Hood River County

Natural Hazards Mitigation Plan

Final Report for:
Hood River County Emergency Management

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August 2006

ONHW Oregon Natural Hazards Workgroup

PARTNERS for DISASTER RESISTANCE RESILIENCE

RARE Resource Assistance for Rural Environments

Special Thanks &

Acknowledgements

This Natural Hazard Mitigation Plan was developed through a regional partnership funded by the Federal Emergency Management Agency's Pre-Disaster Mitigation Grant Program. The Mid-Columbia Gorge Region grant was awarded to support the development of natural hazard mitigation plans for the region. The region utilized a seven-step planning process, plan framework, and plan development support provided by the Oregon Natural Hazards Workgroup at the University of Oregon.

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Hood River County Natural Hazards Mitigation Plan

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Executive Summary

What is the Mitigation Plan?

Hood River County's Natural Hazards Mitigation Plan is an effort to reduce future loss of life and property resulting from natural disasters. The plan includes resources and information that will assist County agencies, residents, public and private sector organizations, and other people interested in participating in hazard mitigation. (Natural hazard mitigation involves permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies). The plan contains:

- 8 Goals to direct the County vision for a disaster resilient community
- 50 Recommended actions for mitigation activities
- A summarized county hazard risk assessment with detailed annex
- Plan implementation and maintenance procedures
- Documentation of County, regional, State, and Federal resources

This plan focuses on the primary natural hazards that could affect Hood River County, Oregon, which include: drought, earthquake, flood, landslide, volcano, wildfire, and severe storm (windstorm and winter-storm). *Section I: Introduction* provides an in-depth overview of the plan, its purpose, how it's organized, and how it was developed.

What is the Plan's Mission?

The Hood River County Natural Hazard Mitigation Plan mission 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."

The mission was formulated by the Steering Committee during the committee meeting focused on vision, mission, goals & action items.

Who Participated in Developing the Plan?

The mitigation plan is the result of a collaborative planning effort between Hood River County citizens, public agencies, non-profit organizations, the private sector, and state and regional organizations. The project steering committee was composed of individuals representing the following agencies:

- American Red Cross
- City of Hood River
- City of Cascade Locks
- Hood River County Emergency Management
- Hood River County Planning & Building
- Hood River County Public Works

- Hood River County Sheriff's Department
- Hood River County Soil & Water Conservation District
- West Side Fire District

The Community Service Center (CSC) at the University of Oregon played a crucial role the plan's development. The CSC's Oregon Natural Hazard Workgroup (ONHW) served as project advisor for mitigation plan development in the Mid-Columbia Region, while the Resource Assistance for Rural Environments (RARE) program provided staffing for Hood River County's project coordinator.

What are 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. Hood River County's goals include:

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

The goals were formulated by the Steering Committee during the committee meeting focused on vision, mission, goals & action items. For more information on plan goals, please see *Section IV: Mission, Goals & Action Items.*

What are 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. 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

For more information on plan action items, please see *Section IV: Mission, Goals & Action Items.*

Section I:
Introduction

This section answers a number of basic questions regarding the purpose of the Hood River Natural Hazards Mitigation Plan: why the plan was developed, how the plan was developed, and how the plan is organized.

What is Hazard Mitigation?

Natural hazard mitigation involves permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Mitigation is an inclusive effort on behalf of federal, state and local governments; individuals, private businesses, industries and community organizations.

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 developed this Natural Hazards Mitigation Plan in an effort to reduce future loss of life and property resulting from natural disasters. A natural disaster occurs when a natural hazard impacts people or property and creates adverse conditions within a community.

This plan focuses on the primary natural hazards that could affect Hood River County, Oregon, which include: drought, earthquake, flood, landslide, volcano, wildfire, and severe storm (windstorm and winter-storm).

The Natural Hazards Mitigation Plan is intended to assist Hood River County in reducing its risk from natural hazards by identifying resources, information, and strategies for risk reduction.

The plan is non-regulatory in nature, meaning that it does not set forth any new policy. It does, however, provide:

- a foundation for coordination and collaboration among agencies and the public in the County;
- identification and prioritization of future mitigation activities; and
- assistance in meeting federal planning requirements and qualifying for assistance programs.

The mitigation plan aims to complement existing plans and procedures rather than create an entirely new framework. To ensure that the plan is incorporated smoothly

into County processes, the NHMP Steering Committee shall reconvene quarterly to work on its implementation.

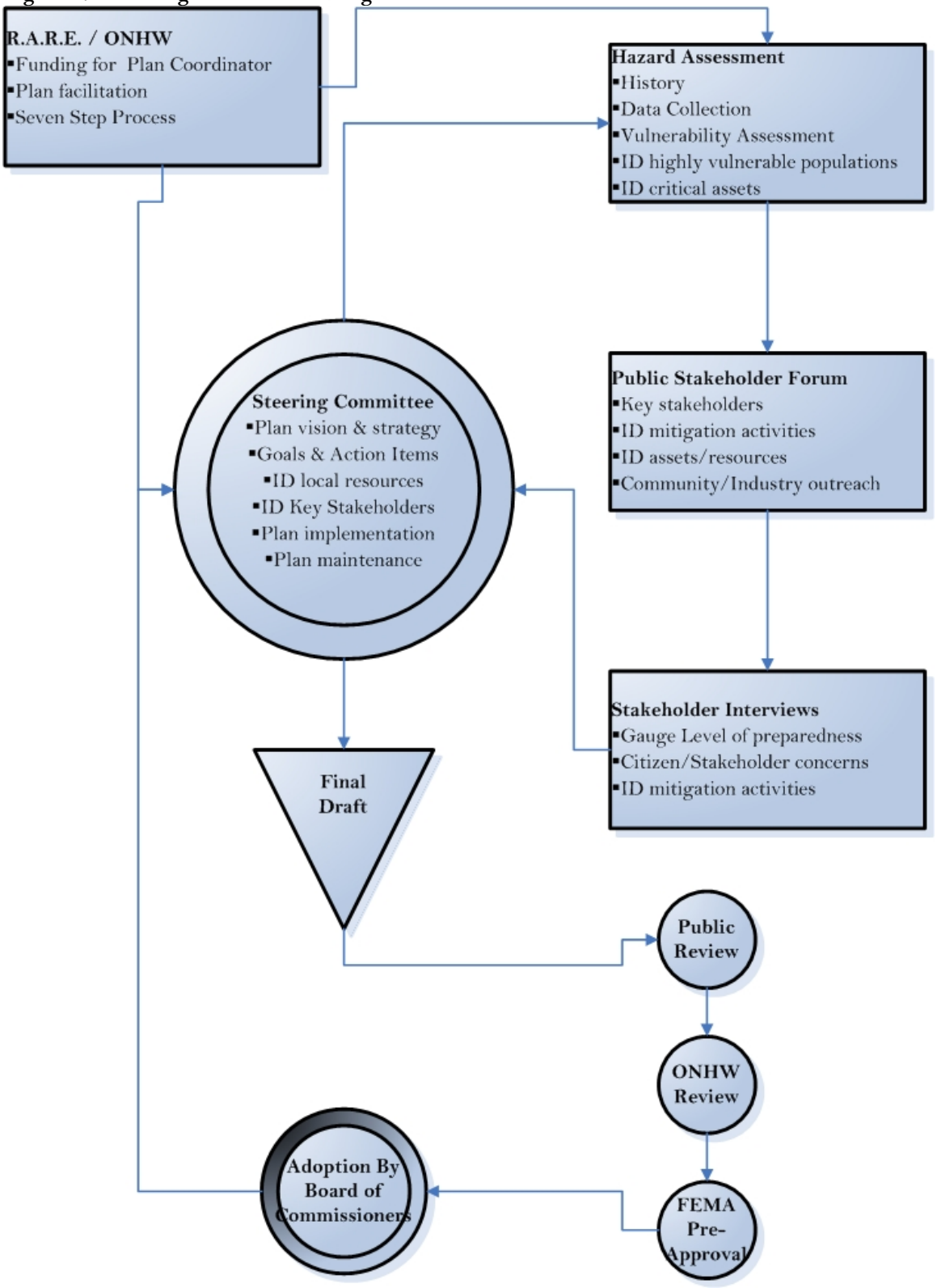
Who Will Benefit From This Mitigation Plan?

All unincorporated areas within the County, including all rural unincorporated communities, and special districts have an opportunity to benefit from The Natural Hazard Mitigation Plan. The City of Hood River and The City of Cascade Locks, participants in the county planning process, also benefits from the Plan in meeting DMA2K requirements for multi-jurisdictional participation in development of is own mitigation plan.

How was the Plan Developed?

The planning process used to create Hood River County's Natural Hazards Mitigation Plan was developed using a planning process created by the Community Service Center's Oregon Natural Hazard Workgroup (ONHW) at the University of Oregon.[i] Human resources were staffed by the RARE program of the Community Service Center at the University of Oregon. The RARE participant served a placement as full-time project coordinator for the county natural hazards mitigation plan. The planning process was designed to: (1) result in a plan that is DMA 2000 compliant; (2) coordinate with the State's plan and activities of the Partners for Disaster Resistance & Resilience; and (3) build a network of jurisdictions and organizations that can play an active role in plan implementation. The following is a summary of major activities included in the ONHW Seven Step planning process. Main components of the planning process are diagramed in *Figure 1.1* below:

Figure 1.1 Planning Process Flow Diagram



ONHW Seven Step Process

This plan was developed using a Seven Step Process under the direction on the Oregon Natural Hazards Workgroup (ONHW) in partnership with Resource Assistance for Rural Environments (RARE), the Department of Geology and Mineral Industries (DOGAMI), and the Mid-Columbia Gorge Region (Gilliam, Hood River, Morrow, Sherman, Umatilla, Hood River, and Wheeler) counties. Funding for the project was made possible through a FEMA awarded Mid-Columbia Gorge Region grant in support of hazard mitigation plan development.
The ONHW Seven Step Process outlined below:

- **Step 1: Organizing to Prepare the Plan:**
  Coordination for this project was provided by University of Oregon RARE participant under the supervision of Hood River County Planning & Development. Training, materials, and mitigation plan templates provided by the Oregon Natural Hazards Workgroup. A steering committee was formed to guide the NHMP Coordinator through the process of developing the plan.

- **Step 2: Involving the Community**
  This step consisted of community forums, interviews, and surveys intended to involve the public in the plan development process.

  The NHMP Coordinator conducted a NHMP Community Stakeholder Participant Forum to raise awareness about natural hazard events and solicit input from community. Invitations were sent out to key stakeholders and the community at large. Additionally, one-on-one stakeholder interviews were conducted to gain retrieve local community knowledge of hazard events and how to best address the community's risk.

  As part of the regional PDM grant, ONHW implemented a region wide household preparedness survey. The survey gauged household knowledge of mitigation tools and techniques and assessed household disaster preparedness. The survey results improve public/private coordination of mitigation and preparedness for natural hazards by obtaining more accurate information on household understanding and needs. The results of the survey are documented in the plan's *Appendix C: Regional Household Survey.*

  ONHW, with commitment from the Institute for Business and Home Safety (IBHS) provided individuals in the Region with access to, and use of, the IBHS interactive, web-based *Open for Business* property protection and disaster recovery planning tool. The purpose of the planning tool is to: 1. create understanding of the importance of disaster planning; 2. teach local businesses how to navigate the interactive, web-based *Open for Business* property protection and disaster recovery planning tool; 3. Assist small businesses develop their own plans during the training; and 4. teach businesses how to communicate the importance of developing and utilizing plans for property protection and recovery from business interruption. A summary of the outcomes is available in *Appendix A: Public Process.*

For more information on community involvement, please refer to *Appendix A: Public Process.*

- **Step 3: Describing the Community**

The County developed a community profile in an effort to gain a better understanding of the community assets that might be at risk from natural hazards. The Community Profile section of this plan was created using information from the OR State Profile, County Comprehensive Land Use Plan, Economic Development Plan, and US Census.

- **Step 4: Identifying and Characterizing the Hazards Impacting the Community**
  Risk assessment performed by project coordinator, Steering Committee, and the Department of Geology and Mineral Industries (DOGAMI) with comparative data provided by local sources, Technical Resource Guide, and Oregon's NHMP Risk Assessment and Regional Profile.

- **Step 5: Developing Plan Goals**
  Community input during stakeholder interviews was a critical aspect of goal development. Mitigation plan goals and goal statements were drafted by NHMP Coordinator using assistance from ONHW. Draft goals were brought before the Hood River County Steering Committee for review and approval. Goals were revised with Steering Committee input before adoption by committee

- **Step 6: Developing Solutions**
  Action Items were identified by Steering Committee in conjunction with stakeholder interviews and participant feedback from Stakeholder Forum.

- **Step 7: Setting the Plan in Motion**
  Hood River County Planning & Development shall serve as convener of this plan. The NHMP Steering Committee which guided the development of this plan shall also serve as the coordinating body to ensure implementation the mitigation plan.

Steering Committee

The Hood River County Steering Committee was comprised of individuals best suited to guide the county through the planning process and ensure that the mitigation plan is fully implemented once adopted.

Its mission is to ensure proper development and implementation of the county natural hazards mitigation plan by:

- setting goals;
- establishing sub committee work groups to address specific needs;
- ensuring public, private and federal participation;
- distributing and presenting the plan;
- facilitating public discussion/involvement;
- developing implementation activities; and
- coordinating plan maintenance and implementation strategies.

The Hood River County Steering Committee is comprised of representatives from nine County area organizations:

Table 1.1 Steering Committee Members

Name	Title	Organization
Anne Debbaut	Planner	Hood River County Planning
Jennifer Donnely	Planner	City of Hood River Planning Department
Peter Mackwell	Assistant Chief	West Side Fire District
Jeff Pricher	Fire Marshall	City of Cascade Locks
Anne Saxby	Director	Soil & Water Conservation District
Hannah Settje	District Manager	Red Cross
Jade Soddell	Emergency Manager	Hood River County Emergency Management
Joe Wampler	Sheriff	Hood River County Sheriff's Department
Don Wiley	Engineer	Hood River County Public Works

Four Steering Committee sessions were held over the course of the 2006 calendar year:

1) Introduction & Overview: 18 January 2006
2) Hazard Risk Assessment: 3 March 2006
3) Goals & Action Items: 14 July 2006

Through raising awareness and citizen involvement, the Committee's end goal is to make hazard mitigation a part of the community's routine decision-making process.

How is the Plan Organized?

Each section 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 together to create a mitigation plan that furthers the community's mission *"…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.* This plan structure enables stakeholders to use the section(s) of interest to them.

Section 1: Introduction

The Introduction briefly describes the County's mitigation planning efforts and the methodology used to develop the plan. It also includes information about the steering committee's role, and how stakeholders provided input.

Section 2: Community Profile

The Community Profile briefly describes the County in terms of demographic, economic, and development trends as well as geography and environment, housing and transportation. The Community Profile also documents existing plans, policies, and programs, as well as completed mitigation activities.

Section 3: Risk Assessment Summary

This section describes the risk assessment process and summarizes the best available local hazard data. It is organized according to the federal requirements for a risk assessment: hazard identification; profiling hazard events; and vulnerability assessment/inventorying assets.

Section 4: Mitigation Plan Goals and Action Items

This describes the plan components which guide implementation of the identified mitigation strategies. This section also documents the plan vision, mission, goals, objectives, and actions.

Section 5: Plan 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 annual and 5-Year review meetings.

Hazard Specific Annexes

The purpose of the hazard specific annexes is to provide additional resources and documentation of the hazard. The hazard annex consists of the regional risk assessments from the State Natural Hazard Mitigation Plan as well as the hazard chapters from the Technical Resource Guide. The State regional risk assessments include information on hazard characteristics, hazard history, probability, and vulnerability. The Technical Resource Guide chapters provide hazard specific information on a statewide basis for the following topics: hazard history, hazard type and characteristics, hazard identification, hazard related legal issues, mitigation examples and best practices, and resources. Where extensive local data is available beyond the scope of information provided in Section 3, the additional local data is located in the annex. The hazard specific annexes included with this plan are the following:

- Earthquake;
- Flood;
- Landslide/Debris Flow;
- Volcanic Event;
- Wildfire;
- Drought;
- and Severe Storm (Windstorm and Winter Storm).

In addition to the State Risk Assessment and Technical Resource Guide information, the Earthquake Annex also includes a seismic risk assessment report provided by DOGAMI.

Resource Appendices

The resource appendices are designed to provide 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.

A: Public Process

This appendix outlines the public involvement process in great detail. It serves (1) to document how the public was involved in the development of this plan, and (2) as a starting point for future public outreach methods.

B: Resource Directory

This appendix provides a one-stop listing for hazard related resources to assist the County in planning and preparation for hazard events.

C: Regional Household Preparedness Survey

This appendix includes the survey instrument and results from the household preparedness survey implemented by ONHW throughout the region. 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.

D: Economic Analysis of Natural Hazard 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.

E: Existing Plans & Programs

This appendix summarizes the existing plans, policies and programs in Hood River County. The first section covers plans and policies on the books for the County and the second section covers social service providers.

F: Mitigation Tools

This appendix summarizes the mitigation tools provided by the Oregon Natural Hazards Workgroup (ONHW) website:
http://www.oregonshowcase.org/index.cfm?mode=resources

G: List of Acronyms

This appendix provides a list of acronyms for county, regional, state and federal agencies and organization that may be referred to within the Hood River County Natural Hazards Mitigation Plan.

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[i] More information on the Oregon Natural Hazards Workgroup can be found at http://darkwing.uoregon.edu/~onhw

Section II:
Community Profile

This section provides information on the characteristics of Hood River County in terms of demographic, economic, and development trends as well as geography and environment, housing and transportation. Many of these community characteristics can affect how natural hazards impact communities, and can affect how communities choose to plan for natural hazard mitigation. Considering these characteristics during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Why Plan for Hazards in Hood River County?

Natural hazards cut across all aspects of the community: citizens and their property, business and the economy, recreational resources and the natural environment. Current trends indicate a continued influx of people, business and tourists into Hood River County. This continued influx of people and business places further strain on an already over-burdened emergency services operation. In order to appropriately combat the risk that natural disasters pose, it is most pertinent to plan in advance and reduce risk through mitigation efforts.

By identifying and assessing hazard risk and county vulnerability, relevant mitigation strategies can be developed to reduce the impact of natural disasters. This effort requires fine tuned coordination amongst residents, businesses, non-profit agencies, and federal, state and local governments. A successful mitigation plan is one that pools resources from these parties in developing mitigation strategies and actions that reduce risk while also guarantying continued public awareness and involvement.

Geography & Environment[i]

Hood River County, located in the north central part of Oregon, has a land area of 529 square miles. Its dimensions are a length of 32 miles from north to south, and a width varying from 23 miles, in the north, to 10.5 miles in the extreme south. It is the second smallest county in Oregon in terms of geographic area, contains approximately 138± square miles of private lands.

Hood River County is a relatively compact physiographic unit. Most of the county is within the drainage basin of the Hood River. The Hood River system rises on the slopes of Mt. Hood and flows north to join the Columbia River at the City of Hood River, a river distance of 39 miles and a fall of 7,500 feet from source to mouth. The Hood River Valley, occupying the bottom of the Hood River drainage basin, is 20 miles long and four to eight miles wide. Local relief separates the valley into two distinct units known as the Lower and Upper Valleys.

The Lower Valley, the larger unit, extends about six miles southward from the Columbia River to Middle Mountain, a traverse ridge about 2,000 feet in elevation. A low ridge enclosed a small bench of a few thousand acres on the north flank of Middle Mountain known locally as Middle Valley. The Upper Valley, located south of Middle Mountain, is approximately seven miles long and four miles wide and rises southward in elevation from 1,500 to 3,000 feet.

The surface of the entire Valley was modified by glacial action. A till sheet of varying thickness was laid down over the floor and subsequently reworked by glacial melt waters and forerunners of the present rivers. The soil pattern is directly related to the nature of the local till and the action of water. Variations range from silt loam laid down in the quiet waters of a lake in the bottom lands of the Lower valley, to loams derived from weathering of glacial outwash materials and gravelly sandy loams derived from stream deposits. In portions of the Upper Valley, soils deriving from recent volcanic ash deposits cover many outwash terraces.

Climate

The Hood River Valley lies in a transition zone between the marine-influenced climate west of the Cascade Mountains and the dry-continental climate of the intermountain region. Local topography and elevation play significant roles in explaining the marked differences in average temperature and precipitation between the Lower and Upper Valleys. The City of Hood River is located within the Columbia River Gorge at an elevation of 500 feet above sea level. The Columbia Gorge is a near sea-level water gap through which marine, often relatively warm air normally flows from the west. The City of Hood River has an average temperature of 36 degrees Fahrenheit for the months December through February, and an average temperature of 64 degrees Fahrenheit for June through August. It has an average growing season of 183 days, and an average precipitation of 30 inches per year. Most of the precipitation falling occurs in the five cool season months of November through March. Snow occasionally falls in the winter, but rarely remains on the ground for more than a few days.

Rivers[ii]

One quarter of Hood River County's tributaries to the Columbia flow almost exclusively through Federal lands managed by the United States Forest Service. The Hood River drains 339 square miles (217,340 acres) of Hood River County and consists of three main forks (West, Middle, and East) that converge into the mainstem Hood River near River Mile 12.0. The drainage contains approximately 400 miles of perennial stream channel of which an estimated 100 miles is accessible to anadromous fish.

Five tributaries of the three forks are fed by glacial sources that drain approximately one third of the total glacial ice on Mt. Hood. During high flows, large amounts of bedload and sediment are transported in these tributaries and in the mainstem. Glacial melt increases water turbidity in the form of suspended silt and glacial flour during summer and early fall. Glacial sediment is more prevalent in the Middle and East Forks and Hood River mainstem, while glacial sediment in the West Fork is contributed by a single small tributary, Ladd Creek. Natural disturbances that contribute significant

amounts of sediment to stream channels include landslides and debris torrents that originate on glacial moraines and steep slopes of Mt Hood.

Typical of many Cascade mountain streams, the hydrology of Hood River County is characterized by highly variable streamflow and rapid storm runoff. The mean annual flow in the Hood River is 1,079 cfs at Tucker Bridge (River Mile 6.1). The record flood is reported as 33,000 cfs (December 1964), while the minimum 7-day average was 155 cfs (September 1994). Mean monthly flows range from 392 cfs in September to a high of 1,747 cfs in January.

Snowmelt generally begins during April. Many tributaries have very low summer flows, while tributaries with glacial sources maintain higher flows. Natural disturbances occurring in the Management Area include floods, fires, mudflows, landslides, and insect and botanical disease epidemics. Rain-on-snow floods are common disturbance events. Periodically, natural dams created by terminal moraines at receding glaciers on Mt. Hood break and cause floods and debris flows; many of these events are triggered by intense rainstorms. Landslides are common but not frequent events.

Defining Geologic Features

The majestic snow capped Mt. Hood in the southwest portion of the County, and the Columbia River Gorge to the north, provide the stunning backdrop that has made Hood River one of the most unique and beautiful places in the Northwest, and a destination for tourists and recreation enthusiasts alike.

Population & Demographics

Population growth is a minor factor in a community's vulnerability to disaster. This is because higher growth rates increase the probability of a technological or manmade disaster and because this adds to other factors that contribute to vulnerability such as development patterns, economic development characteristics, and so on. Most importantly, a rapid growth rate may stress a local government's ability to plan, regulate, and serve the new population.

Hood River County is growing at a rate consistent with the state average. Since 1990, Hood River County has been growing an average of 2.08% a year. This is just above the state average of 2.04% a year. The County continues to rely on farm and fruit production, and has a population density of 39.1 persons per square mile.
Source: Hood River County HIVA

Incorporated Cities
Hood River, (2005 population estimate, 6,176)
Cascade Locks, (2005 population estimate, 1,130)
(unincorporated 2005 population estimate 13,105)

Demographics

Population 2000:	20,411
Population change 1990 – 2000:	20.8%

Population 2005 (estimate by Claritas) 20,831

Vulnerable Populations[iii]

A characteristic of disasters is that they exceed the ability of emergency response agencies to provide assistance promptly. In a major disaster, the public may be on their own for at least three days. Individuals may need to go for several days without utilities and 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 the 2000 census estimates, approximately 24.7% of the Hood River County population over the age of 5 speak a language other than English at home.

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

Elderly

According to 2000 census figures, persons 65 and older made up 12.9% of the total Hood River County population. Nationwide, as the baby boomer generation enters their 60's the senior population is expected to dramatically increase.

Transient Population

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

- *Tourists/Travelers*

Tourists are particularly vulnerable to disasters. This is because tourists 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 tourist, unfamiliar with Hood River County, may have difficulty using evacuation routes, or finding shelters. A light traveling tourist 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, tourists usually do not have a local support structure of family, friends, and neighbors that most of us rely on.
Due to its proximity to the Columbia River, and Mt. Hood, Hood River County is considered a major Northwest tourist destination.

- *Physically Disabled*

According to 2000 census estimates 15.38% of the population has a mobility limitation. These disabilities may or may not be permanent.

- *Developmentally Disabled*

According to national prevalence formulas approximately 1% of the Hood River County Population or 204 residents (2000) 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. Others may not have such a high level of support. Some individuals may be largely self-reliant. Some may have additional disabilities in additional to there developmental disabilities. 10% of the developmentally disabled population is wheelchair bound and approximately 2% of the county population or 408 residents (2000) 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. We have 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 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 tend to have the greatest difficulty recovering from a

disaster. According to 1999 estimates approximately 14.2% of the total population and 9.8% of all families have income below the national poverty level.

Table 1.1 Poverty Rates

% of Total Population	Children under 18	Senior over 65
14%	17%	8%

Land and Development

Hood River County, located in the north central part of Oregon, has a land area of 529 square miles. Its dimensions are a length of 32 miles from north to south, and a width varying from 23 miles, in the north, to 10.5 miles in the extreme south. It is the second smallest county in Oregon in terms of geographic area, contains approximately 138± square miles of private lands.

- Total lands: 338,560 acres/529 square miles
- Public ownership: 250,240 acres/391 square miles (74%)
- Private ownership: 88,320 acres/138 square miles (26%)

Housing and Community Development

Housing development types and year-built dates are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1960s in the Northwest and California use earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that required homes in the floodplain to be elevated to one foot above Base Flood Elevation. Housing characteristics for Hood River County are provided in the tables below.

- Households 2000 7,248
- Household change 1990 -2000 13%
- Households 2005 (estimate by Claritas) 7,310

Development and platting of the original town of Hood River occurred on the west side of the mouth of Hood River. From there it grew in a fan-like shape, expanding westward to 18th Street and southward to May Street. From 1930 to 1950, most of the City's growth occurred south of May Street. From 1950 to present, the main growth has been west of 18th Street and south of Belmont Road in recently annexed areas of the town.

Table 1.2 County Housing Development

Single-Family	Multi-Family	Mobile Homes	Boat, RV, Van, etc.
69%	17%	14%	0%

Table 1.3 Hosing-Year Built

Pre-1939-1959	1960-1979	1980-2000
40%	29%	31%

Oregon Measure 37

The passing of Oregon Measure 37 by initiative petition in November 2004 has the potential to drastically change the land use and development patterns of the County. The measure compels governments to pay owners, or forgo enforcement, when certain land use restrictions reduce property values. The measure states in summary[iv]:

"Currently, Oregon Constitution requires government(s) to pay owner "just compensation" when condemning private property or taking it by other action, including laws precluding all substantial beneficial or economically viable use. Measure enacts statute requiring that when state, city, county, metropolitan service district enacts or enforces land use regulation that restricts use of private real property or interest thereon, government must pay owner reduction in fair market value of affected property interest, or forgo enforcement. Governments may repeal, change, or not apply restrictions in lieu of payment; if compensation not timely paid, owner not subject to restrictions. Applies to restrictions enacted after "family member" (defined) acquired property. Creates civil right of action including attorney fees. Provides no new revenue source for payments. Certain exceptions. Other provisions."

The most likely impact of Measure 37 on the County would be a rapid increase in growth and development as certain precluded lands, such as orchards, become available for residential, commercial, or industrial development.

Employment and Industry

The economy of Hood River County is primarily based on agriculture, forestry, and recreation.

Orchard crops constitute the major share of the agricultural sector. Because of the winter precipitation climatic pattern, irrigation is necessary for the optimum maturation of tree fruits. Fortunately, ample water is available from the melting of the snow fields and glaciers of the surrounding mountains.

: The present economy of the Central Valley area is centered around agriculture and forestry. Fruit and orchards, fruit packing, cold storage and three wood products mills are the area's largest employers. The Central Valley is not an island, rather it is interrelated with the economy of the City of Hood River and other areas. Many people living in the Central Valley commute to jobs outside of the area. Also many people commute into the Central Valley for work.

It is important to keep in mind that economic well-being is not the only component to the quality of life. Such considerations as energy conservation, clean air and water, adequate opportunities for recreation and personal development (e.g., education and cultural activities) are among the many important indicators of the overall quality of life. The community should, therefore, refrain from considering economic goals to the exclusion of other considerations.

Local agriculture and forestry industries are quite stable, and do not expect great future expansion. They are characterized by seasonal employment fluctuations which cause the County to have a high unemployment rate. The background information on the agricultural and forestry goal has more detailed information on these two items.
At this time, there are no commercial or industrial land uses in the Columbia Gorge area. The scenic and recreational attributes of the Gorge attract many tourists and recreationalists to the area. Though these visitors do not spend money inside the commercial establishments, other portions of the County benefit from their trade. The unspoiled scenic beauty is the Columbia Gorge's drawing card. Jeopardizing this quality for short- term profit may likely have negative effects on the long-term economy of the area and its adjacent commercial centers.
Source: Hood River County Comprehensive Land Use Plan

Conditions and Trends[v]

Some orchards have turned their real estate into housing subdivisions, others have sought alternative markets. The local steel boat manufacturing firm is no longer building boats, timber sales could no longer support the two Hanel Mills and the Dee Hardboard burned to the ground. Hood River County is listed as a "Distressed" County by the Oregon Economic & Community Development Department. Both State and Federal agencies recognized the downturn in the lumber industry and provided for the displaced timber workers by offering assistance for training in other fields. Average unemployment rates over the last eight years peaked at 10.8% with the summer of 2003 reaching a maximum of 13.3%.[vi]

- As of 1998, the population of Hood River County (HRC) was 19,500, an increase of 15% since 1990. During the 1990s Hood River County's growth rate was comparable to the state average. The HRC population is forecast to grow an additional 11% to 17% by the year 2010.
- Data provided in the 1998 *Analysis of Hood River County Economic Growth Potentials* indicate the county's labor force participation rate (defined as the proportion of the population 16 and older which are in the labor force) increased from 70% to 75% between 1986 and 1997. HRC's labor force participation rate also remained consistently higher than the state average for the same time period.
- Between 1986 and 1997, unemployment rates in Hood River County ranged between 8% and 11%, notably higher than the statewide average, which ranged from 5% to 8%. Cyclical unemployment in the agriculture industry is the main reason for HRC's higher unemployment rate.
- The proportion of personal income countywide coming from wages and salaries, proprietors, and other wage income has remained relatively stable between 1993 and

1997. However, investment income has become increasingly important. Transfer payments (which include items such as social security) have also held relatively constant as a proportion of total personal income.

- However, proprietors represent a rising share of countywide employment. Proprietors accounted for 20.8% of HRC employment in 1997, compared to 19.9% in 1993.
- Between 1990 and 1998 HRC covered employment grew fastest in the agriculture, services, and wholesale trade sectors. However, covered employment growth in the agriculture sector reflects primarily changes in unemployment insurance coverage and not employment growth.
- Employment cycles in Hood River County closely match cycles in the agriculture industry.

Table 1.4 Major Employers

Employer	Employees
Hood River County School District	502
Providence Hood River Hospital	350
Sprint	294
Luhr Jensen & Sons	250
Hood River Education Association	240
Diamond Fruit Growers	224
Hood River County	191
Duckwall-Pooley Fruit Company	178
Wal Mart	165
Cardinal Glass IG	158
Best Western Hood River Inn	125
Hood River Care Center	115
Rosauer's Store	110
Mid-Columbia Children's Council	95
Stadelman Fruit	80
Columbia Gorge Center	76
Columbia Gorge Hotel	75
Hood River Hotel	60
Mt Hood Meadows	60
City of Hood River	57
Port of Cascade Locks	50

Transportation and Commuting Patterns[vii]

The major modes of transportation in the Central Valley area are at present auto, trucks and rail. The County relies on commercial bus transportation by way of Hood River, with connections at Portland and The Dalles.

The role of transportation has had a major effect on the shaping of the City of Hood River and the Westside area. The original settlement was located on the shores of the Columbia River, which at that time, was the only major thoroughfare leading in or out of the area. From that point, Hood River grew to the south and west followed by, and in some cases preceded by, the road network.

One unique aspect of the Columbia Gorge is that it is not only one of the Pacific Northwest's outstanding scenic show-places, it also serves as one of the region's major transportation corridors. The I-84 freeway is the most traveled east/west route for interstate traffic in the State. About 11,100 trucks and automobiles use the freeway each day (1977 State Highway Department statistic). An unknown number of bicyclists and hitchhikers also utilize the roadway. Two dozen freight and passenger trains travel along the Gorge daily. Freight and recreational boats use the river as a thoroughfare.

Hood River's transportation system relies almost exclusively on the automobile and truck. True, there is an airport and a railroad station, but the airport serves only private and charter customers and the railroad station has been closed to passenger traffic since 1971. Hood River offers few alternatives to those who either choose not to drive or are unable to do so.

The City of Hood River is the transportation center for the entire Hood River County. This has been a major contributing factor to its growth. The County's major industries, fruit growing and processing and timber products, rely heavily on the transport of their goods. Both industries depend on trucks more than any other mode, particularly in the short run. The economics of railroad transport frequently win out in the long run hauls, however. The manufacture of forest products is dependent on harvesting equipment, transferring logs to mills, and the transfer of lumber or plywood to other locations for further use and processing. The fruit industry depends on processing and shipment of fruit within the valley and to locations outside the valley.

The lumber mills in the Central Valley are located in Dee, Odell and Highway 35. All are adjacent to railroad or highway transportation facilities. The fruit industry in times past relied primarily on rail transport for the shipping of the fruit. In more recent times, there has been a shift to emphasis on truck transport. The reasons for the shift include the reluctance of railroads to handle perishable freight, and the fact that trucks can drive directly to wholesalers in city destinations without having to transfer cargoes. It costs the fruit industry additional money each time cargoes have to be shifted from one mode of transportation to another. A new development for the fruit industry is the recent heavy use of air freight. Cherries are now shipped to the Portland airport for air shipment to Japan.

Although rail freight is now a reduced proportion of the total freight transported in the County, rail nevertheless remains an important component of the overall transportation system from the viewpoint of the economy. The Mt. Hood Railroad, recently acquired by Union Pacific Railroad, serves the fruit storage and processing plants in the valley, and the lumber mill and hardwood plant at Odell and Dee respectively.

Table 1.5 Bridges and Highways

State Highway Bridges	County Highway Bridges	City/Municipal Highway Bridges	Historical Covered Bridges	Total
76	19	2	0	97

Critical Facilities and Infrastructure

Critical facilities are those facilities that are critical to government response and recovery activities (e.g., police and fire stations, public works facilities, sewer and water facilities, hospitals, bridges and roads, shelters, and more). Damaged facilities that could cause serious secondary impacts may also be considered critical.
Source: OR-SNHRA: (Region 5) Mid-Columbia

Table 1.6 Critical Infrastructure

# of Hospitals	# of Beds	Police Stations	Fire & Rescue Stations	School Districts & Colleges	Power Plants	# of Dams
1	32	2	7	1	0	4

Source: OR-SNHRA: (Region 5) Mid-Columbia

Critical infrastructure beyond the urban interface include[viii]
1. Watersheds / Municipal Water Supply
2. Watersheds / Irrigation Water Supply
3. County / State roads – Evacuation Routes
4. I-84 Corridor (National Defense Highway)
5. Union Pacific Railroad
6. Bonneville Power Administration – Hi-Tension Power Lines.
7. Electrical / Gas Distributors – PGE, NW Natural Gas
8. Sprint – Telephone Communications
9. Tourism River Traffic
10. Commercial River Traffic
11. Interstate Bridge

Historic and Cultural Resources

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important.

Historic
Historic resources identified within the County include:

- Columbia Gorge Hotel
- Downtown City of Hood River
- Hood River Library
- Hood River Middle School

- Hood River County Historical Museum
- Scenic Highway Trail
- Scenic Railroad

Cultural

Hood River County has become one of the premier outdoor recreation destinations in the United States. Wind in Hood River County is a constant variable; windsurfing and kiting continue to boost the economy from March through September. Hood River has also been named as a destination for winter sports due to its close proximity to the ski areas on Mt Hood.[ix]. In addition, hiking, camping, cycling, mountain biking, and kayaking all serve as a draw for recreation enthusiasts from all over the world.

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[i] Hood River County Comprehensive Land Use Plan
[ii] Hood River Agricultural Water Quality Management Plan
[iii] Hood River County HIVA
[iv] http://www.sos.state.or.us/elections/nov22004/guide/meas/m37_bt.html
[v] Hood River County Economic Development Action Plan
[vi] Community Wildfire Protection Plan
[vii] Hood River County Transportation System Plan
[viii] Community Wildfire Protection Plan
[ix] Community Wildfire Protection Plan

Section III:
Risk Assessment Summary

An important component of the Hood River County Natural Hazards Mitigation Plan is the risk assessment. The purpose of this section is to define the risk assessment process, document the methods used to develop the assessment and to summarize the risk assessment findings for each hazard available at the local level. Detailed risk assessment information for each hazard is included in individual hazard annexes located at the end of the plan. The natural hazards addressed in this plan include: drought, earthquakes, floods, landslides/debris flows, volcanic events, wildfires, and severe storm (windstorms/ winter storms).

The risk assessment builds off the Community Profile by assessing the vulnerability and risk of various community assets including those identified in Section II. The assessment outcomes are used to develop goals and identify potential activities aimed at reducing the risks identified through the risk assessment process.

What is a Risk Assessment?

The risk assessment process is used to identify and evaluate the impact of natural hazards on the human-built environment, businesses, social structure and services, and the natural environment of a community. Risk assessments provide information about the areas where the hazards may occur, the value of existing land and property in those areas, and an analysis of the potential risk to life, property, and the environment that may result from natural hazard events. Specifically, the following elements are present in a risk assessment:

1) ***Hazard Identification*** identifies the geographic extent of the hazard, the intensity of the hazard, and the probability of its occurrence. Maps are frequently used to display hazard identification data Hood River County identified eight major hazards that consistently affect or threaten its geographic area. These hazards – drought, earthquakes, floods, landslides, volcanic events, wildfires, severe storms (windstorms/winter storms) – were identified through a process that utilized input from a project steering committee, subject mater experts, the State Natural Hazard Risk Assessments, and historical records.
2) ***Profiling Hazard Events*** describes the causes and characteristics of each hazard, how they have affected the County in the past, and what part of the County's population, infrastructure, and environment have historically been vulnerable to each specific hazard. A profile of each hazard addressed in this plan from the State Natural Hazard Risk Assessment is provided in the plan's hazard annexes. For a more information on the history of hazard specific events, please see the hazard specific annex.
3) ***Vulnerability Assessment/Inventorying Assets*** combines the hazard identification with an inventory of existing (or planned) property and population that would be exposed to a hazard. Critical facilities are of particular concern

because they provide essential products and services that are necessary to preserve the welfare and quality of life in Hood River County and fulfill important public safety, emergency response, and/or disaster recovery functions.

4) ***Risk Analysis/Estimating Potential Losses*** involves estimating the damage, injuries, and financial losses likely to be sustained from hazard events in a geographic area over a given period of time. This level of analysis typically involves using mathematical models, such as HAZUS. The two measurable components of risk analysis are magnitude of the impact that may result from the hazard event and the likelihood of the hazard occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. Where available, the best available data was used to determine the magnitude and likelihood of future natural hazard events. Where sufficient data was available, quantitative estimates for potential losses are included in the Hazard Annexes.

   The Department of Geology and Mineral Industries completed a HAZUS run for the County using both a crustal and Cascadia Subduction zone event. This analysis allows the County to be able to identify the type and number of buildings damaged as well as potential dollar losses from seismic events. These results include data on: expected building damage, expected damage to essential facilities, debris estimates, and expected economic losses. The outcome of the HAZUS run is documented in the Earthquake Hazard Annex.

5) ***Assessing Vulnerability/Analyzing Development Trends*** provides a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions. This plan provides a comprehensive description of the characteristics of Hood River County in Section II: Community Profile. The profile includes a description of the community's land use and development trends.

Risk Assessment Methodology

The County took the following steps to develop the plan's risk assessment:

(1) Collection of Data

The first step in the risk assessment process involved the collection of the best available data the County possessed on natural hazard related events. Sources of this data include:

- Community Wildfire Protection Plan, Hood River County, Oregon
- Oregon State University Extension- Hood River County
- Hood River County Comprehensive Plan (Goal 7: Natural Hazards)
- Hood River County GIS
- Hood River County Hazard & Vulnerability Analysis (HIVA)
- Hood River County Public Works
- Hood River County Soil & Water Conservation District

Unfortunately, records of "after incident reports" filed in the County were lost in the transition between Emergency Managers.

(2) Review of State Natural Hazard Risk Assessment

This step in the risk assessment process involved a review of the State Natural Hazard Risk Assessment for Region 5 Mid-Columbia. The natural hazard vulnerability & probability assessments within the State plan were compared with the vulnerability & probability assessments in the Hood River County HIVA; similarities and differences were documented for presentation to the Steering Committee.

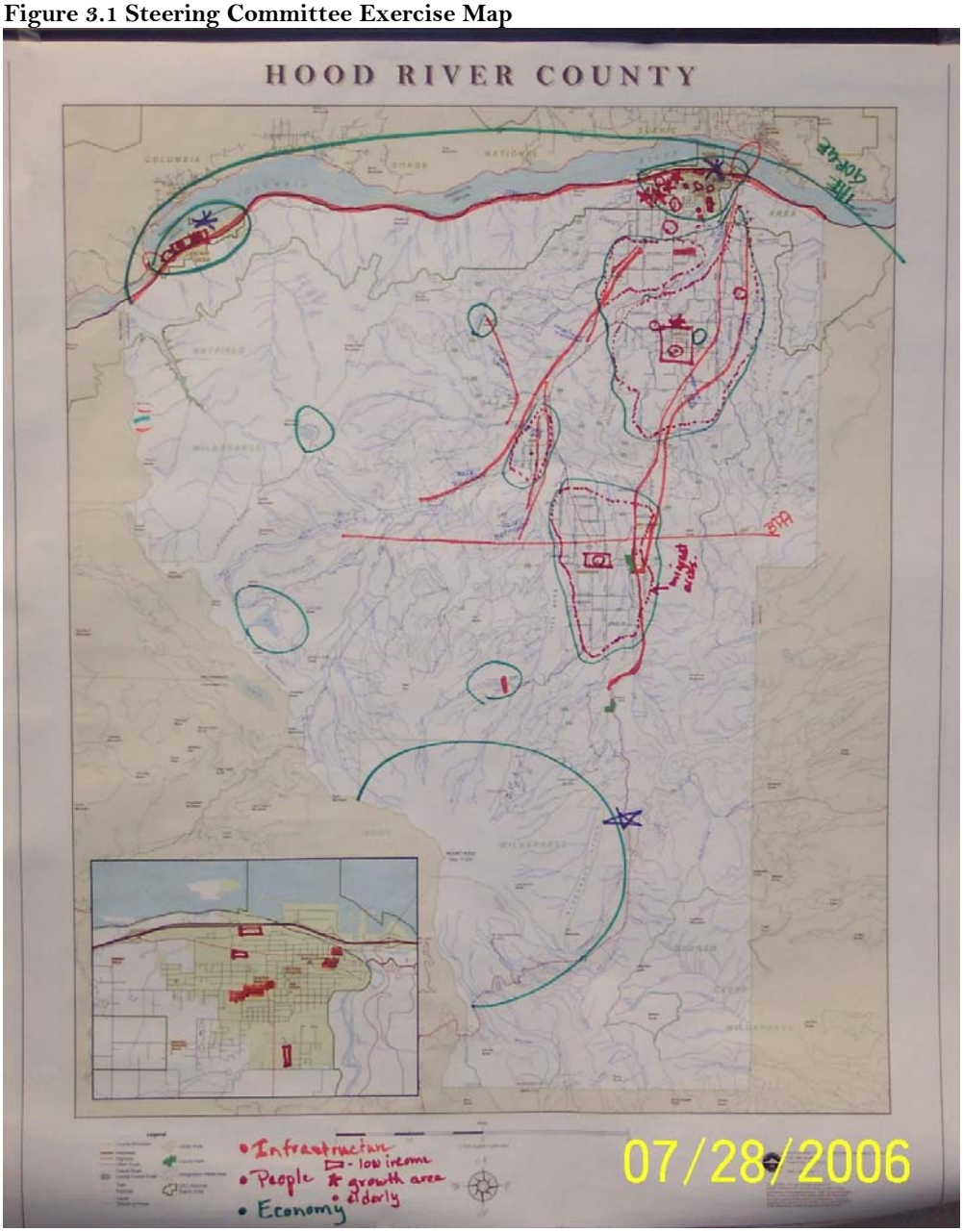
(3) Steering Committee Risk Assessment Meeting
The Risk Assessment Meeting agenda of 3 March 2006 proceeded as follows:

Action: Presented and processed local and state natural hazards data.
Result: Documented Steering Committee knowledge/input with respect to local hazard events.

Action: Community asset identification exercise
Result: (a) Identified and discussed key elements of the region and individual communities within it; and (b) Identified main assets, resources and functions of region within the themes of People, Dollars (economy, cultural & historic assets, environmental assets), and Infrastructure (critical physical facilities).

Action: Community sensitivity table top mapping exercise
Result: (a) Discussed and documented implications with regards to asset loss/damage to community; (b) Provided mechanism to focus planning efforts; (c) Provided a fact base for subsequent action item identification, and (d) Provided physical document (map) of Steering Committee input.

Figure 3.1 Steering Committee Exercise Map



Action: Discussed of next steps and mitigation action items.
Result: Set schedule for the future planning efforts, documented potential action items discussed in meeting, and distributed action item worksheets to participants.

For more information on Steering Committee participation, please see *Appendix A: Public Process.*

(4) NHMP Community Stakeholder Forum

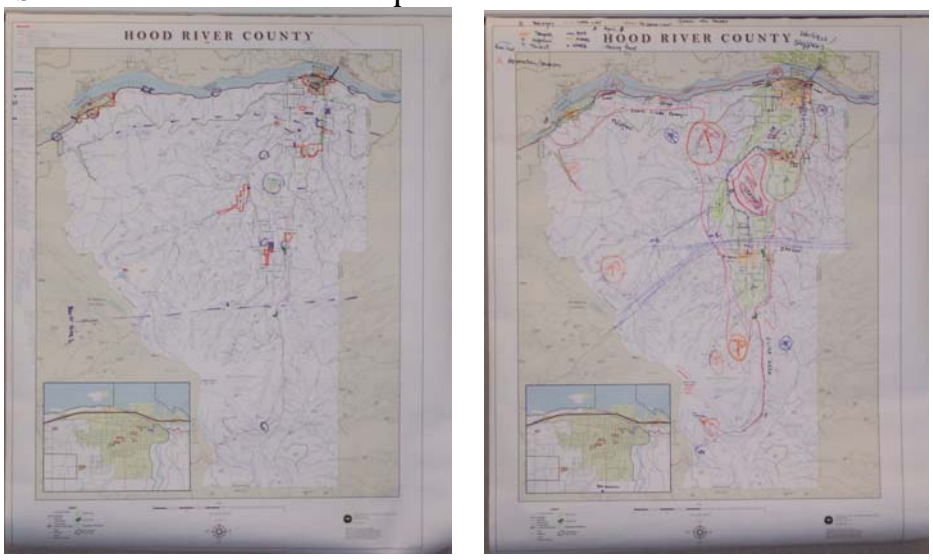
The Forum held 10 April 2006 was the same exercise as the Steering Committee Risk Assessment meeting. The Forum aimed to educate the community stakeholders, gain their insight into how hazard events have impacted the County in the past and how that impact may change in the future, and solicit input for potential action items.

Action: Presented and processed local and state natural hazards data.
Result: Documented community stakeholder knowledge/input with respect to local hazard events.

Action: Community asset identification exercise
Result: (a) Identified and discussed key elements of the region and individual communities within it; and (b) Identified main assets, resources and functions of region within the themes of People, Dollars (economy, cultural & historic assets, environmental assets), and Infrastructure (critical physical facilities).

Action: Community sensitivity table top mapping exercise
Result: (a) Discussed and documented implications with regards to asset loss/damage to community; (b) Provided mechanism to focus planning efforts; (c) Provided a fact base for subsequent action item identification, and (d) Provided physical document (map) of community input.

Figure 3.2 Stakeholder Forum Exercise Maps



Action: Discussed importance mitigation and the development of action items.
Result: Documented potential action items discussed in forum, and distributed action item worksheets to participants.

For more information on community participation, please see *Appendix A: Public Process.*

(5) Stakeholder Interviews
Stakeholder interviews were used as a community involvement method gain input from a variety of members in the community who might not normally be involved in the planning process. Interviews were typically conducted over telephone. The interviews

offered an opportunity to extract hazard event knowledge (history, geography, potential impact) from the community that was not documented in county government records.

For more information on Stakeholder Interviews, please see Appendix A: Public Process.

(7) Potential Action Item Documentation
Throughout the risk assessment process, ideas for action items were identified and documented as they were discussed. Documentation of these ideas led to the development of potential action item worksheets which were then selected, prioritized, and refined for documentation in this plan.

For more information on Stakeholder Interviews, please see *Section IV: Mission, Goals, and Action Items*

Risk Assessment Summary

This section provides an overview of the risk assessments for the natural hazards affecting Hood River County. For more detailed information on each hazard, see the *Hazard Annexes* at the end of the plan.

DROUGHT

Overview

Historically, Hood River County has relied upon the fertile volcanic soils of its valley to sustain its local economy. Logging of the County's fine timber stock and the agricultural production of its fruit industry have driven the regional economy since the first fruit trees were planted in 1859. A history of drought within the region has periodically threatened these two economic engines. In an effort to conserve water during the drought of 2005, rotating water use and the shutting off of junior water rights created conditions where some farmers were unable to adequately irrigate their crops, resulting in a loss of production and revenue.

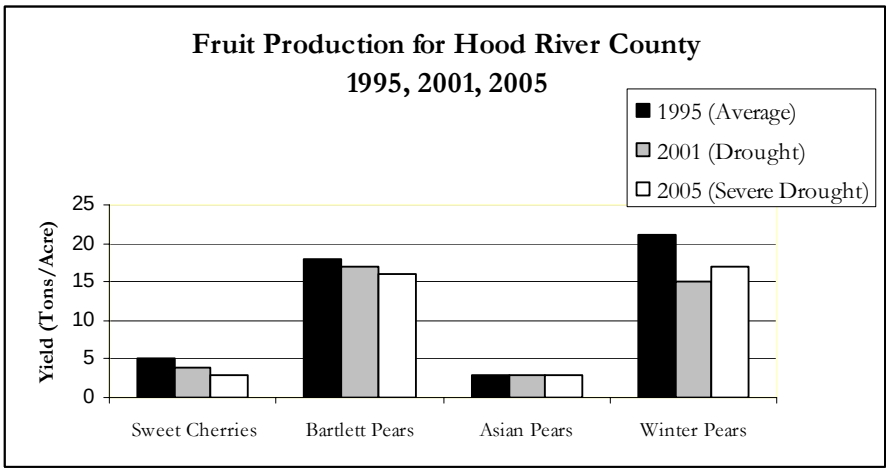
Table 3.1 Drought History

DATE	DESCRIPTION
1904-1905	Statewide drought period of about 18 months
1917-1931	Dry period punctuated by brief wet spells in 1920-21 and 1927
1939-1947	Three year intense drought
1959-1964	Primarily affected eastern Oregon
1985-1997	General dry period, capped by statewide droughts in 1992 and 1994
2000-2004	General dry period, with State of Drought Declarations in 2001 and 2003
2005	2nd Worst drought year on record

Source: OR-SNHMP (Region 5) Mid-Columbia; http://governor.oregon.gov; Hood River County FIRD

In every drought, agriculture has felt the impact, especially in non-irrigated areas such as farms. Droughts have left their major impact on individuals (farm owners), on the agricultural industry, and to a lesser extent, on other agriculture-related sectors[i]. *Figure 3.1* illustrates the impact of drought on the agricultural industry's three highest dollar value crops (tons harvested per acre farmed) using an average year of annual rainfall, 1995, as a standard. In terms of dollar value (2005 dollars) Hood River County witnessed a 16% loss in agricultural revenue in 2001 and a 25% loss in 2005[ii].

Figure 3.3 Drought Impact on High Value Agriculture



Source: OSU Extension Service

Conditions and Concerns

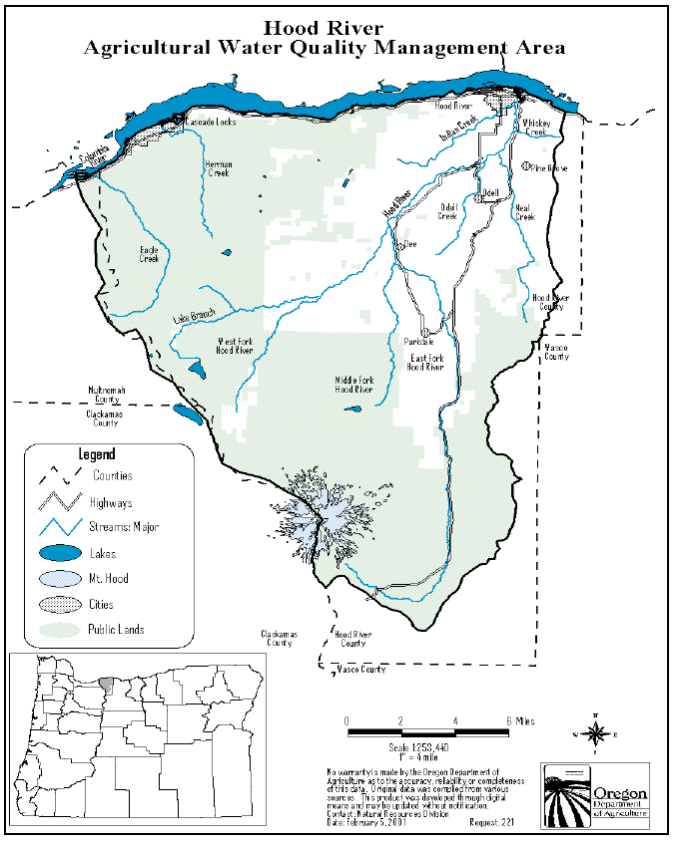
The following conditions and concerns are found in portions of the county which contribute to the drought threat and potential for economic loss and environmental degradation:

- Open roadside irrigation ditches allow for evaporation and vegetation loss.
- Potential growth (increased population and building) within the County could pose serious problems in future drought years if water management practices and public education and outreach are not properly coordinated.
- Extended drought and loss of agricultural production may have significant impact on employment and wages of seasonal migrant workers

Geographic Extent

The entire population of the county is vulnerable to the effects of drought. The agricultural sector is particularly vulnerable. Approximately 15,000 acres of orchard and 2,000 acres of pasture are actively irrigated. An estimated 10% of Hood River valley orchardists use soil moisture sensors to improve orchard water efficiency. The Integrated Fruit Production program promotes environmentally sustainable orchard practices including reduced pesticide, fertilizer, and water use[iii]. Figure 3.4 identifies the Agricultural Water Quality Management area.

Figure 3.4 Hood River Agricultural Water Quality Management Area



Impact Summary[iv]

The following details both historical and potential impacts of drought upon Hood River County:

Economic

- Drought effects result in economic and revenue losses for business, cities and the county; primarily agriculture
- Millions of board feet of timber have been lost
- Increased irrigation costs
- Loss related to curtailed tourist activity (e.g. fruit tours, hunting, fishing, kayaking) and impact on sellers of recreational equipment
- Strain on financial institutions (forecloses, more credit risk, capital shortfalls
- Unemployment from drought related declines in agricultural production

Environmental

- Increased danger of wildfire resulting from drought conditions
- Erosion has occurred which caused serious damage to aquatic life, irrigation, and power development by heavy silting of streams, reservoirs, and river

- Low stream flows have created high temperatures, oxygen depletion, disease, and lack of spawning areas for our fish resources (native steelhead, chinook, endangered bull trout and other fish species)
- Tree disease
- Loss of wetlands

Fore more information on drought in Hood River County, please refer to the *Hazard Appendix*.

EARTHQUAKE[v]

Overview

There is really no past "recent" history of earthquakes in Hood River County. 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.

Even with this lack of history, geology clearly shows that the county has been impacted by significant events in the last 500 years. It is this 500-year history that Oregon Department of Geology and Mineral Industries based the 1999 damage estimates on (see *Impact Summary* section below for damage estimates). Within the limits of predictability, we must assume a moderate probability of occurrence for a damaging earthquake during the next 50 years. A large earthquake centered in Western Oregon could also have a minor impact on Hood River County.

Conditions and Concerns

The following conditions and concerns are found in portions of the county which contribute to the earthquake threat and potential for economic loss and environmental degradation:

- Water-saturated loose sand and silt loses its ability to support structures in an earthquake. Areas in Hood River County that are near the flood plains along rivers or areas with silt deposits are at the greatest risk during an earthquake
- Potential growth (increased population and building) within the County could pose serious problems in future earthquakes for buildings are sited within floodplains or on grounds with steep slopes

Geographic Extent

It is difficult to identify a part of the community that is not vulnerable to an earthquake. People, buildings, emergency services, hospitals, transportation lifelines, and water and wastewater utilities are susceptible to the effects of an earthquake. In addition, electric and natural gas utilities and dams have a potential to be damaged. The best sources pf extent and potential impact are provided by DOGAMI in the form of amplification and liquefaction maps, and HAZUS runs. Please refer to the *Hazard Appendix* fore more information.

Impact Summary[vi]

The following details both historical and potential impacts of earthquake upon Hood River County:

Expected losses in Hood River County from the magnitude 8.5 Cascadia earthquake include:

- No casualties or deaths
- No buildings extensively damaged
- Over $3,800,000.00 of economic damage

Expected losses in Hood River County from the 500-year model include:

- 30 casualties, 1 death
- Over 5% buildings extensively damaged
- Over $78 million of economic damage

The 500 year model is an attempt to quantify the risk across the state. This estimate does not look at a single earthquake. Instead, this study includes many faults, each with a 10 percent chance of producing an earthquake in the next 50 years. It assumes each fault will produce a single "average" earthquake during this time. More and higher magnitude earthquakes than used in this study may occur.

Fore more information on earthquakes in Hood River County, please refer to the *Hazard Appendix.*

Overview

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 these rivers and creeks usually occurs between October and March. Long periods of heavy rainfall and mild temperatures coupled with snowmelt contribute to flooding conditions.[vii]

Riverine and flash floods may both occur in Hood River County. Riverine floods happen when the amount of water flowing through a river channel exceeds the capacity of that channel. Riverine floods are the most common type of flooding. Flash flooding occurs during sudden rainstorms when a large amount or rain falls in a very short period of time. These happen in steeply sloping valleys and in small waterways.

Table 3.2 Significant Flood History

DATE	SUMMARY
January 1923	Record flood levels on the Hood River
May 1928	Columbia River flooding occurred
May 30, 1948	Columbia River crested at 34.4 feet
December 1964	Region wide "Christmas Flood"; every river in the state was far above flood stage and mudslides, bridge failures, and inundation closed the state's roads, airports, and railways.
January - February 1996	Region wide flooding; Five people died and nearly every Oregon county received a disaster declaration. Region-wide damage estimates exceeded one billion dollars.
December 1996 – February 1997	Region wide flooding

Source: Hood River County HIVA

The Columbia is so regulated by upstream dams that it does not present much of a problem. This is partly reflected in the federal flood insurance rate maps for the various communities along the river. However, a swollen Columbia can back up tributary streams to the point where they constitute a significant hazard.[viii]

Conditions and Concerns

The following conditions and concerns are found in portions of the county which contribute to the flood threat and potential for economic loss and environmental degradation:

- During a 30-year mortgage period, a home in a mapped flood plain has about a 26 percent chance of being damaged by a 100 year-flood event. The same structure has

only about a one percent of being damaged by fire. Many homeowners who live in flood plains carry fire insurance, but do not carry flood insurance.

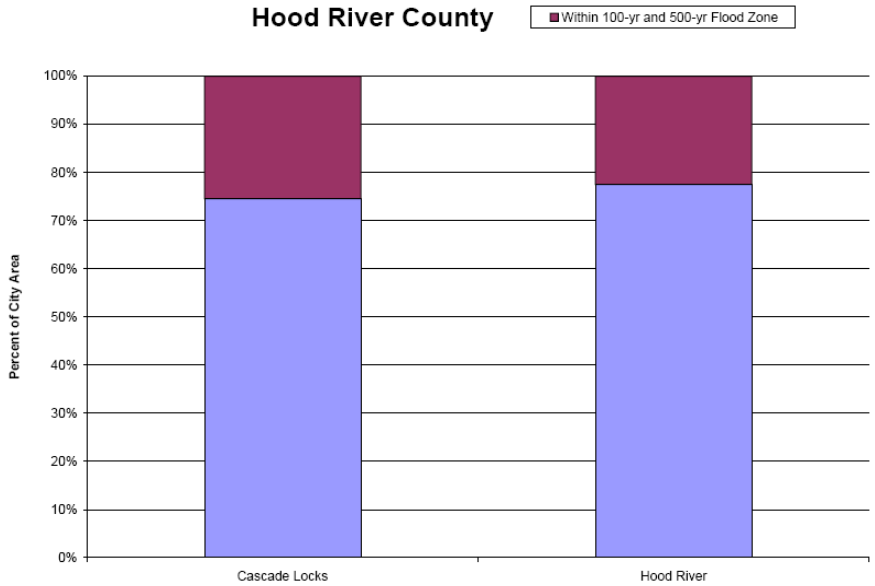
- Hood River County GIS does not have adequate mapping of flood plains in its system; this complicates matters during a land use review by County Planning and Building Department
- As the density of development increases and permeable natural surfaces are replaced with homes and roads, the volume of storm water runoff and the area over which it floods will increase. As a result, unknown numbers of homes that were once outside mapped flood plains will face an increased threat of flooding, a threat they were never built to withstand. In fact, 35-40 percent of the National Flood Insurance claims are currently coming from outside the mapped flood plains.
- Approximately 7.8 miles of the East Fork Hood River are affected by road construction, reconstruction and bank amoring associated with Highway 35. Frequent flood damage necessitates chronic roadway maintenance (e.g. rip-rapping).

Geographic Extent

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.

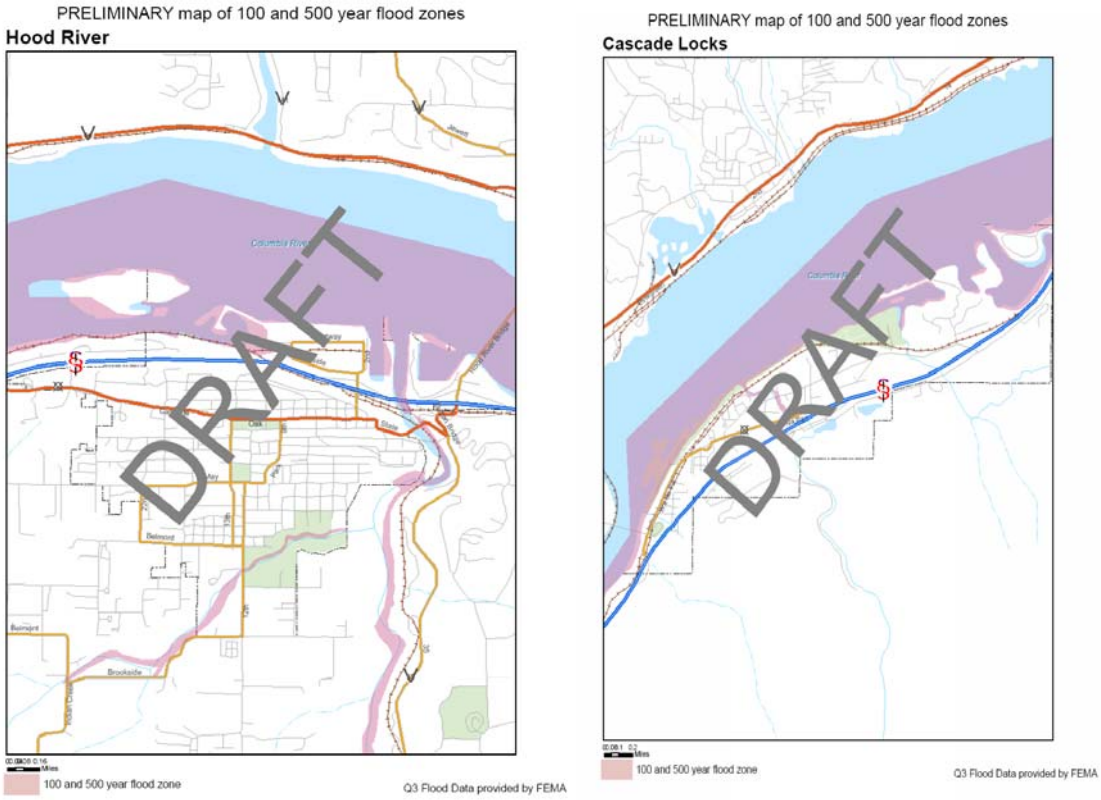
Figures 3.5 and *3.6* identify the flood zones for the County's two major cities.

Figure 3.g Percentage of City Area within 100 Year & 500 Year Flood Zone



Source: DOGAMI

Figure 3.6 Flood Plains of Hood River & Cascade Locks



Source: DOGAMI

Impact Summary

The following details both historical and potential impacts of flood upon Hood River County:

- Floods can cause loss of life and great damage to structures, crops, land resources, flood control structures, roads, and utilities of all kinds.
- Flash flooding in October of 2000 caused damages to bridges on Oregon 35, including the Whitewater Creek, Newton Creek, and Robin Hood Park bridges. The flooding also caused damage to U.S. Forest Service roads, prompting a state of emergency declaration from the Governor's office (Executive Order NO. EO 00 – 28).
- The floods of 1996-1997 caused thousands of dollars in damage to homes and county infrastructure

Fore more information on floods in Hood River County, please refer to the *Hazard Appendix.*

Overview

Hood River County has a history of landslides that tend to occur in isolated, sparsely developed areas threatening individual structures and remote sections of the transportation, energy and communications infrastructure. In contrast, the landslide prone area along parts of Interstate Highway 84 from the border of Multnomah County to the City of Hood River has the potential to cause traffic accidents and region's transportation system.

Slides in Hood River County generally range in size from thin masses of soil of a few yards wide to much larger, 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.

Conditions and Concerns

The following conditions and concerns are found in portions of the county which contribute to the landslide threat and potential for economic loss and environmental degradation:

- 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
- Potential growth (increased population and building) within the County could pose serious problems in future landslides years if building practices and public education and outreach are not properly coordinated
- Computer models are in general agreement that the Pacific Northwest climate will become warmer and wetter over the next 50 years with an increase of precipitation in winter and warmer, drier summers. This could result in more flooding and landslides[ix].

Geographic Extent[x]

Landslides tend to occur in three general areas: the Columbia River Gorge, the Forks of Hood River, and the vicinity of Mt. Hood.

Columbia River Gorge

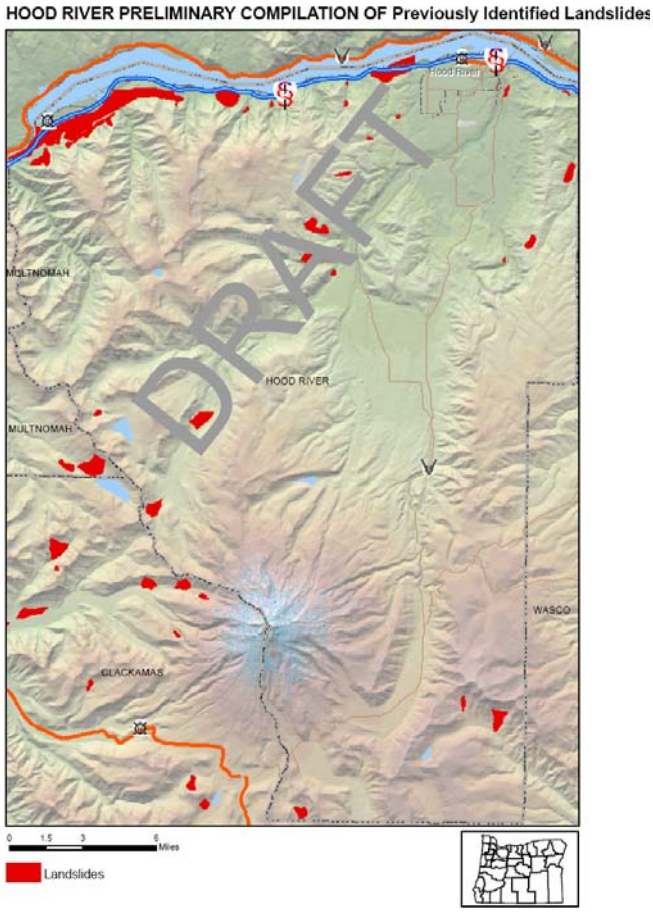
The Columbia River Gorge is known for its landslide topography, and many of the landslides are very ancient. Landslide / debris flow conditions are worsened by the same weather conditions that produce severe flooding throughout Oregon: rain-on-snow. In short, it is not uncommon in the Pacific Northwest for mild rainy conditions to follow an abundant snowfall. Such was the case in February 1996, when similar weather conditions produced over 700 landslides/ debris flows throughout the state. During

that period three landslides closed Interstate Highway 84 along the Columbia River for a period of time. The weather pattern appears to be cyclic.

Hood River

Most streams in the West, Middle and East Fork Hood River lie entirely within the rain-on-snow elevation zone, which usually is under 4500 feet, but due to its orientation and the influence of Mt Hood, the entire East Fork watershed is subject to rain on snow flooding (USFS)). Catastrophic landslides and debris flows are common in several upper East Fork and Middle Fork Hood River tributaries.

Figure 3.7 Previously Identified Landslides in Hood River



Source: DOGAMI

Mt. Hood

Natural landslides, debris flows, and dam-break floods originating on the moraines and slopes of Mt. Hood frequently impact downstream channels. Long, steep gradients allow small mass-wasting events to gain size and destructive force before reaching gentler slopes. The Newton Creek landslide in 2000 and the Pollalie Creek landslide in 1980 are examples of large catastrophic debris flows that were initiated by smaller landslides.

Impact Summary

The following details both historical and potential impacts of landslide upon Hood River County:

- Damage or destruction of portions of roads and railroads, sewer lines, pipelines, and water lines, electrical and communications distribution lines, and destroyed homes and public buildings.
- Disruption of shipping and travel routes result in losses to commerce. Many of the losses due to landslides may go unrecorded because no claims are made to insurance companies, lack of coverage by the press, or the fact that transportation network slides may be listed in records simply as "maintenance."
- The most significant effect of landslides is the disruption of transportation and the destruction of private and public property.
- Some work has been done to prevent developments on top of or below slopes subject to sliding without geotechnical investigations and preventative improvements. Much more needs to be done to educate the public and to prevent development in vulnerable areas.
- On December 25, 1980, a landslide and massive debris dam break in Pollalie Creek caused one fatality, obliterated sections of Highway 35, and damaged the East Fork Hood River for miles. Effects of the 1980 flood on the East Fork channel are still readily observed.
- A major washout in Ladd Creek occurred September 1, 1961. Newton Creek experienced a similar event in November 1991.
- A large mudflow in Eliot Branch occurred Thanksgiving 1999, wiping out a bridge and a diversion dam.
- The massive Newton Creek debris flow on September 30, 2000, resulted from the failure of pyroclastic sediments on Mt Hood at the foot of the Newton Glacier. This event carried large volumes of sand and sediment all the way to the Hood River delta with sand movement and turbidity lasting for several months.

Fore more information on landslides in Hood River County, please refer to the *Hazard Appendix.*

SEVERE STORM[xi]

Overview

Hood River County is vulnerable to a variety of severe storm hazards. Ice, snow, and windstorms 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.

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.

Snow Storm or Blizzard

The northern Oregon Cascades exert a profound effect on Oregon climate and weather. Mid-latitude storms approaching from the West are forced to rise as they encounter the Cascades, resulting in large amounts of orographic (terrain-induced) precipitation on the western slopes. So effective are the Cascades in removing moisture from the Pacific air masses, however, that most of Oregon east of the Cascades lies in a "rain shadow," resulting in large areas with annual precipitation less than 12 inches.

It is possible for significant snowfall to occur in the Northwest. Snowstorms primarily impact the transportation system and the availability or timing of public safety services. Heavy snow accumulations can also cause roofs to collapse. Snow accompanied by high winds is a blizzard, which can affect visibility, cause large drifts and strand residents for up to several days. Melting snow adds to river loading and can turn an otherwise benign situation into a local disaster

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. The strongest winds that impact Hood River County comes from two sources: 1) frequent and widespread strong winds from the west and are associated with strong storms moving onto the coast from the Pacific Ocean; and 2) strong west winds originating 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 strong winds throughout the Gorge and at its outlet.

Table 3.3 Beaufort Wind Scale

WIND SPEED (MPH)	EFFECTS ON LAND
Under 1	Calm, smoke rises vertically.
1-3	Smoke drift indicated wind direction, vanes do no move
4-7	Wind felt on face, leaves rustle, vanes begin to move
8-12	Leaves, small twigs in constant motion, light flags extended.
13-18	Dust, leaves and loose paper raised up, small branches move.
19-24	Small trees begin to sway.
25-31	Large branches of trees in motion, whistling heard in wires.
32-38	Whole trees in motion, resistance felt in walking against wind.
39-46	Twigs and small branches broken off trees.
47-54	Slight structural damage occurs, slate blown off or roofs.
55-63	Seldom experienced on land, trees broken, structural damage occurs.
64-72	Very rarely experienced on land, trees broken, structural damage occurs.
73 or greater	Violence and destruction

Source: HRC HIVA

Conditions and Concerns

The following conditions and concerns are found in portions of the county which contribute to the severe storm threat and potential for catastrophic losses:

- The Columbia Gorge is the most significant east-west gap in the mountains between California and Canada. It serves as a funnel for east and west winds, where direction depends solely on the pressure gradient. Once set in motion, the winds can attain speeds of 80 mph, halt truck traffic, and damage a variety of structures and facilities. The average wind speed at Hood River is 13 mph, not much less than the notoriously windy Texas and Kansas plains whose wind speeds average 15 mph.[xii]
- Isolated residents without power are more likely to use wood fires to stay warm or to cook, possibly resulting in an increase in the number of structural fires. Residents without food or water may attempt to use impassable roads and thereby increase the number of rescues.

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Geographic Extent

The entire County is vulnerable to the effects of a storm. High winds can cause widespread damage to trees and power lines and interrupt transportation, communications, and power distribution. Prolonged heavy rains cause the ground to become saturated, rivers and streams to rise, and often results in local flooding and landslides.

Ice Storm

Ice storms or freezing rain (black ice) conditions can occur anywhere in Hood River County. Ice storms occur when rain falls out of a warm atmospheric layer into a cold one near the ground. The rain freezes on contact with cold objects including the ground, trees, structures, and powerlines, causing power lines to break. High winds along the Columbia River Gorge can completely cover roads with ice, even high traffic highways such as Interstate 84.

Snowstorm

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 Mt. Hood. 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.

Windstorm

Primarily impacts the areas immediately adjacent to the Columbia River Gorge.

Impact Summary

The following details both historical and potential impacts of sever storm upon Hood River County:

- 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. The Columbia Gorge had up to 6 inches of more snow while the Willamette Valley had 2 to 5 inches more.
- Even moderate storms can bring down power lines, and tree and tree limbs obstructing roadways and falling onto houses and other structures with enough force to cause damage. Downed powerlines create widespread electrical hazards.
- Severe windstorms will usually cause the greatest damage to ridgelines that face into the winds. There is an additional hazard in newly developed areas that have been thinned of trees to make way for new structures. Large unprotected trees in these areas are more like to fall.
- Severe storms in Hood River County have left thousands without power. In certain areas it may take several days for utility providers to restore power. This can create life-threatening problems for people with life support equipment such as dialysis machines, respirators, and oxygen generators.

- Severe local storms create hazardous driving conditions that can slow down and completely inhibit traffic. This can hinder police, fire, and medical responses to urgent calls. These types of storms also can wreak havoc on first response operations. Law enforcement resources are often tied up in responding to welfare inquiries and in traffic control, while fire departments are tied up with electrical hazards and debris removal.
- The long-term challenge for severe local storms is in debris removal. Hundreds of tons of debris can pile up in residential and commercial areas.

Fore more information on severe storms in Hood River County, please refer to the *Hazard Appendix*.

Note: This section adapted from the Hood River County Community Wildfire Protection Plan unless otherwise noted. Please see CWPP in the Wildfire section of the Hazard Annex for more information

Overview

Historically, it appears that the instance of wildfire is increasing through the Columbia Gorge region. The 2003 Herman Creek fire near the City of Cascade Locks forced the closure of the region's main thoroughfare, Interstate 84, and threatened the city. The existence of open lands and large forested areas, increasing population and recreational activities, and the uncertain impact of a changing climate combine to suggest that the probability of future wildfire occurrence remains high.

Table 3.4 Major Reported Wildfires in Hood River County

Year	Name	Area	Acres
1902		Columbia Gorge	170,000
1991	Falls Fire	Columbia Gorge	1,100
2003	Herman Creek	Columbia Gorge	375

Approximately 85% of the county lies outside of lands protected by a Rural Fire Protection district; significant ownership within these lands lies with the United States of America in Forested and Wilderness areas managed by the USFS. In the remaining County, State and private lands there are an ever increasing number of dwellings intruding into an area that is historically prone to wildfire. Construction of these new dwellings on the Urban-Wildland Interface show little regard to fuels, weather and topography - the very factors that contribute to and sustain wildfire.

Table 3.5 Community Risk and Value of Structures Vulnerable to Wildfire

Risk/Value	High Risk			Moderate Risk			Low Risk		
	Houses	%	Million	Houses	%	Million	Houses	%	Million
Dee	25	18%	$2.9	104	75%	$4.7	9	7%	$0.9
Cascade Locks	132	29%	$9.5	187	42%	$18.5	130	29%	$9.0
Hood River	80	63%	$15.2	48	38%	$8.4	-	-	-
Odell	232	39%	$30.1	240	40%	$32.3	127	21%	$21.4
Parkdale	245	23%	$26.3	708	67%	$80.3	110	10%	$16.7
Pine Grove	211	54%	$39.6	150	38%	$32.8	31	8%	$8.4
Westside	470	43%	$56.9	526	48%	$61.2	90	8%	$27.6
Unincorporated	42	54%	$5.9	35	45%	$6.3	1	1%	$0.1
Totals	1437	37%	$186.5	1998	51%	$244.6	498	13%	$84.1

NFPA 1411 Survey Data 2002-2004, Assessed Values 2005

Of the 3,933 structures surveyed to date, the total acreage for each category per tax lot is assigned as follows:

- High Risk = 10,265 acres
- Medium Risk = 12,404 acres
- Low Risk = 2,219 acres

Table 3.5 ODF Fires in Hood River County 1994 – 2004

Acres		Number of Fires	Total Acres
0	0.25	127	7.13
> 0.25	10	39	65.85
> 10	100	3	145.93
> 100	300	0	0
> 300	1000	1	375.14
> 1000	5000	0	0
> 5000		0	0
Total Fires / Acres		170	594.05

Table 3.6 Major Employers at Risk to Wildfire

Employer	Employees
Columbia Gorge Hotel	75
Hood River Hotel	60
Mt Hood Meadows	60
Providence Hood River Hospital	350

Conditions & Concerns

The following conditions and concerns are found in portions of the county which contribute to the wildfire threat and potential for catastrophic losses:

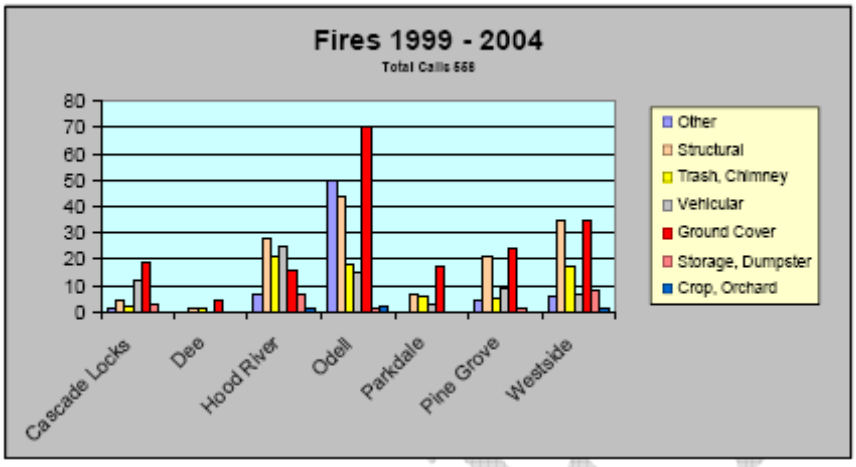
- Many areas in the Hood River County Urban Interface have structures on or on top of significant slopes with moderate or heavy fuels around or below them. As population increases in high fire hazard zones so does the potential for loss of life.
- The most significant increase in county visitors coincides with the time of year when fire danger is at its highest.
- Because low density wildfires (forest undergrowth burn) have been suppressed for many years, the county's current forest conditions have the potential to produce a large, high intensity fire. This type of wildfire could be devastating for the entire ecosystem. All ground cover may be eliminated, soil can be sterilized, and runoff and erosion can choke waterways. Rare endangered, threatened plants and animals essential to biodiversity would also be at risk in the event of wildfire. Recovery from this catastrophe would be very slow unless mitigation dollars are available.
- High winds in excess of 25 mph along the Columbia Gorge coupled with low humidity make for severe wildfire conditions.
- Insects and disease pathogens cause significant tree mortality, growth loss, and damage large volumes of potential wood products each year. This can reduce management options and contribute to hazardous forest fire conditions.

- Closures of Interstate 84 can be expected as a result of a direct wildfire threat or secondary threat resulting from smoke and conditions of low visibility due to a nearby wildfire.

Geographic Extent

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

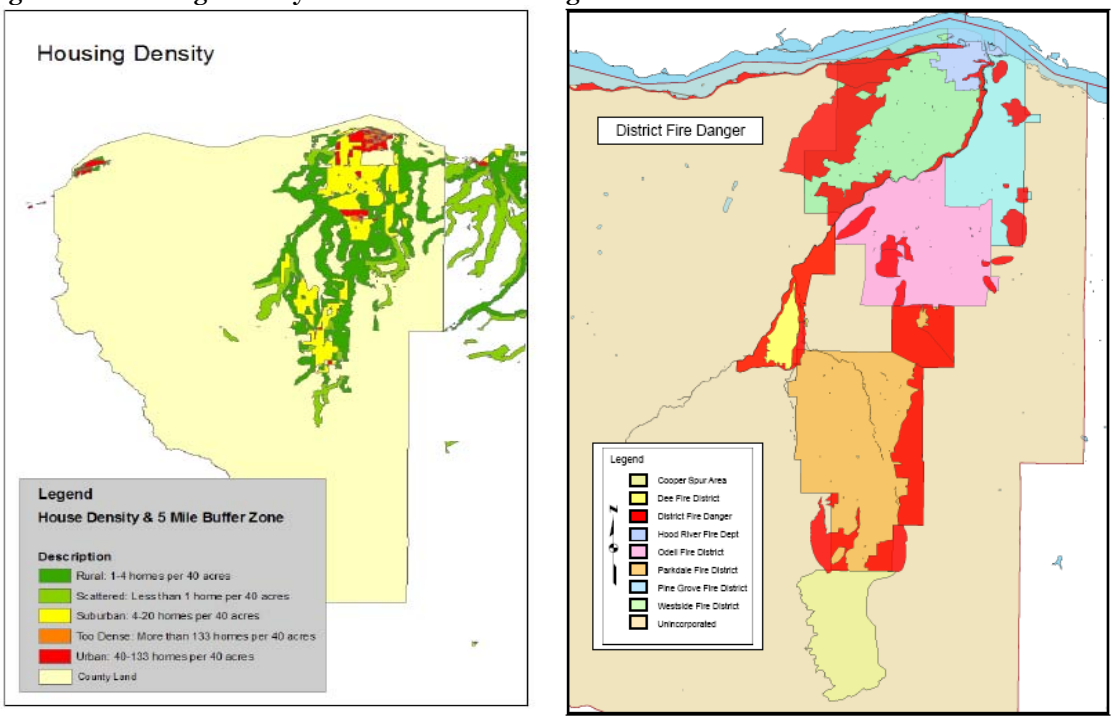
Figure 3.8 Fire Starts 1999-2004



Fire Starts by District: Data Source Oregon State Fire Marshal

Chief Fire Officers were asked to identify areas of most concern within their respective fire districts. Those areas are of most concern for fire that may spread to structures by means of topography or fuel loading that promotes rapid fire spread.
These areas in the case of Pine Grove fire district are isolated areas of concern that need to be incorporated into a larger planning area that shows wild fire potential using established criteria – Weather, Fuel and topography. By contrast, the Westside Fire district danger area relays concerns as to what a wind driven fire could bring to its district. Areas identified are an integral part to the establishment of a WUI boundary.

Figure 3.9 Housing Density and District Fire Danger



Impact Summary

The following details both historical and potential impacts of wildfire upon Hood River County:

- The 1990 Oakland Hills Fire claimed the lives of 25 people
- Historically orchards are well irrigated and green; fire is not expected to encroach beyond the first five rows of trees due to high moisture content of available fuels

.

- In a watershed compromised by wildfire, essential community infrastructure (i.e. municipal water and irrigation supplies) could be negatively affected. Drinking water sources are of primary importance.
- Destruction of large tracts of forest land would have immediate economic impact on the community through lost jobs, reduced taxes, and increase public support while collateral economic and social effect could impact the county for years.
- Greatest short-term loss is the complete destruction of valuable resources, such as timber, wildlife habitat, scenic vistas, and watersheds.
- There is an immediate increase in vulnerability to flooding due to the destruction of all or part of the watershed.

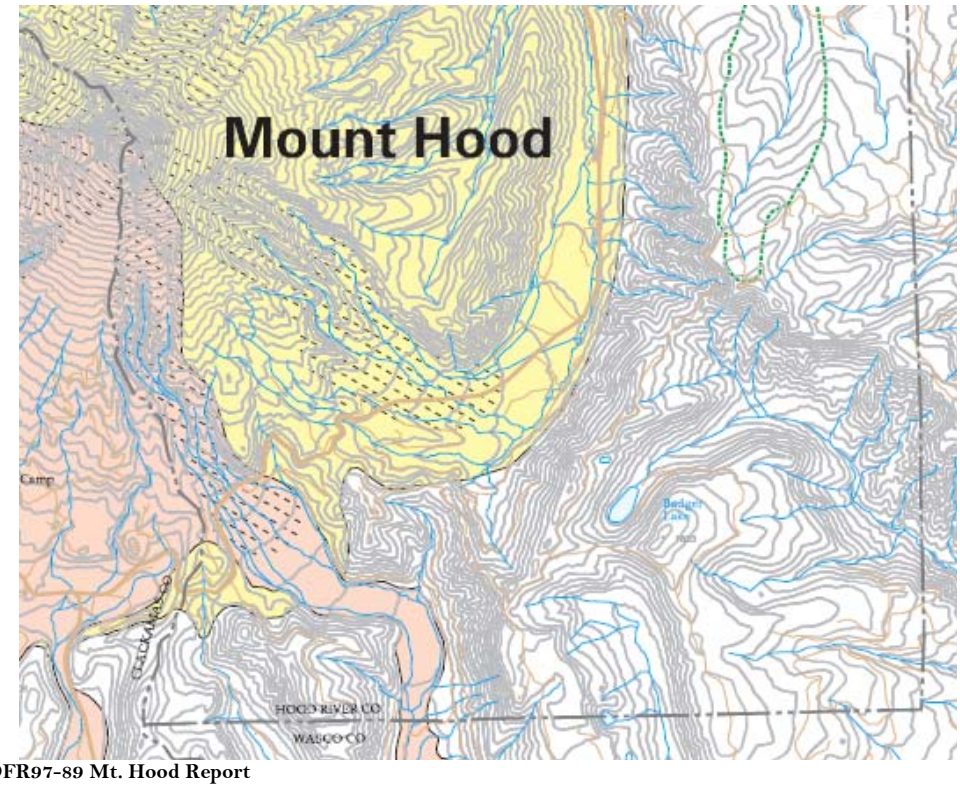
- Long-term effects are reduced amounts of timber and agriculture for commercial purposes and the reduction of travel and recreational activities in the affected area.

- Home building in and near forests increases 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.

Overview

It is possible that unexpected volcanic activity may occur that may significantly impact Hood River County. Mount Hood has erupted intermittently for hundreds of thousands of years, but historical observations are meager, so most of our information about its past behavior comes from geologic study of the deposits produced by prehistoric events. Because of potential impact to the Hood River valley from a lahar flow from the Hood River, there is moderate vulnerability.

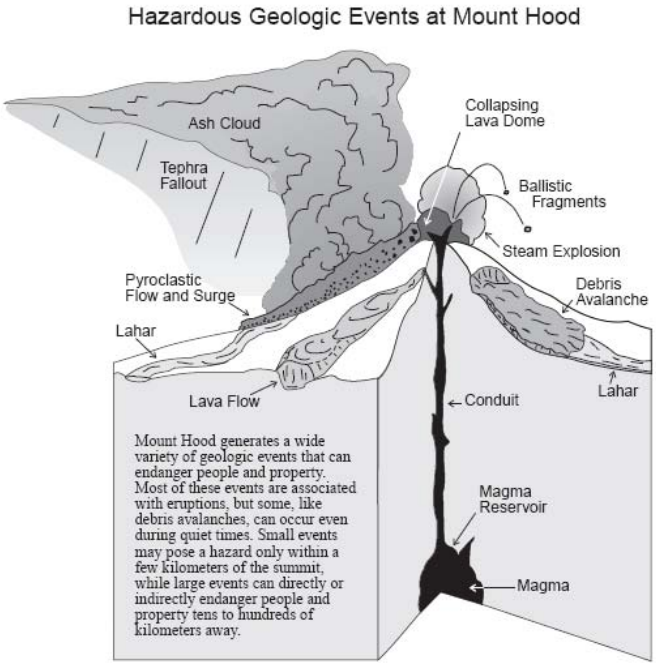
Figure 3.10 Mt. Hood



Source: OFR97-89 Mt. Hood Report

The factor that most limits Hood River County's vulnerability to a major eruption of Mt. Hood is the modern capability to accurately detect eruptive activity well before an eruption occurs. The USGS constantly monitors seismic activity directly underneath Cascade volcanoes. Clusters or 'swarms' of small earthquakes underneath a volcano have proven to be a precursor to renewed volcanic activity. Mt. St. Helens and Mt. Hood are both closely monitored, in terms of ground movement and seismic activity. It is up to emergency managers and other responsible agencies to ensure an aggressive response to these warnings.

Figure 3.11 Hazardous Geologic Events at Mount Hood



Source: OFR97-89 Mt. Hood Report

Conditions and Concerns[xiv]

The following conditions and concerns are found in portions of the county which contribute to the volcanic threat and potential for catastrophic losses

- 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.
- On the basis of the type and magnitude of tephra (ash) production we would expect from Mount Hood in the future, only nearby communities, such as Government Camp, Rhododendron, and Parkdale, would likely receive a tephra thickness approaching 1.5 centimeters (2/3 inch) in any one event. Such a thickness would pose serious threat to visibility, communications and power.
- Major highways (US 26 and OR 35), and popular tourist and recreation areas (Timberline Lodge and Mount Hood Meadows Ski Area) on the flanks of the Mountain are at significant risk, especially during tourist season
- The probability of eruption-generated lahars affecting the Sandy and White River valleys is 1-in-15 to 1-in-30 during the next 30 years, whereas the probability of extensive areas in the Hood River Valley being affected by lahars is about ten times less.
- Several masses of partly altered and highly fractured rock on the steep upper east and north flanks could generate a debris avalanche and related lahar with a volume of about 50 million cubic meters (65 million cubic yards), which is roughly the volume of the largest debris avalanche and lahar generated in the Sandy River valley during the past 1,500 years. Second, dome growth on the upper east or north flank

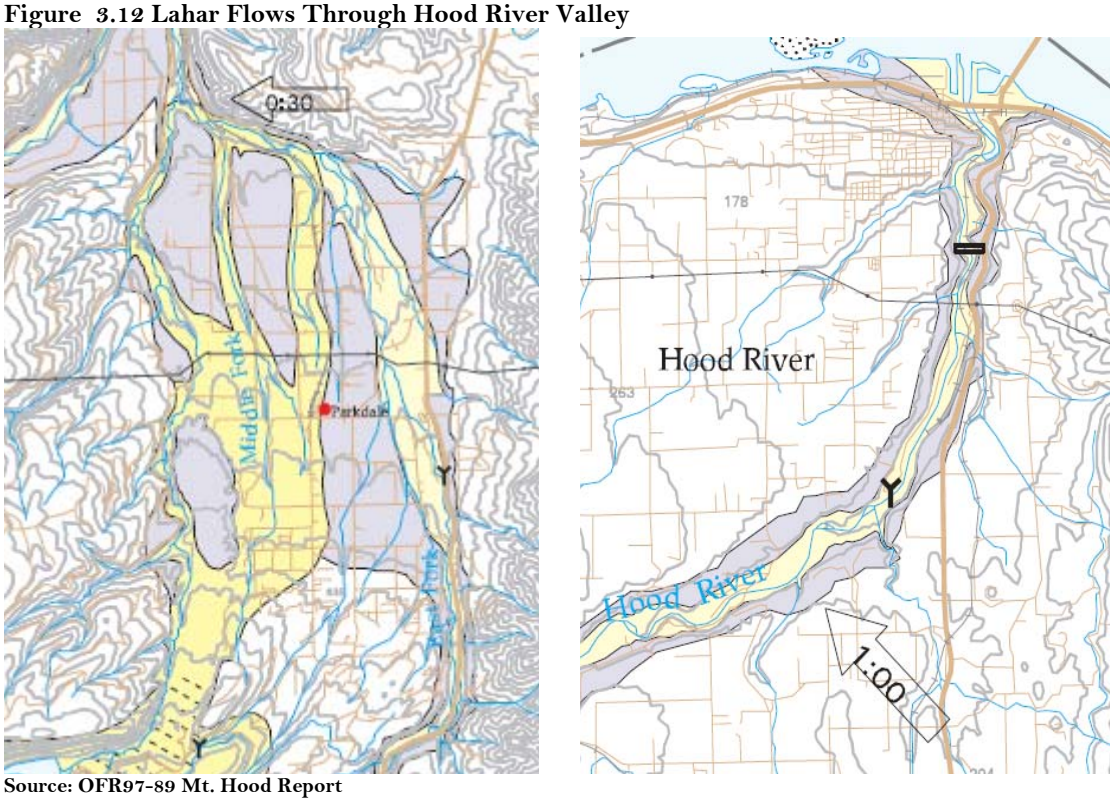
could generate lahars similar to those produced by dome growth and collapse near Crater Rock during the past 1,500 years.

- Past lahars at Mount Hood completely buried valley floors in the Sandy and Hood River drainages all the way to the Columbia River and in the White River drainage all the way to the Deschutes River.

Geographic Extent

Lahars from a Mt. Hood eruption will impact areas along the Hood River. The two population centers at most risk are the east-side of the City of Hood River (roughly one hour after eruption) and Parkdale (roughly 30 min. after eruption).

Figure 3.12 Lahar Flows Through Hood River Valley



Source: OFR97-89 Mt. Hood Report

Tephra falls and earthquakes from a Mt. Hood eruption could cause significant damage and disruption of basic services county wide.

Impact Summary

The following details both historical and potential impacts of volcanic activity upon Hood River County:

- A highly damaging lahar occurred in December 1980 when intense warm rain (with rapid snowmelt) triggered a flow in Polallie Creek that killed a camper at the creek mouth and temporarily dammed the East Fork Hood River. The ensuing dambreak

flood destroyed about 10 kilometers (6 miles) of Oregon Highway 35 and other downstream facilities and caused about $13 million in damage.

- Future eruptions of Mount Hood could seriously disrupt transportation (air, river, and highway), some municipal water supplies, and hydroelectric power generation and transmission in northwest Oregon and southwest Washington.
- Unexpected earthquakes (both smaller local ones and larger distant ones) or steam explosions can also trigger debris avalanches. A debris avalanche can attain speeds in excess of 160 kilometers per hour (100 miles per hour); the larger the avalanche, the faster and farther it can move. Small-volume debris avalanches typically move only a few kilometers (1 to 3 miles), but large-volume debris avalanches are capable of reaching tens of kilometers (tens of miles) from the volcano. Debris avalanches destroy everything in their paths and can leave deposits 10 to more than 100 meters (30 to more than 300 feet) thick on valley floors. Depending upon their water content, debris avalanches can transform into lahars, which, like lahars formed by pyroclastic flows, can move down valleys for even greater distances.
- Tephra clouds can create tens of minutes or more of darkness as they pass over a downwind area, even on sunny days, and reduce visibility on highways. Tephra ingested by vehicle engines can clog filters and increase wear. Deposits of tephra can short-circuit electric transformers and power lines, especially if the tephra is wet and thereby highly conductive, sticky, and heavy. This effect could seriously disrupt hydroelectric power generation and transmission along the Columbia River and powerline corridors north and east of the volcano. Tephra clouds often spawn lightning, which can interfere with electrical and communication systems and start fires. A serious potential danger of tephra stems from the grave effects of even small, dilute tephra clouds on jet aircraft that fly into them. Major air routes pass by Mount Hood, and tephra clouds produced repeatedly during an eruptive episode would interfere greatly with air traffic.

[i] Hood River County HIVA
[ii] OSU Extension Service
[iii] Hood River Water Quality Management Plan
[iv] Hood River County HIVA; National Drought Mitigation Center- University of Lincoln Nebraska
[v] Adapted from Hood River County HIVA
[vi] Hood River County HIVA
[vii] Hood River County HIVA
[viii] OR-SNHMP (Region 5) Mid-Columbia
[ix] Hood River Subbasin Assessment
[x] Hood River County HIVA
[xi] Hood River County HIVA
[xii] OR-SNHMP (Region 5) Mid-Columbia
[xiii] Adapted from OFR97-89 Mt. Hood Report
[xiv] OFR97-89 Mt. Hood Report

Section IV:

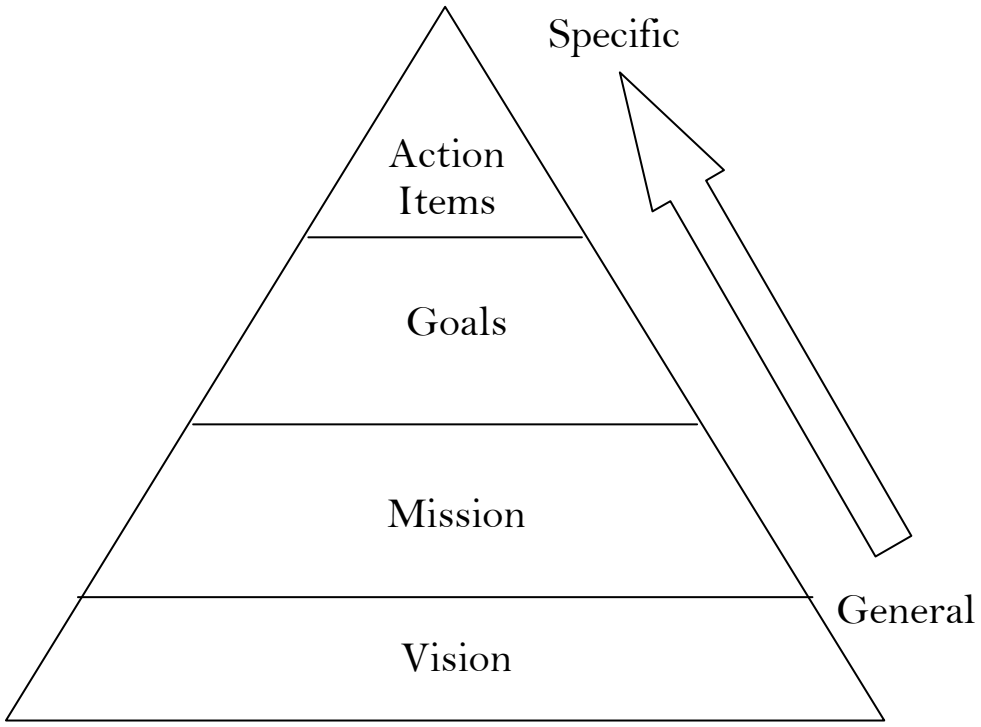
Mission, Goals, and Action Items

This section describes the components that guide the implementation of the identified mitigation strategies and is based on action plan principles. This section also provides information on the process used to develop the action plan components which include: vision, mission, goals, objectives and action items.

- ***Vision***— The vision statement describes the preferred or desired future for the community with regard to natural hazards.
- ***Mission***— The mission statement is a philosophical or value statement that answers the question "Why develop a plan?" In short, the mission states the purpose and defines the primary function of the County's Natural Hazards Mitigation Plan. The mission is an action-oriented statement of the plan's reason to exist. It is broad enough that it need not change unless the community environment changes.
- ***Goals***—Goals are designed to drive actions and they are intended to represent the general end toward which the County effort is directed. Goals identify how the community intends to work toward mitigating risk from natural hazards. The goals are guiding principles for the specific recommendations that are outlined in the action items.
- ***Action Items***—The action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk.

Figure 4.1 illustrates the components of the action plan and depicts the level of specificity for each of the action plan components.

Figure 4.1: Action Plan Components



Source: Oregon Natural Hazards Workgroup. 2005.

Natural Hazard Mitigation Vision and Mission

The vision statement was culled from the adopted vision set forth by the Hood River County Charter. Input from Stakeholder Interviews, Steering Committee meetings, and ONHW training sessions were synthesized by NHMP Coordinator into a NHMP mission statement draft. The mission statement draft was then approved and adopted by the Hood River County NHMP Steering Committee in the course of its final Goals & Action Items Meeting on 14 July 2006.

Vision

Hood River County's mitigation plan vision is…

"…to provide quality of life for all."

Mission

Hood River County's mitigation plan mission 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.

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

The outcome of the goal 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 *Emergency Services Enhancement*, and to *Facilitate Partnerships and Coordination.* The Secondary goal is to *Acknowledge Responsibility* for mitigating hazardous events.

For more information on the public process, please refer to *Appendix A: Public Process.*

Table 4.1 Hood River County Goals, Statements, and Priority

GOAL	STATEMENT	CHOICE	PRIORITY
Education & Outreach	Develop and implement education programs to increase awareness among citizens, local, county, and regional agencies, non-profit organizations, businesses, and industry	1	
	Develop and conduct outreach programs to increase the number of local activities implemented by public and private sector organizations		
	Build community consensus through outreach, education and activities		
Disaster Resilient Economy	Foster a diverse economy to reduce the debilitation impacts of a hazard event on any one sector	1	
	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		
	Protect recreation and tourist industries by raising awareness of potential hazard impacts		
	Provide support for agricultural industries to help them prepare for hazardous events		
Protection of Life & Property	Develop and implement activities to protect human life, commerce, property and natural resource systems	2	
	Reduce insurance losses and repetitive claims for chronic hazard events while promoting insurance for catastrophic hazards		
	Evaluate county guideline/codes, and permitting processes in addressing hazard mitigation; emphasize non-structural means of mitigating hazard impact		
	When applicable, utilize structural mitigation activities to minimize risks associated with hazard events		
Intergenerational Equity	Encourage growth and development that meets the needs of the present without compromising future generations		
Acknowledge Responsibility	Coordinate programs to increase natural hazard knowledge base and use technology to better record events and model vulnerability	1	
	Actively acknowledge amount of loss the County is susceptible to and develop efforts to overcome that loss without significant reliance on outside resources	2	**II**
	Educate County leadership and incorporate hazard mitigation as part of the County's routine decision making process	1	
Facilitate Partnerships & Coordination	Strengthen communication and coordination of public/private partnerships and emergency services among local, county and regional governments and the private sector	6	**I***
	Incorporate hazard mitigation into the greater social, economic and natural resource goal framework		
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	2	
Emergency Services Enhancement	Evaluate performance of critical facilities during a natural hazard event		**I***
	Minimize life safety issues	1	
	Ensure resources, staffing and volunteer base keeps pace with County growth	5	

***Tie**

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 Item Development

The 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 & 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 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 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

The Action Item Worksheet

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 to pre-package potential projects for grant funding. The worksheet components are described below. These action item worksheets are located at the end of this section following the Action Plan Matrix which displays all the plan's action items.

- **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 from a number of sources including participants of the planning process, noted deficiencies in local capability, or issues identified through the risk assessment.

- **Ideas for Implementation**

The ideas for implementation offer a transition from theory to practice. The ideas for implementation serve as a starting point for this plan. This component of the action item is dynamic as some ideas may be not feasible and new ideas can be added during the plan maintenance process. Ideas for implementation include things such as collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. This section should also include a description of how the mitigation activity may be implemented through existing community plans, policies and programs.

- **Coordinating Organization**

The coordinating organization is the public agency with 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 towards completion of the action items.
Internal partner organizations are departments within the County 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 within one to two years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take between one and five years to implement.

Action Plan Matrix

The Action Plan 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.

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH #1	
Proposed Action Title:	
Identification and Pursuit of Implementation Funding for Mitigation Actions	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- The switch from planning to implementation is the step that begins the reduction of risk.

Ideas for Implementation:

- Form partnerships with cities, other counties, and state agencies. Use these partnerships to apply for federal and local (local bonds, measures) mitigation grants.
- Create spreadsheet checklist which:
  - Identifies prioritized action items
  - Coordinating organization which should apply for funding on County's behalf
  - Possible funding sources
  - Funding cycles
  - Timeframe
- Part-time hazard coordinator/deputy emergency manager; or
- Steering Committee reconvene quarterly

Coordinating Organization:	**Emergency Management**

Internal Partners:	**External Partners:**
County Agencies	**Cities, State Agencies, Non-Government/Quasi-governmental Organizations, Public**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
X		

Form Submitted by:	**DOGAMI / NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* MH #1 – for Multi-Hazard #1; or FH #3 – for Flood Hazard #3 *)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#2	
Proposed Action Title:	
Public Outreach / Educational Programs	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Developing education programs aimed at mitigating the risk posed by hazards are sometimes the best way to reduce the risk.

Ideas for Implementation:

- Use internet websites, local fairs, news articles, brochures, etc to get the data to the public.
- Create Natural Hazard display to place at library, planning department, court house, and other pubic buildings
- Create a hazard information page as part of the EM website
- Use pubic service radio announcements to educate public on emergency procedures
- **Sustain education/outreach program for local jurisdictions**
    - Coordinate county wide EM training & exercises
    - Train local jurisdictions
    - Inform local jurisdictions of available resources, grants, opportunities and other assistance
    - Disseminate OEM and FEMA information
- According to the Mid-Columbia Household Survey, conducted by the Oregon Natural Hazards Workgroup in the spring of 2006, television news (53%), mail (49%), and newspaper stories (48%) were the most effective ways of receiving information about how to mitigate the impact of natural hazards. In terms of identifying specific news sources that are trusted by the public, 40% of respondents cited the Red Cross as the most trusted source of news. The second most trusted source were utility companies, cited by 38% of respondents. For improving effectiveness of outreach, partner with the Red Cross and utility providers to create informative mailings about natural hazard mitigation. Also, work with the Red Cross and utility providers to create news stories about natural hazard mitigation, and work with local news media to have the stories run both in print and on television.

Coordinating Organization:	**Emergency Management**

Internal Partners:	**External Partners:**
County Agencies (Planning, SWCD, Building specifically)	**Cities, State Agencies, Non-Government/Quasi-governmental Organizations, Public, Media, Schools**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
X		

Form Submitted by:	**DOGAMI /NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#3	
Proposed Action Title:	
Annual Review and Update the County Emergency Operations Plan and Natural Hazards Mitigation Plan / Complete Review/Update/Adoption by County Court Every Five Years.	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- FEMA requires NHMP update every 5 years to maintain HMGP funding eligibility
- Annual review/update ensures operability of plans and makes 5 year update easier

Ideas for Implementation:

- County Emergency Management will coordinate plan updates annually and complete reviews at least every five years. During the complete reviews, the plans will be evaluated with respect to the county's Zoning Ordinance and Comprehensive Land Use Plan.
- Consider the goals and action items from the County Natural Hazard Mitigation Plan for implementation in other county documents and programs, where appropriate.
- Review the Natural Hazards Mitigation Plan for opportunities to update the county's Comprehensive Land Use Plan and supporting plans and documents. Statewide Planning Goal 7 is designed to protect life and property from natural disasters and hazards through planning strategies.
- Consider how components of the county's Natural Hazards Mitigation Plan might be used in updating current and future capital improvement plans.
- Integrate goals and action items into the county's stormwater management program.

Coordinating Organization:	**Emergency Management / Steering Committee**

Internal Partners:		**External Partners:**
Planning, BOC		**OEM, ONHW**
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
	X (Ongoing)	

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#4	
Proposed Action Title:	
GIS Inventory & Risk Assessment Tool	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Data may be used to create hazard maps, assess risk and develop plans
- Electronic GIS data may be easily maintained, stored, and updated over time

Ideas for Implementation:

- Electronic synthesis of inventory information on natural hazards, land development, community infrastructure and demographics
- Inventory all critical facilites, large employers/public assembly areas, and lifelines (critical infrastructure), and use GIS to evaluate vulnerability by comparing them with hazard prone areas.

Coordinating Organization:	**GIS**

Internal Partners:	**External Partners:**
EM, Planning, Public Works	**ODOT, BLM, ODF, USFS, Utilities, Telecommunications**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	
	X (Ongoing)	

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#5	
Proposed Action Title:	
Create Systems to Support Special Needs Populations	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Special needs populations (elderly, disabled, low income, non-English speaking) are at greatest risk during a hazard event.
- For hazard mitigation, low-income populations need special considerations, because they may not have the savings to withstand economic setbacks, and if work is interrupted, housing, food, and necessities become a greater burden. Additionally, low-income households are more reliant upon public transportation, public food assistance, public housing, and other public programs, all which can be impacted in the event of a natural disaster. 13 percent of Hood River County's citizens live below the poverty line.
- The high percentage of elderly individuals require special consideration due to their sensitivities to heat and cold, their reliance upon transportation for medications, and their comparative difficulty in making home modifications that reduce risk to hazards. 13 percent of Hood River County's citizens are 65 or older.
- Special consideration should also be given to populations who do not speak English as their primary language. These populations can be harder to reach with preparedness and mitigation information materials. They are less likely to be prepared if special attention is not given to language and culturally appropriate outreach techniques. 15 percent of Hood River County's citizens over 5 years of age speak English less than "very well".

Ideas for Implementation:

- Database system to 911 EMO Centers showing location of disabled persons
- Database allows for information sharing by assisting agencies
- Website w/ assistance information
- Media campaign
- Establish a neighbor to neighbor network of voluntary organizations
- According to the Mid-Columbia Household Survey, conducted by the Oregon Natural Hazards Workgroup in the spring of 2006, television news (53%), mail (49%), and newspaper stories (48%) were the most effective ways of receiving information about how to mitigate the impact of natural hazards. In terms of identifying specific news sources that are trusted by the public, 40% of respondents cited the Red Cross as the most trusted source of news. The second most trusted source were utility companies, cited by 38% of respondents. For improving effectiveness of outreach, partner with the Red Cross and utility providers to create informative mailings about natural hazard mitigation. Also, work with the Red Cross and utility providers to create news stories about natural hazard mitigation, and work with local news media to have the stories run both in print and on television. Also consider soliciting participation through organizations that cater to special needs populations (i.e. elderly activity centers, organizations that have close ties to the Hispanic community).

Coordinating Organization:	**Emergency Management**

Internal Partners:	**External Partners:**
Health Department, Planning, Records and Assessment	**Red Cross, Hospitals, OR Senior Advisory Council,**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
X		

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#6	
Proposed Action Title:	
Post-Development Inspection Procedures	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Addresses concerns that County does not conduct follow up inspections to ensure that site plan requirements are met for safety (e.g. floods, fire, landslides, earthquake)
- Concern could increase with potential growth in County over next 50 years
- According to the Mid-Columbia Household Survey, conducted by the Oregon Natural Hazards Workgroup in the spring of 2006, 71% strongly agree or agree with supporting policies to prohibit development in areas subject to natural hazards. This same population likely supports post-development inspection procedures to ensure homes are built as soundly as possible in areas prone to natural hazards.

Ideas for Implementation:

- Update review procedures
- Increase staffing

Coordinating Organization:	**Planning**

Internal Partners:	**External Partners:**
Building, Fire Districts, EM	**Building Inspectors, Real Estate**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
	X	

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#7	
Proposed Action Title:	
Update County Comprehensive Land Use Plan	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Goal 7 is out of date
- Take advantage of opportunity to use comp. plan to implement non-structural mitigation activities

Ideas for Implementation:

- Use updated hazard information for county ordinances and regulations that govern site specific land use decisions
- Use Oregon TRG and other resources to help guide drafting and implementation of regulations and ordinances (non-structural) to mitigate risk

Coordinating Organization:	**Planning**

Internal Partners:	**External Partners:**
BOC	**LCDC**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
	X	

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#8	
Proposed Action Title:	
Emergency Disaster Fund	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- A fund at the local level can be used to pay for mitigation efforts or leverage state and federal assistance in grants
- Communities willing to actively fund mitigation projects are more likely to receive grant money to make up the difference

Ideas for Implementation:

- Contract third party to perform need analysis
- Make part of EOP update

Coordinating Organization:	**BOC**

Internal Partners:	**External Partners:**
EM Response, Emergency Management	**OEM, FEMA,**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
	X	

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#9	
Proposed Action Title:	
Volunteer Coordination & Planning	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Volunteers are a critical resource during disaster and many are members of more than one organization
- Need for a clear view of their roles during different types of disasters to help them prioritize their efforts

Ideas for Implementation:

- Identify & prioritize how volunteers can assist during different types of disaster
- Provide training
- Develop notification procedures w/ thresholds of activation
- Coordinate registration and training
- Retain professional or volunteer coordinator for volunteer programs/activities/grant opportunities, etc.

Coordinating Organization:	**Emergency Managment**

Internal Partners:	**External Partners:**
EM Response	**City, ODF, BLM, CERT**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	
	X	

Form Submitted by:	**NHMP Coordinator**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
Multi-Hazard; Landslide, Flood	
Proposed Action Title:	
County Forest Road Maintenance	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Improve flood capacity and lower the risk of road washouts.
- Improved road maintenance and road management will reduce fine sediment loading and landslide risks introduced by the forest road network. It is expected to improve aquatic habitat conditions for threatened steelhead and bull trout, as well as chinook, cutthroat and rainbow trout, and other native species. Forest roads are a major source of fine sediment delivery to streams especially where poor road conditions and wet weather vehicle use intersect and where culvert failures exist.
- County roads with native soil surfaces, inadequate drainage, too-small culverts, and poor ditch conditions were all identified in a road inventory completed in 2001. Inventory methods followed Oregon Department of Forestry and ODFW protocols.

Ideas for Implementation:

- Conduct various road maintenance activities, drainage improvements, culvert enlargement for flood capacity, cut slope and roadside ditch treatment, resurfacing, obliteration, gating, or other treatments as necessary to reduce sediment delivery to streams. Control risks of washouts and slope failures associated with the forest road system. Use the 2001road

Coordinating Organization:	**HRC Forestry Department**

Internal Partners:	**External Partners:**
	HR Soil & Water Conservation District

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**TBD**
	X	

Form Submitted by:	**SWCD**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
Multi-hazard; Landslide, Flood	
Proposed Action Title:	
Extend Streamside Vegetation Protection to All Land Uses	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Insufficient development rules currently exist to protect streamside vegetation important to aquatic life. Several stream segments exceed temperature standards that protect coldwater fish.
- Riparian and shade assessments of the Lower Hood River and Lower East and Middle Fork Hood River watersheds found that up to 28% of streambank length has low shade and that wood recruitment potential is limited by development and infrastructure along 58 miles of stream length examined. A 2001DEQ study found similar results.
- This measure will help restore and protect important riparian zone functions including shade, erosion control, large woody debris recruitment, and absorption of contaminated runoff in streams used by threatened steelhead, as well as other salmonids.
- Sufficient streamside vegetation reduces risk for landslide and flood.

Ideas for Implementation:

- Encourage and assist the County and City Planning Departments, Planning Commissions, and elected officials to develop and adopt appropriate development standards, ordinances, and rules to maintain sufficient vegetation buffers along streambanks in residential, commercial and all other non-forest, non-agricultural lands. State law requires that adequate shade and vegetation be maintained along stream corridors for timber harvest and agriculture, but no similar protection exists for other land use activities.

Coordinating Organization:	Hood River Watershed Group

Internal Partners:	**External Partners:**
Soil & Water Conservation District	**HR County Planning** **HR City Planning**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**TBD**
	X	

Form Submitted by:	**SWCD**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
Multi-Hazard; Floods, Landslides	
Proposed Action Title:	
U.S. Forest Service Road Maintenance	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Improve flood capacity and therefore reduce the risk of road washouts and sedimentation.
- This measure would reduce fine sediment loading and road-related landslide risks introduced by the forest road network, and is expected to improve aquatic habitat conditions for threatened steelhead and bull trout, as well as chinook, cutthroat and rainbow trout, and other native fish species.
- Road sediment and silt fills pools, clogs gravel, and degrades streambed habitat. Excessive siltation can occur from traditional roadside ditch cleaning/scraping methods that expose bare soils to stormwater erosion. Of key concern are locations where ditch lines slope and drain directly into creeks such as at road crossings
- Fine sediment from forest road runoff and road washouts has been identified as the major source of non-natural sediment delivery to streams in the watershed.

Ideas for Implementation:

- Conduct various road maintenance activities including drainage improvements, culvert enlargement for flood capacity, cut slope and roadside ditch treatment, resurfacing, obliteration, gating, or other treatments as needed to reduce sediment delivery to streams and control risks of washouts and slope failures associated with the forest road system

Coordinating Organization:	U.S. Forest Service

Internal Partners:	**External Partners:**
	Soil & Water Conservation District **HRC Public Works**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	
	X	

Form Submitted by:	**Anne Saxby**

Action Item Proposal Form

Proposed Action Item Identification: *(Example* Multi-Hazard; Flood; Drought; Windstorm; Winter Storm; Landslide, Earthquake; Wildfire; Volcanic*)*	**Alignment with Plan Goals: (***List Goals the action helps to achieve.)*
MH#13	
Proposed Action Title:	
Eliminate Open/Roadside Ditches and Pipe All Irrigation Water	

Rationale for Proposed Action Item:
(What critical issues will the action address?)

- Piped highest canals prevents evaporation and water loss, no vegetation loss;
- Education & piping = best use in drought
- Prevents repetitive flood loss in irrigation ditches
- According to the state risk assessment, Hood River County's risk of drought is high. Therefore, preserving water is a wise measure.

Ideas for Implementation:

- Apply for grant funding to replace open channel & roadside irrigation ditches with piped systems.

Coordinating Organization:	**SWCD**

Internal Partners:	**External Partners:**
Planning	**FID, USDA, OSU Extension Service**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term(2-4 or more years)	**n/a**
	X	

Form Submitted by:	**Farmer's Irrigation District**

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	Intergenerational Equity	Acknowledge Responsibility	Facilitate Partnerships & Coordination	Natural Resource Systems Protection	Emergency Services Enhancement
MULTI-HAZARD 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 (BOC)	Emergency Management, Planning, Public Works, SWCD, Cities, State Agencies, Non-Government/Quasi-governmental Organizations, Public	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	ST (ongoing)	X				X	X		
MH#3	H	Annual Review and Update of the County Emergency Operations Plan , Community Wildfire Protection Plan, and Natural Hazards Mitigation Plan; Re-Adoption by BOC Every 5-Years	Hood River County Hazard Steering Commiettee	Planning, BOC, Emergency Management, OEM, ONHW	ST (ongoing)				X	X	X		
MH#4	**HIGHEST**	Pursue Funding to Increase Hazard Knowledge Base & Develop & Maintain Comprehensive Impact Database	GIS	EM, Planning, Public Works, ODOT, BLM, ODF, USFS, Utilities, Telecommunications	LT (ongoing)					X	X		
MH#5	H	Create Systems to Support Special Needs Populations	Emergency Management	Health Department, Planning, Records and Assessment, Red Cross, Hospitals, OR Senior Advisory Council	ST (ongoing)				X	X	X		X
MH#6	**HIGHEST**	Create County Position for Volunteer Coordination & Planning	BOC	Emergency Response, Emergency Management, City, ODF, BLM, CERT, Region (neighboring counties)	LT	X				X	X		X
MH#7	**HIGHEST**	Formation of Regional Hazard Overhead Team	Fire Districts	BOC, ODF, USFS, Mid Columbia Council of Governements, Region (neighboring counties)	LT			X			X		X
MH#8	L	Create Emergency Disaster Fund	BOC	Emergency Response, Emergency Management, OEM, FEMA	LT		X			X	X		

Action Item	Priority	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals							
						Education & Outreach	Disaster Resilient Economy	Protection of Life & Property	Intergenerational Equity	Acknowledge Responsibility	Facilitate Partnerships & Coordination	Natural Resource Systems Protection	Emergency Services Enhancement
MH#9	L	Develop Post-Disaster Recovery Plan	BOC	Planning, Public Works, County Facilities, Emergency Management, Cities, FEMA, ONHW	LT		X		X	X	X		
MH#10	**HIGHEST**	Create Emergency Communication Systems that are Interoperable	Emergency Management	Emergency Response, BOC	ST								X
MH#11	L	Develop Small Business Awareness & Continuity Planning Campaign	Hood River Chamber of Commerce	BOC, ONHW	LT (ongoing)	X	X		X		X		
MH#12	H	Post-Development Inspection Procedures	Planning	Building, Fire Districts, EM, Building Inspectors, Real Estate	LT			X	X	X	X		
MH#13	L	Update County Comprehensive Land Use Plan	Planning	BOC, DLCD	LT			X	X	X			
MH#14	L	Improve County Forest Road Maintenance	HRC Forestry Department	SWCD	LT			X	X			X	
MH15	L	Extend Streamside Vegetation Protection to All Land Uses	Hood River Watershed Group	SWCD, County Planning, City Planning	LT			X	X			X	
MH#16	L	Identification / Analysis of Irrigation Water Systems & Elimination of Open Irrigation Water	SWCD	Planning, FID, USDA, OSU Extension Service	LT		X		X			X	
MH#17	L	Improve U.S. Forest Service Road Maintenance	U.S. Forest Service	SWCD, Public Works	LT			X	X			X	
DH#1	H	Support Local Agencies Training on Water Conservation Measures and Drought Management Practices	SWCD	Planning, OSU Extension, Fruit Growers	LT (ongoing)	X	X		X		X	X	
DH#2	L	Ensure Long-range Water Resources Development	SWCD	Planning, Public Works, GIS, Watermaster, BOC, SWCD, OSU Extension, Irrigation Districts	LT (ongoing)		X	X	X		X	X	
FH#1	H	Mitigate Flood Event Resulting from Naturally Induced Dam Failure	SWCD	Public Works, GIS, Fire Dept. , Emergency Management, Army Core of Engineers, BPA, DEQ, WRD	ST			X		X			
FH#2	H	Apply for NFIP Community Rating System / CRS Rating System	Planning	BOC, Cities, LCDC, FEMA, OEM, OECDD	ST	X			X	X			
FH#3	H	Address Repetitive Loss	Planning	BOC, Cities, LCDC, FEMA, OEM, OECDD	ST	X		X	X	X			
FH#4	H	Update FIRM Maps	Planning	GIS, Public Works, FEMA	ST			X	X			X	
FH#5	H	Create Flood Identification Inventory	GIS	Planning, Public Works, EM	LT (ongoing)				X	X	X		

Action Item	Priority	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals							
						Education & Outreach	Disaster Resilient Economy	Protection of Life & Property	Intergenerational Equity	Acknowledge Responsibility	Facilitate Partnerships & Coordination	Natural Resource Systems Protection	Emergency Services Enhancement
FH#6	H	Improve Methods of Barrier Prioritization and Culvert Barrier Remediation for Fish Passage & Flood Mitigation	Public Works	SWCD	LT			X	X			X	
FH#7	H	Promote Onsite Stormwater Infiltration and Retention	Planning & Building	SWCD, DEQ, DLCD, SWCD	LT (ongoing)	X	X	X	X			X	
FH#8	L	Develop Flood Education & Outreach Programs	BOC	EM, Planning, Building, SWCD, ONHW, FEMA, OEM	LT (ongoing)	X	X	X			X	X	
EH#1	H	Rehabilitate Identified Vulnerable Schools, Emergency Facilities, and Public Buildings/Lifelines	County Facilities	Emergency Management, BOC, Planning, GIS, Public Works, DOGAMI, OEM, DLCD	LT			X	X				X
EH#2	H	Improve Knowledge of Earthquake Sources / Improve Earthquake Hazard Zone Maps	Emergency Management	GIS, Public Works, DOGAMI, OEM, DLCD	LT					X			
EH#3	H	Improve Understanding of Vulnerability and Risk	Emergency Management	GIS, Public Works, DOGAMI, OEM, DLCD	LT					X			
EH#4	H	Educate Those at Risk	Emergency Management	GIS, Public Works, DOGAMI, OEM, DLCD	LT	X		X		X			
LS#1	H	Improve Understanding of Landslide Risk Inside Hazard Areas and Improve Warning Systems	GIS	Planning, Emergency Management, DOGAMI, ODF, DLCD	LT		X	X	X	X			X
LS#2	H	Improve Landslide Hazard Area Maps	GIS	Planning, Emergency Management, DOGAMI, ODF, DLCD	LT					X			
LS#3	H	Provide Education/Awareness for Those at Risk	Planning	GIS, Emergency Management, Planning, DOGAMI, ODF, DLCD	LT	X		X	X				
LH#4	H	Improve Knowledge of Debris Flow (rapid moving) Landslide Hazard Areas and Improve Warning Systems	Emergency Management	Public Works, GIS, Planning, DOGAMI, ODF, DLCD, OEM	ST		X	X	X	X			X
LH#5	L	Update County Landslide Ordinance	Planning	Planning Commission, ONHW, OEM	LT		X	X	X	X			
SH#1	H	Develop Partnership Programs to Reduce Vulnerability of Public Infrastructure from Severe Winter Storms	Emergency Management	Planning, Public Works, Cities, Utilities	LT		X	X			X		
SH#2	H	Encourage Critical Facilities to Secure Emergency Power	Emergency Management	Planning, Public Works, GIS, DOGAMI, OEM, DLCD, Red Cross	ST								X

Action Item	Priority	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals							
						Education & Outreach	Disaster Resilient Economy	Protection of Life & Property	Intergenerational Equity	Acknowledge Responsibility	Facilitate Partnerships & Coordination	Natural Resource Systems Protection	Emergency Services Enhancement
SH#3	H	Support/Encourage Electrical Utilities to Use Underground Construction Methods	Planning	Emergency Management, GIS, Cities, Utilities, Building Contractors, Real Estate	ST		X		X				
SH#4	H	Increase and Maintain Public Awareness of Severe Storms.	Emergency Management	Planning, Public Works, Utilities, Cities, American Red Cross, St. Vincent DePaul, Churches, , Fire, FEMA	LT (ongoing)	X	X						
SH#5	H	Enhance Strategies for Debris Management and/or Removal Before/After Storm Event	Emergency Management	Public Works, ODOT, Cities, Dump, Regional Recycling Facilities, ODFW, BLM, ODOT, Timber Industry	ST		X	X	X		X		
SH#6	L	Encourage Building Standards Beyond Minimum State Requirements for Windstorm Impact	Planning	Public Works, Building Inspectors, Utilities, Cities	ST (ongoing)			X	X				
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	ST			X			X		X
WH#3	H	Hazard Fuel Reduction	Fire Districts	Public Works, Maintenance, SWCD, Railroads, ODOT, USFS, ODF	ST			X				X	X
WH#4	**HIGHEST**	Ensure Proper Road Continuity, Numbering and Naming	Planning	Fire Districts, BOC, Public Works	ST			X	X				X
WH#5	H	Update County WUI, Zoning and Ordinances	Planning	Fire Districts, BOC, ODF, USFS, ONHW	ST		X	X	X	X			
WH#6	H	Enhance County GIS Infrastructure	GIS	Emergency Management, Fire Districts, ODF, USFS	ST (ongoing)			X	X	X			X
VH#1	L	Acquire or Prepare Detailed Volcanic Hazard Maps	Emergency Management	GIS,DOGAMI, OEM, USGS	ST					X			
VH#2	L	Improve Knowledge Base of Volcanic Risk and Vulnerability	Emergency Management	GIS,DOGAMI, OEM, USGS	LT					X			
VH#3	L	Evaluate Emergency Response Plan and Identify Areas of Public Notification and Evacuation Routes.	Emergency Management	Emergency Response, Cities, ODF, BLM, Warm Springs,	LT			X	X	X	X		X

Section V:
Plan Implementation & Maintenance

The section details the formal process that will ensure that 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. This section also includes an explanation of how the County intends to incorporate the mitigation strategies outlined in this 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. Finally, this section describes how the County will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

After the Plan is locally reviewed and deemed complete Hood River County Planning will be responsible for submitting it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management will then submit the Plan 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. 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

Hood River County Planning & Building 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) Planning & Development 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, Board of Commissioners, local stakeholders, and State/Federal government agencies; and
- Identify emergency management related funding sources for natural hazard mitigation projects.

Contact: **TBA, Emergency Manager**
Hood River County Emergency Management
309 State St.
Hood River, OR 97031
V: TBA
E: TBA

Land Use Convener: Hood River County Planning & Development

The agency administers and enforces land use planning regulations for the County. Hood River County Planning & 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, Hood River County Planning & Development 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 hazard risk reduction projects.

Contact: **Anne Debbaut, Planner**
Hood River County Planning & Building
601 State St.
Hood River, OR 97031
V: (541) 387-6867
E: anne.debbaut@co.hood-river.or.us

Coordinating Body

The Steering Committee will serve 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 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 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: The Hood River County Steering Committee is comprised of representatives from nine County area organizations:

Table 5.1 Steering Committee Members

Name	Title	Organization
Anne Debbaut	Planner	Hood River County Planning
Jennifer Donnely	Planner	City of Hood River Planning Department
Peter Mackwell	Assistant Chief	West Side Fire District
Jeff Pricher	Fire Marshall	City of Cascade Locks
Anne Saxby	Director	Soil & Water Conservation District
Hannah Settje	District Manager	Red Cross
Jade Soddell	Emergency Manager	Hood River County Emergency Management
Joe Wampler	Sheriff	Hood River County Sheriff's Department
Don Wiley	Engineer	Hood River County Public Works

To make the coordination and review of Hood River County Hazard Mitigation Plan as broad and useful as possible, the Steering Committee will engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items.

The Steering Committee will meet quarterly to review the plan and ensure that appropriate County agencies are actively pursuing grant funding for targeted mitigation activities.

Implementation through Existing Programs

The 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 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 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.[i] 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 & Water Conservation District
- Mid-Columbia Council of Governments

For additional examples of plans, programs or agencies that may be used to implement mitigation activities, please refer to *Appendix E: Existing Plans & Programs*

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan. Proper maintenance of the plan will ensure 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 Oregon Natural Hazards Workgroup and includes a process to ensure that a regular review and update of the plan occurs. The steering committee and local staff will be 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 Meeting

The Committee will meet on a semi-annual bases to:

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

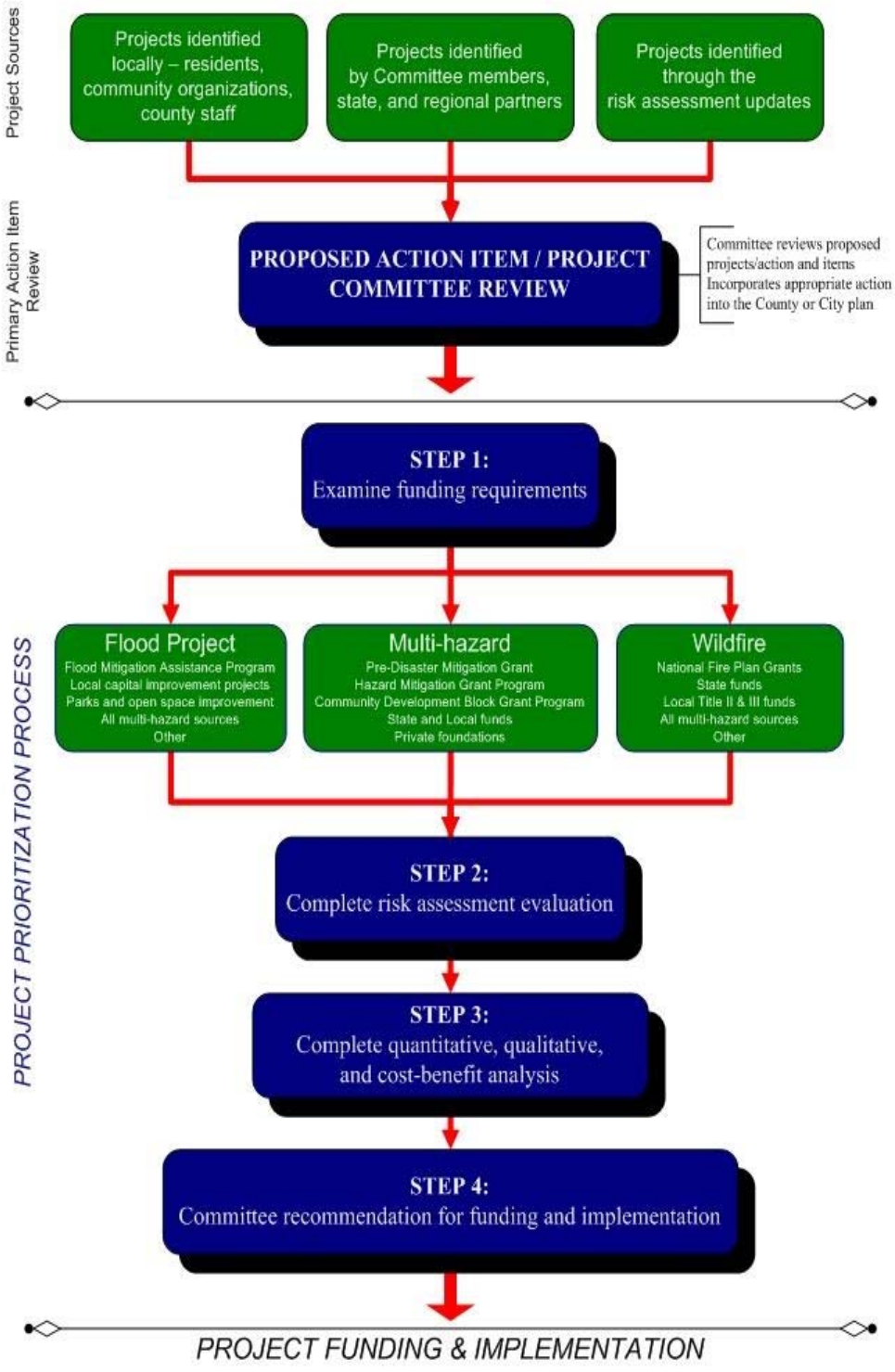
The co-conveners will be responsible for documenting the outcome of the semi-annual meetings. The process the Committee will use to prioritize mitigation projects is detailed in the section below.

Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that County identify a process for prioritizing potential actions. Potential mitigation activities will 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.

Depending on the potential project's intent and implementation methods, several funding sources may be appropriate. 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, National Fire Plan (NFP), Title II funds, Title III funds, Community Development Block Grants (CDBG), local general funds, and private foundations. Some of these examples are used in the figure 5.1 on the next page to illustrate the project development and prioritization process.

Figure 5.1: Project Prioritization Process Overview



Step 1: Examine funding requirements

The Steering Committee will identify how best to implement individual actions into the appropriate existing plan, policy, or program. The committee will examine the selected funding stream's requirements to ensure that the mitigation activity would be eligible through the funding source. The Committee may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organization about the project's eligibility.

Step 2: Complete Risk Assessment Evaluation

The second step in prioritizing the plan's action items was to examine which hazards they are associated with and where these hazards rank in terms of community risk. The committee will determine whether or not the plan's risk assessment supports the implementation of the mitigation activity. This determination will be based on the location of the potential activity and the proximity to known hazard areas, historic hazard occurrence, and the probability of future occurrence documented in the Plan. To rank the hazards, community's natural hazard risk assessment was utilized. This risk assessment identified various hazards that may threaten community infrastructure and population in a range from:

- Low
- Moderate
- High

The rank ordering of hazards by risk follows:

1. Wildfire

2. Severe Storm

3. Drought

4. Flood

5. Landslide

6. Earthquake

7. Volcanic

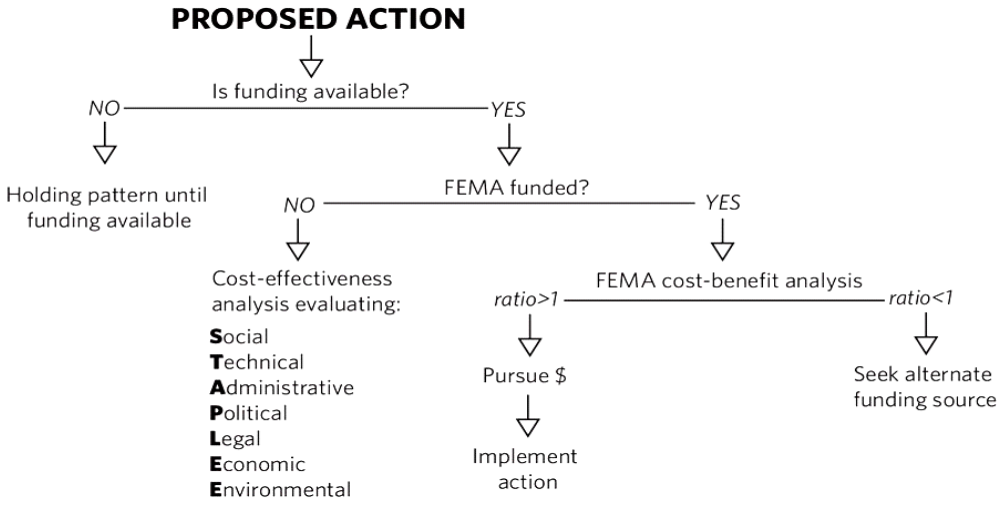
Each of the action items in the plan addresses risk from one or more of these hazards.

Step 3: Complete Quantitative and Qualitative Assessment, and Economic Analysis

The third step is to identify the costs and benefits associated with 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 can assist communities 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 can provide 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 5.2 shows decision criteria for selecting the method of analysis.

Figure 5.2: Project Prioritization Process Overview



Source: Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon, 2006.

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 natural hazard action item prioritization by the University of Oregon's Oregon Natural Hazards Workgroup. See *Appendix D: Economic Analysis of Natural Hazard Mitigation Projects* for a description of the STAPLE/E evaluation methodology.

Step 4: Committee recommendation

Based on the steps above, the committee will recommend whether or not the mitigation activity should be moved forward. If the committee decides to move forward with the action, the coordinating organization designated for the activity will be responsible for taking further action and documenting success upon project completion. The Committee will convene a meeting to review the issues surrounding grant applications and shared knowledge and or resources. This process will afford greater coordination and less competition for limited funds.

The Committee and the community's leadership have the option to implement any of the action items at any time, (regardless of the prioritized order). This allows the committee to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of highest priority. This methodology is used by the Committee to initially prioritize the plan's action items, in addition to maintaining the action list during annual review and update.

Annual Meeting

The steering committee will meet annually to review updates of the Risk Assessment data and findings, discuss methods of continued public involvement, and document successes and lessons learned based on actions that were accomplished during the past year. The convener will be responsible for documenting the outcomes of the annual.

The plan's format allows the County 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 Hood River County.

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. During this plan update, the following questions should be asked to determine what actions are necessary to update the plan. The convener will be responsible for convening the Committee to address the questions outlined below.

- Are the plan goals still applicable?
- Do the plan's priorities align with State priorities?
- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?

- Have new issues or problems related to hazards been identified in the community?
- Do existing actions need to be reprioritized for implementation?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

The questions above will help the committee determine what components of the mitigation plan need updating. The Committee will be responsible for updating any deficiencies found in the plan based on the questions above.

Continued Public Involvement & Participation

Hood River County is dedicated to involving the public directly in the continual reshaping and updating of the Natural Hazard Mitigation Plan. Although members of the Steering Committee represent the public to some extent, the public will also have the opportunity to provide feedback about the Plan.

During plan development, public participation was incorporated into every stage of the plan development process. 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 Hood River County Planning & Building 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 IV: Mission, Goals & Action Items*)

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[i] Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.*

Hazard Annex

This annex gathers detailed information on natural hazard events in the County and places them into one easy to access file. The annex documents knowledge regarding each hazard threatening the County; each specific hazard annex is divided into four section headings:

(1) Best Available Local Data
(2) State of Oregon NHMP Mid-Columbia (Region 5) Risk Assessment
(3) Hood River County Hazard Identification & Vulnerability Assessment (HIVA)
(4) Oregon Technical Resource Guide (TRG)

A summary of the section headings is provided below:

Best Available Local Data
This section collects the best available local data (i.e. County data) on hazard events and their impact. Instances are noted where local data was not readily available or insufficient.

State of Oregon Natural Hazard Mitigation Plan: Mid-Columbia (Region 5) Risk Assessment
This section reports the hazard assessment scores from the State of Oregon's mitigation plan. Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.
Moderate = One incident likely within a 35 to 75 year period.
Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected
Moderate = 1-10% affected
Low = Less than 1% affected

In some cases, counties either did not rank the hazard or did not find it to be a significant concern. These cases are noted with a dash (-) in the table below.

A copy of the State NHMP can be downloaded here:
http://www.oregonshowcase.org/index.cfm?mode=stateplan

Hood River County Hazard Inventory & Vulnerability Analysis (HIVA)
This section highlights the risk assessment provided by the Hood River County HIVA. The Oregon Revised Statutes (ORS) requires each political subdivision to base its Emergency Operations Plan on a hazard analysis. The hazard analysis is also a training tool, providing introductory knowledge of the hazards posing a threat to Hood River County. To make the analysis more useful, adjective descriptors (High, Moderate, Low) are established for each hazard's probability-of-occurrence and vulnerability and a risk rating is assigned based on a subjective estimate of their combination. The risk rating is assigned on the probability of a hazard occurring over the next 50 years. The risk rating will help focus the emergency management program on the hazards of greatest risk.

A *high risk rating* warrants major program effort to prepare for, respond to, recover from, and mitigate against the hazard.

A *moderate risk rating* warrants modest program effort to prepare for, respond to, recover from, and mitigate against the hazard.

A *low risk rating* warrants no special effort to prepare for, respond to, recover from, or mitigate against the hazard beyond general awareness training.

Oregon Technical Resource Guide (TRG)
The TRG is a comprehensive resource developed to assist Oregon communities in planning and preparing for natural hazard events. The TRG includes information on:

- Comprehensive Planning
- Legal Issues of Planning
- Hazard Specific Planning, i.e.:
  - Is your community threatened by natural hazards?
  - What are the laws in Oregon for natural hazards?
  - How can your community reduce risk from natural hazards?
  - How are Oregon communities addressing natural hazards?
  - Where can your community find resources to plan for natural hazards?

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at:
http://www.oregonshowcase.org/index.cfm

Best Available Local Data

Drought data and its impact are not easily accessible at the local level. Stakeholder interviews revealed that the Oregon State University Extension Service has the capacity to perform detailed analysis of drought impact on the agricultural community, but had not done so at the time of this plans development. Additionally, the Hood River County Soil & Water Conservation District houses data on river and stream flows, and irrigation consumption.

State Risk Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
n/a	n/a

HIVA Risk Assessment

History suggests a ***high probability of occurrence.*** The entire population of the county is vulnerable to the effects of drought. 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, suggesting ***high vulnerability***. A ***high risk rating*** is assigned.

Oregon Technical Resource Guide

There is no Drought specific section in the TRG. Please refer to the University of Nebraska-Lincoln's National Drought Mitigation Center (NDMC) website for more information. The NDMC provides the excellent drought related coverage for:

- *Planning for drought*
- *Monitoring drought*
- *Drought risks & impacts*
- *Mitigating drought*

The website address is: http://www.drought.unl.edu/

Best Available Local Data

Due to a lack of recent earthquake events in the County, the best available data is spread across Federal and State sources, the Oregon Department of Geology and Mineral Industries (DOGAMI) in particular. The following Tables are taken from the State of Oregon NHMP and the Hood River County HIVA.

More detailed DOGAMI HAZUS runs, approximating expected damage to critical infrastructure, are forthcoming.

Table H.1: Significant Earthquakes in Oregon

DATE	LOCATION	MAGNITUDE (M)	REMARKS
Approximate Years 1400 BCE* 1050 BCE 600 BCE 400 750 900	Offshore, Cascadia Subduction Zone	Probably 8-9	Based on studies of earthquake and tsunamis at Willapa Bay, Washington. These are the mid-points of the age ranges for these six events.
January, 1700	Offshore, Cascadia Subduction Zone	Approximately 9.0	Generated a tsunami that struck Oregon, Washington, and Japan; destroyed Native American villages along the coast
March, 1893	Umatilla	VI-VII (Modified Mercalli Intensity)	Damage unknown
July, 1936	Milton-Freewater	6.1	Eastern Oregon's largest event, several aftershocks, $100, 000 dollars in damage based on 1936 dollars, chimney damage, houses shifted off foundations, school buildings damaged
January, 1951	Hermiston	V	Damage unknown
April, 1976	Deschutes Valley	4.8	Near Maupin, cracked plaster, objects thrown

Notes: * BCE: Before the Common Era

Source: Ivan Wong and Jacqueline D.J. Bolt, November 1995, A Look Back at Oregon's Earthquake History, 1841-1994, *Oregon Geology*, pp. 125-139.

Table H.2 Estimated Loss from Cascadia Subduction Zone Event

Hood River County	8.5 Cascadia subduction zone event	500 year model
Injuries	0	30
Deaths	0	1
Displaced households	0	56
Short term shelter needs	0	40
Economic losses for buildings	$3 million	$62 million
Operating the day after the quake:		
Fire stations	99%	NA
Police stations	100%	NA
Schools	98%	NA
Bridges	95%	NA
Economic losses to:		
Highways	$704,000	$12 million
Airports	$76,000	$3 million
Communication systems:		
Economic losses	$17,000	$1 million
Operating the day of the quake	96%	NA
Debris generated (thousands of tons)	1	41

These figures have a high degree of uncertainty and should be used only for general planning purposes. Because of rounding, numbers may not add up to 100%.

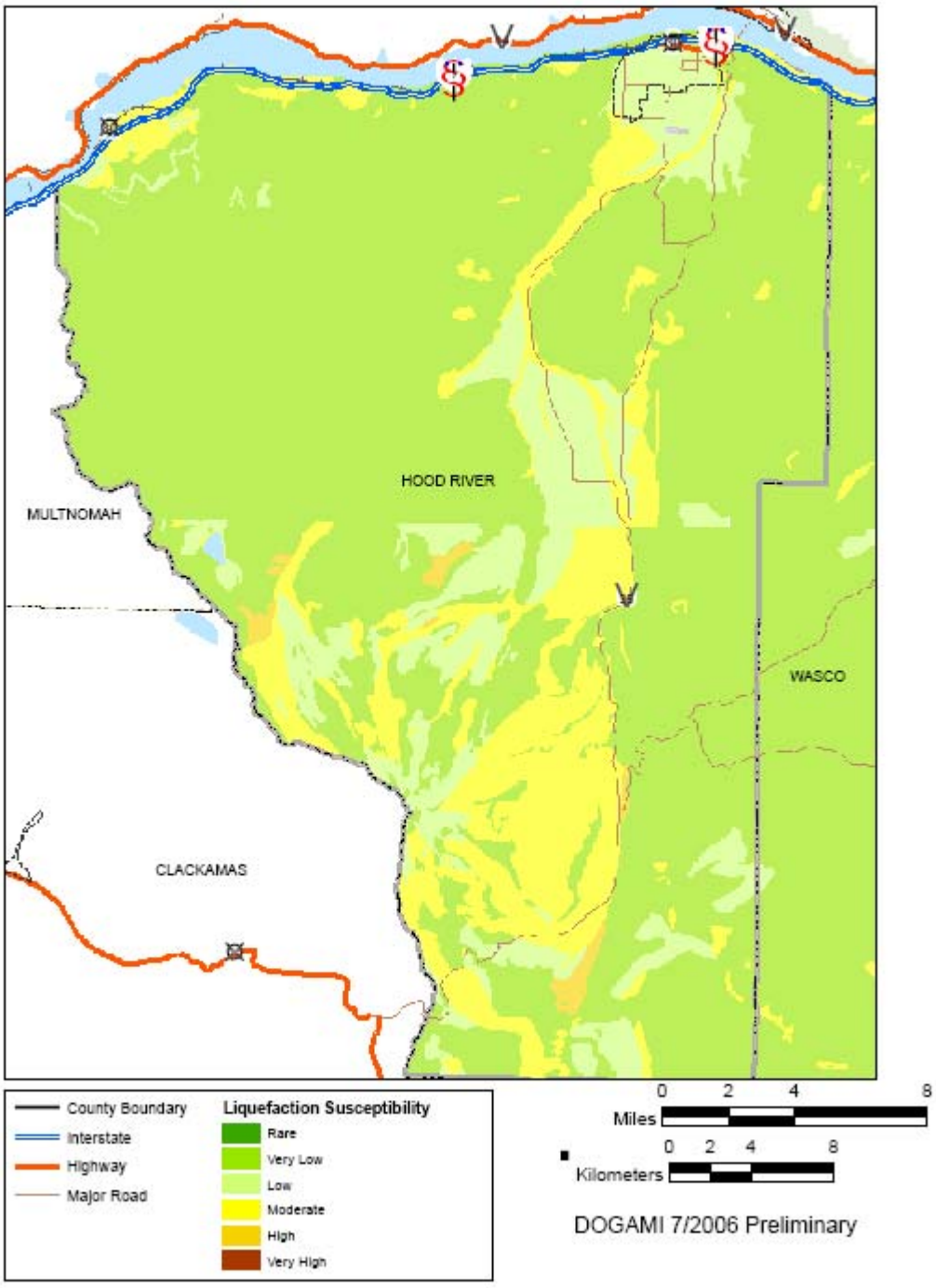
Because the 500 year model includes several earthquakes, the number of facilities operational the "day after" cannot be calculated.

8.5 Cascadia event	Percentage of buildings in damage categories				
Building type	None	Slight	Moderate	Extensive	Complete
Agriculture	97	3	1	0	0
Commercial	96	3	1	0	0
Education	97	3	1	0	0
Government	97	3	1	0	0
Industrial	96	3	1	0	0
Residential	98	2	0	0	0

500 year model	Percentage of buildings in damage categories				
Building type	None	Slight	Moderate	Extensive	Complete
Agriculture	65	15	13	6	1
Commercial	57	17	17	8	1
Education	63	15	15	6	1
Government	57	16	17	7	2
Industrial	55	16	18	9	2
Residential	77	15	6	1	0

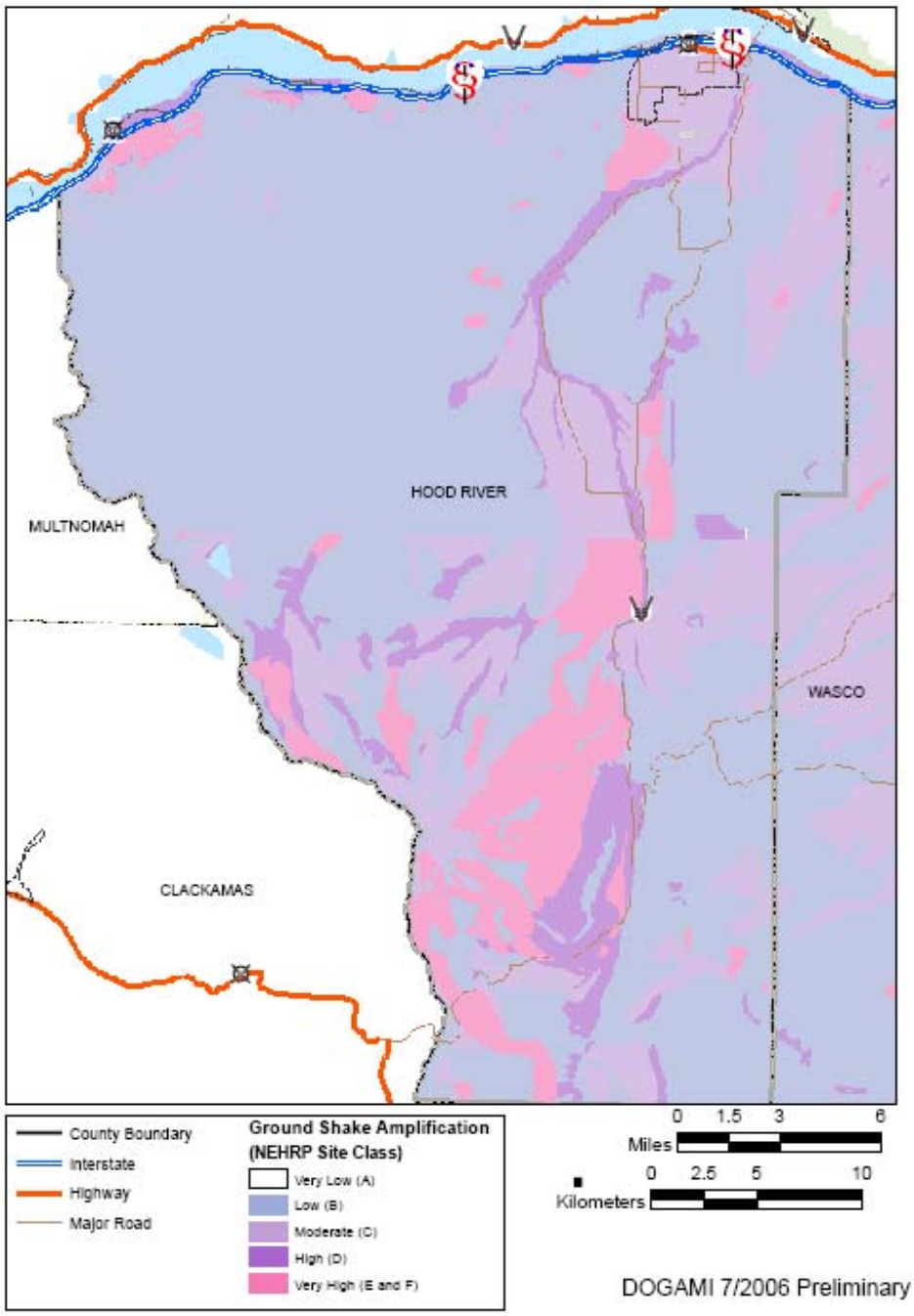
Source: Hood River County HIVA

Figure HA.1: Hood River County Liquefaction Susceptibility



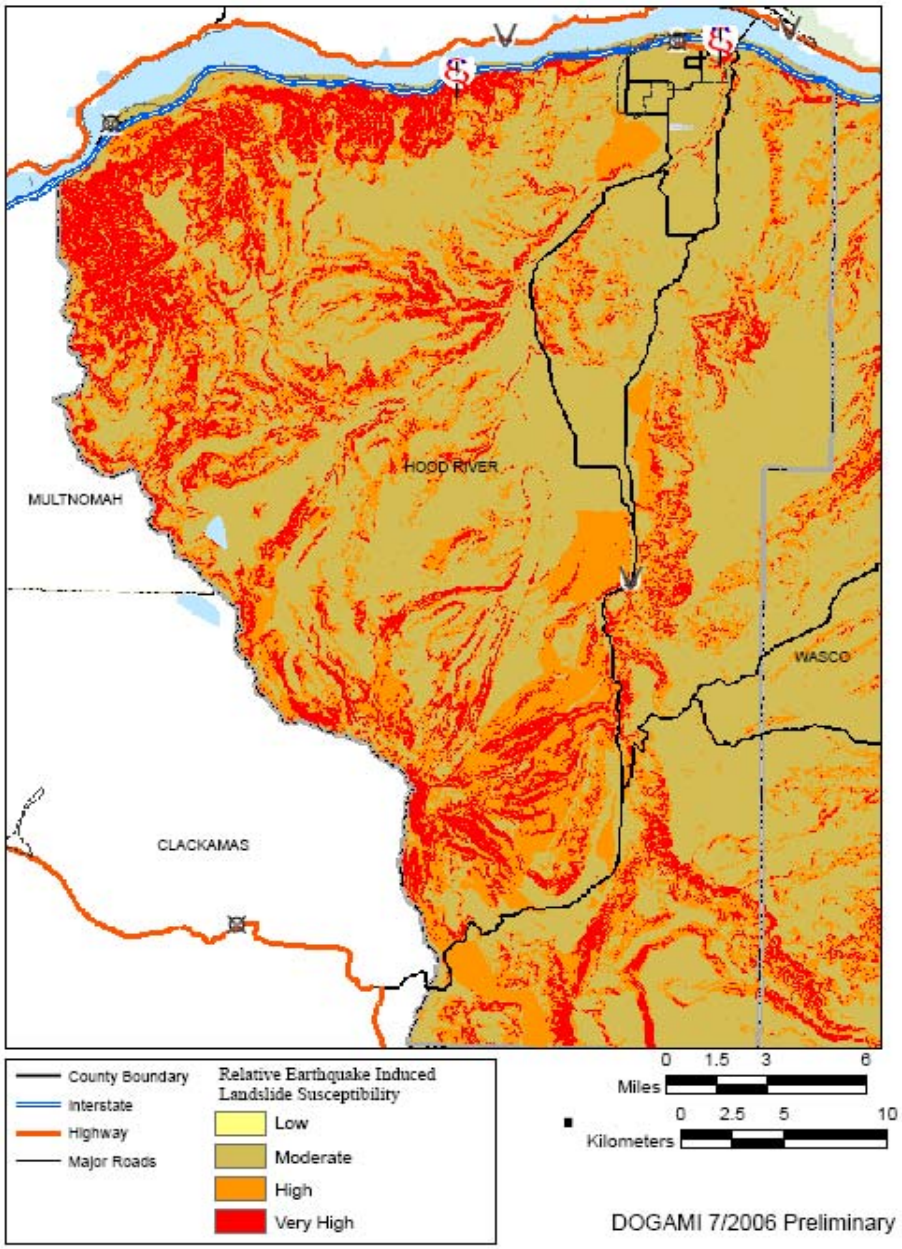
Source: DOGAMI

Figure HA.2: Hood River County Ground Shake Amplification Class



Source: DOGAMI

Figure HA.3 Relative Earthquake Induced Landslide Susceptibility



Source: DOGAMI

State Risk Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
Moderate	**Moderate**

HIVA Risk Assessment

Within the limits of predictability, we must assume a ***moderate probability of occurrence*** for a damaging earthquake during the next 50 years. A large earthquake centered in Western Oregon could have a minor impact on Hood River County suggesting ***moderate vulnerability***. Accordingly, a ***moderate-risk rating*** is assigned.

Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at: http://www.oregonshowcase.org/index.cfm

Best Available Local Data

The section includes Hood River County flood ordinances and DOGAMI flood plain maps for populated places within the County.

Ordinances

This section includes the Hood River County Land Use and Development Ordinance-Article 44 Flood Plain Combining Zone. Flood hazard overlays are provided in *Figures HA.4-5* below.

ARTICLE 44 - FLOODPLAIN ZONE (FP)

(Effective 11/4/87)

Section 44.00 - Purpose & Intent

The purpose of the Floodplain Ordinance is the protection of life and property from natural disasters and hazards. The intent of the ordinance is to: (1) minimize expenditures of public money and costly flood control projects; (2) minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the public; (3) minimize damage to public facilities and utilities; (4) insure that potential buyers are notified that property is in the floodplain; (5) insure that those who occupy the floodplain area assume responsibility for their actions; and (6) insure applicable property owners are adequately insured.

The Floodplain Zone implements the Environmental Protection Plan designation and can be used as an overlay zone in areas not planned or zoned Forest or Primary Forest.

Section 44.05 - Definitions

A. AREA OF SPECIAL FLOOD HAZARD: Means lands in the Floodplain as identified on the County Zoning Map as Floodplain and zoned Floodplain (FP). Lands in the floodplain are subject to a 1% or greater chance of flooding in any given year (see Floodplain definition below).

B. BASE FLOOD: Means the flood having a 1% chance of being equaled or exceeded in any given year. Also referred to as the 100-year floodplain. The area designated Floodplain (FP) on the County Zoning Map.

C. DEVELOPMENT: Means any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or

drilling operations located within the area designated Floodplain on the County Zoning Map.

D. FLOOD OR FLOODING: Means a general and temporary condition of partial or complete inundation of normal dry land areas from the overflow of inland waters and/or the unusual and rapid accumulation of runoff of surface waters from any source.

E. FLOOD INSURANCE RATE MAP (FIRM): Means the official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community. This includes the areas designated Floodplain on the County Zoning Map. These maps are available in the Hood River County Planning Department.

F. FLOODPLAIN: Means land in the floodplain as identified by sources listed in Section 44.10 - Ordinance Applicability, and zoned Floodplain by Hood River County. The County Zoning Map boundary shows the approximate outline. A base flood which reaches this boundary has 1% chance of occurring each year, commonly referred to as the 100-year flood. This is also called the area of Special Flood Hazard by the Federal Emergency Management Agency (FEMA).

G. FLOODWAY: Means the channel of a river or other water course and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than 1'.

H. LOWEST FLOOR: Means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance found in Section 44.50 - Floodplain Standards.

I. MANUFACTURED HOME: Means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes, the term "manufactured home" also includes park trailers, travel trailers, or other similar vehicles. Also see Article 16 - Mobile Home Parks, etc. Zone, Section 16.05 - Definitions.

J. STRUCTURE: Means a walled and roofed building, including a gas or liquid storage tank that is principally above ground.

Section 44.10 - Ordinance Applicability

The Floodplain Ordinance applies to lands zoned Floodplain on the County Zoning Map. The following primary sources were used to designate the Floodplain, and are adopted as elements of the Hood River County Comprehensive Plan: (l) Federal Emergency Management Agency, Flood Insurance Rate Map (FIRM) September 24, 1984;[1] (2) State of Oregon, Department of Geology & Mineral Industries Bulletin #91, Geologic Hazards of Parts of Northern Hood River, Wasco & Sherman Counties, 1977, and State Geologic Hazard Maps accompanying that report, prepared by J.D. Beaulieu, 1977; and (3) Hood River County Generalized Floodplain Report, U.S. Department of Agriculture, Soil Conservation Service, 1975. Copies of the above sources are available for review in the Hood River County Planning Department.

Section 44.15 - Use of Other Base Flood Data

When base flood elevation data has not been provided pursuant to Section 44.10 - Ordinance Applicability, the applicant shall obtain and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other sources, in order to comply with applicable provisions in Section 44.50 Floodplain Standards.

Section 44.20 - Applicant's Burden of Proof

The burden is upon the applicant to provide affirmative documented findings demonstrating compliance with all provisions of this ordinance. The applicant is responsible for retaining either an engineer, architect, hydrologist or geologist (all licensed in Oregon), who will be responsible for demonstrating through written documented findings of compliance with provisions of this ordinance.

Section 44.25 - Planning Director Responsibility

The County Planning Director or his designate will administer and ensure all Floodplain Development Permit applications comply with provisions of this ordinance.

Section 44.30 – Columbia River Gorge National Scenic Area

All permit applications within the Scenic Area will be sent to the Scenic Area Manager for review and comment.

Section 44.35 - Disclaimer of Liability:

1. The FEMA 1984 Maps Supersede the HUD December 6, 1977 Maps.

On rare occasions, large floods can and will occur. Flood heights may be increased by manmade or natural causes. This ordinance does not imply that land outside the area zoned Floodplain, or uses permitted within such areas will be free from flooding or flood damage. This ordinance shall not create liability on the part of Hood River County, or any official or employee, for any flood damage that results from reliance on this ordinance or any administrative decisions pursuant to this ordinance.

Section 44.40 - Permitted Uses

The following uses are permitted within the floodplain, but not within the floodway. Uses proposed within the floodway must comply with Section 44.45 - Floodplain Development Permit.

A. Farm use, other than dwellings, barns, and storage buildings.

B. Small private boat docks, landings for pleasure (not commercial use); but not including incidental buildings.

C. Parks, playgrounds, but not including incidental buildings.

D. Golf courses, driving ranges; but not including incidental buildings.

E. Private airports, not including structures.

F. Truck storage and rental, not including structures.

G. Temporary rock, sand and gravel storage, not including structures.

H. Timber harvesting along streams shall be conducted in compliance with forest practices as defined and regulated under the Oregon Forest Practices Act (January 10, 1980).

Section 44.45 - Floodplain Development Permit

A Floodplain Development Permit shall be obtained before construction or development begins within the floodplain, including floodway, as established pursuant to Section 44.10 - Ordinance Applicability. A Floodplain Development Permit is required for all structures, manufactured homes, and development as defined in Section 44.05 - Definitions. Applicants shall retain one of the following Oregon licensed individuals who is responsible for demonstrating through written documentation (report) of compliance with the requirements of this ordinance, specifically Section 44.50 - Floodplain Standards: engineer, architect, hydrologist, or geologist. Application may include but not be limited to the following information:

A. Scaled site plan showing the characteristics, location, dimensions, and site elevation; existing or proposed structures, development including fill, storage of materials, etc.

B. General elevation to mean sea level of building site.

C. Distance between ground elevation and level to which the proposed structure is to be flood-proofed.

D. Description of the extent to which a water course(s) will be altered or relocated as a result of development, structures, etc.

E. Copies or all permits required from any governmental agency, etc.

Section 44.50 - Floodplain Standards

Applicants for Floodplain Development Permits shall demonstrate through written documented affirmative findings of compliance with the following standards. A County building permit will not be issued unless all provisions of the Floodplain Ordinance have been affirmatively addressed by the applicant's representative.

A. ARTICLE 44 - FLOODPLAIN ZONE ORDINANCE: Compliance with all applicable provisions of Article 44 - Floodplain Zone, Hood River County Zoning Ordinance, prior to making application for a Hood River County building permit.

B. AGENCY REFERRALS: Compliance with permits and approvals of all applicable local, state and federal agencies.

C. INTERPRETATION OF FLOODPLAIN BOUNDARIES: Presentation of documented evidence of the exact location of the floodplain and floodplain boundary and the location of the proposed or existing construction or development.

D. BASE FLOOD ELEVATION DATA: Provide documented evidence identifying the base flood elevation data (in relationship to mean sea level). The sources noted in Section 44.10 - Ordinance Applicability, do not contain base flood elevation data, consequently the following base information is required of the applicant:

1. Record the actual elevation (in relationship to mean sea level) of the lowest floor (including basement) of whole new or improved pre-existing structures.

2. Whether or not the structure contains a basement.

3. Applicant is required to elevate development, etc., at least 2 feet above the base flood elevation data. This information will be obtained and maintained in the applicant's file by the Hood River County Planning Department and will be available for public inspection.

E. ELEVATION DATA NOT AVAILABLE: When elevation data has not been provided in accordance with Section 44.10 - Ordinance Applicability, or from another authoritative source, the applicant is responsible to assume through a licensed professional (engineer, architect, hydrologist or geologist), that the proposed building construction, development, or structures will be reasonably safe from flooding. The test of reasonableness includes use of historical data, high water marks, photographs or past flooding, etc., where available. Failure to elevate at least 2 feet above grade may result in higher insurance rates.

F. ALTERATIONS OF WATER COURSE:

1. Notification of adjacent cities (e.g., Cascade Locks and Hood River) or communities (e.g., Odell, Parkdale, Mt. Hood, etc.) and the State Floodplain Coordinator, and other applicable state and local agencies prior to obtaining a building permit and prior to any alteration or relocation of a water course, and also submit notification to the Federal Insurance Administration.

2. Provide maintenance within the altered or relocated portion of the watercourse to insure that the flood carrying capacity is not diminished.

G. SUBDIVISION PROPOSALS:

1. Shall be consistent with the need to minimize flood damage;

2. Shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage;

3. Shall have adequate drainage provided to reduce exposure to flood damage; and

4. When base flood elevation data has not been provided or is not available, it shall be provided pursuant to Section 44.50 - Floodplain Standards, subparagraph D. or E., for subdivision proposals and other proposed developments, which contain at least 50 lots or 5 acres (whichever is less).

H. BUILDING & SANITATION STANDARDS: Applicant's representative to contact the Building Official and County Sanitarian to insure the following applicable standards are completed:

1. ANCHORING:

   a. All construction and improvements shall be anchored to prevent flotation, collapse or lateral movement or a structure.

   b. All manufactured homes shall be ancho red to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to use of over the top or frame ties to ground anchors, or as specified by the County Building Official.

   c. All construction and improvements shall be constructed using methods and practices that minimize flood damage.

   d. Electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

2. RESIDENTIAL CONSTRUCTION:

   a. Construction and improvement of any residential structure shall have the lowest floor, including basement, elevated to or above base flood elevation by 2 feet.

   b. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited or shall be designed to automatically equalize hydrostatic flood forces on the interior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must meet or exceed the following minimum criteria:

      (1) A minimum of two openings have a total net area of not less than one square inch for each square foot of enclosed area subject to flooding shall be provided.

      (2) The bottom of all openings shall be no higher than l foot above grade.

      (3) Openings may be equipped with screens, louvers or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

c. All manufactured homes to be improved shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at or above the base flood elevation and be securely anchored to an adequate anchored foundation system in accordance with the provisions of the County Building Official.

3. NONRESIDENTIAL CONSTRUCTION: Construction and improvement of any commercial, industrial, or nonresidential structure shall either have the lowest floor, including basement. elevated to the level of the base flood elevation, or together with attending utility and sanitary facilities shall:

   a. Be flood proofed so that below the flood level the structure is watertight with walls substantially impermeable to the passage of water.

   b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

   c. Nonresidential structures that are elevated, not flood proofed, must meet the same standards for space below the lowest floor as described above.

   d. Applicants flood proofing nonresidential buildings are notified that flood insurance premiums will be based on rates that are 1 foot below the flood proof level (e.g. building constructed to the base level will be rated as 1 foot below that level).

4. UTILITIES: Applicant or his representative is required to contact the County Sanitarian and insure the following standards are completed:

   a. All new and replacement water systems shall be designed to minimize or eliminate infiltration of floodwaters into the system;

   b. New and replacement sanitary sewer systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into the floodwaters;

   c. On-site waste disposal shall be located to avoid impairment to them or containment from them during flooding; and

   d. Subsurface sewage disposal drain fields shall be set back a minimum of 100 feet from the ordinary high water line of stream.

I. OTHER:

1. Property access for emergency vehicles will be provided to the proposed site(s).

2. Chemical pesticide or herbicide containers shall not be stored within 300 feet of any watercourse.

3. Compliance with water quality goals, policies, strategies, and land use designations and standards noted in the County Policy Document under Goal 5.

4. No building or subsurface sewage disposal system shall be allowed in the surface drainage basin of Crystal Springs in that area east of the springs to Highway 35, or 1,200 feet, whichever is closer, except for protection and maintenance by Crystal Springs Water District.

Section 44.55 - Site Development Standards

Same as those required in the base zone or:

A. Maximum Height: 35 feet.

B. Setbacks, minimum:

1. Front: 50 feet from the centerline of any local street, or 20 feet from the right-of-way line, whichever is greater. 60 feet from the centerline of any arterial street, or 20 feet from the right-of-way line, whichever is greater.

2. Rear: 20 feet.

3. Side: Interior lot: 10 feet. Exterior, side or corner lot: 50 feet from the centerline of any street.

4. Setbacks between buildings: 10 feet minimum.

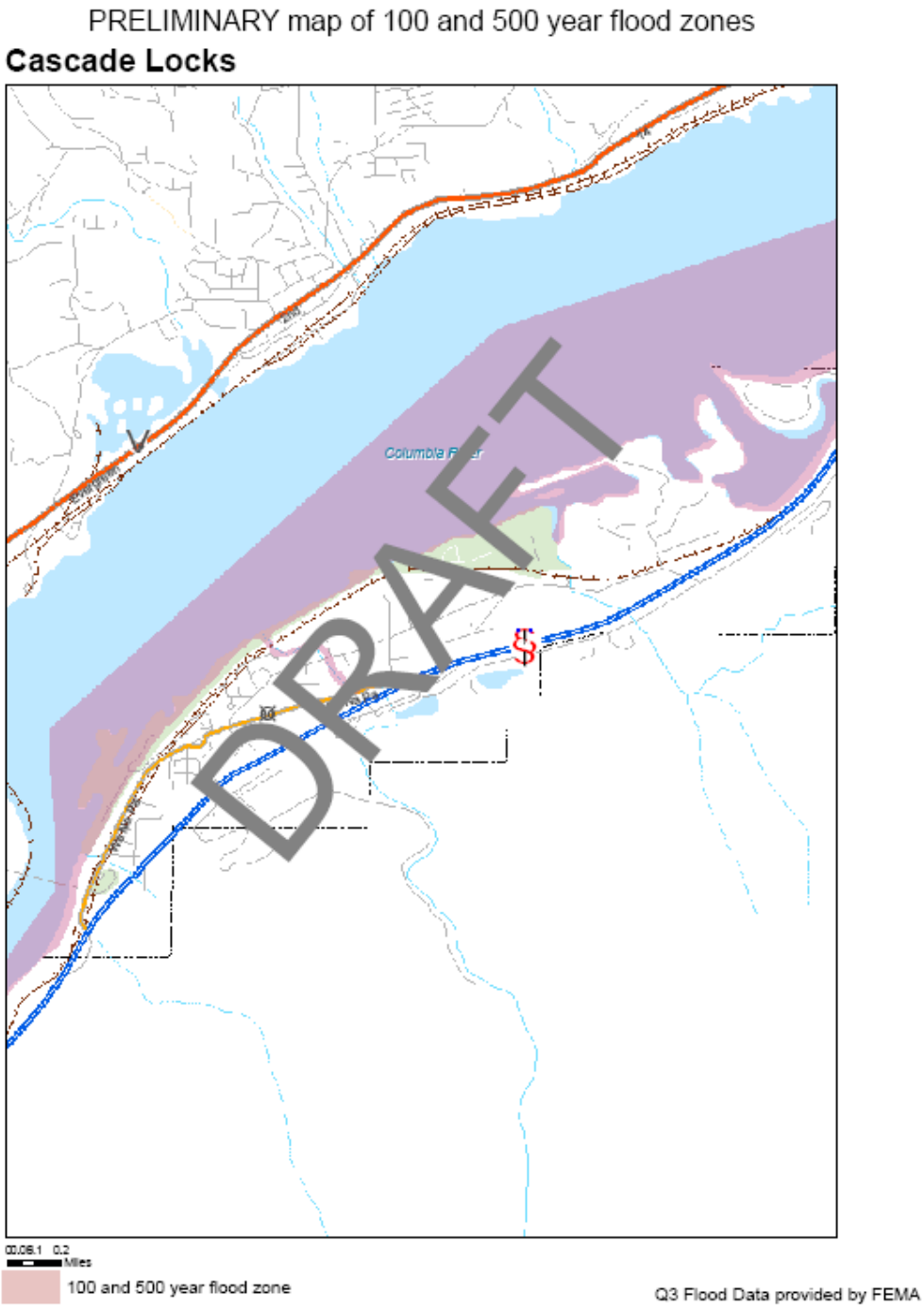
5. Accessory farm buildings may be located within 10 feet of the rear property line.

6. Minimum lot size for new lots or parcels: Compliance with one of the following: (a) as required by each base zone; or (b) must be consistent with the requirements of the predominant adjacent (abutting) zone.

7. Vision clearance: Vision clearance for corner lots shall be a minimum of 35 feet.

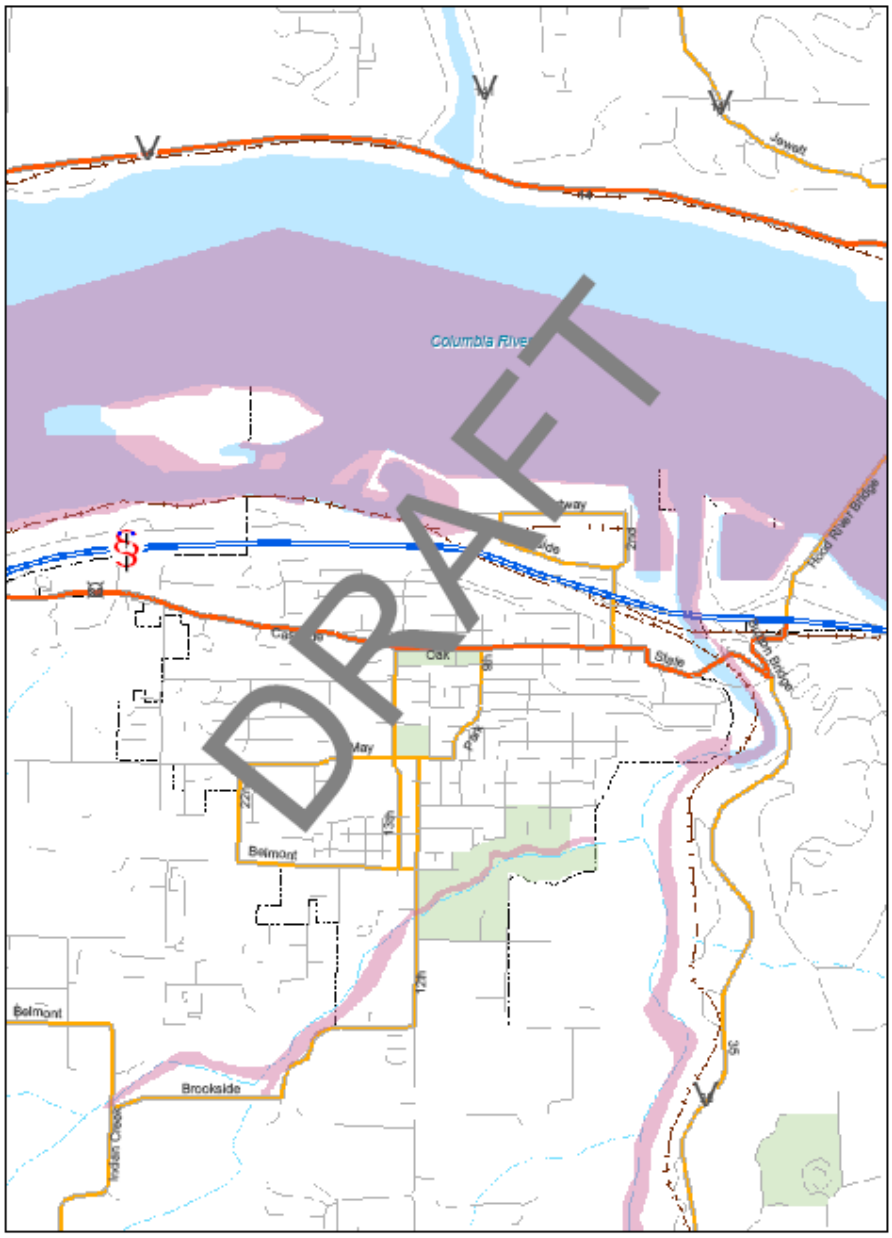
C. WATER COURSE SETBACKS: All new buildings shall be set back 100 feet from ordinary high water line except for those uses in conjunction with water - related or water dependent use. Exceptions to this requirement shall be allowed when affirmative findings through documentation are made and submitted to the Planning Director to satisfy the following: (1) the proposal would provide better protection, maintenance and retention of riparian vegetation than would occur by observance or the setback requirement; or (2) the protection, maintenance, and retention of riparian vegetation are not applicable to the proposal.

Figures HA.4 – 5 DOGAMI Flood Zone Maps



PRELIMINARY map of 100 and 500 year flood zones

Hood River



Q3 Flood Data provided by FEMA

State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
Moderate	**Moderate**

HIVA Assessment

Historically, flooding occurs along one or more of the County's waterways every few years, suggesting a **high *probability of occurrence*.** Because of the relative land area and population affected, the County is exposed to ***moderate vulnerability***. The frequency of flooding, the potential for simultaneous flooding events, plus the historical record of recurrent flooding and cumulative costs, all suggest the assignment of a ***moderate risk rating*.**

Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at: http://www.oregonshowcase.org/index.cfm

Best Available Local Data

From the Hood River County Land Use and Development Ordinance:

ARTICLE 45 - GEOLOGIC HAZARD ZONE (GH)

Section 45.00 - Purpose & Intent

> The purpose of the GH Zone (Geologic Hazard) is to identify existing or potential local geological hazards and to take precautions or restrict development in the interests of preventing hazards from causing harm to people or property. The Geologic Hazard Zone is utilized to implement the Environmental Protection Plan designation. The GH Zone can be used as an overlay zone. The Geologic Hazard Zone (GH) applies to geologic hazards identified by the State of Oregon, Department of Geology & Mineral Industries in Bulletin #91, Geologic Hazards of Parts of Northern Hood River, Wasco & Sherman Counties, 1977, and on State Geologic Hazard Maps accompanying that report prepared by J.D. Beaulieu, 1977.

The Geologic Hazard Zone (GH) does not apply to geologic features shown on Geology Maps that accompany Bulletin #91.

Section 45.10 - Boundaries

The boundaries of the designated Geologic Hazard areas shall be as they appear on the official zoning maps kept on file with the County Planner. A copy of the maps shall also be kept in the office of the Oregon Department of Geology & Mineral Industries.

Section 45.20 - Permitted Uses

The following types of uses are permitted but not including permanent structures or incidental buildings:

A. Farming and Accepted Timber Practices;

B. Parks, playgrounds;

C. Golf courses, driving ranges;

D. Picnic grounds;

E. Wildlife and nature preserves;

F. Target, trap and skeet ranges;

G. Hiking trails;

H. Airports or airstrips;

I. Truck and storage rental; and

J. Rock, sand and gravel storage, but not including quarry operations.

Section 45.30 - Limitations on Use

The following types of uses are permitted subject to signing the Hood River County Geologic Hazard Waiver Form (Appendix "A" to this Zone), review and approval by the Building Official and obtaining, if necessary, a Land Use and Building Permit. If the provisions in this section cannot be met, the use will be denied.

A. At least the following detached accessory uses that are 20 feet from a pre-existing dwelling or a dwelling approved under provisions in Section 45.40 below, or are placed in locations where in the estimation of the Building Official and the property owner the use will not cause harm to people or property: (1) private garage; (2) carport; (3) storage shed; or (4) patio cover.

B. Accessory structures for farming and accepted timber practices except dwellings and quarry operations.

C. Repair, maintenance and additions considered appurtenant to a pre-existing dwelling and its accessory use(s) or a dwelling approved under Section 45.40 and its accessory use(s). Items include the following (list is not exclusive): (1) concrete slabs, driveways and sidewalks; (2) masonry repair; (3) painting; (4) non-bearing partitions; (5) shelving; (6) cabinet work; (7) gutters and down spouts; (8) replacement or repair of siding; (9) replacement and repair of roofing; and (10) plastic glazed windows.

Section 45.40 - Other Conditions to Use and Occupancy

A. Uses not enumerated in Section 45.20 and permitted in the base zone may be established, altered, or enlarged providing at least one of the following conditions exist and signing of the Hood River County Geologic Hazard Waiver Form (Appendix "A" to this zone) and obtaining a Land Use and Building Permit.

1. A certified professional engineer (licensed in Oregon), geologist, hydrogeologist, or other professional competent in geology prepares a report stating that no harm to the development or land will be caused by the proposed development or geologic hazard.

2. A certified professional engineer (licensed in Oregon), geologist, hydrogeologist, or other professional competent in geology prepares a report stating a geologic hazard does not actually exist in the area of proposed development.

3. A certified professional engineer (licensed in Oregon), geologist, hydrogeologist, or other professional competent in geology prepares a report stating a hazard does exist including the type, method, and materials for physical improvements which could significantly reduce the likelihood of personal harm or property in the area due to geological hazards. At a minimum the reports required under Subsection A., 1., 2., and 3., shall contain the following information:

4. At a minimum the reports required under Subsection A., 1., 2., and 3., shall contain the following information:

    a. A scaled map at 1 inch = 200 feet scale, with contour intervals of 10 feet, north arrow, property lines, cultural features, geologic formation, slope, diagrammatic section of geology, and other factors as necessary.

    b. An analysis report (based on field check) explaining the geologic hazard, geomorphology, groundwater, soil suitability, specific hazard characteristics both short and long term, and related matters as necessary.

B. Uses permitted and the improvements associated with such uses shall be subject to the following criteria:

    1. The development of permitted uses and improvements will not substantially increase the specific hazard potential.

    2. Any subsurface sewage disposal system or individual well for the proposed site will not become a health hazard during the future hazard activity.

C. The information required in paragraphs A and B above must be submitted to and approved by the Geological Hazard Technical Review Committee (County Planner, Building Inspector, Sanitarian, Engineer, with assistance from the State Geologist at the Department of Geology and Mineral Industries or its successors). The Committee may approve,

conditionally approve, or deny the request based on the ordinance requirements. The Committee may establish conditions on approval which are designed to minimize public and private loss of life and property.

Section 45.50 - Site Development Standards

A. Same as those required in the base zone or as required by the approval under this Article (45) or as follows:

B. Maximum height: 35 feet

C. Setbacks, minimum:

1. Front: 50 feet from the centerline of any local street or 20 feet from the right-of-way line, whichever is greater. 60 feet from the centerline of any arterial street or 20 feet from the right-of-way line, whichever is greater.

2. Rear: 20 feet.

3. Side: Interior: 10 feet. Exterior, side or corner lot: 50 feet from the centerline of any street.

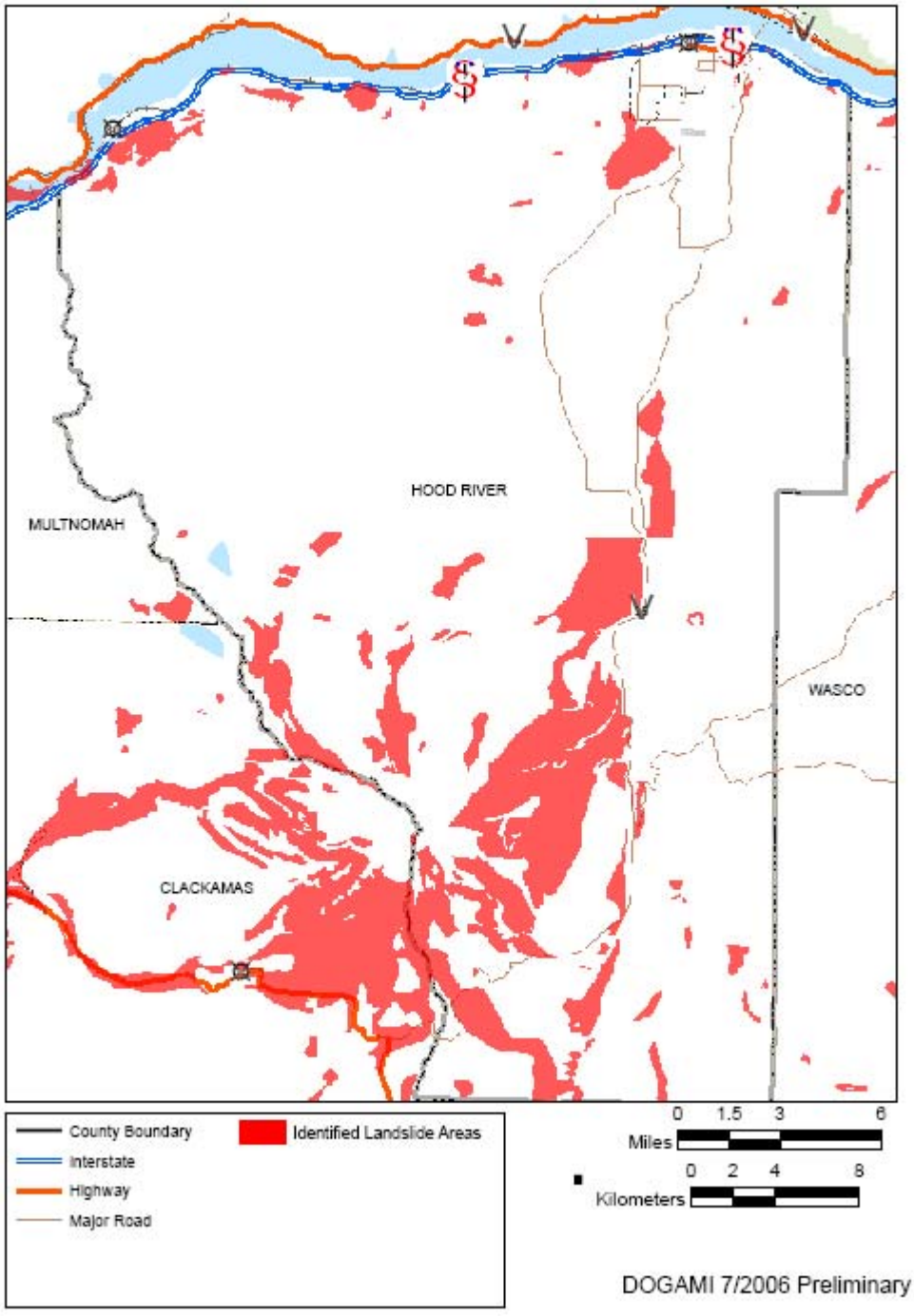
4. Setbacks between buildings: 10 feet minimum.

5. Accessory farm buildings may be located within 10 feet of the rear property line.

6. Minimum lot size for new lots or parcels: Compliance with one of the following: (a) as required by each base zone; or (b) must be consistent with the requirements of the predominant adjacent (abutting) zone.

7. Vision clearance: Vision clearance for corner lots shall be a minimum of 35 feet.

Figure HA.12 Identified Landslide Areas within Hood River County



Source: DOGAMI

State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
n/a	**n/a**

HIVA Assessment

Hood River County has a history of landslides suggesting a ***moderate probability of occurrence***. Landslides tend to occur in isolated, sparsely developed areas threatening individual structures and remote sections of the transportation, energy and communications infrastructure suggesting ***low vulnerability***. Because of the moderate probability of occurrence, a ***moderate risk rating*** is assigned.

Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at: http://www.oregonshowcase.org/index.cfm

Best Available Local Data

State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Windstorm

Vulnerability	Probability
High	**High**

Winter Storm

Vulnerability	Probability
High	**High**

HIVA Assessment

Storm history suggests a ***high probability of occurrence***. Historical damage and cumulative costs of destructive storms suggest ***high vulnerability***. Accordingly, a ***high risk rating*** is assigned.

Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at: http://www.oregonshowcase.org/index.cfm

Best Available Local Data

Please consult the Hood River County Community Wildfire Protection Plan (CWPP) for more information (click on title below).

Hood River County
Community Wildfire Protection Plan
June 2006

State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
Moderate	**High**

HIVA Assessment

Historically, it appears that the instance of wildfire is increasing through the region. Additionally, the existence of open lands and large forested areas, increasing population and recreational activities, and the uncertain impact of a changing climate combine to suggest a ***high probability of occurrence***. The destruction of large tracts of forest land would have immediate economic impact to the community through lost jobs, reduced taxes, and increased public support while collateral economic and social effect could impact the County for years, suggesting ***moderate vulnerability***. Accordingly, a ***high risk rating*** is assigned.

Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at: http://www.oregonshowcase.org/index.cfm

Best Available Local Data

Please consult the report Volcanic Hazards in the Mount Hood Region, Oregon for more information (click on title below).

U.S. Department of the Interior
U.S. Geological Survey

VOLCANO HAZARDS IN THE MOUNT HOOD REGION, OREGON

By

W.E. Scott[1], T.C. Pierson[1], S.P. Schilling[1], J.E. Costa[1],
C.A. Gardner[1], J.W. Vallance[2], and J.J. Major[1]

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Open-File Report 97-89

1997

State Hazard Assessment

Scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

Vulnerability	Probability
Moderate	**Low**

HIVA Assessment

History suggests a ***low probability of occurrence***. Because of potential impact to the Hood River valley from a lahar flow from the Hood River, there is ***moderate vulnerability***. Because Mt. Hood is relatively quiet, this hazard is assigned *a* ***low risk rating***.

Oregon Technical Resource Guide

A hard copy of the TRG can be found at the Hood River County Planning & Development office. The TRG is also available online at: http://www.oregonshowcase.org/index.cfm

Appendix A:

Public Process

People tend to support what they help build. To engage public support of this plan, and to involve the residents in the process, the University of Oregon RARE participant assigned to coordinate this projected reached out to the Hood River County community in three primary ways. First, a steering committee was formed to guide the NHMP Coordinator through the process of developing the plan. Secondly, The Coordinator sent out invitations to key stakeholders and an open invitation to the public for a NHMP Community Stakeholder Forum to raise awareness about natural hazard events and solicit input from community. Lastly, stakeholder interviews were conducted to gain retrieve local community knowledge of hazard events and how to best address the community's risk. Secondary methods of outreach were also conducted in posting the final draft of the mitigation plan for public comment on the County Planning & Development website and the printing and distribution of the International Business & Home Safety *Protect Your Home From Wildfire* brochure at the Hood River County Planning & Development service counter. Lastly, ONHW conducted region-wide outreach and training efforts in the form of a regional household preparedness survey and IBHS *Open for Business* training.

Steering Committee

The Hood River County Steering Committee was comprised of individuals best suited to guide the county through the planning process and ensure that the mitigation plan is fully implemented once adopted.

Its mission is to ensure proper development and implementation of the county natural hazards mitigation plan by:

- setting goals;
- establishing sub committee work groups to address specific needs;
- ensuring public, private and federal participation;
- distributing and presenting the plan;
- facilitating public discussion/involvement;
- developing implementation activities; and
- coordinating plan maintenance and implementation strategies.

Through raising awareness and citizen involvement, the Committee's end goal is to make hazard mitigation a part of the community's routine decision-making process.

Methodology

Three Steering Committee sessions were held over the course of the 2006 calendar year:

1) Introduction & Overview: 18 January 2006
2) Hazard Risk Assessment: 3 March 2006
3) Goals & Action Items: 14 July 2006

These sessions set the tone and structure for the plan's development. Through these meetings the NHMP Coordinator was able to collect valuable information regarding hazard events and impacts within the County, as well as contacts for additional stakeholders to involve in the process. The Steering Committee also played an integral part in the development of the mitigation plan vision, mission, goals and action items. The Committee revised the drafted vision, mission and goals, and selected and prioritized the action items documented in this plan.

Participants

The steering committee was formed by Michael Pasternak, NHMP Coordinator under the guidance of Mike Benedict, Hood River County Planning & Building Services. Additional input provided by the Oregon Natural Hazards Workgroup. Participants included:

Table A.1 NHMP Steering Committee

Name	Title	Organization
Anne Debbaut	Planner	Hood River County Planning
Jennifer Donnelly	Planner	City of Hood River Planning Department
Peter Mackwell	Assistant Chief	West Side Fire District
Jeff Pricher	Fire Marshall	City of Cascade Locks
Anne Saxby	Director	Soil & Water Conservation District
Hannah Settje	District Manager	Red Cross
Jade Soddell	Emergency Manager	Hood River County Emergency Management
Joe Wampler	Sheriff	Hood River County Sheriff's Department
Don Wiley	Engineer	Hood River County Public Works

Community Stakeholder Forum

The County-wide Stakeholder Forum held was designed to solicit input from individuals and community organizations with resources or property that may be severely impacted by natural disasters. The Forums was held on April 11th 2006 at the County Business & Administration Building in Hood River, OR. Roughly 50 people from the County were invited to attend the Forum. The invitees consisted of business leaders, utility providers, government workers (state and county), service providers, transportation & communication workers, health providers, and representatives of vulnerable populations (e.g. elderly, migrant workers).

The purpose of the Forum was three-fold:

1) To spread awareness of potential disasters impacting the County by soliciting a large cross-section of the active public to participate in the hazard mitigation process;

2) To provide a factual basis for potential hazard mitigation measures by public input into critical County infrastructure and resources, and known hazard zones, through the critical asset and hazard identification mapping exercise; and

3) To plant the seeds for potential mitigation measures by introduction and discussion of action item concept and creating personal relationships (i.e. face-to-face introduction) for stakeholder interview and action item follow-ups.

Unfortunately attendance for the Forum was quite poor. Though nearly 50% RSVP, roughly 10% of invitees actually attended. Factors attributing to poor attendance were:

1) Forums where scheduled in the middle of government budget season;

2) Methods of outreach- emails, phone calls- proved inadequate;

3) General attitudes to hazards in the community and mitigation in particular (the floods of 1996 were the last major disaster) gave the Forums an air of little importance.

Those that participated in the Forum were actively responsive to the mapping exercise and the concepts and importance of hazard mitigation. The identification of critical assets and infrastructure re-enforced much of what had already been identified in steering committee meetings and coordinator research, and also provided some previously over-looked assets. All Forum participants have been willing participants in the stakeholder interview follow-ups.

Methodology & Outcomes

The method and outcomes of the Community Stakeholder Forum are described below:

(1) DOGAMI Hazard Impact Overview
Bill Burns, DOGAMI Engineering Geologist presented and dissected local and state natural hazards data, and informed participants on how communities are impacted by natural hazard events.

> *Outcome*: Documented community stakeholder knowledge/input with respect to local hazard events.

(2) Community Asset Identification Exercise
Participants were asked to fill out a worksheet identifying the County's critical infrastructure and assets.

> *Outcome*: (a) Identified and discussed key elements of the region and individual communities within it; and (b) Identified main assets, resources and functions of region within the themes of People, Dollars (economy, cultural & historic assets, environmental assets), and Infrastructure (critical physical facilities).

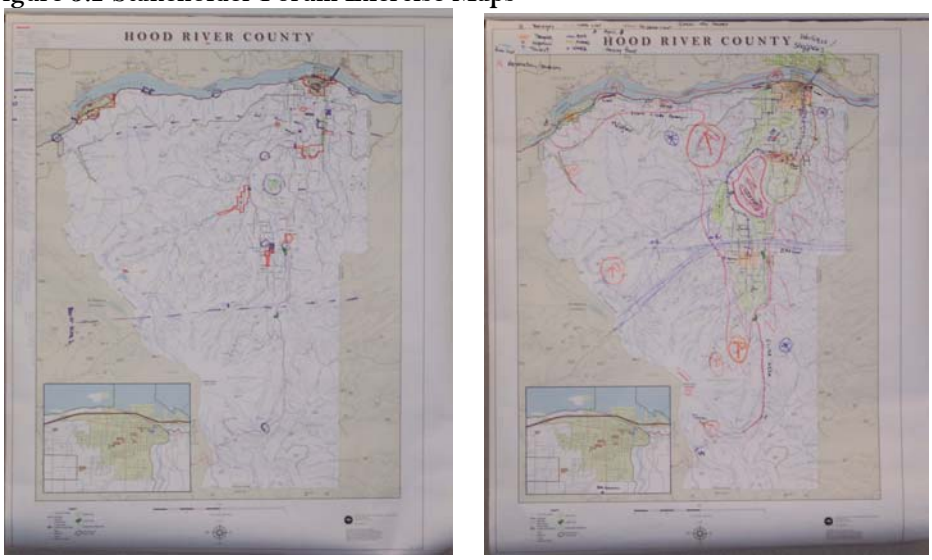
- Participants identified many of the same critical assets identified in the Steering Committee meeting and NHMP Coordinator research. This that assured that data collected for mitigation plan purposes was relevant.

(3) Community Mapping Exercise

Participants were asked to map assets & infrastructure from previous exercise

Outcome: (a) Discussed and documented implications with regards to asset loss/damage to community; (b) Provided mechanism to focus planning efforts; (c) Provided a fact base for subsequent action item identification, and (d) Provided physical document (map) of community input.

Figure 3.2 Stakeholder Forum Exercise Maps



(4) Action Items & Follow-up Stakeholder Interviews

Discussed importance mitigation and the development of action items; passed out action item forms to participants

Outcome: Documented potential action items discussed in forum, and distributed action item worksheets to participants. Set up stakeholder interview.

Invitees

The following the individuals and organizations were contacted to participate in the Forum:

Table A.2 Community Stakeholder Forum Invitees

Name	Organization
Craig Schmidt*	Hood River Chamber of Commerce
Katie MacKendrick	MCEDD
Tim Donahue	Real Estate
Glen Taylor	Real Estate
Risa Wonsyld	Real Estate
Brent Gleason	Hood River County Forest Department
David S. Meyer	Bonneville Power Association
Ron Koffman	Hood River Historic RR
Jean Godfrey	Grower-Shipper Association
Tom Yates	Sprint
Rick Brock	Farmers Irrigation District
	Portland General Electric
Diane Bambi	USDAFS
	Oregon Department of Fish & Wildlife
Ian Macek	Port of Cascade Locks
Mike Doke*	Port of Hood River
	Oregon Department of Forestry
Bill Fashing	Hood River County Economic Development
Pam Bates*	Hood River County 911
Billie Stevens	OSU Extension Service
Ellen Larson*	Department of Health
Anne Debbaut	Hood River County Planning
Nancy Steele*	Hood River County Planning
Sonya Kazen	Oregon Department of Transportation
Michael (Swede) Hays	ODOT Rail Division
Bill Burns*	DOGAMI
	Hood River County Schools
Dean Nygaard	Hood River County Building
	Union Pacific Railroad
Dean Guess	Hood River County Public Works
Gary Grossman	Columbia Gorge Broadcasters
Kirby Neumann-Rea	Hood River News
Elizabeth Settje	Hood River Memorial Hospital
	La Clinica
Marianne Durkan	Home Health
Gwen	Senior Advisory Council
Lou DeSitter	Catholic Churches
Joe Wampler	Hood River County Sheriff
Peter Mackwell*	Westside Fire District

*Participant

Stakeholder Interviews

Due to poor community participation in the Stakeholder Forum, the stakeholder interviews became a crucial component of the public process. Many of the Forum invitees were contacted and their input included in the plan. The individuals contacted ranged from city, state, and federal government employees to business owners and farmers. These individuals provided insight into how hazard events have impacted the community in the past, how growth and development could collide with future hazard events, and how the community can best work together to reduce collective risk. Many of the action items documented in this plan were spawned from ideas discussed during the stakeholder interview process.

Methodology

Stakeholder interviews were conducted May through July 2006. The NHMP Coordinator telephoned stakeholders individually and asked a series of questions. The questions are as follows:

- What is the history of natural hazard events in Hood River County?
- How does growth and development in the community, both current and projected, contribute to natural hazard events?
- Does your organization/industry currently work in natural hazard mitigation? If so, how?
- How can your organization/industry contribute to strengthen regional coordination and cooperation in reducing risk from natural hazards?
- What activities will assist Hood River County in reducing risk and preventing loss from future natural hazard events? (e.g. If you had the money, how would you spend it?)
- How does your organization/industry view the County government's role in reducing risk from natural hazard events?
- What are the ways you would like to see agencies, organizations or individuals participating and coordinating to reduce risk from natural hazards?
- How does hazard mitigation fit into Hood River County's land-use, environmental, social, and economic goals?
- What goals should the County set to reduce risk from natural hazard events, and how would we measure whether our mitigation efforts are successful?
- Can you think of anyone else that should be contacted as part of this process?

The information recorded from the stakeholder interviews was primarily incorporated into three sections of this plan: Community Profile, Risk Assessment, and Goals & Action items.

Contacts

The following the individuals and organizations were contacted to participate in the stakeholder interview process:

Table A.3 Community Stakeholder Interview Contacts

Name	Organization
Bill Fashing*	Hood River County Economic Development
Rick Brock*	Farmers Irrigation District
Mike Doke*	Port of Hood River
Ian Macek*	Port of Cascade Locks
Steve Castgnoli*	OSU Extension Service
Jean Godfrey*	Grower-Shipper Association
David S. Meyer*	BPA
Andrea Klass*	Port of The Dalles
Mel Gard*	ODF
	ODOT
Tom Yates*	Sprint
Peter Mackwell*	Westside Fire District
Kirby Neumann-Rea*	Hood River News
Elizabeth Settje	Hood River Memorial Hospital
Dean Nygaard*	Hood River County Building
Tom Yates*	Sprint
Lou DeSitter	Catholic Churches
Risa Wonsyld*	Real Estate
	Portland General Electric
Bill Burns*	DOGAMI
	La Clinica
Sonya Kazen	Oregon Department of Transportation
	Union Pacific Railroad
Brent Gleason*	Hood River County Forest Department

*Participant

Secondary Outreach Methods

Additional methods of outreach involved in the public process included:

Public Comment of Hood River County NHMP Draft

The mitigation plan draft was sent to steering committee members for review, comment, and approval before the final draft was shipped off the OEM for State review. Additionally, the plan was posted on the Hood River County Planning & Development website for public review and comment.

IBHS Wildfire Brochure

While the final draft of the NHMP was under review by the Steering Committee and public, the NHMP Coordinator oversaw the printing and distribution of the International Business & Home Safety *Protect Your Home From Wildfire* brochure at the Hood River County Planning & Building service counter.

ONHW Region-wide Outreach

The Oregon Natural Hazards Workgroup conducted region-wide outreach activities which included:

Household Preparedness Survey

As part of the regional PDM grant, ONHW implemented a region wide household preparedness survey. The survey gauged household knowledge of mitigation tools and techniques and assessed household disaster preparedness. The survey results improve public/private coordination of mitigation and preparedness for natural hazards by obtaining more accurate information on household understanding and needs. The results of the survey are documented in the plan's *Appendix C: Regional Household Survey.*

IBHS Open for Business Training

ONHW, with commitment from the Institute for Business & Home Safety (IBHS), provided individuals in the Mid-Columbia region with access to, and use of, the IBHS interactive, web-based *Open for Business* property protection and disaster recovery planning tool. The access was provided in two classes, one located in Hermiston, Oregon on May 24th, 2006 and the second in The Dalles, Oregon on May 25th, 2006. The following agencies and organizations were invited to attend: agencies providing start-up and ongoing counseling services to micro and small businesses in low-income areas, such as the Statewide Small Business Development Center; agencies providing housing services to hundreds of low-income residents, such as County Housing Authorities, which also employs low-income people; and disaster assistance agencies serving at-risk populations, such as food banks and the American Red Cross. Any remaining spaces were made available to: micro- or small business start-up companies; and established micro- or small businesses.

The classes were organized as train-the-trainer classes, so that the agency personnel and the business people could: 1. Understand the importance of disaster planning; 2. Learn how to navigate the interactive, web-based *Open for Business* property protection and disaster recovery planning tool; 3. Start to develop their own plans during the training; 4. Learn how to communicate the importance of developing and utilizing plans for property protection and recovery from business interruption to their constituencies and/or colleagues, in order to institutionalize disaster safety into every day decision making.

Recruitment Process

The Oregon Natural Hazards Workgroup assembled a list of social service providers from basic internet searches and representative small businesses from Chamber of Commerce Membership databases for the seven counties in the region. E-mail and/or mailed invitations were sent to over 200 agencies, organizations and businesses in the region. Recruitment materials can be found on the following page. The following agencies and organizations attended the workshop:

- Umatilla/Morrow County Housing Authority
- Irrigon Chamber of Commerce

• Pendleton Chamber of Commerce
• Small Business Development Center – Blue Mountain Community College
• Small Business Development Center – Columbia Gorge Community College
• Hood River County Human Services Department

Appendix B:
Resource Directory

The following appendix includes local, regional, state and federal resources for some of the hazards addressed in the plan. The directory also includes key publications and additional resources. This appendix was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon for use by Pre-Disaster Mitigation Communities.

Multi-Hazard Mitigation Resources

County Resources

Insert community multi-hazard mitigation resources and contact information

Regional Resources

Mid Columbia Council of Governments

The mission of the Mid-Columbia Council of Governments (MCCOG) is to serve as a forum for intergovernmental cooperation and cost effectiveness by providing joint strategic planning for the provision of services; centralization of expertise which may not be affordable by individual member organizations; and the acquisition of revenue with which to fund programs and services as designated by its Board of Directors and the member governments which they represent.

Contact: John Arens, Executive Director
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (800)735-2900
Fax:
Website: http://www.mccog.com/default.htm

State Resources

Department of Land Conservation and Development (DLCD)

DLCD administers the state's Land Use Planning Program. The program is based on 19 Statewide Planning Goals, including Goal 7, related to natural hazards, with flood as its major focus. DLCD serves as the federally designated agency to coordinate floodplain management in Oregon. They also conduct various landslide related mitigation activities. In order to help local governments address natural hazards effectively, DLCD provides technical assistance such as conducting workshops, reviewing local land use plan amendments, and working interactively with other agencies.

Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033

Website: http://www.oregon.gov/LCD/HAZ/index.shtml
Oregon Floodplain Coordinator: (503) 373-0050 ext. 250

Oregon State Police (OSP)-Office of Emergency Management (OEM)

OEM administers FEMA's Hazard Mitigation Grant Program, which provides post-disaster monies for acquisition, elevation, relocation, and demolition of structures located in the floodplain. OEM also administers FEMA's Flood Mitigation Assistance Program. This program provides assistance for NFIP insured structures only. OEM also helps local jurisdictions to develop hazard mitigation plans. OEM is heavily involved in flood damage assessment and works mainly with disaster recovery and hazard mitigation programs. OEM provides training for local governments through workshops on recovery and mitigation. OEM also helps implement and manage federal disaster recovery programs.

Contact: Office of Emergency Management
Address: PO Box 14370, Salem, OR 97309-5062
Phone: (503) 378-2911
Fax: (503) 373-7833
Website: http://www.oregon.gov/OOHS/OEM/index.shtml
OEM Hazard Mitigation Officer: (503) 378-2911 xt. 22247
Recovery and Mitigation Specialist: (503) 378-2911 xt. 22240

Oregon Department of Geology and Mineral Industries (DOGAMI)

The mission of the Department of Geology and Mineral Industries is to serve a broad public by providing a cost-effective source of geologic information for Oregonians and to use that information in partnership to reduce the future loss of life and property due to potentially devastating earthquakes, tsunamis, landslides, floods, and other geologic hazards. The Department has mapped earthquake hazards in most of western Oregon.

Contact: Deputy State Geologist, Seismic, Tsunami, and Coastal Hazards Team Leaders
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: http://www.oregongeology.com

Federal Resources

Federal Emergency Management Agency (FEMA)

FEMA provides maps of flood hazard areas, various publications related to flood mitigation, funding for flood mitigation projects, and technical assistance. FEMA also operates the National Flood Insurance Program. FEMA's mission is "to reduce loss of life and property and protect the nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response and recovery." FEMA Region X serves the northwestern states of Alaska, Idaho, Oregon, and Washington.

Contact: FEMA, Federal Regional Center, Region 10
Address: 228th St. SW, Bothell, WA 98021-9796
Phone: (425) 487-4678
Website: http://www.fema.gov

United States Geological Survey (USGS)

The USGS website provides current stream flow conditions at USGS gauging stations in Oregon and throughout the Pacific Northwest. The Oregon USGS office is responsible for water-resources investigations for Oregon and part of southern Washington. Their office cooperates with more than 40 local, state, and federal agencies in Oregon. Cooperative activities include water-resources data collection and interpretive water-availability and water-quality studies.

Contact: USGS Oregon District Office
Address: 10615 S.E. Cherry Blossom Dr., Portland, OR 97216
Phone: (503) 251-3200
Fax: (503) 251-3470
Website: http://oregon.usgs.gov
Email: dc_or@usgs.gov

National Oceanic and Atmospheric Administration (NOAA)

NOAA's historical role has been to predict environmental changes, protect life and property, provide decision makers with reliable scientific information, and foster global environmental stewardship.

Contact: National Oceanic and Atmospheric Administration
Address: 14th Street & Constitution Avenue, NW, Room 6013, Washington, DC 20230
Phone: (202) 482-6090
Fax: (202) 482-3154
Website: http://www.noaa.gov
Email: answers@noaa.gov

National Weather Service, Portland / Pendleton

The National Weather Service provides flood watches, warnings, and informational statements for rivers in Wasco County

Contact: National Weather Service, Portland Bureau
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 261-9246 or (503) 261-9247
Fax: (503) 808-4875
Website: http://www.wrh.noaa.gov/pqr/

Contact: National Weather Service, Pendleton Bureau
Address: 2001 NW 56th Drive, Pendleton, OR 97801
Phone: (541) 276-7832
Website: http://www.wrh.noaa.gov/pdt/

Additional Resources

American Red Cross

The American Red Cross is a humanitarian organization, led by volunteers, that provides relief to victims of disasters and helps people prevent, prepare for, and respond to emergencies. The Oregon Trail Chapter was chartered as a Red Cross unit in 1917. The chapter serves the residents of Clackamas, Columbia, Multnomah, Washington, Yamhill, and Tillamook counties. The Oregon Trail Chapter provides a variety of community services which are consistent with the Red Cross mission and

meet the specific needs of this area, including disaster planning, preparedness, and education.

Contact: Hannah Settje, District Manager
Address: PO Box 6839
Bend OR 97708
Phone: 541.382.2142
Fax: 541.382.2405
Website: http://www.mountainriver.redcross.org
Email:

Institute for Business & Home Safety (IBHS)

IBHS was created as an initiative of the insurance industry to reduce damage and losses caused by natural disasters. This website provides educational resources and on-line publications for insurers, businesses, and homeowners who are interested in taking the initiative to minimize future damages and losses.

Contact: Institute for Business and Home Safety
Address: 4775 E. Fowler Avenue, Tampa, FL 33617
Phone: (813) 286-3400
Fax: (813) 286-9960
E-mail: info@ibhs.org
Website: http://www.ibhs.org/

Flood Mitigation Resources

County Resources

Insert community flood mitigation resources and contact information

Regional Resources

Insert regional flood mitigation resources and contact information

State Resources

Oregon Department of Fish and Wildlife (ODFW)

ODFW's mission is to protect and enhance Oregon 's fish and wildlife and their habitats for use and enjoyment by present and future generations. ODFW regulates stream activity and engages in stream enhancement activities.

Contact: ODFW
Address: 3406 Cherry Avenue N.E., Salem, OR 97303
Phone: (503) 947-6000
Website: http://www.dfw.state.or.us/
Email: Odfw.Info@state.or.us

Oregon Department of State Lands (DSL)

DSL is a regulatory agency, responsible for administration of Oregon's Removal-Fill Law. This law is intended to protect, conserve, and make the best use of the state's water resources. It generally requires a permit from DSL to remove, fill, or alter more than 50 cubic yards of material within the bed or banks of waters of the state. Exceptions are in state scenic waterways and areas designated essential salmon habitat, where a permit is required for all in-stream activity, regardless of size. DSL and the US Army Corps of Engineers may issue these permits jointly.

Contact: Department of State Lands
Address: 775 Summer Street NE, Suite 100, Salem, OR 97301-1279
Phone: (503) 378-3805
Fax: (503) 378-4844
Website: http://statelands.dsl.state.or.us/
Assistant Director: (503) 378-3805, ext. 279
Western Region Manager: (503) 378-3805, ext. 246

Oregon Water Resources Department (WRD)

The WRD's mission is to serve the public by practicing and promoting wise long-term water management. The WRD provides services through 19 watermaster offices throughout the state. In addition, five regional offices provide services based on geographic regions. The Department's main administration is performed from the central office in Salem.

Contact: WRD
Address: 725 Summer Street NE, Suite A, Salem, OR 97301-1271
Phone: (503) 986-0900
Website: http://www.wrd.state.or.us/OWRD/index.shtml

Federal Resources

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The Bureau of Reclamation owns Scoggins Dam in Washington County and prepares emergency action plans for events at the dam.

Contact: Bureau of Reclamation, Pacific Northwest Region
Address: 1150 N. Curtis Road, Boise, ID 83706
Phone: (208) 378-5012
Website: http://137.77.133.1/pn/index.html

Army Corps of Engineers

The Corps of Engineers administers a permit program to ensure that the nation's waterways are used in the public interest. Any person, firm, or agency planning to work in waters of the United States must first obtain a permit from the Army Corps of Engineers. In Oregon, joint permits may be issued with the Division of State Lands. The Corps is responsible for the protection and development of the nation's water resources, including navigation, flood control, energy production through hydropower management, water supply storage and recreation.

Contact: US Army Corps of Engineers-Portland District, Floodplain Information Branch
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 808-5150
Website: http://www.nwp.usace.army.mil/

Hood River County Soil & Water Conservation District (SWCD)

The SWCD works in partnership with the Natural Resource Conservation Service to promote soil and water conservation in Hood River County. SWCD works with agricultural interests and landowners to provide information on natural resource conservation practices. The partnership blends individual member resources to offer technical and financial assistance in planning and applying natural resource conservation practices and systems. Areas of focus include: erosion management, wetlands preservation and restoration, resource inventories, watershed assessments, and conservation education.

Contact: Anne Saxby
Address: 3007 Experiment Station Road
Hood River, OR 97031
Phone: 541-386-6719
Fax: 541-386-4588 (call first!)
Website: http://hoodriverswcd.org/

National Resources Conservation Service (NRCS), US Department of Agriculture (USDA)

NRCS provides a suite of federal programs designed to assist state and local governments, and landowners in mitigating the impacts of flood events. The Watershed Surveys and Planning Program and the Small Watershed Program provide technical and financial assistance to help participants solve natural resource and related economic problems on a watershed basis. The Wetlands Reserve Program and the Flood Risk Reduction Program provide financial incentives to landowners to put aside land that is either a wetland resource or experiences frequent flooding. The Emergency Watershed Protection Program (EWP) provides technical and financial assistance for clearing debris from clogged waterways, restoring vegetation, and stabilizing riverbanks. The measures taken under the EWP must be environmentally and economically sound and generally benefit more that one property.

Contact: USDA-NRCS
Address: 2325 River Rd., Suite 3
The Dalles, OR 97058
Phone: (541) 298-8559
Fax: (541) 298-7868
Website:

Additional Resources

The National Flood Insurance Program

The National Flood Insurance Program (NFIP) Website is a subsection of the Federal Emergency Management Agency (FEMA) site (http://www.fema.gov). The NFIP information is intended for both the general public and the many organizations and agencies participating in the program. It includes information about the NFIP and other flood disaster assistance available from the Federal Government. It also provides access to the newly revised NFIP booklet: *Answers to Questions about the National Flood Insurance Program.*

Contact: The National Flood Insurance Program
Phone: (888) FLOOD29 or (800) 427-5593
Website: http://www.fema.gov/business/nfip/index.shtm

The Association of State Floodplain Managers

The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery. ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and encourages flood hazard research, education, and training. The ASFPM Web site includes information on how to become a member, the organization's constitution and bylaws, directories of officers and committees, a publications list, information on upcoming conferences, a history of the association, and other useful information and Internet links.

Contact: The Association of State Floodplain Managers
Address: 2809 Fish Hatchery Road, Madison, WI 53713
Phone: (608) 274-0123
Website: http://www.floods.org

USGS Water Resources

This web page offers current US water news; extensive current (including real-time) and historical water data; numerous fact sheets and other publications; various technical resources; descriptions of ongoing water survey programs; local water information; and connections to other sources of water information.

Contact: USGS Water Resources
Phone: (503) 251-3200
Website: http://or.water.usgs.gov/
Email: info-or@usgs.gov

Office of Hydrologic Development, National Weather Service

The National Weather Service's Office of Hydrologic Development (OHD) and its Hydrological Information Center offer information on floods and other aquatic disasters. This site offers current and historical data including an archive of past flood summaries, information on current hydrologic conditions, water supply outlooks, an Automated Local Flood Warning Systems Handbook, Natural Disaster Survey Reports, and other scientific publications on hydrology and flooding.

Contact: Office of Hydrologic Development, National Weather Service
Website: http://www.nws.noaa.gov/oh/

The Floodplain Management Association

The Floodplain Management website was established by the Floodplain Management Association (FMA) to serve the entire floodplain management community. It includes full-text articles, a calendar of upcoming events, a list of positions available, an index of publications available free or at nominal cost, a list of associations, a list of firms and consultants in floodplain management, an index of newsletters dealing with flood issues (with hypertext links if available), a section on the basics of floodplain management, a list of frequently asked questions (FAQs) about the Website, and, of course, a copious catalog of Web links.

Contact: Floodplain Managers Association
Website: http://www.floodplain.org
Email: admin@floodplain.org

Northwest Regional Floodplain Managers Association (NORFMA)

This site is a resource for floodplains, fisheries, and river engineering information for the Northwest. This site provides technical information, articles, and Internet links in the field of floodplain and fisheries management

.

Contact: Northwest Regional Floodplain Managers Association
Website: http://www.norfma.org/

Publications

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and

plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:

Contact: Natural Hazards Program Manager, Department of Land Conservation and Development
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.oregon.gov/LCD/HAZ/publications.shtml

NFIP Community Rating System Coordinator's Manual. FEMA/NFIP. Indianapolis, IN.

This informative brochure explains how the Community Rating System works and what the benefits are to communities. It explains in detail the CRS point system, and what activities communities can pursue to earn points. These points then add up to the "rating" for the community, and flood insurance premium discounts are calculated based upon that "rating." The brochure also provides a table on the percent discount realized for each rating (1-10). Instructions on how to apply to be a CRS community are also included.

Contact: NFIP Community Rating System
Phone: (800) 480-2520 or (317) 848-2898
Website: http://training.fema.gov/EMIWeb/CRS/ (select resources)

Floodplain Management: A Local Floodplain Administrator's Guide to the NFIP. FEMA-Region 10. Bothell, WA.

This document discusses floodplain processes and terminology. It contains floodplain management and mitigation strategies, as well as information on the NFIP, CRS, Community Assistance Visits, and floodplain development standards.

Contact: National Flood Insurance Program
Phone: (800) 480-2520
Website: http://www.oregon.gov/LCD/HAZ/docs/floods/localofficial_4th.pdf

Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials, (February 1987), FEMA-116.

This guidebook offers a table on actions that communities can take to reduce flood losses. It also offers a table with sources for floodplain mapping assistance for the various types of flooding hazards. There is information on various types of flood hazards with regard to existing mitigation efforts and options for action (policy and programs, mapping, regulatory, non-regulatory). Types of flooding which are covered include alluvial fan, areas behind levees, areas below unsafe dams, coastal flooding, flash floods, fluctuating lake level floods, ground failure triggered by earthquakes, ice jam flooding, and mudslides.

Contact: Federal Emergency Management Agency

Phone: (800) 480-2520
Website: http://www.fema.gov/hazard/flood/pubs/lib116.shtm

Oregon Model Flood Damage Prevention Ordinance, (January 1999), FEMA/DLCD.

This is an example of how to write an ordinance that complies with NFIP/FEMA standards. Communities can simply adopt this ordinance, word for word, filling in the blanks specific to their community or jurisdiction.

Contact: Department of Land Conservation and Development
Phone: (503) 373-0050
Website: http://www.oregon.gov/LCD/HAZ/docs/floods/floodord.pdf

Wildfire Resource Directory

County Resources

Insert community wildfire mitigation resources and contact information

Regional Resources

Insert regional wildfire mitigation resources and contact information

State Resources

Oregon Department of Consumer and Business Services

The Building Codes Division of Oregon's Department of Consumer and Business Services is responsible for administering statewide building codes. Its responsibilities include adoption of statewide construction standards that help create disaster-resistant buildings, particularly for flood, wildfire, wind, foundation stability, and seismic hazards. Information about wildfire-related building codes is found through this department.

Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, OR 97309
Phone: (503) 373-4133
Fax: (503) 378-2322
Website: http://www.cbs.state.or.us/external/bcd

Oregon Department of Forestry (ODF)

ODF's Fire Prevention Unit is involved in interface wildfire mitigation and provides information about Oregon's Wildfire Hazard Zones. The Protection From Fire section of the ODF website includes Oregon-specific fire protection resources. Wildfire condition reports can be accessed on the website as well. ODF's Protection from Fire Program works to do the following:

- Clarify roles of ODF, landowners, and other agencies in relation to wildland fire protection in Oregon;
- Strengthen the role of forest landowners and the forest industry in the protection system;
- Understand and respond to needs for improving forest health conditions and the role/use of prescribed fire in relation to mixed ownerships, forest fuels and insects and disease; and
- Understand and respond to needs for improving the wildland/urban interface situation.

Contact: Oregon Department of Forestry, Fire Prevention Unit
Address: 2600 State Street, Salem, Oregon 97310
Phone: (503) 945-7440
Website: http://www.oregon.gov/ODF/FIRE/fire_protection.shtml

Office of the State Fire Marshal (OSFM)

The Prevention Unit of Oregon's Office of the State Fire Marshal contains 19 Deputy State Fire Marshals located in various regions. The responsibilities of these deputies include public education for local fire districts and inspection of businesses, public assemblies, schools, daycare centers, and adult foster homes. The State Fire Marshal's Community Education Services unit works to keep Oregonians safe from fires and injury by providing them with the knowledge to protect themselves and their property.

Contact: Oregon State Fire Marshal
Address: 4760 Portland Road NE, Salem, Oregon 97305-1760
Phone: (503) 378-3473
Fax: (503) 373-1825
Website: http://159.121.82.250/ Oregon Laws on Fire Protection: http://159.121.82.250/SFM_Admin/firelaws.htm
Email: Oregon.sfm@state.or.us

Federal Resources and Programs

Federal Wildland Fire Policy, Wildland/Urban Interface Protection

This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions.

Website: http://www.fs.fed.us/fire/management/policy.html

National Fire Protection Association (NFPA)

This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiative's programs and documents. Other members of the initiative include: the National Association of State Foresters, the US Department of Agriculture Forest Service, the US Department of the Interior, and the United States Fire Administration.

Contact: Public Fire Protection Division
Address: 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101
Phone: (617) 770-3000
Website: www.nfpa.org

National Interagency Fire Center (NIFC)

The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service, National Weather Service, and Office of Aircraft Services.

Contact: National Interagency Fire Center
Address: 3833 S. Development Avenue, Boise, Idaho 83705-5354
Phone: (208) 387-5512
Website: http://www.nifc.gov/

United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)

As an entity of the Federal Emergency Management Agency, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination, and support.

Contact: USFA, Planning Branch, Mitigation Directorate
Address: 16825 S. Seton Ave., Emmitsburg, MD 21727
Phone: (301) 447-1000
Website: http://www.fema.gov/hazard/wildfire/index.shtm - Wildfire Mitigation Planning
http://www.usfa.fema.gov/index.htm - USFA Homepage
http://www.usfa.fema.gov/wildfire/- USFA Resources on Wildfire

United States Forest Service (USFS)

The USFS is a federal land management organization established to manage the nation's federally owned forests. As part of the Department of Agriculture, it provides timber for people, forage for cattle and wildlife, habitat for fish, plants, and animals, and recreation lands throughout the country.

The USFS offers a possible link from local jurisdictions to federal grant programs.

Contact: USDA Forest Service - Pacific Northwest Region
Address: 333 SW First Avenue, Portland, Oregon 97204-3440;
P.O. Box 3623, Portland, OR 97208-3623
Phone: 503-808-2468
Website: http://www.fs.fed.us/r6/welcome.htm

Additional Resources

FireFree Program to Promote Home Safety

In a pioneering effort to address wildfire danger in Bend, Oregon, four local agencies and a Fortune 500 corporation joined together to create "FireFree! Get In The Zone," a public education campaign designed to increase resident participation in wildfire safety and mitigate losses. Spearheaded by SAFECO Corporation, the partnership includes the Bend Fire Department, Deschutes County Rural Fire Protection District #2, Bend City Planning, and The Deschutes National Forest. The Oregon Department of Forestry and a number of local government agencies and businesses have joined the program.

Contact: FireFree
Address: 63377 Jamison St., Bend, OR 97701

Phone: (541) 318-0459
E-mail: dcrfpd2@dcrfpd2.com
Website: http://www.firefree.org

Firewise – The National Wildland/Urban Interface Fire program

Firewise maintains a Website designed for people who live in wildfire- prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences.

Contact: Firewise
Address: PO Box 9101, Quincy, MA 02269-9101
Phone: (617) 984-7056
E-mail: firewise@firewise.org
Website: http://www.firewise.org/

Publications

National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire. National Wildland/Urban Interface Fire Protection Program, (1991). National Fire Protection Association, Washington, D.C.

This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers, and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:

Contact: National Fire Protection Association Publications
Phone: (800) 344-3555
Website: http://www.nfpa.org or http://www.firewise.org

An International Collection of Wildland-Urban Interface Resource Materials (Information Report NOR-X-344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.

This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles, and public education materials. The citation format allows the reader to obtain most items through a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form. To obtain this resource:

Contact: Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
Website: http://www.pfc.cfs.nrcan.gc.ca/cgi-bin/bstore/catalog_e.pl?catalog=11794

Wildland/Urban Interface Fire Hazard Assessment Methodology. National Wildland/Urban Interface Fire Protection Program, (1998), NFPA, Washington, D.C. To obtain this resource:

Contact: Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
Website: http://www.firewise.org

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility. National Wildland/Urban Interface Fire Protection Program. (1998). Washington, D.C.: Author. To obtain this resource:

Contact: Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
Website: http://www.firewise.org

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local staffs and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:

Contact: Natural Hazards Program Manager
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.oregon.gov/LCD/HAZ/index.shtml

Burning Questions. A Social Science Research Plan for Federal Wildland Fire Management, Machlis, G., Kaplan, A., Tuler, S., Bagby, K., and McKendry, J. (2002) National Wildfire Coordinating Group.

The plan covers a wide range of topics and questions related to the human dimensions of federal wildland fire management. Both the beneficial and harmful affects of wildland fire are considered. The plan includes research in the social sciences or anthropology, economics, geography, psychology, political science, and sociology, as well as interdisciplinary fields of research. The plan is national in scale but recognizes the importance of regional variation in wildland fire issues.

Contact: Cooperative Park Studies Unit
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (208) 885-7054
Fax: (503) 378-6033
Website: http://www.psu.uidaho.edu/

Severe Weather Event Resource Directory

County Resources

Insert community multi-hazard mitigation resources and contact information

Regional Resources

Insert community multi-hazard mitigation resources and contact information

State Resources

Oregon Climate Service

The Oregon Climate Service collects, manages, and maintains Oregon weather and climate data. OCS provides weather and climate information to those within and outside the state of Oregon and educates the citizens of Oregon on current and emerging climate issues. OCS also performs independent research related to weather and climate issues.

Contact: Oregon Climate Service
Address: Oregon Climate Service, Oregon State University
Strand Ag Hall Room 316, Corvallis, OR 97331-2209
Phone: (541) 737-5705
Website: http://www.ocs.orst.edu
Email: oregon@oce.orst.edu

Additional Resources

Public Assistance Debris Management Guide, Federal Emergency Management Agency (July 2000).

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The *Public Assistance Debris Management Guide* is available in hard copy or on the FEMA website.

Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Fax: (425) 487-4622
Website: http://www.fema.gov/government/grant/pa/dmgtoc.shtm

Landslide Resource Directory

County Resources

Insert community multi-hazard mitigation resources and contact information

Regional Resources

Insert community multi-hazard mitigation resources and contact information

State Resources

Oregon Department of Forestry (ODF)

The mission of the Oregon Department of Forestry is to serve the people of Oregon through the protection, management, and promotion of a healthy forest environment, which will enhance Oregon's livability and economy for today and tomorrow. ODF regulates forest operations to reduce the risk of serious injury or death from rapidly moving landslides related to forest operations, and assists local governments in the siting review of permanent dwellings on and adjacent to forestlands in further review areas.

Contact: Oregon Department of Forestry
Address: 2600 State Street, Salem OR 97310
Phone: (503) 945-7212
Website: http://www.odf.state.or.us

Oregon Department of Forestry Debris Flow Warning Page

The ODF debris flow warning page provides communities with up-to-date access to information regarding potential debris flows. As the lead agency, ODF is responsible for forecasting and measuring rainfall from storms that may trigger debris flows. Advisories and warnings are issued as appropriate. Information is broadcast over NOAA weather radio and on the Law Enforcement Data System. DOGAMI provides additional information on debris flows to the media that convey the information to the public. ODOT also provides warnings to motorists during periods determined to be of highest risk for rapidly moving landslides along areas on state highways with a history of being most vulnerable. Information is available on the ODF website at www.odf.state.or.us.

Oregon Department of Geology and Mineral Industries (DOGAMI)

DOGAMI is an important agency for landslide mitigation activities in Oregon. Some key functions of DOGAMI are development of geologic data, producing maps, and acting as lead regulator for mining and drilling for geological resources. The agency also provides technical resources for communities and provides public education on geologic hazards. DOGAMI provides data and geologic information to local, state, and federal natural resource agencies, industry, and private groups.

Contact: DOGAMI
Address: 800 NE Oregon Street, Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com
Email: info@naturenw.org

Nature of the Northwest

Oregon Department of Geology and Mineral Industries and the USDA Forest Service jointly operate the Nature of the Northwest Information Center. The Center offers a selection of maps and publications from state, federal, and private agencies.

Contact: The Nature of the Northwest Information Center
Address: 800 NE Oregon Street #5, Suite 177, Portland, Oregon 97232
Phone: (503) 872- 2750
Fax: (503) 731-4066
Website: http://www.naturenw.org
Email: Nature.of.Northwest@state.or.us

Oregon Department of Transportation (ODOT)

ODOT provides warnings to motorists during periods determined to be of highest risk of rapidly moving landslides along areas on state highways with a history of being most vulnerable to rapidly moving landslides. ODOT also monitors for landslide activity and responds to slide events on state highways.

Contact: ODOT Transportation Building
Address: 355 Capitol St. NE, Salem, OR 97310
Phone: (888) 275-6368
Website: http://www.odot.state.or.us

Portland State University, Department of Geology

Portland State University conducts research and prepares inventories and reports for communities throughout Oregon. Research and projects conducted through the Department of Geology at Portland State University include an inventory of landslides for the Portland metropolitan region after the 1996 and 1997 floods and a subsequent susceptibility report and planning document for Metro in Portland.

Contact: Portland State University, Department of Geology
Address: 17 Cramer Hall; 1721 SW Broadway, Box 751, Portland, OR 97207
Phone: (503) 725-3389
Website: http://www.geol.pdx.edu

Federal Resources

Natural Resource Conservation Service (NRCS)

The NRCS produces soil surveys. These may be useful to local governments who are assessing areas with potential development limitations including steep slopes and soil types. They operate many programs dealing with the protection of natural resources.

Contact: NRCS, Oregon Branch
Address: 101 S.W. Main Street, Suite 1300, Portland, OR 97204
Phone: (503) 414-3200
Fax: (503) 414-3103
Website: http://www.or.nrcs.usda.gov

US Geological Survey, National Landslide Information Center (NLIC)

The NLIC website provides good information on the programs and resources regarding landslides. The page includes information on the National Landslide Hazards Program Information Center, a bibliography, publications, and current projects. USGS scientists are working to reduce long-term losses and casualties from landslide hazards through better understanding of the causes and mechanisms of ground failure both nationally and worldwide.

Contact: National Landslide Information Center
Phone: (800) 654-4966
Website: http://www.usgs.gov/hazards/landslides/

Additional Resources

American Planning Association (APA)

The APA's research department embarked on a program to bring together solutions from multiple disciplines into a single source. It will help serve local planning efforts in identifying landslide hazards during the planning process so as to minimize exposure to landslide risks. The APA's website highlights planning efforts to reduce risk and loss from landslides.

Contact: Principal Investigator, Landslides Project
Address: Research Department, American Planning Association
122 S. Michigan Ave., Suite 1600
Chicago, Illinois 60603-6107
Phone: (312) 431-9100
Fax: (312) 431-9985
Website: http://www.planning.org/landslides
Email: landslides@planning.org

State of Washington, Department of Ecology

The Washington State Department of Ecology has a landslide website with tips for reducing risk, warning signs, and maps.

Contact: Department of Ecology
Address: PO Box 47600, Olympia, WA 98504-7600
Website: http://www.ecy.wa.gov/programs/sea/landslides
Email: hshi461@ecy.wa.gov

Publications

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. You can write, call, fax, or go on-line to obtain this document.

Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.oregon.gov/LCD/HAZ/index.shtml

Mileti, Dennis, Disasters by Design: A Reassessment of Natural Hazards in the United States *(1999) Joseph Henry Press.*

This book offers a way to view, study, and manage hazards in the United States that will help foster disaster-resilient communities, higher environmental quality, inter- and intragenerational equity, economic sustainability, and an improved quality of life. The volume provides an overview of what is known about natural hazards, recovery, and mitigation; reveals how research findings have been translated into policies and programs; and advances a sustainable hazard mitigation research agenda.

Olshansky, Robert B., *Planning for Hillside Development* (1996) American Planning Association.

This document describes the history, purpose, and functions of hillside development and regulation and the role of planning, and provides excerpts from hillside plans, ordinances, and guidelines from communities throughout the US.

Olshansky, Robert B. & Rogers, J. David, *Unstable Ground: Landslide Policy in the United States* (1987) Ecology Law Quarterly.

This is about the history and policy of landslide mitigation in the US.

Public Assistance Debris Management Guide (July 2000) Federal Emergency Management Agency

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The Guide is available in hard copy or on the FEMA website.

Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Website: http://www.fema.gov/government/grant/pa/dmgtoc.shtm

USGS Landslide Program Brochure. National Landslide Information Center (NLIC), United States Geologic Survey

The brochure provides good, general information in simple terminology on the importance of landslide studies and a list of databases, outreach, and exhibits maintained by the NLIC. The brochure also includes information on the types and causes of landslides, rockfalls, and flows.

Contact: USGS- MS 966, Box 25046
Address: Denver, Federal Center, Denver, CO 80225
Phone: (800) 654-4966
Web: http://geohazards.cr.usgs.gov/

Earthquake

County Resources

Insert community multi-hazard mitigation resources and contact information

Regional Resources

Insert community multi-hazard mitigation resources and contact information

State Resources

Oregon Department of Consumer & Business Services-Building Codes Division

The Building Codes Division (BCD) sets statewide standards for design, construction, and alteration of buildings that include resistance to seismic forces. BCD is active on several earthquake committees and funds construction related continuing education programs. BCD registers persons qualified to inspect buildings as safe or unsafe to occupy following an earthquake and works with OEM to assign inspection teams where they are needed.

Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, Oregon 97309
Phone: (503) 378-4133
Fax: (503) 378-2322
Website: http://www.cbs.state.or.us/external/bcd/

The Nature of the Northwest Information Center

The Nature of the Northwest Information Center is operated jointly by the Oregon Department of Geology and Mineral Industries and the USDA Forest Service. It offers selections of maps and publications from state, federal, and private agencies. DOGAMI's earthquake hazard maps can be ordered from this site.

Address: Suite 177, 800 NE Oregon Street # 5, Portland, Oregon 97232
Phone: (503) 872-2750
Fax: (503) 731-4066
Email: Nature.of.NW@state.or.us
Website: http://www.naturenw.org/geo-earthquakes.htm

Federal Resources

US Geological Survey (USGS)

The USGS is an active seismic research organization that also provides funding for research. (For an example of such research, see Recommended Seismic Publications below).

Contact: USGS, National Earthquake Information Center
Address: Box 25046; DFC, MS 967; Denver, Colorado 80225
Phone: (303) 273-8500
Fax: (303) 273-8450
Website: http://neic.usgs.gov

Building Seismic Safety Council (BSSC)
The Building Seismic Safety Council (BSSC), established by the National Institute of Building Sciences (NIBS), deals with complex regulatory, technical, social, and economic issues and develops and promotes building earthquake risk mitigation regulatory provisions for the nation.

Address: 1090 Vermont Avenue, NW, Suite 700, Washington, DC 20005
Phone: (202) 289-7800
Fax: (202) 289-1092
Website: http://www.bssconline.org/

Western States Seismic Policy Council (WSSPC)
The WSSPC is a regional organization that includes representatives of the earthquake programs of thirteen states (Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon Utah, Washington, and Wyoming), three U.S. territories (American Samoa, Commonwealth of the Northern Mariana Islands and Guam), one Canadian Province (British Columbia), and one Canadian Territory (Yukon). The primary aims of the organization have been: to improve public understanding of seismic risk; to improve earthquake preparedness; and, to provide a cooperative forum to enhance transfer of mitigation technologies at the local, state, interstate, and national levels.

The mission of the Council is to provide a forum to advance earthquake hazard reduction programs throughout the western region and to develop, recommend, and present seismic policies and programs through information exchange, research and education.

Contact: WSSPC, Executive Director
Address: 121 Second Street, 4th Floor, San Francisco, CA 94105
Phone: (415) 974-6435
Fax: (415) 974-1747
Email: wsspc@wsspc.com
Website: http://www.wsspc.org/

Cascadia Region Earthquake Workgroup (CREW)
CREW provides information on regional earthquake hazards, facts and mitigation strategies for the home and business office. CREW is a coalition of private and public representative s working together to improve the ability of Cascadia Region communities to reduce the effects of earthquake events. Members are from Oregon, Washington, California, and British Columbia. Goals are to:

- Promote efforts to reduce the loss of life and property.
- Conduct education efforts to motivate key decision makers to reduce risks associated with earthquakes.
- Foster productive linkages between scientists, critical infrastructure provides, businesses and governmental agencies in order to improve the viability of communities after an earthquake.

Contact: CREW, Executive Director
Address: 1330A S. 2nd Street, #105, Mount Vernon, WA 97273
Phone: (360) 336-5494

Fax: (360) 336-2837
Website: http://www.crew.org/

Additional Resources

Publications

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. You can write, call, fax, or go on-line to obtain this document.

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Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.oregon.gov/LCD/HAZ/index.shtml

Environmental, Groundwater and Engineering Geology: Applications for Oregon – Earthquake Risks and Mitigation in Oregon, Yumei Wang, (1998) Oregon Department of Geology and Mineral Industries, Star Publishing.

This paper deals with earthquake risks in Oregon, what is being done today, and what policies and programs are in action to help prevent loss and damage from seismic events. This article also gives a good list of organizations that are doing work in this field within the state. This article is somewhat technical but provides vital information to communities around the state.

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Special Paper 29: Earthquake damage in Oregon: Preliminary estimates of future earthquake losses, Yumei Wang, Oregon Department Of Geology And Mineral Industries.

Wang, a geotechnical engineer, analyzed all faults with a 10% chance of causing an earthquake in the next 50 years and projected potential damage. Wang stresses that these are preliminary figures. "There are two things we could not incorporate into this study that would significantly increase these figures. One is a tsunami. The other is an inventory of unreinforced brick or masonry buildings."

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Land Use Planning for Earthquake Hazard Mitigation: A Handbook for Planners, *Wolfe, Myer R. et. al., (1986) University of Colorado, Institute of Behavioral Science, National Science Foundation.*

This handbook provides techniques that planners and others can utilize to help mitigate for seismic hazards. It provides information on the effects of earthquakes, sources on risk assessment, and effects of earthquakes on the built environment. The handbook also gives examples on application and implementation of planning techniques to be used by local communities.

Contact: Natural Hazards Research and Applications Information Center
Address: University of Colorado, 482 UCB, Boulder, CO 80309-0482
Phone: (303) 492-6818
Fax: (303) 492-2151
Website: http://www.colorado.edu/UCB/Research/IBS/hazards

Using Earthquake Hazard Maps: A Guide for Local Governments in the Portland Metropolitan Region; Evaluation of Earthquake Hazard Maps for the Portland Metropolitan Region Spangle Associates, (1998/1999) Urban Planning and Research, Portola Valley, California.

These two publications are useful for local governments concerned with land use in earthquake hazard areas. The proximity of Washington County to Portland and their interactive communities make these guides applicable to the County. The publications are written in clear and simplistic language and address issues such as how to apply earthquake hazard maps for land use decisions.

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Public Assistance Debris Management Guide, Federal Emergency Management Agency (July 2000).

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The *Public Assistance Debris Management Guide* is available in hard copy or on the FEMA website.

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Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Fax: (425) 487-4622
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Household Natural Hazards Preparedness Survey

Survey Report for:

(The Mid-Columbia Region)

Gilliam County, Oregon
Hood River County, Oregon
Morrow County, Oregon
Sherman County, Oregon
Umatilla County, Oregon
Wasco County, Oregon
Wheeler County, Oregon

Prepared by:

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August 2006

Special Thanks & Acknowledgements

The Community Service Center would like to thank the following individuals for their assistance on this project:

Chris Fitzsimmons, Gilliam County

Ray Denny, Umatilla County

Carla McLane, Morrow County

Dennis Olson, Umatilla County

Michael Pasternak, Hood River and Wasco Counties

Shawn Payne, Sherman County

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This survey was developed and implemented as part of a regional planning initiative funded through the Federal Emergency Management Agency's Pre-Disaster Mitigation Competitive Grant Program. The Mid-Columbia Region grant was awarded to support the development of natural hazard mitigation plans for the region. The region's planning process utilized a seven-step planning process, plan framework, and plan development support (including the development of this report) provided by the Oregon Natural Hazards Workgroup at the University of Oregon.

Appendix C: Household Risk Perception Survey

Survey Purpose and Use

The purpose of the survey is to gauge the overall perception of natural disasters, determine a baseline level of loss reduction activity for residents in the community, and assess citizen's support for different types of individual and community risk reduction activities.

Data from this survey directly informs the natural hazard planning process. Counties in the Mid-Columbia region can use this survey data to enhance action item rationale and ideas for implementation. Other community organizations can also use survey results to inform their own outreach efforts. Data from the survey provides the counties with a better understanding of desired outreach strategies (sources and formats), a baseline of what people have done to prepare for a natural hazard, and desired individual and community strategies for risk reduction.

Background

The Federal Emergency Management Agency (FEMA) published Interim Rule 44 CFR Part 201 in February 2002, requiring all states and communities to develop natural hazard mitigation plans by November 2003. These planning and mitigation requirements for states and communities are being accomplished through the Pre-Disaster Mitigation Program (PDM). Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon, as the coordinator of the *Partners for Disaster Resistance and Resilience: Oregon Showcase State Program*, is working with Oregon Emergency Management (OEM) and the PDM Program to assist local governments with their natural hazard mitigation planning efforts. As part of the PDM Program, ONHW is assisting the Mid-Columbia region of Oregon with the citizen involvement components of the natural hazard mitigation planning process.

Citizen involvement is a key component in the natural hazard mitigation planning process. Citizens have the opportunity to voice their ideas, interests and concerns about the impact of natural disasters on their communities. To that end, the Disaster Mitigation Act of 2000[1]

[1] National Archives and Records Administration. 2002. Federal Emergency Management Agency 44 CFR Parts 201 and 206 Hazard Mitigation Planning and Hazard Mitigation Grant Program; Interim Final Rule in Federal Register.

requires citizen involvement in the natural hazard mitigation planning process. It states:

> An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
>
> 1. An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.
> 2. An opportunity 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.

The benefits of citizen involvement, according to Bierle[2], include the following: (1) educate and inform public; (2) incorporate public values into decision making; (3) improve substantially the quality of decisions; (4) increase trust in institutions; (5) reduce conflict; and (6) ensure cost effectiveness.

Methodology

To conduct the household survey, ONHW adapted the eight page survey administered statewide in 2002 to better understand the perceptions of risk to natural hazards held by citizens, as well as the level of preparedness and types of risk reduction activities in which citizens have engaged. (See Appendix A) For the Mid-Columbia region survey, ONHW adapted the statewide survey to include questions about citizens' support for different types of community planning actions. Planning actions mentioned included protecting critical facilities, disclosing natural hazard risks during real estate transactions, and the use of tax dollars to compensate land owners for not developing in hazardous areas.

The survey was sent to 1200 households in the Mid Columbia Gorge region, which includes: Hood River, Wasco, Sherman, Gilliam, Wheeler, Morrow and Umatilla Counties. The households were randomly selected and population weighted based on mailing lists provided to ONHW by each of the counties. The following table documents the individual county list sources.

Table 1.1: County Mailing List Sources, 2006

[2] Bierle, T. 1999. "Using social goals to evaluate public participation in environmental decisions." *Policy Studies Review*. 16(3/4) ,75-103.

County	List Source
Gilliam	911 Addressing
Hood River	Voter Registration
Morrow	Voter Registration
Sherman	Sherman County Ambulance Service Membership List
Umatilla	Voter Registration
Wasco	Wasco County GIS: Tax Lot Database
Wheeler	Voter Registration

Source: Oregon Natural Hazards Workgroup

The mailing contained a cover letter, the survey instrument, and a postage-paid return envelope. Completed surveys were returned to ONHW. A second mailing was sent to households who did not respond to the first mailing, approximately three weeks later. ONHW received 276 valid responses, for a 23% response rate.

Limitations

The study identifies key issues about how members of the Mid-Columbia communities perceive their risk to natural hazards, providing a snapshot of those perceptions at a single point in time. As such, survey responses may reflect external issues, such as heightened concern about terrorism and the current state of the economy. This study was not intended to be representative of the perceptions of all residents, and cannot be generalized to the public.

A challenge is that the survey was not tailored to each community in which it was implemented and natural hazards are not evenly dispersed throughout the state. For example, the survey asked respondents about their level of concern about coastal erosion. Coastal erosion is only an issue in coastal areas of the state. Not surprisingly, the level of concern for coastal erosion is highest in coastal communities and is less significant for those who do not live there. Thus, coastal erosion is a specific concern for respondents who live near this hazard that they are susceptible to every day, just as those who live in the floodplain or near a volcanic hazard may have increased awareness of those hazards.

Organization of Report

The survey results are organized into the following sections:

Characteristics of Survey Respondents: This section reports information about respondent characteristics including: educational attainment, home ownership, age, and household income.

Perception of Risk: This section creates a profile of survey respondents and identifies:

- The hazards experienced;
- General level of concern over natural hazards risk;

- Respondent perceptions of threats posed by natural hazards;
- Perceptions of the effectiveness of various education and outreach material in raising natural hazard awareness; and
- Preferred avenues for information dissemination.

Level of Preparedness: This section provides an overview of household level natural hazard preparedness activities in the Mid-Columbia region.

Natural Hazard Risk Reduction: This section describes the types of structural and nonstructural measures that are being implemented by survey respondents, and the types of resources or programs that might increase risk reduction activities.

Community Natural Hazard Preparedness: This section describes citizens' priorities for planning for natural hazards and the community-wide strategies respondents support.

Written Responses to Open-Ended Questions: This section includes the transcripts of the open-ended questions and comments.

Characteristics of Survey Respondents

Demographic questions provide a statistical overview of the characteristics of the respondents. This section of the survey asked respondents about their age and gender, their level of education, and how long they have lived in Oregon. The survey also included questions regarding respondents' present housing.

There were 276 people who responded to the survey giving the survey a 23% response rate. Of the seven counties the survey was mailed to, the most surveys returned came from residents of Umatilla County (51.9%). This is not surprising as Umatilla has by far the greatest number of residents in the region with 70,548 of the 131,141 Mid-Columbia residents (2000 U.S. Census). Proportionally, the highest percentage of respondents per county was in Wheeler County where 0.5% of the total population responded to the survey.

Table 2.1 shows the percentage of people who responded to the survey by county.

Table 2.1. Percent of Surveys Received Per County

County	Percent of surveys received
Gilliam	3%
Sherman	3%
Wheeler	3%
Morrow	7.5%
Hood River	13.4%
Wasco	18.3%
Umatilla	51.9%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006).

Gender and Age

Women accounted for 57% of survey respondents even though they represented less than 50% of the population in the region according to the 2000 Census. The median age of survey respondents was 61 years even though the median age of Mid-Columbia residents, according to the U.S. Census,[3] was 39.5. Table 2.2 compares the ages of survey respondents to the 2000 U.S. Census. This shows that younger people were underrepresented while older people were overrepresented.

Table 2.2. Percentage of Mid-Columbia Population and Survey Respondents in Each Age Classification (persons 20 and over)

Age Category	Mid-Columbia (from U.S. Census)	Survey Respondents
20-24	4.6%	1.5%
25-34	10.7%	5.2%
35-44	14.9%	8.4%
45-54	14.5%	24.3%
55-59	5.5%	14.9%
60-64	5.1%	16.4%
65-74	8.6%	14.5%
75-84	5.6%	10.7%
85 & over	1.9%	3.0%

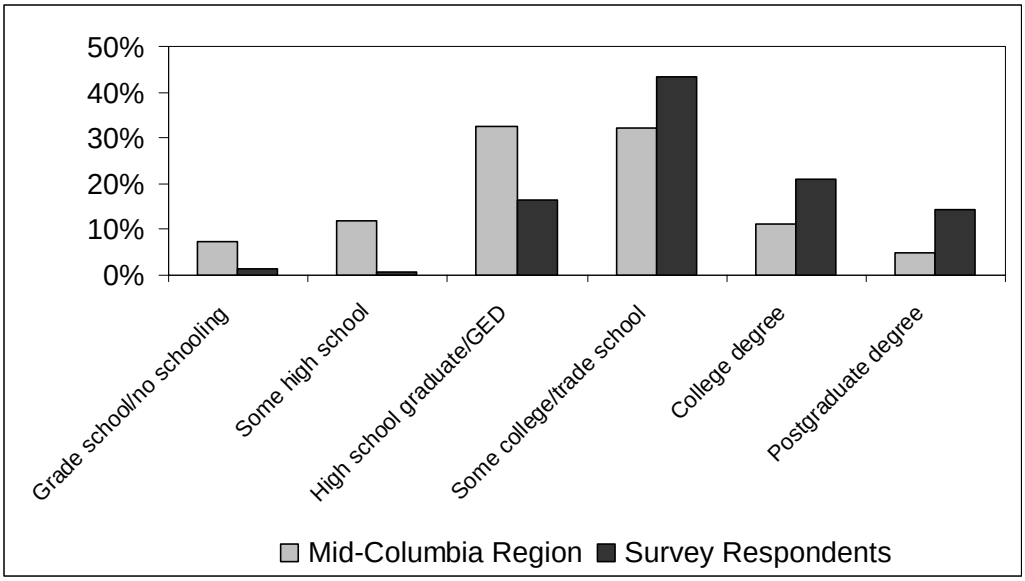
Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006).

[3] U.S. Census data presented in this report is an average of data from each of the seven counties represented in the Mid-Columbia region.

Level of Education

In general, survey respondents were relatively well educated. Figure 2.1 compares the level of education of survey respondents with the 2000 U.S. Census. About 79% of survey respondents have had some college or trade school or have a college or postgraduate degree. In contrast, figures from the Census show that an average of 48% of Mid-Columbia residents have attended some college or trade school or obtained an associate, bachelor or postgraduate degree. Therefore, survey respondents were more likely to have completed a higher educational level than the overall population of the Mid-Columbia region.

Figure 2.1. Level of Education of the Mid-Columbia Population and Survey Respondents

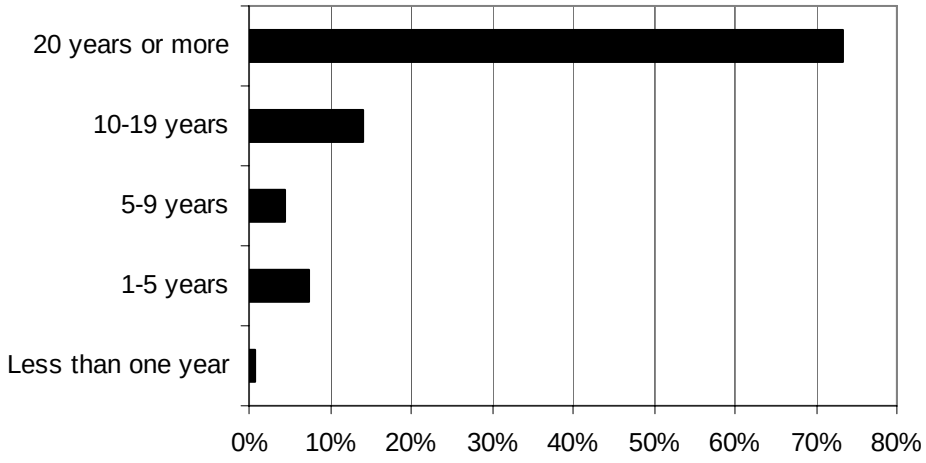


Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Oregon Residency

Over 73% percent of survey respondents have lived in Oregon for 20 years or more (see Figure 2). Respondents who have lived in Oregon for fewer than 20 years have most commonly moved from California (18%), Washington (17%), and Colorado (5%).

Figure 2.2. Length of Time Survey Respondents Have Lived in Oregon



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Housing Characteristics

Homeownership is an important variable in education and outreach programs. Knowledge of the percentage of homeowners in a community can help target the programs. Additionally, homeowners might be more willing to invest time and money in making their homes more disaster resistance. Table 2.3 compares the percentage of homeowners from the survey and the U.S. Census. Almost 88% of survey respondents are homeowners, compared to the 66% reported by the U.S. Census. The survey sample over represents the number of homeowners and considerably under represents the number of renters.

Table 2.3. Percentage of Mid-Columbia Population and Survey Respondents Who Own or Rent Their Home

Occupied housing units	Mid-Columbia	Survey Respondents
Owner-occupied housing units	66.0%	87.7%
Renter-occupied housing units	34.0%	12.3%

Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Almost 74% of survey respondents live in single-family homes, 16% live in manufactured homes, 3% in apartments, and 3% live in duplexes. In addition, 77% said they have access to the internet.

Perception of Risk

It is helpful to understand community members' experiences and perceptions of risk to natural hazards to make informed decisions about natural hazard risk reduction activities. The survey asked respondents for information regarding their personal experiences with natural disasters and their level of concern for specific hazards in the Mid-Columbia region. The primary objective of these questions was to create a "natural hazard profile" of respondents to better understand how Mid-Columbia residents perceive natural hazards.

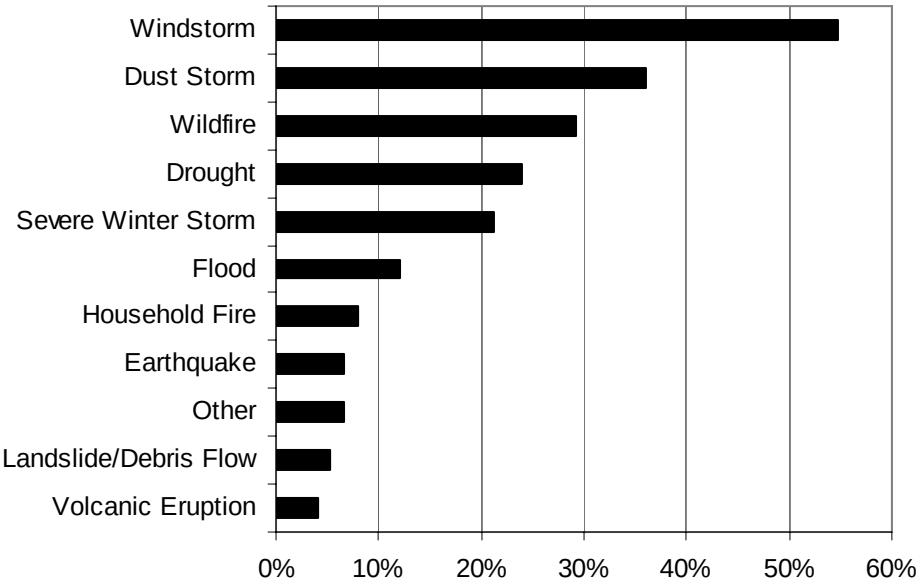
To understand the effectiveness of current outreach activities regarding home and family safety, the survey asked respondents about the types of information they receive on how to make their home and family safer. By identifying communication tools that have been effectively used in the past, local government agencies and organizations can continue to make use of or augment the use of these outreach materials.

General Level of Concern

The survey results indicate that about 27% of the respondents or someone in their household has personally experienced natural disasters in the past five years or since they have lived in the community in which they currently reside.

Of those respondents who have experienced a natural disaster in the last five years, 55% experienced windstorms, 36% experienced dust storms, and 29% experienced wildfires. Figure 3.1 illustrates the disasters experienced in the past five years in the Mid-Columbia region.

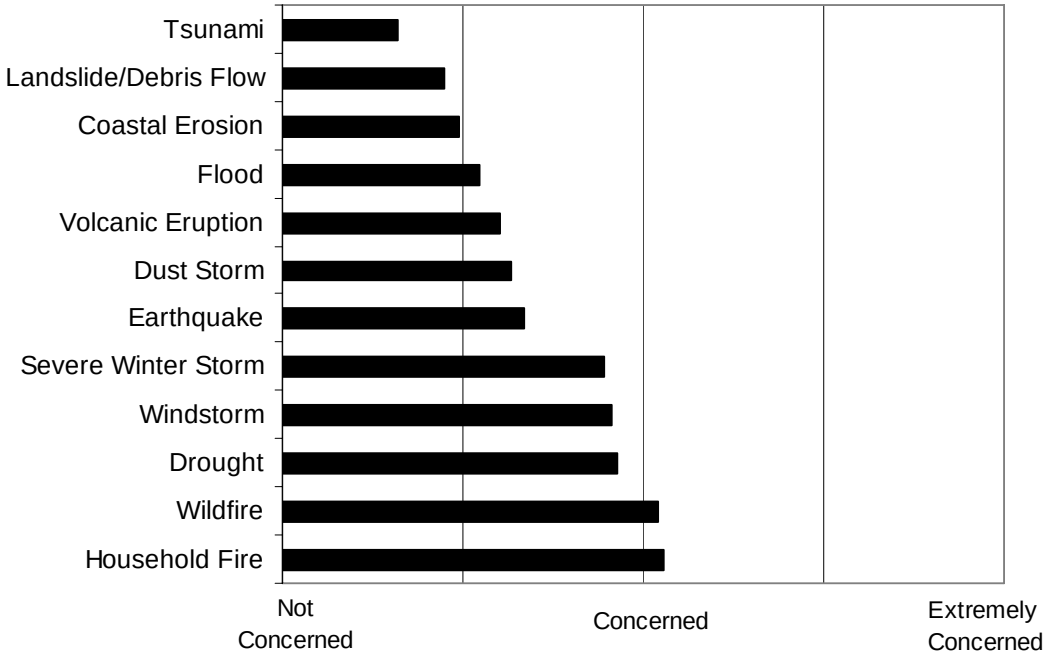
Figure 3.1. Percent of Disasters Experienced by Survey Respondents Within the Past Five Years



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

The survey asked respondents to rank their personal level of concern for specific natural disasters affecting their community. Figure 3.2 shows the general level of concern about natural hazards in the Mid-Columbia region.

Figure 3.2. Survey Respondents' General Level of Concern about Natural Hazards in the Mid-Columbia Region



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Even though windstorms were the most common natural disaster experienced by survey respondents, results show that respondents were most concerned about household fire and wildfire. The respondents are least concerned about landslide/debris flows and tsunamis. See Table 3.1.

Table 3.1. Survey Respondents' Level of Concern Regarding Natural Hazards in the Mid-Columbia Region

Hazard Type	Extremely Concerned	Very Concerned	Concerned	Somewhat Concerned	Not Concerned
Drought	9%	20%	33%	24%	15%
Dust Storm	5%	12%	26%	17%	40%
Earthquake	5%	11%	26%	30%	28%
Flood	3%	10%	22%	26%	40%
Landslide/Debris Flow	1%	7%	19%	27%	46%
Wildfire	17%	24%	26%	18%	15%
Household Fire	19%	18%	32%	21%	11%
Tsunami	3%	5%	11%	17%	64%
Volcanic Eruption	5%	8%	21%	32%	33%
Wind Storm	9%	21%	27%	30%	13%
Coastal Erosion	9%	21%	27%	30%	13%
Severe Winter Storm	8%	20%	31%	26%	16%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

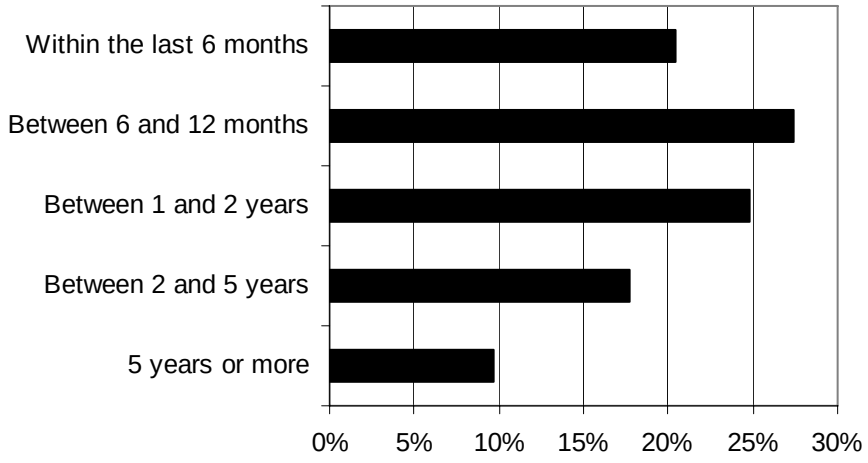
Information Distribution

One of the objectives of the survey was to assess the amount and effectiveness of outreach activities focusing on natural hazards. The survey asked a series of questions on information and outreach.

Recent information and sources

Over 46% of respondents indicated that they have received information regarding home and family safety at some time in the past. Of those who have received information, 20% received the information within the last six months and 27% received information six months to one year ago (see Figure 3.3). This suggests that, while outreach is occurring, it is reaching fewer than half of the households in the Mid-Columbia region and that many of the households have not received any information in over a year.

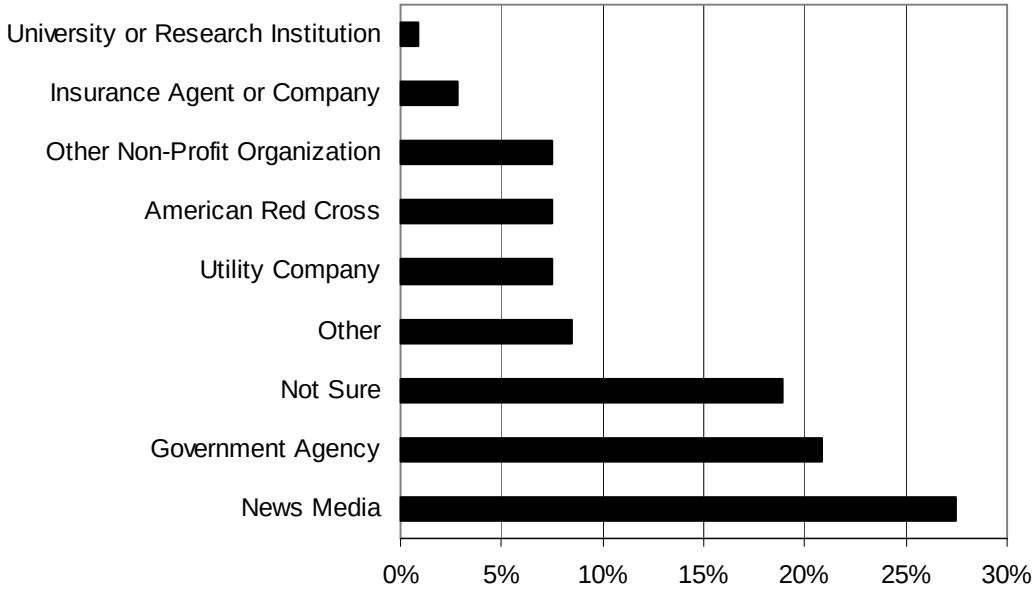
Figure 3.3. Survey Respondents' History of Receiving Information on Family and Home Safety



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Of the respondents who received information on natural hazard preparedness, the news media (26%) and government agencies (21%) were the sources that supplied the most respondents with information Figure 3.4 shows the sources respondents last received information from.

Figure 3.4. Sources of Respondents' Most Recent Information



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Preferred Sources and Formats of Information

To develop and implement effective outreach and education activities, it is important to understand the mechanisms for information dissemination. It is interesting to compare the sources of information with which sources the respondents perceive to be the most trustworthy. Only 7.5% said they last received information from the American Red Cross yet the Red Cross was the most trusted source of information (40%). The second most trusted source was the utility company (38%) which also had only 7.5% of respondents stating that that was where their last safety information came from. Table 3.2 shows the sources respondents trust the most for providing this information.

Table 3.2. Survey Respondents' Most Trusted Sources of Information on Household Preparedness

Source	Percent of Respondents
American Red Cross	40%
Utility company	38%
University or research institution	34%
Insurance agent or company	34%
Government agency	31%
News media	28%
Other non-profit organization	14%
Not sure	14%
Other	7%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

When asked what the most effective way was to receive information, respondents indicated that television news (53%), mail (49%), and newspaper stories (48%) were the most effective. Table 3.3 shows the effectiveness rating of information dissemination methods presented in the survey.

Table 3.3. Survey Respondents' Rating of Various Information Sources in Terms of Outreach Effectiveness

Source	Percent of Respondents
Television news	53%
Mail	49%
Newspaper stories	48%
Radio news	38%
Fact sheet/brochure	35%
Fire department/rescue	30%
Internet	23%
Public workshops/meetings	20%
University or research institution	17%
Schools	15%
Newspaper ads	11%
Television ads	11%
Books	9%
Radio ads	8%
Chamber of Commerce	8%
Magazine	7%
Outdoor advertisement	7%
Other	6%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Level of Preparedness

There are many steps people can take to prepare their households for a natural disaster or emergency. Preparing for a disaster can improve the safety and comfort of the members of a household immediately following a natural disaster or emergency. The survey asked respondents about what steps their households have taken or plan to take to increase their disaster preparedness.

Types of Household Preparedness Activities

Forty-five percent of respondents talked with members of their households about what to do in the case of a natural disaster or emergency. In addition, 41% were trained in first aid or CPR during the past year and 37% prepared a "Disaster Supply Kit" which entails storing extra food, water, and other emergency supplies. Table 4.1 summarizes the activities respondents indicated they have done, plan to do, have not done, or were unable to do to prepare for natural disasters.

Table 4.1. Survey Respondents' Household Disaster Preparedness Activities

Preparedness Activity	Have Done	Plan To Do	Not Done	Unable To Do
Attended meetings or received written information on natural disasters or emergency preparedness?	32%	4%	59%	5%
Talked with members in your household about what to do in case of a natural disaster or emergency?	45%	12%	40%	3%
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	29%	17%	51%	2%
Prepared a "Disaster Supply Kit" (Stored extra food, water, batteries, or other emergency supplies)?	37%	22%	40%	1%
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	41%	4%	52%	3%

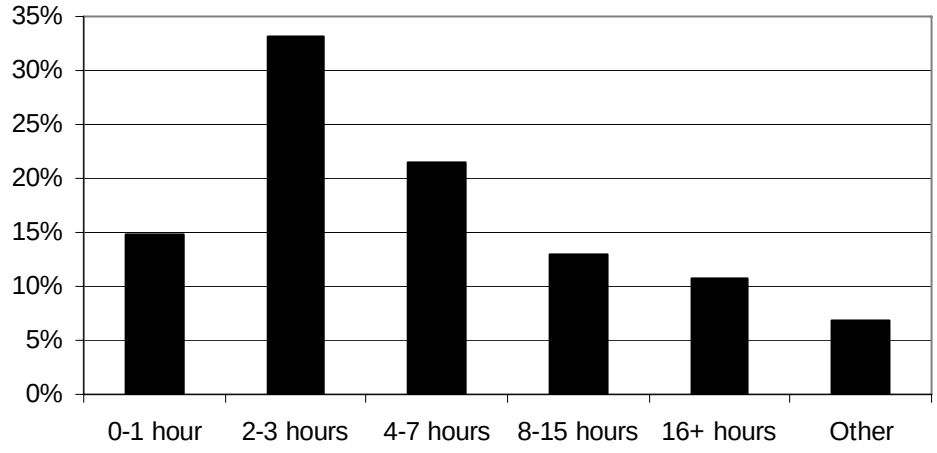
Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Willingness to Participate in Risk Reduction Activities

Understanding how much time per year respondents are willing to spend on preparing themselves and their households for a natural disaster or emergency event can help a community focus its educational efforts. Over 33% of the respondents said they would be willing to spend two to three hours per year preparing themselves and about 21% said they would be willing to spend four to seven hours per year on

preparedness activities. Figure 4.1 shows the number of hours per year the respondents were willing to spend preparing themselves and/or their households for a natural disaster.

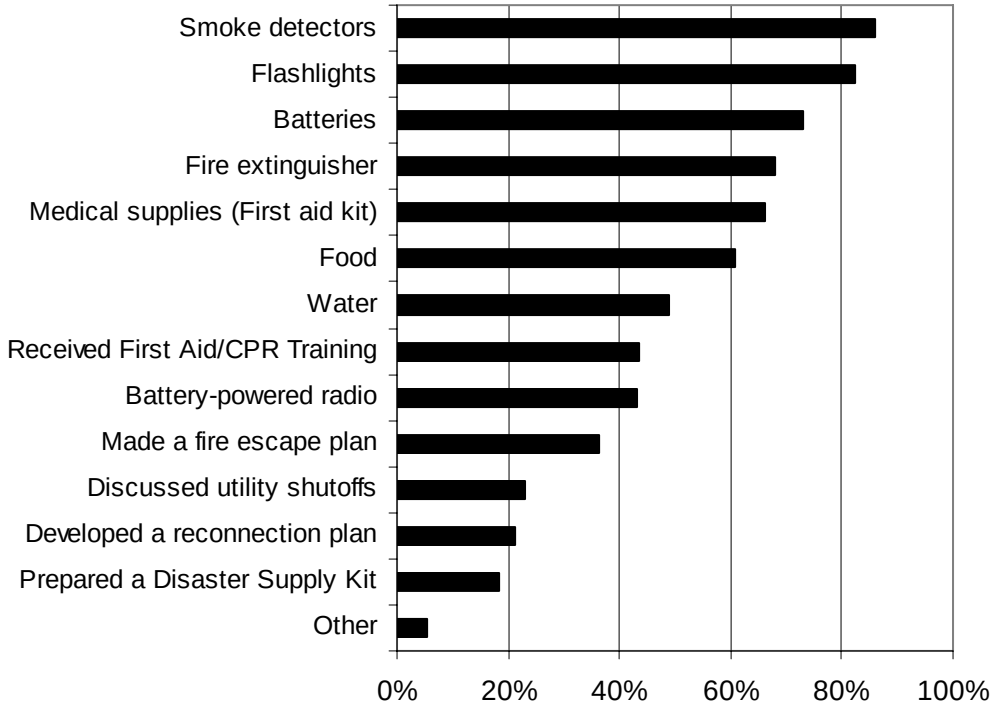
Figure 4.1. Hours Per Year Survey Respondents Were Willing to Spend on Preparedness Activities



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Figure 4.2 illustrates the steps respondents have taken to be better prepared for a natural disaster or emergency event. Placing smoke detectors on every level of the home (86%) and having flashlights in the home (83%) were the most common preparedness action taken. Preparing a disaster supply kit (18%) and developing a plan to reconnect with household members (21%) were the least common actions taken.

Figure 4.2. Preparedness Steps Taken by Survey Respondents



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Property and Financial Recovery

The need to have adequate provisions for financial and property recovery when natural disasters do occur is a necessary component of natural hazard preparedness. Twelve and a half percent of the respondents indicated they have flood insurance leaving 88% without it. However 73% of those who don't have flood insurance indicated the reason is because their home is not located in the floodplain and 8% felt it was not necessary. More people have earthquake insurance. Nineteen and a half percent of respondents indicated they have earthquake insurance. The top two reasons given by those who don't have earthquake insurance were that they never considered it (35%) or that it is not necessary (25%).

Table 4.2. Survey Respondents' Reasons For Not Having Flood and/or Earthquake Insurance

Flood Insurance	Percent of Respondents	Earthquake Insurance	Percent of Respondents
Not located in the floodplain	73%	Never considered	35%
Not necessary	8%	Not necessary	25%
Too expensive	6%	Not familiar	13%
Never considered	4%	Too expensive	10%
Other	4%	Other	8%
Not familiar	4%	Not available	5%
Deductibles too high	2%	Deductibles too high	4%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Natural Hazard Risk Reduction

This chapter provides information on the long-term risk reduction activities Mid-Columbia residents have already taken or are willing to take. This chapter also explores the dollar amount respondents are willing to spend in order to reduce risks and the types of incentives that would motivate the respondents to take risk reduction steps.

Home and Life Safety

Only 34% of the respondents considered the possible occurrence of a natural hazard when they bought or moved into their current homes. While 34% of the respondents indicated they would be willing to spend more money on a home that had disaster-resistant features, almost 43% said they did not know whether they would be willing.

Almost 66% of respondents indicated they are willing to make their home more resistant to natural disasters. Table 5.1 illustrates how much respondents are willing to spend to better protect their homes from natural disasters.

Table 5.1. Amount Survey Respondents Are Willing to Spend

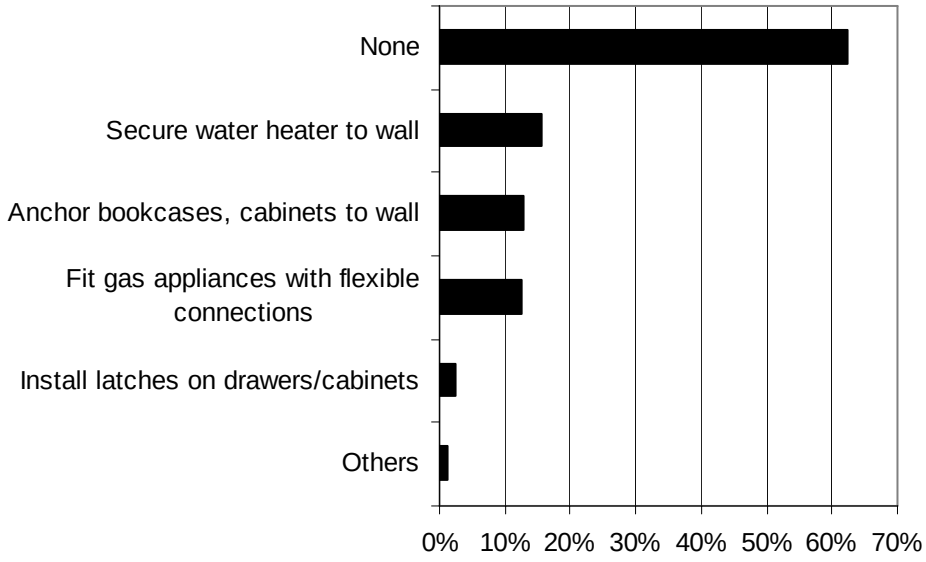
Amount	Percent of Respondents
Less than $100	4%
$100-$499	8%
$500-$999	6%
$1000-$2499	15%
$2500-$4999	6%
$5000 and above	4%
Nothing	3%
Don't Know	39%
What ever it takes	6%
Other	8%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Nonstructural and Structural Home Modifications

While 62% of respondents said they have not completed any nonstructural modifications in their homes to prepare for earthquakes, Figure 5.1 shows that some respondents have taken such steps as securing water heaters to the wall and fitting gas appliances with flexible connectors.

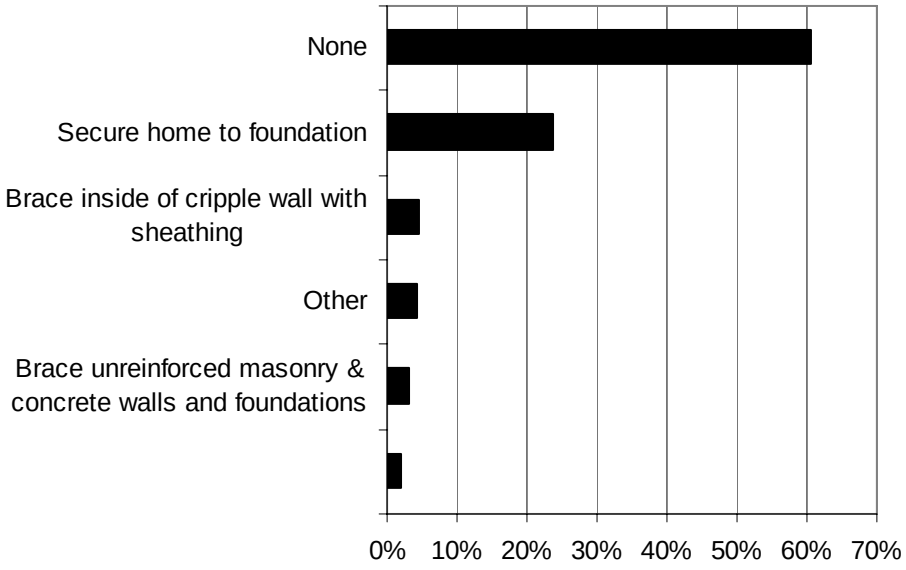
Figure 5.1. Nonstructural Modifications Survey Respondents Have Made to Their Homes



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Respondents also reported making some structural modifications to make their homes more resistant to earthquakes. However, almost 61% of the respondents have not completed any structural modifications. Figure 5.2 indicates that the most common step taken is securing the home to the foundation.

Figure 5.2. Structural Modifications Survey Respondents' Have Made to Their Homes



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Incentives

Approximately 67% of the respondents indicated that tax breaks or incentives would motivate them to take additional steps to better protect their homes from natural disasters. Over 59% also indicated that insurance discounts would be a motivator (See Table 5.2).

Table 5.2. Survey Respondents' Preferred Incentives for Protecting Homes

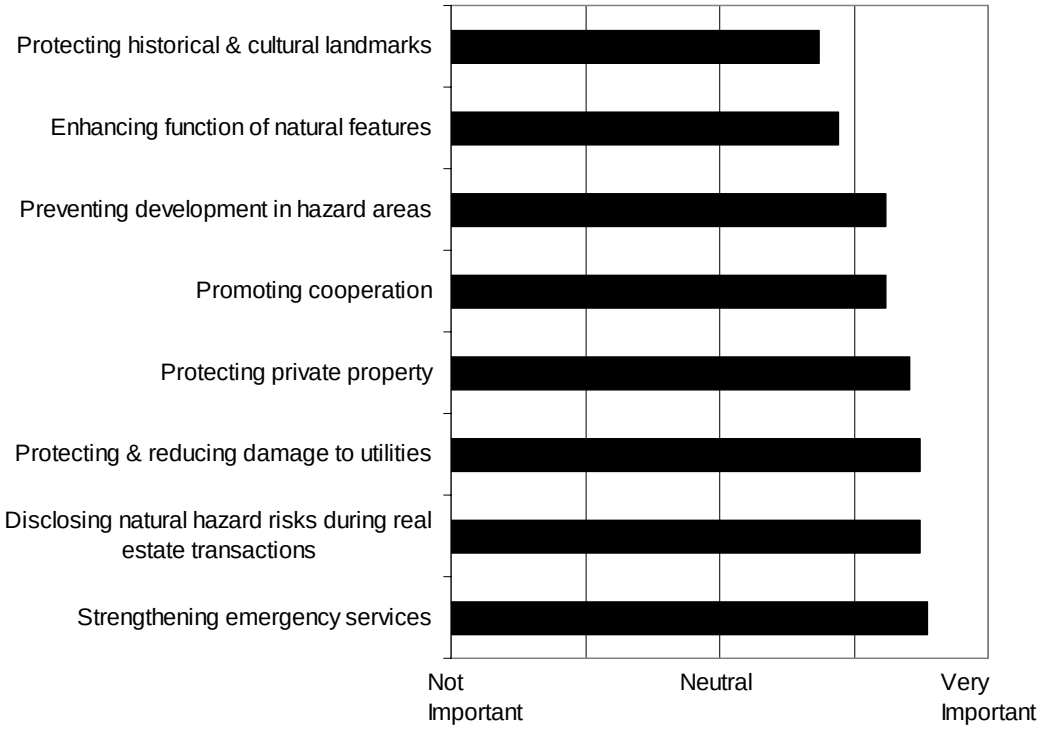
Incentive	Percent of Respondents
Tax break or incentive	67%
Insurance discount	59%
Low interest rate loan	25%
Mortgage discount	23%
None	17%
Lower new home construction costs	17%
Other	6%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Community Natural Hazard Preparedness

To assist those preparing the communities' natural hazard mitigation plans, it is essential to understand the importance community members place on specific community-level risk reduction actions. These questions could help Mid-Columbia communities determine their citizens' priorities when planning for natural hazards. They also provide an idea of which types of strategies to reduce the communities' risk the citizens would be willing support. Figure 6.1 illustrates the important respondents placed on each statement.

Figure 6.1. Survey Respondents' General Level of Importance for Goal Statements



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

As shown in Table 6.1, 96% of respondents indicated that it is very important or somewhat important for the community to protect critical facilities. In addition, over 91% indicated that it is very important or somewhat important to protect and reduce damage to utilities and strengthen emergency services.

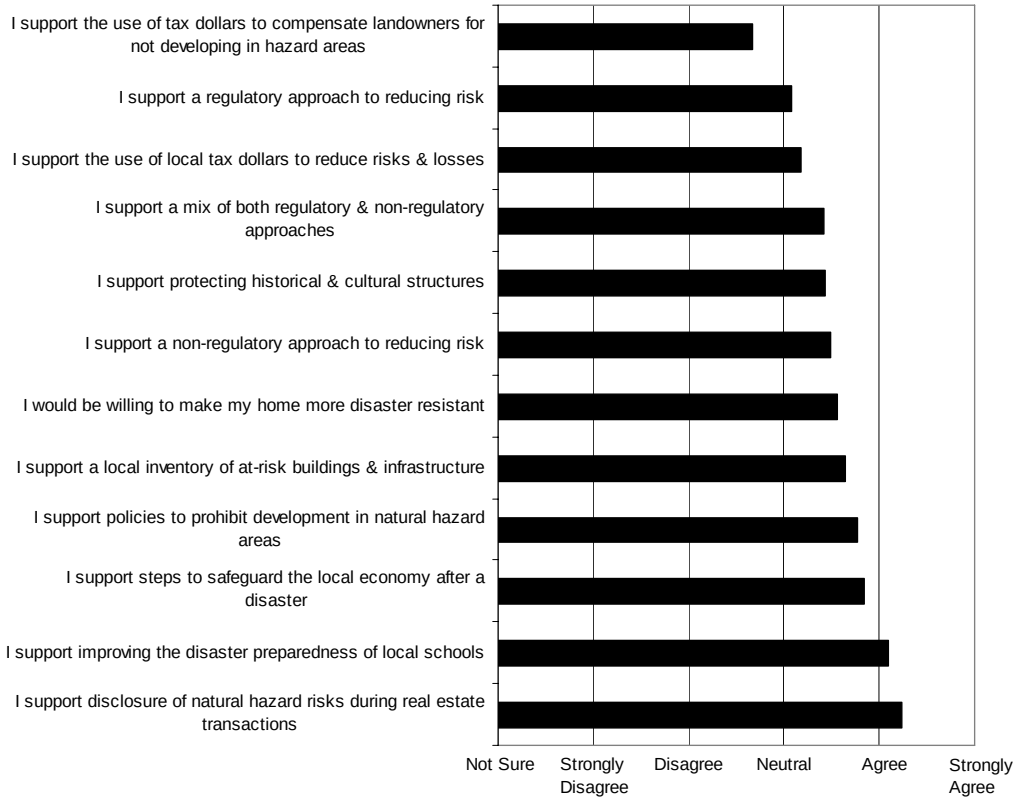
Table 6.1. Survey Respondents' Goal Prioritization

Statements	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	58%	31%	10%	0%	2%
Protecting critical facilities	81%	15%	3%	1%	0%
Preventing development in hazard areas	48%	33%	15%	2%	2%
Enhancing the function of natural features	33%	36%	21%	5%	5%
Protecting historical and cultural landmarks	22%	44%	22%	8%	3%
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	47%	34%	16%	3%	1%
Protecting and reducing utility damage	61%	31%	7%	1%	1%
Strengthening emergency services	66%	26%	6%	2%	1%
Disclosing natural hazard risks during real estate transactions	64%	25%	9%	1%	1%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

There are a number of activities a community can undertake to reduce the risk from natural hazards. These activities can be both regulatory and non-regulatory. Figure 6.2 shows respondents' general level of agreement regarding the community-wide strategies included in the survey.

Figure 6.2. Survey Respondents' General Level of Agreement Regarding Community-wide Strategies



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Table 12 illustrates that 85.8% of the respondents strongly agree or agree that they support improving the disaster preparedness of local schools. Also, 85% said they strongly agree or agree that they support disclosure of natural hazard risks during real estate transactions.

Table 6.2. Survey Respondents' Agreement Regarding Community-wide Strategies

Strategies	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk	11%	34%	25%	17%	9%	5%
I support a non-regulatory approach to reducing risk	18%	41%	26%	9%	1%	6%
I support a mix of both regulatory and non-regulatory approaches to reducing risk	18%	36%	28%	12%	3%	4%
I support policies to prohibit development in areas subject ot natural hazards	26%	45%	15%	10%	2%	2%
I support the use of tax dollars (federal and/or local) to compensate land owners for not developing in areas subject to natural hazards	9%	21%	23%	26%	17%	4%
I support the use of local tax dollars to reduce risks and losses from natural disasters	7%	42%	26%	14%	7%	4%
I support protecting historical and cultural structures	12%	42%	34%	8%	3%	3%
I would be willing to make my home more disaster-resistant	9%	53%	30%	4%	1%	3%
I support steps to safeguard the local economy following a disaster event	14%	63%	20%	2%	0%	2%
I support improving the disaster preparedness of local schools	30%	56%	11%	2%	0%	1%
I support a local inventory of at-risk buildings and infrastructure	14%	51%	29%	3%	0%	3%
I support the disclosure of natural hazard risks during real estate transactions	44%	41%	11%	3%	0%	1%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

Written Responses to Open-Ended Survey Questions

Q1.1 Which of these natural disasters have you or someone in your household experienced?

These are the "other" responses:

- Ice storm on top of heavy snow
- Hail storm
- Not in but only sideline observer – my grandson fought the wildfire
- Hail & wind
- Minor drought

Q3.2 From whom did you last receive information about how to make your household and home safer from natural disasters?

Several people mentioned various governments or agencies as the last source of information:

- City of Pendleton
- Local fire department
- Volunteer fire department
- CSEPP (Chemical Stockpile Emergency Preparedness Program)

Other non-governmental organizations were also mentioned as sources including:

- Employee newsletter
- Boy Scout merit badge
- Church of Jesus Christ of Latter Day Saints
- School

Some respondents also mentioned more informal sources of information:

- Online internet
- Common sense
- Friends & neighbors
- Fire & heater smoke alarms
- When we lived in California

Q4 Who would you most trust to provide you with information about how to make your household and home safer from natural disasters?

The most often mentioned other source for information was various local agencies including three people mentioning the fire department. Other specific local sources included the Gilliam County Sheriff's Department and Sherman Health. Other comments include:

- Not sure, not government or university
- Radio
- Google.com
- Home owners
- Local task force/focus groups w/professional disaster relief
- Self (2)
- Gilliam Co Sheriff Dept
- Sherman Health
- Wildfire is the only disaster applicable to this area
- Combination of above (referring to all the categories listed in the survey question)
- Fire dept. (3)
- Others who have been through natural disasters
- Local help
- Local agency

Q5 What is the most effective way for you to receive information about how to make your household and home safer from natural disasters?

Some of the "other" responses to this question can be categorized into local government or agency sources:

- Sheriff Department
- Local tribal readiness office
- Local agency
- Local government.

Two federal sources were also mentioned:

- US Forest Service
- Army depot.

Two people listed church-related resources:

- Church officials
- www.lds.org (Latter Day Saints).

Another two people mentioned alarm systems:

- Local alarm systems

- Radio alert system

Other responses included:

- Observation
- Grants
- Not sure I need to be communicated to

Q7 Building a disaster supply kit, receiving First Aid training and developing a household/family emergency plan are all inexpensive activities that require a personal time commitment. How much time (per year) are you willing to spend on preparing yourself/household for a natural disaster or emergency event?

In response to this question, one person wrote, "we are ready." Many of the other responses fit into a category of "whatever it takes" or "as much as necessary":

- Whatever it takes (4)
- This is ongoing
- As much time as needed to get the job done
- As necessary (2)
- More.

Other responses were:

- Done these at an early age. None available in this remote area. We are at the exit age of life.
- I was in a security position for 12 years. I learned on the job.
- Disabled (2)
- Live alone
- We are ready

Q8 What steps, if any, have you or someone in your household taken to prepare for a natural disaster?

Several respondents wrote about extra supplies and safety mechanisms, including:

- Keep one vehicle full of gas, have backup generator, have cooking fuel & heating fuel on hand, have backup solar charger for all batteries, have extra clothes & food packed in a vehicle at all times & water purification (Storing things)
- Medicine
- Bought walkie talkies w/8 mile radius
- Extra fuel for heat
- Have all above but not in one spot
- Installed gas powered fire pump on 2000 gal swimming pool

- Gasoline, kerosene, firewood, tent & bedrolls, vehicles, cooking utensils
- Purchased generator, water filtration, home fire sprinklers, reduced/removed combustible vegetation around home, metal roof – non-combustible siding, weather alert radio.

Three people mentioned emergency plans:

- Discussed areas of evacuation (escape plans and action planning)
- We are in CSEPP notification area for evacuation from nerve gas leak at the Umatilla Army Depot. (We are prepared to shelter in place also.)
- I think a plan for neighbors who are disabled would be wise or at least know who is and where they are. Animals should be taken into account also.

The other responses were:

- Not really prepared
- Caregiver takes care of these things
- There will be no phones or electric

Q9.1 If "NO", what is the main reason your household does not have insurance for flood events?

Four people mentioned that they don't need flood insurance:

- I live in the desert
- Not sure TD has ever flooded. Less than 2 yrs in the area.
- Only Noah's flood could reach this high
- Thought we were in a floodplain, but found we aren't

Three people said they were not able to acquire flood insurance or it was not offered to them:

- Can't get it
- Not obtainable
- Not offered (2)

Three people had other comments:

- Landlord's responsibility
- Government program
- Risk versus benefit (meaning the probability of risk is not high enough to receive benefits)

Q10.1 IF "NO", what is the main reason your household does not have earthquake insurance?

Many of the respondents who do not have earthquake insurance said that it was unnecessary for them to purchase because:

- Not located on a fault

- 70 to 80 yrs never had more than a tremor, if that
- We live on a mountainside!
- Not concerned/do not need it (5)

One respondent said he or she "plans to look into it" and two people said they were unable to obtain it:

- Can't meet requirements by insurance company to get coverage because house is older
- Plan to look into it
- No response from insurance company.

There were two other comments:

- Policy speaks to collapse
- Risk versus benefit (meaning the probability of risk is not high enough to receive benefits)

Q13.1 How much <u>are you willing to spend</u> to better protect your home from natural disasters?

Many of the written responses were about how much the respondents could afford and how necessary the protection was.

- As I can do it
- Would depend on situation or feel the need for
- Whatever I can afford
- Would depend on what we could afford versus protection we would be provided
- It depends on how necessary it is and how much it would cost
- Being retired – within reason
- Will try cheapest way

One respondent mentioned that financial assistance would be necessary in order for him or her to protect the home:

- Would need financial assist. To get protection.

In addition, three respondents would not spend additional money to protect their homes. They provided a couple reasons for this:

- We're in a 30 yr old double wide. Only one insurance co will cover it. We'd buy a newer one.
- Don't own our home
- Don't need

Q14 What nonstructural or structural modifications for earthquakes have you made to your home?

Three people wrote about additional nonstructural modifications to their homes. These were:

- Created a fire fuel free zone around home
- Large anchor bolts
- Fire & smoke detectors

There were more written responses about structural home modifications. They ranged from removal of a hazardous fireplace, to structural advantages built into new additions, to living in a recently build homes that were constructed with hazards in mind. Comments included:

- New addition is well secured to foundation
- Removed non-functional chimney
- Restored 100 year old house, mainly structural improvements
- New home built 2003-04
- All done at construction
- Heavier roofing, ty down, ext
- Built barn between house and rim above us.

Q15 Which of the following incentives, if any, would motivate you to take additional steps to better protect your home from a natural disaster?

Many of the respondents discussed why they did not take additional steps to protect themselves rather than discussing motivational techniques. Renting a home can be a disincentive to take additional steps to better prepare a home from a natural disaster. Four people wrote about renting a home as a reason for not taking additional steps:

- I rent (2)
- Move to a house – we currently live in a rented 2-story apartment
- Will own home in about 1 yr, wish I had this info earlier

Other reasons for not taking additional steps included:

- If I lived in a fault zone, if I lived in a flood plain, if I were not surrounded by irrigated land. (If the respondent lived in a fault zone or flood plain, he or she would be motivated to take additional steps.)
- Our home is solid & built well
- My plan is to build a new home.

Seven people did mention what would motivate them to take additional safety preparedness steps:

- Rental deduction
- Local grant money specific to local needs (ie, high hazard area = high grant for modifications)
- To know more about efficiency for gas heater & gas hot H_2O tank, to get credit for installation of more efficient furnace. Contractor did not know or advise us.

- Just do it!
- Safety of my family
- Shared cost program
- Free

One person never thought about it before and said:

- Just thought everyone did those (took steps to protect the home) – never really thought about it.

Q17 Are there any other issues regarding the reduction of risk and loss associated with natural disasters that you feel are important?

This question received comments covering several main themes including: location of development, maintenance techniques, regulations and government, man-made disasters, education/communication, personal responsibility and choice, and insurance. Many respondents discussed multiple topics in their comments. In these situations, the comment has been listed twice with a reference to where the comment is also located.

The **location of development** in natural hazard areas was a concern for some respondents. Some respondents felt that development in known hazard areas should be discontinued or reduced. Here are their comments:

- Its common sense to prohibit development in disaster-prone areas – planning departments should consider this as a matter of course in their zoning decisions just as they should consider the ability of a region to sustain development with regard to water, sewage, power, infrastructure, etc. To compensate any landowners not to develop in areas subject to natural disaster is to allow blackmail & is bad public policy.
- Not building in flood plains. Clearing debris, timber, etc., around homes & outbuildings. (This statement is also included in the following section on maintenance.)
- Don't build a whole city under water level
- Reducing houses in forested areas and floodplains
- The development in areas known to flood such as lower Oregon City & portions of Keizer should not be continued. Many developments along the coast are very vulnerable to a tsunami. Those areas will be hit someday. I have seen a tsunami years ago and it will be worse than anyone thinks.
- I feel that people should be given information regarding building homes in flood plains and new construction in these areas should be discouraged or prevented & society should not bear the cost of developers and individuals who choose to build in these areas. (This comment is also listed in the education/communication section.)
- Many of the potential disasters we face are not natural, i.e. human-caused wildfire. Limit home construction in interface area or require fire-safe construction, ingress, egress, utilities, etc. Safety cannot be legislated; it must be an attitude of society. We should not expect or

tolerate human-caused hazards. (This comment is also in the human-caused, man-made section.)

Other people suggested **methods of prevention or maintenance** that reduce natural hazard risk.

- Construction projects by state and fed government that can create flooding landslides. Poor fill & cut design by forest logging, state highway coast for example.
- When fields are plowed by highways & the winds are high it causes severe dust storms. I feel that if trees are planted at the edge of the fields, there would be less accidents.
- Not building in flood plains. Clearing debris, timber, etc., around homes & outbuildings. (This statement is also located in the location of development section).
- One should <u>never</u> plant large trees around the house; during a wind storm large branches come down causing considerable damage.
- Tree removal in flood area in city limits of Pilot Rock – once bridges get blocked up damage risk increases. Regulations can prevent repairs/corrections. (This comment is also in the role of government and regulation section.)
- Reasonable road and address signs so emergency vehicles can find addresses, etc. (Double sets of confusing mileposts installed by ODOT on the Cow River Gorge Historic Highway, old Highway 30, are particularly stupid & dangerous.) Note: The mileposts do <u>not</u> match up to maps.

Several respondents had strong feelings about the **role of government and regulation** in natural hazard preparedness and disaster recovery.

- Tree removal in flood area in city limits of Pilot Rock – once bridges get blocked up damage risk increases. Regulations can prevent repairs/corrections. (This comment is also in the methods of prevention or maintenance section.)
- Keep the public informed of risks without making restrictive laws. (This comment is also in the communication/education section.)
- Warnings to citizens, if possible, to get prepared. Communities should annually or more often require its citizens where to go, what to do, etc, etc. There should be regular checking and double-checking by county, state, and federal authorities to see that cities are complying and penalized if not.
- Intelligent public officials who can do the job they get paid for doing
- What is the Bureau of Rec, water master office, & my fire district doing to protect my home?!
- Reduce the impression that FEMA is intended to come to the rescue. Make all people more aware of their surroundings and their risks and their own personal responsibility. More government is not the solution,

only a tool. (This comment is also in the communication/education section.)

- Reinstate Clinton's FEMA; do away w/George Bush's
- I believe that the insurance industry should have policies for coverage in place that would influence building in hazardous areas. Couple that with regulated full disclosure for real estate sales and there should be no need for regulatory legislation. (This comment is also in the insurance section.)
- Replace FEMA with a grant program to local emergency agencies

Other people were more concerned about **human-caused or man-made disasters**. A few people expressed the opinion that there is nothing that can be done to prevent natural disasters.

- Many of the potential disasters we face are not natural, i.e. human-caused wildfire. Limit home construction in interface area or require fire-safe construction, ingress, egress, utilities, etc. Safety cannot be legislated; it must be an attitude of society. We should not expect or tolerate human-caused hazards. (This comment is also located in the location of development section.)
- Not worried about natural disasters, only man-made
- I really feel that there isn't much we can do to prevent acts of God. If they happen, we'll deal with it. Lookat Katrina – they did what they could & will pick up the pieces as well as they can.
- I am not as worried about natural disasters as I am about man destroying the earth with his inability to pull his head out of his greedy ass.
- There is <u>nothing</u> you can do to prevent natural disasters (acts of God) other than plan what to do if one happens to occur – plan, be prepared, & be informed.

Education and communication always play important roles in preparedness and recovery responses. People's comments on education and communication ranged from household communication to community preparedness training to including Spanish in communications.

- Realistic education for adults & children. NOT SCARE TATICS, no one believes them.
- Good communication system with monolingual Spanish speakers must be established in Hood River.
- Reduce the impression that FEMA is intended to come to the rescue. Make all people more aware of their surroundings and their risks and their own personal responsibility. (This comment is also in the regulation and government section.)
- "Use your head" and be prepared for oncoming disaster. Listen to media reports informing you that a disaster is forecast. Many Katrina victims had prior warning, but did not take it seriously enough.

- Communication ability
- Having a list of what to have on hand for different emergencies and knowing where to go in case of disaster. Should have a week each year for learning & having the info offered to those who would like it.
- I feel that people should be given information regarding building homes in flood plains and new construction in these areas should be discouraged or prevented & society should not bear the cost of developers and individuals who choose to build in these areas. (This comment is cross-listed in the location of development section.)
- Yes – it would be nice if everyone in our local community were educated on what to do and where to go for shelter or whatever.
- Keep the public informed of risks without making restrictive laws. (This comment is also in the regulation and government section.)
- The training of community members for service with the Red Cross provided locally on a regular schedule.

Three people talked about **personal responsibility and choice**. If people know that their home is in a hazard area, it is their responsibility to plan and prepare for the hazard.

- This is a lot like seatbelts and crash helmets – if anyone chooses to ignore these protections it should be on their head – no help if disaster strikes.
- Plan ahead!!! Responsibility for your own – then can help others.
- Disclose risk at public meetings. Make it clear that if you choose to live in at-risk area, you are not guaranteed bail-out from your problems. There are no guarantees in life.

Some people want the role of **insurance** companies to be increased or to expand their coverage areas.

- I believe that the insurance industry should have policies for coverage in place that would influence building in hazardous areas. Couple that with regulated full disclosure for real estate sales and there should be no need for regulatory legislation. (This comment is also located in the regulation and government section.)
- I think there should be insurance coverage readily available for outlying areas at a reasonable cost.
- I wish the insurance companies would just include them in their policies

Large-scale disaster planning and health care were the concerns of the some respondents.

- Adequate health care people and places for people affected
- In more populated areas the issue of riots & looting should be looked at. If there is an extreme & widespread disaster there will be unlawfulness and citizens should include how to avoid & protect themselves, family,

and property if need be. I feel that this is a "real" threat and byproduct of disasters in populated areas.

- The people, how to help them out during a nationwide disaster
- Stop the greed & graft when donated monies are given to aid disaster victims. Accountability for funds and actions or all this is just activity to create jobs that do nothing.
- What to do about seniors? Their meds – oxygen? Where to take them? How to get to them in a frontier area?

A few people mentioned **smaller-scale hazard warnings and preparation requirements.**

- Early warning for storms – other known existing problems – floods – etc.
- People living in flood places should be required to have boats & life jackets, one per person
- Affordable gas masks and transportation

Some respondents discussed **specific natural hazards** and how they would affect the region.

- Snow pack in mountains. Heavy rains on snow may cause flooding. Flooding over riverbanks & dikes.
- Earthquakes would totally isolate this community from outside help. Air services would be #1. We have wildfire around here, so are fight them! Floods would be minimal! One little river here!
- Forest fires. I live in an area with lots, lots, lots of trees. I live in the timber.

There were also a few unclassifiable responses.

- Protecting pets + livestock + wildlife
- Reduce traffic of toxins; reduce production of toxins, radioactive, etc.
- Using all means available to stop wildfires
- What helps are available?

Finally, one respondent said:

- Everything is pretty well covered.

Q21 Please indicate your level of education.

Only one response was in the "other" category:

- Specialty training

Q25 If you have lived in Oregon for less than 20 years, in what state did you live before you moved to Oregon?

The answer to this question was interesting because although the survey specifically listed California, Washington, and Idaho more respondents moved to the Mid-Columbia region from Colorado than Idaho (5.1% versus 3.4%).

Here are the responses:

- Arizona (2)
- Colorado (6)
- Kentucky
- Maryland
- Massachusetts
- Michigan
- Montana (4)
- Nevada
- New Jersey
- New Mexico
- Tennessee
- Texas
- Washington
- Wyoming
- Norway

Q28 Do you rent/own a:

- Ranch (2)
- Stick-built addition to manufactured home
- 19 ft travel trailer
- 2½ story home built in 1915
- Commercial building with living quarters
- We live/own our dwelling which is a duplex as well as an additional duplex
- Forest/grazing property

Please feel free to provide any additional comments in the space provided.

Three respondents discussed the need for **emergency education for the public and officials**. They felt they either lacked the information on how a particular hazard could affect their area or what to do/where to go in the case of an emergency.

- More than half of our town's houses are built on a hillside above the Columbia River. We also have a dam, and are of relative distance to Mt. Hood. Should the dam break, probably the lower half of the town would be wiped out within minutes. I'm not sure about the rest of the town on the hillsides. Should there be an earthquake, I'm not sure how that would affect us all. Wildfires are a hazard around us, more outside of our

city than directly in it. Should Mt. Hood suddenly erupt, well, I'm not sure what all that would affect in our town. To be honest, there are many natural disasters that could cause us all to be concerned 24/7, but which ones are more likely here? And how do you prepare for just the ones that might affect your area when you aren't sure which to prepare for? It would be nice to know the likelihood of each disaster in our area so we would know better how to prepare. Although, I must admit, your survey made me realize that I haven't done much to prepare at all. And that I should have done more by now. I will get started doing what I can!

- All of us living close to the Columbia River need to be educated on what to do and where to go – if The Dalles Dam or the John Day Dam were to rupture – if Mt. Hood were to rupture – or if an earthquake were to happen – we're not educated on what or where to go in our local areas.
- I feel that in our rural area we are not prepared for any kind of disaster. I really don't think that our leaders really know what they are going to do in actual case of a real disaster. We need more education on this. This does affect rich & poor. Thank you (comment also in govt.)

Several respondents discussed the importance of people taking **individual or personal responsibility** for their choices or actions. They stressed the importance of being responsible for themselves and their families rather than expecting an outside source to safeguard themselves and their possessions and provide compensation for destroyed property.

- Tax money should be used as little as possible. Individuals need to take more responsibility for safeguarding their own possessions. I would much rather pay for (or lose) for myself than to be forced to help pay for someone's loss if that person neglects to do what he can to protect his own things. Citizens must be willing to live with the consequences of his decision to build/live where a natural disaster may occur. Until or unless a person is <u>forced</u> to live in a dangerous area, it is that person's responsibility to safeguard his possessions. The government's responsibility is to inform the citizens of any dangers or considerations of living/building in a disaster zone. From there, it's the citizen's decision and risk.
- A lot of questions do not apply to us. As for insurance, we are insurance poor. Also, we live in a rural area. Nearest neighbor a mile away, so we have to take care of ourselves and glad of it.
- Because we live in the country, we probably feel that basically we are responsible for ourselves, except for fire, police, & ambulance, which our taxes and insurance help to pay for. Therefore, we feel that basically all people should be responsible for themselves. But, we realize that isn't reality, especially in towns, and that most services must be provided in order to people to survive. So, plan for the worst disaster and go from there. Good luck!
- 1) I feel very strongly that homes destroyed by floods in flood zones not be allowed to be reconstructed in the flood zones. Those who do shouldn't expect insurance companies to cover their homes, nor receive federal or

state aid to rebuild. 2) Each of us has to take personal responsibility in the location of our homes and our preparedness in meeting natural or other disasters and shouldn't expect governmental agencies to fully bear the burden of the costs to rebuild. 3) Volunteer fire departments in our area have been training for a variety of disasters, receiving funding through FEMA grants to do so. They should be commended for their efforts. (Hood River Area, WSFD.) (This comment is also located in the location of development section.)

- Early childhood education should stress the importance of individual responsibility for a safe environment. Nowhere except the U.S. can you cause a fire and not only not be shunned by society, but we will help you rebuild. Allowing building construction in flood, fire prone areas without adequate regard for bldg. techniques to reduce or eliminate major risk factors is ridiculous. This not only puts owners lives and property at risk but that of their neighbors and the emergency responders who are expected to protect us from ourselves.
- I believe timber land owners should be responsible for the fire threat on their property. They should have a fire prevention plan and clean up plan for their properties. Thinning, brush work, etc.

Two people thought changes to current **insurance** policies would be beneficial.

- Oregon's land use laws have addressed some of these problems which they have not done. They were hi-hacked by environmental extremists, & are no longer supported by the people of Oregon. I do not really trust the government to do the right thing. I would buy flood insurance if it was available from private companies. Actually, homeowners insurance should be expanded to cover all perils. (This comment is also located in the government section.)
- A lot of questions do not apply to us. As for insurance, we are insurance poor. Also, we live in a rural area. Nearest neighbor a mile away, so we have to take care of ourselves and glad of it.

Several respondents had comments about the **location of development** and related **planning and development codes**.

- 1) I feel very strongly that homes destroyed by floods in flood zones not be allowed to be reconstructed in the flood zones. Those who do shouldn't expect insurance companies to cover their homes, nor receive federal or state aid to rebuild. 2) Each of us has to take personal responsibility in the location of our homes and our preparedness in meeting natural or other disasters and shouldn't expect governmental agencies to fully bear the burden of the costs to rebuild. 3) Volunteer fire departments in our area have been training for a variety of disasters, receiving funding through FEMA grants to do so. They should be commended for their efforts. (Hood River Area, WSFD.) (This comment is also in the personal responsibility section.)
- Build where one wants does not mean we need to provide services or $$ when a disaster happens.

- Large expenditures for this sort of thing are unnecessary. 9-11 and Katrina have given much of our government agencies and education facilities a reason to spend money on things that may or not happen. All in the name of planning. (comment is also in funding section)
- Unfortunately, the scope of natural disasters is such that you can't depend on individual land owners to be able to do what needs to be done to be ready to be prepared. Building codes, zoning & properly educated planning staff at the local level need to set policies to support communities in this regard. Citizens should have cost-efficient resources available to them to deal with these issues as they can incorporate them into their lives (ie, a "lending library" of information, grants for funding improvements, staff to advise them, etc.). This is waving a "magic wand" but hey, you asked! :) (Also in
- We really need to enforce/create zoning and building codes that keep development out of natural resources; streams, river areas, & forest land. We should not authorize development in these areas. (also in location of dev section)

Concerns about **money** (how to spend it and who pays) are frequently contentious issues.

- Large expenditures for this sort of thing are unnecessary. 9-11 and Katrina have given much of our government agencies and education facilities a reason to spend money on things that may or not happen. All in the name of planning.
- I feel contingency funds should be set aside by the state for allocations to cities and counties in need of emergency services due to natural disasters. Fund could be used for prevention every so many years if natural disasters do not occur within that time period
- 1) Our home is located on 10 acres; 12 miles from fire dept (all uphill) – rural locations are subject to wildfire – our neighbor accidentally started a wildfire near our house. 2) Far too much effort and <u>public money</u> goes for flood protection of properties within the floodplains – perhaps we cannot protect every fool from their foolishness. 3) The Oregon State Police (Fire Marshall) spends much money gathering data about small amounts of propane, etc – the information IS NOT EVEN USED BY LOCAL FIRE DEPTS, too much paperwork.
- Tax money should be used as little as possible. Individuals need to take more responsibility for safeguarding their own possessions. I would much rather pay for (or lose) for myself than to be forced to help pay for someone's loss if that person neglects to do what he can to protect his own things. Citizens must be willing to live with the consequences of his decision to build/live where a natural disaster may occur. Until or unless a person is <u>forced</u> to live in a dangerous area, it is that person's responsibility to safeguard his possessions. The government's responsibility is to inform the citizens of any dangers or considerations of living/building in a disaster zone. From there, it's the citizen's decision and risk. (This comment is also in the individual responsibility section.)

Some respondents commented about the capability and role of **government** in natural hazard preparation and after natural disasters. The lack of **emergency services** was also mentioned.

- After New Orleans, I do not think government is capable of doing anything intelligent about natural disaster.
- I would hope government is more prepared to help our community better than they did down south – how sad it was to watch on the news.
- I feel that in our rural area we are not prepared for any kind of disaster. I really don't think that our leaders really know what they are going to do in actual case of a real disaster. We need more education on this. This does affect rich & poor. Thank you. (This comment also in the education section.)
- Gilliam County, Condon has 911, Sheriff Dept & no Red Cross. So the Sheriff Dept has it all. Red Cross will not come to Condon.
- 1) I feel very strongly that homes destroyed by floods in flood zones not be allowed to be reconstructed in the flood zones. Those who do shouldn't expect insurance companies to cover their homes, nor receive federal or state aid to rebuild. 2) Each of us has to take personal responsibility in the location of our homes and our preparedness in meeting natural or other disasters and shouldn't expect governmental agencies to fully bear the burden of the costs to rebuild. 3) Volunteer fire departments in our area have been training for a variety of disasters, receiving funding through FEMA grants to do so. They should be commended for their efforts. (Hood River Area, WSFD.) (This comment is also in the location of development section.)
- Oregon's land use laws have addressed some of these problems which they have not done. They were hi-jacked by environmental extremists, and are no longer supported by the people of Oregon. I do not really trust the government to do the right thing. I would buy flood insurance if it was available from private companies. Actually, homeowners insurance should be expanded to cover all perils. (This comment is also located in the insurance section.)

Another theme for some comments was **types of hazards** that should or should not be considered both in the Mid-Columbia region and Oregon.

- More relevant to this are of flat, irrigated former-desert are the risks of traffic accidents in dense fog or blowing dust.
- This whole county is dangerous because of Rimrock and deep canyons, and rough country. Population is very low here. Population is poor. Earthquakes would block all highways, dam the John Day River, and take out power. If terrorists bomb Hanford, traffic would be diverted through here and we don't have EMS/law enforcement to deal with it. The state would have to step up to the plate!
- It is difficult to imagine my level of "concern" when comparing life threatening events (e.g. volcanic eruption) with mere annoying problems (e.g. wind storm)(and economic disaster (drought). Also, my concerns are

more with events that have virtually no warning (tsunami) and those that have adequate warning (winter storm). The strategies to mitigate a bad outcome need to be different.

- Oregon is far too diverse a state to consider a "natural hazard" common to all parts of the state. Compare west of the Cascades to the high desert, or the Portland area with the rest of Oregon.

Several people offered **suggestions** about the types of preparation that should be made or considered.

- The best preparedness for our area where we have so much wind, windstorms, & hail storms, the Umatilla Army Depot (chemical depot) would be a storm cellar. I've lived in this area since 1940 & I've seen many kinds of storms, & wished I had a storm cellar.
- 1) To prevent wildfire spread, farmers who take CRP program should have fire buffer strip built into the CRP program – requiring the farmers to keep strips effective – we had the 60,000 acre fire a few years ago – we were lucky – buffer strips are the only way we will control this – too many farmers are not farming wheat anymore. 2) OLD cottonwoods fall into creek, plug channel & bridges – city of Pilot Rock needs to enforce floodway rules established by FEMA, and "oversee" a channel manage program – Pilot Rock has 4 bridges & foot bridges that can plug during floods – this can be done – everyone's afraid of regulatory agencies giving out fines. To identify hazards is easy – no one wants to follow through.
- In some areas the flood plain designation appears to be given in a non-scientific manner. I have family in the Spokane County area – they have a 10 acre parcel which is surrounded by land that has been completely developed in the past 2 decades. They have been informed that their parcel is the "flood plain" and cannot be developed/a large percentage must be left undeveloped. Geologically the county does not seem to need any proof other than the necessity of no other undeveloped space left to absorb H_20. I agree that flood plains should not be developed, but there needs to be a more scientific & comprehensive plan. Land owners who have left space undeveloped should also then be reasonably reimbursed. It benefits us all to have some earth to re-absorb water, but a single land owner should not be financially punished.

Two respondents wrote to say **thank you**.

- It's about time someone did this. Way to go! Keep up the great work! Sincerely, a thoughtfully concerned citizen, wife, and parent.
- Good luck on the survey

Finally, this last section contains **miscellaneous** comments.

- If I'd ever been in a disaster I'm sure some of my answers would be different. Was in storm in N.C., tho it was just heavy rains so went to movie at Base. It was cut short so went home & put rugs under the doors. Next AM all TV antennas were bent over & a new piece just completed a few months was lifted off the pilings & set down whole ¼ mile away. The fishing store & another building connected to pier were ok & they later

made them into rooms where we stayed for 2 nights for my husband's discharge papers & came then after 20 years in the Navy but last 5 yrs were spent at Marine bases since my husband was in Medical & Marines only have fighting men. 3 of my children attended U of O.

- 1) One question, why are you asking these questions? Do you know of a real disaster that's coming our way? I have heard before of the United States being split into 3 pieces from a severe earthquake. Most of California is man-made islands put together and the plates are very bad. Also New York & New Jersey are also in danger of shifting. Also along the Mississippi River. This is why I've been prepared for years. Not as much as I would like because of finances. Oregon will have its problems mostly with volcanoes & wildfires. Also coastal tsunamis.
- I know of a patented solution that, when sprayed on wood, will render it inflammable even when gasoline is applied and ignited. Why its sale and usage was somewhat squashed at the onset of its production is no mystery is it?
- The State of Oregon needs to protect the trees from being cut down, and not just timber forests either! Someone needs to stand up and protect the Columbia Gorge from a sewage dump. Has anyone taken into account the damage that will be done once the Warm Springs reservation builds their bloody casino? All the trash and pollution will destroy the salmon habitat for breeding grounds! We need to protect/save gas resources by raising the legal primary age limit to 18 years instead of 16 years. This would cut crime and teenage pregnancies!
- Please explain what the last question has to do with natural disaster.

Appendix D:
Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon. 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.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigatio*n. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to provide the details of economic analysis methods that can be used to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities 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.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are Some Economic Analysis Approaches for Evaluating Mitigation Strategies?

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the there methods is outlined below:

Benefit/cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in public sector mitigation activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in private sector mitigation activities

Private sector mitigation projects may occur on the basis of one of two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;

3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchasers. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Conducting detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practicable. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of these methods is the STAPLE/E Approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a systematic fashion. This set of criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E Approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process".

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or county planning commission, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
- How will this action affect the fiscal capability of the community?
- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

- How will the action impact the environment?

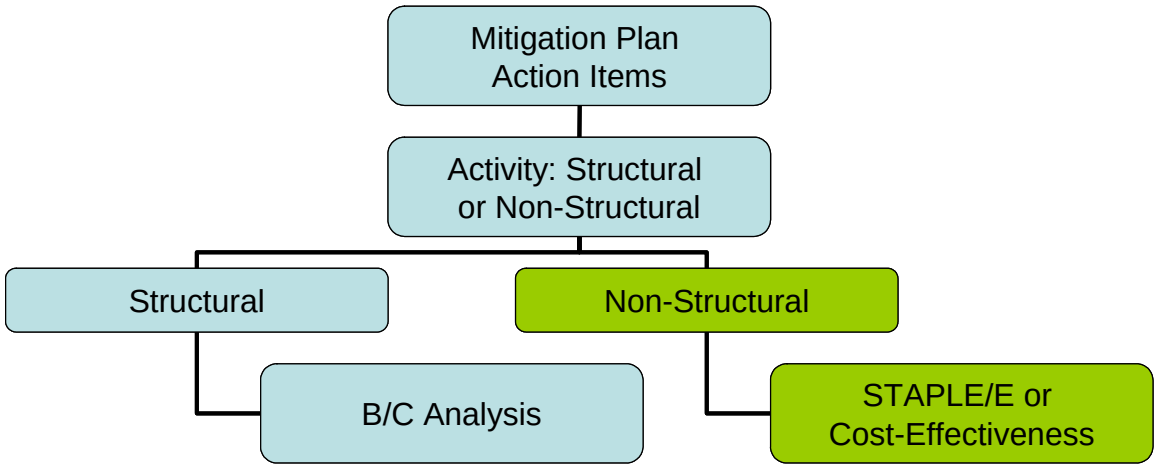
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed Benefit/Cost Analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure A.1: Economic Analysis Flowchart



Source: Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon, 2005

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation project can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- ***Determine the project cost.*** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ***Estimate the benefits.*** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate

salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.

- ***Consider costs and benefits to society and the environment.*** These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ***Determine the correct discount rate.*** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the best activities given varying costs and benefits include net present value and internal rate of return.

- ***Net present value***. Net present value is the value of the expected future returns of an investment minus the value of expected future cost expressed in today's dollars. If the net present value is greater than the project costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ***Internal Rate of Return***. Using the *internal rate of return* method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided

- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community

to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. Many communities are looking towards developing multi-objective projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies For Evaluating The Socio-Economic Consequences Of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eidinger, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997.

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics Inc., 1996.

Federal Emergency Management Agency *Report on Costs and Benefits of Natural Hazard Mitigation*. Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in The City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects* Volume V, Earthquakes, Prepared for FEMA's Hazard Mitigation Branch, October 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olson Associates, Prepared for Oregon State Police, Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000).

Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency Management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

Appendix E
Existing Plans, Policies, and Programs in Hood River County

The following appendix summarizes the existing plans, policies and programs in Hood River County. The first section covers plans and policies on the books for the County and the second section covers social service providers.

Existing Plans and Policies

The Disaster Mitigation Act of 2000 requires that communities identify a process where the requirements of the mitigation plan get incorporated into other planning mechanisms. The purpose of this appendix is to document those existing plans and policies in an effort to assist the community in identifying potential means to better integrate mitigation into the day-to-day decisions of local governments.

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.[1]

The Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the county's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the county's existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the action items identified in the Plan. Implementing the natural hazards mitigation plan's action items through existing plans and policies increases their likelihood of being supported and getting updated to remain current, and maximizes the county's resources.

Below is a table of the plans and policies that currently exist in Hood River County. For each plan or policy, the table provides information on its author, its purpose, and how it relates to natural hazard mitigation. The information provided in the table can also be used to complete action item worksheets by identifying rationale and potential ideas for implementation.

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Hood River County Comprehensive Plan		Hood River County Planning Department	Has legal and regulatory authority to guide land use and development within the county.	• Guides land use within the county. • Goals of preserving resource and protecting life from hazards can be linked to action items that guide development to reduce the county's risk to natural hazards. • Can be linked to action items for how the County will implement Oregon Statewide Planning Goal 7 requirements.
Hood River County Policy Document	July 1991	Hood River County	Expresses the public policy implications of the Comprehensive Plan and describes how the Oregon Statewide Planning Goals will be addressed.	• Influences how the community will be involved in the planning process. • Influences how open spaces and areas subject to natural hazards will be managed. • Can be linked to action items for how the County will implement Oregon Statewide Planning Goal 7 requirements.
Hood River County Zoning Ordinance	August 1989	Hood River County	Guides growth and development by establishing the County's authority to govern land use zoning and by providing conditions for sustainable land use practices.	• Guides growth and development. • Can be linked to action items that shape growth and development so that they do not increase the county's risk to natural hazards. • Can be linked to action items that protect natural and historic areas and areas subject to natural hazards. • Can be linked to action items for how the County will implement Oregon Statewide Planning Goal 7 requirements.

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Hood River County Subdivision Ordinance	September 1989	Hood River County	Direct the development of land use by creating standards and procedures, and assist in implementing the Comprehensive Plan.	• Influence the development of roads and sidewalks, important components of the transportation system. • Can be linked to action items that help make the county's transportation systems more disaster resistant. • Can be linked to action items for how the County will implement Oregon Statewide Planning Goal 7 requirements.
Hood River County Background Report	August 1986	Hood River County	Is the part of the Comprehensive Plan that details how the County will address each Statewide Planning Goal.	• Provides rationale for the creation of other portions of the Comprehensive Plan. • The information and analysis used to justify the creation of the Comprehensive Plan can provide rationale for action items linked to other portions of the plan that are aimed at natural hazard mitigation.
Hood River County Exceptions Document	December 1984	Hood River County	Provides data on why designations for residential, commercial, and industrial land use are made.	• Influences the way development and population growth occur, which can affect the natural environment and the county's vulnerability to natural hazards. • Can provide rationale for action items that influence land use practices in order to reduce the county's risk to natural hazards.
Hood River County Transit Plan	June 1995	Hood River County Transportation District	Makes transportation system and service recommendations for the county and is designed to be responsive to changes in ridership demand and population growth.	• Transportation systems assist in evacuation and response in the event of a natural hazard. • Can be linked to action items aimed at making the county's transit system more disaster resistant to reduce potential damage and risk.

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Park Plans, Hood River County		Hood River County Park Commission	Makes recommendations for updating landscaping for four parks within the county.	• Park plans maintain parks as open spaces. • Can be linked to action items that acquire areas prone to natural hazards to use as parks, which limits development and reduces the risk posed by natural hazards.
Community Shelter Plan, Hood River County	May 1969	Hood River County Civil Defense Agency	Establishes plans and procedures for preparing and operating community shelters in the event of an emergency	• Can be linked to action items that establish pre-disaster emergency response strategies.

Existing Social Service Providers

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. . Often times, actions identified by the plan involve communicating with the public, or specific subgroups within the population (e.g. elderly, children, low income). The County can use existing social systems as resources for implementing such communication related activities because these service providers already work directly with the public and have already established a trusted method for communicating with these subgroups. On a daily basis social service providers work and communicate directly with the public on a number of issues, one of which could be natural hazard preparedness and mitigation.

The following is a brief explanation of how the communication process works and how the community's existing social service providers could be used to provide natural hazard related messages to their clients.

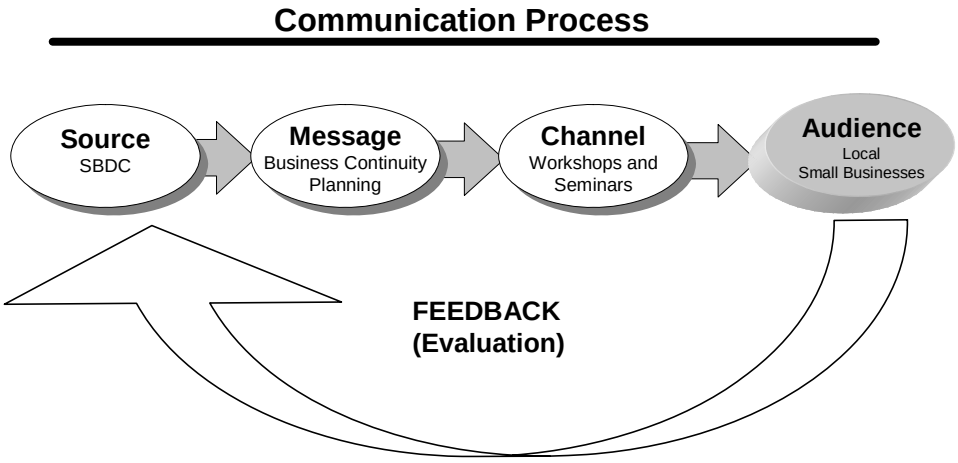
There are five essential elements for communicating effectively to a target audience:

- The **source** of the message must be credible,
- The **message** must be appropriately designed,
- The **channel** for communicating the message must be carefully selected,
- The **audience** must be clearly defined, and

The recommended action must be clearly stated and a **feedback** channel established for questions, comments and suggestions.

An example of an existing social system whose communication system can be linked to natural hazard mitigation is the Columbia Gorge Community College's Small Business Development Center (SBDC). The SBDC (the source) provides local businesses (the audience) with information on business contingency planning (the message) through workshops and seminars (the channel). To target small businesses, (insert name) County can provide the SBDC with information on developing business continuity plans and strategies for recovering from a natural hazard. When local small businesses attend the SBDC's workshops and seminars they can pick up this natural hazard mitigation information. This example communication process is graphically presented in ***Figure X.2***:

Figure X.2 Communication Process



Source: Adapted from the U.S. Environmental Protection Agency Radon Division's outreach program

The following table provides a list of existing social systems within Hood River County. The table provides information on each organization or program's service area, types of services offered, populations served, and how the organization or program could be involved in natural hazard mitigation. The three involvement methods identified in the table are defined below:

- Education and outreach – organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.
- Information dissemination – organization could partner with the community to provide hazard related information to target audiences.
- Plan/project implementation – organization may have plans and/or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

The information provided in the table can also be used to complete action item worksheets by identifying potential coordinating agencies and internal and external partners.

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[1] Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.*

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
American Red Cross Hood River Office 1100 Marina Way, #106 Hood River, OR 97031 Tel: 541-386-6000	Collect and provide blood and plasma to the community.	Hood River County		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination • Plan/project implementation
Arc of the Mid-Columbia PO Box 521 The Dalles, OR 97058	Provide educational and recreational services to children and adults with developmental disabilities.	Gilliam, Hood River, Sherman, and Wasco Counties			✓				• Education and outreach • Information dissemination
Bambinos Bilingual Learning Center Tel: 509-493-8525	Provide bilingual preschool and after-school childcare programs.	Hood River and Wasco Counties		✓			✓		• Education and outreach • Information dissemination
Barrett Business Services 1100 E. Marina Way, Suite 221 Hood River, OR 97031 Tel: 541-386-4407	Provides employment assistance	Hood River County	✓						• Education and outreach • Information dissemination
Boy Scouts of America - Mid Columbia District Tel: 541-298-5022	Provides youth programs.	Mid-Columbia Region		✓			✓		• Education and outreach • Information dissemination
Briggs Business Consulting Tel: 541-490-3435 Fax: 541-387-3434	Provides strategic planning, meeting facilitation, project management services.	Hood River County	✓						• Education and outreach • Information dissemination

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Campfire Boys and Girls - Mt. Hood Council 5427 Glen Echo Ave. Gladstone, OR 97027 Tel: 360-816-0570 Fax: 503-656-6356	Provide youth programs.	Hood River, Sherman, and Wasco Counties		✓					• Education and outreach • Information dissemination
Columbia Gorge Center 2940 Thomsen Road, Hood River, Oregon, 97031 Tel: 541-386-3520 Fax: 541-386-7788 Website: www.cgc-direct.com	Provides various services from health to employment issues for individuals. Also provides commercial services and residential services.	Hood River	✓		✓	✓	✓		• Education and outreach • Information dissemination • Goal and resource sharing
Department of Human Services 910 Pacific Ave Hood River, OR 97031 Tel: 541-386-3199	Provide self-sufficiency, medical, mental health, services and assistance for children, the elderly, and people with disabilities.	Hood River County		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination • Plan/project implementation
Eastern Oregon Support Services Brokerage P.O Box 329 (1216 C Street), Hood River, Tel: 541-387-3600 Fax 541-387-2999 Website: www.eossb.org	Provides consulting and self-sufficiency services to individuals with developmental disabilities.	Umatilla, Morrow, Wallowa, Malhuer, Union, Baker, and Harney Grant Counties		✓	✓		✓		• Education and outreach • Information dissemination

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Gorge Kids P.O Box 1233, Hood River, Oregon, 97401 Tel: 541-386-6250 Fax: 541386-6241 Email: info@gorgekids.com Website: www.gorgekids.com	Provides child-related information, events, and activities.	Columbia River Gorge Region		✓			✓		• Education and outreach • Information dissemination
Hood River County Chamber of Commerce 405 Portway Ave. Hood River, OR 97031 Tel: 541-386-2000	Provide economic development assistance to local businesses.	Hood River County	✓						• Education and outreach • Information dissemination
Hood River County Commission on Children and Families 309 State St., Rm 107 Hood River, OR 97031 Tel: 541-386-2500 Fax: 541-386-2532	Works toward creating community partnerships that help improve the lives of children and families.	Hood River County		✓			✓		• Education and outreach • Information dissemination • Plan/project implementation
Hood River County Habitat for Humanity Tel: 541-386-7982	Providing affordable housing through building and renovating houses for low-income families.	Hood River County						✓	• Education and outreach • Information dissemination • Plan/project implementation
Hood River County Public Health Department 1109 June St. Hood River, OR 97031 Tel: 541-386-1115 Fax: 541-386-9181	Provide health services.	Hood River County		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination • Plan/project implementation

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Hood River County Veteran's Service Office 601 State St. Hood River, OR 97031 Tel: 541-386-1080 Fax: 541-386-1128	Provides consultations and assistance to Veterans and their families for benefits applications.	Hood River County							• Education and outreach • Information dissemination
Hood River Downtown Business Association PO Box 494 Hood River, OR 97031 Tel: 541-308-4027	Promotes and represents downtown Hood River businesses to develop the local economy.	City of Hood River	✓						• Education and outreach • Information dissemination • Plan/project implementation
Hood River Employment Center 1100 E. Marina Way, Suite 120 Hood River, OR 97031 Tel: 541-386-6020	Provides employment assistance	Hood River County	✓						• Education and outreach • Information dissemination
Hood River Rotary Club Tel: 541-354-2002	Foster service within the local community to encourage community development.	Hood River County	✓						• Education and outreach • Information dissemination • Plan/project implementation
HOPE (HOusing PEople) 706 Columbia St. Hood River, OR 97031 Tel: 541-386-9144 Fax: 541-386-9145	Provides affordable housing and community development.	Hood River, Wasco, and Sherman Counties					✓	✓	• Education and outreach • Information dissemination

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Hospice of the Gorge PO Box 36 Hood River, OR 97031 Tel: 541-296-3228 (The Dalles) Tel: 541-387-6449 (Hood River)	Provides medical services and personnel, as well as in-home medical care.	The Columbia Gorge Region			✓				• Education and outreach • Information dissemination
La Clinica Del Carino 849 Pacific Avenue Hood River, OR 97031-1956 Phone: (541) 386-6380	Family health care services primarily geared towards HRC spanish speaking & seasonal farm worker population.	Hood River County		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Legal Aid Service - Clackamas & Mid Columbia Gorge 421 High Street, Suite 110, Oregon City, Oregon, 97405 Tel: 503-655-2518 Fax 503-655-2701	Provides legal aid services to low-income residents.							✓	• Education and outreach • Information dissemination
Mid Columbia Employment & Training Center 1215 Taylor Street Hood River, OR 97031 Tel: 541-386-6300	Provides employment assistance	Hood River County	✓						• Education and outreach • Information dissemination
Mid-Columbia Center For Living 1610 Woods Court, Hood River, Oregon, 97031	Provides assistance for mental, health, alcohol, drug abuse, and gambling addiction treatment.	Gilliam, Hood River, Sherman, and Wasco Counties			✓				• Education and outreach • Information dissemination

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Mid-Columbia Community Action Council, Inc 312 East 4th Street, The Dalles, Oregon, 97508 Tel: 541-298-5131 Fax: 541-298-5141 Website: www.mccac.com	Evaluates the programs aimed at reducing poverty, fosters community partnerships, and provides resources to reduce poverty.	Hood River, Sherman, and Wasco Counties					✓	✓	• Education and outreach • Information dissemination
Mid-Columbia Council of Governments 1102 Twelfth Street Hood River, OR 97031 Tel: 541-386-6300 Fax: 541-386-2189	Provides services to businesses and families.	Gilliam, Hood River, Sherman, Wasco, and Wheeler Counties	✓	✓	✓	✓	✓	✓	• Education and outreach • Information dissemination • Plan/project implementation
Mid-Columbia Economic Development District 515 E. 2nd Street The Dalles, OR 97058 Tel: 541-296-2266 Website: http://www.mcedd.org/	Provides economic development services to communities	Hood River, Sherman, and Wasco Counties	✓						• Education and outreach • Information dissemination • Plan/project implementation
Mid-Columbia Housing 312 Court St., Ste. 419 The Dalles, OR 97058 Tel: 541-296-5462 TTY: 800-735-1232 Fax: 541-296-8570	Provides Section 8 Housing Choice vouchers and services to low-income and developmentally disabled residents	Hood River, Sherman, and Wasco Counties			✓			✓	• Education and outreach • Information dissemination • Plan/project implementation

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Mid-Columbia Senior and Disabled Services 700 Union St., Rm. 203 The Dalles, OR 97058 Tel: 541-386-9080		Mid-Columbia Region			✓	✓			• Education and outreach • Information dissemination
Mid-Columbia Senior Center 1112 W 9th St The Dalles, OR 97058 Tel: 541-296-4788		Mid-Columbia Region				✓			• Education and outreach • Information dissemination
Mt. Hood Economic Alliance 4336 SW Condor Avenue Portland, OR 97201 Tel: 503-228-5565 Fax: 503-228-7456 Website: http://www.mthoodea.org/	Administers the Regional Investment and Rural Investment Programs which fosters and promotes economic development.	Clackamas, Hood River and Wasco Counties	✓						• Education and outreach • Information dissemination • Plan/project implementation
Next Door, Inc - Residential Services P.O Box 661, Hood River, Oregon, 97031 Tel: 541-386-6665 Fax: 541-386-5440 Website: www.nextdoorinc.org	Provides various programs and counseling for children, youths, adults, and families.	Hood River and Wasco Counties		✓			✓		• Education and outreach • Information dissemination
Parent and Child Health 1109 June St. Hood River, OR 97031 Tel: 541-386-1115 Fax: 541-386-9145	Provides health services for parents and children, including children with special medical needs.	Hood River County		✓			✓		• Education and outreach • Information dissemination

Hood River County
Social Organizations

Name and Contact Information	Description	Service Area	Populations Served						Potential Involvement in Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Parkhurst House Tel: 541-387-4600	Assisted living for senior citizens.	City of Hood River				✓			• Education and outreach • Information dissemination
Providence Brookside Manor Tel: 541-387-6370	Assisted living for senior citizens.	City of Hood River				✓			• Education and outreach • Information dissemination
Rosetta Assisted Living Tel: 541-387-4514	Provides assisted living and Alzheimer's care for senior citizens.	City of Hood River			✓	✓			• Education and outreach • Information dissemination
Senior Companion Program 1601 SE Court Pendleton, OR 97801 Tel: 541-276-4474 Fax: 541-278-2237	Provides in-home assistance for senior citizens.	Hood River, Morrow, and Umatilla Counties.				✓			• Education and outreach • Information dissemination
Special Olympics Northwest Region Tel: 503-649-9167 800-595-2860 Fax: 503-649-3586	Provides sports programs for people with developmental disabilities.	Northwest Region		✓	✓		✓		• Education and outreach • Information dissemination
Transportation Network Tel: 541-296-7595 877-875-4657	Provide transportation services to and from medical appointments for people without transportation	Mid-Columbia Region			✓	✓		✓	• Education and outreach • Information dissemination
Women, Infants, and Children's Program (WIC) Tel: 541-387-6882 Fax: 541-386-9181	Provides health and nutrition assistance and programs.	Hood River County		✓			✓	✓	• Education and outreach • Information dissemination

Appendix F:

Mitigation Tools

Please refer to the Oregon Natural Hazards Workgroup website for a wide array of natural hazard mitigation tools:

http://www.oregonshowcase.org/index.cfm?mode=resources

Appendix G
List of Acronyms

This appendix was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon for use by Pre-Disaster Mitigation Communities.

County and Regional

CPAWC	Cooperative Public Agencies of Washington County
CREW	Cascadia Region Earthquake Workgroup
CWPP	Community Wildfire Protection Plan
NHMP	Natural Hazards Mitigation Plan
NSA	National Scenic Area
PGE	Portland General Electric
PLP	Partners for Loss Prevention
NN	Northwest Natural
SWCD	Soil and Water Conservation District

Oregon

AGC	Associated General Contractors
AOC	Association of Oregon Counties
BCD	Building Codes Division (Department of Consumer and Business Services)
BPA	Bonneville Power Administration
CPW	Community Planning Workshop (University of Oregon)
DAS	Department of Administrative Services
DCBS	Department of Consumer and Business Services
DEQ	Department of Environmental Quality
DHS	Department of Human Services
DLCD	Department of Land Conservation and Development
DOGAMI	Department of Geology and Mineral Industries
DSL	Division of State Lands
ESD	Education Service District
GIHMT	Governor's Interagency Hazard Mitigation Team
GNRO	Governor's Natural Resources Office (State of Oregon)
LCDC	Land Conservation and Development Commission (State of Oregon)
LOC	League of Oregon Cities
OCS	Oregon Climate Service
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OEM	Office of Emergency Management (Oregon State Police)
OEMA	Oregon Emergency Management Association

OERS	Oregon Emergency Response System
OHIRA	Oregon Hazard Identification and Risk Assessment
ONHW	Oregon Natural Hazards Workshop (University of Oregon)
ORS	Oregon Revised Statutes
ORVOAD	Oregon Voluntary Organizations Active in Disaster
OSFM	Office of State Fire Marshal (Oregon State Police)
OSP	Oregon State Police
OSSPAC	Oregon Seismic Safety Policy Advisory Commission
OSU	Oregon State University
OUS	Oregon University System
OWEB	Oregon Watershed Enhancement Board
PSU	Portland State University
PUC	Public Utility Commission
WRD	Water Resources Department

Federal

AASHTO	American Association of State Highway and Transportation Officials
AIA	American Institute of Architects
APA	American Planning Association
ARC	American Red Cross
ASCE	American Society of Civil Engineers
ATC	Applied Technology Council
b/ca	benefit/cost analysis
BFE	Base Flood Elevation
BLM	Bureau of Land Management
BSSC	Building Seismic Safety Council
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
CRS	Community Rating System
CVO	Cascade Volcano Observatory (USGS)
CWPP	Community Wildfire Protection Plan
DHS	Department of Homeland Security
EDA	Economic Development Administration
EPA	Environmental Protection Agency
ER	Emergency Relief
EWP	Emergency Watershed Protection (NRCS Program)
FAA	Federal Aviation Administration
FAS	Federal Aid System
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance (FEMA Program)
FTE	Full Time Equivalent
GIS	Geographic Information System
GNS	Institute of Geological and Nuclear Sciences (International)
GSA	General Services Administration
HAZUS	Hazards U.S.

HBA	Home Builders Association
HFRA	Healthy Forest Restoration Act
HMGP	Hazard Mitigation Grant Program
HMST	Hazard Mitigation Survey Team
HUD	Housing and Urban Development (United States, Department of)
IBHS	Institute for Business and Home Safety
ICC	Increased Cost of Compliance
IHMT	Interagency Hazard Mitigation Team
NCDC	National Climate Data Center
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHMP	Natural Hazard Mitigation Plan (also known as "409 Plan")
NIBS	National Institute of Building Sciences
NIFC	National Interagency Fire Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
PDM	Pre-Disaster Mitigation Program
SBA	Small Business Administration
SEAO	Structural Engineers Association of Oregon
SHMO	State Hazard Mitigation Officer
TDR	Transfer of Development Rights
UGB	Urban Growth Boundary
URM	Unreinforced Masonry
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USFA	United States Fire Administration
USFS	United States Forest Service
USGS	United States Geological Survey
USGS-CVO	United States Geological Survey – Cascades Volcano Observatory
WSSPC	Western States Seismic Policy Council