



# Hood River County

## Natural Hazards Mitigation Plan

**Prepared for:**

**Hood River County Community Development Department**

601 State Street  
Hood River, OR 97031

**Prepared by:**

**University of Oregon's Community Service Center:  
Resource Assistance for Rural Environments &  
Oregon Partnership for Disaster Resilience**

1209 University of Oregon  
Eugene, Oregon 97403-1209

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Resource  
Assistance  
for Rural  
Environments





# Special Thanks & Acknowledgements

Hood River County developed this Natural Hazards Mitigation Plan through a regional partnership funded by the Federal Emergency Management Agency's Pre-Disaster Mitigation Competitive Grant Program. FEMA awarded the Mid-Columbia Gorge Region grant to support the update of natural hazards mitigation plans for eight counties in the region. The region's planning process utilized a four-phased planning process, plan templates and plan development support provided by Resource Assistance for Rural Environments (RARE) and the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center. This project would not have been possible without technical and financial support provided by the Mid-Columbia Council of Governments.

Regional partners include:

- Mid-Columbia Council of Governments
- Oregon Emergency Management
- Oregon Public Health
- FEMA Region X
- Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center
- Resource Assistance for Rural Environments at the University of Oregon's Community Service Center

## **Project Steering Committee:**

- Mike Benedict, Hood River County Community Development
- Dean Guess, Hood River County Public Works
- Sandi Lain, Hood River County Administration
- Marita Haddan, Hood River County 9-1-1
- Anne Saxby, Hood River Soil and Water Conservation District
- Peter Mackwell, Hood River Fire Department
- Don Wiley, Hood River County Public Works
- Paul Koch, City of Cascade Locks
- Karl Tesch, Hood River County Emergency Management

## **Project Managers:**

- Mike Benedict, Director, Hood River County Community Development
- William Clark, Resource Assistance for Rural Environments

## **Community Service Center Staff:**

- Megan Smith, Director, Resource Assistance for Rural Environments; Co-Director, Community Service Center
- Josh Bruce, Interim Director, Oregon Partnership for Disaster Resilience
- Michael Howard, Program Specialist, Oregon Partnership for Disaster Resilience
- Titus Tomlinson, Program Assistant, Resource Assistance for Rural Environments
- Julie Foster, Grants Administrator, Community Service Center
- Linda White, Office Coordinator, Community Service Center

## **Geographic Information Systems (GIS) Maps:**

- Mike Schrankel, Hood River County GIS
- Bill Burns, Oregon Department of Geology and Mineral Industries

## **Plan Template Disclaimer**

This Natural Hazards Mitigation Plan is based in part on a plan template developed by the Oregon Partnership for Disaster Resilience. The template is structured to address the requirements contained in 44 CFR 201.6; where language is applicable to communities throughout Oregon, OPDR encourages the use of standardized language. As part of this regional planning initiative, OPDR provided copies of the plan templates to communities for use in developing or updating their natural hazards mitigation plans. OPDR hereby authorizes the use of all content and language provided to Hood River County in the plan template.

## **About the Community Service Center**

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

## **About the Oregon Partnership for Disaster Resilience**

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

## **About Resource Assistance for Rural Environments**

RARE is an AmeriCorps program administered through the University of Oregon's Community Service Center. RARE is currently supported through grants from the Corporation for National & Community Service (AmeriCorps), The Ford Family Foundation, the University of Oregon, the Oregon Food Bank, the Federal Emergency Management Agency, the Oregon Department of Transportation, and other agencies. In addition, each participating community provides \$19,000 of approximately \$32,000 needed to place, train, and support a full-time RARE member.

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# Hood River County Natural Hazards Mitigation Plan

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# **Volume I: Basic Mitigation Plan**

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# Executive Summary

Hood River County developed this Natural Hazards Mitigation Plan in an effort to prepare for the long term effects resulting from natural hazards. This plan was developed for Hood River County. It is impossible to predict exactly when these hazards will occur, or the extent to which they will affect the community. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to create a resilient community that will benefit from long-term recovery planning efforts.

The Federal Emergency Management Agency (FEMA) defines mitigation as “. . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk.” Said another way, natural hazard mitigation is a method of permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the “Whole Community” - individuals, private businesses and industries, state and local governments, and the federal government.

*44 CFR 201.6 – The local mitigation plan is the representation of the jurisdiction’s commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. . . .*

## Why Develop this Mitigation Plan?

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP in order to receive federal funds for mitigation projects. Local and federal approval of this plan ensures that the county and listed cities will remain eligible for pre- and post-disaster mitigation project grants.

*44 CFR 201.6(a)(1) – A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants . . .*

## Who Participated in Developing the Plan?

The Hood River County Natural Hazards Mitigation Plan is the result of a collaborative effort between the county, cities, special districts, citizens, public agencies, non-profit organizations, the private sector and regional organizations. A project steering committee

guided the plan development process. The project steering committee included representatives from the following organizations.

- Hood River County Community Development
- Hood River County Administration
- Hood River County 9-1-1
- Hood River Soil and Water Conservation District
- Hood River Fire Department
- Hood River County Public Works
- City of Cascade Locks Administration
- Hood River County Emergency Management

*44 CFR 201.6(c)(1) – Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Hood River County Community Development convened the planning process and will take the lead in implementing, maintaining and updating the plan. Public participation played a key role in the development of goals and action items. At various stages during the plan update’s development, county officials and the public were invited to learn of its progress and to comment on completed sections. This took place primarily during presentations before the county board of commissioners, but city officials were also given a chance to comment on the plan development during scheduled meetings throughout the update process, when cities were offered a chance to join the process as separate jurisdictions. The public was also given a chance for further involvement in the plan update process when 1,200 surveys were randomly mailed to Hood River County residents using voter registration records. The survey was meant to gauge the priorities of the public in terms of government efforts to address natural hazards, but also contained questions that gauged the public’s knowledge and awareness of the county’s current plan, and thus served an additional purpose as an informational outreach tool. Finally, when a working draft of the updated plan was completed it was posted online for public comment. Members of the general public were invited to view, critique, and otherwise express any concerns they may have had with the plan update, and these comments were addressed during the final plan editing process.

## How Does this Mitigation Plan Reduce Risk?

This natural hazard mitigation plan is intended to assist Hood River County reduce the risk from natural hazards by identifying resources, information, and strategies for risk reduction. It is also intended to guide and coordinate mitigation activities throughout the county. A risk assessment consists of three phases: hazard identification, vulnerability assessment, and risk analysis, as illustrated in the following graphic.

*44 CFR 201.6(c)(2) – A Risk Assessment that provides the factual basis for activities proposed in the strategy*  
...

Figure i.1 Understanding Risk



Source: OPDR

By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capacity, communities in Hood River County are better equipped to identify and implement actions aimed at reducing the overall risk to natural hazards.

## What is the County’s Overall Risk to Hazards?

Hood River County conducted a risk assessment to evaluate the probability of each hazard as well as the vulnerability of the community to that hazard. Table i.1 below presents the overall risk assessment for Hood River County including both the county’s hazard analysis and relative risk. The hazards are listed in rank order from high to low, taking consideration of past historical events, vulnerability to populations, the maximum threat, and the probability, or likelihood of a particular hazard event occurring.

Table i.1: Risk Assessment Summary

Hazard	Probability Total	Vulnerability Total	Total Threat Score	Severity Impact Score	Relative Probability	Relative Risk	Hazard Ranking
Wildfire (WUI)	70	30	190	3.5	5	17.5	1
Severe Storm	63	45	216	3.3	4.5	14.9	2
Flood - Riverine	63	25	172	2.8	4.5	12.6	3
Drought	56	40	192	2.9	4	11.6	4
Earthquake	28	25	111	3.3	2	6.6	5
Landslide / Debris Flow	35	20	103	2.3	2.5	5.8	6
Volcanic Event	7	10	61	4.6	0.5	2.3	7
Tornado	7	5	24	2	0.5	1	8

Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011; Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

## What is the Plan’s Mission?

The mission of the Hood River County Natural Hazards Mitigation Plan is to, “Protect life, property and the environment through coordination and cooperation among public and private partners, which will reduce risk and loss, and enhance the quality of life for the people of Hood River County.”

*44 CFR 201.6(c)(3)(i) – A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

## What are the Plan Goals?

The plan goals describe the overall direction that the participating jurisdiction’s agencies, organizations, and citizens can take toward mitigating risk from natural hazards. Hood River County’s plan goals include:

- Protection of Life and Property
- Disaster Resilient Economy
- Education and Outreach
- Facilitate Partnerships and Coordination
- Acknowledge Responsibility
- Natural Resource Systems Protection
- Emergency Services Enhancement

## How are the Action Items Organized?

The action items are organized within an action item matrix (located in Section 3 of the plan), which lists all of the multi-hazard and hazard-specific action items included in the mitigation plan. Data collection, research and the public participation process resulted in the development of the action items. The Action Item Matrix portrays the overall plan framework and identifies linkages between the plan goals and actions. The matrix documents the title of each action along with the coordinating organization, timeline, and the plan goals addressed. Action items are further detailed in individual action item forms located in Appendix A of the plan.

*44 CFR 201.6(c)(3)(ii) – A section that identifies and analyzes a comprehensive range of specific mitigation actions . . .*

## How will the plan be implemented?

The plan maintenance section of this plan details the formal process that will ensure that the Hood River County Natural Hazards Mitigation Plan remains an active and relevant document. The plan will be implemented, maintained and updated by a designated convener. The convener is responsible for overseeing annual review processes. Cities and special districts developing

*44 CFR 201.6(c)(3)(iii) – An action plan describing how the actions . . . will be prioritized, implemented and administered . . .*

*44 CFR 201.6(c)(4) – A plan maintenance process . . .*

addendums to the county plan will also designate a convener and will work closely with the county convener to keep the plans coordinated. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing a plan revision every five years. This section describes how the communities will integrate public participation throughout the plan maintenance process.

## Plan Adoption

After the plan is locally reviewed and deemed complete the Director of Hood River County Community Development submits it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management reviews the plan and submits it to the Federal Emergency Management Agency (FEMA – Region X) for review. This review will address the

federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201.6. Once the plan is pre-approved by FEMA, the county formally adopts the plan via resolution. The individual jurisdiction’s conveners will be responsible for ensuring local adoption of the Hood River County Natural Hazards Mitigation Plan and providing the support necessary to ensure plan implementation. Once the resolution is executed at the local level and documentation is provided to FEMA, the plan is formally acknowledged by FEMA and the county gains (or maintains) eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and the Flood Mitigation Assistance program funds.

The accomplishment of the Natural Hazards Mitigation Plan goals and actions depends upon the maintenance of a competent Steering Committee and adequate support from the county and city departments reflected in the plan in incorporating the outlined action items into existing county plans and procedures. It is hereby directed that the appropriate county departments and programs implement and maintain the concepts in this plan. Thorough familiarity with this Plan will result in the efficient and effective implementation of appropriate mitigation activities and a reduction in the risk and the potential for loss from future natural hazard events.

*44 CFR 201.6(c)(5) – Documentation that the plan has been formally adopted by the governing body of the jurisdiction . . .*

*44 CFR 201.6(d) – Plan review [process] . . .*

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# Section I: Introduction

This section provides a general introduction to natural hazard mitigation planning in Hood River County. In addition, Section I: Introduction addresses the planning process requirements contained in 44 CFR 201.6(b) thereby meeting the planning process documentation requirement contained in 44 CFR 201.6(c)(1). The section concludes with a general description of how the plan is organized.

## What is Natural Hazard Mitigation?

The Federal Emergency Management Agency (FEMA) defines mitigation as “. . . the effort to reduce loss of life and property by lessening the impact of disasters . . . through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk.” Said another way, natural hazard mitigation is a method of permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the “Whole Community” - individuals, private businesses and industries, state and local governments, and the federal government.

Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

## Why Develop a Mitigation Plan?

Hood River County updated this Natural Hazards Mitigation Plan in an effort to reduce future loss of life and damage to property resulting from natural hazards. This plan applies to both the cities and unincorporated regions of Hood River County. It is impossible to predict exactly when natural hazard events will occur, or the extent to which they will affect community assets. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP in order to receive federal funds for mitigation projects. Local and federal approval of this plan ensures that the county and listed cities will remain eligible for pre- and post-disaster mitigation project grants.

## **What Federal Requirements Does This Plan Address?**

The Disaster Mitigation Act of 2000 (DMA2K) is the latest federal legislation addressing mitigation planning. It reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels. State and local jurisdictions must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

Development of the local mitigation plan update process was pursued in compliance with subsections from 44 CFR 201.6 guidelines. These four subsections address plan requirements, the planning process, plan content, and plan review. Subsection (a) provides an outline of the overall plan requirements, including an overview of general plan components, exceptions to requirements, and multi-jurisdictional participation. Subsection (b) outlines the requirements of the planning process, with particular focus on public involvement in the update process, as well as the role of local agencies, organizations and other relevant entities in the development process, as well as standards for adequate levels of review and incorporation of existing plans and policies. Subsection (c) outlines requirements concerning the plan update's content, including an overview of necessary components for the update's planning process, risk assessment, mitigation strategy, plan maintenance, and overall process documentation. Subsection (d) outlines the steps and agencies required for proper review of the plan before finished plans are adopted by their respective communities.

## **What is the Policy Framework for Natural Hazards Planning in Oregon?**

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the jurisdiction's Comprehensive Plan, and helps each jurisdiction meet the requirements of statewide land use planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and

federal levels. Some of the key agencies in this area include Oregon Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

## How was the Plan Developed?

The plan was developed following a pre-formulated schedule provided by the Oregon Partnership for Disaster Resilience, and described by the statement of work in the county’s update and review process. The following schedule was developed to provide a timeline for completion of the plan update sections, though altered accordingly throughout the year to reflect then-current levels of progress.

**Figure 1.1: NHMP Update Timeline**



Source: Oregon Partnership for Disaster Resilience, 2012

The first four stages of the update process had their own corresponding steering committee meeting, during which previous work could be reviewed and new content developed for each particular session. The community profile was completed after the first steering committee meeting and reviewed by the committee in February as part of the update to the risk assessment. Content for the risk assessment was developed at the second steering committee meeting, and was reviewed and discussed in May before the steering committee reviewed the county’s mission, goals and action items. The mission, goals and action items section was reviewed before discussion of updates to the plan implementation and maintenance strategy at the final steering committee meeting in June, and a final draft of the plan was completed at the beginning of August and circulated among county officials and interested public for review before submission to FEMA for plan pre-approval.

At various stages during the plan update’s development, county officials and the public were invited to learn of its progress and to comment on completed sections. This took place

primarily during presentations before the county board of commissioners, but city officials were also given a chance to comment on the plan development during scheduled meetings throughout the update process, when cities were offered a chance to join the process as separate jurisdictions. The public was also given a chance for further involvement in the plan update process when 1,200 surveys were randomly mailed to Hood River County residents using voter registration records. The survey was meant to gauge the priorities of the public in terms of government efforts to address natural hazards, but also contained questions that gauged the public's knowledge and awareness of the county's current plan, and thus served an additional purpose as an informational outreach tool.

Multiple opportunities were also provided for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process, particularly during Hood River County NHMP Update Steering Committee meetings. Representatives from potential partner organizations and agencies were invited to join the Steering Committee responsible for reviewing and updating the county's plan early in the planning process, and regular attendance was achieved for organizations and agencies that have direct involvement with potential hazard mitigation activities.

During early stages of the planning process, pre-existing plans, studies, reports and other technical information from Hood River County were identified and reviewed for inclusion in the updated plan. Information and policy cultivated from this review was used to inform updates of the county's community profile, risk assessment and mitigation strategy sections, and listed where appropriate for general reference.

## **How is the Plan Organized?**

Each volume of the mitigation plan provides specific information and resources to assist readers in understanding the hazard-specific issues facing Hood River County citizens, businesses, and the environment. Combined, the sections work in synergy to create a mitigation plan that furthers the Hood River County Community Development department's mission to promote economic prosperity and diversity while maintaining the county's environmental quality. This plan structure enables stakeholders to use the section(s) of interest to them.

### **Volume I: Natural Hazards Mitigation Plan**

#### **SECTION 1: INTRODUCTION**

The Introduction briefly describes the countywide mitigation planning efforts and the methodology used to develop the plan.

#### **SECTION 2: COMMUNITY RISK ASSESSMENT**

Section 2 provides the factual basis for the mitigation strategies contained in Section 3.

The section includes a listing of existing plans, policies, and programs, listing of community organizations, a summary of existing mitigation actions, and an overview of the hazards addressed in the plan. This section allows readers to gain an understanding of the County's sensitivities – those community assets and characteristics that may be impacted by natural

hazards, as well as the county’s resilience – the ability to manage risk and adapt to hazard event impacts.

### **SECTION 3: MISSION, GOALS AND ACTION ITEMS**

This section documents the plan vision, mission, goals, and actions and also describes the components that guide implementation of the identified mitigation strategies. Actions are based on community sensitivity and resilience factors and the hazard assessments in Section 2 and the Hazard Annexes.

### **SECTION 4: PLAN IMPLEMENTATION AND MAINTENANCE**

This section provides information on the implementation and maintenance of the plan. It describes the process for prioritizing projects, and includes a suggested list of tasks for updating the plan to be completed at the semi-annual and 5-year review meetings.

## **Volume II: Hazard-Specific Annexes**

The hazard annexes summarize the best available local hazard data. A hazard summary is provided for each of the hazards addressed in the plan. The summary includes hazard history, location, extent, vulnerability, impacts, and probability. Hazard summaries are taken directly from the recently updated Hood River County Hazard Identification and Vulnerability Analysis (HIVA).

The hazard specific annexes included with this plan are the following:

- Drought;
- Earthquake;
- Flood;
- Wildland Fire;
- Landslide;
- Severe Local Storm;
- Tornadoes; and
- Volcanoes

## **Volume III: Resource Appendices**

The resource appendices are designed to provide the users of the Hood River County Natural Hazards Mitigation Plan with additional information to assist them in understanding the contents of the mitigation plan, and provide them with potential resources to assist with plan implementation.

### **APPENDIX A: ACTION ITEM FORMS**

This appendix contains the detailed action item forms for each of the mitigation strategies identified in this plan.

### **APPENDIX B: PLANNING AND PUBLIC PROCESS**

This appendix includes documentation of all the countywide public processes utilized to develop the plan. It includes invitation lists, agendas, sign-in sheets, and summaries of Steering Committee meetings as well as any other public involvement methods.

### **APPENDIX C: COMMUNITY PROFILE**

This profile can be utilized to identify specific issues locally and to develop potential action items. A community profile was included as a main section in the original Hood River County Natural Hazards Mitigation Plan, whereas the expanded profile has been moved to the appendixes in the updated plan. The data in the updated profile are based on best available local, state, and federal data. The profile includes a *Natural Environmental Capacity* section that details the physical geography of the county; a *Socio Demographic Capacity* section that discusses the population in the county; a *Regional Economic Capacity* section that discusses local industry, regional affordability, economic diversity, employment and wages, and an overview of labor and commute sheds; a *Built Capacity* section that addresses the county's housing building stock, physical infrastructure, critical facilities, utilities (including transportation and power transmission systems), dependent facilities, and correctional facilities; a *Community Connectivity Capacity* section that discusses the county's social organizations, civic engagement, cultural resources, and community stability; and lastly a *Political Capital* section that provides an overview of the county's government structure, and existing plans and policies. In addition to describing characteristics and trends, each profile section identifies the traits that indicate sensitivity to natural hazards.

### **APPENDIX D: ECONOMIC ANALYSIS OF NATURAL HAZARDS MITIGATION PROJECTS**

This appendix describes the Federal Emergency Management Agency's (FEMA) requirements for benefit cost analysis in natural hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities. This appendix was developed by OPDR. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

### **APPENDIX E: MID-COLUMBIA REGION NATURAL HAZARD MITIGATION PUBLIC OPINION SURVEY**

This appendix includes the survey instrument and results from the regional household preparedness survey implemented by OPDR. The survey aims to gauge household knowledge of mitigation tools and techniques to assist in reducing the risk and loss from natural hazards, as well as assessing household disaster preparedness.

### **APPENDIX F: GRANT PROGRAMS**

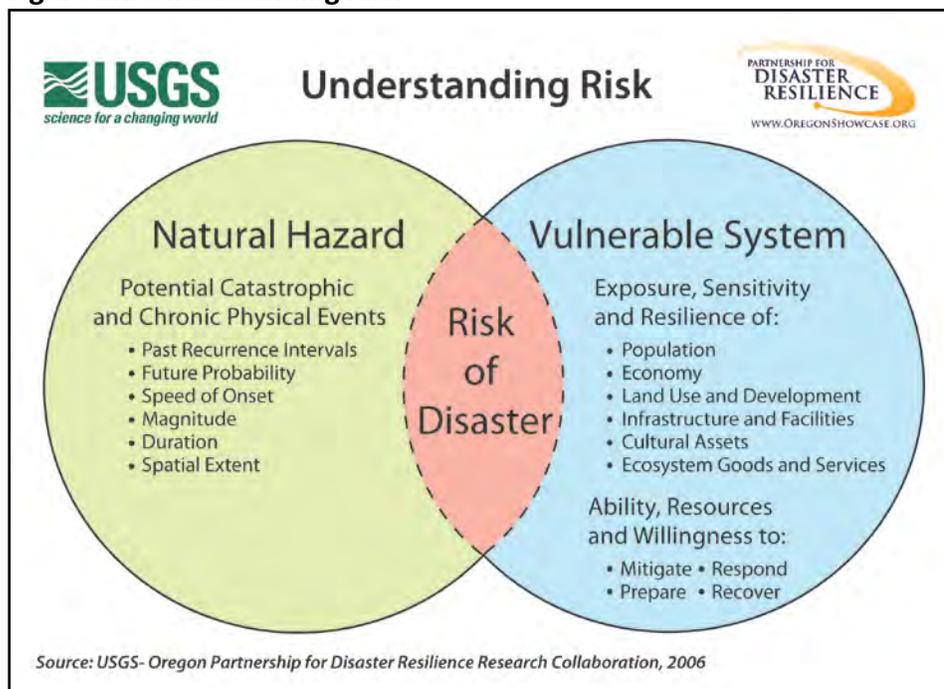
This appendix lists state and federal resources and programs by hazard.

# Section 2: Risk Assessment

This section of the NHMP 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 begins with the identification of hazards that can impact the jurisdiction. Included in the hazard assessment is an evaluation of potential hazard impacts – type, location, extent, etc. The second step in the risk assessment process is the identification of important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources. The last step is to 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 in the Hazard Annex and community characteristics presented in the Community Profile Appendix, will be used as the local level rationale for the risk reduction actions identified in Section 3 – Mitigation Strategy. The risk assessment process is graphically depicted in Figure 2.1 below. Ultimately, the goal of hazard mitigation is to reduce the area where hazards and vulnerable systems overlap.

**Figure 2.1 Understanding Risk**



Source: OPDR

# Hazard Identification

Hood River County is regularly impacted by several Natural Hazards due to its geography, climate and topography. These hazards include flood, wildfire, severe storms, and to a slightly lesser extent drought. Residents of the area are also at varying risks of exposure to landslide/debris flows, earthquakes, volcanic eruption, and tornados. A general overview of these hazards and their threat to Hood River County is listed below in Table 2.1.

**Table 2.1: Hood River County Hazard Overview**

Hazard	General location and extent
Drought	Countywide
Severe Storm	Countywide
Earthquake	A subduction zone earthquake could have impacts countywide. Crustal quake events are most likely around the eastern edge of the county and near the City of The Dalles in Wasco County where an identified fault exists.
Wildfire	The entire county is vulnerable to the effects of wildfire, however agriculture, forest / woodland areas, and individuals living in wildland urban interface (WUI) zones are at the greatest risk
Flood	Rivers in Hood River County historically flood every few years. These include the Hood River, Indian Creek, Phelps Creek and the Columbia River. Flood hazard areas are along the East, Middle and West forks of the Hood River, and along Emil, Odell, Baldwin and Neal Creeks.
Landslide/ Debris Flow	Hood River County has many areas adjacent to the Columbia River Gorge where landslides have taken place and several areas that are susceptible to landslides.
Volcano	Hood River County may be impacted by a volcanic eruption at anytime (particularly Mt. Hood).
Tornado	While violent tornadoes are not a characteristic of the Hood River County climate, the weather systems that may generate tornadoes appear regularly.

Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011

The following subsections summarize the type, effects, location and history information for each of the hazard types listed above. For detailed information on Hood River County’s natural hazards, refer to the hazard reports in this plan’s Volume II: Hazard Annexes.

## Drought

Drought is a condition of climatic dryness severe enough to reduce soil moisture and water below the minimum amount necessary for sustaining plant, animal, and human life systems. Nearly all areas of Hood River County may be vulnerable to drought, and as recently as 2005, the county has suffered from extended drought conditions. In every drought, agriculture has felt

the impact, especially in non-irrigated areas. Droughts have left their major impact on individuals (farm owners), on the agricultural industry, and to a lesser extent, on other agriculture-related sectors.

Droughts in the county also lead to increased danger of wildfires, in which millions of board feet of timber have been lost. In many cases, erosion has occurred which caused serious damage to aquatic life, irrigation, and power development by heavy silting of streams, reservoirs, and rivers. Low stream flows have also created high temperatures, oxygen depletion, disease, and lack of spawning areas for fish resources.

All of the above effects result in economic and revenue losses for business, cities and the county as a whole, and history of drought in the county suggests a high probability of occurrence. The entire population of the county is vulnerable to the effects of drought, though transportation and communications infrastructure would be minimally impacted, if at all. As growth places more pressure on limited local resources, future impacts may be greater.<sup>1</sup>

## Earthquake

An earthquake is the shaking of the ground caused by an abrupt shift of rock along a fracture in the earth, called a fault. There are three categories of quakes and each type may affect Hood River County. The scope of damage is a function of earthquake magnitude and level of preparedness. Damage could range from minimal to moderate loss of life and destruction of property. The entire county population, property, commerce, infrastructure and services may be vulnerable to an earthquake.

There is really no past “recent” history of earthquakes in Hood River County, though county residents have felt some earthquakes distant from Hood River County. Even with this lack of history, geology clearly shows that the county has been impacted by significant events in the last 500 years.

Earthquakes in Hood River County are most likely to originate from two sources: 1) the Cascadia Subduction Zone and 2) faults near the eastern end of the Columbia River Gorge. Table 2.2 lists the class A and B faults that are located in or near the county.<sup>2</sup>

**Table 2.2: Class A and B Faults Located in or near Hood River County**

Name	Class	Fault ID	Primary County, State	Length (km)	Time of most recent deformation	Slip-rate category
Faults near The Dalles	A	580	Hood River County, Oregon	69 km	Quaternary (<1.6 Ma)	Less than 0.2 mm/yr
Unnamed faults northwest of Condon	B	814	Gilliam County, Oregon	22 km	Quaternary (<1.6 Ma)	Less than 0.2 mm/yr

Source: U.S. Geological Survey (USGS), Quaternary Fault and Fold Database, The Dalles 1° X 2° Sheet

<sup>1</sup> Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011

<sup>2</sup> Ibid.

## **Flood**

The main cause of Northwest floods is the moist air masses that regularly move over the region in the winter. In Hood River County, the weather that produces the most serious flooding events are extensive wet conditions that follow a period of mid and high elevation ice and snow pack development. The county is susceptible to both riverine and flash floods.

Rivers in Hood River County historically flood every few years. These include the Hood River, Indian Creek, Phelps Creek and the Columbia River. Flood hazard areas are along the East, Middle and West forks of the Hood River, and along Emil, Odell, Baldwin and Neal Creeks. Flooding on the Columbia River typically occurs during May, June, and July due to melting snowpack, whereas flooding of the other rivers and creeks in Hood River County usually occurs between October and March. Long periods of heavy rainfall and mild temperatures coupled with snowmelt contribute to flooding conditions.

## **Landslide/Debris Flow**

Landslides are the sliding movement of masses of loosened rock and soil down a hillside or slope. The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. It is most common for landslides to occur on water saturated slopes when the base of the slope can no longer support the weight of the soil above it. Landslides are commonly associated with heavy rain and flooding conditions, but they may also be associated with earthquakes (the 1994 Northridge Earthquake caused an estimated 11,000 landslides) and with volcanic activity. The period from December 1996 to February 1997 saw a number of landslides in Hood River County.

Slides in Hood River County generally range in size from thin masses of soil of a few yards wide to deep-seated bedrock slides. Travel rate may range in velocity from a few inches per month to many feet per second, depending largely on slope, material, and water content. The recognition of ancient dormant slide masses is important as they can be reactivated by earthquakes or unusually wet winters. Also, because they consist of broken materials and disrupted ground water, they are more susceptible to construction-triggered sliding than adjacent undisturbed material. Hood River County has many areas adjacent to the Columbia River Gorge where landslides have taken place and several areas that are susceptible to landslides, though landslides in the county tend to occur in isolated, sparsely developed areas threatening individual structures and remote sections of the transportation, energy and communications infrastructure. However there is a risk that a major landslide could cause the partial closure of segments of Interstate 84, or significantly impact developed regions along the I-84 corridor, including the cities of Hood River and Cascade Locks.

## **Volcanic Event**

A volcano is a vent in the earth's crust through which molten rock, rock fragments, gases or ashes are ejected from the earth's interior. There are a wide variety of hazards related to volcanoes and volcano eruption, and these hazards are typically distinguished by the different ways in which volcanic materials and other debris flow from the volcano.

Mount Hood is a potentially active volcano close to rapidly growing communities and recreation areas that could have significant effects on the daily lives of Hood River County residents. The most likely widespread and hazardous consequence of a future eruption will be for lahars (rapidly moving mudflows) to sweep down the entire length of the Sandy (including the Zigzag)

and White River valleys. Lahars can be generated by hot volcanic flows that melt snow and ice or by landslides from the steep upper flanks of the volcano. Structures close to river channels are at greatest risk of being destroyed. The degree of hazard decreases as height above a channel increases, but large lahars can affect areas more than 30 vertical meters (100 vertical feet) above river beds.

Cascade Range volcanoes in the U.S. have erupted more than 200 times during the past 12,000 years for an average of nearly two eruptions per century. At least five eruptions have occurred during the past 150 years. The most recent eruptions in the Cascade Range are the well-documented 1980-1986 eruptions of Mt. St. Helens, which claimed 57 lives and caused nearly a billion dollars in damage and response costs. The effects were felt throughout the northwest, and another Cascade Range volcanic eruption could significantly impact various aspects of life in Hood River County.

## **Wildfire and Wildland Urban Interface (WUI)**

Any instance of uncontrolled burning within a forested area is a forest fire, whereas uncontrolled burning in grassland, brush, or woodlands is classified as a wildfire. Hood River County's fire season usually runs from mid-May through October. However, any prolonged period of lack of precipitation presents a potentially dangerous problem. The probability of a forest fire in any one locality on a particular day depends on fuel conditions, topography, the time of year, the past and present weather conditions, and the activities (debris burning, land clearing, camping, etc.) which are or will be taking place.

The effects of wildfires vary with intensity, area, and time of year. Factors affecting the degree of risk of fires include extent of rainfall, humidity, wind speed, type of vegetation, and proximity to firefighting agencies. The greatest short-term loss is the complete destruction of valuable resources, such as timber, wildlife habitat, scenic vistas, and watersheds. There is also an immediate increase in vulnerability to flooding due to the destruction of all or part of affected watersheds. Long-term effects include reduced amounts of timber for commercial purposes and the reduction of travel and recreational activities in the affected area. There were 75 reported wildfires in Hood River County from 2005 – 2010. During that time the major fires in Hood River County for which data is available occurred in 2006 (Bluegrass – Mt. Hood Complex, 1,859 acres), 2008 (Gnarl Ridge, 3,280 acres), 2009 (Microwave, 1,224 acres), and 2011 (Dollar Lake, 6,304 acres).

Home building in and near forests increases the risks from forest fires. These areas of new homes are referred to as interface areas. Often, structures have been built and maintained with minimal awareness of the need for protection from exterior fire sources, or the need to minimize interior fires from spreading to forested lands. Historically, it appears that the instance of wildfire is increasing in Hood River County and the region more generally. Additionally, the existence of open range lands and large forested areas, increasing population and recreational activities, and the uncertain impact of a changing climate combine to increase the probability of a hazard event. The destruction of large tracts of forest land during these events have immediate economic impacts to the community through lost jobs and reduced taxes, while collateral economic and social effect can impact the county for years.

## **Severe Storms**

Hood River County is vulnerable to a variety of severe storm hazards including ice, snow, and windstorms, which all have the ability to severely impact the county. Severe local storms seldom cause death and serious property damage but they can cause major utility and transportation disruptions. Specific storm sub-types are discussed in further detail below.

### **ICE STORM**

Ice storms or freezing rain (black ice) conditions can occur in Hood River County. Ice storms occur when rain falls from warm moist upper layers of the atmosphere into a cold, dry layer near the ground. The rain freezes on contact with the cold ground and accumulates on exposed surfaces. This has the possibility to create real havoc when the ice accumulates on tree branches, and power lines. This can cause power outages and can obstruct transportation routes. A snow and ice storm occurred in 2012 that caused extensive damage to regional utilities, and left two inches of ice in parts of the county for several days.

### **SNOW STORM OR BLIZZARD**

It is possible for moderate or snowfall to occur in Hood River County. Hood River County has had accumulations that vary depending on geographic location. For example, accumulations in excess of 150 inches may be predicted in areas of the Mt. Hood National Forest around the higher elevations of Mt. Hood, whereas in the area of the Hood River Experimental Station, average snowfall may accumulate to approximately 12 inches, depending on the year. Accumulations of snow usually increase with distance and elevation as the terrain rises to the South of the Columbia River. January is usually the month with the greatest snowfall.

On February 14-16, 1990 a storm brought 24 to 35 inches of snow to the Columbia Gorge cities of Cascade Locks and Hood River, 16 inches at Timberline Lodge. On the 16th, 20 to 35 inches fell in the North Cascades. On December 22, 2008, over 22" inches of snow fell on Hood River in a 24 hour period. The record snowfall in the region occurred December 20-23, 1892.

### **WIND STORM**

Every so often, the Northwest is severely impacted by strong windstorms. In the past, peak wind gusts have gone above 100 miles per hour. Strong winds that impact Hood River County comes from two sources. Frequent and widespread strong winds come from the west and are associated with strong storms moving onto the coast from the Pacific Ocean. Strong west winds may also originate in the Columbia River Gorge when high atmospheric pressure is over the upper Columbia River Basin and low pressure is over the Pacific Ocean. The Columbia River Gorge acts as a funnel, concentrating the intensity of the winds as they flow from the West. This generates frequently strong winds throughout the Gorge and at its outlet.

### **TORNADO**

Tornadoes are the most violent weather phenomena known. They are characterized by funnel clouds of varying sizes that generate winds as fast as 500 miles per hour. They can affect an area of  $\frac{1}{4}$  to  $\frac{3}{4}$  of a mile though seldom more than 16 miles long. Tornadoes normally descend from the large cumulonimbus clouds that characterize severe thunderstorms. They form when a strong crosswind intersects with strong warm updrafts in these clouds causing a slowly spinning vortex to form within a cloud. No recorded instance of a tornado causing damage in Hood River County is available.

## FEMA Declarations

President Dwight D. Eisenhower approved the first federal disaster declaration in May 1953 following a tornado in Georgia. Since then, federally declared disasters have been approved within every state. As of March 2012, FEMA has approved a total of 28 federal disaster declarations, two emergency declarations and 49 fire management assistance declarations in Oregon.<sup>3</sup> When requesting a presidential declaration for a major disaster or emergency, governors provide detailed information about the amount of value of public and private property damage resulting from the event. FEMA uses these damage assessments to determine if the event meets the disaster declaration threshold. In addition, FEMA uses the information to determine the amount of federal public and private assistance being made available as well as the specific counties being included in the declaration.

Disaster declarations can help inform hazard mitigation project priorities, by demonstrating and documenting which hazards historically have caused the most significant damage to the county. Table 2.3 summarizes the six major disasters declared for Hood River County by FEMA since 1953. The table shows that all of the major disaster declarations in Hood River County have been flood, landslide and weather related.

**Table 2.3: FEMA Major Disaster Declarations for Oregon – Hood River County**

Declaration Number:	Declaration Date:	Incident(s):	Incident(s) Period:	Individual Assistance:	Public Assistance Categories:
DR-4055	2-Mar-12	Severe Winter Storm, Flooding, Landslides, and Mudslides	17-Jan-12 to 21-Jan-12	None	A, B, C, D, E, F, G
DR-1672	29-Dec-06	Severe Storms, Flooding, Landslides, and Mudslides	5-Nov-06 to 8-Nov-06	None	A, B, C, D, E, F, G
DR-1510	19-Feb-04	Severe Winter Storms	26-Dec-03 to 14-Jan-04	None	A, B, C, D, E, F, G
DR-1099	9-Feb-96	Severe Storms, Flooding	4-Feb-96 to 21-Feb-96	Yes	A, B, C, D, E, F, G
DR-413	25-Jan-74	Severe Storms, Snowmelt, Flooding	25-Jan-74	Yes	A, B, C, D, E, F, G
DR-184	24-Dec-64	Heavy Rain, Flooding	24-Dec-64	Yes	A, B, C, D, E, F, G

Source: FEMA, Oregon Disaster History, Major Disaster Declarations

## Hazard Probability

Hazard probability is the likelihood of future natural hazard events within a specified period of time. Hood River County evaluated the best available probability data to develop the probability scores presented below. For the purposes of this plan, the county utilized the Oregon Emergency Management Hazard Analysis methodology probability definitions to determine hazard probability. The definitions are:

<sup>3</sup> FEMA. Declared Disasters by Year or State. [http://www.fema.gov/news/disaster\\_totals\\_annual.fema#markS](http://www.fema.gov/news/disaster_totals_annual.fema#markS). Accessed March 8, 2012

LOW = one incident likely within 75 to 100 years scores between 1 and 3 points

MEDIUM = one incident likely within 35 to 75 years scores between 4 and 7 points

HIGH = one incident likely within 10 to 35 years scores between 8 and 10 points

Table 2.4 presents the probability scores for eight natural hazards that consistently affect or threaten Hood River County. As shown in the table, individual natural hazard events in the county have varying levels of probability. Wildfire, severe storm, flood, and drought all have a high probability of occurrence, while landslide/debris flow events and earthquakes are given a medium level of probability. Volcanic events and tornados are both given a very low probability of occurrence.

**Table 2.4: Hood River Hazard Probability Summary**

Threat Event/Hazard	Severity	Weight Factor	Subtotal	Probability
Wildfire (WUI)	10	7	70	High
Severe Storm	9	7	63	High
Flood - Riverine	9	7	63	High
Drought	8	7	56	High
Landslide/Debris Flow	5	7	35	Medium
Earthquake	4	7	28	Medium
Volcanic Event	1	7	7	Low
Tornado	1	7	7	Low

Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011

## Community Vulnerability

Natural disasters occur as a predictable interaction among three broad systems: natural environment (e.g., climate, rivers systems, geology, forest ecosystems, etc.), the built environment (e.g., cities, buildings, roads, utilities, etc.), and societal systems (e.g., cultural institutions, community organization, business climate, service provision, etc.). A natural disaster occurs when a hazard impacts the built environment or societal systems and creates adverse conditions within a community.

It is not always possible to predict exactly when natural disasters will occur or the extent to which they may impact the community. However, communities can minimize losses from disaster events through deliberate planning and mitigation, as well as by identifying distinct vulnerabilities.<sup>4</sup>

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<sup>4</sup> Source: State of Oregon Emergency Management Plan, NHMP Region 5: Mid-Columbia, February 2012

## Populations<sup>5</sup>

There are several factors that contribute to the overall vulnerability of the people who live in Hood River County. For example, population densities, non-English speaking populations, and growth rates are all factors that may impact a community's vulnerability to hazards. Several factors that are commonly considered variables in a community's collective vulnerability to disaster are listed below. Table 2.6 outlines specific and general county-wide population concerns along with the hazards that are most likely to impact them.

### **VULNERABLE POPULATIONS**

One characteristic of disasters is that they often exceed the ability of emergency response agencies to provide assistance promptly. In a major disaster, members of the public may be on their own for at least three days, and might need to go for several days without utilities and/or food and water sources. Disasters may also isolate individuals by damaging transportation routes. Not all people are able to respond to these conditions appropriately. Many people are in vulnerable populations that may have difficulty following official instructions and taking protective actions. For instance, someone who is developmentally disabled or deaf may not be able to hear or understand instructions on sanitation, evacuation routes, or shelter locations.

Vulnerable populations are those groups that possess specific characteristics that inhibit their ability to prepare for, respond to, or recover from a disaster. These characteristics include physical and developmental disabilities, mental illness, poverty, old age, or an inability to speak or understand English. These groups are more heavily impacted because they may lack the necessary knowledge, skills, social support structures, or the mental and physical abilities necessary to take care of themselves. Historically, vulnerable populations present a special challenge to emergency managers and response agencies and they are more likely to be victims of a disaster.

Fortunately, many people that fall into one of these categories have families, friends, neighbors, and other caretakers that will be able to assist them. But many of them do not have adequate support and those who do may not be able to rely on it in a major event.

### **NON-ENGLISH SPEAKING AND SPECIAL CULTURAL CHARACTERISTICS**

According to 2010 census estimates, approximately 30% of the Hood River County population is identified as Hispanic in origin. It should be noted that "Hispanic Origin" is considered an ethnicity, not a race, as Hispanics may be of any race. The US Census Bureau also estimates that 27% of the Hood River County population over the age of five speaks a language other than English at home.<sup>6</sup>

A lack of ability to speak or read the English language can present a challenge to emergency managers, since instructions for self-protective action and general disaster information is usually provided only in English. The non-English speaking population would be uninformed unless they have assistance from friends or services providers who may provide them with instruction and information in English. In certain areas of Hood River County it may be advisable for emergency

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<sup>5</sup> Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011

<sup>6</sup> Source: US Census Bureau, 2010 Census, American FactFinder, S1601

managers and emergency response agencies to arrange for translation of instruction and information into different languages.

**ELDERLY**

According to 2010 census figures, persons 60 and older made up 17.7% of the total Hood River County population. An increase is expected over the next ten years, where this group is predicted to make up 22.1% of the county’s population by 2020.

**TRANSIENT POPULATION**

The transient population includes those who do not have a permanent residence in Hood River County.

**VISITORS/TRAVELERS**

Due to its proximity to the Columbia River and Mt. Hood, Hood River County is considered a major Northwest visitor destination. Travelers and visitors are particularly vulnerable to disasters, because they are usually unfamiliar with the hazards in the region and because they do not have the knowledge or the materials needed to take care of themselves in a disaster. For example, a typical visitor or traveler may have difficulty using evacuation routes, or finding shelters. A light traveling visitor would also not have their own supply of food, water, flashlights, radios, and other supplies that locals can use to take care of themselves in a disaster. And finally, visitors or travelers usually do not have a local support structure of family, friends, and neighbors that most of us rely on.

**PHYSICALLY DISABLED**

According to 2008-2010 census estimates 2,681, or 12.2%, of Hood River County non-institutionalized citizens are living with a disability.<sup>7</sup> These disabilities may or may not be permanent. Table 2.5 describes the number of people throughout Hood River County with disability status or other physical difficulties.

**Table 2.5: Hood River County Disability Characteristics**

<b>Disability</b>	<b>Number of People</b>	<b>Percent of Non-institutionalized Population</b>
Disability status	683	3.1%
Hearing difficulty	242	1.1%
Vision difficulty	374	1.7%
Cognitive difficulty	286	1.3%
Ambulatory difficulty	308	1.4%
Self-care difficulty	330	1.5%
Independent living difficulty	374	1.7%
<b>Total civilian non-institutionalized population</b>	<b>22,018</b>	

Source: US Census Bureau, 2008-2010 American Community Survey 3-Year Estimates, American FactFinder, S1810

<sup>7</sup> Source: US Census Bureau, 2008-2010 American Community Survey 3-Year Estimates, American FactFinder, S1810

### **DEVELOPMENTALLY DISABLED**

According to national prevalence formulas, approximately 1% of the Hood River County Population or 218 residents (as of 2008) have a developmental disability. A developmental disability is defined as a disability that is attributable to mental retardation, cerebral palsy, epilepsy, autism, or any neurological or other condition closely related to mental retardation.

There is a wide variation in the vulnerability of the developmentally disabled population in Hood River County. Some developmentally disabled individuals may have strong support structures and a high level of care provided to them by friends, neighbors, and care providers, though others may not. Some individuals may be largely self-reliant, and some may have additional disabilities in addition to their developmental disabilities. Roughly 10% of the developmentally disabled population is wheelchair bound and approximately 2% of the county population or 436 residents (as of 2008) suffer from a mental illness.

### **MENTALLY ILL**

Disaster conditions can aggravate the symptoms of those who suffer from mental illness. The mentally ill tend to be very sensitive to changes in their environment. There are case studies of this phenomenon from Clark County, Washington. During the Mt. St. Helens eruption disaster several individuals incorporated the fall of ash into their delusional symptoms. There was a marked increase in the caseload for mental health crisis services at the Columbia River Mental Health Services. During the February 1996 floods several mental health patients were hospitalized as a result of increased stress due to relocation, forgetting to take their medications when evacuated, and increased anxiety. Another important consideration is the ability of disaster conditions to cause mental illness. It is estimated that 10% of disaster victims can develop mental health problems, including depression and substance abuse.

### **LOW INCOME**

Not having sufficient financial resources during and after a disaster can be a great disadvantage. Lower income people are more likely to live in mobile homes or other homes that are less able to resist damage from flooding, windstorms, and severe weather. Low-income people also tend to have the greatest difficulty recovering from a disaster. According to 2010 census estimates, approximately 13.0% of the total population has income below the national poverty level.

**Table 2.6: Hood River County Population Issues**

Hood River County Asset Identification	Drought	Earthquake	Flood	Landslide	Volcano	Wildfire	Windstorm	Winter storm	Other
High density/assisted living – HR care center, Ashley Manor, Brookside Assisted Living, Parkhurst, Down Manor, Hawks Ridge, Dethman Manor, Taylor St. special needs home		X							
Hood River Hospital, Dialysis Unit		X							
Schools		X							
Special needs i.e. wheelchair, bed ridden, etc		X							
Hospice, Home health		X							
Tourist/visitors – a number of hotels/motels located in Columbia River Floodplain			X						
Cascade Locks and city of Hood River are both near flood prone area			X						
Parkdale and other County subdivisions			X	X		X		X	
Summer home populations that are unidentifiable		X	X	X		X		X	
Unregistered assisted living homes		X	X					X	
Migrant worker housing			X			X			
Public staff shortages and danger to continuity of services		X	X					X	

Source: Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

## Economy

Hood River County is highly susceptible to economic disturbance from Natural Hazards, as a great deal of funding for county services, and a substantial amount of the region’s income come from timber sales and other natural resource extraction which can be severely disrupted by drought, flood, fire and winter storms, hazards that occur with a high likelihood of probability across the entire county. Specific issues concerning the county’s economy that were identified in the county’s Risk Assessment Steering Committee Meeting are outlined in Table 2.7 below, along with the hazards that are most likely to impact them.

**Table 2.7: Hood River County Economic Issues**

Hood River County Asset Identification	Drought	Earthquake	Flood	Landslide	Volcano	Wildfire	Windstorm	Winter storm	Other
Unregistered businesses could be difficult to address in the event of a hazard		X	X						
Agriculture	X		X			X			
Ski Lodges and Lifts						X		X	
Bridge closures along I-84		X	X	X				X	
Liquefaction – port and buildingg along river		X	X						
BPA Power lines							X	X	

Source: Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

## Land-use and Development

To accommodate growth and development, communities engaged in mitigation planning should address infrastructure and service needs, specific engineering standards and building codes. Eliminating or limiting development in hazard prone areas, such as floodplains, can reduce vulnerability to hazards, and the potential loss of life, injury, and property damage. Communities in the process of developing land for housing and industry need to ensure that land-use and protection goals are being met to prevent future risks.<sup>8</sup>

Specific issues concerning the county’s land use and development that were identified in the county’s Risk Assessment Steering Committee Meeting are outlined in Table 2.8 below, along with a list of hazards that are most likely to impact them.

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<sup>8</sup> Source: State of Oregon Emergency Management Plan, Region 5: Mid-Columbia Regional Profile, February 2012

**Table 2.8: Hood River County Land Use and Development Issues**

Hood River County Asset Identification	Drought	Earthquake	Flood	Landslide	Volcano	Wildfire	Windstorm	Winter storm	Other
Development in wildfire susceptible areas						X			
Building codes for fire and slope gradient			X	X		X			
Flood plain ordinances do not address migrating channels			X						
Port areas are susceptible to liquefaction		X							

Source: Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

## Environment

With four distinct mild seasons, a diverse terrain and its proximity to the Columbia Gorge, Hood River County historically has had to deal with habitual drought, flooding, wildfires and the occasional landslide. By identifying potential hazards, temperature and precipitation patterns, along with natural capitals such as key river systems, Hood River County can focus on key areas to better prepare, mitigate, and increase the resiliency of local communities.<sup>9</sup> Specific and general county-wide environmental concerns along with the hazards that are most likely to impact them are listed in Table 2.9 below.

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<sup>9</sup> Source: Hood River County NHMP Community Profile, 2012

**Table 2.9: Hood River County Environmental Issues**

Hood River County Asset Identification	Drought	Earthquake	Flood	Landslide	Volcano	Wildfire	Windstorm	Winter storm	Other
Two golf courses – one on Indian Creek			X						
Wildfire affecting drinking water						X			
Odell Creek chemical storage facility on Odell Highway		X	X						
Waste water facilities near Odell and Columbia River		X	X						
Tucker park and Tollgate park	X		X			X			
State and National Parks – susceptible to hazards	X		X			X			
Forested areas	X					X			

Source: Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

## Critical Facilities and Infrastructure

Transportation networks, systems for power transmission, and critical facilities such as hospitals and police stations are all vital to the functioning of a county. Due to the fundamental role that infrastructure plays both pre- and post-disaster, it deserves special attention in the context of creating more resilient communities.<sup>10</sup> Specific and general county-wide critical infrastructure and services concerns along with the hazards that are most likely to impact them are listed in Table 2.10 below.

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<sup>10</sup> Source: State of Oregon Emergency Management Plan, Region 5: Mid-Columbia Regional Profile, February 2012

**Table 2.10: Hood River County Critical Infrastructure and Services Issues**

Hood River County Asset Identification	Drought	Earthquake	Flood	Landslide	Volcano	Wildfire	Windstorm	Winter storm	Other
Large amount of infrastructure and Employees in Liquefaction zone – port facilities, sewage treatment facility (port area and nearby facilities were built on fill near the river)		X							
Hood River Distillery – extreme danger if facility combusted		X				X			
Railroad derailment		X	X			X			
The building at 601 State street – unreinforced masonry, houses majority of essential HR county provided services		X							
Water supply distribution		X	X	X		X			
Irrigation districts – surface water		X	X			X			
BPA power lines and towers								X	
Gas line on Hood River bridge		X							

Source: Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

**National Flood Insurance Program (NFIP)**

Hood River County’s Flood Insurance Rate Maps are current as of September, 1984, making them some of the oldest FIRMs in the state. Table 2.11 shows that as of February, 2011, there were a total of 29 National Flood Insurance Program (NFIP) policies in force with a total coverage value of just over \$8 million. Between 1978 and July 25, 2011, there were four NFIP claims including one in Cascade Locks, and three others in unincorporated areas across Hood River County.

**Table 2.11: NFIP Summary Table**

Jurisdiction	FIRM Status	FIRM Date	NFIP Status <sup>^</sup>	# NFIP Policies	Total Coverage	Total Premium	# NFIP Claims	Total Paid
Hood River County	ALL ZONE A,C,X- NO ELEVATION DETERMINED	Sep-84	P	23	\$6,177,000	\$9,373	3	\$26,140
Cascade Locks	ALL ZONE A,C,X- NO ELEVATION DETERMINED	Sep-84	P	4	\$1,128,300	\$3,504	1	\$3,477
Hood River	ALL ZONE A,C,X- NO ELEVATION DETERMINED	Sep-84	P	2	\$700,000	\$810	0	0
<b>TOTALS</b>				<b>29</b>	<b>\$8,005,300</b>	<b>\$13,687</b>	<b>4</b>	<b>\$29,617</b>

Source: State NFIP Coordinator; ^ P = Participating, NP = Not Participating

Table 2.12 illustrates that as of February, 2011, Hood River County and its incorporated cities have zero repetitive flood loss properties. There have been no Community Assistance Visits in Hood River County. Neither Hood River County nor its incorporated cities are members of the Community Rating System (CRS). “The National Flood Insurance Program’s (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.”<sup>11</sup> Participation in the program typically results in discounted flood insurance premium rates that reflect the reduced flood risk from community actions to meet CRS goals.

**Table 2.12: NFIP Repetitive Loss and Severe Repetitive Loss Summary**

Jurisdiction	# SRL Properties- Validated	# SRL Properties- Pending	# RL Properties
Hood River County	0	0	0
Cascade Locks	0	0	0
Hood River	0	0	0
<b>TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>

Source: State NFIP Coordinator

## Vulnerability Summary

Vulnerability is a measure of the exposure of the built environment to hazards. The exposure of community assets to hazards are critical in the assessment of the degree of risk a community has to each hazard. Identifying the facilities and infrastructure at risk from various hazards can assist the county in prioritizing resources for mitigation, and can assist in directing damage assessment efforts after a hazard event has occurred. The exposure of county assets to each hazard and potential implications are explained in each hazard section.

Vulnerability is the percentage of population and property likely to be affected under an “average” occurrence of the hazard. Wheeler County evaluated the best available vulnerability data to develop the vulnerability scores presented below. For the purposes of this plan, the county utilized the Oregon Emergency Management Hazard Analysis methodology vulnerability definitions to determine hazard probability. The definitions are:

<sup>11</sup> Federal Emergency Management Agency, National Flood Insurance Program, Community Rating System, <http://www.fema.gov/business/nfip/crs.shtm> Accessed: May 30, 2012

LOW = less than 1% affected scores between 1 and 3 points

MEDIUM = between 1 and 10% affected scores between 4 and 7 points

HIGH = more than 10% affected scores between 8 and 10 points

Table 2.13 presents the vulnerability scores for each of the natural hazards present in Hood River County. As shown in the table, the county is highly vulnerable to severe storm and drought. In addition, Hood River County is moderately vulnerable to wildfire, flood, earthquakes and landslide/debris flow events, and has a low level of vulnerability to volcanic events and tornados.

**Table 2.13: Hood River Vulnerability Assessment Summary**

Threat Event/Hazard	Severity	Weight Factor	Subtotal	Vulnerability
Severe Storm	9	5	45	High
Drought	8	5	40	High
Wildfire (WUI)	6	5	30	Medium
Flood - Riverine	5	5	25	Medium
Earthquake	5	5	25	Medium
Landslide/Debris Flow	4	5	20	Medium
Volcanic Event	2	5	10	Low
Tornado	1	5	5	Low

Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011

## Risk Assessment

In order to develop a more comprehensive understanding of the risks facing Hood River County from various natural hazards, several scores were developed by members of the Hood River County NHMP Steering Committee to develop a hazard analysis. A vulnerability score (described in Table 2.13 and its preceding paragraph) was combined with a probability score (described in Table 2.4 and its preceding paragraph) along with two other variables (event history and maximum threat) to develop a total threat score for each individual hazard. The scores were used for strategic preparedness planning in Hood River County's 2011 Hazard Identification and Vulnerability Analysis update, and to justify the level of priority for addressing individual natural hazards in the action item section of Hood River County's initial 2006 Natural Hazard Mitigation Plan.

At the Hood River County Risk Assessment Steering Committee Meeting on February 15, 2012, Severity Impact scores were developed by steering committee members to represent the potential impact of various natural hazards to general health and safety (by potential deaths and injuries), facilities (by physical damage and costs), and community (by expected economic, ecologic and social interruption). An overall severity impact score was developed for each hazard using the prescribed metric, and then multiplied by each hazard's relative probability score to produce an overall relative risk score.

Table 2.14 presents the overall risk assessment for Hood River County including both the county’s hazard analysis and relative risk. The hazards are listed in rank order from high to low, taking consideration of past historical events, vulnerability to populations, the maximum threat, and the probability, or likelihood of a particular hazard event occurring. The data show that wildfire is the highest ranked hazard in the county, followed somewhat closely by severe storm. Flood and drought are the next two highest ranked hazards in the county, followed by earthquake, and landslide/debris flow. Volcano and tornado make up the two lowest ranked hazards in the county overall in terms of relative risk.

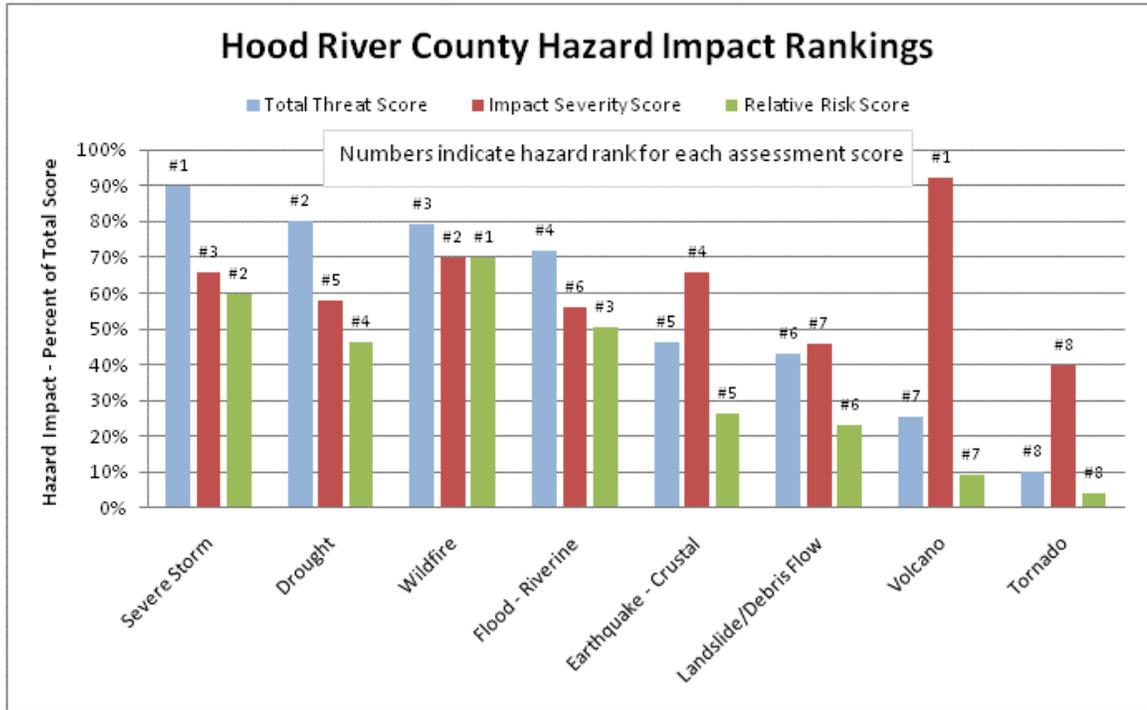
**Table 2.14: Risk Assessment Summary – Hood River County**

Hazard	Probability Total	Vulnerability Total	Total Threat Score	Severity Impact Score	Relative Probability	Relative Risk	Hazard Ranking
Wildfire (WUI)	70	30	190	3.5	5	17.5	1
Severe Storm	63	45	216	3.3	4.5	14.9	2
Flood - Riverine	63	25	172	2.8	4.5	12.6	3
Drought	56	40	192	2.9	4	11.6	4
Earthquake	28	25	111	3.3	2	6.6	5
Landslide / Debris Flow	35	20	103	2.3	2.5	5.8	6
Volcanic Event	7	10	61	4.6	0.5	2.3	7
Tornado	7	5	24	2	0.5	1	8

Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011; Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

Figure 2.2 provides additional analysis for the total threat, impact severity and relative risk scores from Table 2.14. The scores are presented as a percentage of the overall scoring potential for each hazard, and then assigned a rank based on their placement among the other hazard scores. In other words, the figure dissects the relative placement of each hazard’s scores by contrasting the components of each hazard’s overall relative risk score components. For example, though severe storm has the highest total threat score among the hazards in Hood River County, it is only ranked #3 in terms of impact severity, and has the second highest relative risk score. Conversely, volcano has the highest impact severity score, but is only ranked #7 in terms of its total threat and overall relative risk scores.

**Figure 2.2: Hazard Impact Rankings – Hood River County**



Source: Hood River County Strategic Preparedness Planning, Hazard Identification and Vulnerability Analysis, Updated November, 2011; Hood River County Risk Assessment Steering Committee Meeting, February 15, 2012

# Section 3: Mission, Goals, and Action Items

This section of the NHMP addresses 44 CFR 201.6(c)(3) – Mitigation Strategy. The information provided in Section 2 and the Hazard Annexes provide the basis and justification for the mitigation actions identified in this plan. This section provides information on the process used to develop a mission, goals and action items. This section also includes an explanation of how the County intends to incorporate the mitigation strategies outlined in the plan into existing planning mechanisms and programs such as the County comprehensive land use planning process, capital improvement planning process, and building codes enforcement and implementation

## Mitigation Plan Mission

Hood River County's overall vision and mission is, "Providing quality of life for all." The 2006 NHMP used this as the guiding principle when developing the NHMP mission. For this update, the plan's Hood River County NHMP Steering Committee reviewed and reaffirmed the NHMP mission at its Mitigation Strategy Meeting on 17 May, 2012.

The mission of the Hood River County Natural Hazard Mitigation Plan is to:

*Protect life, property and the environment through coordination and cooperation among public and private partners, which will reduce risk and loss, and enhance the quality of life for the people of Hood River County.*

## Mitigation Plan Goals

The plan goals help guide the direction of future activities aimed at reducing risk and preventing loss from natural hazards. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items. Each goal has a series of statements which further reflect and more clearly define the goals.

## Background

Soliciting community input during stakeholder interviews was a critical aspect of initial goal development. Armed with Stakeholder Interview input, the mitigation plan goals and goal statements were drafted by the NHMP Coordinator using assistance from OPDR during the creation of the Hood River County NHMP in 2006. The draft goals were brought before the 2006 Hood River County Steering Committee for review and approval. The goals were revised with Steering Committee input before adoption by the committee.

In an effort to prioritize goals, each member of the Steering Committee was asked to (i) identify three statements that were most important to them and (ii) speak to why they chose those statements. Their statement choices were tallied and goals prioritized by the number of

statements selected; goals with the most statements selected are ranked in priority from I-II. This exercise was not meant to exclude the importance of the other goals, but rather assist in the implementation of this plan by identifying which of the high priority risk reducing action items to pursue funding for first.

## **Goal Update Process**

The 2011/2012 Hood River County NHMP Steering Committee reviewed the plan goals during its Mitigation Strategy Meeting on 17 May, 2012. The committee revised the language of some of the statements in four of the plan goals, and removed one goal, "Intergenerational Equity," because it was not seen to fit within the scope of the NHMP. The goals were then reaffirmed and re-prioritized using a similar method to the one used by the previous Steering Committee. The committee also decided that the goals should be listed in order of their new level of priority.

The outcome of the goal review and re-prioritization process is represented in Table 3.1 below. The "CHOICE" column indicates the number of times a given statement was identified as a community priority by Steering Committee members. The "PRIORITY" column tallies the number of statements selected for each goal and identifies the principal goals to serve as a starting point in the implementation of mitigation activities for Hood River County.

The primary goals identified are the Protection of Life & Property and Disaster Resistant Economy. The secondary goals are Education and Outreach efforts and Facilitate Partnerships and Coordination.

**Table 3.4: Hood River County NHMP Goals**

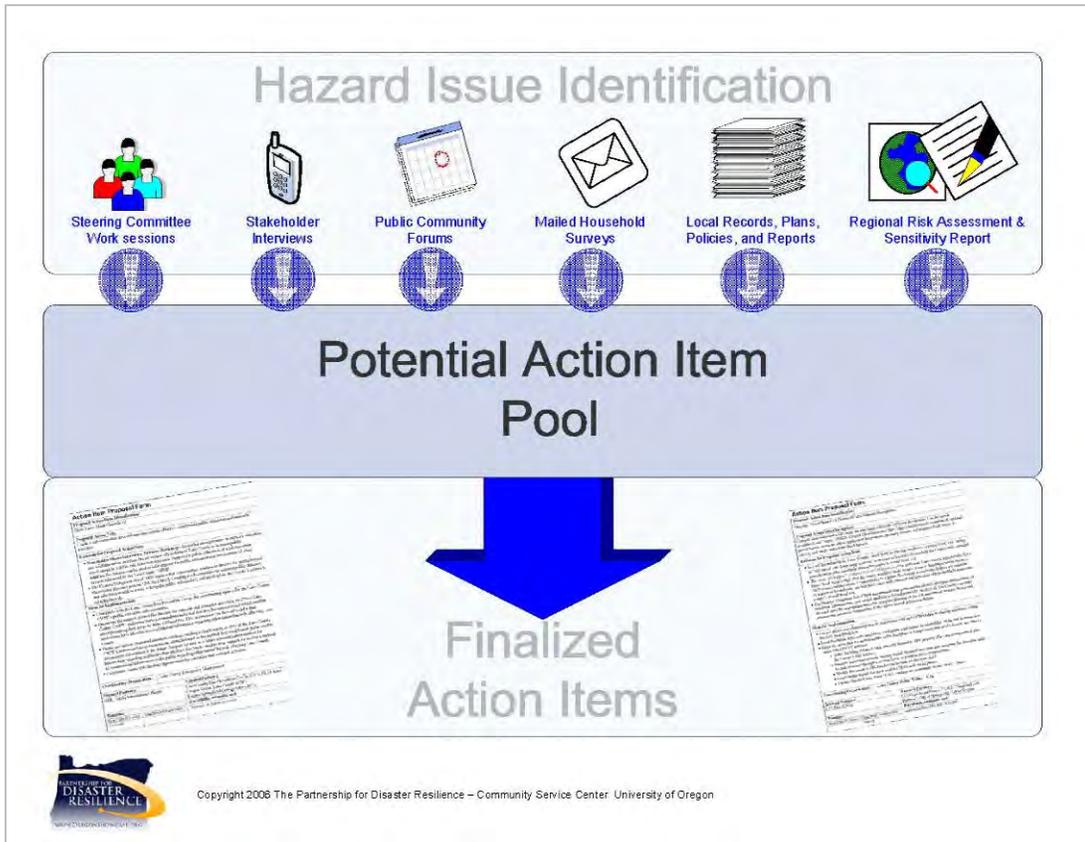
<b>Goal</b>	<b>Statement</b>	<b>Choice</b>	<b>Priority</b>
Protection of Life & Property	Develop and implement activities to protect human life, commerce, property and natural resource systems	1	<b>I*</b>
	Reduce insurance losses and repetitive claims for chronic hazard events while promoting insurance for catastrophic hazards	1	
	Evaluate county guideline/codes, and permitting processes in addressing hazard mitigation; emphasize non-structural means of mitigating hazard impact	1	
	When applicable, utilize structural mitigation activities to minimize risks associated with hazard events	1	
Disaster Resilient Economy	Foster a diverse economy to reduce the debilitation impacts of a hazard event on any one sector		<b>I*</b>
	Create the conditions for a transitional economy that welcomes new industry and innovative ideas that are sensitive to potential hazard risks faced by the county	3	
	Protect recreation and tourist industries by raising awareness of potential hazard impacts	1	
	Provide support for agricultural industries to help them prepare for hazardous events		
Education & Outreach	Develop and implement education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry		<b>II*</b>
	Develop and conduct outreach programs to increase the number of local activities implemented by public and private sector organizations	2	
	Build community consensus through outreach, education and activities		
Facilitate Partnerships & Coordination	Strengthen communication and coordination of public/private partnerships and emergency services among local, county and regional governments and the private sector	1	<b>II*</b>
	Incorporate hazard mitigation into the greater social, economic and natural resource goal framework	1	
Acknowledge Responsibility	Coordinate programs to increase natural hazard knowledge base and use technology to better record events and model vulnerability		
	Actively acknowledge amount of loss the county is susceptible to and develop efforts to overcome that loss without significant reliance on outside resources		
	Educate county leadership and incorporate hazard mitigation as part of the county's routine decision making process		
Natural Resource Systems Protection	Link watershed planning, natural resource management, and land use planning with natural hazard mitigation activities to protect vital habitat and water quality		
	Preserve and rehabilitate natural systems to serve natural hazard mitigation functions and protect recreation and tourist resources		
Emergency Services Enhancement	Evaluate performance of critical facilities during a natural hazard event		
	Minimize life safety issues		
	Ensure resources, staffing and volunteer base keeps pace with county growth		

Source: Hood River County NHMP Steering Committee

# 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. The figure below illustrates some of these sources. A description of how the plan's mitigation actions were developed is provided below.

**Figure 3.1 Action Item Sources**



Source: Partnership for Disaster Resilience, 2006

## 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 below. These action item worksheets are located in Appendix A.

### **RATIONALE OR KEY ISSUES ADDRESSED**

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for

proposed action items is based on the information documented in Section 2 and the Hazard Annexes.

### **IDEAS FOR IMPLEMENTATION**

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure.

### **IMPLEMENTATION THROUGH EXISTING PROGRAMS**

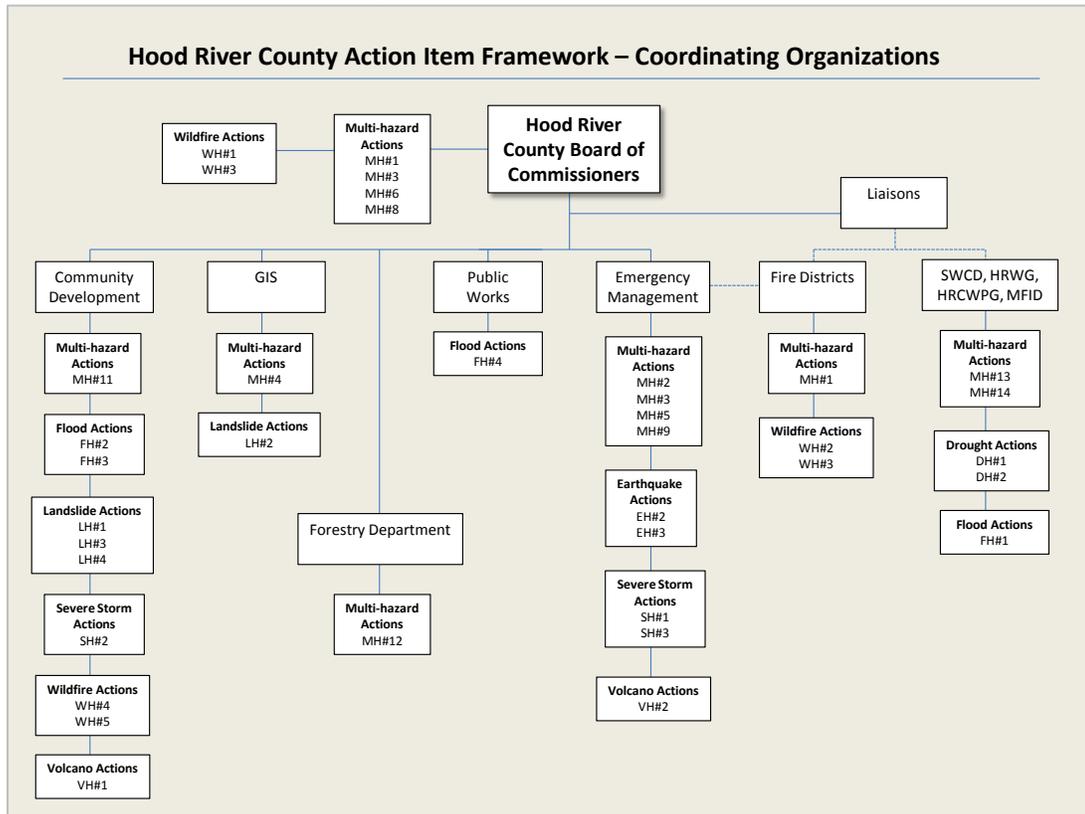
The Hood River County Natural Hazard Mitigation Plan includes a range of action items that, when implemented, will reduce loss from hazard events in the county. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Hood River County currently addresses statewide planning goals and legislative requirements through its comprehensive plan, county zoning ordinances and building codes. To the extent possible, Hood River County will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Hood River County Natural Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the county's existing plans and policies. Where possible, Hood River County will implement the Natural Hazard Mitigation Plan's recommended actions through existing plans and policies. Plans and policies already in existence often have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.<sup>1</sup> Implementing the Natural Hazard Mitigation Plan's action items through such plans and policies increases their likelihood of being supported and implemented.

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<sup>1</sup> Burby, Raymond J., ed. 1998. Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.

**Figure 3.2 Hood River County Action Item Framework**



Source: Hood River County

**COORDINATING ORGANIZATION:**

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

**INTERNAL AND EXTERNAL PARTNERS:**

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### **PLAN GOALS ADDRESSED:**

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### **TIMELINE:**

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to two years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

## **Action Item Development:**

The 2006 NHMP Coordinator led the effort to collect and document action item ideas, disperse action worksheets to government agencies and community stakeholders, and ultimately draft action item worksheets to present to the Steering Committee. Action item input was gathered through the NHMP Community Stakeholder Forum, stakeholder interviews, and Steering Committee meetings. The Steering Committee was charged with the selection of draft action items to document in the plan and prioritization (high or low) of action items to help guide implementation.

Selection and prioritization of action items was accomplished during the NHMP Steering Committee Goals and Action Items meeting on 14 July 2006. The method of selection and prioritization was as follows:

(1) First pass review (selection):

Each action item was reviewed individually by the Steering Committee with the question posed: "is this an action item worth pursuing, i.e. will it effectively reduce the county's risk from natural hazards?" The action items were placed in "Yes" or "No" piles accordingly.

(2) Second pass review (prioritization):

Of those action items in the "Yes" pile, each item was reviewed individually by the Steering Committee and given a "High" or "Low" priority rating based on potential impact and feasibility.

(3) Third pass review (detail):

The details of the selected action items were discussed and debated with emphasis on rationale for the action, ideas for implementation, and the coordinating organization.

(4) Highest priority review:

The Steering Committee selected eight action items that were deemed most critical to reducing the impact of future hazard events. Those action items are as follows:

- Identification and Pursuit of Implementation Funding for Mitigation Actions and Creation of Part-time Position to Coordinate Efforts (NHMP & CWPP)
- Pursue Funding to Increase Hazard Knowledge Base & Develop & Maintain Comprehensive Impact Database
- Develop Public Outreach / Educational Programs

- Create County Position for Volunteer Coordination & Planning
- Formation of Regional Hazard Overhead Team
- Create Emergency Communication Systems that are Interoperable
- Establish County-wide Wildfire Protection Group
- Ensure Proper Road Continuity, Numbering and Naming

## **Action Item Review and Update**

The action items were reviewed and revised by the 2011/2012 Hood River County NHMP Steering Committee during the Mitigation Strategy Meeting on 17 May, 2012. Steering Committee Members analyzed each of the action items developed by the previous Steering Committee, and documented the status of completion for each action item over the past five years since the plan's creation. Completed action items were described and removed, or deferred if the nature of the action item made its progress or timeline "ongoing." Action items that had not been completed were either deleted or deferred. Most deferred action items were modified in some way, either in terms of the action itself, partner organizations, or the timeline for completion. The actions taken by the 2011/2012 Hood River County NHMP Steering Committee during their review of the plan's action items, along with justifications for these decisions, can be found in Appendix B: Planning and Public Process.

## **Action Item Matrix**

The action item matrix portrays the overall action plan framework and identifies linkages between the plan goals, partnerships (coordination and partner organizations), and actions. The matrix documents a description of the action, Steering Committee identified priority, the coordinating organization, partner organizations, timeline, and the plan goals addressed.

## Hood River County NHMP Action Item Matrix

Action Item	Priority	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
						Education & Outreach	Disaster Resilient Economy	Protection of Life & Property	Acknowledge Responsibility	Facilitate Partnerships & Coordination	Natural Resource Systems Protection	Emergency Services Enhancement
Multi-Hazard (MH)												
MH#1	Highest	Identification and Pursuit of Implementation Funding for Mitigation Actions and Creation of Part-time Position to Coordinate Efforts (NHMP & CWPP)	Board of Commissioners	County Departments, SWCD, Cities, State Agencies, Non-Government/Quasi-governmental Organizations, Public, CWPP	ST (ongoing)				X	X		X
MH#2	Highest	Develop Public Outreach / Educational Programs	Emergency Management	County Agencies (Planning, SWCD, Building specifically), Cities, State Agencies, Non-Government Quasi-governmental Organizations, Public, Media, Schools, Forest Service	ST (ongoing)	X			X	X		
MH#3	H	Annual Review and Update of the County Community Wildfire Protection Plan, and Natural Hazards Mitigation Plan, Re-Adoption by County Court Every 5-Years; Review and Update of the County Emergency Operations Plan Every 2-Years	Emergency Management, BOC	Planning, BOC, Emergency Management, OEM, OPDR	ST (ongoing)				X	X		
MH#4	Highest	Develop & Maintain Comprehensive Impact Database	GIS	EM, Planning, Public Works, ODOT, BLM, ODF, USFS, Utilities, Telecommunications, DOGAMI	LT (ongoing)				X	X		
MH#5	H	Create Systems to Support Special Needs Populations	Emergency Management	Health Department, Planning, Red Cross, Hospitals, 911, CCFL	ST (ongoing)				X	X		X
MH#6	Highest	Create County Position for Volunteer Coordination & Planning	BOC	Emergency Response, Emergency Management, Cities, ODF, BLM, CERT, Region (neighboring counties)	LT (ongoing)	X			X	X		X
MH#7	Highest	Formation of All Hazard Overhead Team	Fire Districts	BOC, ODF, USFS	LT			X		X		X
MH#8	L	Develop Post-Disaster Short Term Recovery Plan	BOC	Planning, Public Works, County Facilities, Emergency Management, Cities, FEMA, OPDR	LT (ongoing)		X		X	X		
MH#9	L	Develop Small Business Awareness & Continuity Planning Campaign	Hood River Chamber of Commerce	BOC, OPDR	LT (ongoing)	X	X			X		
MH#10	L	Update County Comprehensive Land Use Plan	Planning	BOC, DLCD	LT			X	X			
MH#11	L	Improve County Forest Road Maintenance	HRC Forestry Department	SWCD	LT (ongoing)			X				X
MH#12	L	Extend Streamside Vegetation Protection to All Land Uses	Hood River Watershed Group	SWCD, County Planning, City Planning	LT (ongoing)			X				X
MH#13	L	Identification / Analysis of Irrigation Water Systems & Elimination of Open Irrigation Water with Consideration of Impact on Stormwater	SWCD	Planning, Irrigation Districts, USDA, OSU Extension Service	LT		X					X
Drought Hazard (DH)												
DH#1	H	Support Local Agencies Training on Water Conservation Measures and Drought Management Practices	SWCD	County Agencies, OSU Extension, Fruit Growers, Water Districts	LT (ongoing)	X	X			X	X	
DH#2	L	Ensure Long-range Water Resources Development	Hood River County Water Planning Group	Public Works, GS, BOC, SWCD	LT (ongoing)		X	X		X	X	
Flood Hazard (FH)												
FH#1	H	Mitigate Flood Event Resulting from Naturally Induced Dam Failure	Middle Fork Irrigation District	Public Works, GS, Fire Dept., Army Corps of Engineers, BPA, DEQ, FERCC	ST (ongoing)			X	X			
FH#2	H	Apply for NFP Community Rating System	Planning	BOC, Cities, LCDC, FEMA, OEM	ST	X			X			
FH#3	H	Update FIRM Maps	Planning	GS, Public Works, FEMA, DOGAMI	ST			X				X
FH#4	H	Improve Methods of Barrier Prioritization and Culvert Barrier Remediation for Fish Passage & Flood Mitigation	Public Works	SWCD	LT (ongoing)			X				X
Earthquake Hazard (EH)												
EH#1	H	Rehabilitate Identified Vulnerable Schools, Emergency Facilities, and Public Buildings/Lifelines	County Facilities	Emergency Management, BOC, Planning, GS, Public Works, DOGAMI, OEM, DLCD	LT			X				X
EH#2	H	Improve Knowledge of Earthquake Sources / Improve Earthquake Hazard Zone Maps	Emergency Management	GS, Public Works, DOGAMI, OEM, DLCD	LT (ongoing)				X			
EH#3	H	Educate Those at Risk	Emergency Management	GS, Public Works, DOGAMI, OEM, DLCD, School District	LT (ongoing)	X		X	X			

### Hood River County NHMP Action Item Matrix

Action Item	Priority	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
						Education & Outreach	Disaster Resilient Economy	Protection of Life & Property	Acknowledge Responsibility	Facilitate Partnerships & Coordination	Natural Resource Systems Protection	Emergency Services Enhancement
Landslide Hazard (LH)												
LH#1	H	Improve Understanding of Landslide Risk Inside Hazard Areas	Planning	Emergency Management, DOGAMI, ODF, DLCD, GIS, USGS	LT		X	X	X			X
LH#2	H	Improve Landslide Hazard Area Maps	GIS	Planning, Emergency Management, DOGAMI, ODF, DLCD, USGS	LT (ongoing)				X			
LH#3	H	Provide Education/Awareness for Those at Risk	Planning	GIS, Emergency Management, DOGAMI, ODF, DLCD	LT	X		X				
LH#4	L	Update County Zoning Ordinance Regarding Landslide Hazards	Planning	Planning Commission, OPDR, OEM	LT		X	X	X			
Severe Storm Hazard (SH)												
SH#1	H	Continue Partnership Programs to Reduce Vulnerability of Public Infrastructure from Severe Winter Storms	Emergency Management	Planning, Public Works, Cities, Utilities, ODOT, OSP	LT (ongoing)		X	X		X		
SH#2	H	Support/Encourage Electrical Utilities to Use Underground Construction Methods	Planning	Emergency Management, GIS, Cities, Utilities, Building Contractors, Real Estate	ST (ongoing)		X					
SH#3	H	Increase and Maintain Public Awareness of Severe Storms	Emergency Management	Planning, Public Works, Utilities, Cities, American Red Cross, Churches, Fire, FEMA	LT (ongoing)	X	X					
SH#4	H	Reduce Trees in Public Utility Right-of-Ways - Avoiding Damage to Power Lines	Public Works	Planning, Emergency Management, Utility Companies	LT (ongoing)		X	X	X	X		
Wildfire Hazard (WH)												
WH#1	Highest	Establish County-wide Wildfire Protection Group	BOC	County Agencies, Fire Districts, Ports, SWCD, Cities, ODF, USFS	ST				X	X		X
WH#2	H	Improve Residential Fire Protection Capacity	Fire Districts	GIS, Public Works, ODOT, USFS, ODF, General Public, Property Owners	ST (ongoing)			X		X		X
WH#3	H	Hazard Fuel Reduction	Fire Districts / BOC	Public Works, Maintenance, SWCD, Railroads, ODOT, USFS, ODF, Property Owners	ST (ongoing)			X			X	X
WH#4	Highest	Ensure Proper Road Continuity, Numbering and Naming	Planning	Fire Districts, BOC, Public Works	ST (ongoing)			X				X
WH#5	H	Update County Zoning Ordinance to Implement the WUI	Planning	Fire Districts, BOC, ODF, USFS, OPDR	ST		X	X	X			
WH#6	H	Perform Routine Forest Management on Zones of Contribution for County-wide Potable Water Systems	Hood River Wildfire Protection Group, CWPP Manager	Planning, Potable Water Districts, Land Owners, Cities, SWCD	LT (ongoing)		X	X	X		X	
Volcano Hazard (VH)												
VH#1	L	Improve the Public's Knowledge Base of Volcanic Risk and Vulnerability	Planning	GIS, DOGAMI, OEM, USGS	LT				X			
VH#2	L	Evaluate Emergency Response Plan and Identify Areas of Public Notification and Evacuation Routes	Emergency Management	Emergency Response, Cities, ODF, BLM, Warm Springs	LT (ongoing)			X	X	X		X

# Section 4: Plan Implementation and Maintenance

This section of the NHMP addresses 44 CFR 201.6(c)(4) – Plan Maintenance. Specifically, the section details the formal process that will ensure that the Hood River County Natural Hazards Mitigation Plan remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan annually, as well as producing an updated plan every five years. Finally, this section describes how the county and participating jurisdictions will integrate public participation throughout the plan maintenance and implementation process.

## Implementing the Plan

After the Plan is locally reviewed and deemed complete, the Hood River County Community Development Department submits it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management submits the plan to the Federal Emergency Management Agency (FEMA-- Region X) for review. This review addresses the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the county will adopt the plan via resolution. At that point the county will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds.

## Co-conveners

The Hood River County Community Development Department and Hood River County Emergency Management shall serve as co-conveners of this plan. The agencies shall split responsibilities with (1) Emergency Management coordinating emergency service related aspects of the plan and its projects; and (2) Community Development Department coordinating documentation, GIS and land use related aspects.

### **EMERGENCY SERVICES CONVENER: HOOD RIVER COUNTY EMERGENCY MANAGEMENT**

The County's Emergency Management system strives to coordinate activities to mitigate, prepare for, respond to and recover from major emergencies or disasters. As the agency responsible for the implementation and maintenance of the mitigation plan, Hood River County Emergency Management shall:

- Serve as a communication conduit between the Steering Committee and key plan stakeholders;

- Identify emergency management-related funding sources for natural hazard mitigation projects;

Contact: Karl Tesch, Emergency Program Manager  
 Hood River County Emergency Management  
 601 State Street  
 Hood River, OR 97031  
 V: (541) 386-1213  
 E: karl.tesch@co.hood-river.or.us

**LAND USE CONVENER: HOOD RIVER COUNTY COMMUNITY DEVELOPMENT**

The agency administers and enforces land use planning regulations for the county. Hood River County Community Development strives to protect life, property, the environment, and economic health of the county by (1) coordinating private development with the provision of public services and infrastructure and (2) determining how and where development occurs in a way that preserves for future generations. As the agency responsible for the implementation and maintenance of the mitigation plan, the Hood River County Community Development Department shall:

- Coordinate Steering Committee meeting dates, times, locations, agendas, and member notification;
- Document outcomes of Committee meetings;
- Incorporate, maintain, and update Hood River County’s natural hazards risk GIS data elements; and
- Utilize the Risk Assessment as a tool for prioritizing proposed natural hazards risk reduction projects.

Contact: Mike Benedict, Director  
 Hood River County Community Development Department  
 601 State Street  
 Hood River, OR 97031  
 V: (541) 387-6840  
 E: plan.dept@co.hood-river.or.us

**Coordinating Body**

The Steering Committee serves as the coordinating body for the mitigation plan. The roles and responsibilities of the coordinating body include:

- Serving as the local evaluation committee for funding programs such as the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds;
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Documenting successes and lessons learned;
- Evaluating and updating the Natural Hazards Mitigation Plan following a disaster;

- Evaluating and updating the Natural Hazards Mitigation Plan in accordance with the prescribed maintenance schedule; and
- Developing and coordinating ad hoc and/or standing subcommittees as needed.

**MEMBERS**

The following organizations were represented and served on the Steering Committee during the development of the Hood River County Natural Hazards Mitigation Plan:

**Table 4.1: Hood River County NHMP Update Steering Committee**

<b>Name</b>	<b>Title</b>	<b>Organization</b>
Mike Benedict	Director	Hood River County Community Development
Dean Guess	Director	Hood River County Public Works
Sandi Lain	Administration Secretary	Hood River County Administration
Marita Haddan	911 Commander	Hood River County 9-1-1
Anne Saxby	District Manager	Hood River County Soil and Water Conservation District
Peter Mackwell	Fire Marshall	City of Hood River
Don Wiley	County Engineer	Hood River County Public Works
Paul Koch	City Administrator	City of Cascade Locks
Karl Tesch	Emergency Program Manager	Hood River County Emergency Management

Source: Hood River County

To make the coordination and review of Hood River County Natural Hazards Mitigation Plan as broad and useful as possible, the coordinating body will engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items. Specific organizations have been identified as either internal or external partners on the individual action item forms found in Appendix A.

**IMPLEMENTATION THROUGH EXISTING PROGRAMS**

The Natural Hazards Mitigation Plan includes a range of action items that, when implemented, will reduce loss from hazard events in the county. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Hood River County currently addresses statewide planning goals and legislative requirements through its comprehensive land use plan, capital improvement plans, mandated standards and building codes. To the extent possible, Hood River County will work to

incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Natural Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the county's existing plans and policies. Where possible, Hood River County should implement the Natural Hazards Mitigation Plan's recommended actions through existing plans and policies. Plans and policies already in existence often have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the Natural Hazards Mitigation Plan's action items through such plans and policies increases their likelihood of being supported and implemented.

Examples of plans, programs or agencies that may be used to implement mitigation activities include:

- Community Wildfire Protection Plan
- Hood River County Budget
- Hood River County Economic Development Action Plan
- Hood River County Comprehensive Land Use Plan
- Soil and Water Conservation District
- Mid-Columbia Council of Governments

For additional examples of plans, programs or agencies that may be used to implement mitigation activities refer to Tables 3.1 and 3.2 in Section 3: Mission, Goals, and Action Items.

## **Plan Maintenance**

Plan maintenance is a critical component of the natural hazard mitigation plan. Proper maintenance of the plan ensures that this plan will maximize the county's efforts to reduce the risks posed by natural hazards. This section was developed by the University of Oregon's Partnership for Disaster Resilience and includes a process to ensure that a regular review and update of the plan occurs. The Steering Committee and local staff are responsible for implementing this process, in addition to maintaining and updating the plan through a series of meetings outlined in the maintenance schedule below.

### **Semi-Annual Meetings**

The Committee will meet on a semi-annual basis to complete the following tasks. During the first meeting the Committee will:

- Review existing action items to determine appropriateness for funding;
- Educate and train new members on the plan and mitigation in general;
- Identify issues that may not have been identified when the plan was developed; and
- Prioritize potential mitigation projects using the methodology described below.

During the second meeting of the year the Committee will:

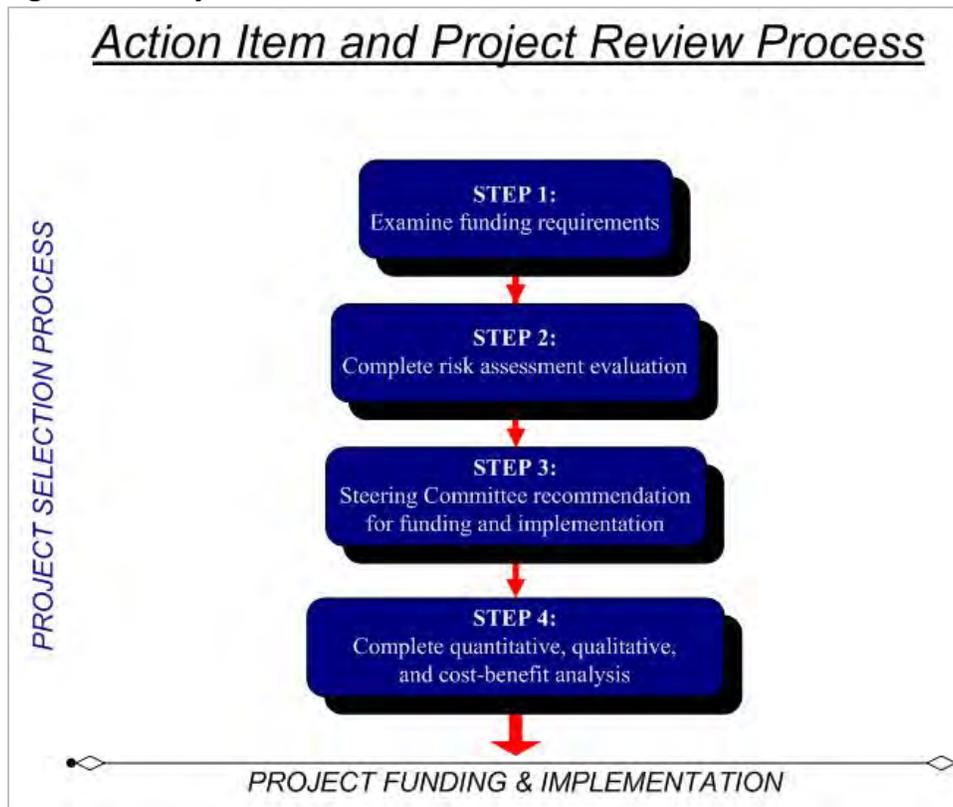
- Review existing and new risk assessment data;
- Discuss methods for continued public involvement; and
- Document successes and lessons learned during the year.

The convener will be responsible for documenting the outcome of the semi-annual meetings in Appendix B. The process the coordinating body will use to prioritize mitigation projects is detailed in the section below. The plan's format allows the county and participating jurisdictions to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a natural hazards mitigation plan that remains current and relevant to the participating jurisdictions.

### **PROJECT PRIORITIZATION PROCESS**

The Disaster Mitigation Act of 2000 requires that jurisdictions identify a process for prioritizing potential actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by committee members, local government staff, other planning documents, or the risk assessment. Figure 4.1 illustrates the project development and prioritization process.

**Figure 4.1: Project Prioritization Process**



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2008.

### **STEP 1: EXAMINE FUNDING REQUIREMENTS**

The first step in prioritizing the plan's action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the county's proposed mitigation projects. Examples of mitigation funding sources include but are not limited to: FEMA's Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds, and private foundations, among others. Please see Appendix F: Grant Programs for a more comprehensive list of potential grant programs.

Because grant programs open and close on differing schedules, the coordinating body will examine upcoming funding streams' requirements to determine which mitigation activities would be eligible. The coordinating body may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organizations about project eligibility requirements. This examination of funding sources and requirements will happen during the coordinating body's semi-annual plan maintenance meetings.

### **STEP 2: COMPLETE RISK ASSESSMENT EVALUATION**

The second step in prioritizing the plan's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The coordinating body will determine whether or not the plan's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas, and whether community assets are at risk. The coordinating body will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future, or are likely to result in severe / catastrophic damages.

### **STEP 3: COMMITTEE RECOMMENDATION**

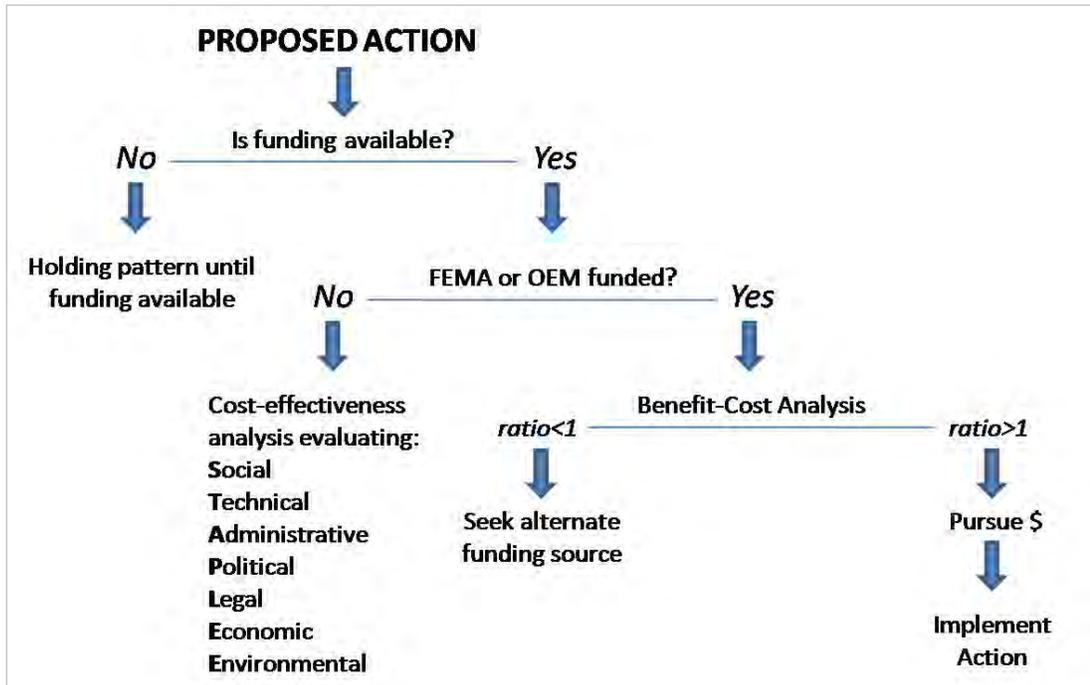
Based on the steps above, the coordinating body will recommend which mitigation activities should be moved forward. If the coordinating body decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The coordinating body will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

### **STEP 4: COMPLETE QUANTITATIVE AND QUALITATIVE ASSESSMENT, AND ECONOMIC ANALYSIS**

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth

undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 4.2 shows decision criteria for selecting the appropriate method of analysis.

**Figure 4.2: Benefit Cost Decision Criteria**



Source: Community Service Center’s Partnership for Disaster Resilience at the University of Oregon, 2010.

If the activity requires federal funding for a structural project, the Committee will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project’s cost effectiveness. The committee will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project’s qualitative cost effectiveness. The STAPLE/E technique has been tailored for use in natural hazard action item prioritization by the Partnership for Disaster Resilience at the University of Oregon’s Community Service Center. See Appendix D for a description of the STAPLE/E evaluation methodology.

## **Continued Public Involvement & Participation**

The participating departments, agencies and organizations are dedicated to involving the public directly in the continual reshaping and updating of the Hood River County Natural Hazards Mitigation Plan. Although members of the Steering Committee represent the public to some extent, the public will also have the opportunity to continue to provide feedback about the Plan.

To ensure continued public engagement and support of this plan, Hood River County shall invite the public to participate in future plan developments in the following ways:

- Post plan on the Hood River County Community Development Department Website for comment
- Post notices that invite public to participate in one of the semi-annual Steering Committee meetings
- Hold community hazard workshops
- Implement various other outreach activities documented in this plan (See Section 3: Mission, Goals, and Action Items)

In addition to the involvement activities listed above, the county's Natural Hazards Mitigation Plan has been archived and posted on the Partnership website via the University of Oregon Libraries' Scholar's Bank Digital Archive.

## **Five-Year Review of Plan**

This plan will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. The Hood River County Natural Hazards Mitigation Plan is due to be updated in the fall of 2017. The convener will be responsible for organizing the coordinating body to address plan update needs. The coordinating body will be responsible for updating any deficiencies found in the plan, and for ultimately meeting the Disaster Mitigation Act of 2000's plan update requirements.

The following 'toolkit' can assist the convener in determining which plan update activities can be discussed during regularly-scheduled plan maintenance meetings, and which activities require additional meeting time and/or the formation of sub-committees.

### Mitigation Plan Update Checklist

Question	Yes	No	Plan Update Action
Is the planning process description still relevant?			Modify this section to include a description of the plan update process. Document how the planning team reviewed and analyzed each section of the plan, and whether each section was revised as part of the update process. (This toolkit will help you do that).
Do you have a public involvement strategy for the plan update process?			Decide how the public will be involved in the plan update process. Allow the public an opportunity to comment on the plan process and prior to plan approval.
Have public involvement activities taken place since the plan was adopted?			Document activities in the "planning process" section of the plan update
Are there new hazards that should be addressed?			Add new hazards to the risk assessment section
Have there been hazard events in the community since the plan was adopted?			Document hazard history in the risk assessment section
Have new studies or previous events identified changes in any hazard's location or extent?			Document changes in location and extent in the risk assessment section
Has vulnerability to any hazard changed?			
<i>Have development patterns changed? Is there more development in hazard prone areas?</i>			
<i>Do future annexations include hazard prone areas?</i>			Document changes in vulnerability in the risk assessment section
<i>Are there new high risk populations?</i>			
<i>Are there completed mitigation actions that have decreased overall vulnerability?</i>			
Did the plan document and/or address National Flood Insurance Program repetitive flood loss properties?			Document any changes to flood loss property status

**OVER** →

<b>Mitigation Plan Update Checklist</b>			
<i>Question</i>	<i>Yes</i>	<i>No</i>	<i>Plan Update Action</i>
Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?			1) Update existing data in risk assessment section or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Did the plan identify data limitations?			If yes, the plan update must address them: either state how deficiencies were overcome or why they couldn't be addressed
Did the plan identify potential dollar losses for vulnerable structures?			1) Update existing data in risk assessment section or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Are the plan goals still relevant?			Document any updates in the plan goal section
What is the status of each mitigation action?			Document whether each action is completed or pending. For those that remain pending explain why. For completed actions, provide a 'success' story.
Are there new actions that should be added?			Add new actions to the plan. Make sure that the mitigation plan includes actions that reduce the effects of hazards on both new and existing buildings.
Is there an action dealing with continued compliance with the National Flood Insurance Program?			If not, add this action to meet minimum NFIP planning requirements
Are changes to the action item prioritization, implementation, and/or administration processes needed?			Document these changes in the plan implementation and maintenance section
Do you need to make any changes to the plan maintenance schedule?			Document these changes in the plan implementation and maintenance section
Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?			If the community has not made progress on process of implementing mitigation into existing mechanisms, further refine the process and document in the plan.