of flood hazards at these locations. The 1996 flood extent was mapped for Benton County.

Benton Co. Community Development Dept.

7.2.f In 2002, Benton County improved its National Flood Insurance Program rating from a Class 10 to a Class 7, resulting in a premium rate reduction of 15% for purchasers of flood insurance. This was accomplished through enhanced public outreach and implementation of existing regulations, rather than through additional regulations. Existing regulations are also responsible for the County's low incidence of flood-related damage to structures since 1979.

Benton Co. Community Development Dept.

7.2.g To help reduce the need and subsequent cost of building dams, levees, and other structures in the county and in others downriver, Benton County has been moving toward floodplain management through policy and action with a more preventive than corrective emphasis. Flood damage prevention methods include a combination

of non-structural methods, land use and code regulations, and emergency preparedness.

Background Report
1979 Benton Co. Comp Plan

7.2.h The Board of Commissioners recently adopted policies from the Corvallis Stormwater Master Plan that apply to the Corvallis Urban Fringe and are to be considered for application county-wide. One of these policies pertains to reducing peak runoff from impervious areas. The Board deferred seven policies for future consideration to apply both in the urban fringe and countywide, one of which would prohibit development of new buildings within the floodplain portion of undeveloped properties.

Benton Co. Community Development Dept.

7.2.i Many portions of the floodway fringe contain natural assets, such as significant vegetation, wetlands, wildlife and scenic areas, and productive agricultural lands and are therefore valuable for open space and recreation.

Background Report
1979 Benton Co. Comp Plan

7.2.j Parts of eastern Benton County are subject to ponding and high ground water. Areas of critical ponding are generally unacceptable for dense development. Reduction of infiltration arising from ponding and other aspects of urbanization can increase runoff and lead to local flooding. These soil conditions are typically problematic for on-site sewage disposal systems. The South 3rd Street health hazard area in Corvallis is an example.

Background Report
Planning for Natural Hazards
Oregon Tech. Resource Guide, 2001
Benton Co. Community Dev. Department

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7.2.k At times, rain and snowfall events have caused localized flooding unrelated to the Willamette River. In 2006, for example, both Muddy Creek and Marys River experienced substantial flooding while the Willamette River never reached flood stage.

7.2.l Within the Corvallis UGB, the County has adopted the City's 0.2 foot rise floodway standard. Elsewhere in the county, the floodway standard is a 1.0 foot rise.

7.3 Landslide and Slope Erosion

7.3.a Water-related landslide hazards in Benton County are low in the eastern part, low to moderate in the northwestern part, and moderate to high in the southwestern part of the county.

DOGAMI, 2001

7.3.b Since 1972, 75 landslides have been recorded in Benton County. In 1998, a house was damaged by a landslide near Alsea and 3 occupants escaped with minor injuries. In 1996, 45 roads were closed in Benton County due to flooding, washouts, or landslides.

Benton County Hazard Analysis, Analysis, 2002

7.3.c More than 9,500 landslides were triggered in Oregon by storms in 1996-97, mostly in the Coast Range and Cascade Mountains, and caused \$100,000 in damage. Since 1975, landslides have killed 25 people. A Water-Induced Landslide Hazard Map has been prepared for Benton County.

DOGAMI, 2000, 2002

7.3.d A detailed slide map has been compiled for areas within and surrounding the Corvallis-Philomath urban growth boundary. 110 possible sites were mapped,

mostly outside the UGB in areas with steep slopes. A notable slide complex occurs at Vineyard Mountain.

DOGAMI, 2001

7.3.e Oregon Department of Forestry (ODF) now places greater emphasis on public safety as a component of forest practices in Benton County, including landslide and debris flow hazards. High landslide and debris-flow hazard locations have been mapped at a coarse scale in Benton County and are used as a screening tool for field-based analysis. Timber harvests may be prohibited or restricted if they represent potential hazards to dwellings and roads. ODF has expressed interest in collaborating with Benton County in land use and development decisions to reduce landslide risks.

Oregon Dept. of Forestry
Philomath and Salem Offices

7.3.f The Forest Service uses a landslide susceptibility risk model as a screening tool for identifying high landslide hazard areas; slope information is at a broad scale. Oregon State University is in the process of preparing a debris torrent model for two watersheds on the Siuslaw National Forest; this model is also at a large scale.

U.S. Forest Service, Siuslaw National Forest

7.3.g Human-induced causes of landslides are the result of improper land use or lack of proper engineering such as undercutting steep slopes, indiscriminate blasting, improper handling of runoff, or improper placement or excessive fill.

Background Report
1979 Benton Co. Comp Plan

7.3.h Disturbance of hillsides can reduce slope and soil stability, increase erosion,

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remove vegetation, increase runoff, alter drainage patterns, and affect scenic qualities of the landscape.

Background Report
DLCDD, Landslide Program, 2003

7.3.i Senate Bill 12 (1999) requires local governments to protect the public from rapidly moving landslides, and to reduce risk of serious bodily injury or death. DOGAMI landslide hazard maps are being revised, and a model Landslides Hazards Ordinance and Landslide Overlay Zone has been developed for Douglas County to help local governments implement SB 12.

DLCDD, Landslide Hazards Program, 2003

7.3.j House Bill 3375 (2003) directs local governments to adopt new land use regulations for siting dwellings and other structures once DOGAMI issues final maps of rapidly moving landslide hazard areas. The bill clarifies that local government may deny a request for a building permit if a geotechnical report discloses information about landslide hazards.

DLCDD, Landslide Hazards Program, 2003

7.4 Earthquakes

7.4.a Ground shaking hazards that could significantly affect Benton County are from sources outside the county, especially from the Cascadia subduction zone along the Pacific Northwest Coast, which poses potentially significant seismic hazard and risk to Benton County. The last known occurrence was in 1700.

DOGAMI, 2001

7.4.b DOGAMI maps show that areas with high ground amplification and liquefied soil hazards concentrated along the Willamette River, while areas with high earthquake-induced landslide hazards are spread out over

the western part of the county in the Coast Range. Relative Earthquake Hazard Maps have been prepared for the Benton County.

DOGAMI, 2001

7.6 Wildfires

7.6.a Wildland fire is a growing concern in the urban interface and in rural or unincorporated areas. Areas of greatest concern for wildfire hazard are forested rural residential developments with limited access, steep and narrow roads, inappropriate building materials, limited water supply, and long periods of dry weather during the summer. Uncontrolled burning increases the risk of wildfire.

Benton County Hazard Analysis, 2002;
Background Report, Oregon
Technical Resource Guide, 2001

7.6.b During dry periods the potential for major wildfires is significant in Benton County. For the past five years of recorded wildfire incidents in Benton County, the database shows a sharp rise in the past two years. Incidents of wildfires reached 29 in Benton County in 2002, the highest in the database.

Background Report,
Benton County Hazard Analysis, 2002

7.6.c Locations reporting more than two wildfire incidents in the past five years include the Philomath vicinity (14), Alsea vicinity (7), Bellfountain Road (5), and Monroe vicinity (3).

Benton County Hazard Analysis, 2002

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7.6.d Wildfire incidents have occurred at a number of parks and recreation areas in Benton County over the last five years with one incident reported at each of these locations: Alsea Falls, Bellfountain Park, Chip Ross Park, Finley Wildlife Refuge, Pioneer Playground, and McBee Park. Two incidents were reported at Fort Hoskins (Benton County Hazard Listing). With increased recreational use of public open space, there is a concern for greater risk of wildfire. Management plans for parks and natural areas provide an opportunity to develop fire protection programs and action strategies, and the ODF is willing to collaborate as a partner.

Benton County Emergency Services
Wildfire Data Base, 2004

7.6.e Much of the county's rural and suburban development has occurred in small valleys and gulches that run along creeks extending out from valley floors. These areas tend to have limited access, little water during the fire season, and severe fuel loading problems such as accumulation of brush, scrub oak, etc.

Background Report
1979 Benton Co. Comp Plan

7.6.f Some rural areas of Benton County are unprotected by structural fire protection agencies (approximately 234 houses or 3% of the total), and these areas should be identified and mapped.

Benton County Emergency Management

7.6.g Mapping of high fuel build-up areas in Benton County was done by the ODF several years ago, but did not result in an official map. Areas mapped included the hills surrounding Philomath and Corvallis, Kings Valley, the corridor to Alsea, and out to the coast. Areas considered to have the greatest risk for wildfire are hillsides with

south and southeast aspect due to exposure to the sun and prevailing east and northeast winds in the fall.

Oregon Department of Forestry,
Philomath Office 2004

7.6.h Department of Environmental Quality (DEQ) is responsible for developing a Wildfire Natural Events Action Plan for Oregon, in response to the wildfire smoke that impacted Oregon cities during the summers of 2002 and 2003. Fuel buildup and fire hazard in the Wildland Urban Interface is one of the elements of the plan. Oregon Department of Forestry is the lead agency that is currently developing pilots for how to map the Wildland Urban Interface area.

DEQ Wildfire Website, 2004
DLCD, 2004

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Findings and References

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