Skamania County
Multi-Jurisdictional
Natural Hazards Mitigation Plan

2007, Broughton Mill Fire, Underwood, Photograph Credit Unknown

Skamania County is comprised primarily of forested land, and wildland fire has been identified as one of the natural hazards the county is most vulnerable to.

The Department of Natural Resources has identified both the community of Skamania, and the City of Stevenson as Wildland Urban Interface communities at risk for fire.

2010
Skamania County
Department of Emergency Management

Plan Format

- **Preceding Pages**
- **Section I – Multi-Jurisdictional Plan Adoption**
- **Section II – Multi-Jurisdictional Planning Process**
- **Section III – Identifying and Profiling Hazards**
- **Section IV – Multi-Jurisdictional Risk Assessment and Mitigation Strategies**
- **Section V – Plan Maintenance Process**

Preceding Pages Table of Contents

Special Thanks and Acknowledgements

This plan was a joint effort among representatives of unincorporated Skamania County, the Cities of North Bonneville and Stevenson, special purpose districts, businesses, other agencies, and private citizens throughout the county.

Assistance was also provided from a number of resources throughout the State of Washington including mitigation specialists, geologists, and other technical experts.

The commitment and dedication of all those involved in the planning process has resulted in a plan we believe will be of great interest and benefit throughout the county.

This plan was made possible through grant funding from the Washington State Military Department, Emergency Management Division.

Point of Contact

For information regarding this plan or to comment on this plan, please contact the Skamania County Department of Emergency Management:

Mailing Address: Skamania County Department of Emergency Management
PO Box 790
Stevenson, WA 98648

Telephone: 509/427-8076

For information regarding the National Flood Insurance Program (NFIP), please contact our county's local NFIP Coordinator.

Telephone: 427-3921

Record of Changes

Change No.	Page No.	Subject	Date	Entered By

List of Plan Recipients

Copy Number: _____ Agency: Skamania County Emergency Management
Date Distributed: _____ Received By: _____

Copy Number: _____ Agency: Skamania County Assessors Office
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Promulgation

The Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan dated ? 2010 is hereby adopted this ? day of ?, 2010, as the official natural hazards mitigation plan for Unincorporated Skamania County, the City of North Bonneville, the City of Stevenson, Skamania County Fire Districts #1, #2, #3, #4, #5, #6, Mill A Fire, North Bonneville Fire, Stevenson Fire, Home Valley Water District, Port of Skamania County, Public Utility District #1, Stevenson and North Bonneville Community Libraries, Skamania County Cemetery District, Skamania County Hospital District, Mt. Pleasant School No. 29, Skamania School No. 2, Stevenson-Carson School District #303, and Mill-A School District #31.

The participation in and adoption of a multi-jurisdictional pre-disaster mitigation plan shall not necessarily imply advocacy of, or support for, individual mitigation initiatives proposed by other participating jurisdictions, and the adoption of the plan by each jurisdiction shall be subject to limitations as set forth in each jurisdictions adoption resolution.

APPROVED:

Board of County Commissioners

Jamie Tolfree, Chairman District #	???, Commissioner Fire District #3
Jim Richardson District #	???, Commissioner Fire District #4
Paul Pearce District #	???, Commissioner Fire District #5
Don Stevens, Mayor City of North Bonneville	???, Commissioner Fire District #6
Frank Cox, Mayor City of Stevenson	???, Commissioner Mill A Fire
???, Commissioner Fire District #1	???, Commissioner North Bonneville Fire
???, Commissioner Fire District #2	???, Commissioner Stevenson Fire

Commissioner
Skamania County Cemetery District

Commissioner
Skamania County Hospital District

Commissioner
Home Valley Water District

Commissioner
Port of Skamania County

Commissioner
Public Utility District #1

Commissioner
North Bonneville & Stevenson
Community Libraries

Commissioner
Mt. Pleasant School No. 29

Commissioner
Skamania School No. 2

Commissioner
Stevenson-Carson School District #303

Commissioner
Mill-A School No. 31

Structure of this Plan

The Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan is divided into five sections as follows:

SECTION I - Multi-Jurisdictional Plan Adoption

This section includes:

- A listing of specific jurisdictions represented in the plan
- Information regarding each local governing body's adoption of the plan
- Supporting documentation such as a resolution
- Procedures for adding additional special purpose districts and/or other entities to the plan

SECTION II - Multi-Jurisdictional Planning Process

This section includes:

- An introduction
- Description of how each jurisdiction participated in the plan's development
- A narrative of the process followed to prepare the plan
- Who was involved in the planning process
- How the public was involved
- How others were involved
- Description of the review and incorporation of existing plans, studies, reports and technical information

SECTION III - Identifying and Profiling Hazards

This section includes:

- A multi-jurisdictional community profile
- Description of the multi-jurisdictional hazard identification process
- Profile of each identified hazard to include:
    - A hazard description
    - Geographical area affected
    - Magnitude of hazard
    - Previous occurrences
    - Probablility of future events
    - Overall county vulnerability to hazard
    - Overall county impact of hazard
    - References and/or resources

SECTION IV - Risk Assessment and Mitigation Strategies

This section includes:

- Specific vulnerability assessments and mitigation strategies for unincorporated Skamania County, cities of North Bonneville and Stevenson, special purpose districts and other entities
- Information includes:
    - Location/area served
    - Asset profile
    - Hazard history
    - Repetitive loss properties information
    - Critical infrastructure

- Potential dollar losses
- Land use and development trends
- Hazard vulnerability rating
- Proposed mitigation actions and projects

SECTION V - Plan Maintenance Process

This section:

- Describes the method and schedule for monitoring, evaluating, and updating the plan
- Includes information regarding incorporation into existing planning mechanisms
- Describes how continued public participation will be obtained

Section I
Multi-Jurisdictional Plan Adoption

Section I – Multi-Jurisdictional Plan Adoption
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Jurisdictions and Special Purpose Districts Represented in Plan

The Skamania County Multi-Jurisdiction Natural Hazards Mitigation Plan was developed and adopted to benefit all of Skamania County. Jurisdictions and/or special purpose districts represented in this plan include the following:

Jurisdiction and/or Special Purpose District	Local Governing Body
Unincorporated Skamania County	Skamania County Board of County Commissioners
City of North Bonneville	North Bonneville City Council
City of Stevenson	Stevenson City Council
Fire Districts and Departments	
Skamania County Fire District #1	Fire Commissioners
Skamania County Fire District #2 and Stevenson Fire Department	Fire Commissioners
Skamania County Fire District #3	Fire Commissioners
Skamania County Fire District #4	Fire Commissioners
Skamania County Fire District #5	Fire Commissioners
Skamania County Fire District #6	Fire Commissioners
Mill A Fire	Fire Commissioners
North Bonneville Fire	Fire Commissioners
School Districts	
Mill-A School No. 31	School Board
Mt. Pleasant School No. 29	School Board
Skamania School No. 2	School Board
Stevenson-Carson School District #303	School Board
Other	
Home Valley Water District	Commissioners
North Bonneville and Stevenson Community Libraries	Commissioners
Port of Skamania County	Commissioners
Public Utility District #1	Commissioners
Skamania County Cemetery District	Commissioners
Skamania County Hospital District	Commissioners
Williams Pipeline	

Adoption of Plan by Local Governing Body

The local governing body of each jurisdiction and/or special purpose district listed above will adopt after favorable review by FEMA.

Supporting Documentation

Supporting documentation for formal adoption of this plan, from each jurisdiction and/or special purpose district listed above is included at the end of this section.

Procedure for Adding Additional Entities

The following procedure was developed in the event a special purpose district or other entity not currently included in this plan, wishes to be added to the plan.

Step One:
The special purpose district or other entity wishing to be added to this plan contacts the Skamania County Department of Emergency Management.

Step Two:
The Skamania County Department of Emergency Management provides a copy of the approved plan and other data, to assist the entity in developing their portion of the plan.

Step Three:
Upon review of the current plan, and development of new portions (in accordance with FEMA requirements) specific to the entity requesting addition to the plan, the new entity's plan is forwarded to the State Hazard Mitigation Program Manager for review and compliance with current FEMA Local Multi-Hazard Mitigation Planning Guidance.

Step Four:
The State Hazard Mitigation Program Manager reviews the new portion for compliance with current Local Multi-Hazard Mitigation Planning Guidance in conjunction with the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan. If the new portion does not meet the required standard, the State Hazard Mitigation Program Manager works with the entity to resolve issues.

Step Five:
The State Hazard Mitigation Program Manager forwards the new plan to FEMA Region X for review and approval.

Step Six:
Upon approval from FEMA Region X, the new entity is considered part of the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan and complies with the update schedule of the plan and the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Local Planning Team.

ADOPTION RESOLUTION SAMPLE

(from Draft Multi-jurisdictional How-To #8)

(Name of Jurisdiction) Town A

(Governing Body) Town Council

(Address) 100 Main Street, Town A

RESOLUTION

WHEREAS, Town A, with the assistance from Consultant X, has gathered information and prepared the County ABC Plan; and

WHEREAS, the County ABC Plan has been prepared in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, Town A is a local unit of government that has afforded the citizens an opportunity to comment and provide input in the Plan and the actions in the Plan; and

WHEREAS, Town A have reviewed the Plan and affirms that the Plan will be updated no less than every five years;

NOW THEREFORE, BE IT RESOLVED by Town Council that Town A adopts the County ABC Plan as this jurisdiction's Natural Hazard Mitigation Plan, and resolves to execute the actions in the Plan.

ADOPTED this 20th day of September, 2005 at the meeting of the Town Council.

_____

(Mayor)

_____

(Clerk)

Section II
Multi-Jurisdictional Planning Process

Section II – Multi-Jurisdictional Planning Process Table of Contents

Introduction

Researching many historical records show that severe storms, wildland fires, floods, landslides, avalanches, drought, earthquakes, and volcanic activity have impacted Skamania County in the past. The county's beautiful rural setting and the fascination with the Columbia River Gorge creates an ideal place to work and/or live, and as the population of Skamania County increases, the potential impacts of hazards particular to the area increase the vulnerability to natural disaster, for the population, for local business and industry, and for the environment.

Skamania County continues to be subject to potential flooding, severe storms, landslides, earthquakes, avalanche, wildfires, volcanic activity, and drought. Of course it is impossible to predict when any of these disasters will occur, or the extent to which they will affect the county, but they will occur – it is only a matter of time.

Based on careful planning and collaboration between jurisdictions, among public agencies, the private sector, industry and businesses, as well as citizens within the community, it is possible to minimize the losses that can result from these natural disasters. Organizational and personal preparedness and mitigation efforts are keys to successfully absorb the impact of these disasters and minimize the damage they potentially can cause.

What is natural hazard mitigation?

Mitigation of natural hazards is the development and implementation of activities designed to reduce or eliminate the impact of and losses resulting from natural hazards.

Mitigation planning is a process where communities assess risks and identify actions that may be taken to mitigate vulnerability to natural hazards.

Rock Creek Bridge, 2007, Photograph by Larry Douglass

A Mitigation Plan is a community-driven document that shows the link between land-use decisions and vulnerability, and may be used by planners or other officials to advise and inform decision makers.

Rock Creek Landslide, 2007, Photograph by Larry Douglass

Severe storms and prolonged heavy rainfall during November 2006 (Federally Declared Disaster 1671-DR-WA) was the contributing factor to the activation of the Rock Creek Landslide in early February of 2007.

Skamania County's estimate was $899,318.59 to the Federal Emergency Management Agency's (FEMA) disaster recovery assistance program.

This estimate was for the emergency protective measures (mitigation) to protect public and private improved facilities located approximately ½ mile downstream of the slide. The declaration was to cover the initial excavation of 94,000 cubic yards from the creek bed and for removal of the materials that were placed in the stockpile site just east of Rock Creek equal to that amount.

Total costs associated with work accomplished by the County to date are $1,439,663.79.

Why develop a natural hazards mitigation plan?

Developing a mitigation plan for Skamania County completes the process of planning that began with the Skamania County Emergency Management Plan (CEMP). This plan establishes a foundation for coordination and collaboration among the miscellaneous agencies, jurisdictions, and the citizens of the County. It also will identify mitigation strategies and possible individual mitigation projects in order to fulfill the requirements of various federal assistance programs.

The ever-increasing cost of response to and recovery from natural disasters makes the reduction of the community's vulnerability to natural hazards and the potentially resulting disasters a high priority. A natural hazard mitigation plan will identify the hazards that potentially impact a community and how vulnerable the community is to these natural hazards. It will also outline mitigation strategies to eliminate or at least reduce the impacts of these hazards. This will be accomplished through a cooperative, collaborative, and coordinated approach across jurisdictions, disciplines and agencies.

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for State, local, and Indian Tribal governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning. Communities must have a plan to apply for or receive certain Mitigation Grants. These grants can augment local mitigation activities already being done. Ultimately, these actions reduce vulnerability, and communities are able to recover more quickly from disasters.

The Benefits of Hazard Mitigation

Saving lives and property
Through mitigation efforts communities may save lives and minimize property damage. For example, mitigation actions could include restriction of residential or industrial development in certain areas, establishing certain building code requirements, or moving families and their homes out of harm's way.

Reducing vulnerability to potential hazards in the future
A community's overall preparedness increases significantly by developing and establishing mitigation strategies that will guide the community to permanently reduce risk and losses in the future.

Accelerating post-disaster funding
Having established mitigation strategies and projects prior to a disaster will enable a community to expeditiously obtain post-disaster funding, due to the fact that much of the preliminary work for funding assistance will already be in place.

Speeding up recovery
Having gone through the development of a Hazard Mitigation Plan and having developed mitigation strategies and projects will enable a community to quickly transition from response to recovery actions and will also help identify additional mitigation opportunities before another disaster may strike in the future.

Improving community health and safety
Developing a Hazard Mitigation Plan and mitigation strategies, and implementing mitigation projects clearly demonstrates the community is fully committed to keeping its citizens safe, to protect its economic infrastructure, and to ensure a healthy environment.

Who benefits from a natural hazards mitigation plan?

The Skamania County Natural Hazards Mitigation Plan was developed, written, and adopted as a multi-jurisdictional natural hazards mitigation plan. It will benefit the incorporated municipalities, various special purpose districts, and the unincorporated rural areas of Skamania County.

This plan - and all the information contained in it – applies to the whole county and is intended to provide the framework for natural hazard mitigation within Skamania County. Even the process of performing research, updating the Hazard Identification Vulnerability Analysis (HIVA), meeting and conversing with subject matter experts and local representatives, developing this Hazard Mitigation Plan and basic mitigation strategies has resulted in much benefit. There is little doubt that the collaborative and cooperative spirit crossing jurisdictional and discipline/agency lines, which has been established during this planning effort, will continue in the years to come. It will benefit Skamania County and all its jurisdictions and agencies as well as the citizens these jurisdictions and agency serve.

Natural hazards land use policy in Washington
Policies enacted through State Environmental Policy Act (1971), the Shorelines Management Act (1971), the State Building Code Act (1974, 1985), and the Growth

Management Act (1991) have become an integral part of Washington's statewide land use planning program. The focus is on appropriate land use controls in critical areas prone to natural disasters, and also on the latest technology in construction methods to mitigate potential disasters.

Support for natural hazards mitigation
It is the local jurisdictions' primary responsibility to develop and to implement mitigation strategies and policies. Yet, various State and Federal partners and resources assist local government in the development of mitigation strategies and plans. In Washington State, the lead agency assisting local jurisdictions in hazard mitigation planning is the Washington Military Department - Emergency Management Division.

Vision Statement, Mission Statement and Goals

In order to describe the overall purpose of developing the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan, the following Mission and Vision Statements were developed and agreed upon by the Local Planning Team Members.

- **Vision Statement**
  A Skamania County resilient to the natural hazards inherent to our unique setting

- **Mission Statement**
  To proactively respond to our hazards by incorporating mitigation activities into the day-to-day activities of our local jurisdiction;

  To promote hazard awareness;

  To protect the way of life for the residents and visitors of Skamania County.

The following goals were also agreed upon:

Goals

Goal 1: Protect Life.
Objective (Obj.) 1.1 - Improve systems that provide warning and emergency communications.
Obj. 1.2 - Develop or amend laws so they effectively address hazard mitigation.
Obj. 1.3 - Reduce the impacts of hazards on vulnerable populations.
Obj. 1.4 - Strengthen state and local building code enforcement.
Obj. 1.5 - Train emergency responders.

Goal 2: Protect Property.
Obj. 2.1 - Protect critical assets.
Obj. 2.2 - Protect and preserve facility contents.
Obj. 2.3 - Reduce repetitive and severe repetitive losses, including those caused by flooding.

Goal 3: Promote a Sustainable Economy.
Obj. 3.1 - Provide incentives for mitigation initiatives.
Obj. 3.2 - Continue critical business operations.
Obj. 3.3 - Form partnerships to leverage and share resources.

Goal 4: Protect the Environment.
Obj. 4.1 - Develop hazard mitigation policies that protect the environment.

Goal 5: Increase Public Preparedness for Disasters.
Obj. 5.1 - Understand natural hazards and the risk they pose.
Obj. 5.2 - Improve hazard information, including databases and maps.
Obj. 5.3 - Improve public knowledge of hazards and protective measures so individuals appropriately respond during hazard events.
Obj. 5.4 - Develop new policies to enhance hazard mitigation initiatives.

The Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan was developed utilizing information from a wide variety of sources, to include historical records, plans and ordinances, as well as information solicited from agencies and individuals having knowledge of specific hazards.

Multi-Jurisdictional Planning Participation

In the initial stages of the planning process, an email list was developed to include ongoing participation from jurisdictions and special purpose districts throughout the county. Emails were regularly sent out to include the online hazard survey link, worksheets, templates, planning process guidance documents, summaries of local planning team meetings and a link to the draft plan as it progressed through various stages.

Representatives from some of the participating jurisdictions/special purpose districts attended the local planning team meetings on a regular basis, while others submitted input via email, phone conversations, or meetings in person.

In addition to the jurisdictions/special purpose districts listed below who participated in the planning process, we also received input from agencies, non-profit organizations, businesses, and community members at large.

Planning Process Participants	
Unincorporated Skamania County	Mill A Fire
City of North Bonneville	North Bonneville Fire
City of Stevenson	Stevenson Fire
Stevenson and North Bonneville Community Libraries	SCFD #1
Home Valley Water District	SCFD #2
Port of Skamania County	SCFD #3
Public Utility District #1	SCFD #4
Mill A School No. 31	SCFD #5
Mt. Pleasant School No. 29	SCFD #6
Skamania School No. 2	Skamania County Cemetery District
Stevenson-Carson School District	Skamania County Hospital District

Planning Process Documentation

The planning process for the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan included opportunities for the public to comment on the plan during the draft stage and prior to plan approval. It also provided opportunities for neighboring communities, local and regional agencies involved in hazard mitigation activities and agencies that have authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

Lastly, the process included review and incorporation of existing plans, studies, reports and technical information as appropriate. Following are highlights of the planning process:

Narrative Description of Process

On April 21, 2009, the Skamania County Department of Emergency Management received a letter, and signed, and executed grant agreement from the State of Washington Military Department, Emergency Management Division, to develop a Skamania County Multi-Hazard Mitigation Plan.

The following is a narrative description (including key dates, elements and participants) of the process followed to prepare the plan:

May 2009
In May of 2009 Skamania County Sheriff/DEM Director Dave Brown and Emergency Management Coordinator John Carlson, with input from Washington State EMD, set out to identify participants for the local planning team. The criteria established were simple; the team member must be associated with a public service district or own infrastructure within the county that had potential to be affected by the identified natural hazards. An email distribution list was constructed containing the names of potential planning team members. The invitation to participate explained the reason why it was important to participate and the value it would provide to their operations. The invitation, indicating the initial planning team meeting would be held on Thursday, July 30, 2009, 1-3pm at Rock Creek Center in Stevenson was sent and was met with a positive response.

July 30, 2009
An initial meeting of the local planning team was held from 1-2:30pm at Rock Creek Center. This meeting primarily focused on the scope of the mitigation plan, and how local planning team members will be involved in the plan development process.

Discussion also included how the plan may benefit the county and specific agencies/jurisdictions in terms of funding opportunities for mitigation projects, how the plan will be developed, and strategies for involving the public.

A mission statement, vision statement, goals and objectives were discussed and approved.

Agencies and jurisdictions represented at this initial meeting were as follows:

- Skamania County Sheriff's Office

- Skamania County Department of Emergency Management
- State of Washington Hazard Mitigation Representatives
- City of Stevenson
- Skamania County Public Health
- Port of Skamania County
- Skamania County Public Works
- Skamania County Community Health

August 27, 2009
The second meeting of the local planning team was held from 1-2:15pm at the Skamania County EOC. A questionnaire for public input was reviewed, adjusted, and finalized. Williams Pipeline and Skamania County Public Works submitted information they compiled based on the meeting in July.

October 7, 2009
A press release was published on the front page of "The Skamania County Pioneer" describing the Hazard Mitigation project and requesting public input. A survey was made available to the public at http://skamania-dem.org/ and also distributed to locations on the east, west and central areas of the county.

October 15, 2009
Emergency Management Director Dave Brown and Kathleen Carlson attended the Underwood Community Council Meeting at 7pm in Underwood to discuss the mitigation planning process, and provide an opportunity for public input. Informational flyers were distributed that included the link to the online hazard survey. Hard copies of surveys were also distributed.

October 29, 2009
The third meeting of the local planning team was held from 1-2:30pm at the Skamania County EOC.

November 3, 2009
Kathleen Carlson attended the Stevenson Business Association meeting and gave a brief overview of the mitigation planning process. Informational flyers were distributed that included the link to the online hazard survey.

November 11, 2009
Brief article published in "The Skamania County Pioneer" requesting public input and providing information about online survey.

December 3, 2009
The fourth meeting of the local planning team was held from 1-2pm at the Skamania County EOC. Overall jurisdictional vulnerability to specific hazards was determined utilizing a hazard analysis matrix and averaging results. Numerical values were assigned after analyzing a variety of data, including input from the public at large, and long-time local residents. Hazard rankings were consistent with survey results identifying hazards of most concern to residents.

December 7, 2009
DEM Director Brown, DEM Coordinator Carlson and Kathleen Carlson attended the PUD #1 Commissioner's meeting. The hazard mitigation process was discussed, with an opportunity for questions and comments.

December 17, 2009
DEM Coordinator Carlson, Ben Shumaker and Kathleen Carlson met from 1-2pm to discuss the City of Stevenson's progress on their portion of the plan, and from 2-3pm participated in a conference call with Bev O'Dea from the State of Washington Emergency Management Division.

January 7, 2010
DEM Director Brown, DEM Coordinator Carlson and Kathleen Carlson met with Mayor Don Stevens of the City of North Bonneville to discuss the Hazard Mitigation Plan and their participation in the planning process.

January 14, 2010
The fifth meeting of the local planning team was held from 1-2 pm at the Skamania County EOC. A comprehensive range of mitigation actions and projects were identified, analyzed and prioritized for unincorporated Skamania County.

February 8, 2010
DEM Coordinator John Carlson and Kathleen Carlson met with Stevenson-Carson School District Superintendent Bill Hundley to discuss their participation in the planning process and specific special purpose district issues.

February 12, 2010
DEM Director David Brown, DEM Coordinator John Carlson, Ernie Schnabler and Kathleen Carlson met to review plan progress so far, and discuss target dates for completion of specific tasks.

February 25, 2010
The sixth meeting of the local planning team was held from 1-2:45 pm, at the Skamania County EOC. Mitigation Actions/Projects were reviewed, a matrix was completed to determine percentages of structures at risk within specific unincorporated areas of the county, and a timeline of meetings, deadlines and next steps was discussed.

March 2, 2010
DEM Director David Brown, DEM Coordinator John Carlson, and Kathleen Carlson attended the Carson/Stabler Community Council meeting from 6:30-7:30 pm to discuss the hazard mitigation plan and solicit input from the public.

March 3, 2010
DEM Coordinator John Carlson and Kathleen Carlson met from 3:30-4:30 pm with Fire Chief Hildenbrand (Fire District #1) to discuss the fire district's participation in the planning process.

March 4, 2010
Kathleen Carlson met from 11:00- 11:30 with Librarian Chris Hughey to discuss the participation of Stevenson and North Bonneville Community Libraries in the planning process.

Week of March 1st-5th
DEM Director David Brown contacted Skamania County School Districts regarding their progress on district input to the mitigation plan.

March 16, 2010
Kathleen Carlson met with Tom Jermann from the City of North Bonneville regarding the city's progress on their portion of the mitigation plan.

March 22, 2010
Kathleen Carlson met with Fire Chief Wayne Martin (Stevenson Fire Department and Fire District #2) and Fire Chief Neal Sacon (Mill A Fire Department) to discuss their portions of the mitigation plan.

March 23, 2010
DEM Coordinator John Carlson and Kathleen Carlson attended the North Bonneville Community Council meeting to inform the public of progress on the mitigation plan, to specifically discuss North Bonneville's portion of the plan, and to receive public input.

March 25, 2010
The seventh meeting of the local planning team was held from 1-2 pm, at the Skamania County EOC. The draft plan was discussed, specifically requesting input for Section V, and also any other areas where information was still needed. A timeline was also reviewed and discussed regarding steps still needing to be completed in the planning process.

Wednesday, April 14, 2010
A press release was published in the Skamania County Pioneer giving the public a chance to comment on the draft plan. The plan was made available via website at www.skamania-dem.org/Mitigation.html Public input was received through April 23, 2010.

Thursday, May 6, 2010
DEM Coordinator John Carlson, Ernie Schnabler and Kathleen Carlson participated in a National Flood Insurance Program (NFIP) Workshop hosted by the State of Washington, from 9:30-11am. This workshop covered the NFIP components to be addressed in the mitigation plan, as required for FEMA approval.

Monday, May 10, 2010
Draft plan was once again posted to the website (after incorporating changes received during the public comment period), for final comment by the local planning team before submitting the draft plan to the State.

Planning Process Involvement

The planning process for the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan included involvement from a large cross-section of Skamania County's population. Input was solicited from county, city, and special purpose district personnel, as well as businesses, industry and everyday citizens. Following is more specific information regarding who was involved and how they participated in the process:

Initial Steering Committee
DEM Director Brown headed up an initial steering committee along with DEM Coordinator John Carlson.

Local Planning Team
A Local Planning Team was developed and included jurisdictions and special purpose districts throughout the county. Each of the following participated by attending meetings, providing information, and/or reviewing documents throughout the planning process.

Representing	Name	Category
Beacon Rock State Park	Erik Plunkett	Government
City of North Bonneville	Don Stevens	City
City of North Bonneville	Tom Jermann	City
City of Stevenson	Ben Shumaker	City
City of Stevenson	Mary Ann Duncan-Cole	City
Gator Creek Gardens/Carson Stabler Business Association		Business
Home Valley Water District		Special Purpose District
Incident Management Partners	Ernie Schnabler	Other
Mill A Fire Department	Neal Sacon	Special Purpose District
Mill A School District #31	Dale Palmer	Special Purpose District
Mount Pleasant School District #029-93	Ronald Worrell	Special Purpose District
North Bonneville Fire Department	JB Tennison	Special Purpose District
North Bonneville & Stevenson Community Libraries	Chris Hughey	Special Purpose District
Port of Skamania County	John McSherry	Special Purpose District
Port of Skamania County	Tony Bolstad	Special Purpose District
Seven “P” Solutions	Kathleen Carlson	Other
Skamania County Assessors Office	Gabe Spencer	County
Skamania County Hospital District	Heidi Penner	County
Skamania County Board of Commissioners	Jamie Tolfree	County
Skamania County Cemetery District		Special Purpose District
Skamania County Community Development	Mark Mazeski	County
Skamania County Community Development	Amanda Smeller	County
Skamania County Community Development	George Waun	County
Skamania County Community Development	Karen Witherspoon	County
Skamania County Community Health	Kirby Richards	County
Skamania County Department of Emergency Management	David Brown	County
Skamania County Department of Emergency Management	John Carlson	County
Skamania County Economic	Peggy Bryan	Non-Profit

Development Council		
Skamania County Facilities and Recreation	Scott Pineo	County
Skamania County Fire District #1	Bob Hildenbrand	Special Purpose District
Skamania County Fire District #2	Wayne Martin	Special Purpose District
Skamania County Fire District #3	John Hardham	Special Purpose District
Skamania County Fire District #4	Don Ochs	Special Purpose District
Skamania County Fire District #5	Bob Baxter	Special Purpose District
Skamania County Fire District #6	Frank Yela	Special Purpose District
Skamania County Fire Marshall	Marlon Morat	County
Skamania County GIS Department	Rick Hollatz	County
Skamania County Public Health	Linda McCaulley	County
Skamania County Public Utility District #1	Bob Wittenberg	Special Purpose District
Skamania County Public Utility District #1	Curt Esch	Special Purpose District
Skamania County Public Works Department	Larry Douglass	County
Skamania School District #2	JoAnn Fritz	Special Purpose District
Stevenson Business Association	Scott Anderson	Business
Stevenson-Carson School District	Bill Hundley	Special Purpose District
Washington State Emergency Management Division	Beverly O'Dea	Government
Williams Pipeline	Ben Kirsten	Business
Williams Pipeline	Ruth Mabrey	Business
Williams Pipeline	G. Stickney	Business

Local Planning Team meetings were held on the following dates:

- July 30th, 2009
- August 27th, 2009
- October 29th, 2009
- December 3rd, 2009
- January 14th, 2010
- February 25th, 2010
- March 25th, 2010

Specific Accomplishments of the Local Planning Team are as follows:

- Developed and agreed upon vision and mission statements
- Developed and agreed upon goals
- Reviewed and approved public questionnaire
- Continually reviewed and contributed to the plan as it progressed. The "draft plan in progress" was posted to the Emergency Management website on November 12th, and as sections were drafted they were posted online for review by the local planning team.
- Prioritized hazard vulnerability for the unincorporated areas of Skamania using a hazard analysis matrix, as well as input compiled from local sources, historical data, and existing documents.
- Identified, analyzed and prioritized mitigation projects and actions for Unincorporated Skamania County.

Contractors
Two contractors, Ernestus Schnabler, and Kathleen Carlson, assisted with the development of the Skamania County Multi-Jurisdictional Natural Hazard Mitigation Plan.

Specific deliverables included:

- Conducting risk assessment
- Review of existing HIVA
- Facilitation of public meetings
- Preparing press releases and public notices
- Authoring the plan
- Editing the plan
- Reviewing the plan
- Facilitation of plan adoption and approval

Public Involvement

Public involvement in the development of this plan was highly encouraged. An initial press release was published October 7, 2009 in the Skamania County Pioneer describing the planning process and emphasizing the importance of public input.

Questionnaires for the public were distributed to various locations in the county, as well as posted on the Department of Emergency Management website.

Informational flyers were also distributed both as handouts, and via various email listings (Skamania County Chamber of Commerce, CERT).

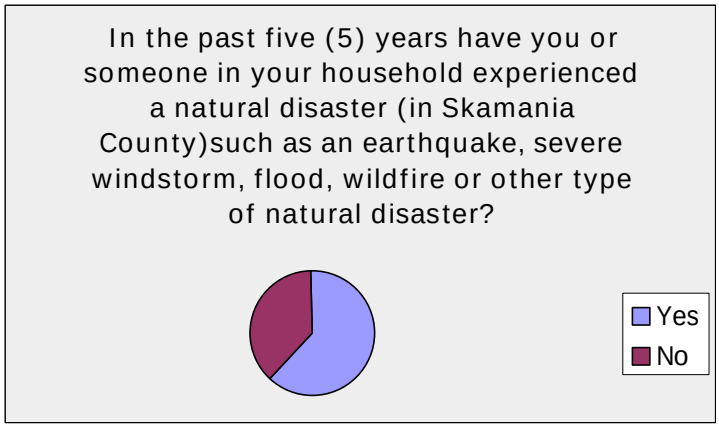
Carson/Stabler Community Council Meeting

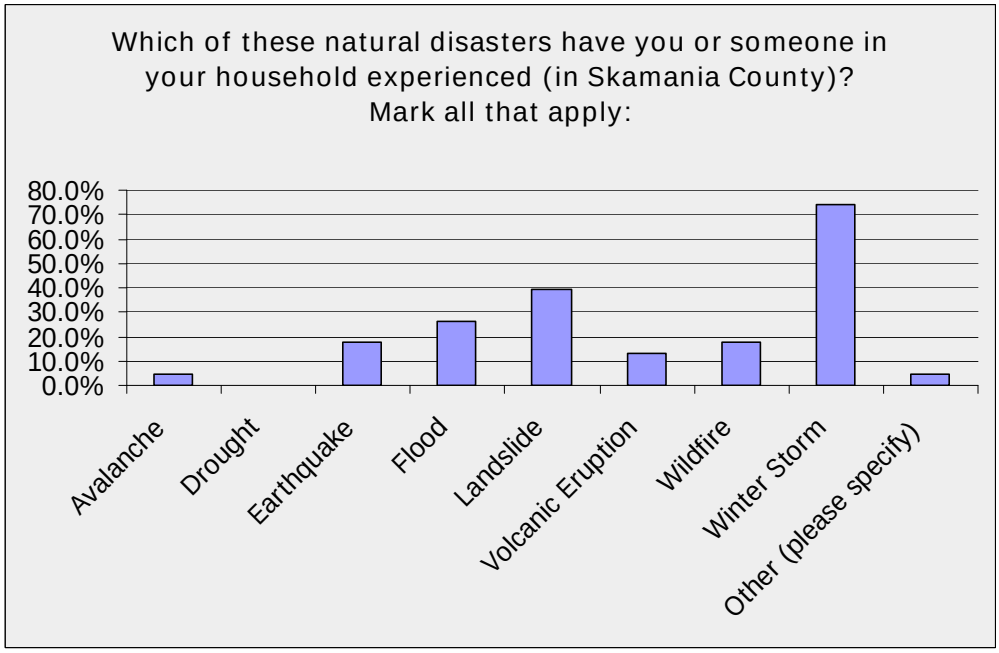
An additional article appeared in the local paper (November 11, 2009) once again requesting input from the public during the planning process.

A press release was published in the Skamania County Pioneer March 10, 2010 giving an overview of progress made on the mitigation plan, and placing a deadline of March 19th on public input (via the online survey).

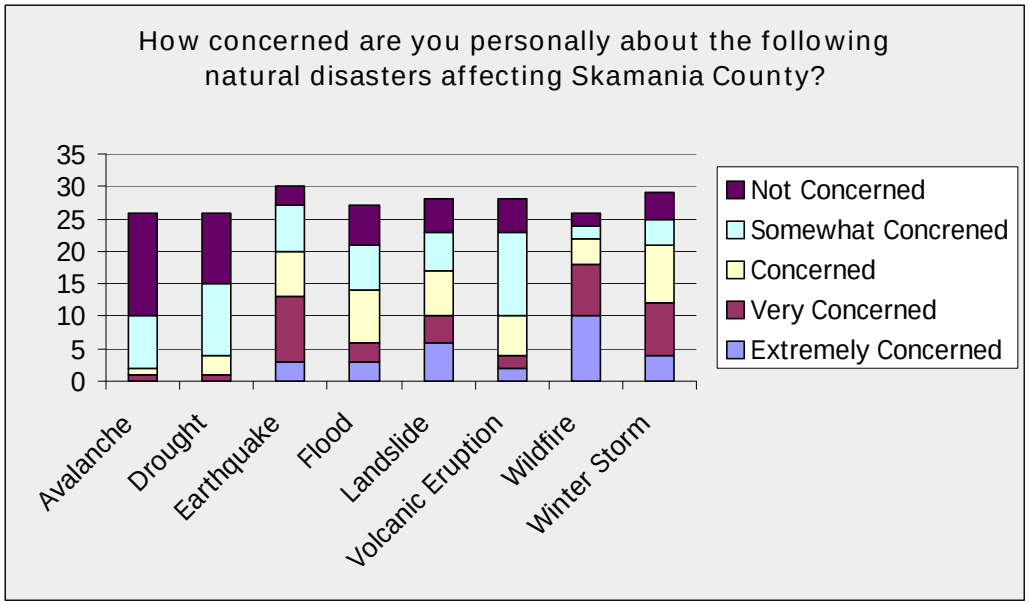
This deadline was set in order to compile all the information and prepare a draft plan for public review by early April.

Results of the online survey are as follows:

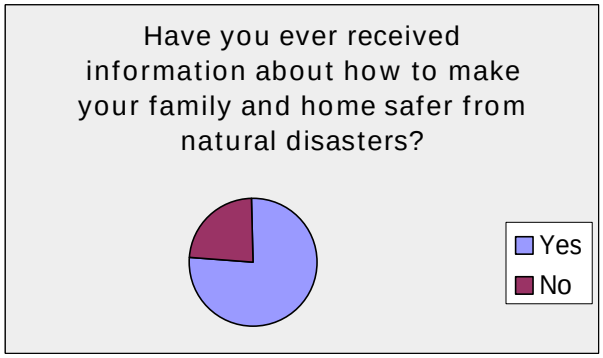


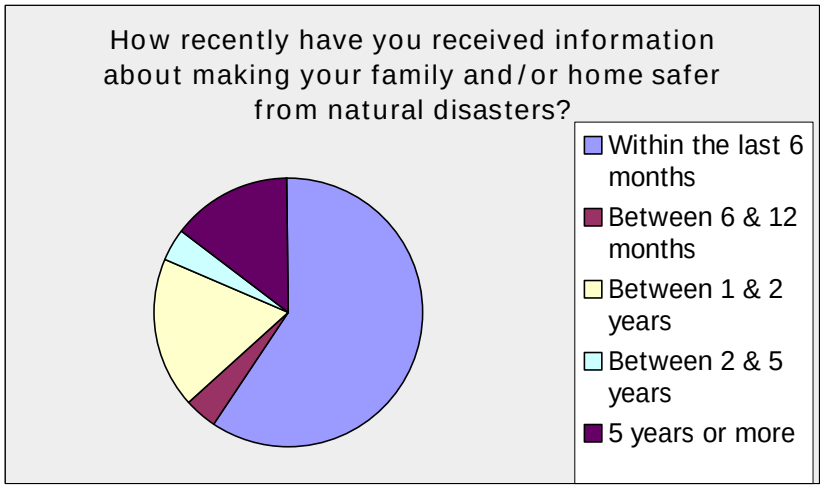


Other response included gas line explosion.



River erosion was also listed as a concern.





Who would you most trust to provide you with information about how to make your family or home safer from natural disasters? Check all that apply:		
Answer Options	Response Percent	Response Count
News media	16.7%	4
Government agency	58.3%	14
Insurance agent or company	25.0%	6
Utility company	45.8%	11
University or research institution	41.7%	10
American Red Cross	33.3%	8
Other non-profit organization	33.3%	8
Not sure	4.2%	1
Other (please specify)		7
answered question		24
skipped question		7

Other responses included DEM, Emergency Services, Own Research, Self, EOC, Sheriff's Office and Fire District.

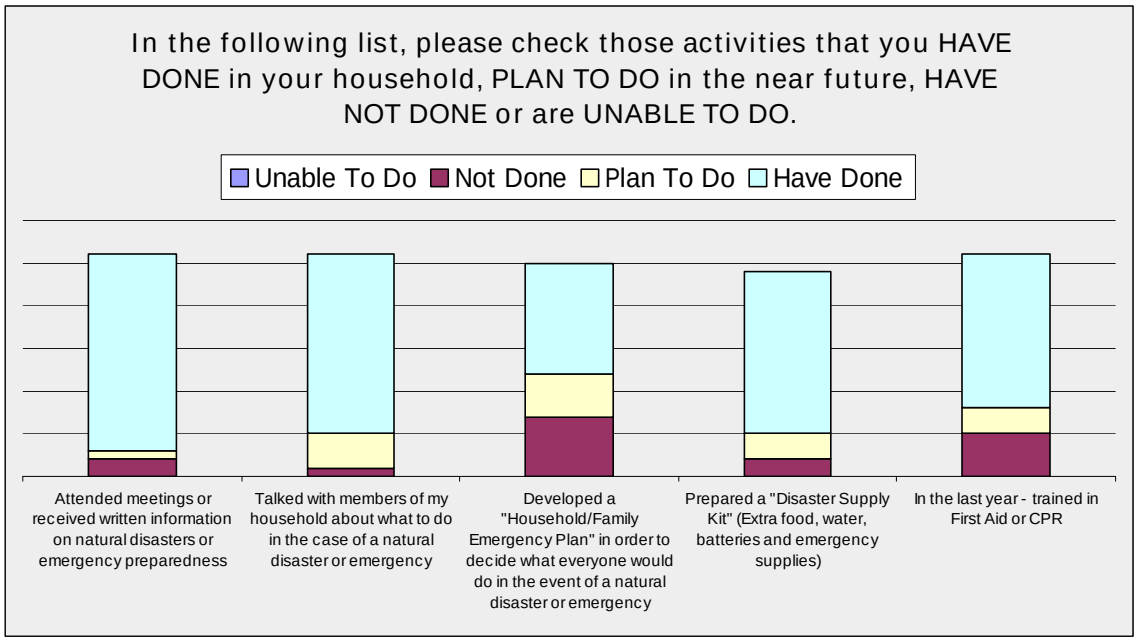
What is the most effective way for you to receive information about how to make your family and home safer from natural disasters? Check all that apply:		
Answer Options	Response Percent	Response Count
Newspaper Stories	37.0%	10
Newspaper Advertisments	14.8%	4
Television News Stories	18.5%	5
Television Advertisments	3.7%	1
Radio News Stories	11.1%	3
Radio Advertisments	0.0%	0
Schools	11.1%	3
Outdoor Advertisments (Billboards, etc)	14.8%	4
Books	3.7%	1
Mail	63.0%	17
Fire Departments	51.9%	14
Internet	55.6%	15
Fact Sheets/Brochures	48.1%	13
Chamber of Commerce	11.1%	3
Public Workshops/Meetings	51.9%	14
Magazines	3.7%	1
Academic Institutions	3.7%	1
Other (please specify)		4
answered question		27
skipped question		4

Other responses included DEM, Flyers at Stores and Gas Stations, Computer, and None

To assist in communicating information to residents of Skamania County about how to better prepare for a natural disaster, which of the following phrases do you think is the easiest to understand? Check only one:

Answer Options	Response Percent	Response Count
Natural Disaster Readiness	11.5%	3
Disaster Preparedness	38.5%	10
Emergency Preparedness	38.5%	10
Natural Hazard Risk Reduction	11.5%	3
Other (please specify)		3
answered question		26
skipped question		5

Other responses included Disaster and Emergency Preparedness, Prepare and Protect your Home and Family, and Surviving a Natural Disaster.



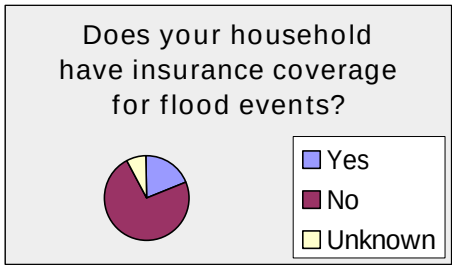
Building a disaster supply kit, receiveing first aid training and developing a household/family emergency plan are inexpensive activities that require a personal time committment. How much time are you willing to spend (per year) on preparing your self/household for a natural disaster or emergency event?

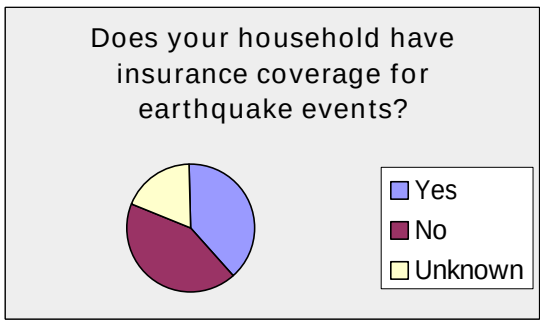
Answer Options	Response Percent	Response Count
0-1 hours	0.0%	0
2-3 hours	20.0%	5
4-7 hours	32.0%	8
8-15 hours	16.0%	4
16 + hours	32.0%	8
Other (please specify)		2

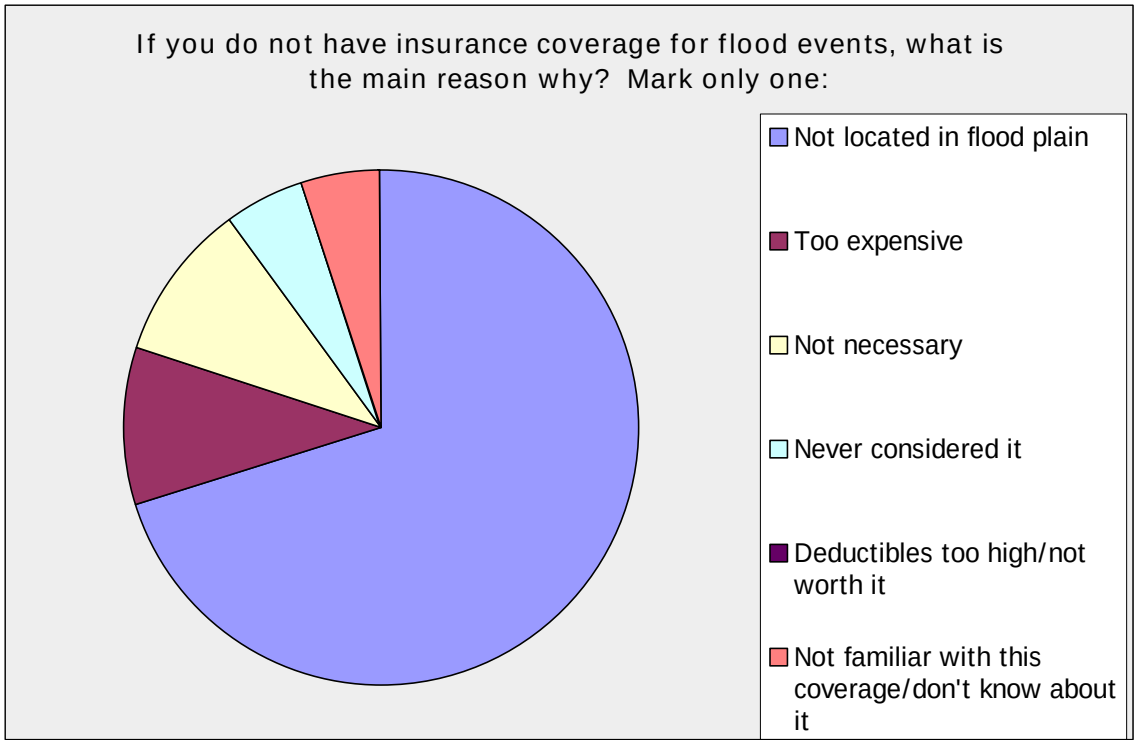
Other responses included “So long as it expands knowledge or skill that will relate to other life situations”, and “Have no need Scouts are always prepared.”

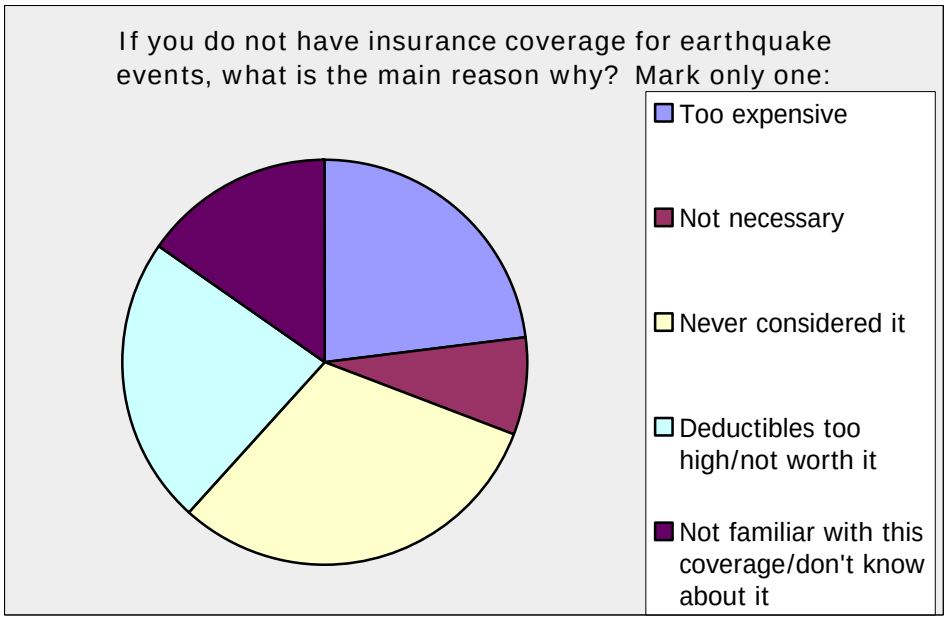
What steps, if any have you or someone in your household taken to prepare for a natural disaster? Check all that apply:		
Answer Options	Response Percent	Response Count
Stored/Stocked up on food	80.8%	21
Stored/stocked up on water	69.2%	18
Stored/stocked up on flashlights & batteries	69.2%	18
Acquired a battery powered radio	57.7%	15
Acquired a First Aid Kit/medical supplies	84.6%	22
Acquired a fire extinguisher	80.8%	21
Acquired/Checked smoke detectors on each level of the house	84.6%	22
Prepared a disaster supply kit	53.8%	14
Received First Aid/CPR training	76.9%	20
Made a fire escape plan	42.3%	11
Developed a Reconnection Plan (where to go/who to call)	42.3%	11
Discussed utility shutoffs	50.0%	13
Other (please specify)		2
answered question		26
skipped question		5

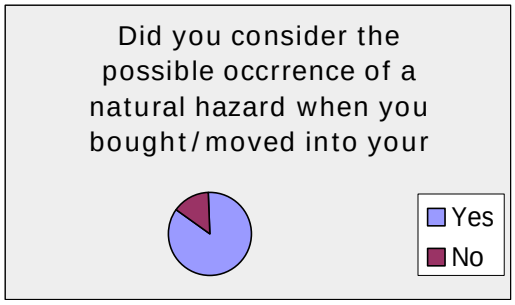
Other responses included “Discusses neighborhood communications and meeting place”, and “We all carry a list of phone numbers of family.”

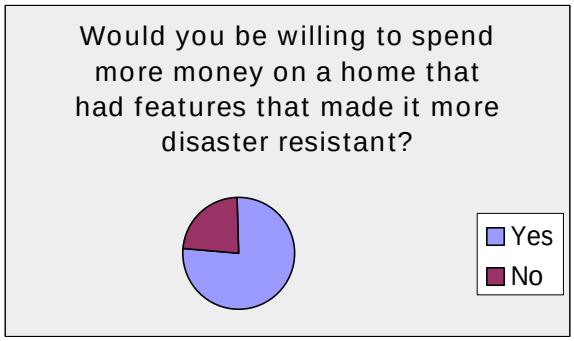


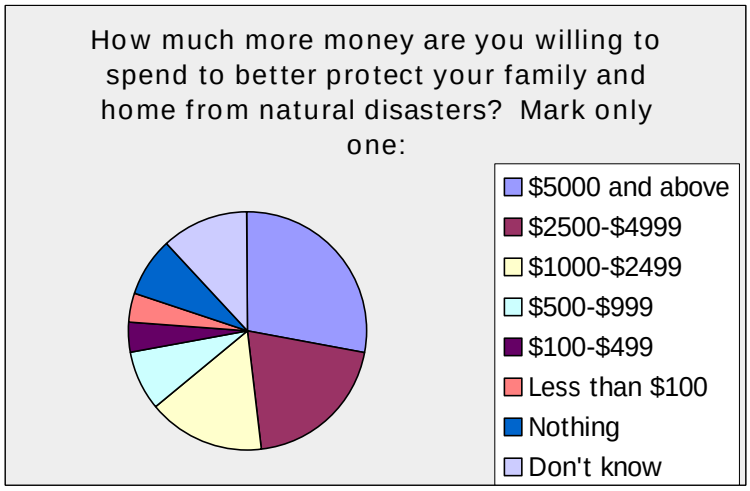



If you do not have insurance coverage for flood events, what is the main reason why? Mark only one:
Not located in flood plain
Too expensive
Not necessary
Never considered it
Deductibles too high/not worth it
Not familiar with this coverage/don't know about it


If you do not have insurance coverage for earthquake events, what is the main reason why? Mark only one:
Too expensive
Not necessary
Never considered it
Deductibles too high/not worth it
Not familiar with this coverage/don't know about it



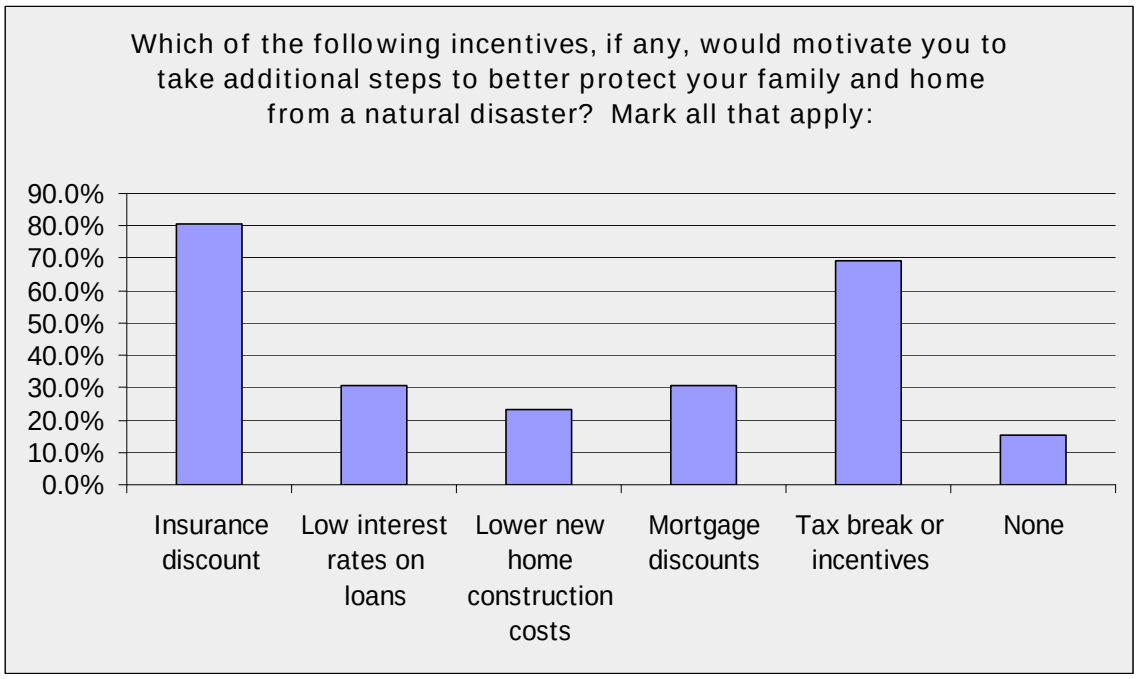




Other response included “Whatever it takes.”

Please mark and structural and non-structural modifications for earthquake that you have made to your home. Mark all that apply:		
Answer Options	Response Percent	Response Count
Anchor bookcases and/or cabinets to the wall	40.0%	8
Secure water heater to the wall	80.0%	16
Install latches on drawers/cabinets	5.0%	1
Fit gas appliances with flexible connections	35.0%	7
Secure home to the foundation	60.0%	12
Brace inside of cripple wall with sheathing	10.0%	2
Brace unreinforced chimneys	25.0%	5
Brace unreinforced masonry and concrete walls/foundations	5.0%	1
Other (please specify)		1
answered question		20
skipped question		11

Other response included “In a new home which has addressed most of these concerns.”



Additional comments from the public included the following:

“Thank you for the survey. It reminded me that I’ve got to take some steps to make my home safer.”

“We have taken the CERT training which is very thorough and beneficial. Most folks probably don't have either the time or motivation to commit to that effort. It might be beneficial to hold well-advertised public sessions of 1-2 hours, either after work hours or on weekends, or both. It could highlight the prime events that will eventually occur in the county and might serve as a catalyst to get more folks CERT certified.”

“What about the disabled in the community? How are they contacted and how do they get prepared? What are the considerations for exotic animals kept as pets in the area? Are there identified shelters? Assume it is the schools and churches, but there isn't any signage. How do we accommodate or educate the visitors/tourists to our county?”

“Survey has motivated me to gather a disaster kit.”

“People need to take the responsibility for themselves and their property. I don't want to see development of a Government organization dictating to people. At most the Government should only be informing the public of the risks not developing requirements or regulations. This is a personal choice to be prepared or not, no one is accountable or responsible but yourself.”

“Need an evacuation plan in the west end and an effective emergency alert system and procedures in place.”

The public was given an opportunity to comment on the draft plan from April 14th-23rd, 2010. A press release was published April 14, 2010 notifying the public of this opportunity.

Other Involvement (Neighboring Communities, Agencies, Businesses, Nonprofits and Other Interested Parties)

Skamania County Chamber of Commerce Members were invited to participate in the planning process and also provide input through the online survey. Chamber members include businesses both in Skamania County and throughout the Gorge. Members also include non-profit organizations and individual community members.

In addition, an email was sent out to various individuals requesting input and feedback once the draft plan was in place. These individuals included regional emergency management partners, geologists and other technical experts.

Review and Incorporation of Existing Plans, Studies, Reports and Technical Information

Review of existing documents was one of the starting points for the development of this plan. Initially, the Skamania County Hazard Identification Vulnerability Analysis (HIVA) and Community Wildfire Protection Plans (CWPPs) were the primary documents reviewed.

The HIVA was updated and incorporated into this plan as Section III Identifying and Profiling Hazards.

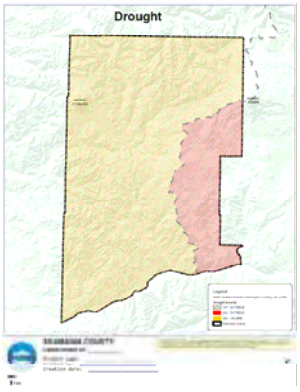
As the planning process progressed, the following plans, studies, reports, and/or technical information was also reviewed, and incorporated into this plan as appropriate:

- Skamania County 2007 Comprehensive Plan
- Skagit County Natural Hazard Mitigation Plan
- Washington State Hazard Mitigation Plan
- Washington State HIVA
- County Road Emergency Support Information
- Skamania County Comprehensive Emergency Management Plan

Section III
Identifying and Profiling Hazards

Avalanche

Drought



Earthquake

Flooding

Landslide

Severe Storm

Volcano

Wildland Fire

Section III – Identifying and Profiling Hazards
Table of Contents

Multi-Jurisdictional Community Profile

County Characteristics

Skamania County's landmass measures 1,656 square miles and expands north from the shore of the Columbia River in the southwestern part of the State of Washington.

The County has several diverse environments, ranging from the banks of the Columbia River, gently sloping lands near the river west of Stevenson, mountainous uplands extending to the river east of Stevenson, rugged, steep foothills to mountainous evergreen forest.

The Cascade Mountains traverse Skamania County from north to south. Most of the county is heavily forested with over 90 percent of the 1.1 million acres in public and private forest land.

Western Skamania County has some upland farmland, and eastern Skamania County has some orchard lands—both are near the Columbia River.

Goose Lake, Photograph by Kathleen Carlson

The County runs about forty miles east and west, along the Columbia River, and extends northward into the Cascade Mountains and the Gifford Pinchot National Forest for fifty miles.

Skamania County Statistics

County Seat	Stevenson
Population 2009 (Entire County) Unincorporated Incorporated	10,800 8,465 2,335
Land Area in Square Miles	1656.44
Density Population/Square Mile	6.5
Median Household Income 2007	$48,932
Average Sale Prices (June 2009) Stick Built Homes Manufactured Homes Bare Land	 $257,800 $185,800 $112,400

The Columbia River, at the southern boundary of Skamania County, flows nearly at sea level through the Cascade Mountains, on its way to the Pacific Ocean. This area is nationally recognized for its unique scenic beauty and serves as a major water and highway transportation corridor.

In 2008, the County's population was 10,794, which translates into a population density of approximately 6 persons per square mile (U.S. Census Bureau). The population of Skamania County is concentrated in the southern quarter of the County, along the Columbia River, and in the Wind River Valley.

The Columbia River and the Pacific Ocean exert a strong influence on the climate, economy, and recreational activities of the county. The Columbia River is the only fresh-water harbor for ocean-going commerce on the entire West Coast of North America, and the only water-grade route through the Cascade Range between Canada and California.

Along the Columbia are low-lying bottomlands, from which a series of alluvial plains and terraces extend north and northeast. Land elevations rise from less than ten feet on the south and west floodplains, to several thousand feet above mean sea level. The western half of Skamania County lies at the western end of the Columbia River Gorge, and is comparatively level over the southern portion. While progressing northward and eastward, the terrain develops into rolling hills culminating in the Cascade Range.

The major driving route is State Highway 14, which leads west to the metropolitan area of Vancouver, Washington and Portland, Oregon. Going east on Highway 14 will lead to the bridge at Hood River and The Dalles in Oregon, and further to the Tri Cities area in Washington. State Route 14 and 503 provide access to the County's major population centers and recreational opportunities.

Climate

Skamania County enjoys a mild but variable climate, with rainfall and temperature figures growing drier and warmer as one travels from west to east. The following statistics are from the Carson Fish Hatchery.

Period of Record Monthly Climate Summary – Period of Record: 9/1/1977 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temp (F)	38.1	42.6	50.9	57.8	65.0	71.5	79.5	80.7	73.5	60.8	45.8	37.6	58.7
Average Min. Temp (F)	27.7	28.1	31.4	34.8	40.3	45.1	48.1	47.4	42.5	36.2	32.4	27.9	36.8
Average Total Precipitation (in)	14.03	11.63	9.14	6.32	3.39	2.22	.73	.99	2.85	6.34	13.93	15.40	86.98
Average Total SnowFall (in)	23.4	14.8	5.1	.7	0	0	0	0	0	.1	7.0	20.1	71.2
Average Snow Depth (in)	11	11	4	0	0	0	0	0	0	0	1	5	3

Percent of possible observations for period of record. Max. Temp.: 98.8% Min. Temp.: 98.8% Precipitation: 98.8% Snowfall: 98.7% Snow Depth: 98.2% Source: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wacars

Demographics

There are several factors that contribute to the overall vulnerability of the people who live in Skamania County. For example, population density, non-English speaking and vulnerable populations, residents' age, and population growth rates are all factors that may impact a community's vulnerability to hazards. Below are listed several factors that are commonly considered variables in a community's collective vulnerability to disaster.

Population Growth

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.

Skamania County is growing at a rate consistent with the state average. Since 2000, Skamania County has been growing an average of 1.16% a year. This is just above the state average of 1.38% a year.

The County continues to rely on farm and timber production, and has a decidedly rural population density of 6 persons per square mile.
Of the 10,794 people living in Skamania County, 8,464 live in unincorporated areas, 880 live in the City of North Bonneville, and 1,450 live in the City of Stevenson.

Population Growth Projection	2010	2015	2020	2025	2030
Low	10,794	10,445	10,729	10,962	11,111
Medium	11,075	11,720	12,332	12,915	13,426
High	12,376	13,416	14,453	15,489	16,468

Office of Financial Management, State of Washington, Source: http://www.ofm.wa.gov/pop/gma/projections07.asp

Vulnerable Populations

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 depending on their own resources 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 part of 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 evacuation routes, shelter locations and other important information.

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
In 2008, approximately 4.9% of the Skamania County population over the age of five speak a language other than English at home. An estimated 500 Skamania County residents do not speak English very well.

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 Skamania County it may be advisable for emergency managers and emergency response agencies to arrange for translation of instruction and information into different languages.

Elderly
In 2008, persons 65 years and older made up 12% of the total Skamania County population and those younger than 18 years comprise 21%. The female and male split is 50:50. 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 Skamania 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 Skamania 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. Skamania County as tourist destination is becoming increasingly well-known.

Disabled
Physically Disabled - According to a 2000 census, over 3,000 residents (i.e., approximately 30% of the population) had a disability which may or may not be permanent.

Developmentally Disabled – Based on the same census, approximately 1% of the Skamania County Population - or roughly 1,000 residents - have a developmental disability, and of those roughly 400 residents have a disability that is severe enough to qualify them for developmental disability services. 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 Skamania 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 other disabilities in additional to their developmental disabilities. 10% of the developmentally disabled population is wheelchair bound and approximately 2% of the county population or roughly 200 residents suffer from a mental illness.

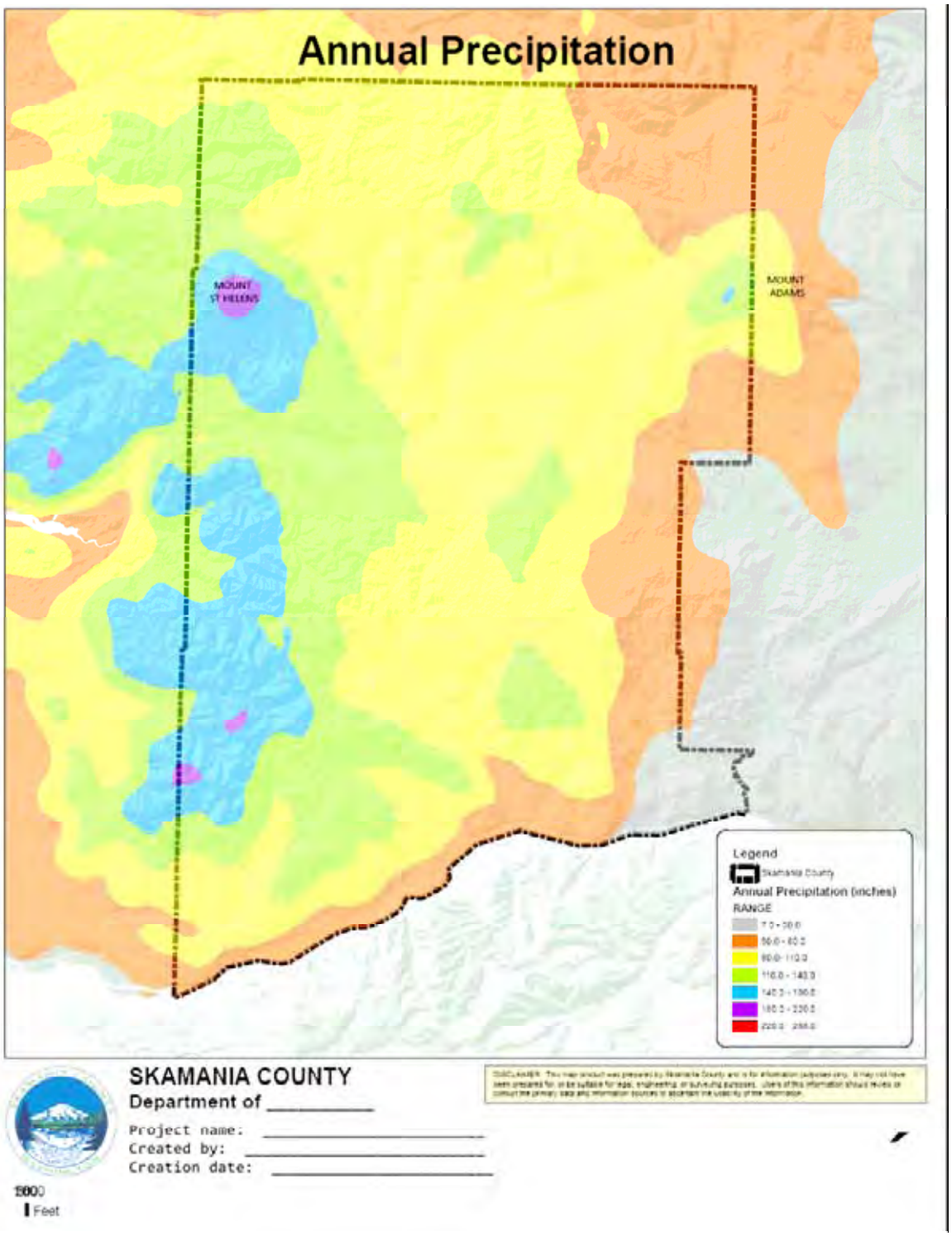
Mentally Ill
Disaster conditions can aggravate the symptoms of those who suffer from mental illness. The mentally ill tend to be very sensitive to changes in their environment. Studies have shown that during the Mt. St. Helens eruption disaster several individuals incorporated the fall of ash into their delusional symptoms. There was a marked increase in the case load for mental health crisis services. During the flooding event in 1996 several mental health patients were hospitalized as a result of increased stress and anxiety due to relocation and/or sheltering. Another important consideration is that disaster conditions potentially could cause mental illness. Mental health experts estimate that 10% of disaster victims could 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. Furthermore, low-income residents are more likely to live in mobile homes or other homes that offer less resistance to damage from flooding, windstorms, and severe weather. The low-income segment of the population tends to have the greatest difficulty recovering from a disaster.

According to 2007 census, approximately 12% of the total population has income below the national poverty level, and the median household income amounted to $ 48,932.

References/Resources:

Organization	Address	Phone/Email/Website
Skamania County Assessor & GIS Department	**240 NW Vancouver Ave, PO Box 790, Stevenson, WA 98648**	**509/427-3720** **http://skamaniacounty.org/assessor.htm**
Office of Financial Management, State of Washington	**PO Box 43113, Olympia, WA 98504-3113**	**360/902-0555** **http://www.ofm.wa.gov/localdata/skam.asp** **Skamania County Information Page**


Annual Precipitation
MOUNT ST HELENS
MOUNT ADAMS
Legend
Skamania County
Annual Precipitation (inches)
RANGE
SKAMANIA COUNTY
Department of _____
Project name: _____
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Creation date: _____
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Multi-Jurisdictional Hazard Identification Process

Hazard Identification and Vulnerability Analysis (HIVA)

The purpose of the Hazard Identification Vulnerability Analysis or HIVA is to identify which hazards should be considered in mitigation, preparedness, response, and recovery activities. Elected officials, emergency managers, emergency responders, public educators, and others who have a role and/or an interest in emergency management can and should use the HIVA.

Loop Road Landslide, Stevenson, 1996, Photograph by David Brown

This document defines hazards and vulnerabilities in Skamania County and each of its cities. For the purposes of the HIVA, 'Skamania County' is the geographic subdivision of Washington State. Included in this area are unincorporated Skamania County and the cities of North Bonneville and Stevenson. The HIVA will refer to all of these geographic areas as 'Skamania County'.

Hazard – A possible source of danger or harm to people, property, or the environment.
Vulnerability – The potential for death and injury to people and economic loss to individuals, organizations, or government caused by a disaster.

The fact that this document describes specific disasters does not suggest emergency management should dwell on each particular hazard. Rather, a good emergency management program should be applicable to a wide variety of disasters. An all-hazards approach will avoid the creation of plans and procedures that are not transferable to different types of incidents. The purpose of the detailed descriptions of individual hazards described in the HIVA is to provide an overall picture of what disasters are possible and a description of the ways in which these disasters may impact the community.

An important function of the HIVA is to act as a justification for emergency management plans. The HIVA is the compass that guides the planning process and the application of emergency management resources. As such, the objective of the HIVA is to provide answers to questions that are crucial to emergency planners.

For example,

- What hazards exist in Skamania County?
- What is the likelihood of these hazards to materialize?

- How will these hazards/disasters impact life, property, and the environment?
- How will the community recover from these hazards/disasters?
- What hazards have materialized into disasters in Skamania County in the past?
- What primary disasters should be considered in the community's disaster planning and preparedness efforts?
- What mitigation efforts are in place reference to the identified hazards?
- Which are lacking mitigations efforts for identified hazards?

It is essential for planners to have answers to these questions since a good plan should be based on realistic assumptions about what disasters are possible and what disasters are likely in Skamania County.

The data is not original but extracted from various publications. Numerous technical experts also made contributions. The HIVA is not presented as a detailed study, but as a general overview. Skamania County Emergency Management expresses its thanks to the local, state, and federal organizations that provided information and assistance.

Identifying Hazards

The process of identifying specific natural hazards that have a potential to occur in Skamania County included the following:

- Researching historical records
- Consulting with local experts
- Consulting with technical specialists (geologists, etc.)
- Reviewing existing plans
- Gathering information from web sites

Wind River, 1996, Photograph by David Brown

The State of Washington has identified nine natural hazards (both in the State HIVA and the State Hazard Mitigation Plan) as being of concern throughout Washington State.

Skamania County has included eight of these hazards as a part of this plan. Tsunamis have been excluded based on research and technical input from the Washington Department of Natural Resources.

Below are the natural hazards that were identified as being a concern for Skamania County:

- Avalanche – Skamania County has been identified as one of twelve counties with parts most vulnerable to avalanche, within Washington State. SR 504 Johnston Ridge has been identified by Washington State Department of Transportation as being at risk to avalanche.

- Drought – Skamania County has not been identified as one of the nine counties in Washington most vulnerable to drought, however there have been several major drought events in Washington that have affected the entire state.

- Earthquake – The largest earthquake in Skamania County in recent history was a 5.7 magnitude earthquake 1.0 km NNE of Mount St. Helens, May 18, 1980. Earthquakes with a magnitude of smaller than 3.0 occur near Mount St. Helens on a regular basis.

- Flooding – Flood damage in Washington State exceeds damage by all other natural hazards. From 1956 to present, the frequency of a major flood occurrence for Skamania County is approximately every nine years.

- Landslide – Skamania County has been identified as one of the counties in Washington State most vulnerable to landslides. From 2006 until present there has been continual movement of a landslide in the Stevenson area.

- Severe Storm – Severe storms include high winds, severe thunderstorms, tornados, winter storms, blizzards and dust storms. Skamania County is especially susceptible to severe winter storms.

- Volcanic Eruption – Mount St. Helens (located in northwest Skamania County) has been active with a massive eruption in 1980, followed by dome building eruptions in the 1980-1986 and 2004-present periods.

- Wildland Fire – Skamania County's most recent wildland fire occurred in 2007 on the east end of the county and destroyed six homes. Skamania County's fire season usually runs from mid-May through October.

Historical Data

Hazard	Date and Location	Magnitude and Impact
Avalanche	1975, Mount St. Helens	5 deaths
Drought	March 31, 1977 FEMA Emergency Declaration, Throughout Washington	Worst drought in Washington State history
Drought	April 2001, Statewide Drought Emergency Declared by Governor, Throughout Washington	Compared with the 1977 Drought
Earthquake	May 18, 1980, 1.0 km NNE of Mount St. Helens	5.7 Magnitude Earthquake
Earthquake	October 20, 1998, 19 mi SSE of Mount St. Helens	3.1 Magnitude Earthquake
Earthquake	March 1, 2001, FEMA-1361-DR	Washington Earthquake, Magnitude

	February 28, 2001 – March 16, 2001, Skamania County	6.8 Nisqually Earthquake
Flooding	December 1996-January 1997, Federally declared disaster #1159, Throughout Washington	Saturated ground combined with snow freezing rain, rain, rapid warming and high winds within a five-day period to cause flooding
Flooding	January 2006, Federally declared disaster #1641, Throughout Washington	Moist subtropical rainstorms – record flood levels throughout state
Flooding	November 2006, Federally declared disaster #1671, Throughout Washington	Strong winds, prolonged rainfall, cracks in the Rock Creek Slide area
Landslide	May 18, 1980, Mount St. Helens	5.1 Magnitude Earthquake triggered an estimated 3.7 billion cubic yard Landslide. Extensive damage. Destroyed all buildings near Spirit Lake, and destroyed more than 200 homes and cabins
Landslide	February 1996, Near Stevenson, a reactivated landslide complex	Removed three homes from their foundations
Landslide	December 12, 2006, FEMA-1671-DR November 2-11, 2006, Skamania County	Severe Storms, Flooding, Landslides and Mudslides, Piper Road landslide and debris removal
Severe Wind Storm	1985, Upper Wind River Area	Destroyed thousands of acres
Severe Storm	December 12, 2006, FEMA-1671-DR November 2-11, 2006, Skamania County	Prolonged rainfall, cracks in the Rock Creek Slide area
Severe Storm	February 14, 2007, FEMA-1682-DR December 14-15, 2006, Skamania County	Severe Winter Storm, Landslides, and Mudslides
Severe Storm	January 30, 2009, FEMA-1817-DR January 6-16, 2009, Skamania County	Severe Winter Storm, Landslides, Mudslides, and Flooding
Severe Storm	March 2, 2009, FEMA-1825-DR December 12, 2008-January 5, 2009, Skamania County	Severe Winter Storm and Record and Near Record Snow
Volcanic Eruption	May 18, 1980, Mount St. Helens Volcanic Eruption	Loss of 57 lives, widespread destruction of valuable property.
Wildland Fire	2007, State Fire Mobilization, Skamania County near Underwood	Destroyed six homes and caused evacuation of 400 residents from 100 immediately threatened homes.

Probability, Vulnerability and Risk

The Washington Administrative Code (WAC 118-30-060(1)) requires each political subdivision to base its comprehensive emergency management plan on a hazard analysis. The hazard analysis is also a training tool that provides introductory knowledge of the hazards posing a threat to Skamania County.

To make the analysis more useful, the descriptors "High, Medium , and 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 25 years. This interval was chosen because it is the long-term recurrence interval of a dangerous earthquake, a hazard of greatest risk to Skamania County. The risk rating will help focus the emergency management program on the hazards of greatest risk.

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

The following terms are used to in hazard analysis:

Probability of Occurrence

The description "High, Medium, or Low" indicates the probability of a hazard impacting Skamania County within the next 25 years. Probability is based on an assessment of a hazard's frequency using information provided by relevant sources, observations and trends.

HIGH	MEDIUM	LOW
There is great likelihood that a hazardous event will occur within the next 25 years.	**There is Medium likelihood that a hazardous event will occur within the next 25 years.**	**There is little likelihood that a hazardous event will occur within the next 25 years.**

Vulnerability

The description "High, Medium, or Low" describes the potential impact a hazard could have on Skamania County. It is the ratio of population, property, commerce, infrastructure and services at risk relative to the entire County.

HIGH	MEDIUM	LOW
The total population, property, commerce, infrastructure and services of the county are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worst case scenario the disaster could be of major or catastrophic proportion.	**The total population, property, commerce, infrastructure and services of the county are exposed to the effects of a hazard of Medium influence; or The total population, property, commerce, infrastructure and services of the county are exposed to the effects of a hazard, but not all to the same degree; or An important segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of Medium to major, but not catastrophic proportions.**	**A limited area or segment of the population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of minor or Medium proportions.**

Risk Rating

The description "High, Medium, or Low" indicates the overall threat posed by a hazard over the next 25 years. It is a subjective estimate of the combination of probability of occurrence and vulnerability.

HIGH	MEDIUM	LOW
There is a strong potential for a disaster of major proportions during the next 25 years; or History suggests the occurrence of multiple disasters of Medium proportions during the next 25 years. The threat is significant enough to warrant major program efforts to prepare for, respond to, recover from, and to mitigate against this hazard. This hazard should be a major focus of the emergency management training and exercise program.	**There is Medium potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and to mitigate against hazard. This hazard should be included in an emergency management training and exercise program.**	**There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or to mitigate against this hazard. This hazard need not be specifically addressed in the county's emergency management training and exercise program except as generally dealt with during hazard awareness training.**

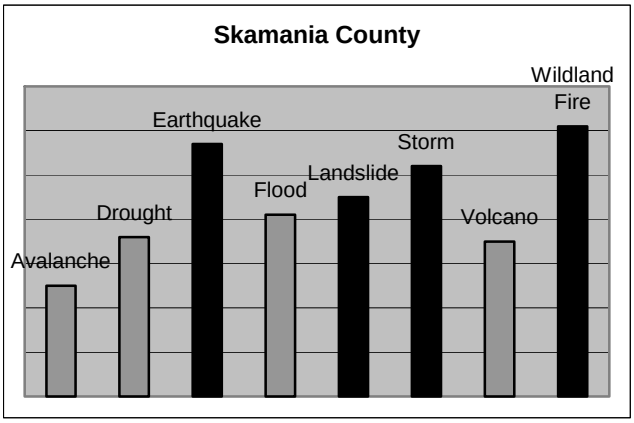
Below is a Hazard Risk Calendar showing the time of year a particular hazard is likely to occur.

SKAMANIA COUNTY HAZARD RISK CALENDAR

HAZARD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Avalanche	X	X	X	X	X	X					X	X
Drought						X	X	X	X			
Earthquake	X	X	X	X	X	X	X	X	X	X	X	X
Flood	X	X	X	X						X	X	X
Landslide	X	X	X	X						X	X	X
Storm	X	X	X	X	X	X	X	X	X	X	X	X
Volcano	X	X	X	X	X	X	X	X	X	X	X	X
Wildland Fire					X	X	X	X	X			

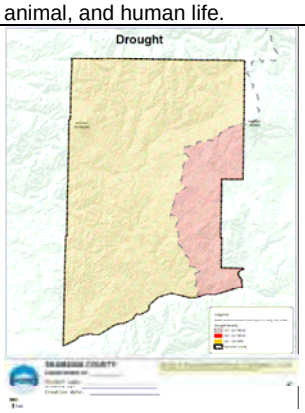
Overall jurisdictional vulnerability to specific hazards was determined utilizing a hazard analysis matrix and averaging results.

Numerical values were assigned after analyzing a variety of data, including input from the public at large, and long-time local residents.



Ranking	Hazard	Probability	Vulnerability	Risk
8	Avalanche	11	7	7
6	Drought	12	13	11
2	Earthquake	21	18	18
5	Flood	16	12	13
4	Landslide	17	14	14
3	Storm	21	15	16
7	Volcano	21	7	6
1	Wildland Fire	21	20	20

Skamania County Multi-Jurisdictional Natural Hazards Risk Assessment

	Avalanche	Drought	Earthquake
Description of Hazard	An avalanche occurs when a layer of snow loses its grip on a slope and slides downhill.	A drought is a condition of climatic dryness severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life.	An earthquake is the shaking of the ground caused by an abrupt shift of rock along a fracture in the earth.
Geographic Area Affected			
Severity of Hazard	Factors that may impact severity include storms, rate of snowfall, temperature, wet snow and terrain	Drought occurences in 1977 and 2001 ranged from Medium to severe in Skamania County	May be catastrophic. Largest recent history earthquake in Skamania County was 5.7 magnitude (in conjunction with the 1980 eruption of Mount St. Helens)
Previous Occurences	April 26, 1975	March 31, 1977 April 2001	1700, 1872, 1949, 1980 1998, 2001
Probability of Future Events	Low – Overall County High – Specific Areas	Low to Medium – may increase liklihood of wildland fire	High
Vulnerability to Hazard	Skamania County's vulnerability and risk rating for avalanches is low.	Medium vulnerability rating, entire population vulnerable, however severity is historically low.	High vulnerability due to a large earthquake's possibility to have a catastrophic impact on the county.
Impact of Hazard on Jurisdiction	Impact on the county as a whole is limited, as avalanches typically occur in backcountry recreational areas	Impact may include crop or pasture losses, water restrictiions and/or shortages	May be catastrophic, and result in cascading events (power outages, fires, etc)

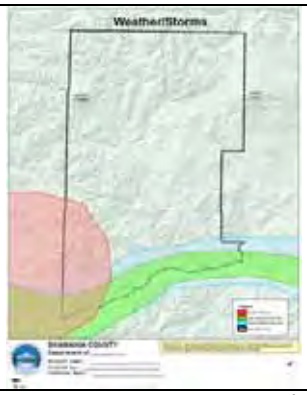
Types and Numbers of Repetitive Loss Properties Located in Hazard Area (Flooding)
Unincorporated Skamania County has 61 NFIP policies with 1 (one) repetitive loss property.
The City of Stevenson has 5 NFIP policies with 1 (one) repetitive loss building and 2 (two) repetitive losses (total). There are 0 (zero) severe repetitive loss structures. The City of North Bonneville has 0 repetitive losses.

Types/Numbers of Existing and Future Buildings in Hazard Area	0 Existing Improved Parcels (such as a house, shop, etc,)	72 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard	100 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard
Potential Dollar Losses to Vulnerable Structures	$0	Estimated Potential Dollar Loss - $484,000,000	Estimated Potential Dollar Loss - $672,000,000

The type, number, and dollar value of structures located in hazard areas was estimated by local planners based on readily available data and/or their best judgement. The percentage of structures threatened by each hazard was estimated in the same way. This percentage multiplied by the average value of each structure to determine a total estimated value of property at risk for each specific hazard.

Land Uses and Development Trends	Skamania County's growth rate is projected at 1.6% annually until the year 2025.	Skamania County's growth rate is projected at 1.6% annually until the year 2025.	Skamania County's growth rate is projected at 1.6% annually until the year 2025.

Skamania County Multi-Jurisdictional Natural Hazards Risk Assessment

	Flood	Landslide	Storm
Description of Hazard	Flooding is mainly caused by moist air masses that regularly move over the region in winter.	Landslides are th sliding movement of masses of loosened rock and soil down a hillside or slope.	Storms Skamania County is most vulnerable include ice, snow, and windstorms.
Geographic Area Affected			
Severity of Hazard	Poor drainage, elevated groundwater levels, natural soil conditions and geological features may all affect the severity of flooding.	Landslides in Skamania County may range in veolocity from a few inches per month to many feet per second.	May cause power outages and hazardous driving conditions, that in turn may affect emergency response capabilities and communications infrastructure.
Previous Occurences	December 1996-January 1997, January 2006, November 2006	May 1980, February 1996, November 2006	1985, 2008, 2009
Probability of Future Events	Medium – Overall County	Medium – Overall County	Medium to High – Overall County
Vulnerability to Hazard	Medium vulnerability	Medium vulnerability	Medium vulnerability
Impact of Hazard on Jurisdiction	Impact may include loss of life, damage to structures,m crops, land resources, flood control structures, roads and utilities.	The most significant impact is the potential disruption of transportation and the destruction of private and public property.	May overload emergency response services and result in long-term debris removal challenges.

Types and Numbers of Repetitive Loss Properties Located in Hazard Area (Flooding)
Unincorporated Skamania County has 61 NFIP policies with 1 (one) repetitive loss property.
The City of Stevenson has 5 NFIP policies with 1 (one) repetitive loss building and 2 (two) repetitive losses (total). There are 0 (zero) severe repetitive loss structures. The City of North Bonneville has 0 repetitive losses.

Types/Numbers of Existing and Future Buildings in Hazard Area	19 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard	20 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard	100 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard
Potential Dollar Losses to Vulnerable Structures	Estimated Potential Dollar Loss - $128,000,000	Estimated Potential Dollar Loss - $134,000,000	Estimated Potential Dollar Loss - $672,000,000

The type, number, and dollar value of structures located in hazard areas was estimated by local planners based on readily available data and/or their best judgement. The percentage of structures threatened by each hazard was estimated in the same way. This percentage multiplied by the average value of each structure to determine a total estimated value of property at risk for each specific hazard.

Land Uses and Development Trends	Skamania County's growth rate is projected at 1.6% annually until the year 2025.	Skamania County's growth rate is projected at 1.6% annually until the year 2025.	Skamania County's growth rate is projected at 1.6% annually until the year 2025.

Skamania County Multi-Jurisdictional Natural Hazards Risk Assessment

	Volcano	Wildland Fire
Description of Hazard	A volcano is a vent in the earth's crust through which molten rock, rock fragments, gases or ashes are ejected from the earth's interior.	Wildland fires are fires caused by nature or humans that result in the uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property.
Geographic Area Affected		
Severity of Hazard	Potentially deadly – volcanic eruption of Mount St. Helens in 1980 resulted in loss of 57 lives.	Effects vary with intensity, area and time of year.
Previous Occurences	May, 1980	1902, 1929, 2007
Probability of Future Events	Low – Overall County High – Specific Areas	High – Overall County
Vulnerability to Hazard	Low vulnerability	High vulnerability
Impact of Hazard on Jurisdiction	Impact on the county as a whole is limited, as the area most affected (Mount St. Helens) is not heavily populated.	Destruction of large tracts of forest land would have immediate economic impact to the county.

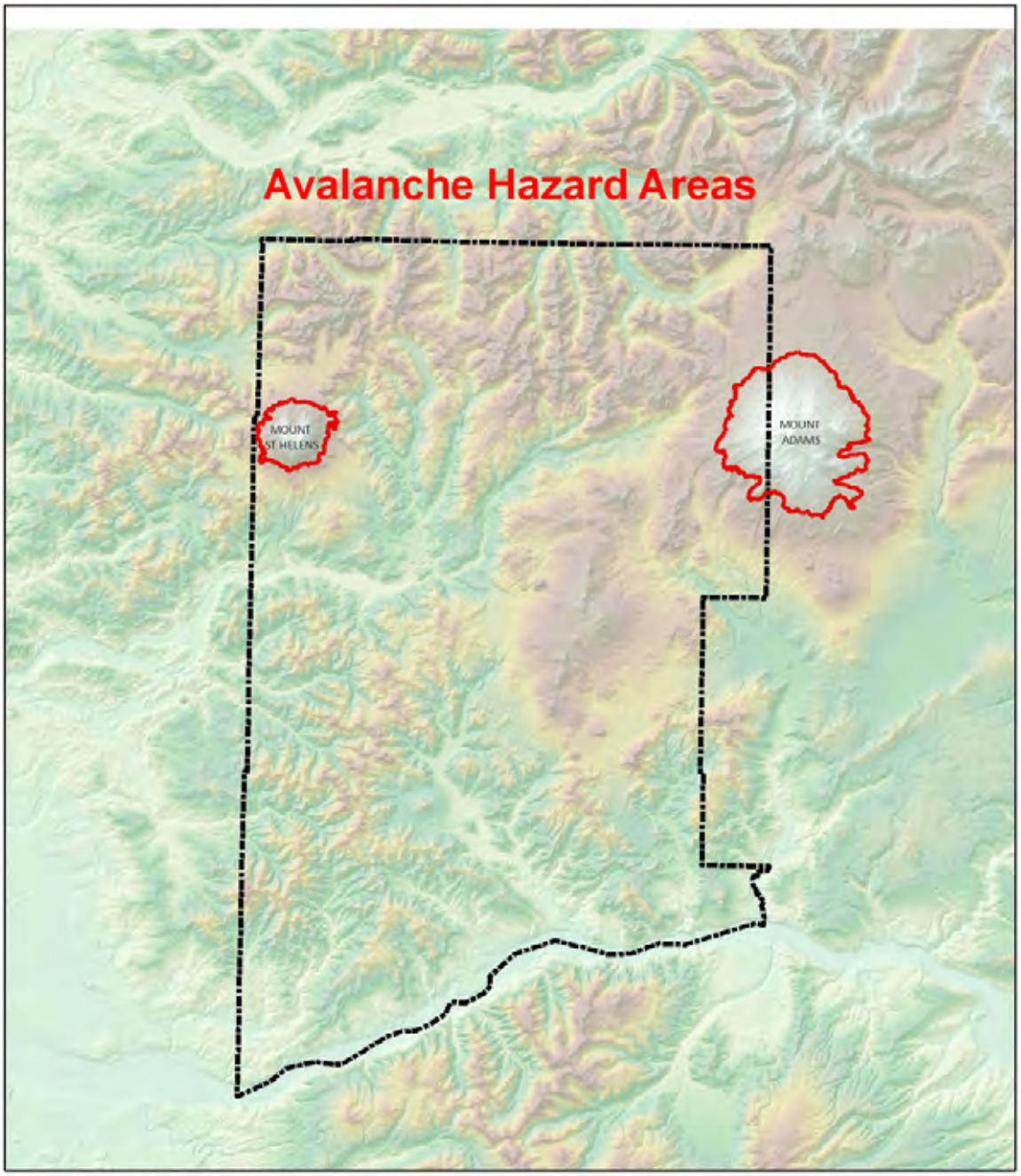
Types and Numbers of Repetitive Loss Properties Located in Hazard Area (Flooding)
Unincorporated Skamania County has 61 NFIP policies with 1 (one) repetitive loss property. The City of Stevenson has 5 NFIP policies with 1 (one) repetitive loss building and 2 (two) repetitive losses (total). There are 0 (zero) severe repetitive loss structures. The City of North Bonneville has 0 repetitive losses.

Types/Numbers of Existing and Future Buildings in Hazard Area	23 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard	100 % of the Existing Improved Parcels (such as a house, shop, etc,) in Skamania County are vulnerable to this hazard
Potential Dollar Losses to Vulnerable Structures	Estimated Potential Dollar Loss - $155,000,000	Estimated Potential Dollar Loss - $672,000,000

The type, number, and dollar value of structures located in hazard areas was estimated by local planners based on readily available data and/or their best judgement. The percentage of structures threatened by each hazard was estimated in the same way. This percentage multiplied by the average value of each structure to determine a total estimated value of property at risk for each specific hazard.

Land Uses and Development Trends	Skamania County's growth rate is projected at 1.6% annually until the year 2025.	Skamania County's growth rate is projected at 1.6% annually until the year 2025.

Avalanche


Avalanche Hazard Areas
MOUNT ST HELENS
MOUNT ADAMS
SKAMANIA COUNTY
Department of _____
Project name: _____
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Creation date: _____
DISCLAIMER: This map product was prepared by Skamania County and is for information purposes only. It may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
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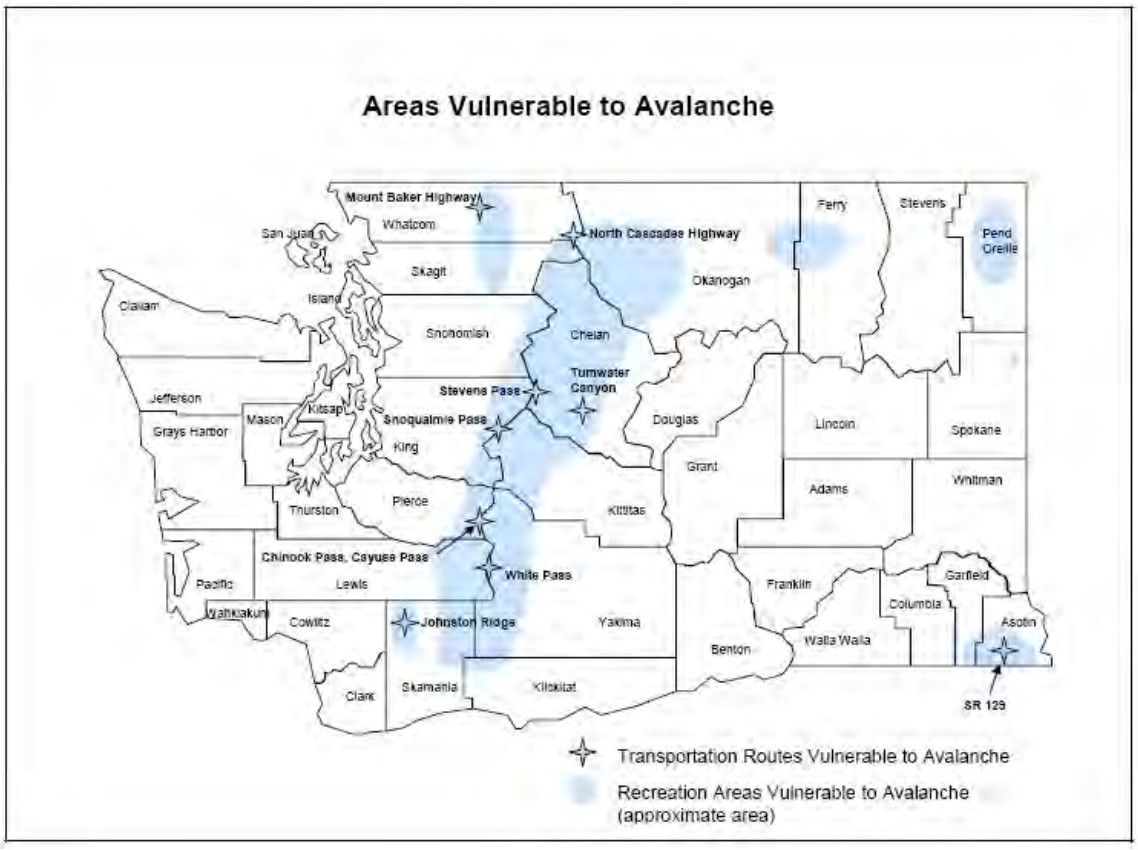
Hazard Description:

Avalanches occur when a layer of snow loses it grip on a slope and slides downhill. In Washington State, an average of one to two people are killed each year as a result of avalanches.

Avalanches are described as either loose (grains of snow lose hold on a slope and slide downhill), or slab (cohesive mass of snow breaks away from slope all at once). Slab avalanches may also be categorized as either wet or dry.

Geographical Area Affected:

Skamania County has been identified as one of twelve counties with parts most vulnerable to avalanche, within Washington State. SR 504 Johnston Ridge has been identified by Washington State Department of Transportation as being at risk to avalanche.



Source: Washington State Hazard Mitigation Plan 2007

Magnitude of Hazard:

Storms, rate of snowfall, temperature, wet snow, and terrain, are all factors that have an impact on avalanche danger. Most current avalanche victims are participating in recreational activities in the backcountry where there is no avalanche control.

Previous Occurrences:

Hazard	Date	Location	Impact
Avalanche	April 26, 1975	Forsyth Glacier, Mount St. Helens	5 deaths

Probability of Future Events:

Overall there is a low probability of avalanche hazards in Skamania County. Although avalanches occur regularly in and around the Mount St. Helens area of Skamania County, the impact to lives and property is typically limited.

Overall County Vulnerability to Hazard:

Skamania County's vulnerability and risk rating for avalanches is low, and is limited to the geographical area near Mount St. Helens.

Overall County Impact of Hazard:

The impact of avalanches on Skamania County is limited.

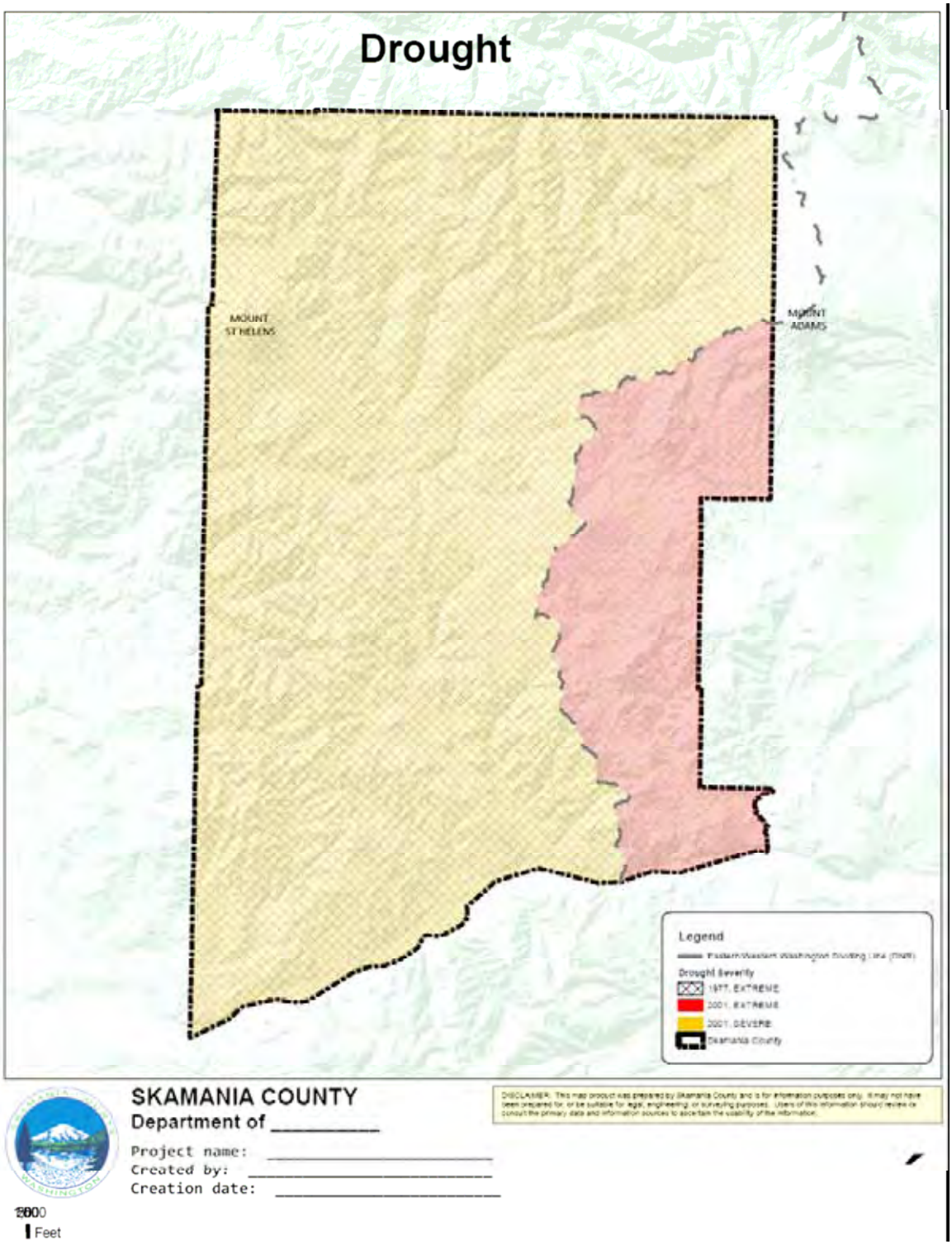
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Phone/Email/Website
Northwest Weather and Avalanche Center	**7600 Sandpoint Way NE, Seattle, WA 98115-6349**	**Message: 206/526-4666** **Hotline: 206/526-6677, 503/808-2400** **NWAC@nwac.us** **http://www.nwac.us/**
Washington Military Department Emergency Management Division	**Building 20, MS TA-20, Camp Murray, WA 98430-5112**	**http://www.emd.wa.gov/**
Washington State Hazard Mitigation Plan 2007		**Avalanche Section** **http://www.emd.wa.gov/plans/documents/AvalancheNov2007Tab5.2.pdf**

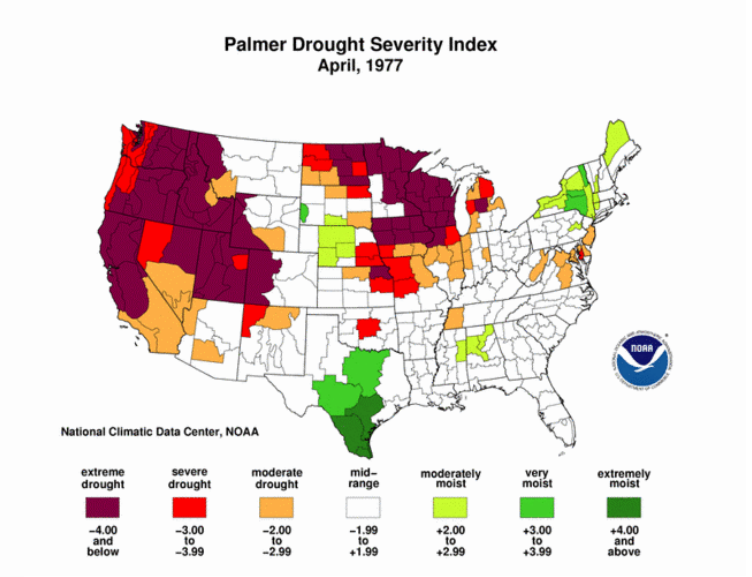
Drought


Drought
MOUNT ST HELENS
MOUNT ADAMS
Legend
Drought Severity
SKAMANIA COUNTY
Department of _____
Project name: _____
Created by: _____
Creation date: _____
Feet

Hazard Description:

Drought is a condition of climatic dryness severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life systems.

The Revised Code of Washington (RCW) 43.83B.400 defines drought conditions as follows:
"As used in this chapter, 'drought condition' means that the water supply for a geographical area or for a significant portion of a geographical area is below seventy-five percent of normal and the water shortage is likely to create undue hardships for various water uses and users."



National Oceanic and Atmospheric Administration, National Climatic Data Center

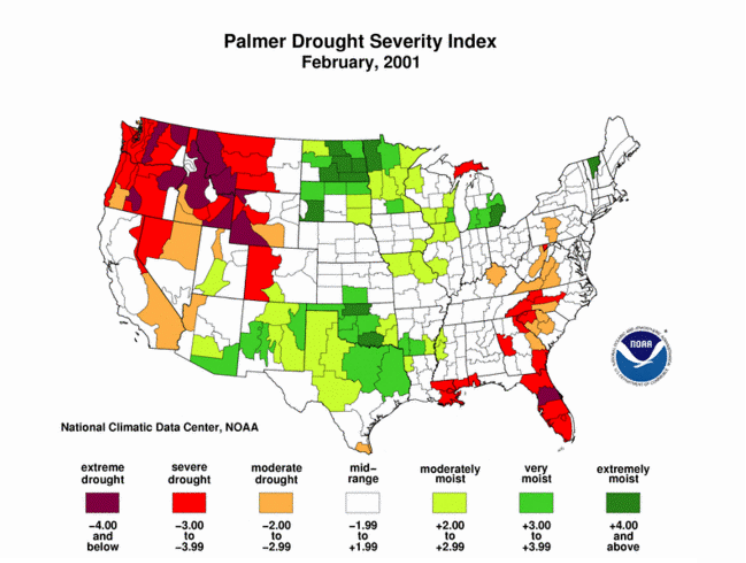
Geographical Area Affected:

Nearly all areas of the county may be vulnerable to drought.

Magnitude Of Hazard:

Locally, actual drought conditions have been limited to a few days, even during otherwise extended dry periods.

The transportation and communications infrastructure would be minimally impacted, if at all. However, as growth increases the pressure on limited local resources, future impacts of drought events may be greater, therefore suggesting **Medium vulnerability**.



National Oceanic and Atmospheric Administration, National Climatic Data Center

Previous Occurrences:

Hazard	Date	Location	Impact
Drought	March 31, 1977 FEMA Emergency Declaration	Throughout Washington	Worst drought in Washington State history
Drought	April 2001, Statewide Drought Emergency Declared by Governor	Throughout Washington	Compared with the 1977 Drought

Probability Of Future Events:

The history of Skamania County suggests a Medium probability of occurrence.

Overall County Vulnerability To Hazard:

Although the entire population of the county is vulnerable to the effects of drought, the severity has historically been low, being more of an inconvenience than a threat. A Medium risk rating is assigned.

Overall County Impact Of Hazard:

During drought conditions, agriculture has felt the impact, especially in non-irrigated areas and farms. Droughts have left their major impact on individuals (farm owners), on the agricultural industry, and also on agriculture-related sectors.

During periods of drought there is increased danger of forest fires, which could result in millions of board feet of timber being lost. As a consequence of the fires, in many cases, erosion can occur which causes serious damage to aquatic life, irrigation, and power generation due to heavy silting of streams, reservoirs, and rivers. Low stream-flows create an increase in water temperature, enhance depletion of oxygen, and for our fish resources it means increased disease incidents and lack of spawning areas. All of the above effects result in economic and revenue losses for business, cities and the county.

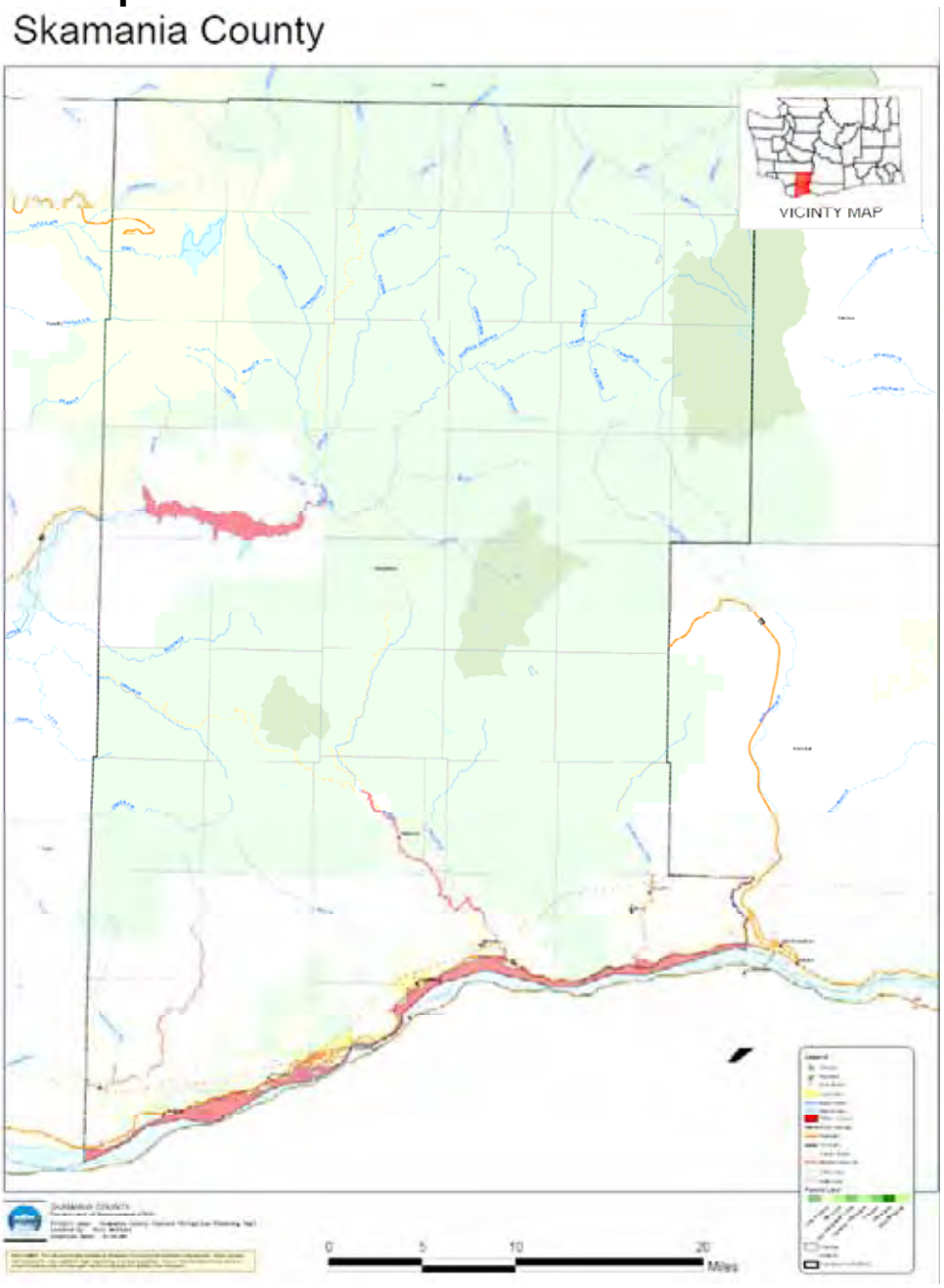
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Phone/Email/Website
NOAA Satellite and Information Service	**7600 Sandpoint Way NE, Seattle, WA 98115-6349**	**http://www.ncdc.noaa.gov/oa/ncdc.html**
Washington Military Department Emergency Management Division	**Building 20, MS TA-20, Camp Murray, WA 98430-5112**	**http://www.emd.wa.gov/**
Washington State Hazard Mitigation Plan 2007		

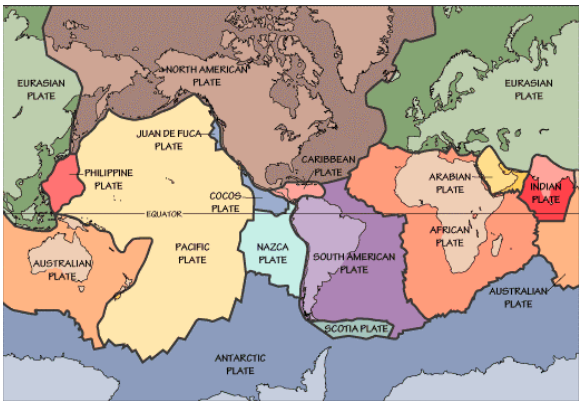
Earthquake



Hazard Description:

An earthquake is the shaking of the ground caused by an abrupt shift of rock along a fracture in the earth, called a fault. There are three categories of quakes and each type may affect Skamania County.

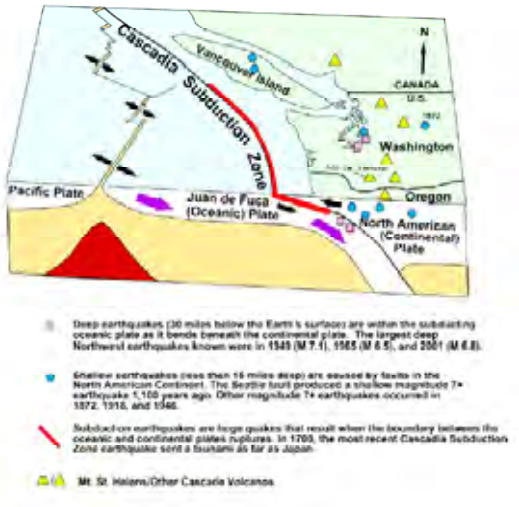
The first is a shallow or crustal quake. These occur at a depth of 5 to 10 miles beneath the earth's surface. These quakes are associated with fault movement within a surface plate.



Tectonic Plates

The second type of earthquake is an intra-plate, or "deep" earthquake. Intra-plate quakes occur when an earthquake on a geologic plate affects another plate. In Pacific Northwest geology, intra-plate quakes happen when the Juan de Fuca plate breaks up underneath the continental plate, approximately 30 miles beneath the earth's surface.

The third type of quake is a subduction zone earthquake. These occur when two converging plates become stuck along their interface. Continued movements between the plates will build up energy across the locked surface until the plates abruptly slip along the interface when the strain is released.



USGS http://www.pnsn.org/CascadiaEQs.pdf

Geographical Area Affected:

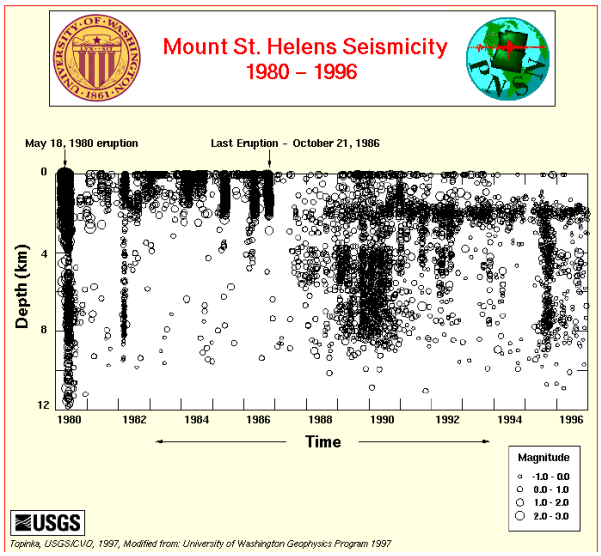
The Pacific Northwest is seismically a very active area. Potential earthquake sources in Skamania County are not well known because - unlike places like California - there have not been frequent large earthquakes. Estimations of possible earthquake sources are limited to studies of many small earthquakes, investigations of known faults, and other geological surveys.

Earthquakes in Skamania County are most likely to originate from three sources:

- the Mt. St. Helens seismic zone;
- the Portland/Vancouver Seismic Zone, and
- the Cascadia Subduction Zone.

Of these the Portland/Vancouver Seismic Zone is the least understood. There is better and more information about the Mt. St. Helens seismic zone, because of the intense scrutiny of Mount St. Helens. And as far as the Cascadia Subduction Zone is concerned, there are numerous studies available and still being implemented.

Mt St. Helens Seismic Zone – This seismic zone is the most common source of numbers of small earthquakes (<4 M). The strongest earthquake associated with this zone was the Elk Lake earthquake in 1981. This was approximately a 5.5 magnitude earthquake and while just Medium in nature, it was felt over an area of about 104,000 Km^2. It was felt as far north as Ferndale, Washington and as far South as Salem, Oregon. There was light damage to structural materials and Medium damage to non-structural items in the area near the epicenter. The fault associated with the Mount St. Helens seismic area with a length of 70km is a fairly long. Generally, larger earthquakes are associated with longer faults and geologists suggest that an earthquake with a magnitude of 6.5 is possible.



http://www.ux1.eiu.edu/~cfjps/1300/msh_seismic_80-96.gif

Portland/Vancouver - Looking back in history, the Portland metropolitan area is the most seismically active region in Oregon. In the past 150 years there have been six earthquakes of magnitudes (M) 5 or greater. In Washington State side, the second most seismically activity is found in Southwest Washington adjacent to the Portland Metropolitan area - the Puget Sound area is the most seismically active area in Washington. The area between the Lacamas Creek Fault and the Portland Hills Fault borders this seismic region. The existence of the Portland Hills fault was confirmed during the light rail tunnel construction through the West Hills of Portland. This discovery, matched with other geophysical studies suggest that earthquakes as large as M 6 or larger should occur in the Portland region every 300-350 years, and an event of M 6.5 or larger about every 800-900 years. Earthquakes in this area present what may be the worst-case scenario for Skamania County, because the epicenters may be close enough to cause damage. Geologists theorize there may be faults directly underneath the cities of Portland and Vancouver. Recent studies suggest that the epicenter for the 5.5 M earthquake in November 1962 was located underneath the City of Vancouver.

Cascadia Subduction Zone - The Cascadia Subduction Zone lies about 50 miles offshore, extending from near Vancouver Island to northern California. The zone is where the oceanic Juan de Fuca plate dives beneath the continental North American plate. These plates are converging at a rate of 1 – 1.5 inches per year.

Magnitude Of Hazard:

Magnitude is the measure of the strength of an earthquake, or the strain energy released by it, as determined by seismographic observations (size or length of a seismic signal). There are several types of magnitude scales of which the Richter Scale is the best known. Magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude of 5.3 might be computed for a Medium earthquake, and a strong

earthquake might be rated as a magnitude of 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude. As an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value. See Appendix D for more information on earthquake measuring scales.

The largest earthquake in Skamania County in recent history was a 5.7 magnitude earthquake 1.0 km NNE of Mount St. Helens, May 18, 1980. Earthquakes with a magnitude of smaller than 3.0 occur near Mount St. Helens on a regular basis.

Previous Occurrences:

Type of Earthquake	Date	Location	Impact
Subduction Zone	1700	Coast of WA, OR, CA, and BC	9.0 Magnitude Earthquake
Shallow	1872	900 AD, Seattle 1872, North Cascades	7.4 Magnitude Earthquake
Deep	1949	April 13, 1949, Olympia	7.1 Magnitude Earthquake, 8 deaths, property damage estimated at $25 million (1949 dollars) for Olympia, Seattle and Tacoma
	May 18, 1980	1.0 km NNE of Mount St. Helens	5.7 Magnitude Earthquake
	October 20, 1998	19 mi SSE of Mount St. Helens	3.1 Magnitude Earthquake
Deep	February 28, 2001	Nisqually, 10 miles NE of Olympia	6.8 Magnitude Earthquake, 1 death of a heart attack, more than 700 people injured, between 1 and 4 billion dollars of damage

The shallow 1872 earthquake in North Cascades was the largest in the history of Washington and Oregon. It had an estimated magnitude of 7.4 and was followed by many aftershocks. In 1993, a magnitude 5.6 earthquake in the Willamette Valley of Oregon caused $28 million in damages, including damage to the Oregon State Capital in Salem. A pair of earthquakes near Klamath Falls, Oregon of magnitude 5.9 and 6.0, caused two fatalities and $7 million in damage. Large shallow quakes in the Pacific Northwest occur about once every 50 years.

The two most damaging deep earthquakes in Washington occurred in 1965 (magnitude 6.5 located between Seattle and Tacoma) and in 1949 (magnitude 7.1 near Olympia). Each of these earthquakes caused significant damage. Other deep earthquakes occurred in 1882, 1909, and 1939. Large deep earthquakes are estimated to occur about once every 50 years.

A Northwest subduction zone earthquake has not occurred locally since the 1700's. However, similar subduction zones worldwide have produced earthquakes of

magnitudes in excess of 8 on the Richter Scale. One such example is the 9.2 Alaska earthquake in 1964. Geologic evidence indicates that the Cascadia Subduction Zone has generated great earthquakes at roughly 500 year intervals, most recently about 300 years ago. Researchers estimate there is a 10% chance of a local subduction zone earthquake within the next 200 years.

Probability Of Future Events:

Each year, since 1980, the Pacific Northwest Seismograph Network has recorded an average of over two thousand earthquakes in Washington and Oregon. The vast majority of the quakes are shallow earthquakes and almost all had a magnitude less than 3.0.

The probability of future occurrence for earthquakes similar to the 1965 magnitude 6.5 Seattle-Tacoma event and the 2001 magnitude 6.8 Nisqually event is about once every 35 years. The approximate recurrence rate for earthquakes similar to the 1949 magnitude 7.1 Olympia earthquake is once every 110 years.

Overall County Vulnerability To Hazard:

The entire county population, property, commerce, infrastructure and services are vulnerable to an earthquake. The scope of damage is a function of the earthquake's magnitude and to an extent determined by the level of preparedness of the affected communities. Damage could range from minimal to extreme loss of life and destruction of property.

Most injury, death, and property damage in an earthquake result from seismic impacts on structural and non-structural materials. The vulnerability of certain areas partially depends on the types of structures in that area. A wood frame residential structure that is adequately secured to the foundation is relatively safe. An un-reinforced masonry building is at greatest risk from seismic impacts. Most injuries in earthquakes result from non-structural materials such as light fixtures, equipment, and furniture, falling on people and causing injury.

Another factor in earthquake vulnerability is soil type. Water-saturated loose sand and silt loses its ability to support structures in an earthquake. Areas in Skamania County that are near the flood plains on its Western border or areas with silt deposits are at the greatest risk during an earthquake. Within the limits of predictability, we must assume a **high probability of occurrence** for a damaging earthquake during the next 25 years. A large earthquake could have catastrophic impact on Skamania County suggesting **high vulnerability**. Accordingly, a **high-risk rating** is assigned.

Overall County Impact Of Hazard:

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.

Earthquakes are unique in their impact on structures. Injuries are the result of structural materials falling on people and creating hazards.

Effects of a major earthquake in the Pacific Northwest could be catastrophic, providing the worst case disaster short of war. Thousands of persons could be killed and many tens of thousands injured or left homeless. A major earthquake may create additional hazards such as pipeline line leaks and ruptures, hazardous materials releases, train derailments, and fires.

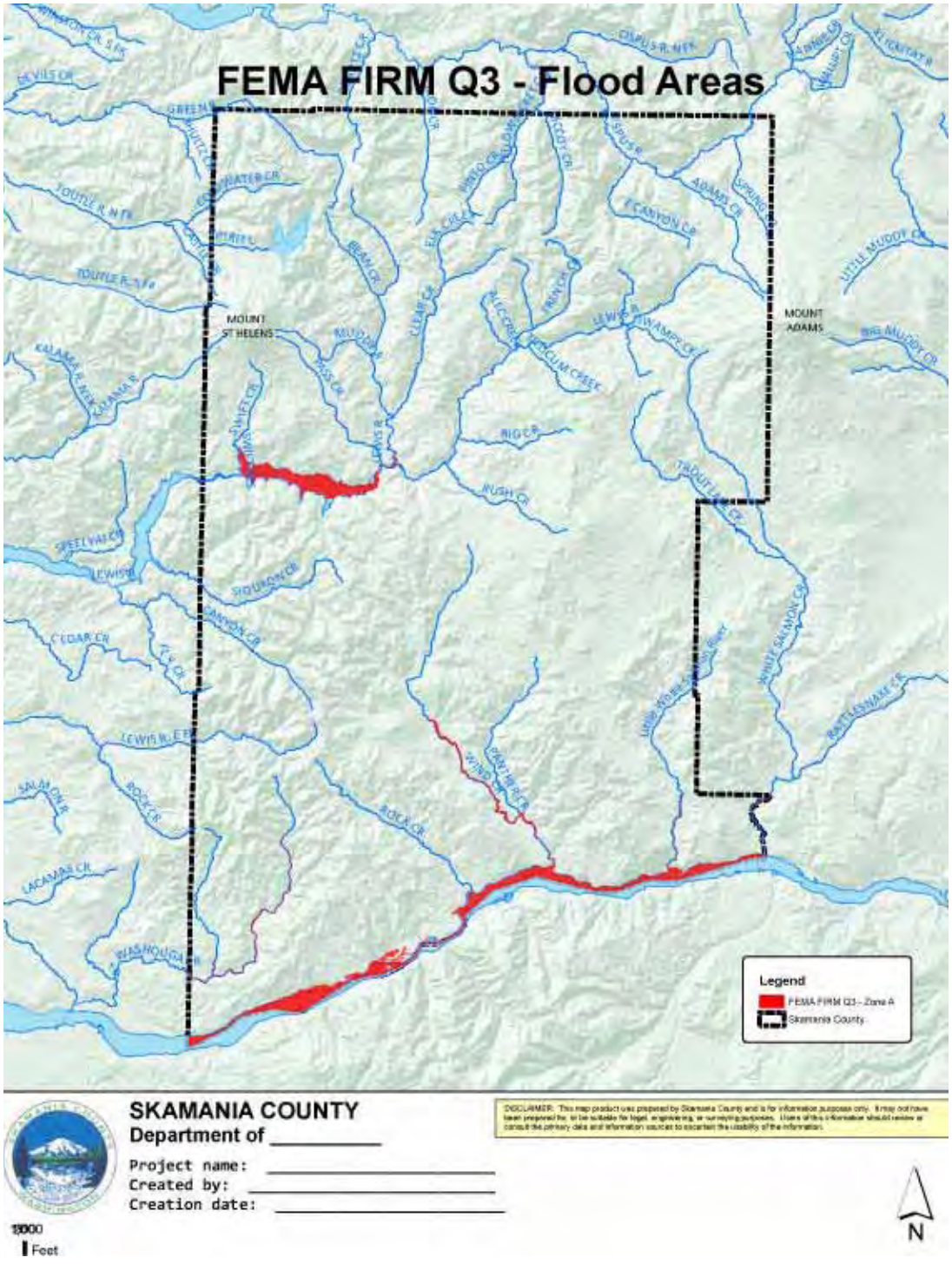
Vulnerability Assessment And Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Phone/Email/Website
Pacific Northwest Seismic Network	**Seismology Lab, University of Washington Dept. of Earth and Space Sciences, Box 351310, Seattle WA 98195-1310**	**206/685-5788 http://www.pnsn.org/**
USGS	**Pacific Northwest, University of Washington, Johnson Hall, Box 351310, Seattle, WA, 98195**	**http://earthquake.usgs.gov/**
Washington Military Department Emergency Management Division	**Building 20, MS TA-20, Camp Murray, WA 98430-5112**	**http://www.emd.wa.gov/**
Washington State Hazard Mitigation Plan 2007		

Flooding


FEMA FIRM Q3 - Flood Areas
MOUNT ST HELENS
MOUNT ADAMS
Legend
FEMA FIRM Q3 - Zone A
Skamania County
SKAMANIA COUNTY
Department of _____
Project name: _____
Created by: _____
Creation date: _____
DISCLAIMER: This map product was prepared by Skamania County and is for information purposes only. It may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
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Hazard Description:

Floods are the most common disaster in Washington State and Skamania County. Mainly caused by the moist air masses that regularly move over the region in the winter, precipitation in Skamania County ranges from 56 inches in the area of the Washougal River and Cape Horn to over 90 inches in the mountainous northeastern part of the county.

1996 Flood, Mouth of Lewis River at Eagle Cliff, Photo by David Brown

The State's climate, topography, and geology are conducive to flooding and the most serious flooding events are extensive wet conditions that follow a period of mid and high elevation ice and snow pack development.

Geographical Area Affected:

Riverine and flash floods may both occur in Skamania 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 usually occurs in steeply sloping valleys and in small waterways during sudden rainstorms when a large amount or rain falls in a very short period of time.

Another category of flood is the storm water or urban flood. Storm water flooding occurs when runoff from rainfall concentrates in developed areas, drainage, and low-lying areas. Poor drainage, elevated groundwater levels, and ponding are all symptoms of storm water flooding that can cause property damage.
Storm water flooding is a concern in Skamania County because of rapid development.

During the flooding event in 1996, a surprising number of impacted properties were not even near a tributary. Instead these properties were in poorly drained areas where ponding and runoff patterns flooded basements and caused other types of water damage. However, development is not the only culprit. Natural soil conditions and geological features often determine drainage patterns that could lead to flooding.

Magnitude Of Hazard:

Skamania County participates in the National Flood Insurance Program and has developed local ordinances to better regulate and direct development in flood plain areas. These local ordinances regulate planning, construction, operation, and maintenance of any structures, and improvements, private or public. They work to insure that these developments are properly planned, constructed, operated, and maintained to avoid adversely influencing the regimen of a stream or body of water or the security of life, health, and property against damage by flood water.

"Flood hazard areas are those areas that are at risk of being inundated by a 100-year flood or, more specifically, subject to a one percent or greater chance of flooding in any given year. These areas include, but are not limited to streams, rivers, creeks, lakes, and wetlands. Floods adjacent to these bodies of water can cause great damage to human life, as well as to private and public property. In order to minimize and prevent these adverse impacts from occurring, it is imperative that appropriate regulations are established.

Skamania County currently reviews all proposed development to determine whether it would occur within the 100-year floodplain of any river or stream. The review is based on the Flood Insurance Rate Maps (FIRM) created by the Federal Emergency Management Agency (FEMA). Title 15 of the Skamania County Code establishes the requirements for any structures located within the 100-year floodplain that are consistent with the International Building Code and meets the requirements of best available science. A licensed land surveyor completes a Flood Elevation Certificate; these forms serve as a site-specific inventory to determine whether a proposed structure is elevated to an appropriate level above the floodplain." (2007 County Comprehensive Plan)

Unfortunately, most of the residents who live in flood plains face far greater risks than needed. They probably face greater financial liability than they realize. 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 chance of being damaged by fire. Unfortunately, many homeowners who live in flood plains carry fire insurance, but do not carry flood insurance.

Pine Creek Bridge, 25 Road, 1996, Photograph by David Brown

With many uninsured homes located in flood plains, Skamania County homeowners are quite vulnerable to flood damage. Adding to this vulnerability are increases in the number and percentage of households located in flood plains. This is a result of new growth and development which increases the pressure to develop land that is more marginal. Furthermore, 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 which were once outside mapped flood plains are now facing a higher threat of flooding - a threat they were never built to withstand. In fact, 35-40 percent of the National Flood Insurance claims are currently originating from outside the mapped flood plains.

Previous Occurrences:

Hazard	Location	Impact
Flooding, December 1996-January 1997	Federally declared disaster #1159, Throughout Washington	Saturated ground combined with snow freezing rain, rain, rapid warming and high winds within a five-day period to cause flooding
Flooding, January 2006	Federally declared disaster #1641, Throughout Washington	Moist subtropical rainstorms – record flood levels throughout state
Flooding, November 2006	Federally declared disaster #1671, Throughout Washington	Strong winds, prolonged rainfall, cracks in the Rock Creek Slide area

Probability of Future Events:

While certainly possible, major flooding has not been a common event (last major impact was 1996), however many rivers in Skamania County historically flood every few years. These include the Washougal River, and the Columbia River. Flooding on these rivers usually occurs between October and February. Long periods of heavy rainfall and mild temperatures coupled with snowmelt contribute to flooding conditions. Probability of major flooding has been determined as **Medium** for Skamania County.

Overall County Vulnerability To Hazard:

Historically, flooding occurs along one or more of the County's waterways every few years. Because of the land area and population affected by flooding - relative to all of Skamania County - the County is exposed to Medium vulnerability and Medium risk rating.

Overall County Impact Of Hazard:

Floods can cause loss of life and great damage to structures, crops, land resources, flood control structures, roads, and utilities of all kinds. Flood damages in Skamania County exceed damages by all other natural hazards.

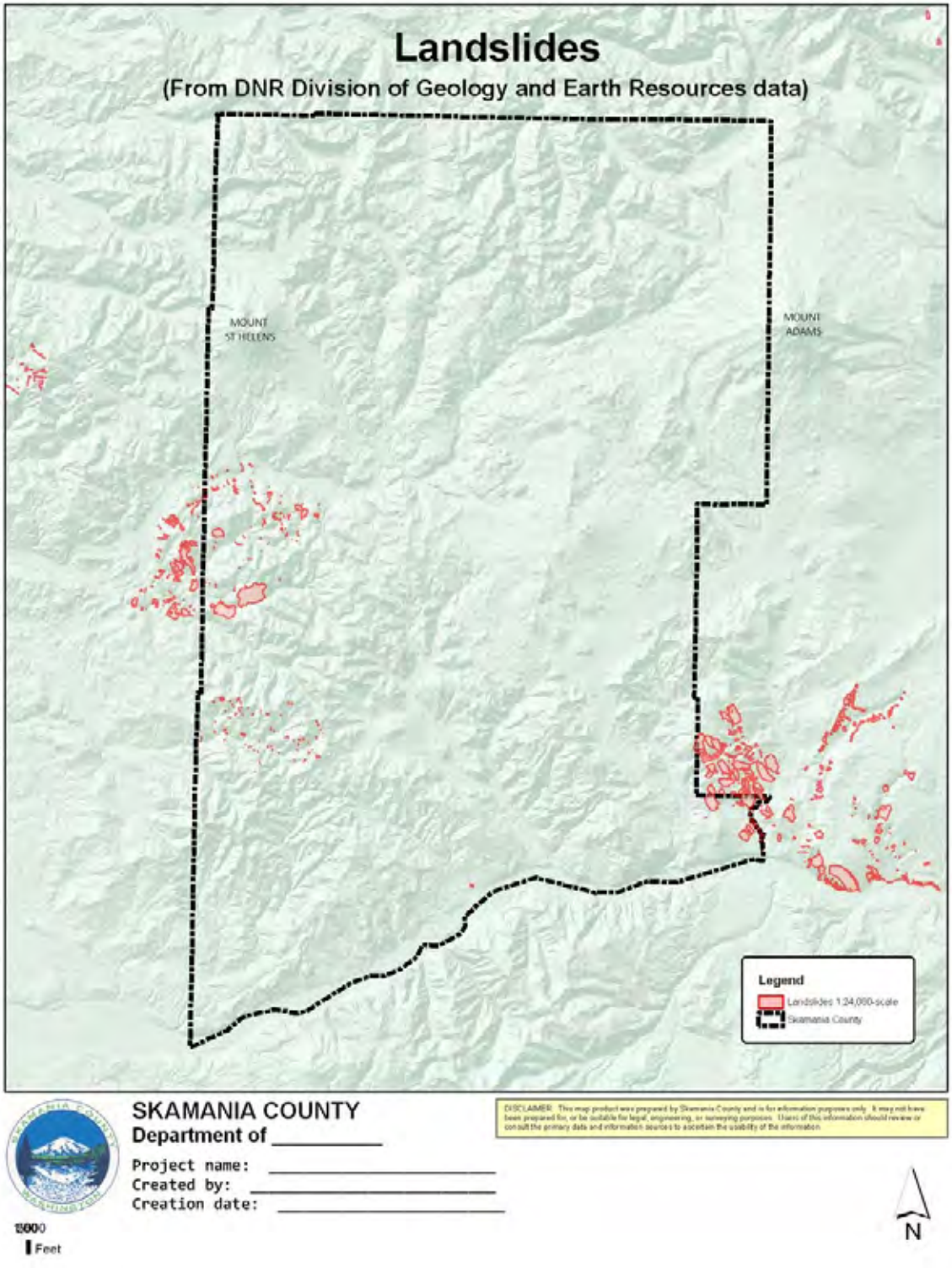
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Phone/Email/Website
FEMA Region X/Mitigation Division	**Federal Regional Center 130 - 228th Street, Southwest Bothell, WA 98021-8627**	**http://www.fema.gov/about/contact/regionx.shtm**
Department of Ecology NFIP State Coordinator	**Washington Department of Ecology P.O. Box 47600 Olympia, WA 98504-7600**	**http://www.floods.org/index.asp**
Washington Military Department Emergency Management Division		**http://www.emd.wa.gov/**
Washington State Hazard Mitigation Plan 2007		

Landslide


Landslides
(From DNR Division of Geology and Earth Resources data)
MOUNT ST HELENS
MOUNT ADAMS
Legend
Landslides 1:24,000-scale
Skamania County
SKAMANIA COUNTY
Department of _____
Project name: _____
Created by: _____
Creation date: _____
DISCLAIMER: This map product was prepared by Skamania County and is for information purposes only. It may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
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Feet
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Hazard Description:

Landslides are the sliding movement of masses of loosened rock and soil down a hillside or slope.

Photograph credit unknown

The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. It is most common for landslides to occur on water saturated slopes when the base of the slope can no longer support the weight of the soil above it.

Landslides are commonly associated with heavy rain and flooding conditions but they may also be associated with earthquakes (the 1994 Northridge Earthquake caused an estimated 11,000 landslides) and with volcanic activity.

Geographical Area Affected:

In Skamania County landslides usually occur during or after periods of heavy rain and flooding.

Photograph credit unknown

The period from December1996 to February 1997 saw a number of landslides in Skamania County and the most recent one continued over many months along Rock Creek in 2008.

Skamania County has several areas where landslides have taken place and several areas that are susceptible to landslides. The slopes north and East of Washougal are particularly susceptible.

Magnitude Of Hazard:

Slides in Skamania County generally range in size from thin masses of soil of a few yards wide to deep-seated bedrock slides more than six miles across. Travel rate may range in velocity from a few inches per month to many feet per second, depending largely on slope, material, and water content. The recognition of ancient dormant slide masses is important as they can be reactivated by earthquakes or unusually wet winters. Also, because they consist of broken materials and disrupted ground water, they are more susceptible to construction-triggered sliding than adjacent undisturbed material.

Previous Occurrences:

Hazard	Date	Location	Impact
Landslide	May 18, 1980	Mount St. Helens, 5.1 Magnitude Earthquake triggered an estimated 3.7 billion cubic yard Landslide	Extensive damage. Destroyed all buildings near Spirit Lake, and destroyed more than 200 homes and cabins
Landslide	February 1996	Near Stevenson, a reactivated landslide complex	Removed three homes from their foundations
Landslide	November 2006, DR 1671	Near and in Stevenson	Piper Road landslide and debris removal

Probability Of Future Events:

Skamania County has a history of landslides and their numbers seem to be increasing, suggesting a **high probability of occurrence**.

Photograph credit unknown

Overall County Vulnerability To Hazard:

Landslides tend to mostly occur in isolated, sparsely developed areas threatening individual structures and remote sections of the transportation, energy and communications infrastructure suggesting **Medium vulnerability**. Because of the

high probability of occurrence and the trend to more frequent landslides, a **Medium risk rating** is assigned.

Overall County Impact Of Hazard:

The most significant effect of landslides is the disruption of transportation and the destruction of private and public property.
Typical effects include 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 media, or the fact that landslides hampering the transportation network may be listed in records simply as "road maintenance."

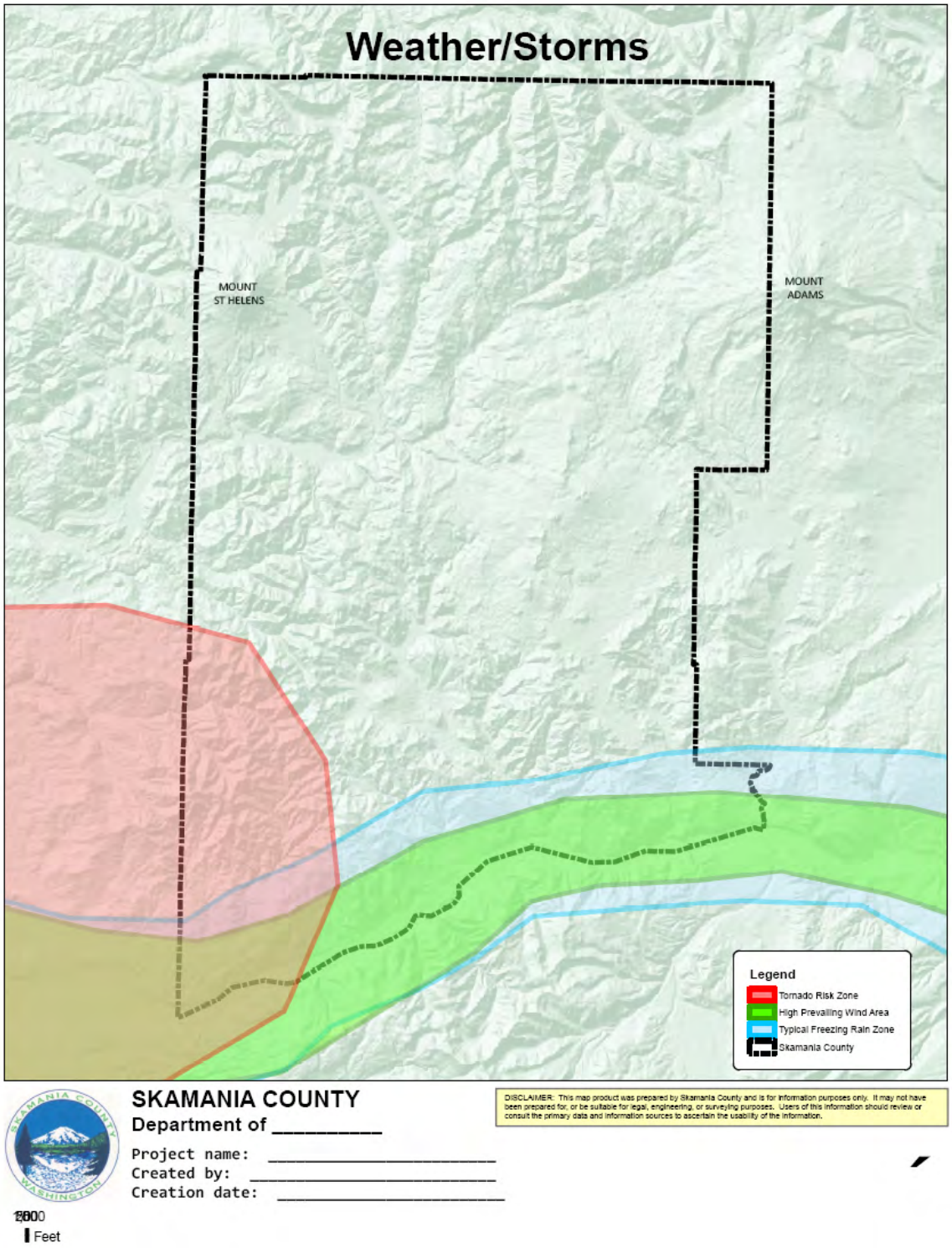
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Phone/Email/Website
Washington Military Department Emergency Management Division		**http://www.emd.wa.gov/**
Washington State Hazard Mitigation Plan 2007		

Severe Storm



Hazard Description:

Skamania 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 Skamania County. Ice storms occur when rain falls from warm and 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 severe problems due to the ice accumulating on tree branches, power lines, telecom lines, and other objects, thus increasing the weight and potentially breaking or collapsing the branch, line, or structure.

January 2005 Ice Storm, Stevenson, Photograph by Kathleen Carlson

Furthermore, ice accumulation on the roadway will have severe impacts on transportation and travel. Power outages and interruptions in communications are other consequences of Ice Storms.

Snow Storm or Blizzard
It is possible for significant snowfall to occur in the Northwest. Skamania County has had accumulations that vary depending on geographic location. For example, accumulations in excess of 100 inches may be predicted in areas of the Gifford Pinchot National Forest around the higher elevations south of Mt. St. Helens. In the area north of Stevenson and Carson, occasional snowfall may accumulate anywhere between 10 to 48 inches. Accumulations of snow usually increase elevation as the terrain expands and rises to the North of the Columbia River. January is usually the month with the greatest snowfall.

Moisture and cold air are required for snow to fall. While moisture is common in the winter months, the Cascades act as a barrier to cold air coming from the east. On occasion, cold air can penetrate through lower passes in the Cascades bringing snow to the lower elevations. However, as soon as warmer air moves in the snow melts rather quickly. It is very common for cold air to rush into the County from the East through Columbia Gorge.

Wind Storm
Occasionally, the Northwest is severely impacted by strong windstorms. In the past, peak wind gusts in excess of 100 mph have been measured. The strongest winds impacting Skamania County originate from two sources. One source are strong storms moving on land from the Pacific Ocean causing frequent and widespread wind in Skamania County. The other source originates from high atmospheric pressure over the Columbia River Basin in Central Washington and a low pressure in the West off the

Pacific Coast. This pressure differential causes a strong airflow through the Columbia River Gorge which acts as a venture-like funnel accelerating the speed of the rushing air.

Wind speed is measured by the Beaufort Wind Scale. The Beaufort Wind Scale is a scale classifying wind strength in terms of observable effects both on sea and over land.

BEAUFORT NUMBER	WIND SPEED IN MPH	EFFECTS OF LAND
0	Under 1	Calm, smoke rises vertically.
1	1-3	Smoke drift indicated wind direction, vanes do no move
2	4-7	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Leaves, small twigs in constant motion, light flags extended.
4	13-18	Dust, leaves and loose paper raised up, small branches move.
5	19-24	Small trees begin to sway.
6	25-31	Large branches of trees in motion, whistling heard in wires.
7	32-38	Whole trees in motion, resistance felt in walking against wind.
8	39-46	Twigs and small branches broken off trees.
9	47-54	Slight structural damage occurs, slate blown off or roofs.
10	55-63	Seldom experienced on land, trees broken, structural damage occurs.
11	64-72	Very rarely experienced on land, trees broken, structural damage occurs.
12	73 or greater	Violence and destruction

Tornado

Tornadoes are the most violent weather phenomena known. They are characterized by funnel clouds of varying sizes that generate winds as fast as 500 miles per hour. They can affect an area of ¼ to ¾ of a mile but are seldom more than 16 miles long.

Tornadoes normally descend from the large cumulonimbus clouds that characterize severe thunderstorms. They form when a strong crosswind (sheer) intersects with strong warm updrafts in these clouds causing a slowly spinning vortex to form within a cloud. Eventually, this vortex may develop significant intensity and then descend to form a funnel cloud. When this funnel cloud touches the ground or gets close enough to the ground to affect the surface it becomes a tornado.

Tornadoes can descend from lines of cumulonimbus clouds or from a single storm cloud. Tornadoes are measured using the Fujita Scale ranging from F0 to F6.

The Fujita Scale (also known as the Fujita-Pearson Scale) may not be a perfect system for linking damage to wind speed, but it had distinct advantages over what had gone on before its inception. And it was simple enough to use in daily practice without involving much additional expenditure of time or money.

The entire premise of estimating wind speeds from damage to non-engineered structures is very subjective and is difficult to defend from various meteorological perspectives. The Fujita Scale rates the intensity of the tornado, and measured both the path length and the path width.

F-Scale Number	Intensity Phase	Wind Speed	Type of Damage Done
F0	Gale Tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.

F1	**Medium Tornado**	**73-112 mph**	**The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.**
F2	**Significant Tornado**	**113-157 mph**	**Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.**
F3	**Severe Tornado**	**158-206 mph**	**Roof and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted.**
F4	**Devastating Tornado**	**207-260 mph**	**Well-constructed houses leveled; structures with weak foundations blown of some distance; cars through and large missiles generated.**
F5	**Incredible Tornado**	**261-318 mph**	**Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through air in excess of 100 meters; trees debarked; steel re-inforced concrete structures badly damaged.**
F6	**Inconceivable Tornado**	**319-379 mph**	**These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.**

Geographical Area Affected:

Severe storms may affect any area of Skamania County.

Magnitude Of Hazard:

The record snowfall in the region occurred December 20-23, 1892. In Southwest Washington and Northwest Oregon, 15 to 30 inches of fell. Portland had 27.5 inches of snow. The Columbus Day Storm on October 12, 1962 was the worst windstorm to occur in the Northwest since records have been kept. Thirty-eight people died and monetary losses were estimated somewhere between $175 and $200 million. The Portland Airport reported a peak gust of 88 miles per hour. At the Morrison Bridge in Downtown Portland there was a peak gust of 114 mph.

The strongest windstorm since the Columbus Day Storm occurred November 13-15, 1981. This storm was nearly as strong as the Columbus Day Storm but it tracked farther west. This storm actually contained two strong windstorms, the stronger first one arrived November 13 and early November 14 and the second one hit on November 15.

January 2005 Ice Storm, Stevenson, Photograph by Kathleen Carlson

No recorded instance of a tornado causing damage in Skamania is available. However, in 2007, a Tornado touched down in neighboring Clark County causing significant property damage.

Previous Occurrences:

Hazard	Date	Location	Impact
Severe Wind Storm	1985	Upper Wind River Area	Destroyed thousands of acres
Severe Winter Storm	December 12, 2008 – January 5, 2009 DR 1825	Skamania County	Severe winter storm, record and near-record snow
Severe Winter Storm	January 6-16, 2009 DR 1817	Skamania County	Flooding and landslides

Probability Of Future Events:

Storm history suggests a **high probability of occurrence**.
Tornadoes are not a normal occurrence in the Northwest the way they are in the Midwest. Tornadoes require the warm surface temperatures and the confluence of warm fronts coming from the south with cold fronts coming from the north. Northwest climates do not normally generate the temperature variations conducive to tornado formation. Washington is ranked 43 in the US for total number of tornadoes. Nonetheless, the tornado threat should be taken very seriously. The conditions favorable for tornado formation may develop in Southwest Washington and it is common for funnel clouds to be reported in this region. During severe thunderstorms it is possible for tornadoes to occur.

With the exception of the April 1972 disaster occurring in Clark County, tornadoes in Washington and Oregon tend to be light or Medium , with winds ranging from 40 to 112 mph. There are notable minorities of tornadoes that cause significant to severe damage with winds going as high as 200 mph. The peak season for tornadoes is April through July. However, in Washington tornadoes may occur in the late summer months and, in a few rare cases, may occur in the winter months – such as the tornado in Clark County in February 2007. While tornadoes are sometimes formed in association with large Pacific storms, most of them are caused by intense local thunderstorms. Tornadoes almost always occur in the late afternoon and early evening.

Overall County Vulnerability To Hazard:

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, the rivers and streams rise and local flooding and landslides are the potential result.

Ice storms occur when rain falls out of a warm atmospheric layer into a cold layer of air near the ground. The rain freezes on contact with cold objects including the ground, trees, structures, and powerlines. Icy roadways cause accidents and transportation problems, trees and branches may break and interrupt power and communication lines, and the accumulation of ice on power lines may cause those to break.
Snowstorms primarily impact the transportation system and the availability or timing of public safety services. Heavy, wet snow accumulating on roofs may cause those to collapse. Snow accompanied by high winds is a blizzard, which can affect visibility,

cause large drifts and strand and isolate residents for up to several days. Melting snow adds to river loading and can turn an otherwise benign situation into a local disaster.

Each of these when in combination with any other or if accompanied by freezing temperatures can exacerbate a storm's impact. Isolated residents without power are more likely to use wood fires to stay warm or to cook, potentially 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 necessary rescues.

The effects can vary with the intensity and duration of the storm, the level of preparation of local jurisdictions and residents, and the equipment and staff available to perform necessary tasks to lessen the effects of severe local storms.
Historical damage and cumulative costs of destructive storms suggest **Medium vulnerability**. Accordingly, a **Medium risk rating** is assigned.

Overall County Impact Of Hazard:

January 2005 Ice Storm, Stevenson, Photograph by Kathleen Carlson

All of the hazards described above affect communities in similar ways. Even Medium storms can bring down power lines, trees and tree limbs thus obstructing roadways and/or 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 likely to fall. Severe storms causes massive power and telephone outages. Severe storms in Skamania County have left thousands without power and/or communications capability. 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 flow. This can hamper responses from law enforcement, fire, and emergency medical services. Aside from the traffic problems, first response operations in law enforcement are often overloaded with welfare inquiries and traffic questions, and fire departments are occupied dealing with electrical hazards and debris removal. The long-term challenge after severe local storms is debris removal and debris management Hundreds of tons of debris can pile up in residential and commercial areas.

It has not been demonstrated that there is a likelihood of tornadoes impacting Skamania County. Typically, Pacific Northwest tornadoes are Medium but it is possible for serious tornadoes to develop causing death and serious injury.

Typically, tornadoes may cause severe damage to everything in their path. Walls collapse, roofs are ripped off, trees and power lines are destroyed. The challenge is that tornadoes, especially in the northwest, are very difficult to predict and their onset is sudden. Unlike the tornado-prone areas in the plains states, there is little awareness of the tornado threat and the forecasting and warning systems are less well developed. It is extremely rare for a tornado watch or warning to be issued anywhere in the Northwest. As such, there is little public awareness of the warning systems, and self-protection measures common to the tornado prone states.

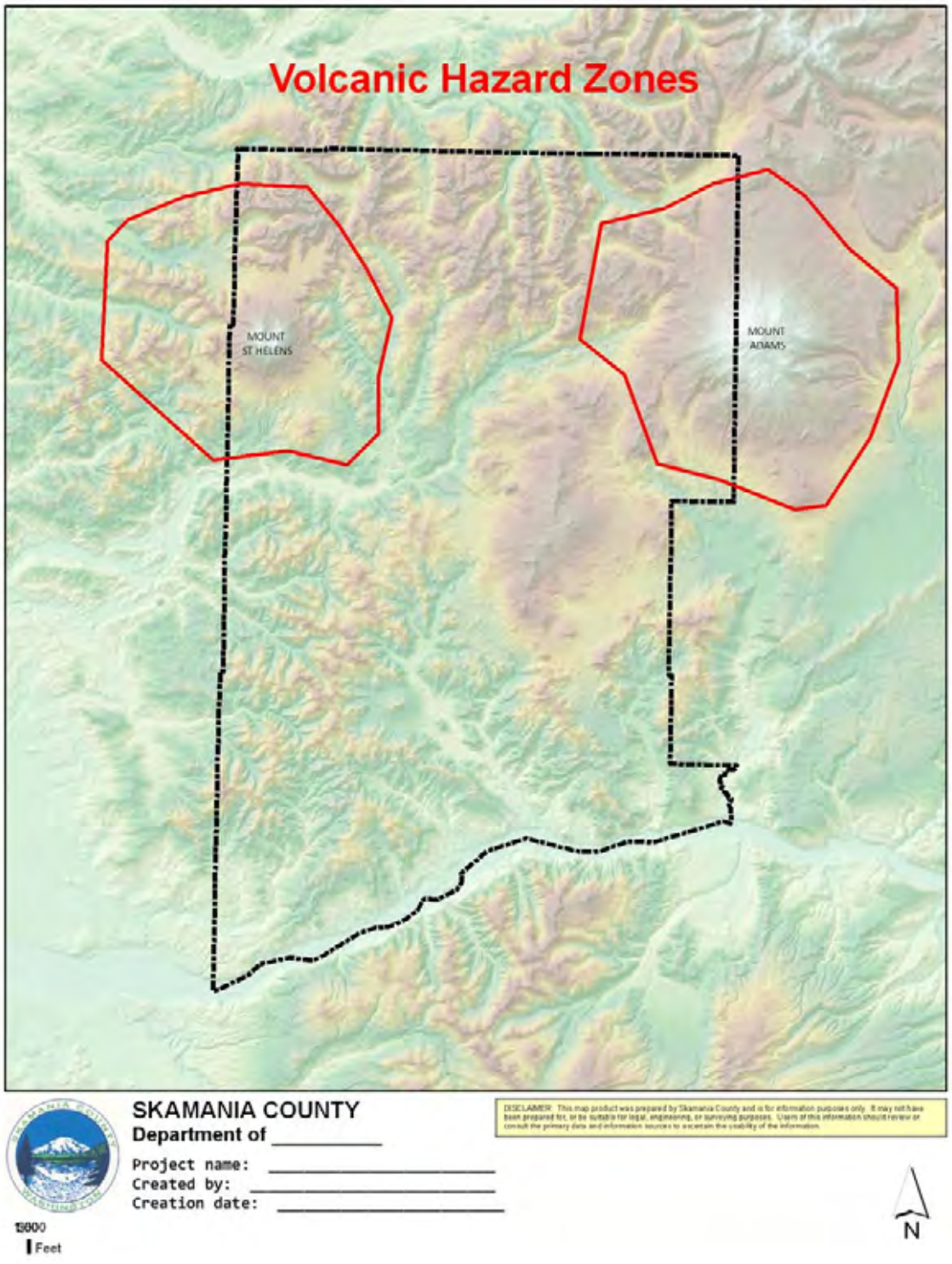
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Website and/or Comments
Washington Military Department Emergency Management Division	Building 20, MS TA-20, Camp Murray, WA 98430-5112	http://www.emd.wa.gov/ http://www.emd.wa.gov/publications/pubed/noaa_weather_radio.shtml Weather Radio Information
Washington State Hazard Mitigation Plan 2007		Severe Storm Section http://www.emd.wa.gov/plans/documents/SevereStormNov2007Tab5.7.pdf

Volcano


Volcanic Hazard Zones
MOUNT ST HELENS
MOUNT ADAMS
SKAMANIA COUNTY
Department of _____
Project name: _____
Created by: _____
Creation date: _____
DISCLAIMER: This map product was prepared by Skamania County and is for information purposes only. It may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
N
0 5000
Feet

Hazard Description:

A volcano is a vent in the earth's crust through which molten rock, rock fragments, gases or ashes are ejected from the earth's interior.

Mount St. Helens, Photograph by David Brown

Volcanoes are potentially deadly causing a wide variety of hazards related to the volcano and its eruption. With volcano eruptions, the hazards are distinguished by the different ways in which volcanic materials and other debris are expelled from the volcano.

The following is a list of the different types of hazards that exist in the Cascade volcanoes.

Pyroclastic Flows and Surges
Pyroclastic flows are avalanches of hot (300-800°C), dry, volcanic rock fragments and gases that descend a volcano's flanks at speeds ranging from 20 to more than 200 miles per hour. They originate from the actual explosion related to an eruption. Pyroclastic flows and surges are a lethal hazard. They result in incineration, asphyxiation, burial, and impact. Because of their speed they cannot be outrun.
Pyroclastic flows are heavier than air and will seek topographically low areas. Pyroclastic surges, composed of hot mixtures of gas and rock will flow above the ground and over topographical barriers such as ridges and hills.

Lava Flows
Lava flows are normally the least hazardous threat posed by volcanoes. The speed and viscosity of a lava flow are determined by the silica content of the lava. The higher the silica content, the more viscous (thick) the lava becomes. Low silica basalt lava can move 10 to 30 mph. High silica andesite and dacite tend to move more slowly and usually only travel short distances. Cascades volcanoes are normally associated with slow moving andesite or dacite lava. However, 2,000 years ago, Mt. St. Helens produced a large amount of basalt.
Large lava flows may destroy property and cause forest fires but, since they are slow moving they pose little threat to human life. Perhaps the greater hazard presented by lava flows is that their extreme heat which will cause snow and ice to melt very quickly causing the development of a Lahar, debris avalanches, and flooding hazards.

Tephra
The ash and the large volcanic projectiles that erupt from a volcano into the atmosphere are called tephra. The largest fragments (bombs, >64mm – i.e., >2.5in) fall back to the ground fairly near the vents, as close as a few meters and as far as 10 km (6 mi.). The

smallest rock fragments (ash) are composed of rock, minerals, and glass that are less than two millimeters in diameter.

The Tephra plume characteristics are affected by wind speed, particle size, and any precipitation.
Tephra poses a variety of threats and dangers. Accumulation of only 1cm (0.4in) of ash can impede the movement of most vehicles and disrupt transportation, communication, and utility systems. During the past 15 years about 80 commercial jets have been damaged by inadvertently flying into ash, and several have nearly crashed.

Mount St. Helens, Volcanic Ash,
USGS Photograph taken on August 22, 1980, by Lyn Topinka

Airborne tephra will seldom kill people who are a safe distance from the vent. However, tephra may cause eye and respiratory problems, particularly for those with existing medical conditions. Short-term exposure should not have any long-term health effects. Some tephra material may have acidic aerosol droplets that adhere to them. This may cause acid rain or corrosion of metal surfaces they fall on.

Ash may also clog ventilation systems and other machinery. When tephra is mixed with rain it becomes a much greater nuisance. Wet ash is much heavier and it can cause structures to collapse. For example, most of the 330 deaths associated with the Mt. Pinatubo eruption were caused by roofs collapsing under the weight of ash soaked by rain. Wet ash may also cause electrical shorts. Furthermore, ash-fall also decreases visibility and may cause psychological stress and panic.

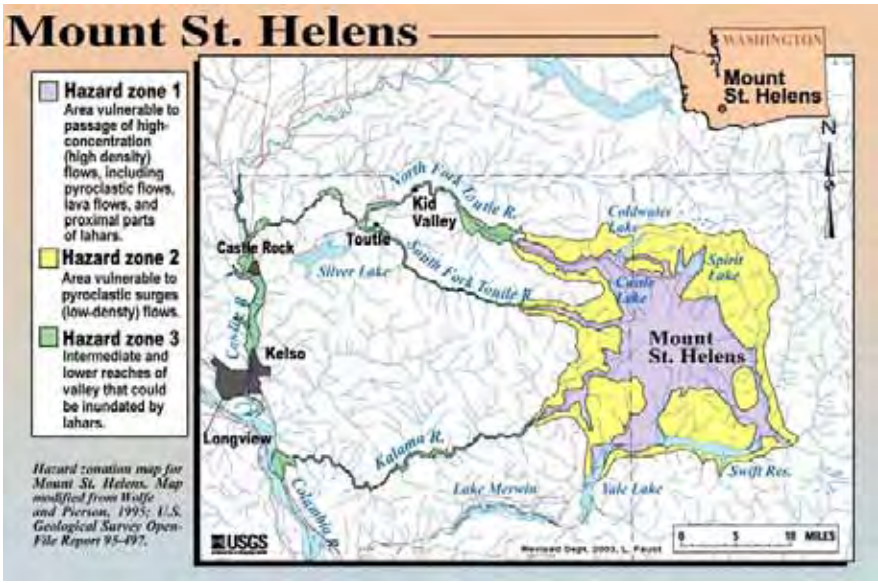
Lahars
Lahars are rapidly flowing mixtures of water and rock debris that originate from volcanoes. While Lahars are most commonly associated with eruptions, heavy rains, and debris accumulation, even earthquakes may trigger them. Lahars are also referred to as debris or mud flows.

Lahars can travel over 50 miles downstream, reaching speeds between 20 and 40 mph. The highest recorded speed of a Lahar during the 1980 Mt. St. Helens eruption was 88 mph. Beyond the flanks of a volcano, Lahars will normally be channeled into waterways. The threat from Lahars comes from their speed and from the debris they carry. Abrasion from the heavy sediment and impacts from heavy debris can destroy forests as well as man-made structures including bridges, dams, roads, pipelines, buildings, and farms. Lahars may also fill in shipping channels, obstructing shipping lanes and impacting a channel's ability to handle large volumes of water.

Debris Avalanches
Volcanoes are prone to debris and mountain rock avalanches that can approach speeds of 160 kilometers per hour (100 mph). Volcanoes are characterized by steep slopes of weak rock. Volcanic rock material is weakened by the acidic ground water that seeps through rock cracks and turns rigid rock into clay. Minor eruptions, earthquakes, or releases of built up water and debris may trigger large avalanches of this material.

Mount St. Helens Debris Avalanche, USGS Photograph taken on September 16, 1980, by Tom Casadevall

Volcanic Gases
All active volcanoes emit gases. These gases may include steam, carbon dioxide, sulfur dioxide, hydrogen sulfide, hydrogen, and fluorine. Sometimes, these chemicals can be absorbed by ash and impact ground water, livestock, and metal objects. Even when a volcano is not erupting, gases can escape through small surface cracks.
The greatest danger to people comes when large quantities of toxic gases are emitted from several sources or when there are topographic depressions that collect gases that are heavier than air. These gases can accumulate to the point where people or animals can suffocate. Neither of these conditions currently exist in Cascade volcanoes, though this could change if magma were to come close to the surface.
Mt. St. Helens emitted thousands of tons of Sulfur Dioxide every day in the early 80's, but these gases were easily and rapidly dispersed by the wind.



Geographical Area Affected:

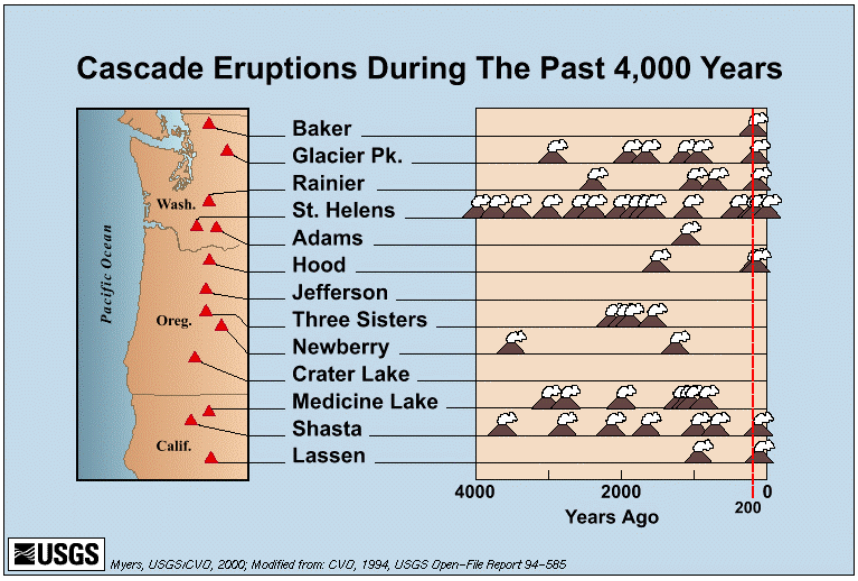
Mount St. Helens is considered an active volcano with potential for future eruptions. In 1995, the U.S. Geological Survey (USGS) published a "Volcanic-Hazard Zonation for Mount St. Helens, Washington."

Magnitude Of Hazard:

Cascade Range volcanoes in the U.S. have erupted more than 200 times during the past 12,000 years for an average of nearly two eruptions per century. At least five eruptions have occurred in the last 150 years.
The most recent eruptions in the Cascade Range are the well-documented 1980-1986 eruptions of Mt. St. Helens, which claimed 57 lives and caused nearly a billion dollars in damage and response costs. The effects of this eruption were felt throughout the Pacific Northwest.

Previous Occurences:

Hazard	Date	Location	Impact
Volcanic Eruption	May 18, 1980	Mount St. Helens Volcanic Eruption	Loss of 57 lives, widespread destruction of valuable property.



The force of the North American continental plate running against the Juan de Fuca plate caused the creation of the Cascade Volcano Range. The energy generated by these two plates running together is regularly released in the form of volcanic eruptions. Seven volcanoes have erupted in the Cascades in the last 200 years.

There are 20 volcanoes in the Cascades, but only Mt. Rainier, Mt. Baker, Mt. Hood, Mt. St. Helens, and Glacier Peak have been active in historical time. There is a possiblity for Skamania County to be impacted by volcanic activity on Mt. Hood, Mt. St. Helens, and Mt. Adams. These are all Strato-Volcanoes. These are composite volcanoes which are typically steep-sided, symmetrical cones of large dimensions built of alternating layers of lava flows, volcanic ash, cinders, blocks, and bombs and may rise as much as 8,000 feet above their bases. Strato-Volcanoes tend to erupt explosively and pose considerable danger to nearby life and property. In contrast, the gently sloping shield volcanoes, such as those in Hawaii, typically erupt non-explosively, producing fluid basalt lavas that can flow great distances from the active vents.

Mt. Adams and the nearby Simcoe and Indian Heaven volcanic fields present a threat to Skamania County. Yet, this volcanic area has only had eruptions of relatively low frequency and magnitude in the last 20,000 years. The United States Geological

Service (USGS) estimates that the annual probability for a Mt. Adams eruption is somewhere in the range of 1:100,000 to 1:1,000,000. The worst case scenario for Mt. Adams would be a lateral blast eruption, similar to the one seen at Mt. St. Helens. While potential lateral blast eruptions from Mt. Hood or Mt. St. Helens are most likely going in predictable directions (toward the Northwest for Mt. St. Helens and the Southwest for Mt. Hood), a lateral blast at Mt. Adams could go into any direction.

Photograph by Carlson

Probability Of Future Events:

Skamania County may be impacted by a volcanic eruption at anytime. The above assessments of volcano hazards consider past activity to determine the most likely pattern and probability of a future eruption. It is possible that unexpected volcanic activity may occur and may significantly impact Skamania County.

Mt. St. Helens is by far the most active volcano in the Cascades, with four major explosive eruptions in the last 515 years. It presents the greatest threat to Southwest Washington. However, according to the USGS "The chance of another catastrophic landslide and blast comparable to that of May 18, 1980, is exceedingly low. Yet, the past history of the volcano suggests that one or more explosive eruptions with heavy ash fall comparable to that of 1980 might occur before Mt. St. Helens returns to a dormant state."

In a 1997 hazard study, the USGS suggests that for an appropriate hazard assessment one needs to assume that the next eruption will be as large or larger than the eruption of May 18, 1980.
History suggests a **high probability of occurrence**.

Vulnerability Of Hazard:

The factor that most limits Skamania County's vulnerability to a major eruption of Mt. Hood, Mt. Adams, or Mt. St. Helens 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 response agencies to ensure an aggressive response to these warnings.

As part of its Emergency Action Plan, PacfiCorp will draw down the level of the Swift Reservoir if Mt. St. Helens shows signs of volcanic activity. If the potential for eruption exists, the outflow at the Merwin Dam (the most western dam) could be as high as 60,000 cfs which could cause flooding in the lower reaches of the river at Woodland. If the Lewis River is already at a high level due to runoff or if there is sudden volcanic activity causing a debris avalanche, matters may become more complicated.

While the May 18, 1980 eruption was preceded by about two months of volcanic activity, the 1989 Mt. Redoubt eruption in Alaska was preceded by only 24 hours of intense activity, so there is a possibility for a quick onset of an eruption.

Because of the potential impact to the Camas-Washougal area from a Lahar flow coming down the Sandy River, there is **low vulnerability**. Because Mt. Hood and Mt. St. Helens are both relatively quiet, this hazard is assigned a **low risk rating**.

Impact Of Hazard:

Even assuming a major eruption, it is unlikely that flow hazards would impact Skamania County. USGS predicts that the most likely event will be an eruption from the same point as the 1980 eruption, with an outbreak of Castle Lake. The flow hazards from this type of eruption will channel down the North and South Fork of the Toutle River and down the Kalama River. There may be lava flows, pyroclastic flows and surges, and Lahars that could flow into the Lewis River and the Swift Reservoir. However, as happened in the 1980 eruption, PacifiCorp, the operators of the reservoir, were able to draw down the reservoir levels in anticipation of debris flows.

The greatest threat would come from tephra. Since the prevailing winds are to the east the highest tephra concentrations would be the east of Mt. St. Helens.
Perhaps a greater threat comes from Mt. Hood.

The most likely eruption for Mt. Hood would be explosion from Crater Rock that would create a massive Lahar down the Sandy River. Sediments from past Lahars and floods created the delta at the mouth of the Sandy River near Troutdale. The USGS claims that “future Lahars and eruption will trigger sedimentation that is likely to build the delta farther out into the Columbia River and narrow the existing channel, which could lead to progressive bank erosion and inundation of land in the Camas-Washougal area. The threatened area includes the Lady Island, Reed Island, and the lowland areas to the north and south of SR-14 in the Camas-Washougal Area.

A Lahar flow associated with a large Mt. Hood eruption is estimated to have a 3 ½ hour travel time to reach the Troutdale area. The USGS puts the 30 year probability for this type of Lahar flow at between 1:15 and 1:30 (annual probability of between 1:500 and 1:1000).

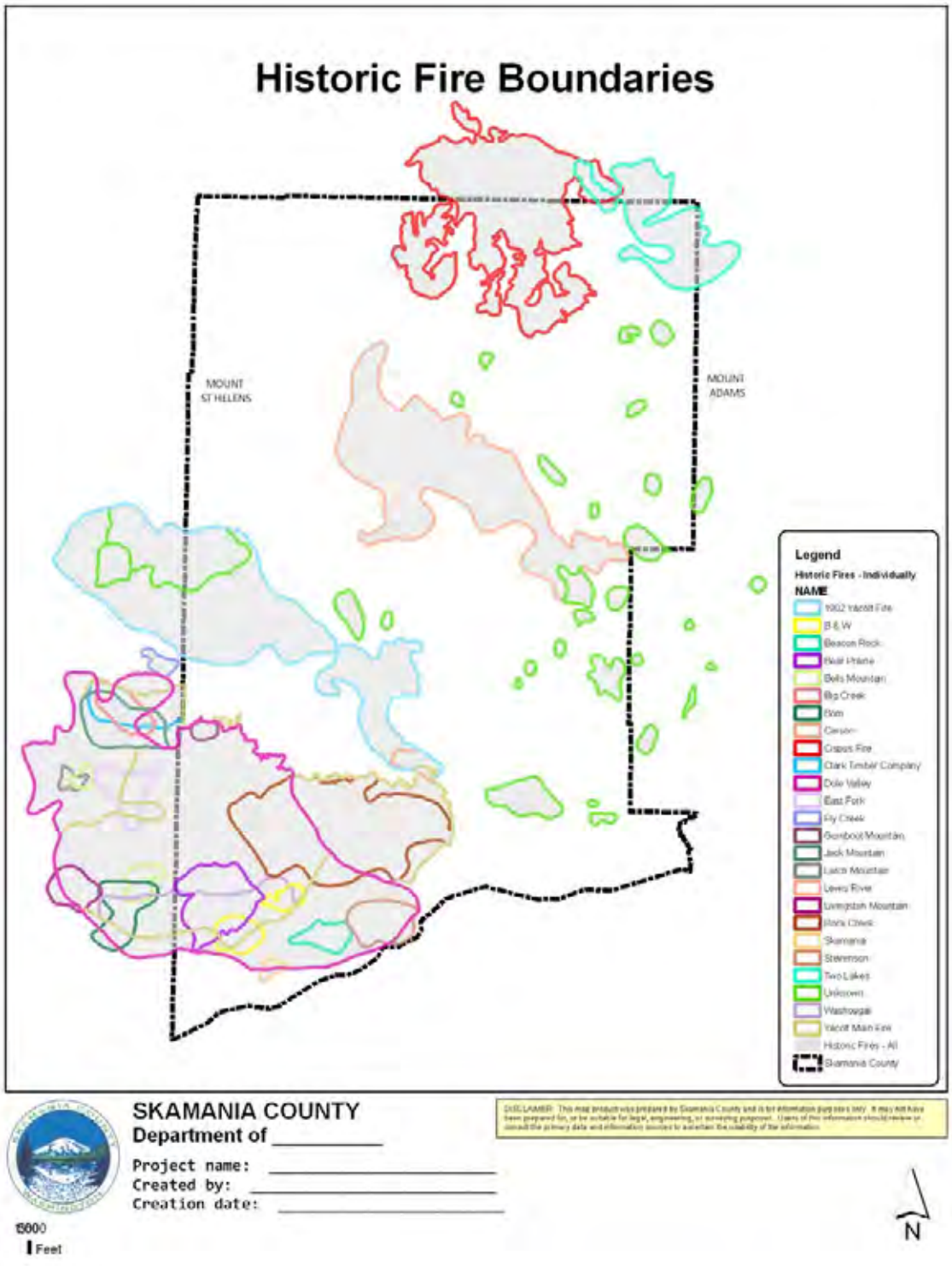
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Website and/or Comments
NASA Earth Observatory		http://earthobservatory.nasa.gov/ http://earthobservatory.nasa.gov/NaturalHazards/ Natural Hazard Images http://earthobservatory.nasa.gov/IOTD/view.php?id=4976 Mount St. Helens Image of 2004 Dome
USGS Cascade Volcano Observatory		http://vulcan.wr.usgs.gov/LivingWith/VolcanicFacts/misc_volcanic_facts.html#cascade_eruptions Learn About Volcanoes – Q & A
Washington Military Department Emergency Management Division	Building 20, MS TA-20, Camp Murray, WA 98430-5112	http://www.emd.wa.gov/ http://www.emd.wa.gov/publications/pubed/volcanic_ash_english.pdf Volcanic Ashfall informational brochure
Washington State Hazard Mitigation Plan 2007		Volcano Section http://www.emd.wa.gov/plans/documents/VolcanoNov2007Tab5.9.pdf

Wildland Fire



Hazard Description:

Wildland fires are fires caused by nature or humans that result in the uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property. Any instance of uncontrolled burning within a forested area is a forest fire, where as uncontrolled burning in grassland, brush, or woodlands is classified as a wildfire.

Skamania County's fire season usually runs from mid-May through October. However, any prolonged period of lack of precipitation presents a potentially dangerous problem.

Broughton Fire 2007, Photograph Credit Unknown

Geographical Area Affected:

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.

Wildfire has always been a part of the forest ecosystems of the western United States. What has changed is the risk to public safety, private property and the quality of life. Risks have compounded due to more homes in and around forests and to the deterioration of forest health.

Skamania County and WSU Extension completed community wildfire protection plans (CWPPs) in 2007 and 2008 for all areas where people live in Skamania County. The county was divided into the following seven areas where wildland fire hazards exist:

Beacon Rock - The Beacon Rock CWPP area is located in southwest Skamania County. The CWPP planning area includes the city of North Bonneville, and many small communities served by Skamania County FD #5. Beacon Rock State Park is located within the CWPP area as are a number of popular recreation destinations in the Gifford Pinchot National Forest.

Greater Stevenson - The Greater Stevenson CWPP area is located in south central Skamania County. The CWPP area includes the city of Stevenson, the county seat. The Greater Stevenson CWPP area is served by Skamania County FD #2 and Stevenson Fire Department.

Skamania County & WSU Extension
Wildfire Prevention Program

Greater Wind River - The GWR planning area encompasses 3 unincorporated communities: Carson, Home Valley and Hemlock/Stabler. Hemlock/Stabler is located along Wind River Highway, approximately 8 miles north of SR14. Carson is located 1 mile north of Highway SR14 on Wind River Highway. Home Valley is located on SR14 mile post 50.

Little White Salmon Drainage - The Little White Salmon Drainage is located in the southeast corner of Skamania County. One of two southern access routes to the Gifford Pinchot National forest passes through the Little White Salmon Drainage planning area.

Swift Reservoir- The Swift CWPP area is located in the northwest corner of Skamania County. Major communities reside in the southern half of the Swift CWPP area and are located on the north side of Swift Reservoir from the Cowlitz County border to the northeast side of the reservoir. Mount Saint Helen's National Volcanic Monument is located in the northwestern section within the Swift CWPP planning area. The 1982 established monument covers 110,000 acres following the May 18, 1980 eruption (Witherspoon 2007). State lands are located in the southwest section of the planning area and cover over 121,000 acres.

Underwood - Underwood is located in the southeast corner of Skamania County on the north shore of the Columbia River.

West End - Within the CWPP planning area, the Skamania County West End Community Comprehensive Subarea Plan designates the West End Community to the lands located within Township 1 North, Range 5 East; Township 2 North, Range 5 East; Township 3 North, Range 5 East; Township 1 North, Range 6 East; Township 2 North, Range 6 East; Township 3 North, Range 6 East, Willamette Meridian, lying north of the CRGNSA boundary and south of the GPNF boundary (Witherspoon 2007).

Although a CWPP was not developed for the part of the county where no one resides, it should be noted this part of the county is most definitely an area where wildland fire hazards exist.

Magnitude Of Hazard:

The effects of forest fires vary with intensity, area, and time of year. Factors affecting the degree of risk of fires include extent of rainfall, humidity, wind speed, type of vegetation, and proximity to fire fighting agencies.

The 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 for commercial purposes and the reduction of travel and recreational activities in the affected area.

Previous Occurrences:

Large fires reported in Skamania County since the turn of the century include the following:

Year	Fire	Area	Acres Burned	Impacts
1902	Yacolt	Skamania, Clark Counties	238,900	38 deaths
1919	Sunset	Skamania, Clark Counties	26, 900	
1929	Dole Valley	Skamania, Clark Counties	227,500	3 million acres burned, mostly in Idaho and Montana; considered one of the nation's historically significant fires.
2007	Broughton	Skamania County near Underwood	250	Destroyed six homes and caused evacuation of 400 residents from 100 immediately threatened homes.

Probability Of Future Events:

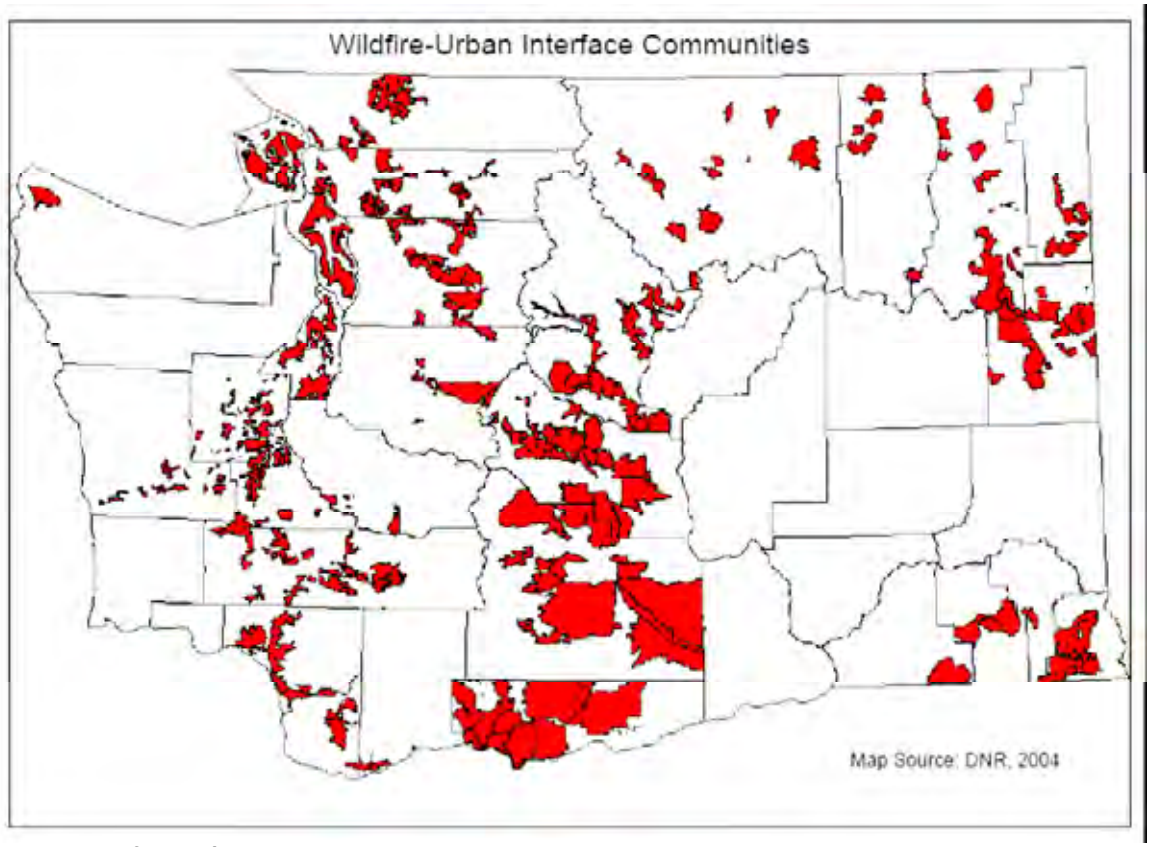
The existence of large forested areas, increasing population, and recreational activities, and the uncertain impact of a changing climate combine to suggest a **high probability of occurrence** for wildland fire.

Photo by David Brown

Overall County Vulnerability To Hazard:

Home building in and near forests increases the risks from forest fires. These areas of new homes are referred to as interface areas. Often, structures have been built and maintained with minimal awareness of the need for protection from exterior fire sources,

or the need to minimize interior fires from spreading to forested lands. Because of these interface areas, the county has a high vulnerability rate for wildfire and is at high risk. Wildland Urban Interface (WUI) communities at risk for fire in Skamania County include both the community of Skamania and the city of Stevenson as identified by the Department of Natural Resources (DNR).



Department of Natural Resources, 2004

Overall County Impact Of Hazard:

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

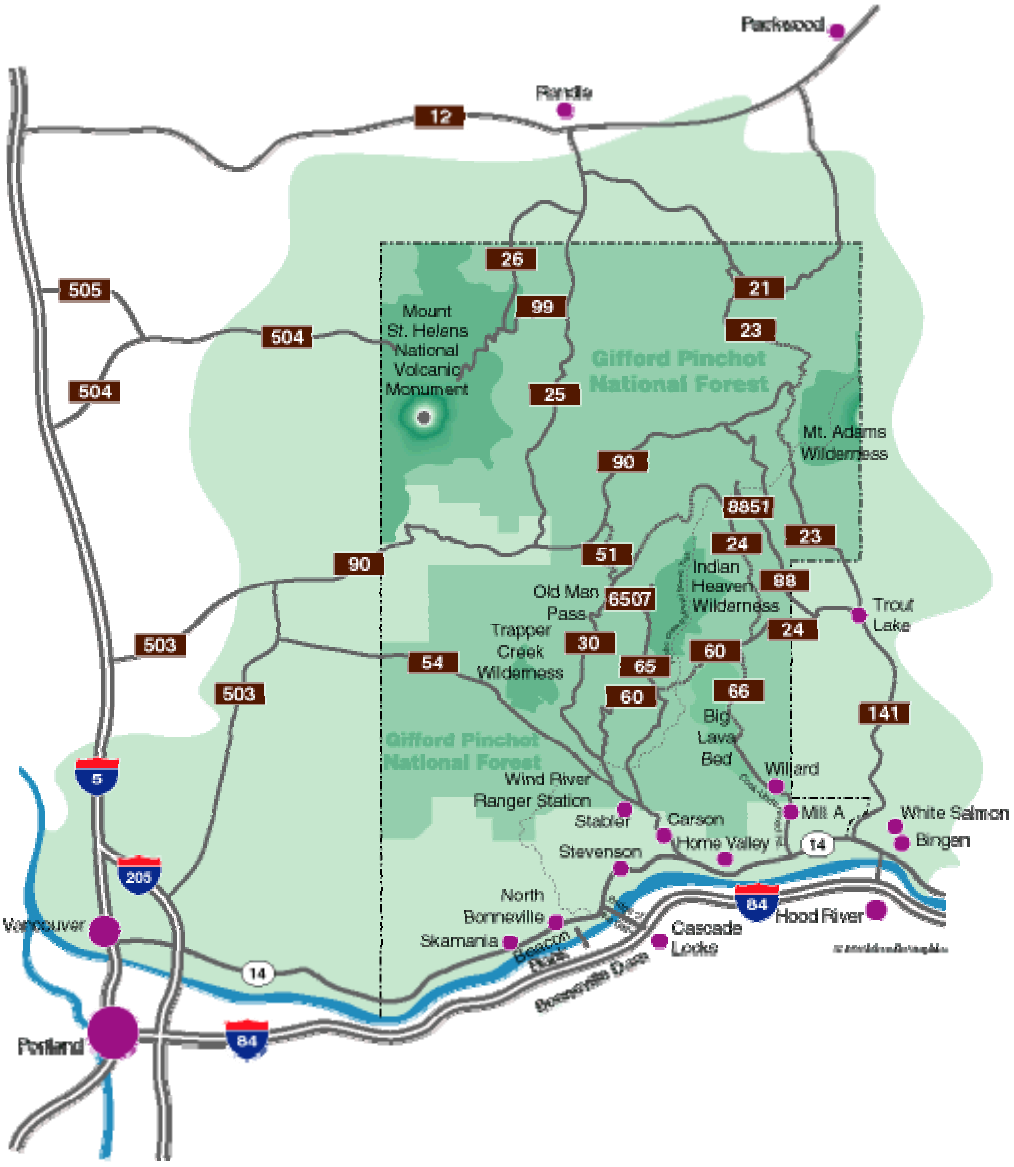
Vulnerability Assessment and Mitigation Strategies:

Specifics regarding vulnerability assessment and mitigation strategies are covered in the jurisdiction specific portions of this plan.

References/Resources:

Organization	Address	Phone/Email	Website and/or Comments
InciWeb			http://www.inciweb.org/ Incident Information System
National Interagency Fire Center	Boise, Idaho		http://www.nifc.gov/index.html http://www.nifc.gov/preved/comm_guide/wildfire/fire_5.html
Skamania County & WSU Extension Wildfire Prevention Program	710 Rock Creek Drive, Stevenson, WA 98648	509/427-3769	http://skamania.wsu.edu/Forestry.htm Includes links to Community Wildfire Protection Plans for identified areas in Skamania County
Washington Military Department Emergency Management Division	Building 20, MS TA-20, Camp Murray, WA 98430-5112		http://www.emd.wa.gov/ http://www.emd.wa.gov/documents/WildfireFactSheet.pdf Wildfire Fact Sheet for individuals to help prevent or reduce damage caused by wildfires
Washington State Hazard Mitigation Plan 2007			Wildland Fire Section http://www.emd.wa.gov/plans/documents/WildlandfireNov2007Tab5.10.pdf

Section IV
Multi-Jurisdictional Risk Assessment and Mitigation Strategies



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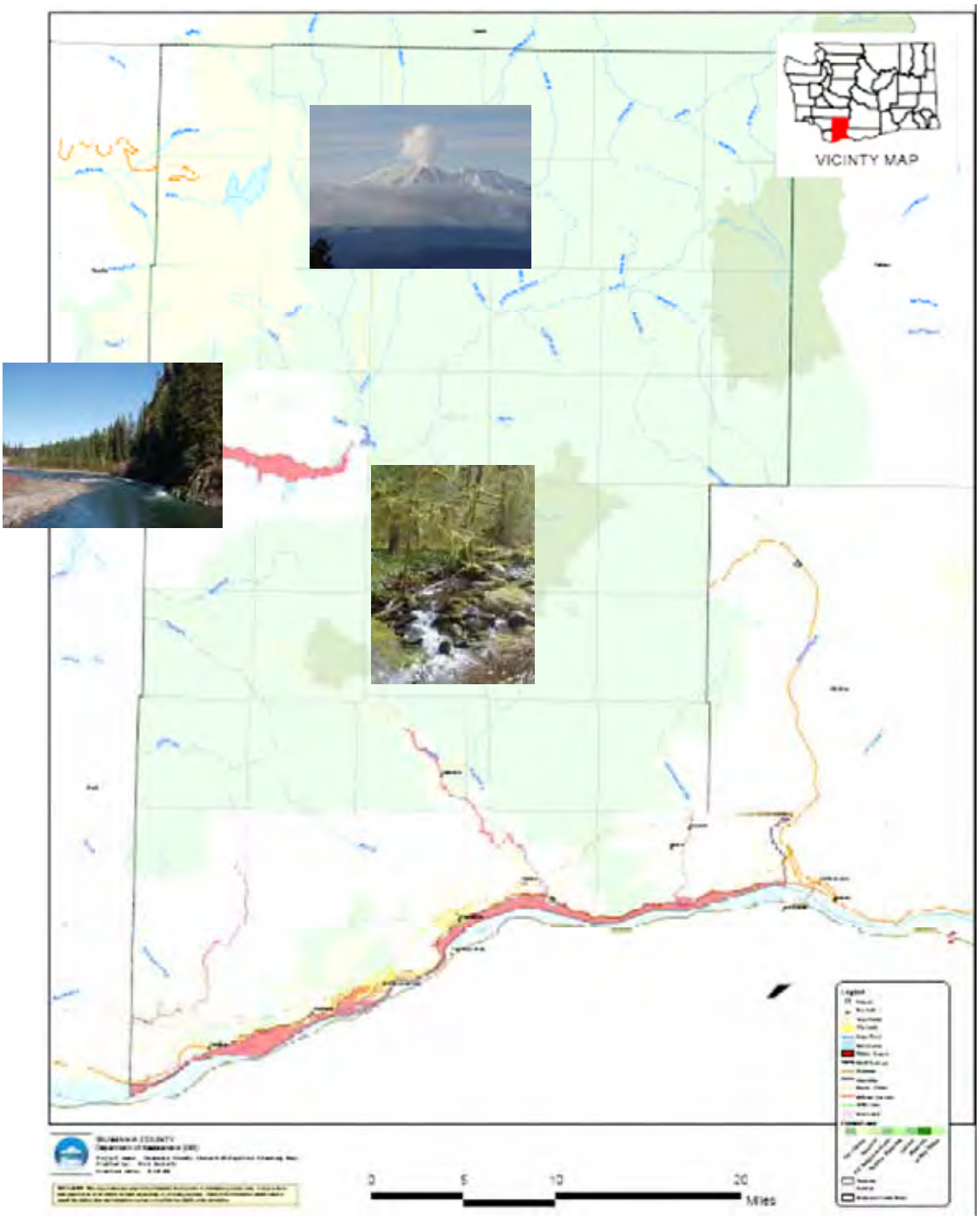
Unincorporated Skamania County



Unincorporated Skamania County includes all of Skamania County except the City of North Bonneville and the City of Stevenson (both located along the southern boundary of the above map).

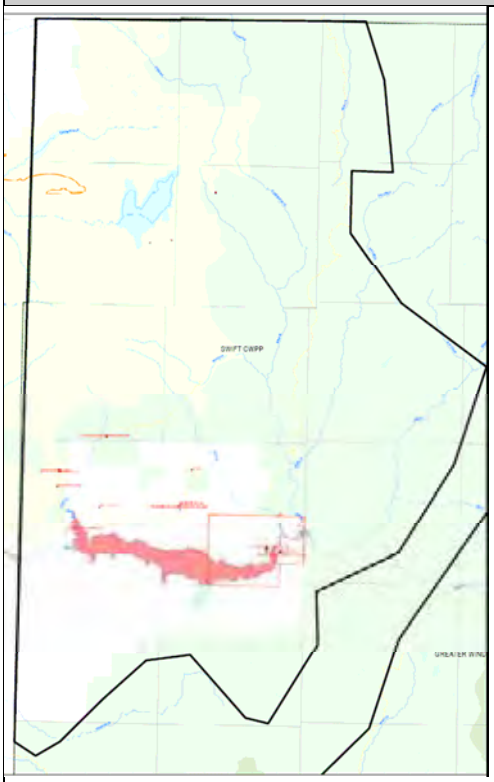
Location/Area Served:

Skamania County covers approximately 1672 square miles, of which 1335.94 square miles is federally owned (Gifford Pinchot National Forest), and 93.56 square miles is state owned. The cities of North Bonneville (2.47 square miles) and Stevenson (1.47 square miles) are the only incorporated areas in the county.

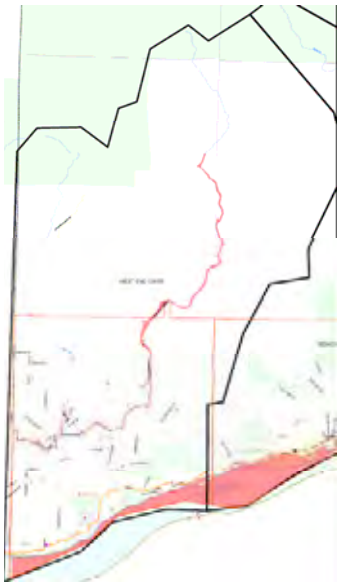
Unincorporated Skamania County includes the communities of Carson, Cook, Home Valley, Mill A, Prindle, Mt. Pleasant, Northwoods, Skamania, Stabler/Hemlock, Underwood and Willard.

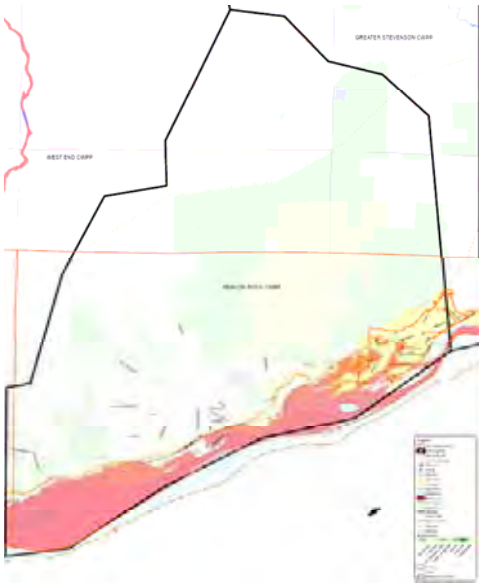
Community Wildfire Protection Plans (CWPPs) were completed in 2007 and 2008 for all areas in Skamania County where people live; consequently they include the above listed communities. To avoid duplication of efforts and streamline the hazard vulnerability process, it was decided to utilize for this plan, the same geographical divisions as were used for the CWPPs. An additional area has been included and designated as the "Rest of the County" and the Little White Salmon Drainage and Underwood Areas have been combined since there is a large overlapping section between the two.

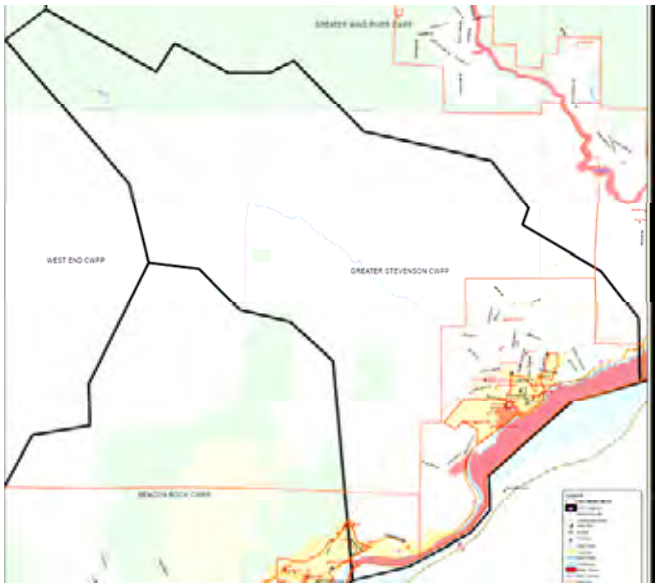
Below are descriptions of Unincorporated Skamania County Sub Areas:

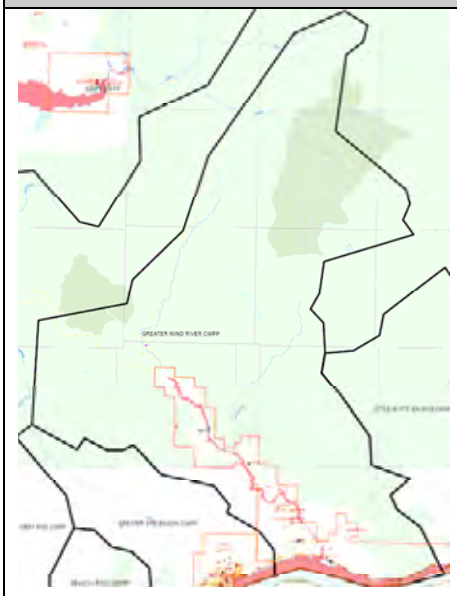
Swift Reservoir	**Description, Assets, Land Use and Development Trends**
	The Swift Reservoir area is located in northwest Skamania County. Communities are located along the north side of Swift Reservoir from the Cowlitz County border to the northeast side of the reservoir. Mount St. Helens National Volcanic Monument is located in the northwest portion of the Swift Reservoir area, and covers 110,000 acres. The southwest section of the Swift Reservoir area is comprised of 121,000 acres of state land. Assets within the Swift Reservoir area include roads, bridges, power lines, wells, water pumping and supply areas, dams, commercial areas of economic value to the communities, gas and fuel storage areas, commercial timber, recreational areas, watersheds, historical sites, endangered species, archaeological sites and homes. The Swift Reservoir area has high growth potential with the possibility of 564 new recreational cabins (for a total of 903 cabins) projected for 2027, with a corresponding rise in population (Swift Reservoir Area CWPP, December 2007)

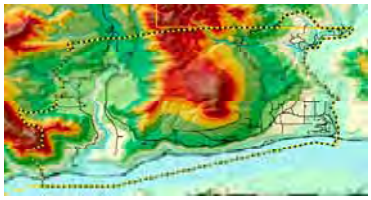
Rest of the County	Description, Assets, Land Use and Development Trends
	The geographical area designated as the “Rest of the County” in this plan is the white area in the map to the right. This area is comprised mostly of forested land. There is no population base in this area. Assets within the Rest of the County include roads, bridges, commercial timber, recreational areas, historical sites, endangered species and archaeological sites.

West End	Description, Assets, Land Use and Development Trends
	The West End area is located in southwest Skamania County. Assets within the West End area include roads, bridges, railroads, natural gas lines, power lines, wells and water pumping and supply areas, dams, commercial areas of economic value to the communities, commercial timber, recreation areas, archaeological sites and homes. “Historically, the West End of Skamania County was utilized primarily for agriculture and timber production. Since the late 1980s, the trend has moved toward single-family residential uses with many residents commuting for work to the urban areas of Vancouver and Portland. However, even with the development that has recently occurred, the current overall character of the West End Community is “rural”. There are many large tracts of land remaining within the community that are utilized for agriculture and timber production: primarily tree plantations, Christmas trees, animal husbandry, and hay production.” (West End Community Comprehensive Subarea Plan 2007)

Beacon Rock	Description, Assets, Land Use and Development Trends
	The geographical area designated as “Beacon Rock” in this plan is the same geographical area used for the Greater Beacon Rock Community Wildfire Protection Plan, with the exception of City of North Bonneville. The Beacon Rock area is located in southwest Skamania County, and includes the communities of Skamania, Mt. Pleasant, and Prindle. Assets within the Beacon Rock area include roads, bridges, railroads, natural gas lines, propane tanks, Bonneville Dam hydropower production facility, power transmission lines, reservoir, water lines and tanks, senior center, post office, Beacon Rock State Park, historic structures, businesses and homes.

Greater Stevenson	Description, Assets, Land Use and Development Trends
	The geographical area designated as “Greater Stevenson” in this plan is the same geographical area used for the Greater Stevenson Community Wildfire Protection Plan, with the exception of the Cities of North Bonneville and Stevenson. The Greater Stevenson area is located in south central Skamania County, and elevation ranges from about 50 feet to almost 5000 feet above sea level. Assets within the Greater Stevenson area include roads, bridges, railroads, natural gas lines, propane tanks, power transmission lines, water lines and tanks, a transfer site, senior center, post office, churches, county facilities, grocery, gas station, other businesses and homes.

Greater Wind River Area	Description, Assets, Land Use and Development Trends
	The Greater Wind River Area encompasses the unincorporated communities of Carson, Home Valley and Stable/Hemlock. Carson is located 1 mile north of Highway SR 14 on Wind River Highway. Home Valley is located on SR14, milepost 50. Stabler/Hemlock is located along Wind River Highway approximately eight miles north of SR14. Assets within the Greater Wind River Area include power lines, industrial sites, water treatment facilities, reservoirs, wells, water pumping and supply area, dams, bridges, railroads, emergency communication towers, historical and cultural sites, commercial areas of economic value to the communities, gas and fuel pipelines, SR14 and Wind River Road, Bear Creek Watershed, commercial timber, recreation areas, archaeological sites, fish hatcheries and homes.

Little White Salmon Drainage and Underwood Area	Description, Assets, Land Use and Development Trends
 	The Little White Salmon Drainage and Underwood Area is located in the southeastern part of Skamania County. Unincorporated communities included in the Little White Salmon Drainage and Underwood Area include Cook, Mill A, Willard and Underwood. Assets within the Little White Salmon Drainage and Underwood Area include roads, tunnels, bridges, railroads, natural gas lines, pumping station, propane tanks, power generation, two sets of BPA lines, power poles, water lines, water tanks, Shaddox Springs (water supply, drinking), a transfer site, two communications towers, community center, post office, hatcheries, research laboratories, businesses and homes. Timberland clearing and new homes are being built in this area.

Land Uses And Development Trends In Hazard Area:

Skamania County's growth rate is projected at 1.6% annually until the year 2025, as shown in the following table.

Table 1-3. Projected Growth High Rate (OFM, January 2002)

	2010	2015	2020	2025
Skamania County	12,368	13,429	14,467	15,503

To meet the housing needs of the projected population growth, a minimum of 84 new residences would need to be constructed each year until 2025.

Comparative population figures for Skamania County are as follows:

Location	2000	2007
Unincorporated Areas	**8079**	**8448**
City of North Bonneville	593	882
City of Stevenson	1200	1370

Office of Financial Management, State of Washington (website)

Natural Hazard Event History:

Events with Countywide Impact on Unincorporated Skamania County

Hazard	Date	Location	Impact
Drought	**March 31, 1977 FEMA Emergency Declaration**	**Throughout Washington**	**Worst drought in Washington State history**
Drought	**April 2001, Statewide Drought Emergency Declared by Governor**	**Throughout Washington**	**Compared with the 1977 Drought**
Earthquake	**March 1, 2001, FEMA-1361-DR February 28, 2001 – March 16, 2001**	**Skamania County**	**Washington Earthquake, Magnitude 6.8 Nisqually Earthquake**
Flooding	**December 1996-January 1997**	**Federally declared disaster #1159**	**Saturated ground combined with snow freezing rain, rain, rapid warming and high winds within a five-day period to cause flooding**
Flooding	**January 2006**	**Federally declared disaster #1641**	**Moist subtropical rainstorms – record flood levels throughout state**
Landslide	**February 1996**	**Near Stevenson, a reactivated landslide complex**	**Removed three homes from their foundations**
Severe Wind Storm	**1985**	**Upper Wind River Area**	**Destroyed thousands of acres**
Severe Storm	**February 14, 2007, FEMA-1682-DR December 2006**	**Skamania County**	**Severe Winter Storm, Landslides, and Mudslides**
Severe Storm	**January 2009, FEMA-1817-DR**	**Skamania County**	**Severe Winter Storm, Land-slides, Mudslides, and Flooding**
Severe Storm	**March 2, 2009, FEMA-1825-DR December 12, 2008-January 5, 2009**	**Skamania County**	**Severe Winter Storm and Record and Near Record Snow**
Volcanic Eruption	**May 18, 1980**	**Mount St. Helens Volcanic Eruption**	**Ash cleanup from multiple fallouts**

Swift Reservoir Specific Events

Event	Impact
1998 Earthquake	19 mi SSE of Mount St. Helens, 3.1 Magnitude Earthquake
1996 Flooding	Pine Creek Bridge, 25 Road
1980 Landslide	5.1 Magnitude earthquake triggered an estimated 3.7 billion cubic yard landslide. Extensive damage. Destroyed all buildings near Spirit Lake, and destroyed more than 200 homes and cabins.
1980 Volcanic Eruption	Loss of 57 lives, widespread destruction of valuable property.
1975 Avalanche	5 deaths

Eagle Cliff Bridge, 25 Road, 1996,
Photograph by David Brown

May 18, 1980 eruption of Mount St. Helens.
USGS Photograph taken on May 18, 1980, by Joseph Rosenbaum.

Greater Stevenson Specific Events

Event	Impact
December 12, 2006, FEMA-1671-DR November 2-11, 2006 Landslide	Severe Storms, Flooding, Landslides and Mudslides, Piper Road landslide and debris removal

Piper Road Landslide, 2007, Photograph by Larry Douglass

Little White Salmon Underwood Specific Events

Event	Impact
2007 Wildland Fire	Broughton Fire – State Fire Mobilization – Destroyed six homes and caused evacuation of 400 residents from 100 immediately threatened homes.

Broughton Fire, 2007, Photograph Credit Unknown

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

Unincorporated Skamania County has 61 NFIP policies with 1 (one) repetitive loss property. Total coverage - $16,360,500, Total claims – 72, Total losses paid - $1,351,980, Substantial damage claims – 50, Repetitive loss properties 1 @ $58,429.

SUB AREA	REPETITIVE LOSS PROPERTY
Swift Reservoir	0
Rest of the County	0
West End	0
Beacon Rock	0
Greater Stevenson	1
Greater Wind River	0
Little White Salmon Drainage and Underwood	0

Existing & Future Critical Infrastructure/Facilities (Types & Numbers):

Unincorporated Skamania County has roughly 3500 improved parcels with an average value of $230,000 per parcel (exempt parcels not included). If exempt parcels are included it would roughly be 4500 parcels with an average of $235,000 per parcel.

SPECIFIC CRITICAL INFRASTRUCTURE/FACILITIES BY SUB AREA

SWIFT RESERVOIR		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
Wind River Road, Curly Creek Rd, USFS 90 Rd, State Route 503, (Primary routes to access the Swift Reservoir area, north/south and to the west) Dams, Bridges	Power Lines, Watersheds	Cabins and structures, 339 as of May 2006 (not all are year-round residents) Recreation Values, Commercial Timber, Cedar Flats, Mount St. Helens, Swift Reservoir, Fisheries, Rivers and Streams Historical and Archaeological Sites
REST OF THE COUNTY		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
USFS Roads		Commercial Timber, Recreational Areas
WEST END		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
State Highway 14, (Major east-west route) Belle Centre, Canyon Creek, Salmon Falls, and Washougal River (Major access roads) BNSF Railroad Line along the Columbia River	Natural Gas Lines (Avista Utilities, Williams Pipeline	Post Office, Businesses, Schools in the Washougal School District (Clark County Jurisdiction), Homes
BEACON ROCK		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
State Highway 14, (Major east-west route) BNSF Railroad Line along the Columbia River	Natural Gas Lines (Avista Utilities, Williams Pipeline	Businesses, Homes
GREATER STEVENSON		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
State Highway 14, (Major east-west route) Rock Creek Drive, Loop Road, Kanaka Creek Road, Nelson Creek Drive (Major access roads) Rock Creek Bridge, SR-14 Bridge BNSF Railroad Line along the Columbia River	Natural Gas Lines (Avista Utilities, Williams Pipeline	County Owned Buildings - Courthouse, Sheriff's Office/Jail, Rock Creek Center, Stevenson Transfer Site, District #2 Shop, Public Health, Courthouse Annex Businesses, Homes
GREATER WIND RIVER		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
State Highway 14, (Major east-west route) Five Tunnels along State Hwy 14, owned and maintained by	Natural Gas Lines (Avista Utilities,	Carson National Fish Hatchery, US Post Office, Gravel Stockpile

Washington State Department of Transportation BNSF Railroad Line along the Columbia River	Williams Pipeline	
LITTLE WHITE SALMON DRAINAGE AND UNDERWOOD		
TRANSPORTATION	**UTILITIES**	**FACILITIES/OTHER**
State Highway 14, (Major east-west route) Cook-Underwood Road - Main access/escape route (14.35 mi)– potential of major cut-slope failures at the east and west ends. In addition, the west end fill slopes have potential for major failures. Detours for emergency services could be lengthy. Five Tunnels along State Hwy 14, owned and maintained by Washington State Department of Transportation BNSF Railroad Line along the Columbia River	Natural Gas Lines (Avista Utilities, Williams Pipeline	Little White Salmon and Willard National Fish Hatchery, USGS Columbia River Research Laboratory, includes main building, wetlab, pump house, ozone shed, and boat storage) County owned community center with a 30KW Mobile Kamag Diesel Generator Spring Creek National Fish Hatchery US Post Office District Shop Transfer Site

Potential Dollar Losses & Methodology Used To Estimate:

The percentage of unincorporated Skamania County estimated to be threatened by each hazard was based on readily available data and/or best judgment. This percentage was used to estimate the number of structures considered at risk.

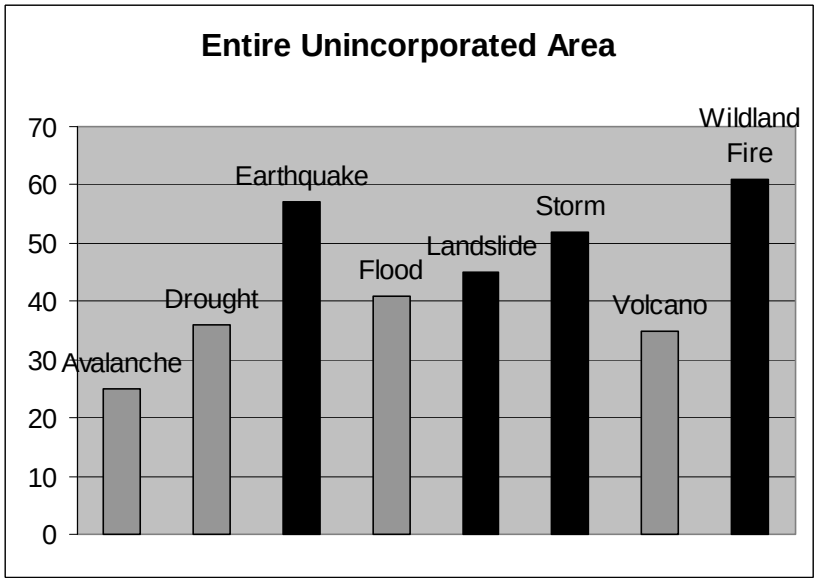
That number was then multiplied by the average value of each structure to determine a total estimated value of property at risk for each specific hazard.

The following chart represents estimates for the each specific unincorporated area as well as unincorporated Skamania County as a whole

Unincorporated Skamania County

	Type of Existing Buildings, Infrastructure, and Critical Facilities	Estimated Number of Structures	Average Value of Each Structure	Total Value of Structures	% of Structures Considered at Risk								Total Estimated Value ($) of Structures at Risk							
					Avalanche	Drought	Earthquake	Floods	Landslide	Storm	Volcanic Eruption	Wildland Fire	Avalanche	Drought	Earthquake	Floods	Landslide	Storm	Volcanic Eruption	Wildland Fire
Swift Reservoir	**Improved Parcels (such as a house, shop, etc,)**	151	$ 76,386	$11,534,286	0	60	100	15	25	100	80	100	$ -	$ 6,920,572	$11,534,286	$ 1,730,143	$ 2,883,572	$11,534,286	$ 9,227,429	$11,534,286
Rest of the County	**Improved Parcels (such as a house, shop, etc,)**				0	0	100	10	0	100	10	100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West End	**Improved Parcels (such as a house, shop, etc,)**	1046	$ 142,036	$148,569,656	0	75	100	25	15	100	10	100	$ -	$111,427,242	$148,569,656	$ 37,142,414	$ 22,285,448	$148,569,656	$ 14,856,966	$148,569,656
Beacon Rock	**Improved Parcels (such as a house, shop, etc,)**	295	$ 134,736	$39,747,120	0	75	100	20	15	100	10	100	$ -	$29,810,340	$39,747,120	$ 7,949,424	$ 5,962,068	$39,747,120	$ 3,974,712	$39,747,120
Greater Stevenson	**Improved Parcels (such as a house, shop, etc,)**	213	$ 152,400	$32,461,200	0	75	100	5	50	100	10	100	$ -	$24,345,900	$32,461,200	$ 1,623,060	$16,230,600	$32,461,200	$ 3,246,120	$32,461,200
Greater Wind River	**Improved Parcels (such as a house, shop, etc,)**	1217	$ 119,596	$145,548,332	0	75	100	10	10	100	10	100	$ -	$109,161,249	$145,548,332	$ 14,554,833	$ 14,554,833	$145,548,332	$ 14,554,833	$145,548,332
Little White Salmon Drainage and Underwood	**Improved Parcels (such as a house, shop, etc,)**	570	$ 152,657	$87,014,490	0	75	100	30	10	100	20	100	$ -	$65,260,868	$87,014,490	$26,104,347	$ 8,701,449	$87,014,490	$17,402,898	$87,014,490
Total Potential Dollar Loss													**$ -**	**$ 346,926,170**	**$ 464,875,084**	**$ 89,104,221**	**$ 70,617,970**	**$ 464,875,084**	**$ 63,262,958**	**$ 464,875,084**

Note: The large percentage for structures potentially at risk due to drought is based on an extended drought, and the possible effect on "well" water supply. (The major source of supply for most homes in unincorporated Skamania County). If homes have no source of water supply over an extended period of time it is assumed they may become uninhabited.

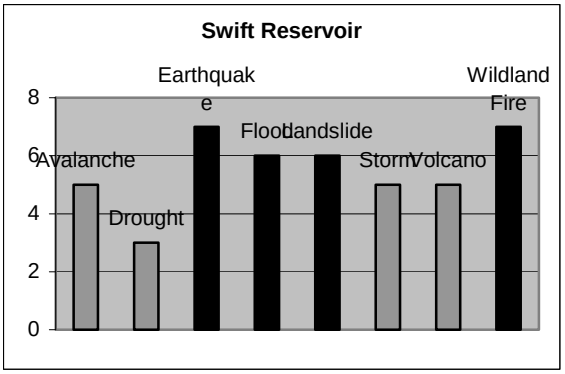


Unincorporated Skamania County Risk Assessment:

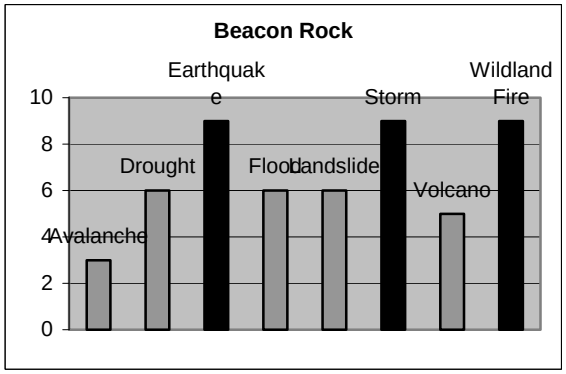
The risk assessment for unincorporated Skamania County was determined by using a hazard analysis matrix. High, Moderate and Low Values (3,2,1 respectively) were assigned to various criteria, then averaged to determine risk ratings.

Overall, it was determined unincorporated Skamania County is most vulnerable to the following natural hazards.

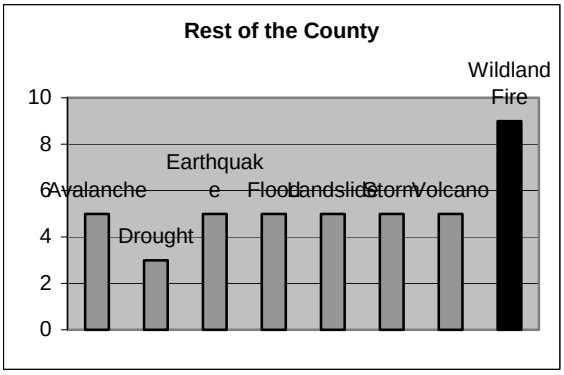
1. Wildland Fire
2. Earthquake
3. Storm
4. Landslide



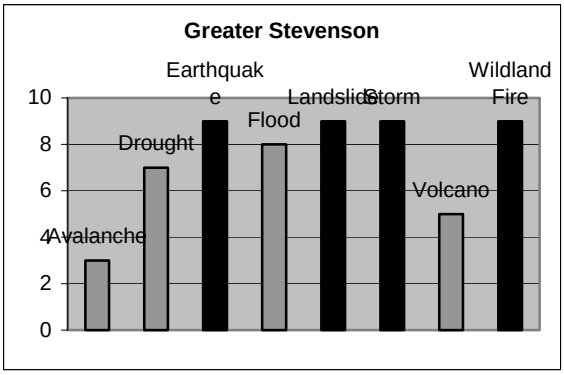
Earthquake, Wildland Fire
Flood, Landslide



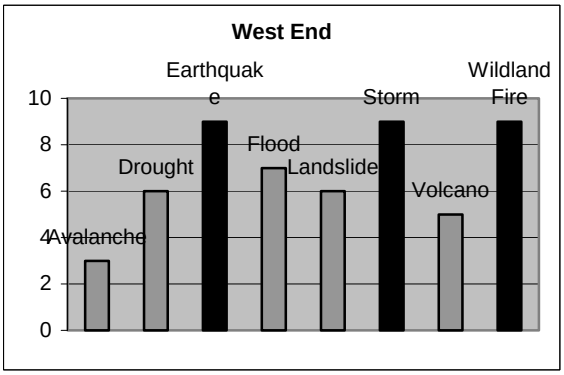
Earthquake, Storm, Wildland Fire



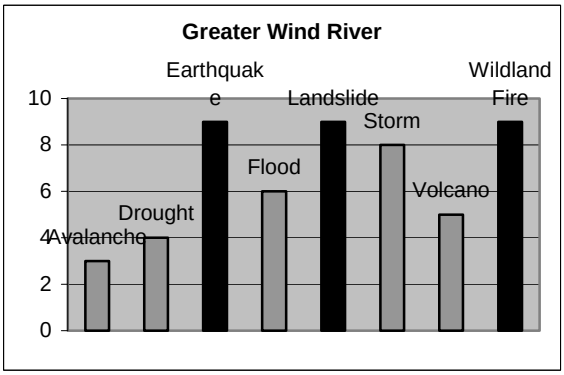
Wildland Fire



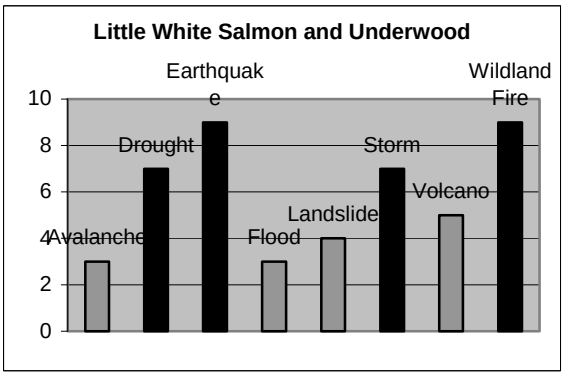
Earthquake, Landslide, Storm, Wildland Fire



Earthquake, Storm, Wildland Fire



Earthquake, Landslide, Wildland Fire



Local Hazard Mitigation Goals:

The following is a description of mitigation goals for unincorporated Skamania County. These goals address strategies to reduce or avoid long–term vulnerabilities to the hazards identified above:

Goal 1: Protect Life.
Objective (Obj.) 1.1 - Improve systems that provide warning and emergency communications.
Obj. 1.2 - Develop or amend laws so they effectively address hazard mitigation.
Obj. 1.3 - Reduce the impacts of hazards on vulnerable populations.
Obj. 1.4 - Strengthen state and local building code enforcement.
Obj. 1.5 - Train emergency responders.

Goal 2: Protect Property.
Obj. 2.1 - Protect critical assets.
Obj. 2.2 - Protect and preserve facility contents.
Obj. 2.3 - Reduce repetitive and severe repetitive losses, including those caused by flooding.

Goal 3: Promote a Sustainable Economy.
Obj. 3.1 - Provide incentives for mitigation initiatives.
Obj. 3.2 - Continue critical business operations.
Obj. 3.3 - Form partnerships to leverage and share resources.

Goal 4: Protect the Environment.
Obj. 4.1 - Develop hazard mitigation policies that protect the environment.

Goal 5: Increase Public Preparedness for Disasters.
Obj. 5.1 - Understand natural hazards and the risk they pose.
Obj. 5.2 - Improve hazard information, including databases and maps.
Obj. 5.3 - Improve public knowledge of hazards and protective measures so individuals appropriately respond during hazard events.
Obj. 5.4 - Develop new policies to enhance hazard mitigation initiatives.

Identification And Analysis Of Mitigation Actions:

The mitigation actions/projects on the following pages includes a **comprehensive range of specific mitigation actions and projects relating to the identified hazards in Section III of this plan.**

Many of the actions/projects were identified as applying to **ALL/MOST** of unincorporated Skamania County, however there were also a few identified mitigation actions and projects that applied only to a specific unincorporated area.

Actions/projects that specifically **address reducing effects of hazards on new and existing buildings are identified with an X in the "Protect Property" column.**

Skamania County participates in the National Flood Insurance Program and has developed local ordinances to better regulate and direct development in flood plain areas. These local ordinances regulate planning, construction, operation, and maintenance of any structures, and improvements, private or public. They work to insure that these developments are properly planned, constructed, operated, and maintained to avoid adversely influencing the regimen of a stream or body of water or the security of life, health, and property against damage by flood water.

"Flood hazard areas are those areas that are at risk of being inundated by a 100-year flood or, more specifically, subject to a one percent or greater chance of flooding in any given year. These areas include, but are not limited to streams, rivers, creeks, lakes, and wetlands. Floods adjacent to these bodies of water can cause great damage to human life, as well as to private and public property. In order to minimize and prevent these adverse impacts from occurring, it is imperative that appropriate regulations are established.

Skamania County currently reviews all proposed development to determine whether it would occur within the 100-year floodplain of any river or stream. The review is based on the Flood Insurance Rate Maps (FIRM) created by the Federal Emergency Management Agency (FEMA). Title 15 of the Skamania County Code establishes the requirements for any structures located within the 100-year floodplain that are consistent with the International Building Code and meets the requirements of best available science. A licensed land surveyor completes a Flood Elevation Certificate; these forms serve as a site-specific inventory to determine whether a proposed structure is elevated to an appropriate level above the floodplain." (2007 County Comprehensive Plan)

Action/projects related to continued compliance with NFIP are italicized and bold on the following pages.

Actions/Projects were identified through meetings with the local planning team, as well as through public input generated from flyers, surveys, email contacts and the Department of Emergency Management website. They were **prioritized using a High, Medium, Low Priority system taking into consideration the number of goals, hazards addressed, effectiveness at reducing risk, ease of administration, cost, potential availability of resources, and whether or not the action/project has already been identified in other plans.**

Below illustrates the process used in developing the prioritization of projects and mitigation actions. (Example)

Mitigation Action	number of goals addressed	hazards addressed	reducing risk	ease of administra-tion	cost	availability of resources	identified in other plans
Vulnerable Population Evacuation Plan	H	M	L	M	L	M	H

Implementation and administration of the identified actions/projects is dependent upon the receipt of future federal, state and/or other hazard mitigation grant funding. Information regarding the responsible administering department, existing and potential resources and a timeframe for completion of the actions/projects has been listed alongside each action/project. Timeframes are identified as follows:
years – Short Term
2-4 years – Medium Term
4 or more years – Long Term

Although the actions were prioritized as described above, the completion of actions will largely be dependent upon outside funding.

Cost/Benefit Review

As part of the project development process, entities identified as being responsible for implementing and administering the identified actions should prioritize the actions using a cost/benefit analysis based on guidelines provided by the United States Department of Homeland Security (FEMA).

Qualitative and/or quantitative methods may be used to analyze benefits and costs of actions. Refer to "Using Benefit-Cost Review in Mitigation Planning" (FEMA 386-5) for a variety of templates and scoring procedures.

FACILITY AND INFRASTRUCTURE ACTION/PROJECTS

Area and Priority				HIGH	MED	LOW	Action/Project		Goal Addressed					Hazard Addressed								
Greater Stevenson	Greater Wind River	Beacon Rock	Little White Salmon Drainage and Underwood	West End	Swift	Rest of County	**Identification and Analysis**	**Administration, Implementation and Timeline**	Protect Life	Protect Property	Promote a Sustainable Economy	Protect the Environment	Increase Public Preparedness for Disasters	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
H	H	H	H	H	H	H	General Inspection of Communication Towers	Owners and Users, Ongoing	X	X		X	X			X		X	X		X
H	H	H	H	H	H	H	Reconstruct, strengthen, and/or retro-fit local emergency communications structures, facilities, and equipment to better withstand the effects of a major earthquake and aid in post-disaster communication capabilities of first response agencies.The Lookout and Red Mountain repeater sites have priority needs.	Sheriff's Office - ongoing	X	X	X	X	X			X	X		X		X
H	H	H	H	H	H	H	Fuel Breaks around "communities at risk"	Local Fire Districts - ongoing	X	X	X	X	X									X
H	H	H	H	H	H	L	Establish, Improve and Maintain Evacuation and Response Routes	State, county, city administrators, implemented as funding becomes available, long term project	X	X	X	X	X	X		X	X	X	X	X	X	X
H	H	H	H	H	H	L	"Firewise" structure protection - create defensible space around homes and other critical structures	Local Fire Districts - ongoing	X	X	X	X	X									X
M	M	M	M	M	M	M	General Inspection of Bridges, especially High Bridge, Susceptible to Multiple Failures	Public Works, Short Term	X				X			X	X	X	X			
M	M	M	M	M	M	M	General Inspection of Roads	Public Works, Pre-planning by Priority and Road Type	X		X		X			X	X	X	X	X	X	X

M	M	M	M	M	M	M	Maintaining defensible space and fuel breaks along Evacuation Routes	Public Works, DNR - ongoing	X	X	X	X	X									X
M	M	M	M	M	M	M	Signage to communicate emergency related information to residents and visitors	Public Works - Ongoing	X	X			X	X	X	X	X	X	X	X	X	X
H	M	M	M	M	M	L	Re-trofit and/or reconstruct county owned buildings/facilities and transportation systems to better withstand damage from a major earthquake.	Public Works, Facilities and Recreation, County Commissioners	X	X	X	X	X			X						
M	M	M	M	M	M	L	General Inspection of Power Lines and Communication Lines	Owners and Users, Ongoing, Short, ASAP	X	X	X	X	X			X	X	X	X		X
M	M	M	M	M	M	L	General Inspection of All Buildings in General, Retrofitting and Engineering as Needed	Facility Owners, Short Term	X	X	X	X	X			X	X	X	X		X
M	M	M	M	M	M	L	Create access on private roads for emergency response	Planning Department, Commussioners - Medium Term	X	X			X	X		X	X	X	X	X	X
M	M	M	M	M	M	L	Establish a fuels disposal program	Local Fire Districts - ongoing	X	X	X	X	X								X
M	M	M	M	M	L	L	General Inspection of Pipelines	Utility Companies, Short Term, Ongoing	X	X		X	X			X	X	X	X		X
M	M	M	M	M	L	L	Communicate with Commercial Industry Regarding Mitigation???	???	X	X	X		X			X	X	X	X		X
L	L	L	L	L	L	L	Create defensible fuel zones and fire breaks along roads accessing high-use recreation areas	Public Works, DNR - ongoing	X	X	X	X	X								X
L	L	L	L	L	L	L	Re-locate all above-ground utilities underground within 300 feet of all county-owned buildings to facilitate egress of employees and citizens and ingress of emergency response personnel following a damaging earthquake or severe storm.	Public Works, local utility providers - Long Term	X	X	X	X				X			X		

PLANNING ACTION/PROJECTS

Area and Priority							Action/Project		Goal Addressed					Hazard Addressed							
				HIGH	MED	LOW															
Greater Stevenson	Greater Wind River	Beacon Rock	Little White Salmon Drainage and Underwood	West End	Swift	Rest of County	Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote a Sustainable Economy	Protect the Environment	Increase Public Preparedness for Disasters	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
H	H	H	H	H	H	H	Develop a county-wide communications plan for all-hazards disasters, to include back-up communications plans, such as use of amateur radio	EMES Council-ongoing	X	X	X	X	X	X		X	X	X	X	X	X
H	H	H	H	H	H	M	Establish an evacuation plan to include a public notification system and identification of escape routes, escape areas, staging areas and helicopter landing zones	Emergency mgmt, Public safety providers- ongoing	X	X			X			X	X	X	X		X
H	H	H	H	H	H	M	Evaluate, and prioritize all county transportation infrastructure systems for needed seismic retro-fitting	Public works, WSDOT	X	X	X					X					
H	H	H	H	H	H	L	Develop a plan for all-hazards evacuation of special needs populations during a disaster	Emergency Mgmt, senior services, medical service providers- ongoing	X				X			X	X	X	X		X
H	H	H	H	H	H	L	Prioritize residential fuel mitigation projects	Firewise program local fire districts, ongoing	X	X		X	X								X
M	H	H	M	H	L	L	***Update Flood Information and Update Maps in Flood Plain***	***Planning Deparment, Medium, Long Term***	X	X		X					X				
M	M	M	M	M	M	L	***Adjust Local Codes to Address Enhanced Stability and Increase Protection from Natural Hazards***	***Planning Department, Short Term***	X	X		X				X		X	X		
M	M	M	M	M	M	L	Continue Critical Area Code Requirements Regarding Volcanic and Landslide Areas - Better Utilize the Required Engineering Reports	Planning Department, Sort Term	X	X		X	X				X			X	

M	M	M	M	M	M	L	Evaluate all Known Hazards - Example Maple Hill Slide and Update Possible Requirements for BP etc.	Planning Department, Medium	X	X		X					X	X		X		
M	M	M	M	M	M	M	Designate Emergency Areas (Staging, Helicopter LZ and Evacuation)	Local emergency response agencies and emergency management- ongoing	X				X	X	X	X	X	X	X	X	X	X
M	M	M	M	M	M	M	Develop a mobilization handbook for first responders to include identification of hazards, bridge weight limitations, gates, road accessibility, power lines, gas lines, fire hydrants, etc.	Public works, GIS Emergency management, local utility providers- longterm	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M	M	M	M	M	M	M	Enhance GPS data collection and map building	GIS, Public Works- ongoing	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M	M	M	M	M	M	L	Enhance the Public Notification Plan.	Emergency Mgmt	X	X	X		X			X	X	X	X	X	X	X
M	M	M	M	M	M	L	Identify at least one primary and one alternate meeting place/shelter for each unincorporated area.	Red Cross-Local emergency mgmt- ongoing	X				X	X		X	X	X	X	X	X	X
M	M	M	M	M	M	L	Ensure all new construction permit applications be screened for potential hazards and all appropriate codes are enforced.	Planning	X	X	X	X	X	X		X	X	X	X	X	X	X
L	L	L	L	L	L	L	Resolve conflicts between NSA and Firewise requirements	Local Governments- Longterm	X	X		X										X
L	L	L	L	L	L	L	Develop a plan for all-hazards evacuation of pets and livestock, during a disaster.	Emergency Mgmt, Veterinary providers- medium		X			X			X	X	X	X			X

EDUCATIONAL ACTION/PROJECTS

Area and Priority				HIGH	MED	LOW	Action/Project		Goal Addressed					Hazard Addressed							
Greater Stevenson	Greater Wind River	Beacon Rock	Little White Salmon Drainage and Underwood	West End	Swift	Rest of County	Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote a Sustainable Economy	Protect the Environment	Increase Public Preparedness for Disasters	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
H	H	H	H	H	H	M	Programmable reader boards at specific points throughout the county to inform and educate community members of wildfire danger, burn bans, evacuation routes, assembly points and other emergency information.	Public Works, and Dispatch, Use of Dispatch for programming, Long Term	X	X	X	X	X	X	X	X	X	X	X	X	X
H	H	H	H	H	H	M	Engage community members in "personal preparedness" activities through expansion of CERT program to include active groups in each unincorporated area and SERT within the school system.	DEM, Fire Districts, EMS, potential use of existing CERT volunteers to become trainers, Long Term, Ongoing Project	X	X	X	X	X	X	X	X	X	X	X	X	X	X
H	H	H	H	H	H	L	***Expand the use of websites, mass email, news articles, editorials, brochure distribution, etc. to educate community members on all-hazards preparedness with an emphasis on Wildland Fire, Earthquake, Storm, Landslide and Flooding (top five identified hazards) Include information related to Firewise and the National Flood Insurance Program (NFIP)***	***Department of Emergency Management, Fire Districts, County, Potential use of CERT to distribute materials, Long Term, Ongoing Project***	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M	M	M	M	M	M	L	"Firewise" Public Education Workshops	Fire Districts/ Departments, Potential use of volunteer fire fighters to conduct workshops, Short Term	X	X	X	X	X		X				X		X

M	**M**	**M**	**M**	**M**	**M**	**L**	Junior "Firewise" Programs	Fire Districts/ Departments, Potential use of volunteer fire fighters to organize program, Short Term to start, Long Term to continue program	X	X	X	X	X		X				X		X
M	**M**	**M**	**M**	**M**	**M**	**L**	Expanded participation in annual community events such as the Skamania County Fair to encourage community preparedness for all-hazards.	DEM, Fire Districts, EMS, Public Health, Potenial use of CERT volunteers, Short Term to Long Term, Ongoing Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M	**M**	**M**	**M**	**M**	**M**	**L**	Program for high school seniors to participate in community preparedness educational activities as part of their senior project or as a community service project.	DEM, Long Term	X	X	X	X	X	X	X	X	X	X	X	X	X	X

EQUIPMENT, TRAINING AND EXERCISE ACTION/PROJECTS

Area and Priority							Action/Project		Goal Addressed					Hazard Addressed							
HIGH	MED	LOW																			
Greater Stevenson	Greater Wind River	Beacon Rock	Little White Salmon Drainage and Underwood	West End	Swift	Rest of County	Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote a Sustainable Economy	Protect the Environment	Increase Public Preparedness for Disasters	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
H	H	H	H	H	H	L	Attain adequate communications equipment	By Agency if Funding Available	X	X	X	X	X	X	X	X	X	X	X	X	X
H	H	H	H	H	H	L	Achieve Communication Interoperability	All Agencies, Region IV, Short Term	X	X	X	X	X	X	X	X	X	X	X	X	X
H	H	H	H	H	H	L	Develop 'common protocol', training and standards among Skamania County Emergency Responders (enhance mutual aid agreements)	By Agency, Short Term	X	X						X	X			X	X
H	H	H	H	H	H	L	Upgrade Firefighting personal safety equipment to NFPA standards	District Specific	X	X											X
M	M	M	M	M	M	L	Organize and perform multi-agency training/ drills and involve CERT in emergency response, training and exercises.	By Agency if Funding Available	X	X		X	X			X	X	X	X	X	X
M	M	M	M	M	M	L	***Pursue training for NFIP staff to include Community Assistant Visits and information regarding the CRS program***	***DEM, County, Medium***	X	X		X	X				X				
M	M	M	M	M	M	L	Coordinate with DNR and FS to provide "red card" training to volunteer firefighters.	District Specific, Ongoing	X	X		X									X
M	M	M	M	M	L	L	Acquire updated technology equipment for first responders such as GPS units and Laptop Computers.	By Agency if Funding Available	X	X						X	X	X	X		X

City of North Bonneville

Location And Area Served:

The City of North Bonneville is located in southern Skamania County between the Bonneville Dam and Beacon Rock. It is on the Columbia River with State Highway 14 running as a limited access highway through the length of the city. It encompasses 2.47 square miles, and serves a population of 880 (2009).

Asset Profile:

North Bonneville assets (not listed under other jurisdiction or special purpose district sections of this plan) include the following:

Category	Assets
Transportation	State Highway, roads, pathways, railways, bridges
Utilities	Natural gas pipelines, Bonneville Dam second powerhouse, BPA substation, power and telephone lines, water system, wastewater system, underground city television cables
Facilities	Post office, municipal structures, industrial buildings, golf course, businesses of economic value to the community, assisted living facility, and homes
Other	City ball fields, tennis courts, park facilities, boat access facilities, recreational areas

Natural Hazard Event History:

Year	Event	Impact
February 2008	Hamilton Creek High Water Event	Evacuation of RV park on Hamilton Creek, sandbagged homes on Greenleaf Lake, no damage reported.
November 2006	High Rainfall – Hamilton Creek, Greenleaf Lake Flood – Resolution #395 Declaring support of any effort to correct the Hamilton Creek/Greenleaf Lake channels	Flooded 8 structures on Hamilton Creek and Greenleaf Lake, including industrial structure, rv park, city wastewater pump station and 5 homes. Also covered East Cascade and Evergreen Drive - major arterials, Hamilton Creek Drive - industrial street, Windsong Drive and Windsong Circle – residential streets
February 1999	Williams Gas Line Explosion near Bonneville Hot Springs Resort	Although not a natural occurrence, the result of such a natural gas line breakage could develop into a wild fire depending on the time of year and location of the break.
1996	Greenleaf Lake Flood – Outflow channel was plugged, froze over and high extended	Flooded approximately 4 homes on the lake. No major damage reported.

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

The City of North Bonneville has four NFIP insurance policies with 0 (zero) repetitive losses. Total insurance coverage: $1,190,000/year, Insurance premiums paid: $1,301/year, Number of flood loss claims: 0, Total insurance losses paid: 0, Repetitive Loss Buildings: 0, Repetitive Losses (total): 0, Repetitive Loss Payments: 0 (structure only), Severe Repetitive Loss Structures: 0

Existing & Future Critical Infrastructure/Facilities (Types & Numbers):

The City of North Bonneville has 341 improved parcels (buildings such as a house, shop, etc.) with an average value of $170,054.

Potential Dollar Losses & Methodology Used To Estimate:

The percentage of North Bonneville parcels estimated to be threatened by each hazard was based on readily available data and/or best judgment. This percentage was used to estimate the number of parcels considered at risk. That number was then multiplied by the average value of each parcel to determine a total estimated value of property at risk for each specific hazard. Refer to chart on following page.

City of North Bonneville

	Type of Existing Buildings, Infrastructure, and Critical Facilities	Estimated Number of Structures	Average Value of Each Structure	Total Value of Structures	% of Structures Considered at Risk								Total Estimated Value ($) of Structures at Risk							
					Avalanche	Drought	Earthquake	Floods	Landslide	Storm	Volcanic Eruption	Wildland Fire	Avalanche	Drought	Earthquake	Floods	Landslide	Storm	Volcanic Eruption	Wildland Fire
North Bonneville	Improved Parcels (such as a house, shop, etc,)	341	$ 170,054	$ 57,988,414	0	0	100	10	0	25	0	100	$ -	$ -	$ 57,988,414	$ 5,798,841	$ -	$ 14,497,103	$ -	$ 57,988,414
Total Potential Dollar Loss													$ -	$ -	$ 57,988,414	$ 5,798,841	$ -	$ 57,988,414	$ -	$ 57,988,414

Land Uses And Development Trends In Hazard Area:

North Bonneville's growth rate is projected at less than 1% annually for the near future. Even though the city grew by an annual rate of almost 11% for the years 2003-2007, growth for 2008 and 2009 were less than 1% because of the slow economy and reductions in home construction.

Though predominately a residential community, North Bonneville has a growing industrial area with major new construction in the industrial park area over the past few years. The business district is not fully developed and has many vacant lots. However, there has been construction of a few business structures in recent years. The hot springs resort hotel is the major business structure and private employer in the city.

Recent residential development has seen a preliminary approval given to a planned unit development of 14 lots adjacent to a potential landside area on the west side of town. Mitigation measures were part of the approval and should address the potential hazard.

There are a few large vacant parcels of land on the north side of Greenleaf Lake and next to Bass Lake that have potential landslide and flood areas. Any development proposal will have to address these concerns prior to approval. A majority of this vacant land is zoned Commercial Recreation which does allow residential development as well as destination type commercial development.

North Bonneville Risk Assessment:

The risk assessment for North Bonneville was determined by averaging rankings for specific neighborhood areas within the city limits. A hazard analysis matrix was used

taking into account event history, probability, population vulnerability, estimated system impact and local concern.

1. Wildland Fire
2. Earthquake
3. Storm

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	**Mitigation & Preparedness** **(Protection devices, safeguards, & procedures to reduce effect of the hazard)**	**Response** **(Immediate actions to function at a minimal acceptable level)**	**Recovery** **(Resources required to restore function or longer term recovery)**
Earthquake, Flooding, Landslide, Severe Storm, Volcanic Eruption, Wildland Fire	Evacuation Routes and Signage for South Side of North Bonneville	Public Works and/or Fire Department would unlock the gates that are locked	Assess and identify needed resources
Earthquake, Flooding, Landslide, Severe Storm, Volcanic Eruption, Wildland Fire	City-wide emergency notification system	Siren-city, cable TV notification alerts	Assess and identify needed resources
Severe Storm (snow, wind, etc.)	City Public Works Department Snow and Debris Removal Plan	Crews begin plowing as needed. Priority given to arterial streets. Debris removed as necessary. Notify PUD.	Assess and identify needed resources
Earthquake, Flooding, Landslide, Severe Storm, Volcanic Eruption, Wildland Fire	Interagency agreements and response plans with other fire districts, etc.	Assistance and back-up for fire department	Assess and identify needed resources

City Of North Bonneville Proposed Mitigation Action/Projects:

HIGH	MED	LOW	Action/Project		Goal Addressed					Hazard Addressed							
			Identification and Analysis	**Administration, Implementation and Timeline**	**Protect Life**	**Protect Property**	**Promote a Sustainable**	**Protect the Environment**	**Increase Public Preparedness for**	**Avalanche**	**Drought**	**Earthquake**	**Flooding**	**Landslide**	**Severe Storm**	**Volcanic Eruption**	**Wildland Fire**
H			Establish Evacuation Routes to include signage - North Side North Bonneville	City, Public Works - Long Term Project	X	X		X	X			X	X	X	X	X	X
H			Establish preparedness plan with city administrative delegation	City - Short Term Project	X	X		X			X	X	X	X	X	X	X
H			Portable temporary emergency signage	City - Short Term Project	X	X		X				X	X	X	X	X	X
	M		Expand City-Wide Emergency Notification System	City Cable System, Block Leader Program, Radio Notification System - Short Term Project	X	X	X	X	X		X	X	X	X	X	X	X

Short Term Projects - 0-2 Years
Medium Term Projects - 2-4 Years
Long Term Projects - Greater than 4 years

2006 FLOOD

Hamilton Creek Diversion Channel into Greenleaf Lake

Greenleaf Lake South Shore

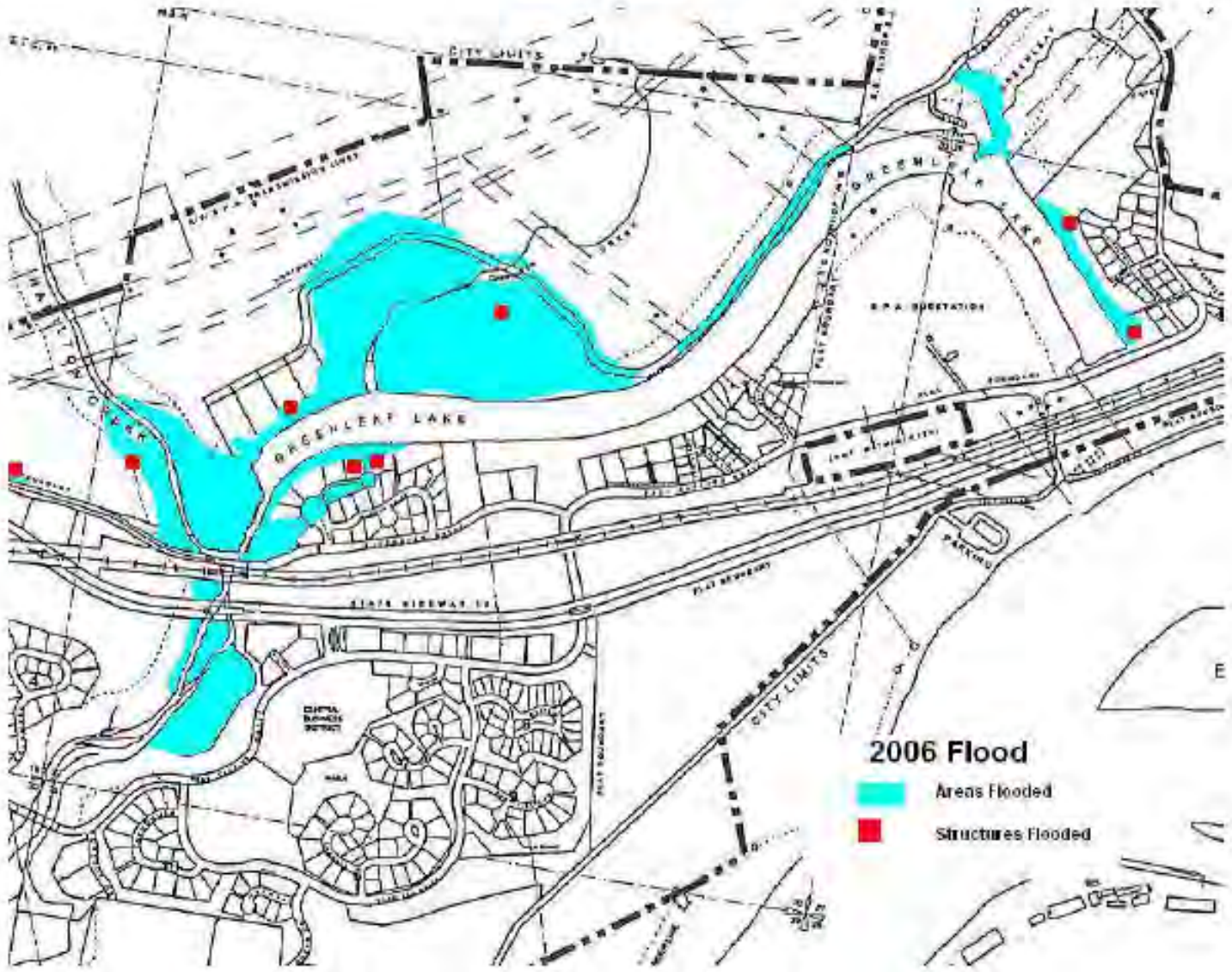
Greenleaf Lake North Shore

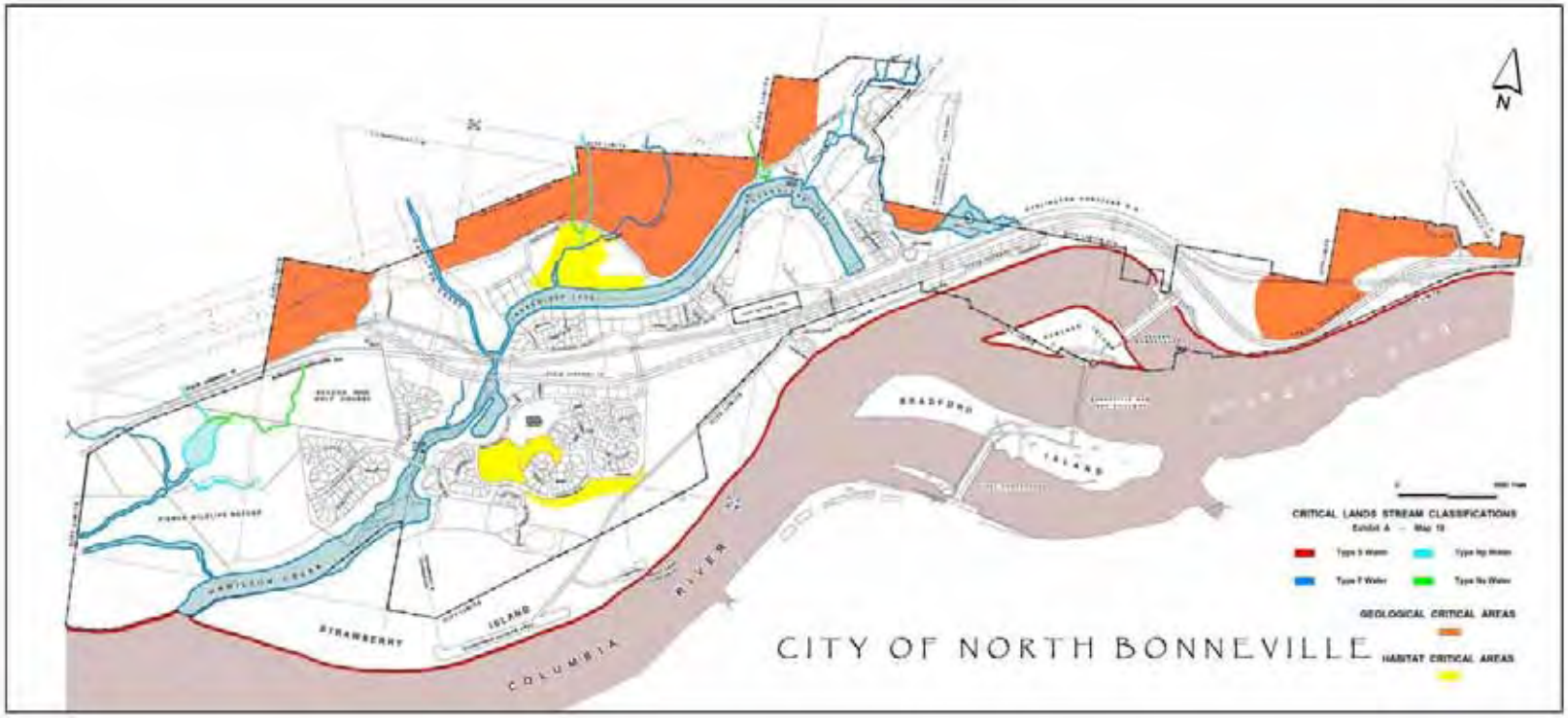
Greenleaf Lake North Shore

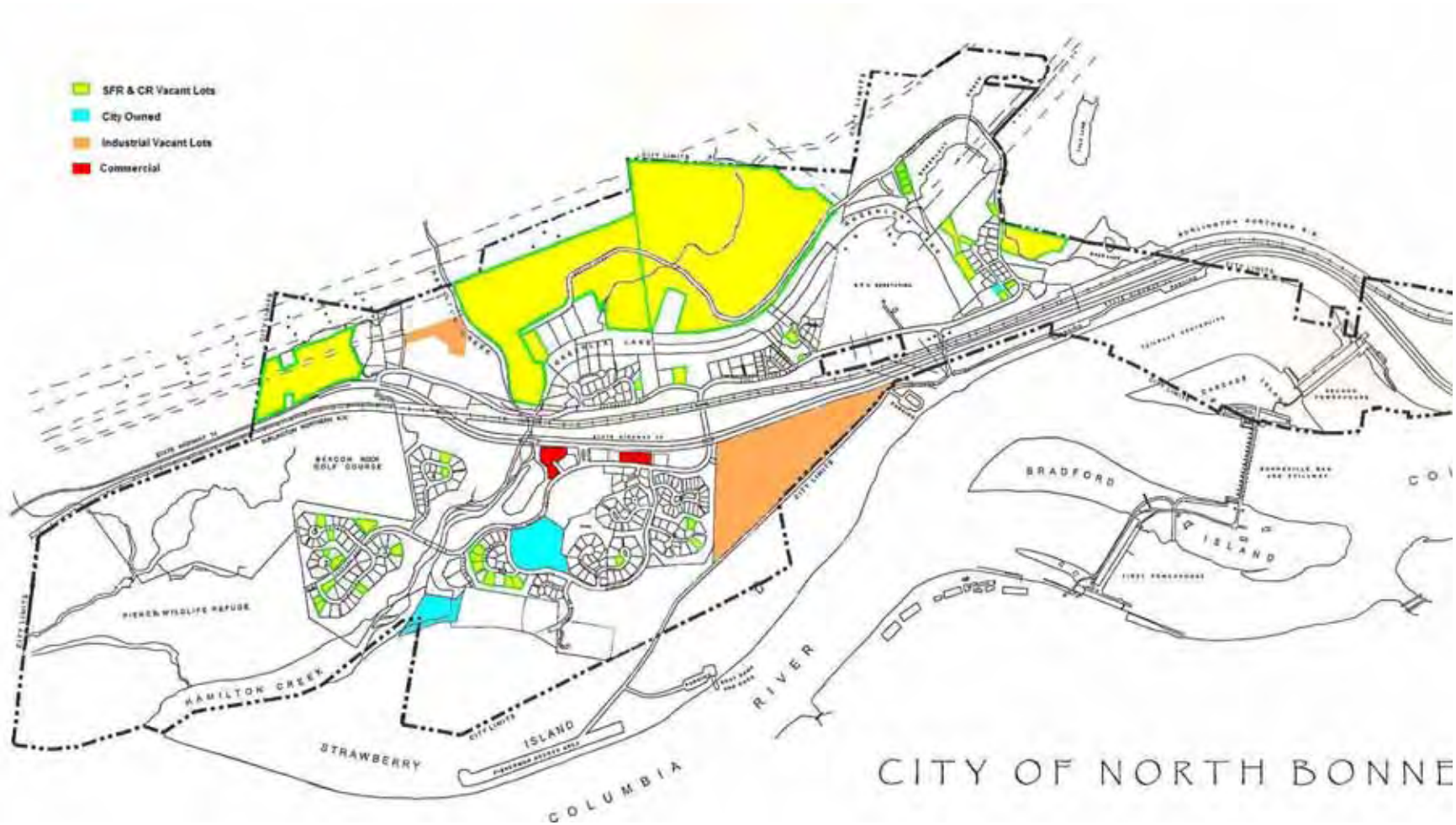
Cascade Drive Greenleaf Lake North Shore

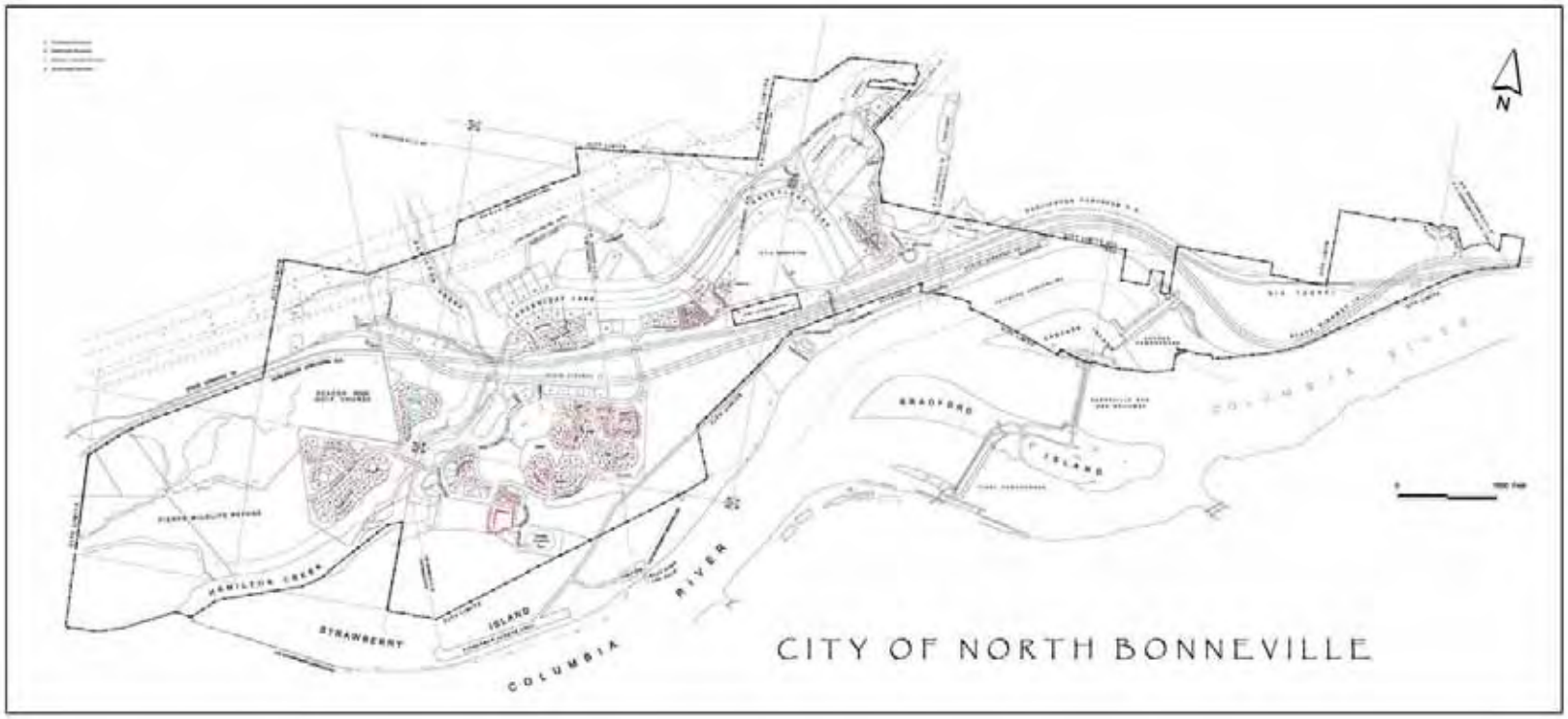
City Wastewater Pump Station Greenleaf Lake East Shore

2006 FLOOD MAP




N
CRITICAL LANDS STREAM CLASSIFICATIONS
Exhibit A — Map 10
GEOLOGICAL CRITICAL AREAS
HABITAT CRITICAL AREAS
CITY OF NORTH BONNEVILLE
COLUMBIA
RIVER
BRADFORD
ISLAND
STRAWBERRY
ISLAND


SFR & CR Vacant Lots
City Owned
Industrial Vacant Lots
Commercial
BEACON ROCK GOLF COURSE
PIERCE WILDLIFE REFUGE
HAMILTON CREEK
STRAWBERRY ISLAND
COLUMBIA RIVER
BRADFORD ISLAND
CITY OF NORTH BONNE


N
HAMILTON CREEK
STRAWBERRY
ISLAND
COLUMBIA
RIVER
BRADFORD
ISLAND
CITY OF NORTH BONNEVILLE

City Of Stevenson

City of Stevenson, City Hall, Photograph by John Carlson

Location and Area Served:

The City of Stevenson covers approximately 1.52 square miles, of which 0.35 square miles is under public ownership.

Located on the Columbia River in south-central Skamania County, Stevenson is contained within an Urban Area of 5.14 square miles as defined by the Columbia River Gorge National Scenic Area and periodic annexations will likely occur within this area.

Throughout its history, Stevenson has experienced fairly steady population growth, a trend that is expected to continue during the planning period.

In 2000 the US Census Bureau shows Stevenson having 1200, and official estimates from 2009 show 1455 citizens of the City. City projections anticipate approximately 1,525 people by 2015 and 1,700 by the year 2030.

In addition to the resident population, Stevenson serves as the primary service center of Skamania County, containing a bulk of the educational system, emergency and medical personnel, retail and commercial offerings, financial institutions, the seat of the County government, and a key gateway for traveling tourists of the Gorge.

Natural Hazard Event History:

Year	Event	Impact
January 2009	Severe Winter Weather – Resolution #221, Declaring a Local Emergency Due to Severe Winter Weather	Heavy snowfall beginning December 11, 2008 and continuing through January 5, 2009 threatened the community's health and welfare, damaged infrastructure, and exceeded budgeted allowances. High snow and rainfall on Thursday, January 1, 2009 through Tuesday, January 6, 2009 created a flood threat to the City of Stevenson's Wastewater Treatment Plant and the associated Rock Creek Pump Station.
November 2008	High Rainfall, Flood Threat – Resolution #218, Declaring a Local Emergency Due to Flood Threat to the Waste Water Treatment Plant	High flows in Rock Creek threatened to flood the City of Stevenson's Wastewater Treatment Plant and the associated Rock Creek Pump Station

Rock Creek from Angel Heights
Photograph by Ben Shumaker

Stevenson Landslide
Photograph by WSDOT

Flood Threat, Rock Creek Bridge, Stevenson
Photograph by Eric Hansen

Flooding, Private Home near Rock Creek Bridge
Photograph by Eric Hansen

Year	Event	Impact
February 2007	Landslide – Resolution #209, Declaring a Local Emergency Due to Landslide Activity	Increased landslide activity damaged area homes, threatened transportation and utility assets, and created the potential for synergistic hazards associated with debris flow and damming of Rock Creek. Long-term flood threats also increased due to debris deposition within the historic Rock Creek floodplain.
1997	Storm – Resolution #145 Proclaiming an Emergency Due to Inclement Weather Conditions	Severe storms extensively damaged city roads and bridges, private property, public facilities and businesses.
1996	Storm – Resolution #139 Proclaiming an Emergency Due to Inclement Weather Conditions	Severe storms extensively damaged city roads and bridges, private property, public facilities and businesses.
1964	Storm – Ordinance 568	Severe storm damaged streets in the Town of Stevenson.

Stevenson City Hall, December 2008
Photograph by Candace Ford

Downtown Stevenson, December 2008
Photograph by Candace Ford

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

The City contains only five properties insured under the National Flood Insurance Program. Only one of these properties has experienced repetitive damage by flooding. This property contains one building and has made two loss claims totaling $19,363.

Asset Profile:

Assets within the City of Stevenson include a full range of urban services and utilities.

Transportation Assets	Utility Assets	Other Assets
The transportation system includes Washington State Route 14, local roads, pedestrian and bicycle trails, a trunk rail line, bridges, and boat landing and docking facilities. Ownership and responsibility for these assets includes the City, the State, the Port of Skamania, and private citizens and corporations.	The utility system includes water collection, treatment and distribution infrastructure, sanitary sewer collection and treatment infrastructure, stormwater collection and treatment infrastructure, electrical transmission and distribution facilities, telecommunications networks and towers, and natural gas transmission and distribution infrastructure. Ownership and responsibility for these assets includes the City, the County, the Skamania County Public Utility District, the Bonneville Power Administration, and private citizens and corporations.	Additional assets in Stevenson include private residences, City, County, Port, State, and US Post Office, governmental entities, businesses of economic value, faith-based institutions, commercial timber, and structures and areas of historic, cultural and recreational importance.

Existing Critical Infrastructure/Facilities (Types & Numbers):

The following table includes descriptions and values of select assets in Stevenson. Where values are provided, this information is based on City asset management records and County Assessor records.

Transportation Description	**Value**
Public Roads- Stevenson's public road network covers approximately 17 miles.	Land- $12,140,000* Improvements- $15,760,000†
Rail Facilites- The Burlington Northern and Santa Fe Railroad includes a mainline and two sidings within Stevenson	
Boat Facilities- The Port of Skamania County operates a commercial tourboat landing and a recreational boat ramp	
Utilities Description	**Value**
Public Water System- The water system includes well and surface sources, treatment equipment, reservoirs, pump stations, distribution lines, and metering equipment.	Land- $960,000 Improvements- $3,870,000
Public Sanitary Sewer System- The sanitary sewer system includes collection lines, manholes, pump stations, treatment equipment and an outfall pipe.	Land- $100,000 Improvements- $3,432,730
Public Stormwater System- The stormwater system includes catch basins, collection lines, manholes, swales, and outfall pipes	Land- Included in public roadways Improvements- $896,153
Other Assets Description	**Value**
Building Stock- There are 602 improved parcels in Stevenson. This includes all privately- and publicly-owned parcels.	Mean Improvement Value- $270,000
Fire Protection System- The fire protection system includes a fire hall, hydrant, and fire trucks	Land- $50,000 Improvements- $170,000 Rolling Stock/Equipment- $190,000†
City Government- The City government includes City Hall, vehicles, and other City equipment.	Land- $70,000 Improvements- $150,000 Rolling Stock/Equipment- $190,000

*Land value for City assets is based on current assessed value.
†Improvement and rolling stock values for City assets are based on the net value remaining, and are not estimates of actual replacement cost. The improvement value for the full building stock is based on the assessed value.

Stevenson Risk Assessment:

The following is from the City of Stevenson Comprehensive Plan:

General Natural Features and Hazards
Findings:
Most land within the planning area has at least one characteristic which is defined as having sever limitation for normal urban development. The limitations include, but are not limited to: flood plains, slopes, soil characteristics, and various combinations of characteristics which create hazards such as weak foundation soils and landslide potential.

A site inspection and soils report may be necessary to adequately determine the degree of land limitation on any given site.

Lands with severe limitations require special site development standards and may preclude development.

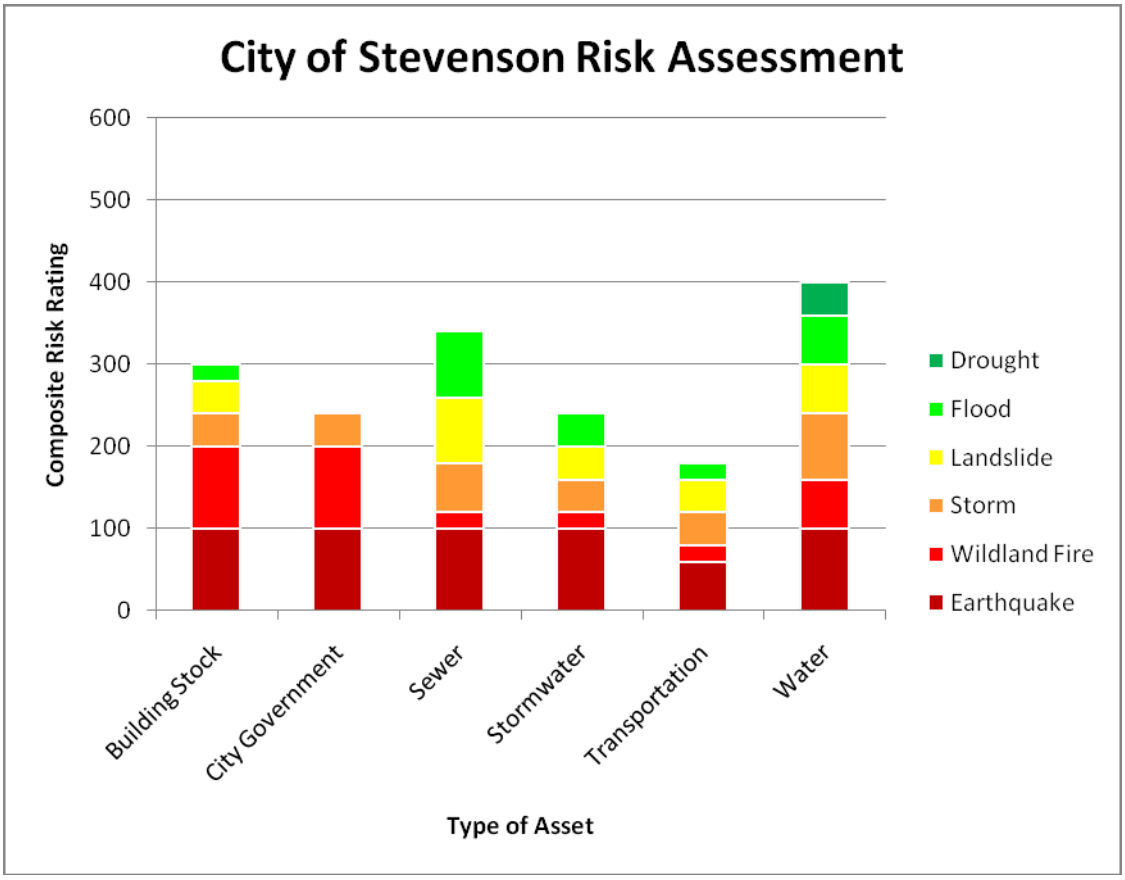
Vegetation contributes to the quality of the community through control of erosion, absorption of sound, moderation

The risk assessment for Stevenson was determined by using a hazard analysis matrix. High, Moderate, and Low values were assigned to various criteria and then combined to determine risk rating.

Separate risk ratings were developed for individual assets within Stevenson, including: the private and public building stock, City governmental offices, and for the City's sewer, storm-water, transportation, and water systems.

The composite risk rating is based on 8 hazards with a possible rating of 100, meaning that an asset having an 800 composite rating would be at the maximum risk to all hazards.

The following figure shows the composite ratings for each of Stevenson's asset types.



This figure indicates that Stevenson's water system is at the greatest risk, followed by the sewer system and the building stock.

Potential Dollar Losses & Methodology Used To Estimate:

The composite risk ratings were then compared to the current value of each asset type to assess the potential dollar losses to natural disasters. Building Stock values are based assessment records, and the values for the remaining assets are based on the City's asset depreciation schedule.

The following chart shows the potential losses for each asset in a worst-case hazard event.

City of Stevenson- Potential Dollar Losses

	Type of Asset	Estimated Number of Structures	Average Value of Each Structure	Total Value of Asset	% of Asset Considered at Risk								Estimated Value ($) of Potential Losses							
					Avalanche	Drought	Earthquake	Flood	Landslide	Storm	Volcanic Eruption	Wildland Fire	Avalanche	Drought	Earthquake	Flood	Landslide	Storm	Volcanic Eruption	Wildland Fire
City of Stevenson	Building Stock	602	$ 268,010	$ 161,342,020	0	0	100	20	40	40	0	100	$ 0	$ 0	$ 161,342,020	$ 32,268,404	$ 64,536,808	$ 64,536,808	$ 0	$ 161,342,020
	City Government			$ 340,000	0	0	100	0	0	40	0	100	$ 0	$ 0	$ 340,000	$ 0	$ 0	$ 136,000	$ 0	$ 340,000
	Sewer System			$ 3,432,730	0	0	100	80	80	60	0	20	$ 0	$ 0	$ 3,432,730	$ 2,746,184	$ 2,746,184	$ 2,059,638	$ 0	$ 686,546
	Stormwater System			$ 896,153	0	0	100	40	40	40	0	20	$ 0	$ 0	$ 896,153	$ 358,461	$ 358,461	$ 358,461	$ 0	$ 179,231
	Transportation System			$ 15,760,000	0	0	60	20	40	40	0	20	$ 0	$ 0	$ 9,456,000	$ 3,152,000	$ 6,304,000	$ 6,304,000	$ 0	$ 3,152,000
	Water System			$ 3,870,000	0	40	100	60	60	80	0	60	$ 0	$ 1,548,000	$ 3,870,000	$ 2,322,000	$ 2,322,000	$ 3,096,000	$ 0	$ 2,322,000
	Total Potential Dollar Loss by Hazard												$ 0	$ 1,548,000	$ 179,336,903	$ 40,847,049	$ 76,267,453	$ 76,490,907	$ 0	$ 168,021,797

This figure indicates that earthquakes present the greatest financial threat to Stevenson, followed closely by wildland fires and then severe storms and landslides.

Existing Applicable Hazard Mitigation Associated Plans And/Or Documents:

Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Severe Storm	City of Stevenson Public Works Department Snow Removal Plan	City crews will begin plowing streets after approximately 2 inches of snow has accumulated. City streets are divided into three priorities. These priorities are based on several criteria including school bus routes, population density, alternative routes, etc.	Assess damage and identify needed resources.

STEVENSON FACILITY AND INFRASTRUCTURE ACTIONS/PROJECTS

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Facility and/or Infrastructure Projects																
F1	**H**	Remove Publicly Owned and Repetetive Loss Buildings from the Flood Plain	City & County Governments, Private Owners- Long Term	X	X		X	X				X	X	X		
F2	**H**	Replace Rock Creek Drive Bridge with a Free-Span Structure	Public Works Department- Short Term	X	X	X	X	X				X	X	X		
F3	**H**	Construct a Multi-Agency Fire/Ambulance/Emergency Response Station in Stevenson	City Fire Department, Skamania County Fire District #2, Skamania County Ambulance District, Skamania County Sheriff- Short Term	X	X	X	X	X								X
F4	**H**	Install Watertight Manhole Covers in Flood-Prone Areas	Public Works Department- Short Term		X	X	X	X				X		X		

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Facility and/or Infrastructure Projects																
F5	H	Floodproof Rock Creek Sewer Pump Station	Public Works Department- Short Term		X	X	X	X				X		X		
F6	H	Bury All Above-Ground Uutilities Except in Major Landslide Hazard Areas	Public Works Department, Local Utility Providers - Mid-Term	X	X	X	X	X			X		X	X		
F7	H	Establish, Improve and Maintain Evacuation and Response Routes	State, county, city agencies- Ongoing	X	X	X	X	X	X		X	X	X	X	X	X
F8	H	Connect Iman Springs with the City Water System	Public Works Department- Long Term	X	X	X		X		X			X	X		
F9	H	Establish Fuel Breaks around Stevenson and Its Evacuation Routes	Stevenson Fire Department, Skamania County Fire Districts DNR, Skamania County- Ongoing	X	X	X	X	X								X

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Facility and/or Infrastructure Projects																
F10	**M**	Move Main Water Line from West Loop Road to Gropper Road	Public Works Department- Mid-Term	X	X	X		X								X
F11	**M**	Upgrade Water System Telemetry/SCADA System	Public Works Department- Short Term		X	X	X						X	X		
F12	**M**	Improve Kanaka Creek Underpass as Evacuation Route	Public Works Department- Ongoing	X	X		X	X		X	X	X	X	X		X
F13	**M**	Install Evacuation Route and Other Emergency-Related Signage	Public Works Department- Ongoing	X	X			X	X	X	X	X	X	X	X	X
F14	**M**	Retrofit Publicly Owned Buildings to Withstand Seismic Events	State, County, City, and Other Public Agencies- Ongoing	X	X			X			X					
F15	**L**	Install Wand/Radio-Read Water Meters	Public Works Department- Short Term		X	X		X						X		
F16	**L**	Improve Drainage along the City's Watershed Road	Public Works Deaprtment- Mid-Term	X	X	X	X				X		X	X		

STEVENSON PLANNING ACTIONS/PROJECTS

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Planning Projects																
P1	H	Incorporate Hazard Mitigation into Existing and Future Plans and Development Regulations	Planning Department-Ongoing	X	X	X	X	X	X	X	X	X	X	X	X	X
P2	H	Establish an Overland, Waterbourne, & Airbourne Evacuation Plan which considers Special Needs Populations and Includes a Public Notification System and an Identification of Staging, & Landing Areas	County Sheriff, County Government, City Government-Short Term	X				X	X		X	X	X	X	X	X
P3	H	Continue Implementing Critical Areas Development Regulations	Planning Department-Ongoing	X	X	X	X			X	X	X	X	X	X	
P4	H	Study Effects of Piper Road Landslide on West Loop Road	City & County Planning and Public Works Departments-Short Term	X	X	X	X	X			X	X	X	X		

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Planning Projects																
P5	**H**	Identify at Least one Primary and One Alternate Meeting Place/Shelter	County Sheriff, Fire Department, Charitable/Faith-Based Organizations- Short Term	X				X	X	X	X	X	X	X	X	X
P6	**M**	Consider Strategic Down-Zoning of Areas Prone to Landsliding and Seasonal Drought (Dry Domestic Wells)	Planning Department- Short Term													
P7	**M**	Develop a City-Wide Land-Stabilization and Stormwater Management Plan with Special Attention on the Piper & Bone Road Areas	Planning Department, Public Works Department- Mid-Term	X	X		X					X	X	X		
P8	**L**	Modernize and Update Flood Plain Maps and Flood Information	Department of Ecology, Planning Department- Long-Term	X	X	X	X	X				X	X	X		

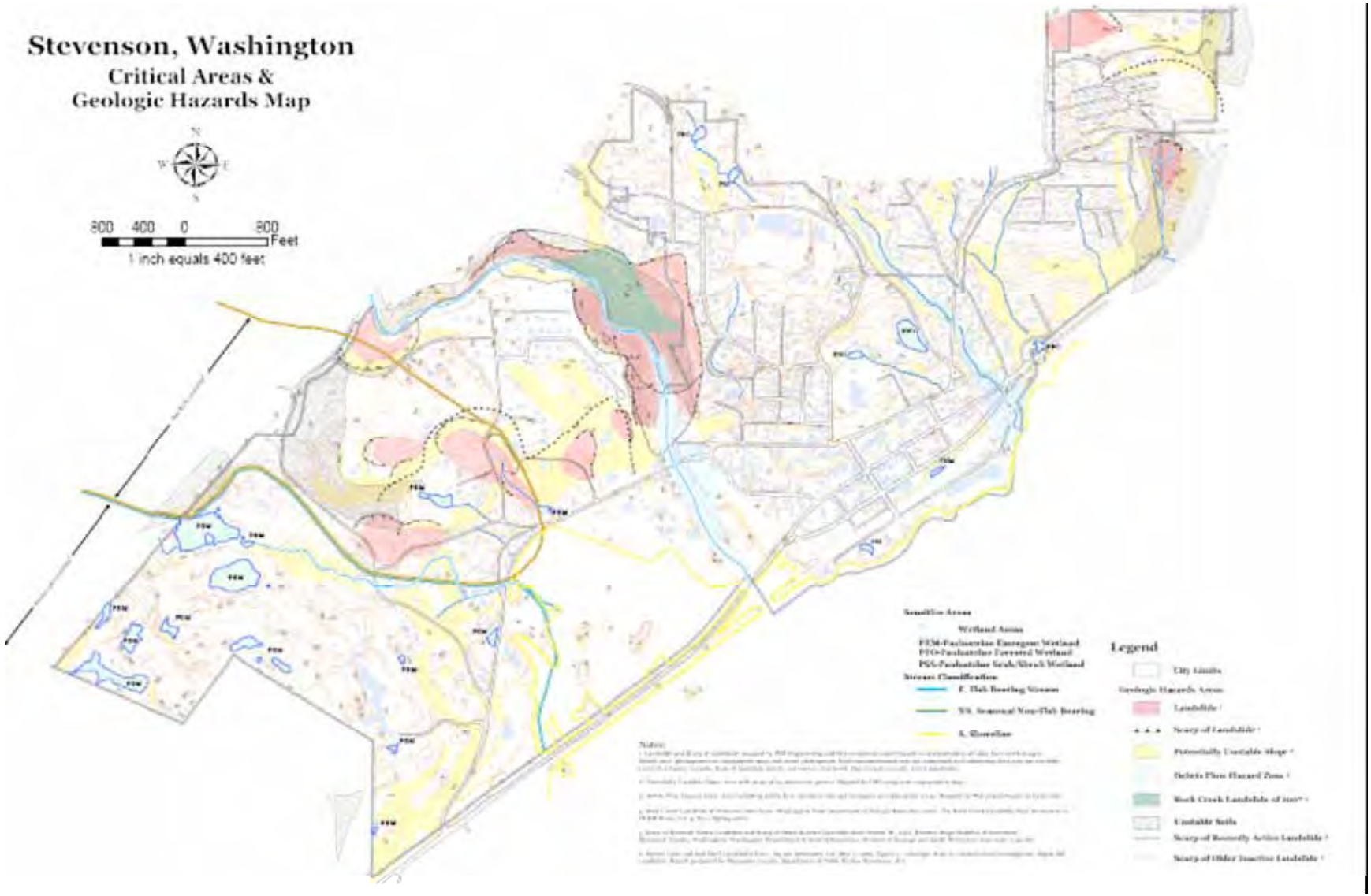
STEVENSON EDUCATIONAL AND TRAINING ACTIONS/PROJECTS

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Education & Training Projects																
T1	**H**	Support County Sheriff's Educational and Training Efforts on Emergency Management and Response	City Government-Ongoing	X	X	X	X	X	X	X	X	X	X	X	X	X
T2	**M**	Develop City Website to Include Information on Emergency Preparedness and Response	City Government, County Sheriff-Short Term	X	X	X		X	X	X	X	X	X	X	X	X
T3	**M**	Encourage Staff Trainings on Hazard Mitigation Issues	City Government-Ongoing	X	X	X	X	X	X	X	X	X	X	X	X	X

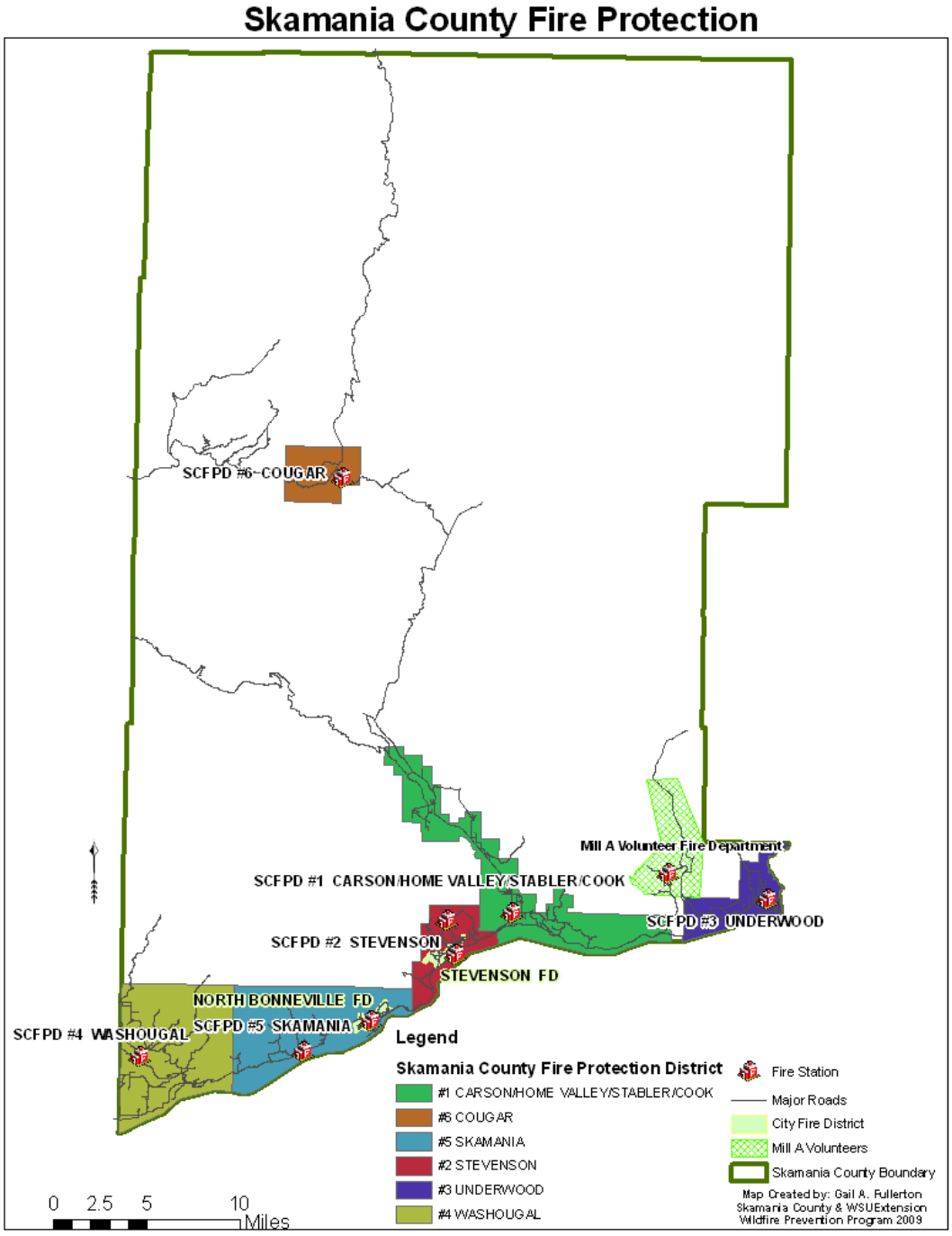
STEVENSON EQUIPMENT ACTIONS/PROJECTS

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Equipment Actions/Projects																
E1	H	Aquire, Improve, and/or Upgrade Rolling Stock of Vehicles, Including Plows and Earthmoving Equipment	Public Works Department-Ongoing	X	X	X	X	X	X		X	X	X	X	X	X
E2	H	Aquire, Improve, and/or Upgrade Backup Generators at City Facilities, Especially the City and Fire Halls	City Government-Ongoing	X	X		X	X	X	X	X	X	X	X	X	X
E3	H	Develop 'Common Protocol', Training and Standards among Skamania County Emergency Responders (Enhance Mutual Aid Agreements)	Fire Department, County Sheriff-Ongoing	X	X						X	X			X	X
E4	H	Upgrade Firefighting Personal Safety Equipment to NFPA Standards	Fire Department-Ongoing	X	X			X								X

Priority		Action/Project		Goal Addressed					Hazard Addressed							
HIGH MED LOW		Identification and Analysis	Administration, Implementation and Timeline	Protect Life	Protect Property	Promote Economic Sustainability	Protect the Environment	Increase Public Preparedness	Avalanche	Drought	Earthquake	Flooding	Landslide	Severe Storm	Volcanic Eruption	Wildland Fire
Equipment Actions/Projects																
E5	**L**	Attain Adequate Communications Equipment	City Government-Ongoing	X	X	X	X	X	X	X	X	X	X	X	X	X
E6	**L**	Achieve Communication Interoperability	State, County, and City Agencies-Ongoing	X	X	X	X	X	X	X	X	X	X	X	X	X


Stevenson, Washington
Critical Areas &
Geologic Hazards Map
800 400 0 800
Feet
1 inch equals 400 feet
Legend
City Limits
Landslide
Scarp of Landslide
Potentially Unstable Slope
Debris Flow Hazard Zone
Rock Creek Landslide of 1997
Unstable Soils
Scarp of Recently Active Landslide
Scarp of Older Inactive Landslide

Skamania County Fire Districts and Fire Departments

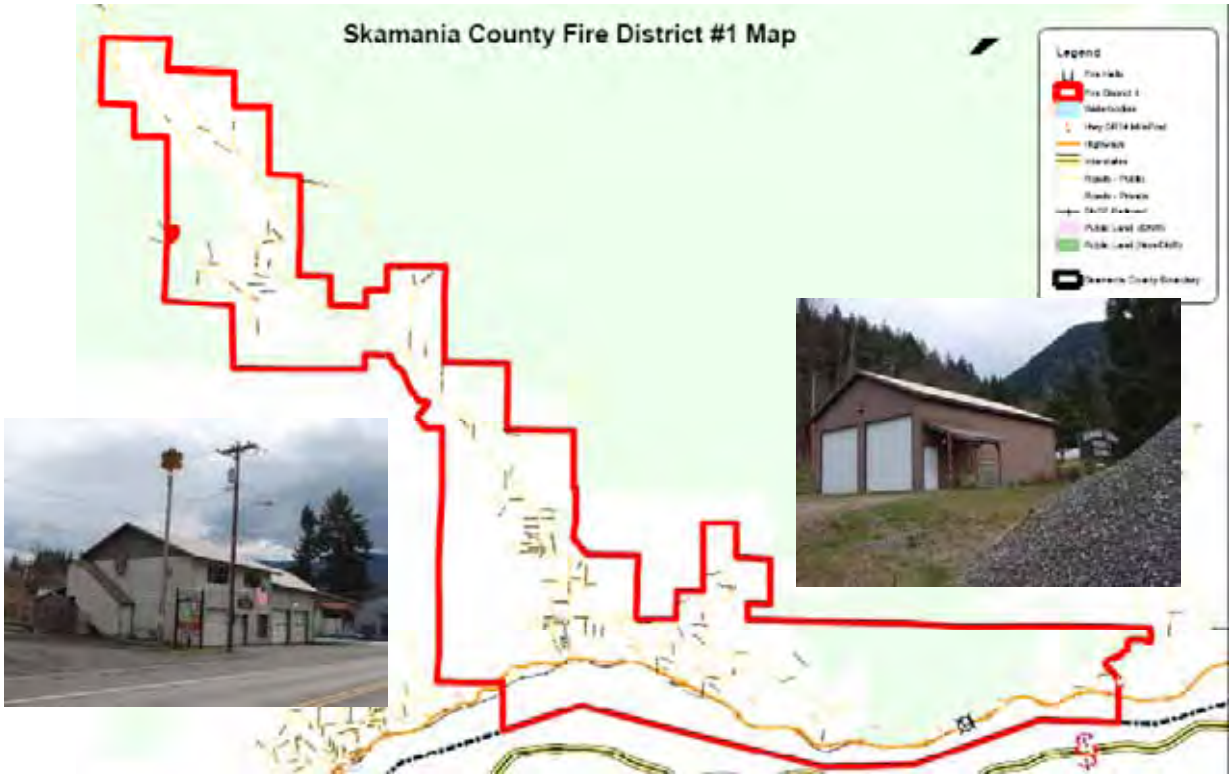


Skamania County Fire District #1

Location and Area Served:

Skamania County Fire District #1 headquarters are located at the junction of Wind River Highway and Hot Springs Avenue in Carson.

Fire District #1 services the communities of Carson, Home Valley, Stabler/Hemlock and Cook. (Boundary line below).



Carson is located 1 mile north of Highway SR 14 on Wind River Highway. Home Valley is located on SR14, milepost 50. Stabler/Hemlock is located along Wind River Highway approximately eight miles north of SR14.

This fire protection district provides first alarm and mutual aid response to many elements of critical infrastructure. Some of the exposures in this District's primary response area include but are not limited to the following:

- Interstate Highway 84 and WA State Highway 14 (respectively the only East-West roadway passages for Portland, OR and Vancouver, WA through the Cascade Mountains)
- The Burlington Northern Railroad (untold hazmat materials, etc pass on this daily)
- Willard National Fish Hatchery (all hatcheries are rich in hazmat materials)
- Little White Salmon National Fish Hatchery
- Carson National Fish Hatchery

- Spring Creek National Fish Hatchery
- A high pressure 36-inch natural gas pipeline and a local high pressure pumping station providing natural gas for the western United States
- Bonneville Dam which provides electricity to the BPA electrical grid feeding much of the western United States
- Commercial Marine Traffic on the Columbia River transporting commodities ranging from radioactive materials, petroleum products, grain and freight. In addition to commercial traffic, numerous cruise ships and sightseeing vessels use the Columbia River on a daily basis.

In addition to essential infrastructure, the Fire District responds to two local destination resorts and convention center.

We presently provide initial response to 2 lumber mills in our protection district. These mills provide approximately 200 family wage jobs without which, this county would have no local economy of any significance.

Repetitive Loss Properties **(National Flood Insurance Program insured structures that have been repetitively damaged in floods):**

None

Critical Facilities And Equipment **(OWNED BY FIRE DISTRICT #1):**

Facility and/or Equipment	Approximate Value
Fire Station #1 – Carson	Fire Stations - $825,053
Fire Station #2 – Home Valley	
Fire Station #3 – Stabler	
(3) Type 1 Engines	$819,400
(2) Type 6 Engines	$151,100
(1) 1500 Gallon Tender	$224,000
(1) 3000 Gallon Tender	$163,900
(1) Rescue/Air Rig	$177,000
(1) Command Vehicle	$19,700
PPE and Fire Fighting Equipment	$500,000

Current and Anticipated Service Trends:

Call Volumes by Year: 2006-95
2007-145
2008-115
2009-205

We initiated Medical first response June 2009. Our 2010 call volume will increase dramatically.

Skamania County Fire District #1 is an all hazards emergency response agency. The following are a few examples of some of our past responses:

STRUCTURAL FIRE PROTECTION	PLANE CRASHES
WILDLAND FIRE PROTECTION	RIVER RESCUES
MOTOR VEHICLE ACCIDENT RESPONSE	ROPE RESCUES
VEHICLE EXTRICATION	TRAIL RESCUES
VEHICLE FIRES	CHILDREN IN TREE RESCUE
MEDICAL FIRST RESPONSE	COW IN SEPTIC TANK
TRAIN DERAILMENTS	HAZARDOUS MATERIALS OPERATIONS LEVEL
GAS LINE EXPLOSIONS	HAZARDOUS MATERIALS DECONTAMINATION
FLOODING	

Recent Natural Hazard Event History:

Year	Event	Impact
2008-2009 Dec-Jan	Severe Winter Storm, Record and Near-Record Snow	No Impact on Fire Stations or Equipment
2006 December	Severe Winter Storms, Wind, Landslides, Mudslides	No Impact on Fire Stations or Equipment
2006 November	Severe Storms, Floods, Landslides, Mudslides	Stored Engine at WRRS Pump Froze $26,000 Damage
2001 February	Earthquake	Major Damage to East Wall of Station #1
1996	Stabler Landslide	Demolished Station #3

Natural Hazard Vulnerability Rating:

Skamania County Fire District #1 is considered most vulnerable to the following natural hazards - ranked in order:

Ranking	Carson	Home Valley	Stabler	Cook
1	Earthquake	Storm	Wildland Fire	Wildland Fire
2	Storm	Wildland Fire	Earthquake	Storm
3	Flooding	-	Storm	-

Existing Applicable Hazard Mitigation Associated Plans And/Or Documents

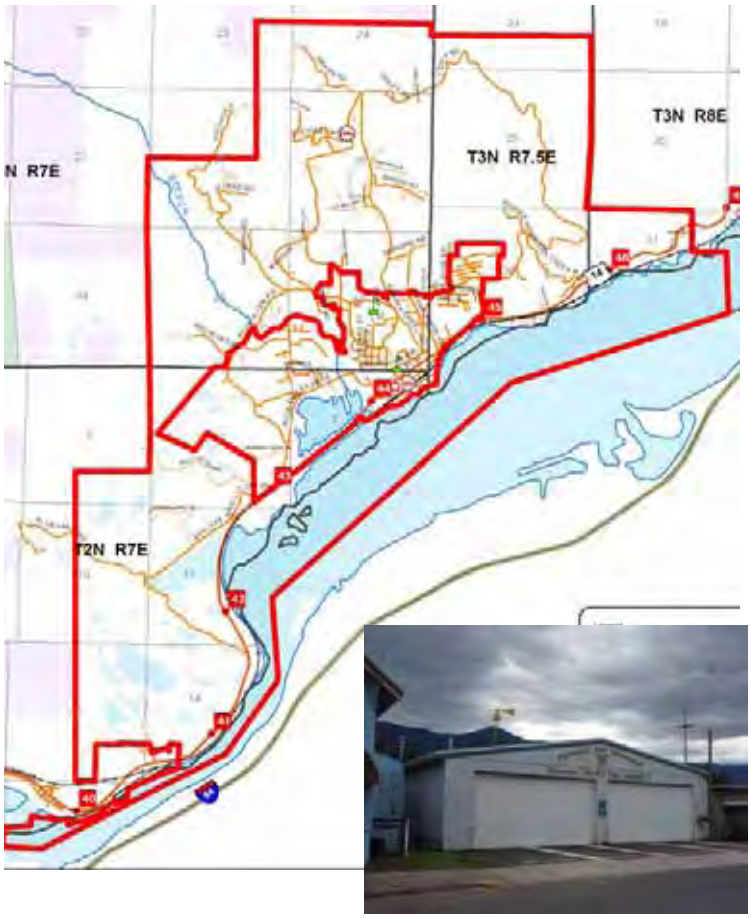
1. Fire Department Standard Operating Guidelines
2. We have mutual aid agreements with the following:
   Skamania County Fire Districts 2, 3, 4, 5 and 6
   The City of Stevenson, WA
   The City of Cascade Locks, OR
   The City of North Bonneville, WA
   Skamania County EMS

The Gifford Pinchot National Forest
The Washington State Department of Natural Resources
Columbia Gorge National Scenic Area Fire Patrol, USFS
The U.S. Department of Fish & Wildlife
The U.S. Army Corp of Engineers
Region 4 Homeland Security
Southwest Washington Fire Defense Region
Washington State Military Department State Mobilization Plan
Skamania County Sheriff
Washington State Patrol

Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	**ACTION/PROJECT Administration, Implementation and Timeline**	**ACTION/PROJECT Goal and Hazard Addressed**
Survey of fire station and upgrade or replace to seismic code as soon as can be. Priority is critical.	Lead Agency – Fire District #1 Implementation based on grant funding Short term (0-2yr) project	Protect life, property, and the environment in the event of any emergency event. Provide for Emergency Evacuation shelter/ safe place for our community during an event.

Skamania County Fire District #2 & Stevenson Fire Department



Location and Area Served:

Skamania County Fire District #2 & Stevenson Fire Department headquarters are located on First Street, within the city limits of Stevenson. The areas serviced by Skamania County Fire District #2 and Stevenson Fire Department are outlined in the map to the left:

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Critical Facilities And Equipment (Shared By Skamania County Fire District #2 And Stevenson Fire Department):

Facility and/or Equipment	Amount	Historical Cost
Fire Station Land		$100,000
Fire Station Improvements		$108,000
Ingersall Rand Compressor	1	$1,042
Fire hydrants	124	$246,382
Wild land gear (pants, shirts, web gear)	10	
Wild land fire Shelters	20	
UHF Portable Radios	26	$10,251
Pagers	10	$3,900
Defribrillators	6	$13,000
Dell laptop with projector	1	$2,872
VCR & TV with Cabinet	1	$5,210

Critical Facilities And Equipment (Owned By Skamania County Fire District #2):

Facility and/or Equipment	Amount	Historical Cost
Satellite Station Land		$103,500
Satellinte Station Improvements		$50,000
1250 GPM 1000 gallon struct engine #22	1	
Type 6 Wildland Resp vehicles #21 & 28	2	
3800 gal tender w/750 GPM pump #27	1	
3000 gal tender #23	1	
Roof Chain saw	1	
Honda Pump 5 HP	1	
Folding tanks, yellow	2	
10 gallons of foam		
Infra-red Camera	1	$10,000
5000 watt generator	1	
1250 GPM engine mounted pump #22	1	
750 GPM mounted pump ##27	1	
Mark III Portable Fire Pump #21	1	
Type 6 Mounted Fire Pumps #21 & #28	2	
1200 ft. 3" structural fire hose		
1000 ft. 1.75" structural fire hose		
2000 ft. of 1" wildland fire hose		

Critical Facilities And Equipment (Owned By Stevenson Fire Department):

Facility and/or Equipment	Amount	Historical Cost
1250 GPM 1000 gallon fire engine #26	1	$215,000
UHF & VHF mobile radios	1	$530
Chain Saws	2	$1,100
Generator Colman		
RIT System	1	$3,454
MSA SCBA's (older with upgrades)	10	$21,079
MSA SCBA's	6	$17,341
Fiber air cylinders	10	$4,655
Aluminum air cylinders	20	
Gas Monitor #26	1	$1,547
Vinyl Draft Tanks #27	2	$1,000
Knox Box	1	$845
Smoke/Fog Machine	1	$1,000
Fire Fan	1	$1,243

10 gal of foam		
1500 ft of 3" structural hose		
700 ft 1.73" structural hose		
250 ft of 1" wildland hose		
Debribrillators	6	$13,000

Current And Anticipated Service Trends:

Decrease in fire calls in the past two years.

Recent (5-Year) Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No significant impact
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No significant impact
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No significant impact

Natural Hazard Vulnerability Rating:

Skamania County Fire District #2 and Stevenson Fire Department are considered to be most vulnerable to the following natural hazards - ranked in order:

	1st Highest Hazard Vulnerability	2nd Highest Hazard Vulnerability	3rd Highest Hazard Vulnerability
Skamania County Fire District #2 Upper Fire Hall	Landslide	Earthquake	-
Main Fire Hall	Earthquake	Severe Storm	-

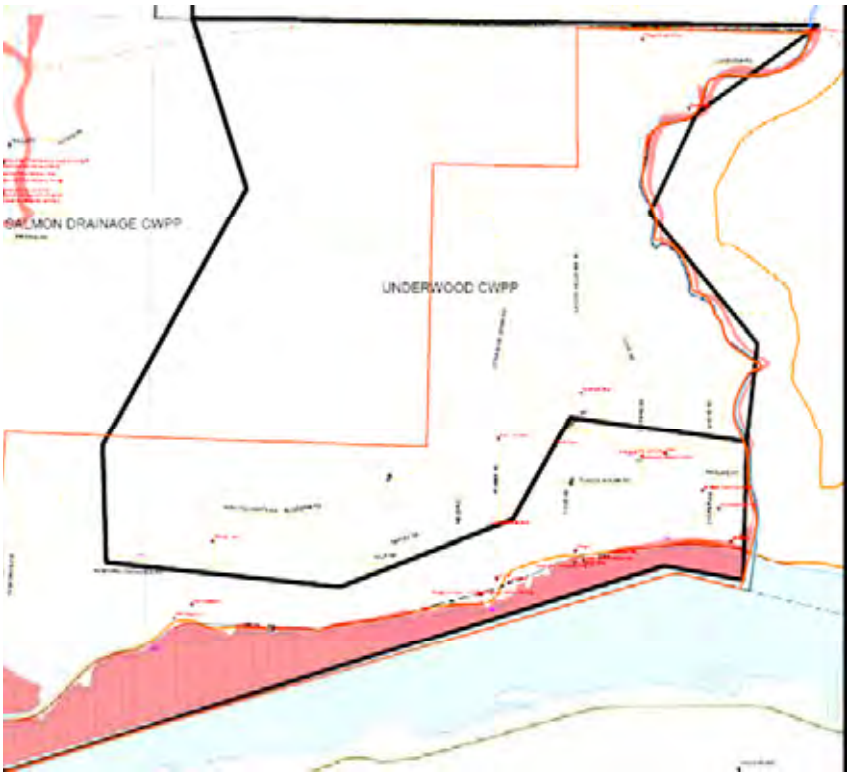
Existing Applicable Hazard Mitigation Associated Plans And/Or Documents:

1. Fire Department Standard Operating Guidelines
2. Mutual Aid Agreements with Cascade Locks, North Bonneville and all Skamania County Fire Districts

Proposed Natural Hazard Mitigation Action/Project:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Multi-Agency Facility to house EMS, Fire, SAR, Sheriff's Office and Emergency Management	Participating Agencies, Implementation dependent on grant funding	Long Term Project (More than 4 years)	All Hazards Mitigation, Life Safety, Property Preservation

Skamania County Fire District #3



Location And Area Served:

Skamania County Fire District #3 is located on Cook Underwood Road in Underwood.

The area serviced by Skamania County Fire District #3 is outlined in the map to the left.

Repetitive Loss Properties (National Flood Insurance Program Insured Structures Repetitively Damaged In Floods):

None

Critical Facilities And Equipment (Owned By Fire District #3):

Facility and/or Equipment	
Fire Station	(17) sets wildland PPE
(1) Type 1 structural engine	(9) compliant structural PPE
(1) Type 2 structural engine	(7) UHF & VHF radios (one per vehicle)
(1) Type 3 wildland engine	(8) portable VHF
(1) Type 5 wildland engine	pumps
(1) Type 7 wildland engine	tanks
(1) Type 2 tender	600’ 4” hose
(1) Type 3 tender	

All equipment and trucks are insured with a private company. Klickitat Co. Fire Districts Pool.

Current And Anticipated Service Trends:

There were 35 calls in 2009. Ongoing increase yearly.

RECENT (5-year) NATURAL HAZARD EVENT HISTORY:

Year	Event	Impact
2008-2009	Severe Winter Storm, Record and Near-Record Snow	Impact on house access. Have snowplow.
2007	Broughton Fire	Yes
2006 (Nov-Dec)	Severe Winter Storms	No

Natural Hazard Vulnerability Rating:

1. Wildland Fire
2. Severe Storm
3. Landslide

Existing Applicable Hazard Mitigation Associated Plans And/Or Documents:

1. Fire Department Standard Operating Guidelines
2. Mutual Aid Agreements with Mill A, Husum and White Salmon

Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	**ACTION/PROJECT Administration, Implementation and Timeline**	**ACTION/PROJECT Goal and Hazard Addressed**
Communications upgrade to P-25 compliant equipment. High Priority	Lead Agency – Fire Commissioners, Implementation based on grant funding, short term project	Protect life, property, and the environment through more effective response in the event of a natural hazard incident.
Reader board in front of the fire station. Low Priority – In Gorge Commission Area	Lead Agency – Fire Commissioners, Implementation based on grant funding, short term project	Protect life, property, and the environment by allowing quick communication to the community in the event of a natural hazard incident.

Skamania County Fire District #4

Location And Area Served:

Skamania County Fire District #4 has two fire stations; a three-bay fire station with a training room on Washougal River Road and a two-bay station that houses two trucks only at 51 Strunk Road, Washougal, Washington.

The area serviced by Skamania County Fire District #4 is outlined in the map to the left.

Repetitive Loss Properties (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

None

Critical Facilities And Equipment (Owned By Fire District #4):

Facility and/or Equipment	
(2) Fire Stations	(3) CDM 1550 VHF radios
(1) Base Station	(1) P1225 VHF radio
(2) Type 1 structural engine	(6) HT 1250 UHF radios
(1) Type 3 wildland engine with CAFS	(5) M1250 UHF radios
(1) Type 2 water tender	(2) Mobile repeater UHF radios
(1) Type 3 tender	1250 GPM pump
(26) sets structural fire PPE	1000 GPM pump
(9) sets wildland PPE complete	300 GPM pump?
(14) SCBA with (14) spare bottles	Pump carry

Current And Anticipated Service Trends:

Residential growth while increasing, it is somewhat slowed down due to the economy. Call volume in 2009 was down from 2008 but there has been some increase so far in 2010 in all areas, medical, fire and MVC.

Recent (5-Year) Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Impact due to snow fall was access to off road properties
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	Closure of Canyon Creek road due to landslide and fallen trees created delay in response
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	Flooding was an issue in the area. Lack of available sand for sandbagging activities was an issue.

Natural Hazard Vulnerability Rating:

Skamania County Fire District #4 is considered most vulnerable to the following natural hazards - ranked in order:

1. Wildland Fire
2. Flooding
3. Landslides

Existing Applicable Hazard Mitigation Associated Plans And/Or Documents:

1. Fire Department Standard Operating Guidelines are being developed.
2. Mutual Aid Agreements with Neighboring Districts – ECF&R (Clark County)

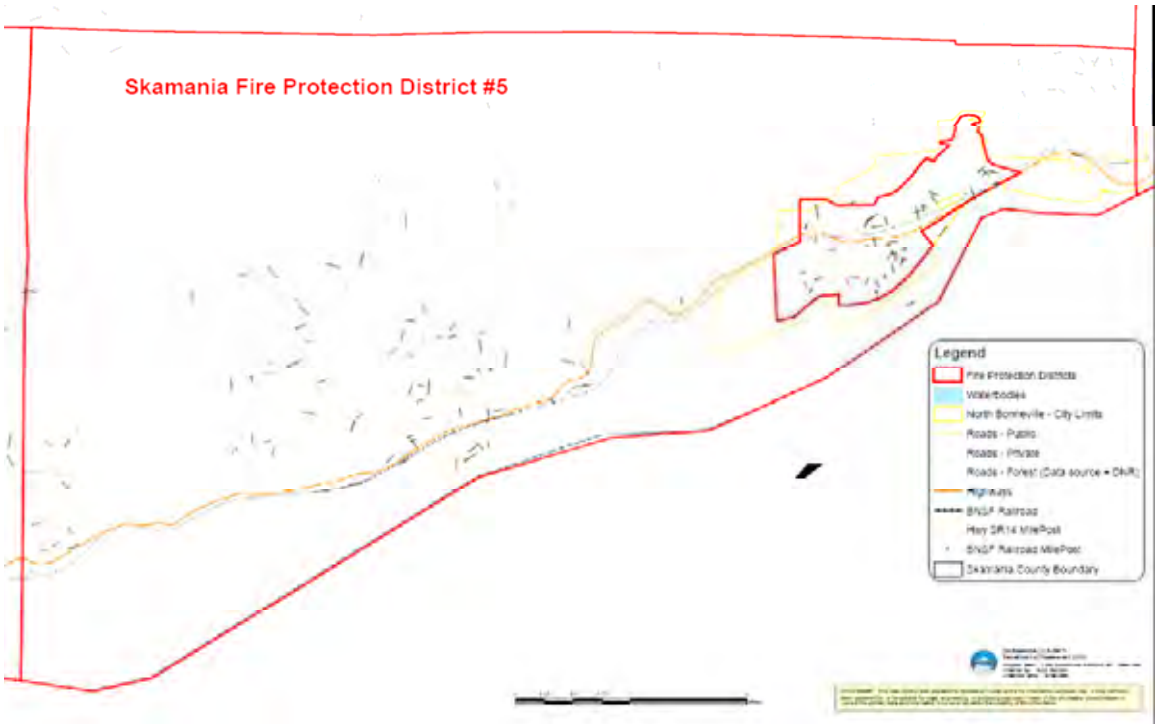
Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	ACTION/PROJECT Administration, Implementation and Timeline	ACTION/PROJECT Goal and Hazard Addressed
Conduct an emergency notification warning/evacuation drill and/or exercise based on a wildland fire/or other natural hazard incident, to test both communications and response on the West End of the County.	Lead Agency – County 911 and Fire District #4, Implementation based on grant funding, short term project (o-2 years) once funded.	Protect life, property, and the environment through more effective and efficient communication and response in the event of a natural hazard incident.

Skamania County Fire District #5

Location and Area Served:

Skamania County Fire District #5 headquarters are located along State Highway 14 at milepost #33. The area serviced by Skamania County Fire District #5 is outlined in the map below: (Large boundary area excluding the North Bonneville Fire District – small boundary area)



Repetitive Loss Properties (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

None

Critical Facilities And Equipment (Owned By Skamania County District #5):

Facility and/or Equipment	
(1) Fire Station (4 bays)	(1) Brush Rig (out of service)
(2) Engines	(1) Squad
(1) Tender Pumper	Some new hose, but majority old, and nozzle
(5) Radios (old style) (1 per truck)	

Current And Anticipated Service Trends:

Slight increase in number of service calls.

NATURAL HAZARD EVENT HISTORY:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No significant impact on Fire Station
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No significant impact on Fire Station
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No significant impact on Fire Station

Natural Hazard Vulnerability Rating:

Skamania County Fire District #5 is considered most vulnerable to the following natural hazards - ranked in order:

1. Landslide
2. Earthquake
3. Severe Storm

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

1. Fire Department Standard Operating Guidelines
2. Mutual Aid Agreements with North Bonneville, Stevenson, Fire District #1 and Fire District #4

Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	ACTION/PROJECT Administration, Implementation and Timeline	ACTION/PROJECT Goal and Hazard Addressed
Resolve issues caused by repeater locations (holes in coverage area) and radio upgrades	Lead Agency – Fire District, implementation based on grant funding, short term project	Protect life, property, and the environment through more effective and efficient communication in the event of a natural hazard incident.

Skamania County Fire District #6

Location and Area Served:

Skamania County Fire District #6 headquarters is located in Northwest Skamania County on the 90 Road.

The area serviced by Skamania County Fire District #6 is outlined in the map above.

REPETITIVE LOSS PROPERTIES (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

None

Critical Facilities And Equipment (Owned By Fire District #6):

Facility and/or Equipment	
(1) Fire Station (6 bays)	(2) Water Tenders
(1) Engine	(1) Squad
(2) Brush Engines	Combination Fire, Wildland and BLS Aid Vehicle
Old Hose, but Fully Equipped Pumper/BLS Aid Vehicle	

Current And Anticipated Service Trends:

Service calls for Skamania County Fire District #6 have remained steady.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	$1000 of Damage to Fire Station Roof
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No Impact on Fire Station or Equipment
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No Impact on Fire Station or Equipment

Natural Hazard Vulnerability Rating:

Skamania County Fire District #6 is considered most vulnerable to the following natural hazards - ranked in order:

1. Volcano
2. Wildland Fire
3. Storm

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

1. Fire Department Standard Operating Guidelines
2. Mutual Aid Agreements with all Cark County, all Skamania County Fire Districts/Departments and Cowlitz-Skamania Fire District 7.

Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	ACTION/PROJECT Administration, Implementation and Timeline	ACTION/PROJECT Goal and Hazard Addressed
Ground Fuel Reduction and Fire Break Mitigation on South Side of Swift Reservoir	Lead Agency – Fire District, Implementation based on funding, ongoing project	Protect life, property, and the environment.
Red card training with FS and WADNR	Lead Agency – Skamania County Fire Districts and WADNR. Implementation based on funding, ongoing project	Protect life, property, and the environment through more effective and efficient response in the event of a wildland fire.

Mill A Fire Department

Location and Area Served:

The Mill A Fire Department has two stations. The main station is located on Jessup Rd in Mill A. A satellite station is located on Oklahoma Rd in Willard.

The area serviced by Mill A is outlined in the map to the right:

Repetitive Loss Properties
(National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

None

Critical Facilities And Equipment (Owned By Mill A Fire Department):

Facility and/or Equipment
(1) Main Fire Station
(1) Satellite Station
(1) 1955 “heavy engine” (meets no NFPA standard and is in poor condition)
(1) Type 5 engine
(1) 1974 pick-up chassis with slip pack (very poor condition)
Uniforms/Clothing, Wildland PPE, Structure PPE
(6) UHF portable radios
(3) UHF mobile radios
(15) VHF portable radios
(2) VHF mobile radios
(8) portable VHF
Pump and Hose Lay, 1-Mark III, 600’ 1 ½” wildland hose, 300’ 1” wildland hose, 2 folding tanks (Mark III in poor condition, hose inventory includes aging cotton hose subject to bursting)

Current And Anticipated Service Trends:

The Mill A Volunteer fire department is the first responder in a large urban-wildland zone that includes portions of state, federal and privately held timberland and recreational land which is remote from USFS and DNR responders.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No Impact on Fire Station
2008	Lava Bed Fire	No Impact on Fire Station
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No Impact on Fire Station
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No Impact on Fire Station

Natural Hazard Vulnerability Rating:

Mill A Fire Department is considered most vulnerable to the following natural hazards - ranked in order:

1. Wildland Fire
2. Earthquake

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

1. Fire Department Standard Operating Guidelines
2. Mutual Aid Agreement with Skamania County Fire District #3

Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	**ACTION/PROJECT Administration, Implementation and Timeline**	**ACTION/PROJECT Goal and Hazard Addressed**
Train Mill A Volunteers and upgrade all equipment to NFPA Standards. Training – Annual refresher for Wildland Fire Vehicle Upgrade – Type III and IV Tenders and Rapid Response Engines Hand Equipment – Additional UHF portables, portable pumps, nylon jacketed hose, additional folding tanks Vehicle Storage – Modern facilities to house equipment and training needed in both the middle and upper regions of the Little White Salmon Drainage Community Wildfire Protection Plan area.	Lead Agency – Mill A Fire Department, Implementation based on grant funding and or government surplus. Short Term	Protect life and protect property in the event of a natural disaster.

North Bonneville Fire Department

Location And Area Served:

The North Bonneville Fire Department is located in the City of North Bonneville.

Repetitive Loss Properties

(National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

None

Critical Facilities And Equipment (Owned By North Bonneville Fire Department):

Facility and/or Equipment
(1) Fire Station
(2) Engines, Engine #81 – 2006, Engine #82
(1) Brush Truck
(20) Sets NFPA standard PPE
(1) Radio per truck
(6) Handheld UHF
(1) Handheld VHF
Pump and Hose Lay – 6 pumps including 3 on trucks, 900 ft 5 inch hose, 7000 ft 2 ½ inch hose, 600 ft 1 ½ inch hose, 8-50 ft apartment bundles

Current And Anticipated Service Trends:

There has been a decrease in Fire calls for the first five months of 2010.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No impact on Fire Station
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No impact on Fire Station
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No impact on Fire Station

Natural Hazard Vulnerability Rating:

1. Wildland Fire
2. Earthquake
3. Storm

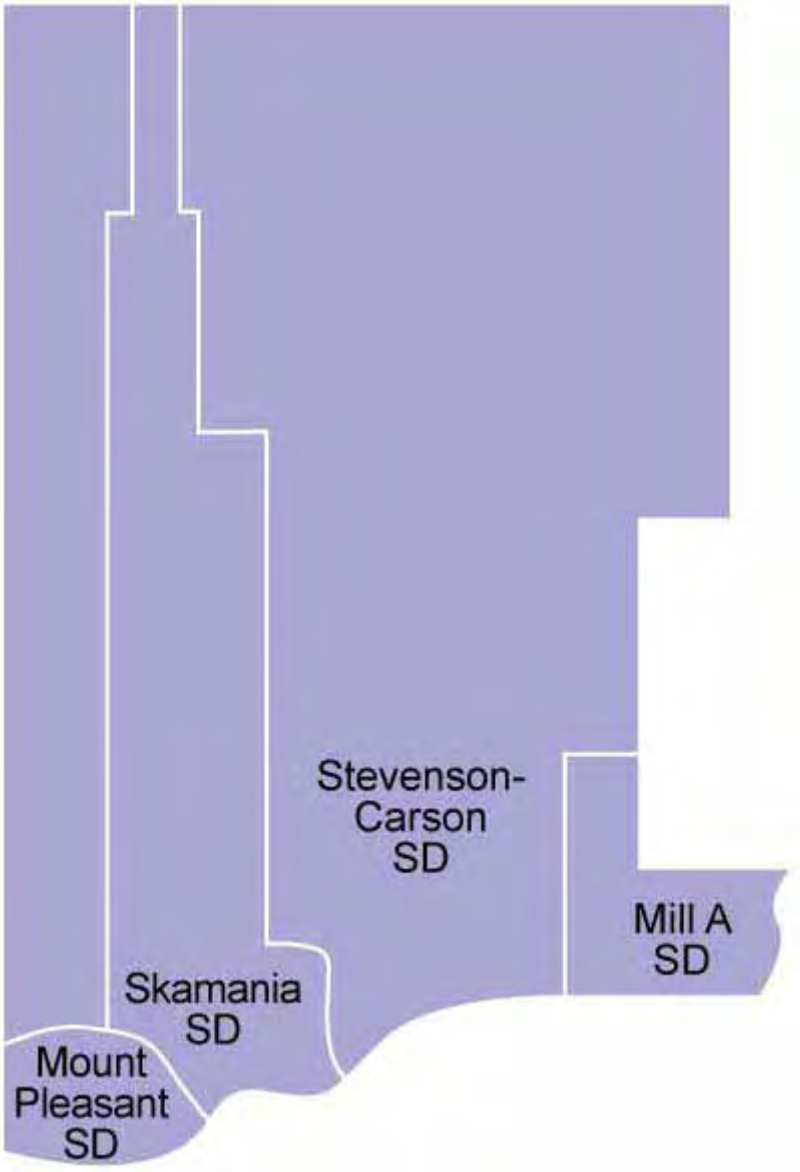
Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

1. Fire Department Standard Operating Guidelines
2. Mutual Aid Agreements with Stevenson Fire Department, Skamania County Fire District #5, and several buildings in North Bonneville.

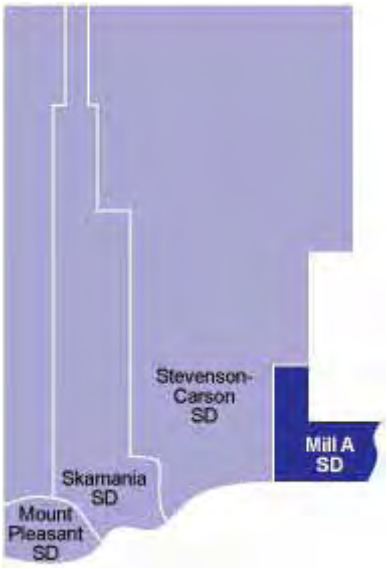
Proposed Natural Hazard Mitigation Action/Project:

ACTION/PROJECT Identification, Analysis and Prioritization	ACTION/PROJECT Administration, Implementation and Timeline	ACTION/PROJECT Goal and Hazard Addressed
Wildland Red Card and EMS Training, as well as equipment upgrades to include: Water Tender, Wildland gear backpacks, water bladders, fire shelters, 1 P-25 compliant radio per vehicle, 20 handheld P-25 compliant radios, signage for communicating danger and promoting volunteers. Small Wildland fire vehicle. Boat(s) for flooding evacuation.	Lead Agency – Fire Commissioners, Implementation based on grant funding and or government surplus. Short (0-2 year timelines) once funding is acquired.	Protect life and protect property in the event of a natural disaster.

Skamania County School Districts



Mill A School District #31



Location and Area Served:

Mill A is a rural one-school district and currently serves 55 students in kindergarten through eighth grade. Kindergarten is full time, and we offer pre-school three mornings per week.

Critical Facilities And Equipment (Owned By Mill A School District #31):

Our facility is a single building, with five classrooms, a cafeteria, library and gym that are well maintained for use by both students and community.

Our school is fully networked. Every class has access to high-speed internet and we have an on-line computer for every 1.9 students.

School	Address	Bldg. Value	Equip. Value	Total Value
Mill A School	1142 Jessup Rd., Cook, WA 98605	$3,295,290	$383,759 $115,979	$3,795,028

Repetitive Loss Properties (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

None

Current And Anticipated Service Trends:

Increase in enrollment.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Missed days of school, snow removal
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	Missed day of school
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	Bus routes interrupted

Natural Hazard Vulnerability Rating:

The Mill A School District is considered most vulnerable to the following natural hazards - ranked in order:

1. Landslide (Road Blockage)
2. Severe Storm
3. Wildland Fire

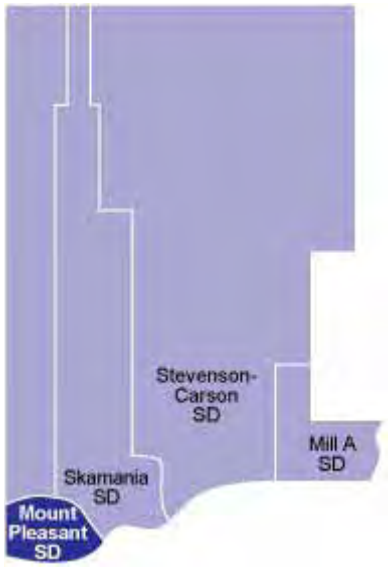
Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Storms and landslides	Shelter in place if needed	Alternate routes to take students home if possible	
Wildland Fire	Ground and adjoining area free from large flammables	Fire department equipment on site manned by volunteers	WA DNR/USFS Aid

Proposed Mitigation Actions/Project:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Storms and landslide Road Mitigation	Skamania County Road Department	Short-term	Protect life, property and the environment.
Ongoing Firewise Programs	Underwood Conservation District	On-going	Protect life, property and the environment, make the area around the school as safe as possible

Mount Pleasant School District #029-931



Location and Area Served:

Mount Pleasant School District is located on the west end of Skamania County off Marble Road. Mt. Pleasant Elementary School is a kindergarten through sixth grade school, and is the only school in the Mt. Pleasant School District.

Our boundaries are contained with a small portion of southwestern Skamania County. Our school population varies from 45 to 55 full time students.

Critical Facilities And Equipment (Owned By Mt. Pleasant#029-931):

The main building was constructed in 1962. A two-room addition was added in 1971. The main building is in good condition and contains four classrooms, a library, a cafeteria, a multi-purpose room, and a gym.

We have three portables with five classrooms in them. The single classroom portable was added in 1979 and double classroom portables were added in 1989 and 1996 respectively. All are in good condition. Our bus garage houses four buses and a school van and is in good condition.

School	Address	Bldg. Value	Equip. Value	Total Value
Mount Pleasant School	152 Marble Road, Washougal, WA 98671	$800,000	$200,000	$1million

Repetitive Loss Properties (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

No properties or structures within the School District are affected or associated with the National Flood Insurance Program and there are no repetitive loss properties within the district.

Current And Anticipated Service Trends:

Enrollment with the district has been steady for the most part over the past 5 years. There have been minor increases and decreases with overall enrollment remaining relatively even. Neither land use nor developmental trends have had any major impact on the district and funding levels continue to decrease with significant financial issues facing the district in 2012 after federal forest payments cease.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Damage to Gutter system from heavy snow and ice on roof
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No Significant impact
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No Significant impact

Natural Hazard Vulnerability Rating:

The Mount Pleasant School District is considered most vulnerable to the following natural hazards - ranked in order:

1. Severe Winter Storm
2. Earthquake
3. Wildland Fire

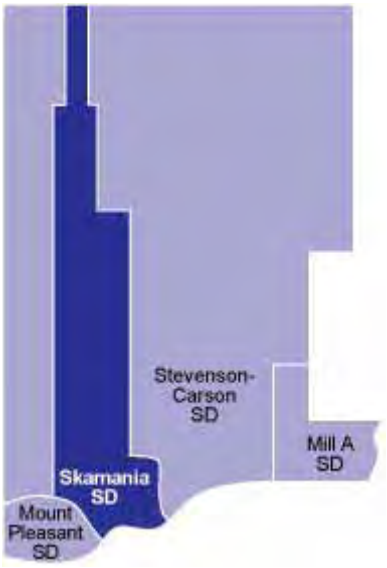
Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Severe Winter Storm	Emergency Plan in place, Update parent call down lists, Ensure Flash News Network is functional and comprehensive lists exists. If shelter in place is necessary ensure adequate food and water on site.	Conduct comprehensive facility survey of all sites affected. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Damage = Assess, identify needed resources. Obtain necessary resources to allow staff to maintain minimum operations for educational purposes.

Proposed Mitigation Actions/Project:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Secure outside fixtures, replace gutter system on building	School Maintenance Department	One year from acquisition of funding	Severe Winter Storm Mitigation, Life Safety, Property Preservation

Skamania School District #2



Location And Area Served:

Skamania Elementary School is a kindergarten through eighth grade school, and is the only school in the Skamania School District.

Our boundaries stretch in the south from the north shore of the Columbia River past Mount St. Helens and Spirit Lake in the north.

Our school population varies from 59 to 72 full time students and operates on a trimester (3) marking period.

Critical Facilities And Equipment (Owned By Skamania School District #2):

The main building was constructed in 1947. A gymnasium was added in 1961. A two-room addition was added in 1971.

The main building is in good condition and contains four classrooms, a library, a cafeteria, a multi-purpose room, and a gym. We have three portables with five classrooms in them. The single classroom portable was added in 1979 and double classroom portables were added in 1989 and 1996 respectively. All are in good condition. Our bus garage houses four buses and a school van and is in good condition.

School	Address	Bldg. Value	Equip. Value	Total Value
Skamania Elementary School	122 Butler Loop Road, Skamania, WA 98648	$900,000	$500,000	1.4 Million

Repetitive Loss Properties (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

No properties or structures within the School District are affected or associated with the National Flood Insurance Program and there are no repetitive loss properties within the district.

Current And Anticipated Service Trends:

Enrollment with the district has been steady for the most part over the past 5 years. There have been minor increases and decreases with overall enrollment remaining relatively even. Neither land use nor developmental trends have had any major impact on the district and funding levels continue to decrease with significant financial issues facing the district in 2012 after federal forest payments cease.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No significant structural impacts. Man hours related to snow removal
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No significant structural impacts. Man hours related to snow removal
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No significant structural impacts. Man hours related to snow removal

Natural Hazard Vulnerability Rating:

The Skamania School District is most vulnerable to the following natural hazards - ranked in order:

1. Severe Winter Storm
2. Wildfire
3. Earthquake

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	**Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)**	**Response (Immediate actions to function at a minimal acceptable level)**	**Recovery (Resources required to restore function or longer term recovery)**
Severe Winter Storm	Emergency Plan in place, Update parent call down lists, Ensure Flash News Network is functional and comprehensive lists exists. If shelter in place is necessary ensure adequate food and water on site.	Conduct comprehensive facility survey of all sites affected. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Damage = Assess, identify needed resources. Obtain necessary resources to allow staff to maintain minimum operations for educational purposes.

Proposed Mitigation Actions/Projects:

Specific Actions/Projects	**Responsible Entity**	**Timeline**	**Hazard and Goal Addressed**
Update emergency contact lists/prepare for shelter in place	School staff and maintenance Department	One year from acquisition of funding	Severe Winter Storm

Stevenson-Carson School District #303

Location and Area Served:

The Stevenson-Carson School District is a K-12 district serving the towns of Stevenson, North Bonneville, Carson, Stabler and Home Valley.

The District boundaries include the largest geographic area in the region and one of the largest in the state. The boundaries extend along the Columbia River from North Bonneville on the west to Home Valley on the east, a distance of approximately 15 miles.

The northern boundary is located approximately 50 miles north of the Columbia River, capturing a large portion of the Gifford Pinchot National Forest, including the southern portion of the Mount St. Helens national monument

A large portion of the Gifford Pinchot National Forest is located within district boundaries. As a result, the district is the largest timber district in the state.

The District serves approximately 1331 students, K-12. Students attend Stevenson Elementary (K-2), Carson Elementary (3-6), Wind River Middle School (7-8), and Stevenson High School (9-12).

Critical Facilities And Equipment (Owned By Stevenson-Carson School District #303):

School	
Stevenson Elementary School 100 NW School Street, PO Box 850, Stevenson, WA 98648 Bldg. Value: 5.3M Equip. Value: 700K Total: 6M	

Carson Elementary School 351 Hot Springs Ave., Carson, WA 98610 Bldg. Value: 6.7M Equip. Value: 800K Total: 7.5M	
Wind River Middle School 441 Hot Springs Ave., Carson, WA 98610 Bldg. Value: 7.3M Equip. Value: 1M Total: 8.3M	
Stevenson High School 390 NW Gropper Rd., Stevenson, WA 98648 Bldg. Value: 11M Equip. Value: 1.5K Total: 12.5M	

Repetitive Loss Properties (National Flood Insurance Program Insured Structures That Have Been Repetitively Damaged In Floods):

No properties or structures within the School District are affected or associated with the National Flood Insurance Program and there are no repetitive loss properties within the district.

Current And Anticipated Service Trends:

Enrollment with the district has been declining over the past five years. Most of the decline has been relatively minor however. Land use has not had a significant increase in residential housing availability in the past four years. The district funding levels continue to decrease with significant financial issues facing the district in 2010 after federal forest payments cease.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No significant structural impacts. Man-hours related to snow removal and grounds cleanup were biggest impact
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No significant impact
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No significant impact

Natural Hazard Vulnerability Rating:

The Stevenson-Carson School District is most vulnerable to the following natural hazards - ranked in order:

1. Earthquake
2. Severe Storm
3. Wildfire

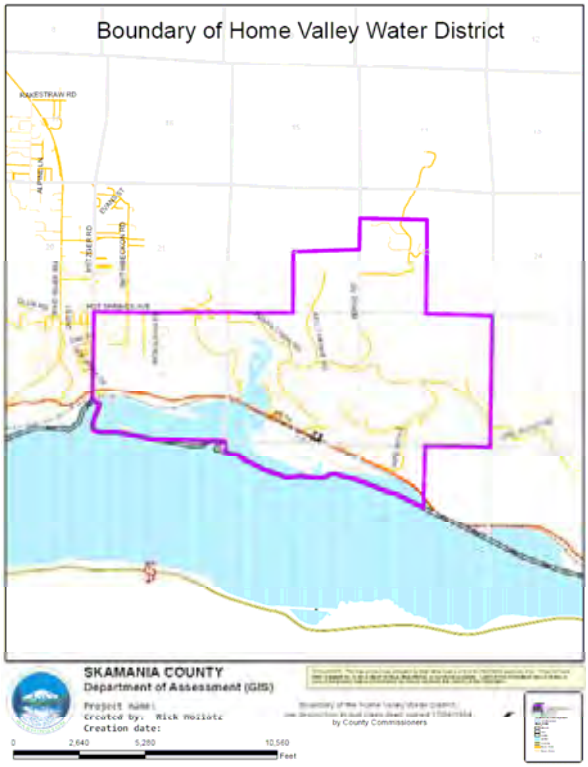
Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Earthquake	Emergency Plan in place, sites drill on regular basis for familiarity. Facility tours conducted relocating and securing shelving units and equipment to minimize injuries.	Conduct comprehensive facility survey of all sites affected. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos. at Bldg. Sites	Damage = Assess, identify needed resources. Establish counseling for students and staff upon return to school.

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Secure fixtures, furniture, equipment in buildings	School Maintenance Department	One year from acquisition of funding	Earthquake, Life Safety, Property Preservation

Home Valley Water District



Location and Area Served:

The Home Valley Water District encompasses the area in the map shown on the left.

There are 314 improved parcels in the district. Total market value for land and improvements is $48,164,096.

The Home Valley water plant is located on Bylon Road in Home valley and services approximately 140 Home Valley customers.

Critical Facilities and Equipment (Owned by Home Valley Water District):

The following table identifies critical district facilities and equipment.

The district views these assets as critical to meeting its customer and emergency needs.

Facility and or Equipment
2 (Two) Water Towers (Bylon Rd)
1 (One) Water Tower (Erickson Rd)
1 (One) Water Tower (Wind Mountain Rd)
9 Capped Springs off Bylon Rd

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods)

None

Current And Anticipated Service Trends:

Service trends for Home Valley Water District have remained steady.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No Impact
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No Impact
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No Impact
March 2005	Statewide Drought	Low Water Levels

Natural Hazard Vulnerability Rating:

The Home Valley Water District considers itself most vulnerable to the following natural hazards - ranked in order:

1. Landslide
2. Drought
3. Earthquake

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

None

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Identify alternate water source through surveying, water rights negotiations and/or drilling.	Water Commissioners, implementation dependent on grant funding	Long-term (four or more years)	Drought Mitigation, Life Safety, Property Preservation

North Bonneville and Stevenson Community Libraries

North Bonneville Community Library

Location And Area Served:

The North Bonneville Community Library is located in North Bonneville.

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None.

Critical Facilities And Equipment:

Library	Address	Bldg. Value	Personal Property	Total Value
North Bonneville Community Library	214 CBD Mall, North Bonneville, WA 98639 (inside City Hall)	$72,198	$27,583	$99,781

Current And Anticipated Service Trends:

Steady increase in patrons. Exterior of building and utilities maintained by City of North Bonneville; library maintains interior of Library area.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	None
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	None
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	None

Natural Hazard Vulnerability Rating:

The North Bonneville Community Library is considered most vulnerable to the following natural hazards - ranked in order:

1. Severe Storm
2. Wildfire
3. Earthquake

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Severe Storm	FVRL emergency response plan in place: Emergency reporting, inclement weather procedures, evacuate/shelter in place plans. Regular staff safety meetings.	Work with city to conduct comprehensive facility survey. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Assess damage; identify needed resources and repairs.
Wildfire	FVRL emergency response plan in place: Emergency reporting, evacuate/shelter in place plans. Regular staff safety meetings.	Work with city to conduct comprehensive facility survey. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Assess damage; identify needed resources and repairs.
Earthquake	FVRL emergency response plan in place: Emergency reporting, evacuate/shelter in place plans. Regular staff safety meetings.	Work with city to conduct comprehensive facility survey. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Assess damage; identify needed resources and repairs.

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Acquire several gallons of drinking water to be stored in work room.	Library Branch Manager/Purchasing Department.	4-30-2010	Severe storm – shelter in place preparation.
Review evacuation plans on regular basis	Library Branch Manager	Ongoing	Wildfire – preserve health and safety.
Review contents of shelves in office and keep heavy items lower	Library Staff	ongoing	Earthquake – maintain and preserve life and safety
Review earthquake safety during Stevenson library staff meetings	Library Branch Manager	ongoing	Earthquake – maintain and preserve life and safety

Stevenson Community Library

Photograph by Kathleen Carlson

Location and Area Served:

The Stevenson Community Library is located in downtown Stevenson, and services residents throughout Skamania County.

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Critical Facilities And Equipment (Owned By Stevenson Community Library/Fort Vancouver Regional Library):

Library	Address	Bldg. Value	Personal Property	Total Value
Stevenson Community Library	120 NW Vancouver Ave., Stevenson, WA 98648	$1,922,577	$377,838	$2,300,415

Current And Anticipated Service Trends:

Continued increase in patrons; ongoing programs to citizens of all ages. Ongoing maintenance of building and grounds. Agreement in place to serve as command center location for county if government buildings were damaged/unsafe. Agreement in place for county to plow/clear parking lot and access lane in return for seven leased county parking spots and access through lot.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Limbs on roof did minor damage. Limited snow closure.
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	Minor tree pruning/removal.
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	Minor pruning/removal of downed limbs.

Snow Storm, 2009, Photograph by Chris Hughey

Snow Storm, 2009, Photograph by Chris Hughey

Natural Hazard Vulnerability Rating:

The Stevenson Community Library is considered most vulnerable to the following natural hazards - ranked in order:

1. Severe storm – most likely to occur but relatively less damage
2. Landslide – could result in severe damage
3. Wildfire – could result in catastrophic damage

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Severe Storm	FVRL emergency response plan in place: Emergency reporting, inclement weather procedures, evacuate/shelter in place plans. Regular staff safety meetings; training on how to shut off gas/power. Regular monitoring and pruning of trees.	Conduct comprehensive facility survey; determine if safe to open. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Assess damage, arrange for snow removal, building repair, tree pruning/removal.
Landslide	FVRL emergency response plan in place: Emergency response protocol; evacuation plan. Regular staff safety meetings; training on evacuation.	Conduct comprehensive facility and grounds survey. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Assess damage, identify needed repairs.
Wildfire	FVRL emergency response plan in place: Emergency response protocol; evacuate/shelter in place plans. Regular staff safety meetings; training on evacuation. Regular monitoring and pruning of trees. Deck and roof constructed of fire-resistant materials.	Conduct comprehensive facility survey. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Assess damage, identify needed repairs.

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Acquire several gallons of drinking water to be stored on each floor.	Library Branch Manager/Purchasing Department.	4-30-2010	Severe storm – shelter in place preparation.
Regularly monitor condition of south driveway and hillside. Maintain vegetation to control erosion.	FVRL Facilities Dept.	Ongoing	Landslide - property preservation.
Request fire safety evaluation from FIrewise.	Branch Manager	April 30, 2010	Wildfire damage prevention. Life, safety, property preservation.

Skamania County Bookmobile

Location And Area Served:

The bookmobile is housed in the Stevenson Library garage, and serves rural Skamania County, North Bonneville and western Klickitat County.

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Critical Facilities And Equipment:

Library	Address	Value	Contents Value	Total Value
Skamania County Bookmobile	120 NW Vancouver Ave., Stevenson	$137,000	Part of Stevenson Collection	$137,000

Current And Anticipated Service Trends:

Small but steady increase in patrons. Serves outlying schools and more rural parts of Skamania and Western Klickitat counties, and provides Saturday service in North Bonneville twice a month. Travels on narrow two-lane roads, often at higher elevations. Cell phone and computer reception is spotty.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Could not go out on routes; canceled several trips.
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	Routes canceled.
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	Routes canceled.

Natural Hazard Vulnerability Rating:

The Skamania County Bookmobile is most vulnerable to the following natural hazards - ranked in order:

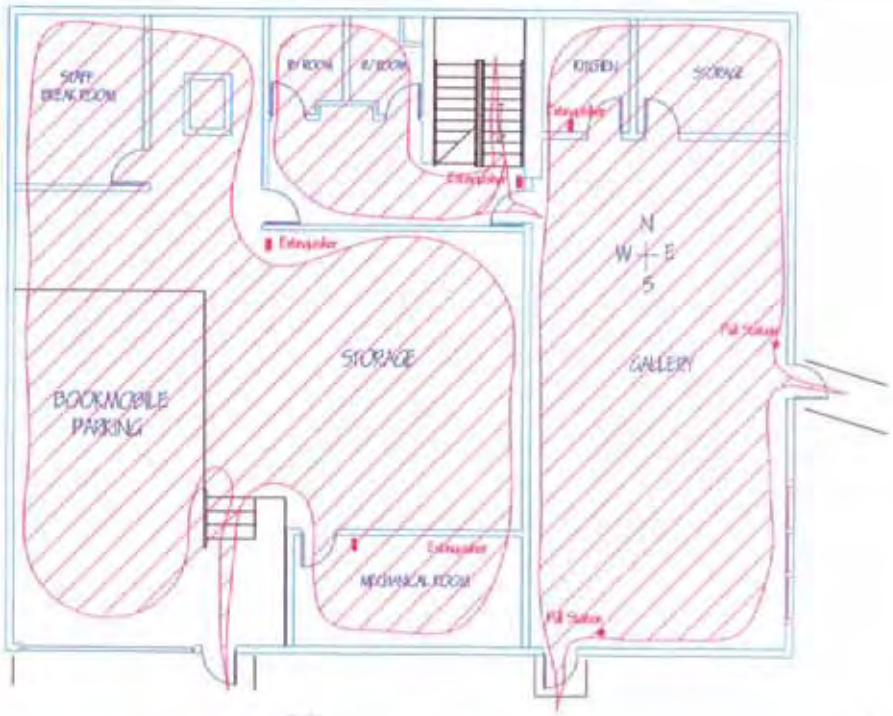
1. Severe Storm
2. Landslides/flooding
3. Wildfire

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

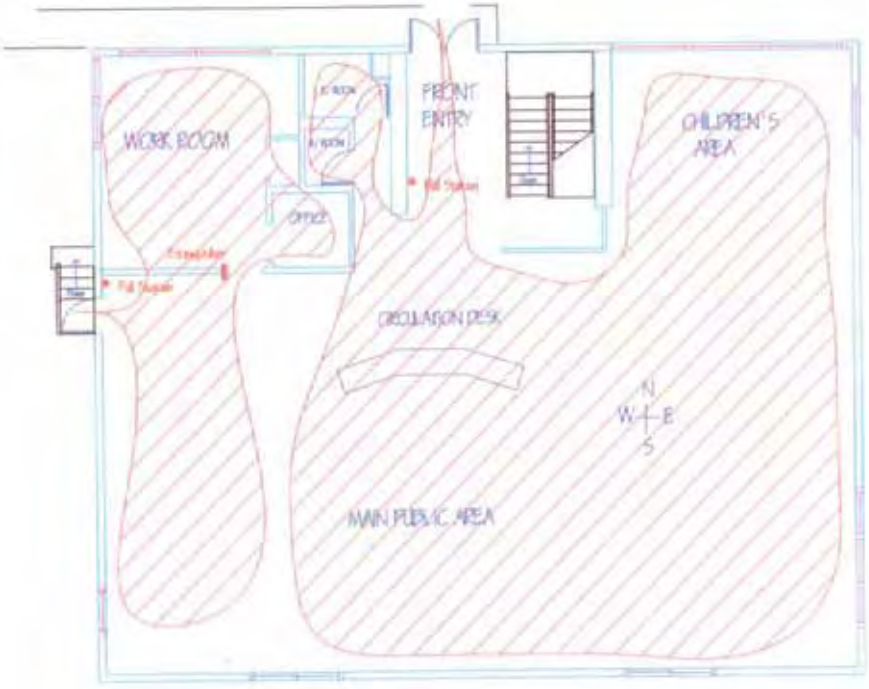
Hazard	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
Severe Storm	FVRL emergency response plan in place: Emergency reporting, inclement weather procedures, evacuate/shelter in place plans. Regular staff safety meetings.	Stop and shelter within bookmobile; contact library/emergency personnel to determine if road is passable.	Assess damage; identify needed resources and repairs.
Landslides/ flooding	FVRL emergency response plan in place: Emergency reporting, evacuate/shelter in place plans. Regular staff safety meetings.	Stay with bookmobile if possible; evacuate if necessary; summon help and get vehicle towed if possible	Assess damage; identify needed resources and repairs.
Wildfire	FVRL emergency response plan in place: Emergency reporting, evacuate/shelter in place plans. Regular staff safety meetings.	Reverse route and drive to safe area if possible; return to library when fire danger ends.	Assess damage; identify needed resources and repairs; revise routes if needed.

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Store drinking water with first aid kit.	Library Branch Manager/Purchasing Department.	4-30-2010	Severe storm – shelter in place preparation.
Obtain GPS/Onstar system to summon help	Library I.T. Manager/Purchasing Department.	When funds received	Severe storm – rescue of library staff if needed.
Review weather and road conditions	Library Branch Manager	Ongoing	Landslides/ flooded roads – preserve health and safety.
GPS device as noted above	IT Manager and Purchasing Dept.	When funds received.	Wildfire -- maintain and preserve life and safety



STEVENSON LIBRARY EVACUATION PLAN - Lower Floor



STEVENSON LIBRARY EVACUATION PLAN - Main Floor

Port of Skamania County

Location And Area Served:

The Port owns 162 acres in Stevenson, and North Bonneville including approximately 30,000 square feet of commercial space and 120,000 square feet of industrial use space.

Public access to recreational opportunities is an important priority for the Port. The Port owns and maintains approximately 6 acres of parkland with 1.5 miles of waterfront in Stevenson, and has developed 1.1 miles of walking paths with interpretive signs and amenities.

The Stevenson Landing dock, parks, beaches, and boat launch ramp facilities draw a variety of watersport enthusiasts and tourists helping to invigorate the local economy.

Over 12 businesses are located at the Port, employing approximately 200 people.

Critical Facilities And Equipment **(Owned By The Port Of Skamania County):**

Building/Site/Tenant	Address	Value
Underwater Land (east of pier)	Columbia River	$3,500
Underwater Land (west of pier)	Columbia River	$7,000
Stevenson Landing Pier (property leased)	Russell Street	$2,058,062
Port Shop	Cascade/Leavens	$85,092
Rental (Little Brown House)	126 SW Cascade Ave	$160,000+$149,367 $309,367
Welch Property	128 SW Cascade Ave.	$160,000*
Old Saloon	130 SW Cascade Ave	$375,000+$223,446 $498,446
Waterfront Pathway	Vacated Front Street	$10,000*
Waterfront Pathway	Vacated Front Street	$8,000*
Waterfront Pathway	Vacated Front Street	$8,000*
Teo Park	152 SW Cascade Ave	$330,000*+$73,920 $403,920
Bob's Beach	206 SW Cascade Ave	$240,000*+$22,040 $262,040
Tichenor Building	40 SW Cascade Ave	$687,078 +$2,994,346 $3,681,424
Insitu	Suites 60 - 100	
Normandeau	Suite 40	

Sawtooth Tech.	Suite 50	
Woodrich/Archer	Suite 110	
Galaxy Manufacturing	Suite 85/105	
Slingshot Sports	Suite 45/105	
River Point Building, (Industrial Building) Insitu, Inc.	26/28/30 SE Cascade Ave	$1091132 +$3,334,826 $4,425,958
Red Barn, Normandeau	11 SW Cascade Ave	$81928+$237,738 $319,666
East Point Kite Beach	60 SE Cascade Ave	$100,000*
Slaughterhouse Point	Skamania County	$10,000*
Pebble Beach	Skamania County	$450,000*
Boat Launch Area $180,000+$753,480	SE Cascade Ave	$155,590+$239,715+$146,975+$211,200 $933,480
Port Office House	212 SW Cascade Ave	$240,000+$190,400 + $63,856+$51,520 $545,776
Beacon Rock Golf Course/Kevin Coombs	102 Grenia Road	$949,500+$578,425 $1,527,925
Discovery “I” Building/Gorge Delights Discovery “II” Building/Slingshot & Battelle	396 Evergreen Drive 390 Evergreen Drive	$250,000+$1,864,490 +~$2,000,000 $4,114,490
Evergreen Building/Silver Star Cabinets & Ecowork	505 Evergreen Drive	$152,000+$736,598 $888,598
Cascades Business Park/For Lease	Highway 14	$666,200*
Skye Building/Battelle	380 Evergreen Drive	$120,000+$223,446 $343,446

REPETITIVE LOSS PROPERTIES (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Current And Anticipated Service Trends:

The Port of Skamania foresees continued development of Commercial and Industrial space from 2010 through 2015, with a potential addition of another 20,000 to 100,000 square feet of available space. Most of this expansion will occur in North Bonneville in the Cascades Business Park property.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Moderate disruption of shipping for Port Tenants, difficulties with employees getting to/from work. No major impact.
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	Moderate disruption of shipping for Port Tenants, difficulties with employees getting to/from work. No major impact.
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	Moderate disruption of shipping for Port Tenants, difficulties with employees getting to/from work. No major impact.

Natural Hazard Vulnerability Rating:

The Port of Skamania County is considered most vulnerable to the following natural hazards - ranked in order:

1. Severe Winter Storm
2. Flooding
3. Landslides

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	**Responsible Entity**	**Timeline**	**Hazard and Goal Addressed**
Educate employees, tenants about natural hazards, alert system, preparedness and evacuation routes	Port Manager, Facility Manager	One year from acquisition of funding	All Hazards Mitigation, Life Safety, Property Preservation
Develop / install back up / alternate data and communication plans	Port Manager	Two years from acquisition of funding	Commerce Preservation
Develop / install back up power generation for critical tenant processes	Port Manager	Two years from acquisition of funding	Commerce Preservation

Public Utility District #1

Photograph by John Carlson

Location and Area Served:

The Public Utility District #1 is located in Carson, and provides electric service in Skamania County.

The utility district also has two water systems, serving customers in Carson and Underwood. Emergency Response Plans and equipment are in place for these systems.

Critical Facilities and Equipment (Owned by Public Utility District #1):

The following table identifies locations and replacement costs for critical district facilities and equipment. The district views these assets as critical to meeting its customer and emergency needs.

Facility and or Equipment	Address	Bldg. Value	Equip. Value	Total Value
PUD #1 Office Building	1492 Wind River Highway, Carson, WA 98610	$1,195,000	$2,207,926	$3,402,926
Power Lines	County-wide	-	$26,903,074	30,306,000

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods)

None

Current And Anticipated Service Trends:

During the period January 2001 to January 2010 the services supplied by the district grew by 15%. Growth rate is anticipated to continue at a rate of 1-1/2% to 2% per year.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	Normal damage and outages, power restored by local PUD crews
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	Normal damage and outages, power restored by local PUD crews
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	Normal damage and outages, power restored by local PUD crews

Natural Hazard Vulnerability Rating:

The Public Utility District considers itself most vulnerable to the following natural hazards:

A landslide that destroys one or more steel support towers of the BPA 115 kV transmission line that serves Skamania PUD and Skamania County. This is the Natural Hazard that imposes the most risk of extended power outage in the County.

Other problems such as wildfire, flooding, severe storms, are more routine, and can be dealt with locally and quickly.

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

Per WAC 246-290 Group A public water supplies, we have an Emergency Response Plan for the water systems.

Proposed Mitigation Actions/Projects:

For most problems on both the electrical and water systems, the PUD has plans, equipment, and Mutual Aid Agreements in place to provide the man-power and materials needed to restore service in a timely manner. These include Emergency Generators for pumps and the headquarters facility, and a warehouse full of materials.

For a major Landslide that damages a BPA steel transmission tower, the PUD is at the mercy of BPA. Because of the likely-hood of inaccessibility to repair the damaged towers, it is expected that such an event will cause an electrical blackout to most of Skamania County for several days, perhaps weeks.

The proposed mitigation plan for such a landslide is to build a ‘back-feed’ 115 kV transmission connection on the east end of Skamania County. BPA has facilities nearby, and the connection is not a major construction project, just an expensive one. The estimated cost of this project exceeds the total annual revenue of the PUD. Hence, grant funds are needed to help support the costs of this project, along with BPA funding and PUD funding.

Skamania County Cemetery District

Location And Area Served:

The Skamania County Cemetery encompasses the entirety of Skamania County and services residents throughout the county.

Critical Facilities And Equipment (Owned By The Skamania County Cemetery District):

Facility and or Equipment	Location
Berge Cemetery	Home Valley
Chris Zaba Underwood Cemetery	Underwood
Eyman Cemetery	Carson
Iman Cemetery	Stevenson
Mount Pleasant Cemetery	Washougal
Old Carson Cemetery	Carson
Saint Martin Cemetery	Carson
Stevenson Cemetery	Stevenson

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No significant damage to facility or equipment
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No significant damage to facility or equipment
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No significant damage to facility or equipment

Natural Hazard Vulnerability Rating:

The Skamania County Cemetery District considers itself most vulnerable to the following natural hazards - ranked in order:

Rank	Berge	Chris Zaba	Eyman	Iman	Mount Pleasant	Old Carson	Saint Martin	Stevenson
1	Wild Fire	Wild Fire	Earth-quake	Landslide	Flooding	Wild Fire	Wild Fire	Landslide
2	Earth-quake	Earth-quake	-	Earth-quake	Earth-quake	Earth-quake	Earth-quake	Earth-quake

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

None

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Review of Topography and Structures at all Locations, and Development of Plans for Fuel Reduction Projects, Standing Water Mitigation Projects and/or Landslide Mitigation Projects as appropriate.	Cemetery Commissioners, Facility Employees	Long Term (4 years or more)	Wildfire, Earthquake, Flooding, Wildland Fire

Skamania County Public Hospital District #1

Location And Area Served:

The Skamania County Hospital District is located in Stevenson and provides ambulance and rescue services throughout Skamania County.

Photograph by John Carlson

Critical Facilities And Equipment (Owned By The Skamania County Hospital District):

The following table identifies locations and replacement costs for critical district facilities and equipment.

The district views these assets as critical to meeting its customer and emergency needs.

Facility and or Equipment	Total Value
Skamania County EMS Ambulance Hall (Building and Land)	$600,000
4 (Four) Ambulances	$500,000
1 (One) Rescue Rig	$110,000
1 (One) MCI Trailer	$15,000
1 (One) Utility Vehicle	$5,000
3 (Three) Squads	$30,000

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Current And Anticipated Service Trends:

Service calls for Skamania County Public Hospital District #1 have remained steady for the past year.

Natural Hazard Event History:

Year	Event	Impact
2008-2009 (December 12-January 5)	Severe Winter Storm, Record and Near-Record Snow	No significant damage to facility or equipment
2006 (December 14-15)	Severe Winter Storms, Wind, Landslides, Mudslides	No significant damage to facility or equipment
2006 (November 2-11)	Severe Storms, Floods, Landslides, Mudslides	No significant damage to facility or equipment

Natural Hazard Vulnerability Rating:

The Skamania County Hospital District considers itself most vulnerable to the following natural hazards - ranked in order:

1. Flooding
2. Severe Storm
3. Earthquake

Existing Applicable Hazard Mitigation Associated Plans And/Or Documents

None

Proposed Mitigation Actions/Projects:

Specific Actions/Projects (Prioritized)	Responsible Entity	Timeline	Hazard and Goal Addressed
Multi-Agency Facility to house EMS, Fire, SAR, Sheriff's Office and Emergency Management	Participating Agencies, Implementation dependent on grant funding	Long Term Project (More than 4 years)	All Hazards Mitigation, Life Safety, Property Preservation

Williams Natural Gas Pipeline

Location And Area Served:

Williams Natural Gas Pipeline is located in Battle Ground, Washington, and has a natural gas pipeline crossing Skamania County, serving local gas distribution companies.

Critical Facilities And Equipment:

Facility and or Equipment
4 (Four) Metering/Regulation Stations
1 (One) Compressor Station
Numerous Mainline Valve Sites

Repetitive Loss Properties (National Flood Insurance Program insured structures that have been repetitively damaged in floods):

None

Natural Hazard Event History:

In the five-year recent history, we have performed “stress relief” projects in areas that have shown even minor landslide movement. We have instruments on our system that serve as monitoring devices that allow us to take action before these take place.

Natural Hazard Vulnerability Rating:

1. Landslide
2. Earthquake
3. Ice Storms (Preventing access to facilities and telecommunications equipment)

Section V
Plan Maintenance Process

Section V – Plan Maintenance Process
Table of Contents

Monitoring, Evaluating, And Updating The Plan

On an annual basis, the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan will be evaluated in order to assess the effectiveness of mitigation programs, mitigation projects, or other such related activities and to reflect changes in land development or programs that may affect mitigation priorities and/or strategies.

Every five years, the plan will be thoroughly reviewed and updated. This updated version of the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan will then be delivered to the Washington State Hazard Mitigation Officer for review and forwarding to the Federal Emergency Management Agency, Region X Office.

Additionally, following any occurring natural hazard event when event recollection is still fresh on everyone's mind, a key opportunity exists and will be used to review the hazard specific section(s) of this Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan and to evaluate its/their relevance and adequate coverage of the specific analyses and mitigation efforts.

Annual Plan Evaluation

In an effort to facilitate the annual plan evaluation process, the Local Planning Team will remain a semi-active group following the formal adoption of this plan and will conduct an annual plan evaluation during the months of October and November of each calendar year. The Skamania County Emergency Management Coordinator will contact the members of the Local Planning Team to organize this annual plan evaluation process. The Local Planning Team will review the current natural hazards mitigation strategies and determine their relevance to changing situations within the County. Also reviewed will be any changes in State or Federal policy to insure that these mitigation strategies are still addressing current and expected conditions.

Following the annual plan evaluation process, the Local Planning Team together with the Emergency Management Coordinator, will prepare a written report describing

- the plan evaluation process;
- the status of any current mitigation activities or projects; and
- any deficiencies identified as a result of the plan evaluation

A copy of this report will be mailed to the Washington State Hazard Mitigation Officer.

The objective for the annual evaluation and report is the status evaluation of the various mitigation strategies and/or projects identified in the Skamania Multi-Jurisdictional Natural Hazards Mitigation Plan. At that time, also an assessment of the progress of existing mitigation activities is made. Jurisdictions that participated in the development of the plan are responsible for evaluating, maintaining, and updating the sections pertaining to them. The purpose for their involvement is to maintain continuity, coordinate the development of mitigation strategies and collaboratively complete mitigation activities and/or projects. These jurisdictional inputs and reports will be reviewed, considered, and included in the annual Hazard Mitigation Plan evaluation report.

Five-Year Plan Update

The Skamania County Natural Hazards Mitigation Plan will be updated every five-years. The Skamania County Emergency Management Director or his designee, together with Emergency Management staff and in cooperation with the Local Planning Team will begin the process of updating the plan.

The updated plan will be vetted appropriately - probably in the same or similar fashion as the original version – and upon its adoption, a copy of the updated plan will be submitted to the Washington State Hazard Mitigation Officer.

Incorporation Into Existing Planning Mechanisms

Those jurisdictions having additional planning mechanisms in place specific to comprehensive, critical areas or other appropriate plans recognize the importance of incorporating the goals and strategies of this hazard mitigation plan.

The incorporation of this plan will be done in an effort to effectively address areas of concern and to maintain consistency in governmental decision-making that provides for minimal impacts to private property owners and the business community.

Continued Public Involvement

All participating entities are dedicated to the continued involvement of the public in the natural hazards mitigation process.

A copy of the Skamania County Natural Hazards Mitigation Plan will be kept and made available for public review at the Skamania County Department of Emergency Management in addition to being posted online at the Emergency Management website. A notice regarding the existence and location of these copies of the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan will be publicized annually during the month of September in the Skamania County Pioneer, the local weekly newspaper that serves Skamania County.

The Skamania County Department of Emergency Management is responsible for receiving, tracking, and filing public comments regarding the Skamania County Natural Hazards Mitigation Plan. A public meeting will be held as a part of the annual plan evaluation process as well as the five-year plan update.

The purpose of these meetings is to provide a public forum so that citizens can express concerns, opinions, or ideas about the Skamania County Multi-Jurisdictional Natural Hazards Mitigation Plan.

These public meetings need to be publicized (Skamania Country Pioneer) in order to facilitate continued public involvement in the natural hazards mitigation process within Skamania County.

Schedule and Method for Plan Monitoring, Evaluating, Updating

When & Whom	How
Annually (September, October and November) Local Planning Team DEM is the responsible party for coordinating the process	Press release to involve the public in the process Assess effectiveness and relevance of mitigation strategies, programs, projects and/or related activities, and changes in land development or other situation within the county that may affect mitigation priorities and/or strategies (Input to be solicited from all participating jurisdictions and special purpose districts). Review any changes in State or Federal policy as it relates to the plan. Prepare a written report describing the plan evaluation process, status of current mitigation activities or projects; and any deficiencies identified as a result of the plan evaluation. Submit report to Washington State Hazard Mitigation Officer.
Following Significant Natural Hazard Events Local Planning Team DEM is the responsible party for coordinating the process	Review hazard specific section(s) of plan and evaluate relevance and coverage of specific analyses and mitigation efforts.
Every five years (date based on adoption of final plan) Local Planning Team DEM is the responsible party for coordinating the process	Press Release to involve the public. Thorough review and update of plan.