SKAGIT COUNTY NATURAL HAZARD MITIGATION PLAN

A multi-jurisdictional plan developed for the benefit of all governmental jurisdictions within Skagit County, as well as the Samish Indian Nation, the Swinomish Indian Tribal Community and the Upper Skagit Indian Tribe



SKAGIT COUNTY

NATURAL HAZARD MITIGATION PLAN

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SECTION I: THE PLANNING PROCESS

Note:

This section of the Skagit County Natural Hazard Mitigation Plan contains a short introduction to the plan, an overview of the 2014 plan update process, a description of the plan methodology, the plan development process, information regarding the adoption of the plan, and how the plan will be maintained in the future.

Introduction

"Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Mitigation is taking action *now*—before the next disaster—to reduce human and financial consequences later (analyzing risk, reducing risk, insuring against risk). Effective mitigation requires that we *all* understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, we jeopardize our safety, financial security, and self-reliance." (Plan, Prepare, Mitigate, 2013)

Residents of Skagit County have historically dealt with high water, severe windstorms, harsh winter storms, wildfires, earthquakes, landslides, and even minor volcanic activity. With an ever-continuing growth in population and the development of natural lands, the impact of these natural hazards will continue to escalate. It is impossible to predict exactly when or to what extent these hazards will occur, however with careful planning and community collaboration it is possible to minimize the losses that can result from these natural phenomena.

WHO DOES THE NATURAL HAZARD MITIGATION PLAN BENEFIT?

The **Skagit County Natural Hazard Mitigation Plan** was developed, written, and adopted as a multi-jurisdictional Natural Hazard Mitigation Plan for the benefit of the following entities:

Swinomish Indian Tribal Community	Town of Concrete
Samish Indian Nation	Town of Hamilton
Upper Skagit Indian Tribe	Town of La Conner
City of Anacortes	Town of Lyman
City of Burlington	Unincorporated Skagit County
City of Mount Vernon	
City of Sedro-Woolley	

In addition to identifying mitigation strategies and mitigation projects, this plan also establishes a foundation for collaboration among local Indian Tribes, agencies, jurisdictions, and the citizens of Skagit County as a means to meet the requirements of federal assistance programs.

WHAT ARE THE BENEFITS OF HAZARD MITIGATION?

- *≠* Demonstrate commitment to improving community health and safety
- ≠ Save lives and property
- ≠ Reduce vulnerability to future hazards
- ≠ Facilitate post-disaster funding
- ≠ Speed recovery

The **Skagit County Natural Hazard Mitigation Plan** October 13, 2014 and approved by the Federal Emergency Management Agency on March 4, 2014, has been adopted by resolution by the Upper Skagit Indian Tribe, the Swinomish Indian Tribal Community, the Samish Indian Nation, and the governments of Skagit County and the cities/towns of Anacort es, Burlington, Concrete, Hamilton, La Conner, Lyman, Mount Vernon, and Sedro-Woolley.

It should be noted that 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 entity shall be subject to limitations as set forth in each entities adoption resolution.

Furthermore, the **Skagit County Natural Hazard Mitigation Plan** was developed following the process set forth in the Disaster Mitigation Act of 2000 as well as the requirements of the National Flood Insurance Program Community Rating System. By doing so, it is anticipated that the citizens living in those jurisdictions within Skagit County that participate in the Community Rating System could possibly further benefit from this plan through an additional decrease in their flood insurance premiums.

NATURAL HAZARDS LAND USE POLICY IN WASHINGTON

Planning for natural hazards in Washington has taken shape over the past 30 years beginning with the State Environmental Policy Act (1971) and the Shorelines Management Act (1971), and followed by the State Building Code Act (1974, 1985) and the Growth Management Act (1991). It is an integral element of Washington's statewide land use planning program which focuses on appropriate land use controls in critical areas that are prone to natural disasters, along with keeping up with the latest technology in construction methods to mitigate potential disasters.

SUPPORT FOR NATURAL HAZARD MITIGATION

The primary responsibility for the development and implementation of mitigation strategies and policies lies with local jurisdictions. However, local jurisdictions are not alone; various partners and resources exist at the state and federal levels to assist local government in the development of mitigation strategies and plans. Within Washington State, the Washington Military Department, Emergency Management Division is the lead agency for providing hazard mitigation planning assistance to local jurisdictions. FEMA Region X is the supporting federal agency for Washington State.

Special Thanks & Acknowledgements

PLAN CONTRIBUTORS

Skagit County Geographic Information Systems Geoff Almvig, Director Sean Carson, GIS Analyst II

Skagit County Planning & Development John Cooper, Senior Natural Resource Planner/Geologist Jack Moore, CRS Coordinator & Building Official

Skagit County Public Works Kara Symonds, Watershed Manager

Skagit Conservation District Al Craney, District Forester Jennifer Hinderman, Firewise Program Coordinator

Washington State Military Department, Emergency Management Division Elizabeth Minor, Hazard Mitigation Strategist

Washington State Department of Natural Resources Tom Smith, Glacier District Fire Operations

Federal Emergency Management Agency, Region X Kristen Meyers, Mitigation Planning Manager

Skagit Natural Hazard Mitigation Steering Committee Mark Watkinson, Director, Skagit County Department of Emergency Management Kerri Love, Mitigation Specialist, Skagit County Department of Emergency Management Margaret Fleek, Planning Director, City of Burlington

Citizen

Carol Ehlers, Concerned Citizen & Former Skagit County Planning Commission Member

FUNDING ACKNOWLEDGEMENTS

The 2014 update of this plan was made possible by Federal Grant funding obtained by the Skagit County Department of Emergency Management. In addition, local jurisdictions, Indian tribes, and special purpose districts provided staff time and resources to help complete the updating of this multi-jurisdictional plan.

Point Of Contact

SKAGIT COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT:

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Telephone:	(360) 428-3250
Fax:	(360) 428-3255
E-mail:	dem@co.skagit.wa.us

NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM (CRS)

City of Anacortes: Don Measamer at (360) 293-1901

City of Burlington: Margaret Fleek at (360) 755-9717

Town of La Conner: John Doyle at (360) 466-3125

City of Mount Vernon: Rick Prosser at (360) 336-6214

Unincorporated Skagit County: Jack Moore at (360) 336-9400

Record of Changes

CHANGE NO. ENTERED BY	PAGE NO.	SUBJECT	DATE

List of Plan Recipients

Copy #	Agency	Received By	Date
1	Skagit County Emergency Management	Office Copy	
2	Skagit County Emergency Management	Office Copy	
3	Skagit County Board of Commissioners	Office Copy	
4	City of Anacortes	Mayor Laurie Gere	
5	City of Burlington	Mayor Steve Sexton	
6	Town of Concrete (Town Hall Copy)	Mayor Jason Miller	
7	Town of Hamilton (Town Hall Copy)	Mayor Joan Cromley	
8	Town of La Conner	Mayor Ramon Hayes	
9	Town of Lyman (Town Hall Copy)	Mayor Debra Heinzman	
10	City of Mount Vernon	Mayor Jill Boudreau	
11	City of Sedro-Woolley	Mayor Mike Anderson	
12	Skagit County Public Works Department	Dan Berentson	
13	Skagit County Planning Department	Gary R. Christensen	
14	City of Anacortes Planning Department	Don Measamer	
15	City of Burlington Planning Department	Margaret Fleek	
16	Town of La Conner Town Hall	John Doyle	
17	City of Sedro-Woolley Planning Department	John Coleman	
18	Samish Indian Nation Planning Department	Edie Hill	
19	Swinomish Indian Tribal Community Office of Planning and Community Development	Ed Knight	
20	Upper Skagit Indian Tribe Public Works Department	Joe Hemmerich	
21	City of Anacortes Library	Sheri Miklaski	
22	City of Burlington Library	Maggie Buckholz	
23	City of Sedro-Woolley Library	Debra Peterson	
24	La Conner Regional Library	Joy Neal	
25	Upper Skagit Library	Brooke Pederson	
26	Washington State Military Dept. EMD Division	Elizabeth Minor, Mitigation Program Strategist	
27	Department of Homeland Security - FEMA	Kristen Meyers, Mitigation Planning Manager	

How To Use This Plan

The **Skagit County Natural Hazard Mitigation Plan** provides information to assist the governmental jurisdictions and agencies, Indian Tribes, and citizens of Skagit County in understanding the hazard-related issues facing citizens, businesses, government and the environment. This document serves as a guide to reduce vulnerability and minimize loss from future natural hazard events.

The Skagit County Natural Hazard Mitigation Plan is organized into five sections.

Section I contains the introduction and an overview of the planning process.

Section II contains information regarding the natural hazards that can affect Skagit County.

Section III contains multi-jurisdictional community profile information as well as multi-jurisdictional mitigation strategies and projects suggested by stakeholders and citizens.

Section IV contains specific vulnerability assessment and mitigation strategies for each jurisdiction, Indian tribe, and special purpose district that has participated in the hazard mitigation planning process.

Section V contains appendices to the plan.

OVERVIEW: 2014 PLAN UPDATE

During the 2014 update of the **Skagit County Natural Hazard Mitigation Plan** every effort was made to comply with the requirements of 44 CFR, Part 201.6 as well as National Flood Insurance Program Community Rating System requirements.

The Skagit Natural Hazards Steering Committee determined that revisions to SECTION II would include the possible effects of climate change in the Fire, Flood and Severe Storm chapters of SECTION II. Also within the Flood chapter a heavier emphasis on the need to remove standing flood water off the land as quickly as possible.

The Skagit Natural Hazards Planning Committee reviewed SECTION III of the plan in June, 2014. The planning committee revised the Multi-Jurisdiction/Multi-Hazard Mitigation Goals and also revised and approved a list of Multiple-Hazard Mitigation Action Items for the 2014-2019 cycle of the plan.

SECTION IV of the plan was reviewed and revised separately by each participating Indian Tribe, jurisdiction, and special purpose district.

SECTION V of the plan was modified by Skagit County Department of Emergency Management staff to comply with revisions made to the remainder of the plan. A synopsis of the revisions made to the various sections of the plan is listed below:

SECTION I: THE PLANNING PROCESS

Introduction

• Flood event history removed as it is referenced in Section II in greater detail.

<u>Overview</u>

- Revised to highlight changes made to the sections of the plan in 2014.
- <u>Plan Methodology</u>
 - The Steering Committee decided to streamline the plan process by focusing more on the 2014 process and less on previous plan updates.
 - 2014 Planning Committee members were identified.

Plan Development Process

- Key contributors to the 2008 plan development process were deleted; key contributors to the 2014 plan update process were listed.
- The Public Meeting Process table was revised to reflect the 2014 plan update public meeting process.
- All important dates and elements in the 2014 plan update process were listed by date. <u>Plan Adoption</u>
 - It was noted that participating entities would formally re-adopt the plan following approval by the Federal Emergency Management Agency.

Plan Maintenance

- The Plan Evaluation and Update Schedule was revised to reflect the 2014-2019 timeline.
- Plan maintenance activities from 2008-2013 were listed; successes and failures were noted.

SECTION II: MULTI-JURISDICTIONAL HAZARD IDENTIFICATION

All Sections

• Revised to include hyperlinks for additional on-line information regarding the hazard. <u>Fire</u>

- Information regarding recent efforts to begin development of a county-wide Community Wildfire Protection Plan was added.
- Included information on climate change and corresponding increase fire risk. <u>Flood</u>
 - Minor additions were made to reflect the 2009 flood events as well as efforts by various Skagit County jurisdictions to increase flood storage within the Puget Sound Energy Baker River Project.
 - Reference made to 2014 Hazus100 year flood scenario regarding damages and displacement.
 - Listed the importance of removing flood waters off the land as quickly as possible to lessen the losses and damages to property and the agricultural industry.

<u>Earthquake</u>

- Included information on the Devils Mountain Fault that crosses through Skagit County.
- Added recent 2014 Hazus information regarding damages and displacement.

Land Movement

- Minor revisions were made to identify contributing factors to landslides.
- Included info on a 1932 slide that occurred in Concrete, WA.
- Added USGS recommended steps to better understand and assess landslide risk. Severe Storms
 - Included information on 2011 storm event that caused flooding and landslides.
 - Possible effects of sea level rise due to climate change were added.

Tsunami and Seiche

Updated tsunami inundation map with revised color key.

SECTION III: MULTI-JURISDICTION/MULTI-HAZARD MITIGATION

Mitigation Goals

• Existing mitigation goals were re-affirmed and minor revisions were made.

Multiple Hazard Mitigation Action items

- Accomplishments and deficiencies were noted.
- Revisions were made based on current mitigation priorities.

Stakeholder/Citizen Suggested Mitigation Strategies and Projects

 Revisions were made based on comments and suggestions received by various stakeholders and citizens as part of the 2014 plan update public meeting process.

SECTION IV: JURISDICTION-SPECIFIC INFORMATION

Revisions to this section of the plan were completed by each of the participating entities.

- Contact information revised to reflect any changes made since 2008.
- Current data was considered to revise vulnerability and risk information, as needed.
- Information regarding critical facilities was revised to reflect changes made since 2008.
- Maps were changed to reflect current jurisdictional boundaries and to remain consistent with updated information contained in the plan.
- If appropriate, mitigation strategies were revised to meet current needs, especially with regards to flooding and tsunami hazards.
- Possible mitigation projects were revised, as needed.

SECTION V: APPENDICES

Revisions to this section of the plan were made by Department of Emergency Management staff.

- Appendix C, listing Federal funding sources was removed. A brief overview of Federal funding sources is referenced on page 162 as well as a link for a complete listing.
- Appendix D was removed as a complete list of works cited is now available as well as references to how additional hazard information can be found throughout the plan.

Plan Methodology

Early in the plan development process a decision was made that the **Skagit County Natural Hazard Mitigation Plan** should meet three basic goals:

That the plan be multi-jurisdictional thereby satisfying the Natural Hazard Mitigation Planning requirements as specified in the Disaster Mitigation Act of 2000 for <u>all</u> communities within Skagit County.

That the plan be developed following the process outlined by the Disaster Mitigation Act of 2000 as well as the National Flood Insurance Program Community Rating System so that the plan coordinates with and compliments Community Rating System programs that exist now or may exist in the future within Skagit County.

That the plan be written in such a way so as to also serve as the Skagit County Hazard Identification and Vulnerability Analysis.

The **Skagit County Natural Hazard Mitigation Plan** was written using the best available information obtained from a wide variety of sources. Throughout the plan development process, a concerted effort was made to gather information from participating Indian Tribes, municipal and county agencies and staff as well as stakeholders, business and industry, and the citizens of Skagit County. Information was also solicited from local agencies and individuals with specific knowledge of certain natural hazards and past historical events, as well as planning and zoning codes and ordinances and recent planning decisions.

Input from the Skagit Natural Hazard Mitigation Planning Committee

Throughout the development of the original plan, the Skagit Natural Hazard Mitigation Planning Committee convened on a regular basis as a means to gather and share information, assess vulnerabilities, identify critical facilities, assist in developing mitigation strategies, and provide continuity throughout the plan development process to insure that jurisdictional-specific natural hazards vulnerability information and mitigation strategies were incorporated into the plan.

SKAGIT NATURAL HAZARD MITIGATION PLANNING COMMITTEE MEMBERS

City of Anacortes Don Measamer, Building Official

City Of Burlington

Margaret Fleek, Planning Bryan Harrison, City Administrator Marv Pulst, Public Works Jim Sherwood, Building Official

Department of Ecology

Sharon Riggs

Town of Hamilton

Joan Cromley, Mayor Margaret Fleek, Planning

Town of Lyman

Margaret Fleek, Planning

Skagit County

City of Mount Vernon Rick Prosser, Building Official

City of Sedro-Woolley John Coleman, AICP, Planner

Town Of Concrete Jason Miller, Mayor

Town of La Conner John Doyle, Administrator, Planner

Samish Tribe Edie Hill, Health and Human Services

Dan Berentsen, Director, Public Works Jack Moore, CRS Coordinator and Building Official, Planning & Development Services John Cooper, Natural Resource Planner/Geologist, Planning & Development Services Kara Symonds, Watershed Planner, Public Works Mark Watkinson, Manager, Public Works-Emergency Management Division Kerri Love, Mitigation Specialist, Public Works-Emergency Management Division

Swinomish Tribe

Ed Knight, Planner Jim Sande, Emergency Management

STAKEHOLDERS AND CITIZENS

Conservation District Jenny Henderson, Fire Wise Coordinator Al Craney, Forester

Dike District #12 Dan Lefeber, Operations Manager **Concerned Citizen** Carol Ehlers

Upper Skagit Tribe

Joe Hemmerich, Public Works

Dike District #17 Daryl Hamburg, Operations Manager

Red Cross, Mount Baker Chapter

Nan Barbo, Emergency Services Coordinator

INPUT FROM STAKEHOLDERS AND CITIZENS

Information was gathered from stakeholders and citizens via a series of five (5) meetings beginning in February, 2014 and concluding in July, 2014. Burlington was chosen as the meeting location for all public meetings because of its central location within the county. Meeting announcements were emailed to all members of the Skagit Natural Hazard Mitigation Planning Committee in advance of all meeting dates. In addition, these meetings were also advertised in the Skagit Valley Herald and posted on the Skagit County website prior to the meeting date in an attempt to solicit information from the general public. These meetings helped to identify common concerns related to natural hazards as well as short-term and long-term mitigation activities and/or projects to reduce risk from natural hazards.

Stakeholders

As part of the 2014 update, information pertaining to wildland/urban-interface fires and the FIREWISE program was provided by the Skagit Conservation District. Mr. Al Craney, District Forester and Ms. Jennifer Hinderman, Firewise Program Coordinator contributed a significant portion of the updated material to the Fire hazard portion of the plan and also attended all public meetings to provide information to the public and answer questions, as needed.

In addition, information regarding hazard identification, vulnerability assessment, and mitigation strategies for inclusion in this plan was also requested from the following agencies and organizations:

Skagit County Public Utility District #1 Skagit County Sewer District #1 La Conner Regional Library District Port of Anacortes Port of Skagit County Mount Vernon School District Various Skagit County Dike Districts Various Skagit County Fire Districts Anacortes School District Burlington-Edison School District Concrete School District All Skagit County Hospital Districts La Conner School District Sedro-Woolley School District Various Skagit County Drainage Districts

HAZARD SPECIFIC RESEARCH

The Skagit Natural Hazard Mitigation Plan identifies nine natural hazards: avalanche, drought, earthquake, fire, flood, land movement, severe storms, tsunami/seiche, and volcanic activity. Information was obtained from local historical records, and a wide variety of local, state, and federal agencies as well as the above referenced stakeholder interviews and public workshops.

As part of the 2014 plan update process, the hazard specific information and data was fully reviewed and updated, as needed.

Tribal Mitigation Plan Requirements

Effective October 1, 2008, the Federal Emergency Management Agency (FEMA) placed new requirements on Tribal hazard mitigation plans. These requirements differ slightly than the requirements for local hazard mitigation plans.

Because the Skagit County Natural Hazard Mitigation Plan is a multi-jurisdictional plan, the Samish Indian Nation, the Swinomish Indian Tribal Community, and the Upper Skagit Indian Tribe have addressed these requirements within their individual portions of the plan.

NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

Effective October 1, 2008, the Federal Emergency Management Agency (FEMA) required jurisdictions that participate in the National Flood Insurance Program to link their mitigation strategy with continued compliance with the National Flood Insurance Program.

The **Skagit County Natural Hazard Mitigation Plan** was updated in 2014 following the process outlined by the Disaster Mitigation Act of 2000 as well as the National Flood Insurance Program (NFIP) Community Rating System (CRS) program so that the plan would fully coordinate with and compliment NFIP flood mitigation programs that exist now or may exist in the future within Skagit County.

Those jurisdictions that currently participate in the National Flood Insurance Program are:

C	City of Anacortes*	Town of Lyman
C	City of Burlington*	City of Mount Vernon*
Т	Town of Concrete	City of Sedro-Woolley
Т	Town of Hamilton	Samish Indian Nation*
Т	Fown of La Conner*	Skagit County Government*

* National Flood Insurance Program Community Rating System participating jurisdiction

In addition, the Town of Concrete, the Town of Hamilton and unincorporated Skagit County each maintain a listing of "*repetitive loss properties*" that have been damaged as a result of previous flood events occurring within Skagit County. The Town of Concrete, the Town of Hamilton and unincorporated Skagit County have considered these properties in describing their vulnerability to flooding within their individual portions of the plan.

To some extent, the flood hazard affects <u>all</u> incorporated municipalities within Skagit County as well as a majority of the unincorporated portions of Skagit County, therefore continued participation in the National Flood Insurance Program is integral to current and future mitigation efforts occurring within Skagit County. As a result, the mitigation strategy (in great part) for all of the above-listed jurisdictions is based upon continued participation and compliance with the National Flood Insurance Program. In addition, the mitigation strategies for unincorporated Skagit County as well as the City of Burlington, the Town of La Conner, and the City of Mount Vernon, are also based upon continued participation in the NFIP Community Rating System.

Plan Development Process

THE DISASTER MITIGATION ACT OF 2000

In the past, federal legislation has provided funding for disaster relief, recovery, and hazard mitigation planning. The Disaster Mitigation Act of 2000 is the latest legislation to improve this planning process and was put into motion on October 10, 2000, when the President of the United States signed the Act (Public Law 106-390). The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur.

The Disaster Mitigation Act of 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state predisaster planning and promotes sustainability as a strategy for disaster resistance.

The primary purpose of hazard mitigation is to identify community policies, actions, and tools for implementation over the long term that will result in a reduction in risk and potential for future losses community-wide. This is accomplished by using a systematic process of learning about the hazards that can affect the community, setting clear goals, identifying appropriate actions, following through with an effective mitigation strategy, and keeping the plan current.

Local Involvement:

The jurisdictions and Indian Tribes included in the **Skagit County Natural Hazard Mitigation Plan** contributed to the development of the plan through the dedication of staff time to oversee the development of the plan, assist in writing the plan, and/or compile jurisdiction-specific information contained in the plan.

Key Contributors

Don Measamer, Building Official
Margaret Fleek, Planning Director/C.R.S. Coordinator
Bryan Harrison, Administrator
James Sherwood, Building Department
Marv Pulst, Public Works Director
Jason Miller, Mayor
Margaret Fleek, Town Planner
John Doyle, Town Administrator/C.R.S. Coordinator
Margaret Fleek, Town Planner
Rick Prosser, Building Official
Rebecca Lowell, Senior Planner
John Coleman, Planning Director
John Cooper, Senior Natural Resource Planner / Geologist
Jack Moore, CRS Coordinator, Planner

Key Contributors Continued:

Skagit County:	Kerri Love, Mitigation Specialist, Emergency Management
Skagit County:	Kara Symonds, Public Works Watershed Manager
Skagit County:	Mark Watkinson, Director Emergency Management
Samish Indian Nation:	Edie Hill, Health & Human Services Director
Swinomish Tribe:	Ed Knight, Senior Planner, Planning and Community Development
Upper Skagit Tribe:	Joe Hemmerich, Public Works Director
Conservation District:	Jenny Hinderman, Firewise Coordinator
Conservation District:	Al Craney, Forest Advisory Board

Skagit County and each of the municipalities were involved in the plan development process through regular plan development meetings with the planning committee and regularly scheduled Skagit Emergency Management Council meetings. In addition, each of these jurisdictions as well as each of the participating Indian Tribes participated in reviewing and commenting on the final draft of the plan.

In order to involve the public in the planning process, the Skagit Natural Hazards Mitigation Steering Committee advertised and conducted a total of five (5) public meetings to solicit information and comments from the citizens of Skagit County.

Public Meeting Process						
Date	Time	Location	Number of Attendees	Purpose of Meeting		
February 20, 2014	7:00 P.M.	Burlington	19	Identify the Hazard		
March 12, 2014	7:00 P.M.	Burlington	25	Assess the Problem		
April 29, 2014	7:00 P.M.	Burlington	23	Set Goals		
April 30, 2014	6:00 P.M.	Concrete	16	Discuss Hazards		
May 20, 2014	7:00 P.M.	Burlington	11	Review Mitigation Possibilities		
September 7, 2014	7:00 P.M	Burlington	9	Public Comment		

PLAN UPDATE PROCESS - IMPORTANT DATES

January 8, 2014

First meeting of the Skagit County Natural Hazards Planning Committee to discuss the 2014 update of Mitigation Plan, focus on the natural hazards that affect Skagit County and why a mitigation plan is needed; 19 persons attended this meeting.

March 12, 2014

The second of a series of five public meetings was held at 7:00 P.M. at the Burlington City Council Chambers to inform the public of the process to update the **Skagit County Natural Hazard Mitigation Plan**, focus on the natural hazards that affect Skagit County and the problems that may results from these hazards; 25 persons attended this meeting.

March 20, 2014:

The Skagit Natural Hazard Mitigation Planning Committee met to assess the problems and review changes made to date in updating the **Skagit County Natural Hazard Mitigation Plan** and discuss the status of the various tribal, municipal, and county entities in their efforts to update their respective sections of the plan. 16 people in attendance.

April 11, 2014:

Meeting at Skagit County Planning and Development with John Cooper, Senior Natural Resource Planner/Geologist, to discuss resources for readers of the **Skagit County Natural Hazard Mitigation Plan** to seek additional information regarding land movement within Skagit County.

April 16, 2014:

Meeting at Dike District 12 with representatives of 6 Dike & Drainage Districts to discuss the **Skagit County Natural Hazard Mitigation Plan** update process and goals. Encouraged participation amongst the Dike & Drainage Districts to engage in the **Skagit County Natural Hazard Mitigation Plan** and to identify future mitigation objectives and projects.

April 17, 2014:

The Skagit Natural Hazard Mitigation Planning Committee met discuss the timeline of the various tribal, municipal, and county entities in their efforts to update their respective sections of the plan as well as inform the committee of additional public input meeting dates. Jurisdictions advised to begin to identify mitigation goals. Concern of increased rail traffic and how changing conditions may increase risk of hazardous material spills during a natural disaster lead the committee to agree to create a sub-committee regarding trains, emergency response and evacuation routes, separate from the **Skagit County Natural Hazard Mitigation Plan**. 15 people in attendance.

April 21, 2014:

Meeting between Kara Symonds, Watershed Manager, Skagit County Public Works, Mark Watkinson and Kerri Love of Skagit County Department of Emergency Management to discuss updates and changes within Flood Hazard Identification section, recent events since the last plan update, progress in the Army Corps of Engineers Skagit River General Investigation and the Tentatively Selected Comprehensive Urban Levee Improvement Plan.

April 29, 2014:

The third of a series of five public meetings was held at 7:00 P.M. at the Burlington City Council Chambers to inform the public of the process to update the **Skagit County Natural Hazard Mitigation Plan**, discuss and set goals to mitigate the various natural hazards that affect Skagit County, and to solicit input from the public for inclusion into the plan. Several suggestions for the **Skagit County Natural Hazard Mitigation Plan**. 7 people present.

February 20, 2014

The first of a series of five public meetings was held at 10:00 A.M. at the Burlington City Council Chambers to inform the public of the process to update the **Skagit County Natural Hazard** changes/additions to the existing multiple-hazard action items were received from those in attendance. Concern was expressed regarding flooding of both the Samish and Skagit Rivers and the need to remove flood water from flooded areas either over or under roads, desires for more flood and tide gates. Communication concerns and how will people be contacted in a case of emergency and discussion of communication failures due to system overload; 23 persons attended this meeting.

April 30, 2014:

Skagit Natural Hazard Mitigation Planning Committee representatives met with the Saukcrates Discussion Group at 6 pm at Annies Pizza in Concrete to discuss the plan update. The meeting was informal and was announced in advance in the Skagit Herald Approximately 17 people in attendance. Primary concerns were flooding, early warning systems, evacuation, repetitive loss properties and land movement.

May 13, 2014:

By invitation of the Skagit Conservation District, Skagit County Department of Emergency Management attended a presentation by Seattle City Light on Climate Change and the predicted effects it will have on decreased watershed storage and increased wildfire occurrence and severity.

May 15, 2014:

The **Skagit Natural Hazard Mitigation Planning Committee** met to assess the progress being made by the various participants in updating their individual sections of the plan. Need for updated Hazus runs identified, requests for inclusion of climate change effects on storm surge and fire risks, and the necessity to not only divert but remove flood waters off the land. 16 people in attendance.

May 20, 2014:

The fourth of a series of five public meetings was held at 7:00 P.M. at the Burlington City Council Chambers. The purpose of the meeting was to inform the public of the process to update the **Skagit County Natural Hazard Mitigation Plan**, review and discuss proposed mitigation strategies related to the various natural hazards that affect Skagit County, and to solicit input from the public for inclusion into the plan. 11 people attended the meeting.

August 22, 2014:

The final draft is posted to the county web site on Friday, August 22, 2014; a paper copy will be available at the Department of Emergency Management, Anacortes Public Library and Concrete Town Hall. It was agreed to establish a three-week public review and comment period beginning August 25, 2014 and ending September 15, 2014.

August 24 & 25, 2014:

Notices regarding the final public meeting of the 2008 plan update process, the public review and comment period, and the locations where the plan can be reviewed by the public are published in Skagit Valley Herald.

August 25, 2014:

Public review and comment period for the updated **Skagit County Natural Hazard Mitigation Plan** officially begins.

September 5 & 7, 2014:

Notices regarding the final public meeting of the 2014 plan update process, the public review and comment period, and the locations where the plan can be reviewed by the public are published in Skagit Valley Herald.

September 9, 2014:

The fifth of a series of five public meetings was held at 7:00 P.M. at the Burlington City Council Chambers; 13 persons attended the meeting. The purpose of the meeting was to inform the public of the process to update the **Skagit County Natural Hazard Mitigation Plan**, review and discuss the draft plan and solicit input from the public for inclusion into the plan.

September 15, 2014:

Public review and comment period for the updated **Skagit County Natural Hazard Mitigation Plan** officially closes.

September 16, 2014:

Representatives from the **Natural Hazard Mitigation Planning Committee** met to finalize changes to the Unincorporated Skagit County portion of the plan.

October 8, 2014:

Final version of the Natural Hazard Mitigation Plan is completed.

October 13, 2014:

The completed plan delivered to Washington State EMD for review.

Plan Adoption

2014 Plan Adoption

Upon receiving notice from FEMA that the updated plan was approved as a multi-jurisdictional local plan as outlined in 44 CFR Part 201 and approved as a Tribal Mitigation Plan as outlined in 44 CRF 201.7, the Skagit County Natural Hazard Mitigation Plan was adopted by each of the participating entities. Each city/town council, the Samish Indian Nation Tribal Council, the Swinomish Indian Senate, the Upper Skagit Tribal Council, the Board of Skagit County Commissioners, signed resolutions formally re-adopting the updated Skagit County Natural Hazard Mitigation Plan. In addition, each participating special purpose district will sign resolutions formally re-adopting the updated plan.

A copy of FEMA's formal letter of approval of the plan can be found in Appendix A of this plan. Electronic copies of all adopting resolutions from local Indian Tribes and Jurisdictions were forwarded to FEMA Region X and the Washington State Hazard Mitigation Officer. Copies of all special purpose district adoption resolutions are maintained by the Skagit County Department of Emergency Management.

Summary of 2014 Adopting Resolutions						
Indian Tribe/Agency/Jurisdiction	Approving Entity	Resolution Number				
Samish Indian Nation	Samish Indian Nation Tribal Council	2015-02-0				
Swinomish Indian Tribal Community	Swinomish Indian Senate	2015-02-030				
Upper Skagit Indian Tribe	Upper Skagit Tribal Council	2014-045				
City of Anacortes	Anacortes City Council	1910				
City of Burlington	Burlington City Council	02-2015				
Town of Concrete	Concrete Town Council	2015-03				
Town of Hamilton	Hamilton Town Council	01-15				
Town of La Conner	La Conner Town Council	509				
Town of Lyman	Lyman Town Council	2015-1				
City of Mount Vernon	Mount Vernon City Council	885				
City of Sedro-Woolley	Sedro-Woolley City Council	909-15				
Skagit County	Board of County Commissioners	R20150028				
Plan Maintenance

The **Skagit County Natural Hazard Mitigation Plan** will be evaluated on an annual basis to determine the effectiveness of mitigation programs, projects, or other related activities and will be formally updated every 5 years.

ANNUAL PLAN MONITORING AND EVALUATION

The Department of Emergency Management will coordinate the members of the Skagit Natural Hazard Mitigation Planning Committee to conduct an annual review of the plan each July.

Skagit County Department of Emergency Management shall announce and conduct a forum for public review and comment of the plan.

Jurisdictions will submit progress reports regarding the implementation of mitigation activities and evaluate current mitigation strategies to determine their relevance to changing situations within Skagit County. The Skagit Natural Hazard Mitigation Planning Committee will work to identify implementation problems and assist in developing strategies to overcome these obstacles when possible.

Communities participating in the Community Rating System shall submit an annual evaluation report to the Chairperson of the Skagit Natural Hazard Mitigation Planning Committee no later than September 1st to be included in the annual Hazard Mitigation Plan evaluation report.

Following the annual plan monitoring and evaluation process, the Chairperson of the Skagit Natural Hazard Mitigation Planning Committee, in cooperation with the Skagit County Department of Emergency Management, will prepare a written report describing:

- \neq Plan evaluation process
- ≠ Status of any current mitigation activities or projects
- \neq Identified deficiencies as a result of the plan evaluation.

A copy of this report will also be mailed to the Washington State Hazard Mitigation Officer no later than September 30th of each calendar year.

FIVE-YEAR PLAN UPDATE

Updates to the **Skagit County Natural Hazard Mitigation Plan** shall be conducted on a five-year cycle and shall commence at the direction of the Director of the Skagit County Department of Emergency Management, in cooperation with the chairperson of the Skagit Natural Hazard Mitigation Planning Committee.

Major changes to the plan will be identified publically via public meetings or on-line announcement and made available for discussion and comment.

Review of Existing Programs

Skagit County hazard mitigation planning will include review and incorporation, when appropriate, of existing plans, studies, reports and technical information. A review of the following programs that may also affect hazard mitigation planning is done to ensure consistancy.

- Skagit County Comprehensive Plan (2007)
- Skagit County Critical Areas Oridinance
- Skagit County Comprehensive Emergency Plan (2013)
- Skagit County Wildfire Protection Plan (2009)
- Skagit County Community Rating System Program
- Skagit County Comprehensive Flood Control Management Plan (1989)
- USACE Skagit River General Investigation Study (2014)
- National Flood Insurance Program

SECTION II: HAZARD IDENTIFICATION

Note:

This section of the Skagit County Natural Hazard Mitigation Plan contains general, multijurisdictional information regarding the natural hazards that affect Skagit County.

The statements regarding vulnerability assessment as well as probability and risk that are contained in this section depict the average condition that exists within Skagit County.

The contents of this section of the Skagit County Natural Hazard Mitigation Plan are based upon the best available information. Probability and risk assessments regarding natural hazards were made on a subjective basis considering past events.

Please refer to Section IV of this plan for jurisdiction-specific information regarding vulnerability, probability, and risk associated with natural hazards as well as suggested mitigation strategies proposed by each of the jurisdictions that participated in the development of this plan.

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Multi-Jurisdictional Community Profile

GEOGRAPHY

Skagit County is situated in northwestern Washington approximately 60 miles north of the city of Seattle. With a geographical area of 1,735 square miles (approximately 95 miles west to east and 24 miles north to south) Skagit County ranks a modest 21st in size among Washington's 39 counties. The City of Mount Vernon is the county seat.

Skagit County is one of marked contrasts ranging from broad, flat floodplain to jagged exposed rock peaks and elevations ranging from sea level to 8,966 feet above sea level at the summit of Mount Logan. The western one-third of the county includes a broad delta and flood plain that extend inland through the rich and fertile Skagit flats. The rugged and heavily forested mountains of the Cascade Range dominate the eastern two thirds of the county.

At its western extreme, the county's boundary envelops some of the islands located on the leeward edge of the San Juan Archipelago including Sinclair Island, Cypress Island, Guemes Island, and Fidalgo Island. In addition to the waters of Puget Sound, there are 89 named lakes, 6 rivers (the Baker, Cascade, Samish, Sauk, Skagit, and Suiattle) and numerous small streams located within Skagit County.

From its source in Canada, the Skagit River flows 135 miles and empties into Skagit Bay. The river drains an area of approximately 3,115 square miles. Based on discharge flows of rivers that empty into salt water, the Skagit River is the third largest river system on the West Coast of the contiguous United States with only the Columbia River and the Sacramento River being larger.

The Skagit River provides natural beauty, abundant wildlife, and varied recreational opportunities. The Skagit River is a source of electrical power and drinking water and has generated economic growth and promoted quality of life for many generations of county residents. Portions of the Skagit River, as well as portions of the Sauk River, the Suiattle River, and the Cascade River have been designated by the federal government as *WILD AND SCENIC*.

CLIMATE

The ocean currents that flow along Washington State's coast and the Pacific westerlies (also known as the jet stream or storm track) significantly influence Skagit County's moderate climate. Rainfall is sparse during the summer months and increases during the fall months with moderate to heavy rains occurring from November through January.

Summer highs can often be in the 80's to low 90's and winter lows may dip as low as 10°. The annual average temperature is 50° and the frost-free growing season averages 193 days. Snowfall is seldom heavy and varies greatly from year to year.

SOILS AND GEOLOGY

Skagit County lies near the Cascadia Subduction Zone where the Juan de Fuca Plate (moving east) subducts under the overriding North American Plate (moving west) as they collide off the coast of Washington. The volcanic mountains of the Cascade Range were formed over the centuries as the buoyant, melted rock of the subducted Juan de Fuca Plate rose to the surface as magma.

The underlying bedrock of Skagit County is comprised of a variety of sedimentary, volcanic, and metamorphic rocks; most of this bedrock is overlaid with glacial deposits. Much of the lower valley is comprised glacial fill deposits, Glacier Peak ash and lahar deposits, and sediments deposited by the Skagit River and Samish River. It has been estimated that these deposits cover the underlying bedrock as much as 1,000 feet in depth throughout most of the lower Skagit floodplain.

Skagit County is home to many faults, including the Bellingham Bay—Lake Chaplain Fault, the Ross Lake Fault and the Hamilton Fault, which may or may not be active. However, the Devils Mountain Fault that runs east to west through the central part of the county has been determined to be active. (Source: Alternative Interpretations of the Seismic and Geologic Hazards to the Skagit Nuclear Power Site, Eric Cheeney, 1977)

POPULATION

The Washington State Office of Financial Management estimated Skagit County's population at 116,901 in 2010. Skagit County's population density is approximately 68 people per square mile, making it the 11th most densely populated county in Washington.

The following table shows 2013 population data for Skagit County and also includes the 2036 recommended population allocation as recommended by the Skagit Council of Governments Planners Committee acting as the technical committee to the Growth Management Act Steering Committee.

Jurisdiction	2013 Population	2036 Population Allocation
Anacortes	16,080	22,293
Burlington	8,445	14,272
Concrete	710	1,193
Hamilton	304	427
La Conner	890	1,226
Lyman	440	605

Jurisdiction	2013 Population	2036 Population Allocation
Mount Vernon	32,710	47,403
Sedro-Woolley	10,610	17,069
Rural	48,411	45,665
TOTAL	118,600	150,153

TRANSPORTATION

Skagit County is accessible by several modes of transportation. Major highways, railroads, marine ports, and airports are located in the area. Interstate 5, the primary north-south highway connects the county with major markets to the north and south. State Route 20 runs west to east through the middle of the county and connects most of the county's larger cities.

There are five airfields in Skagit County (three public and two private). The Skagit Regional Airport has two runways, one being 5,475 feet in length and the other being 3,000 feet in length. The Anacortes Municipal Airport, operated by the Port of Anacortes, has a 3,015-foot runway and the Concrete Municipal Airport has a 2,600-foot runway. The county hosts industrial ports, rail lines and pipelines that are critical links for the states refinery industry.

The Port of Anacortes, in addition to servicing ships, has two deep-water berths to handle cargo such as logs, steel, lumber, and dry bulk commodities. The Port of Anacortes also has two slips for barge service.

The Washington State Department of Transportation owns and operates a major ferry terminal in the City of Anacortes that serves as the primary transportation connection between the San Juan Islands and the mainland as well as providing international service to Victoria, British Columbia, Canada. In addition, Skagit County owns and operates a ferry terminal, also located in the City of Anacortes, to serve the transportation needs of the residents of Guemes Island.

Amtrak operates a commuter train that offers twice daily service between Vancouver, Canada and Portland, Oregon. Burlington Northern-Santa Fe Railroad owns and operates 20 active spur lines within Skagit County in addition to the main north-south rail line that serves the entire west coast of the United States and connects with east-west rail approximately 30 miles south of Mount Vernon in Everett, Washington.

Rail traffic is anticipated to increase with a rise in the number of coal and Bakken crude oil deliveries to area refineries and ports. The increase in shipping by rail is predicted to continue for the next 20-30 years. A serious rail incident could complicate response efforts due to impeding travel corridors and hazardous material spills.

BUSINESS AND INDUSTRY

Skagit County is home to a diverse agricultural community which is the number one industry in the county. Local farmers produce about \$300 million worth of crops, livestock, and dairy products on approximately 100,000 acres of land. Skagit County produces more than 90 different crops, including 95% of the state's red potato crop and is the largest producer of tulip, iris, and daffodil bulbs in the country.

A large portion of Skagit County is comprised of commercial forest under DNR Management or private companies. Although the large lumber mills have mostly vanished from the local landscape, the timber industry in Skagit County still remains a viable and active industry.

In order to meet the needs of the fishing industry (as well as recreational boaters) a substantial number of marine suppliers, repair facilities and custom boat builders are located within Skagit County.

As the population of the county has increased over the past 20 years, a greater percentage of the local economy as shifted toward service-based companies. Shopping malls, motels, and restaurants have replaced lumber and plywood mills and heavy manufacturing facilities.









AVALANCHE

DEFINITIONS:

Avalanche – a mass of sliding snow, ice, earth, and rock that grows and collects additional material as it descends.

HISTORY:

To our knowledge, there is no record of avalanche impacting an homes, businesses, or communities within Skagit County. However, avalanches do occur in various unpopulated backcountry and wilderness areas within Skagit County. Typically, these avalanches have little or no impact except to those persons who may be backpacking or climbing in these areas or traveling through the eastern portion of the county via State Route 20.



Figure 1 Spiral Gulch avalanche chute. (WA DOT Flicker)

In December 2007, warming temperatures caused an avalanche in eastern Skagit County damaging a Skagit County bridge on the Cascade River Road (FEMA Disaster #1734).

HAZARD IDENTIFICATION:

The Cascade Range is the largest mountainous area within Washington State. The west slopes of the Cascades receive extensive snow due to their elevation and perpendicular orientation to the prevailing Pacific marine airflow.

Skagit County's avalanche season usually begins in November and continues until the last remnants of snow have melted, normally in the early summer. In the highest alpine areas of the Cascades, the avalanche season continues throughout the entire year.

The following list is a compilation of comments and suggestions made by various stakeholders and the public regarding possible problems that could result from an avalanche.

In addition to damaging the environment, an avalanche in Skagit County could potentially result in the following:

✓ Snowmobiler's and backcountry travelers may be stranded, injured, or killed if caught in an avalanche.

≠ A very large avalanche on the slopes of Mount Baker could reach Baker Lake and cause severe wave-action in the lake. It is unknown if this could result in damage to the Upper Baker Dam owned by Puget Sound Energy.



Figure 2. Avalanche, State Route #20, 2014. (WA DOT FLICKER)

VULNERABILITY ASSESSMENT:

Avalanches have and do occur in the mountainous backcountry areas of eastern Skagit County. While very few (if any) persons live in these areas, there may be people in these areas who are engaging in backcountry skiing, snowmobiling, crosscountry skiing, snowshoeing, mountaineering, or similar outdoor activities.

State Route 20 is the main transportation route between western Washington and eastern Washington. It travels through Skagit County and crosses the Cascade Range at Rainy Pass located at the eastern border of Skagit County. Snow pack and/or avalanches typically close State Route 20 east of the Seattle City Light community of Diablo during the winter.

While the winter closure of State Route 20 has little impact on the majority of the citizens of Skagit County, the occurrence of a large avalanche while State Route 20 is open to the traveling public could have a serious impact on those persons traveling and recreating in the immediate area and could isolate remote areas of eastern Skagit County.

A large avalanche that would cause a long-term closure of State Route 20 would most likely impact the businesses in eastern Skagit County. The timber industry, recreational resorts, and various recreational groups depend upon access to wilderness areas that may be restricted or closed as the result of a large avalanche.

The increasing development of recreational sites in the mountains brings added exposure to the people using these sites and associated structures.

PROBABILITY AND RISK:

Because an avalanche would most likely affect only those persons recreating in the backcountry and high alpine areas or traveling through the area on State Route 20, there is a very low probability and a very low risk associated with avalanche hazard in Skagit County.

CONCLUSION:

Those persons actively involved in recreation activities in the remote alpine backcountry areas of Skagit County need to be aware of the dangers posed by avalanches and take the necessary precautions when avalanche conditions are present.

Those people engaging in such activities that may place them at risk from an avalanche should educate themselves as to the danger of avalanche and have the proper equipment with them while they are skiing, snowmobiling, crosscountry skiing, snowshoeing, mountaineering, or similar outdoor activities in the backcountry.

The United States Forest Service, National Park Service, National Weather Service, and Washington State Department of Transportation have programs to monitor avalanche zones and forecast avalanche hazards. However, there is no effective way to keep the public out of avalanche-prone areas, even during times of highest risk.



Figure 3 Avalanche control by WA DOT at Chinook Pass. (WA DOT FLICKER)

For more information on avalanche danger and risk please visit:

Skagit County Department of Emergency Management: http://www.skagitcounty.net/Departments/EmergencyManagement/main.htm

Northwest Avalanche Center: http://www.nwac.us/

Washington State Department of Emergency Management: <u>http://www.emd.wa.gov/hazards/haz_avalanche.shtml</u>

Washington Department of Transportation Avalanche Control: http://www.wsdot.wa.gov/maintenance/avalanche/

Mountaineers Avalanche Training:

http://www.mountaineers.org/source/atrips/tripselection.cfm?nd=yes&ec=yes&oo=yes&a t=avy&ss=yes This page intentionally left blank.

DROUGHT

DEFINITIONS:

Drought – an extended period of abnormally low precipitation; a condition of climate dryness that is severe enough to reduce soil moisture as well as water and snow levels below the minimum necessary for sustaining plant, animal, and economic systems.



While drought originates from a deficiency of precipitation over an extended period of time,



Figure 4 Alder Lake in Western Washington, 2001. (Wasington State Department of Ecology)

usually a season or more; drought is also related to the timing and the intensity or number of rainfall events. Other climactic factors such as high temperature, high wind, and low relative humidity are associated with drought in many regions of the world and can significantly aggravate the severity of a drought. Drought differs from aridity, a permanent climactic feature common to regions with low rainfall.

In 1989, the Washington State Legislature gave permanent drought relief authority to the Department of Ecology and enabled them to issue orders declaring drought emergencies. (RCW 43.83B.400-430 and Chapter 173-166 WAC)

In Washington State, the statutory criteria for drought is a water supply below 75% of normal and a shortage expected to create undue hardship for some water users.

There is currently much debate regarding climate change, especially pertaining to the uncertainty of how soon (and to what extent) climate change will adversely affect weather conditions. While climate change and the subsequent precipitation patterns may someday significantly affect Skagit County, the mitigation strategies contained within this plan do not yet take future climate change (and its effects) into account.

HISTORY:

Even in the Evergreen State, droughts are a natural part of the climate cycle. In the last century, there have been a number of drought episodes, including several that have lasted for more that a single season, such as the dry periods between 1928-1932 and 1992-1994. Severe drought episodes occurred in 1977 and 2001. The 1977 event set records for low precipitation, snow-pack, and stream flow totals that still stand today.

The 2001 event was the second-worst drought year in state-recorded history. Rainfall for Western Washington during the 2001 water year was approximately 30% below normal. On March 14, 2001, after several months of record low precipitation, Governor Gary Locke authorized the Department of Ecology to declare a statewide drought emergency. (Ecology) Washington was the first Northwest state to make a drought Figure 5 Riffle Lake, Western Washington, 2001. declaration. Due to above-average precipitation in the final two months of the year, the drought



(Wasington State Department of Ecology)

emergency formally expired on December 31, 2001. The National Weather Service reported that the winter of 2000-01 was the driest since 1976-1977. It was also one of the five driest in the past 100 years.

While Skagit County has experienced some periods of drought in the past, these events are typically low to moderate in severity and relatively short in duration. The agricultural and forestry industries usually experience the greatest impact from a drought event in Skagit County.

Washington State Drought Occurrences (Information obtained from Washington State Military Department, Emergency Management Division)			
Date	Occurrence		
July-August 1902	No measurable rainfall in Western Washington.		
August 1919	Drought and hot weather occurred in Western Washington.		
July-August 1921	Drought in all agricultural sections.		
June-August 1922	The statewide precipitation averaged .10 inches.		
March-August 1924	Lack of soil moisture retarded germination of spring wheat.		
July 1925	Drought occurred in Washington.		
July 21-Aug 25, 1926	Little or no rainfall was reported.		
June 1928-March 1929	Most stations averaged less than 20 percent of normal rainfall for August and September		
	and less than 60 percent for nine months.		
July-August 1930	Drought affected the entire state. Most weather stations averaged 10 percent or less of		
	normal precipitation.		
April 1934-March 1937	The longest drought in the region's history – the driest periods were April-August 1934,		
	September-December 1935, and July-January 1936-1937.		
May-September 1938	Driest growing season in Western Washington.		
1944	Water shortages in Spokane.		
1952	Every month was below normal precipitation except June. The hardest hit areas were Puget		
	Sound and the central Cascades.		
January-May 1964	Drought covered the southwestern part of the state. Precipitation was less than 40 percent		
	of normal.		
Spring, 1966	The entire state was dry.		
June-August 1967	Drought occurred in Washington.		
January-August 1973	Dry in the Cascades.		
October 1976 – September 1977	Below normal precipitation in Olympia, Seattle, and Yakima. Crop yields were below normal		
	and ski resorts closed for much of the 1976-77 ski season.		
October 1991 – September 1994	Water supply in Yakima River Basin was 65 percent of normal.		
2000 - 2001	Governor Gary Locke authorized the Department of Ecology (Ecology) to declare a statewide		
	drought emergency. National Weather Service reported that the winter of 2000-01 was the		
	driest since 19/6-19/7.		

HAZARD IDENTIFICATION:

When a drought begins, the agricultural sector is usually the first to be affected because of its heavy dependence on stored water in the soil. Soil water can be rapidly depleted during extended dry periods. If precipitation deficiencies continue, people dependent on other sources of water will begin to feel the effects of the shortage. Those who rely on surface water (reservoirs and lakes) and subsurface water (ground water), for example, are usually the last to be affected. A short-term drought that persists for 3 to 6 months may have little impact on these sectors, depending on the characteristics of the hydrologic system and water use requirements.

When precipitation returns to normal and meteorological drought conditions have abated, the sequence is repeated for the recovery of surface and subsurface water supplies. Soil water reserves are replenished first, followed by stream-flow, reservoirs and lakes, and ground water. Drought impacts may diminish rapidly in the agricultural sector because of its reliance on soil water, but linger for months or even years in other sectors dependent on stored surface or subsurface supplies. Ground water users, often the last to be affected by drought during its onset, may be last to experience a return to normal water levels. The length of the recovery period is a function of the intensity of the drought, its duration, and the quantity of precipitation received as the episode terminates.

In addition to a possible shortage of potable water in some areas of the county as well as possible damage to forest lands and agricultural crops, a drought in Skagit County could potentially result in the following:

- ✓ An increase in the potential risk of wildland fires, wildland-urban interface fires, and cropland fires from a variety of natural and human-caused sources including the discharge of fireworks.
- \neq Inadequate stream flow volumes to support fish.
- \neq Long-term burn bans throughout the county.
- \neq The closing of all forest lands to commercial logging operations.

VULNERABILITY ASSESSMENT:

A drought lasting for more than one season would most likely reduce the annual snow-pack accumulated at high elevations in the Cascade Mountains thereby reducing normal stream flows in local rivers and creeks. Should an extreme, long-term drought occur, a large portion of the population of Skagit County would be impacted.

The water supply for most of Skagit County is obtained from the Skagit River or large creeks with reliable, glacial sources. The effects of an extreme, long-term drought could result in inadequate streams flows and ground water recharge, thereby resulting in the implementation of strict water conservation measures.

A severe drought may result in large numbers of wells going dry. Many residents in rural areas of the county rely on private wells or private water systems for their domestic water supply. Those areas that could be most vulnerable to drought situations are Fidalgo Island and Guemes Island in western Skagit County. Guemes Island relies totally on an island aquifer for domestic water. It is unknown what effect a long-term drought would have on this aquifer. While the number of full-time residents living on Guemes Island is relatively few, a large number of residents living on rural Fidalgo Island rely on private, stand-alone water systems for their domestic water supply. A severe or long-term drought situation could severely impact a large number of citizens living and working on Fidalgo Island. In addition, a severe or long-term drought would subject persons living on Guemes Island and portions of Fidalgo Island to a significant fire risk.

The agricultural industry relies on a consistent and ample water supply. Annual crops may be damaged or lost in a single growing season but usually rebound with normal precipitation amounts the following year. Many farmers have drilled wells or have the ability to pump water directly from the Skagit River or drainage ditches to irrigate fields during short-term dry periods. In the case of a long-term drought that lasts for several growing seasons, there is a possibility that salt water may intrude and contaminate fresh water aquifers. Employment associated with agriculture would drop in drought years due to low crop production.

Approximately 80% of Skagit County is forested, primarily in the eastern portion of the county. A long-term drought event would most likely cause all industrial logging operations to cease due to severely reduced moisture levels in the soil and timber thereby leading to extreme fire risk. If industrial logging operations were to be suspended for a long period of time due to drought conditions, the overall economy of Skagit County could be severely affected.

Drought conditions increase the risk of forest fire which pose a risk to homes and businesses. Statistics show that on an annual basis, an average of 900 wildland fires burn 23,000 acres resulting in a resource loss of \$28 million in Washington State. (Washington State Hazard Mitigation Plan - Wildland Urban Fire, 2013) Between 2008 and 2013, Skagit County experienced a total of 91 wildland fires. (Resources, 2014)

A substantial reduction in stream flows could severely impact the generation of electricity from the hydro-electric dams located on the Skagit River and the Baker River in Eastern Skagit County. A reduction in hydro-electric generation will result in increased electricity rates for all residents and businesses in the area.

According to the Washington State Hazard Identification and Vulnerability Assessment (HIVA), three energy curtailments during drought periods prior to 1977 caused temporary unemployment. Due to a drastic increase in electricity rates in 2001, many large manufacturing plants closed their businesses and laid off employees. A severe, long-term drought would have the same effect on large business and industry heavily reliant on electrical power to operate.

The Skagit River and its watershed is the only river in Washington State that is home to 5 species of salmon. The Skagit River supports some of the largest and healthiest Chinook runs and Pink salmon stock in Washington. (Ecology, 2014) A severe drought could cause reduced stream flows thereby creating a major environmental and economic impact on local salmon runs due to potentially warmer waters and low water levels. Decreased stream flows would severely impact local sport fishing as well as recreational use of many lakes and streams within Skagit County.

PROBABILITY AND RISK:

Based on historical evidence, there is a **moderate probability** of a drought occurring in Skagit County but a **very low risk** associated with such an event due to the typically short duration and minor severity of drought events in Skagit County.

CONCLUSION:

Skagit County water supplies are relatively resistant to short-term drought episodes. Should a severe, long-term drought occur, it will be vital that local elected officials and governmental agencies work cooperatively with the Washington State Department of Health and the Washington State Department of Ecology to help insure efforts are made to protect public water supplies, aid agriculture and local industry, and safeguard fish and stream flows.

More drought information can be found at:

Washington State Department of Emergency Management: http://www.emd.wa.gov/hazards/haz_drought.shtml

Skagit Conservation District: http://skagitcd.org/

Skagit County Public Works:

http://www.skagitcounty.net/Departments/PublicWorksWaterResources/main.htm

Washington State Department of Natural Resources: http://www.dnr.wa.gov/RecreationEducation/FirePreventionAssistance/Pages/Home.aspx

Washington State Department of Ecology:

http://search.usa.gov/search?utf8=%E2%9C%93&affiliate=www.ecy.wa.gov&query=drou ght&x=0&y=0

Washington State Department of Health:

http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/DroughtInformation.aspx

Ready.gov (FEMA): http://www.ready.gov/drought

United States Department of Agriculture: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

US Forest Service: http://www.fs.fed.us/

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EARTHQUAKE

DEFINITIONS:

Earthquake – A sudden slip on a fault and the resulting ground shaking and radiated seismic energy caused by the slip; or by volcanic or magmatic activity; or other sudden stress changes in the earth.

Epicenter – The point on the earth's surface vertically above the focus, the point in the crust where a seismic rupture begins.

Focus – The point within the earth where an earthquake rupture starts.

Liquefaction – A process by which water-saturated sediment temporarily loses strength and acts as a fluid similar to when a person wiggles their toes in the wet sand near the water at a beach.

Seiche – The sloshing action of an enclosed body or partially enclosed body of water from earthquake shaking.

Tsunami – A sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands.

BACKGROUND INFORMATION:

Washington ranks second in the nation (after California) among states susceptible to earthquake loss according to a Federal Emergency Management Agency (FEMA) study. More than 1,000 earthquakes are recorded in the state annually, the majority of these occurring in the Puget Sound region. Most of these earthquakes are so small that only very sensitive instruments can detect them – a small number of these earthquakes cause shaking and occasional damage. Depending upon the magnitude and depth of an earthquake, the effects of an earthquake can be felt over large geographical areas.

Large oceanic and continental tectonic plates move over the surface of the earth at a rate of a few centimeters each year. Where these plates collide stresses build up eventually releasing energy as earthquakes.

Washington State is located near the middle of an offshore tectonic plate convergent boundary called the Cascadia Subduction Zone that extends from southern British Columbia to northern California. The inland extent of related earthquake activity is the Cascade Mountain Range where the volcanoes mark the melting edge of the subducting (sinking) Juan de Fuca Plate.

HISTORY:

Of the many earthquakes that occur in our region on an annual basis, only a few are large enough to cause ground shaking and property damage. Washington State has experienced at least 20 damaging earthquakes during the past 125 years. Earthquakes in 1949 and 1965 (with magnitudes of 7.1 and 6.5 respectively) killed 15 people and caused more than \$200,000,000 (1984 dollars) in damage throughout several counties. The most recent damaging earthquake in Western Washington occurred on February 28, 2001. This earthquake, called the Nisqually Earthquake, was a deep, 6.8 magnitude earthquake located approximately 12 miles northeast of Olympia in the Puget Sound. One person died of a heart attack, 700 people were injured; damages were greater than \$1,000,000,000 as a result of the Nisqually Earthquake. In Skagit County, public damage totaled almost \$175,000 and 402 private damage claims were submitted to FEMA totaling just over \$479,000.

Significant Earthquakes in Washington State						
(Information obtained from Washington State Military Department, Emergency Management Division)						
Date	Time (PST)	Depth	Magnitude	Approximate Location		
December 14, 1872	2140 Hours	shallow	7.4 Richter	North Cascades		
December 12, 1880	2040 Hours		5.5 Richter	Puget Sound		
April 30, 1882	2248 Hours	deep	6.0 Richter	Olympia Area		
November 29, 1891	1521 Hours		5.0 Richter	Puget Sound		
March 6, 1893	1703 Hours	shallow	4.9 Richter	Southeast Washington		
January 3, 1896	2215 Hours		5.7 Richter	Puget Sound		
March 16, 1904	2020 Hours		5.3 Richter	Olympic Mountains		
January 11, 1909	1549 Hours	deep	6.0 Richter	Puget Sound		
August 18, 1915	0605 Hours		5.6 Richter	North Cascades		
January 23, 1920	2309 Hours		5.5 Richter	Puget Sound		
July 17, 1932	2201 Hours	shallow	5.2 Richter	Central Cascades		
July 15, 1936	2308 Hours	shallow	5.7 Richter	Southwest Washington		
November 12, 1939	2346 Hours	deep	5.7 Richter	Puget Sound		
April 29, 1945	1216 Hours		5.5 Richter	Central Cascades		
February 14, 1946	1914 Hours	40 Km	6.3 Richter	Puget Sound		
April 13, 1949	1155 Hours	54 Km	7.1 Richter	Puget Sound		
August 5, 1959	1944 Hours	35 Km		Northwest Cascades		
April 29, 1965	0728 Hours	63 Km	6.5 Richter	Puget Sound		
February 13, 1981	2209 Hours	7 Km	5.5 Richter	South Cascades		
April 13, 1990	2133 Hours	5 Km	5.0 Richter	Deming Area		
January 28, 1995	1911 Hours	16 Km	5.0 Richter	17.6 Km NE of Tacoma		
May 2, 1996	2104 Hours	7 Km	5.3 Richter	10.2 Km NE of Duvall		
June 23, 1997	1113 Hours	7.4 Km	4.9 Richter	5.5 Km NE of Bremerton		
July 2, 1999	1743 Hours	41 Km	5.1 Richter	8.2 Km N or Satsop		
February 28, 2001	1054 Hours	52.4 Km	6.8 Richter	17.6 Km NE of Olympia		

Current estimates of the likelihood of another potentially damaging intraplate earthquake during a 50-year time window with the Puget Sound region put the probability at 84%, with somewhat lower probabilities as one goes southward. (Earthquake Hazard Program, 2012)

In recent years, geologists have discovered evidence that very large earthquakes have occurred repeatedly in the past. The interval between these very large earthquakes is estimated to range from 100 to 1,000 years. Some of this evidence includes:

- Massive block landslides within Lake Washington.
- Large rock avalanches on the Olympic Peninsula.
- Possible tsunami deposits at West Point in Seattle and at Cultus Bay on Whidbey Island.

HAZARD IDENTIFICATION:

In recent years, scientists have greatly expanded their knowledge concerning the seismic vulnerability of the Puget Sound region. Seismologists have identified three distinct sources of earthquakes in the Pacific Northwest.



Figure 6 (PACIFIC NORTHWEST GEOLOGIC MAPPING & URBAN HAZARDS, 2002)

Shallow (crustal zone) earthquakes that occur along near-surface faults and fractures within the Earth's crust at depths less than 30 Kilometers.

Shallow earthquakes with magnitudes of up to 7 on the Richter scale can happen anywhere in the Puget Sound region. Such earthquakes have the potential to cause greater loss of life and property damage in Skagit County than any other kind of disaster. Fortunately, great crustal earthquakes are quite rare and occur perhaps only once every 1,000 years.

Skagit County is home to many faults, *most* of which are inactive. Fault lines that have been identified in Skagit County include the Bellingham Bay—Lake Chaplain Fault, the Ross Lake Fault and the Hamilton Fault, which may or may not be active. (Source: Alternative Interpretations of the Seismic and Geologic Hazards to the Skagit Nuclear Power Site, Eric Cheeney, 1977)

One of the most notable faults, according to the Washington State Department of Natural Resources Geology Division, is the <u>Devils Mountain Fault</u> which is roughly 125 km (78 miles) long, runs generally east to west through Darrington in Snohomish County to Vancouver Island, Canada and has been determined to be active. If a magnitude even M7 or greater the event were to occur it would affect 15 counties with **Skagit County being the greatest impacted**.

Deep (intraplate) earthquakes that occur from faulting in the subducting (Juan de Fuca) plate, usually at depths between 50 and 70 Kilometers of the Earth's surface.

Deep or intraplate earthquakes with magnitudes ranging from 6 to 7 (or greater) on the Richter Scale are <u>very likely</u> to occur in Western Washington. The largest of these events recorded in recent years were the 1949 Olympia Earthquake with a magnitude 7.1 on the Richter Scale and the 2001 Nisqually Earthquake with a magnitude 6.8 on the Richter Scale. Scientists estimate the recurrence interval for this type of earthquake to be 30 to 40 years for a magnitude 6.5 (Richter) event and 50 to 70 years for a magnitude 7.0 (Richter) event. Because of their depth, intraplate earthquakes are least likely to produce significant aftershocks.

Subduction (Subduction Zone) earthquakes are caused by the release of the friction and stresses generated as two converging tectonic plates slide past one another. The world's greatest earthquakes are observed at subduction zone boundaries. Subduction earthquakes have the potential of being large quakes (with magnitudes exceeding 8 on the Richter Scale) that may affect a large geographical area and may be accompanied by tsunamis and large aftershocks.

The figure to the right shows the relationship of the subducting Juan de Fuca Plate and the overriding North American Plate as they contact each other and attempt to move in opposite directions from each other.

Earthquakes cause damage primarily by strong ground shaking and secondarily from the effects of ground failures as well as tsunamis and seiches. Ground failures caused by earthquakes include fault rupture, ground cracking, slumps, landslides, rock falls, liquefaction, uplift and subsidence.

Given an earthquake of a certain magnitude, the severity of ground shaking will generally lessen the farther you are located from the epicenter of the earthquake or the deeper the earthquake occurs.

The following list is a compilation of comments and suggestions made by various stakeholders and the public regarding possible problems that could result from an earthquake.

In addition to damaging homes, businesses, property, and the environment, an earthquake in Skagit County could potentially result in the following:

- Utilities (above and below ground) including telephone, electricity, natural gas, water, and sewer as well as private wells and water systems could be damaged or destroyed.
- Transportation routes and/or systems including roads, bridges, railroad, and ferry transport may be damaged or destroyed.
- Emergency services could be totally overwhelmed and not able to respond to emergency situations due to damaged facilities and/or equipment, a lack of personnel, or damaged transportation routes.
- Critical facilities such as 9-1-1 centers, hospitals, emergency operations centers, fire stations, water treatment plants, and wastewater treatment facilities may be damaged or destroyed.
- Large areas of the county may be subject to liquefaction and/or land movement causing even greater damage in certain areas.
- Large hazardous materials incidents may occur as the result of damage to local oil refineries, chemical plants, rail lines and major petroleum pipelines.
- Levees and salt-water dikes may be damaged.
- Large hydroelectric dams located in eastern Skagit County and Whatcom County may be damaged or possibly fail causing possible flooding of those areas located within the 100year and possibly the 500-year floodplain.
- Localized seiche action in local waters may result in increased levels of damage along shoreline areas within the county.
- The arrival of outside resources to assist with debris removal, repair of critical facilities, and sheltering of victims may be delayed due to severe damage in adjacent counties with larger populations and needs.
- The overall economy of the county and possibly the region could be affected.

VULNERABILITY ASSESSMENT:

In the simplest of terms ... the entire population is vulnerable to the effects and impacts of a large (magnitude greater than 7 Richter) earthquake. The floodplains of the Skagit River and Samish River are particularly vulnerable due to large areas of lahar deposits that underlay the alluvial soils of the area. Liquefaction of these soils as the result of a large earthquake is a serious concern. In addition, all commercial and residential buildings, government infrastructure, transportation systems, communication systems, utilities, and ultimately, the overall economy of Skagit County are vulnerable to the effects and impacts of a large earthquake.

The time of day at which an earthquake occurs is critical. Greater numbers of people are away from their homes and separated from other family members during high commute times or during the regular business day thereby increasing the level of chaos in the event of a major earthquake.

Possible types of damage from an earthquake may include but will probably not be limited to:

- Cracking and/or structural failure of foundations, chimneys, decorative cornices, parapet walls, and cantilevered porches or roofs.
- Wall failure in older buildings of non-reinforced masonry construction.
- Damage to waterfront buildings and piers built on pilings and artificial fill.
- Structural damage or failure of bridges.
- Damage to streets and roads.
- Damage to railways and airport facilities.
- Broken water lines and natural gas lines.
- Power and communication failures due to damage of electrical and telephone distribution systems.

In the event that an earthquake causes considerable damage, grocery stores, banks, gasoline stations, and similar services may be closed. In addition, citizens should expect and prepare in advance for a significant delay in fire, emergency medical, law enforcement, and other day-to-day government services. As a general rule, citizens should be prepared to survive on their own for a <u>minimum</u> of 72 hours following a large magnitude earthquake that causes major damage to transportation and communication systems as well as roads and bridges.

In the event of a major earthquake, large areas of western Skagit County lying within the floodplains of the Samish River and the Skagit River are susceptible to liquefaction. In addition, steep and/or unstable slopes in various locations throughout the county are susceptible to landslides. Large earthquake events may cause large-scale landslides or avalanches on steep mountains slopes as well as possible structural failure of hydroelectric dams located on the Baker River and Skagit River in Eastern Skagit County.

Bridges are the most vulnerable component of highway transportation systems and the loss of bridges will have a direct effect the delivery of emergency services to a large number of Skagit County citizens. Very few bridges in Skagit County have been retrofitted to withstand the effects of a major earthquake. In addition, bridge foundations are typically located in soils susceptible to liquefaction thereby allowing bridge piers to move and bridge girders to collapse.

The bridges listed below are necessary to maintain emergency evacuation routes and deliver emergency services within Skagit County:

(state)

(state)

(state)

(state)

(county)

(county)

(county)

(county)

(state)

(county)

(municipal)

- Deception Pass State Route 20 Bridge
- Skagit River Interstate 5 Bridge
- Skagit River State Route 9 Bridge
- Skagit River State Route 536 Bridge
- Skagit River South Fork Bridge
- Skagit River North Fork Bridge
- Skagit River Dalles Bridge
- Skagit River Rockport Bridge
- Skagit River Riverside Bridge
- Swinomish Channel State Route 20 Bridge
- Swinomish Channel Rainbow Bridge
- Baker River State Route 20 Bridge (state)
- Sauk River Government Bridge (county)

In addition to the potential loss of bridges, numerous roads may be damaged or otherwise unusable due to soil liquefaction, landslides, severe ground cracking, uplifting, or subsidence.

Railways are highly vulnerable to soil liquefaction, landslides, severe ground cracking, uplifting, and subsidence. Railway routes in Skagit County are owned and operated by the Burlington Northern-Sante Fe Railroad. In Skagit County, these routes are located along shorelines and traverse the floodplains of the Skagit River and the Samish River thereby making them especially vulnerable to liquefaction, landslides, severe ground cracking, uplifting, and subsidence.



Figure 7 Path destroyed during Nisqually earthquake, Olympia, WA 2001 (NISQUALLY EARTHQUAKE OF FEBRUARY 2001, 2014)

Airport facilities also highly vulnerable to soil liquefaction, landslides, severe ground cracking, uplifting, and subsidence. The 2001 Nisqually Earthquake caused severe damage to the control tower at Seattle-Tacoma International Airport and ground cracking damaged the runway at Boeing Field. In addition, airports are highly dependent upon electrical power to maintain radar and communication systems.

The City of Anacortes, Port of Anacortes, as well as the Shell and Tesoro oil refineries located on Marches Point in Skagit County are dependent upon substantial marine facilities such as piers, wharfs, and docks to conduct and support business trade and development. Construction of these facilities typically involves shoreline landfill and pilings that are vulnerable to liquefaction resulting in pile failure, loss of load carrying capacity, and possible failure of supported structures. We are all dependent upon pipelines for the delivery and distribution of natural gas and potable water and the disposal of wastewater. The majority of underground pipelines in Skagit County are located in soils that are vulnerable to liquefaction. The City of Anacortes water system could be especially vulnerable to the effects of a major earthquake. Two water transmission lines run side-by-side for a distance of 17 miles connecting the City of Anacortes Water Treatment Plant located on the Skagit River near Mount Vernon with their distribution system within the City of Anacortes. This same system also supplies water to various areas of unincorporated Skagit County, the Town of La Conner, the oil refineries on Marches Point, as well as the City of Oak Harbor and Naval Air Station Whidbey Island located in Island County.

In addition to water, wastewater, and natural gas distribution pipelines, several major transmission pipelines carrying oil, gasoline, and natural gas are located within Skagit County. Some of these lines (in addition to one large water transmission pipeline) cross the Samish River and Skagit River – some of these pipeline crossings are located underground and some are located aboveground supported by cable suspension structures.

Two large oil refineries (Shell and Tesoro) and a chemical plant are located in the Western portion of the county on Marches Point near the City of Anacortes. In addition, Olympic Pipe Line Company owns and operates a 20 million gallon fuel storage tank facility and pump station within Skagit County. Each of these facilities has numerous storage tanks containing liquid hydrocarbons – some of these tanks have capacities that exceed 12.8 million gallons. During earthquake events ground movement may cause connecting piping to break and the liquids contained in these tanks may slosh resulting in partial or complete failure of the tanks. Upon tank failure, these liquid fuels may explode and burn.

There are several earth-fill dams located in Skagit County. The majority of these dams are small, are located in sparsely populated or remote areas, and would have a minor impact on nearby areas should a failure occur.

Skagit County Public Utility District # 1 owns and maintains two earth-fill dams located East of Mount Vernon near Gilligan Creek. These earth-fill dams contain Judy Reservoir with a total water storage capacity of 4,630 acre-feet or 1.5 billion gallons and supplies water to more than 50,000 residents. The reservoir is located in a sparsely populated area but due to the storage capacity of the reservoir and the topography of the area, a sudden failure of either of these earth-fill dams could severely impact areas located downstream of the reservoir causing damage to homes and loss of life.

The West Pass Dike is an earth and rock-filled dam that is owned and maintained by Puget Sound Energy as part of the Baker River Project. The West Pass Dike is located in Eastern Whatcom County on the Baker River and has a water storage capacity of approximately 177,000 acre-feet. The West Pass Dike runs across a low area located to the West of the Upper Baker Dam for the purpose of impounding the waters of Baker Lake between the elevations of 680 feet and 724 feet. The West Pass Dike is located in a very remote area but a partial or total failure of this dam would most definitely have an impact on downstream areas as a result of large amounts of water entering Lake Shannon thereby leading to a possible overtopping the Lower Baker Dam near the Town of Concrete. Puget Sound Energy and Seattle City Light own and operate large hydroelectric projects on the Baker River and Skagit River respectively. Only one of these dams, the Lower Baker Dam is located in Skagit County, the remaining dams are located in Whatcom County. All of these dams are of Portland Cement Concrete construction and are built and anchored to bedrock; the table below provides additional information regarding these dams.

Major Hydro-electric Dams Located in Eastern Skagit and Whatcom Counties (Information obtained from the United States Army Corps of Engineers)					
Name of Dam	Owner/Operator	River System	Storage Capacity		
Lower Baker Dam	Puget Sound Energy	Baker River	160,000 Acre Feet		
Upper Baker Dam	Puget Sound Energy	Baker River	285,000 Acre Feet		
Gorge Dam	Seattle City Light	Skagit River	8,500 Acre Feet		
Diablo Dam	Seattle City Light	Skagit River	90,000 Acre Feet		
Ross Dam	Seattle City Light	Skagit River	1,435,000 Acre Feet		

Due to their close proximity to Mount Baker, the Upper Baker Dam and the Lower Baker Dam are vulnerable to the effects of large-scale landslides, mudflows, lahars, and avalanches originating from the upper slopes of Mount Baker. Gorge Dam, Diablo Dam, and Ross Dam are not vulnerable to the hazards that could be caused by Mount Baker nor are any of the dams on the Baker River or the Skagit River vulnerable to similar hazards originating from Glacier Peak. Because of their location and the storage capacity of their reservoirs, the failure of any one of these dams will have a severe impact on the Eastern portion of Skagit County, the Town of Concrete, and those persons living within the floodway and floodplain of the Skagit River.

While large portions of Skagit County are vulnerable to ground failures caused by earthquakes, some areas in Western Skagit County may also be vulnerable to tsunamis and seiches.

Most Skagit County marine and shoreline areas are protected from the direct effects of tsunamis caused by distant earthquakes. However, the shoreline areas of Fidalgo Island, Guemes Island, Sinclair Island, Cypress Island, Samish Island, March's Point, the communities of La Conner and Bayview, as well as lakeshore areas may be vulnerable to seiche. Tsunami and seiches are discussed specifically in more detail later in this plan.

PROBABILITY AND RISK:

Because of the infrequency of such devastating events, there is a **low probability** for a potentially damaging earthquake to occur that could result in many people being injured or killed and damaging private property, government infrastructure and the local economy. However, there is a **moderate to high risk** to the citizens, infrastructure, and economy of Skagit County should such an earthquake occur.

CONCLUSION:

It is difficult to identify any part of Skagit County that would not be vulnerable to a large earthquake.

The citizens of Skagit County need to be knowledgeable and understand earthquake risk and potential severe implications. People need to recognize that government is not able to totally protect them from the impacts of an earthquake. They need to take the necessary actions to prepare themselves, their families, and their businesses <u>before</u> an earthquake – not after.

The best tool is preparedness. The adoption and enforcement of building codes, proper land use planning, public awareness programs, school "Drop, Cover and Hold" training, business continuity plans and "Community Emergency Response Team" education and training are just part of the answer.

Future population increases and urban development will require that Skagit County continually re-assess the earthquake hazard. In addition, each business and citizen must accept the responsibility to take the necessary actions and prepare for the day a major earthquake occurs.

For more Earthquake information please visit:

Skagit County Department of Emergency Management: http://www.skagitcounty.net/Departments/EmergencyManagement/main.htm

Washington Department of Emergency Management:

http://www.emd.wa.gov/hazards/haz_earthquakes.shtml

Washington State Department of Natural Resources:

http://www.dnr.wa.gov/ResearchScience/Topics/GeologicHazardsMapping/Pages/geologic hazards.aspx

Geologic Mapping: <u>http://www.dnr.wa.gov/Publications/ger_ofr2007-</u> 2 darrington_devils_mountain_fault.zip

Devils Mountain Fault Scenario:

http://www.dnr.wa.gov/Publications/ger seismic scenario devils mt.pdf

The Great Washington ShakeOut: http://www.shakeout.org/washington/index.html

Pacific Northwest Seismic Network: http://www.pnsn.org/

U.S. Geological Survey: http://www.usgs.gov/natural_hazards/#eq

FEMA: <u>http://www.fema.gov/earthquake</u>

Home Preparedness: http://www.emd.wa.gov/preparedness/prep_home.shtml

Prepare in a Year: http://www.emd.wa.gov/preparedness/prep_prepare_year.shtml





DEFINITIONS:

Structure Fire – a fire of natural or human-caused origin that results in the uncontrolled destruction of homes, businesses, and other structures in populated, urban or suburban areas.

Wildland Fire – a fire of natural or human-caused origin that results in the uncontrolled destruction of forests, field crops and grasslands.

Wildland-Urban Interface Fire – a fire of natural or human-caused origin that occurs in or near forest or grassland areas where isolated homes, subdivisions, and small communities are also located.

BACKGROUND INFORMATION:

Skagit County experiences three types of fire threats: structure fires, wildland fires, and wildland-urban interface fires.



Figure 1 Roaming Roe Fire, 2012

Structure fires do not typically pose a great threat to the community except when the fire spreads to other nearby structures and quickly expands to a size that could threaten large numbers of people and overwhelm local fire resources.

Wildland fires are a natural part of the ecosystem in Washington State. In wilderness areas where there are no structures or lives being threatened, these fires are sometimes allowed to burn. According to the National Interagency Fire Center (NIFC), in 2013 Washington State reported 1527 fires, and 152,603 acres burned at a cost of approximately \$48 million. In Skagit County, as reported by the WA State Department of Natural Resources (WADNR) in 2013, there were 17 fires and 36 acres burned.

Wildfires can occur anywhere under the right conditions. A wildland fire can ignite from lightning and burn in a wilderness area without endangering structures or human lives, but a wildland fire can also burn in an urban interface area where lives and structures are threatened. Wildfires that endanger human life and property are an entirely different type of threat to deal with. When firefighters deal with wildland fires that aren't imminently threatening any structures or lives, they will control it around the fire's perimeter. In a wildland-urban interface fire where many homes, possibly hundreds, are threatened at the same time, firefighters are then forced to provide point protection where they are focused on saving one home in danger, while others are left unattended.

The most common cause of wildland fires in the urban interface in Washington State is escaped debris burns. Recreational campfires and lightning strikes are also a common cause of wildland fires. Depending upon temperature, relative humidity, wind, topography, vegetation type, and other factors, wildland fires can spread rapidly to over 100,000 acres and may require thousands of firefighters working several weeks to extinguish. Because of the sheer magnitude of these fires and how quickly they can overwhelm resources, their destruction can be massive.

On occasion, individual fires will spread and merge together to form a firestorm covering vast amounts of area. The involved area becomes so hot that all combustible materials ignite, even if they are not exposed directly to flames. As the fire becomes larger, it has the capacity to create its own local weather as superheated air and hot combustion gases rise upward over the fire zone, drawing surface winds from all sides, often at velocities approaching 50 miles per hour. In exceptionally large events, the rising column of heated air and combustion gases carries enough soot and particulate matter into the upper atmosphere to create a locally intense thunderstorm thereby increasing the possibility of additional lightning strikes.

Skagit County has an increasing number of homes being built in the wildland-urban interface with development continuing to expand further into forested lands. Within Skagit County, approximately 41% of the land area is zoned industrial forest, secondary forest, rural resource and rural reserve; these areas are vulnerable to wildland or wildland-urban interface fires; however, the potential for large forest fires in Skagit County is small. Improved fire spotting techniques, better equipment, and trained personnel are major factors, as are Skagit County's normally wet climate and high fuel moisture levels.

In 2008 Skagit County requested the Skagit Conservation District to lead efforts on creating a county-wide Community Wildfire Protection Plan (CWPP). The plan was successfully completed in 2009 and updated in 2012. The purpose of the CWPP is to identify and prioritize hazardous fuel treatments and recommend ways to reduce structural ignitability. The CWPP provides a set of goals and actions and identifies resources designed to address the threat of wildland and urban-interface fires. The CWPP helps to:

- Raise public awareness about wildland and urban-interface fire risk.
- Educate landowners of their shared responsibility in protecting against wildland and urban-interface fires.
- Enhance public safety.
- Strengthen partnerships between local, state, and federal firefighting agencies.
- Realize opportunities for collaboration between governmental agencies and other interested parties.
- Improve economic resiliency through the identification and protection of critical infrastructure and businesses at risk to urban-interface fires.
- Protect and restore ecosystem health.

HISTORY:

In 2013 the Washington State Department of Natural Resources and other agencies provided resources to fight more than 20 Type 2 and Type 3 (high to medium complexity) forest fires. On DNR managed land alone, more than 764 wildfires burned more than 126,000 acres; this
includes the Colockum Tarps fire that burned 80,053 acres, forced evacuations and destroyed structures and homes. This single fire cost the DNR more than 10.3 million to fight.

Although Skagit County typically has numerous fires that occur in forest lands each year, almost all of these fires are extremely small (less than .2 acres in size) and remain so due to the relative high moisture content in fire fuels. The majority of these fires involve minimal resources and response costs are typically less than \$500 per fire.

According to Washington State Department of Natural Resources records, 638 reported wildland fires occurred in Skagit County from 1970 through 2001. The largest of these fires (the Jordan Creek Fire) occurred near the community of Marblemount in 1998 and burnt 1,162 acres of forest land and threatened several homes in the area. Costs to fight this fire were in excess of 3 million dollars. In 2007, a small wildland fire occurred at Burpee Hill near the Town of Concrete and another at Sares Head on the westerly slopes of Fidalgo Island.

HAZARD IDENTIFICATION:

During a wildland fire event, the community's normal as well as emergency services may be affected as large numbers of agencies and individual responders focus their efforts on the fire. Adjacent fire agencies may be asked for assistance in one form or another and access to a city's business district may be restricted or closed and the influx of sightseers and media personnel can further add to the disruption. Furthermore, since most fire fighters in Skagit County are volunteers, large fire events could significantly affect not only their lives but their source of employment should economic impacts continue.



Figure 2 Big Rock 2 Fire2013

Evacuation of threatened homes is one of the first tasks that may need to be undertaken by emergency responders. Depending upon the rate of fire spread, and the population density of the area, notification and evacuation efforts may reduce the effectiveness of the first responders in fighting the fire. Additionally, large scale evacuations may have a significant effect on other parts of the community.

The fire season in Skagit County can begin before new vegetation green-up occurs in May and continue into September though unusually dry periods can extend the fire season through October. The possibility of a wildland fire depends on fuel availability, topography, the time of year, weather, and activities such as debris burning, land clearing, camping, and recreation. In Washington State, wildland fires start most often in lawns, fields or other open areas, along transportation routes, and forested areas.

Due to their size and complexity, large fires can put a tremendous strain on a wide variety of agencies and jurisdictions within the area that the fire occurs and local resources could be quickly overwhelmed in dealing with the impacts of a large fire. Because other parts of the state have more active fire seasons, firefighting resources are often deployed to other areas of the

state during fire season. This means that if there is a major fire in Skagit County, it is likely that response times could be longer, and the resources could be minimal. Fire danger in Skagit County commonly rises at the same time as the danger rises in other neighboring counties, potentially increasing the demand on firefighting resources in northwestern Washington. Large, rapid moving wildland-urban interface fires in eastern Washington also place a demand on all firefighting resources statewide annually. During these times, it is possible that wildland fire responses in Skagit County may have fewer wildland firefighters and equipment travelling longer distances to the incident.

Those persons living or doing business in the area of a large fire could be affected in several ways. Access to the area will probably be controlled or entry may be denied entirely. If a recreational area is involved, this closure may have a severe impact on tourist industry business and logging operations. In many cases, evacuations may be necessary if the fire directly threatens residential or commercial areas or in the event health issues could result from heavy volumes of smoke.

The Jordan Creek Fire near Marblemount in 1998 quickly overwhelmed local fire district personnel who initially responded to the fire. Several homes in the immediate area of the fire were threatened; mutual aid provided by adjacent fire districts and a quick response by a Department of Natural Resources initiated Unified Command. Using multiple agencies prevented the loss of several homes and other structures. Had the wind been blowing in a different direction, the fire could have directly threatened the community of Marblemount and local fire resources, already overwhelmed, would have had great difficulty in extinguishing multiple structure fires in close proximity to each other.

The following list is a compilation of comments and suggestions made by various stakeholders and the public regarding possible problems that could result from a wildland or wildland-urban interface fire.

There may be a lack of fire hydrants in many areas within unincorporated Skagit

- County resulting in water needing to be brought in by truck.
- Sinclair Island and Cypress Island are particularly vulnerable to wildland fires as there is no fire service on these islands and a response by Washington State Department of Natural Resources crews would be dependent upon boat or helicopter access.
- Fidalgo Island and Guemes Island are very susceptible to wildland-urban interface fires due to the lack of rainfall and low humidity during the summer months and the large number of homes that are located in or very near heavily timbered areas. Fire hydrants in these areas are typically supplied with water from private water systems that may have an inadequate supply for firefighting because of a lack of summer rainfall or longterm drought conditions.
- Many areas of Skagit County are susceptible to wildland or wildland-urban interface fires caused by fireworks and/or human recklessness.

VULNERABILITY ASSESSMENT:

Those persons living in forested areas or interface areas are most vulnerable to wildland or wildland-urban interface fires.

Much of the industrial forest areas of Skagit County receive in excess of 50 inches of rainfall annually with some areas receiving as much as 100 inches or more rainfall annually. This moderate climate and accompanying lush forest vegetation allow the forest floor to maintain higher soil moistures, lower temperatures, and higher relative humidity. In shaded areas, this means more resistance to fire spread. However, warm summer temperatures coupled with seasonal low rainfall amounts and low relative humidity sometimes lead to summer drought conditions in the industrial forest. These conditions are reached more often than most people realize. Luckily, there has been a lack of ignition during times of serious fire danger in Skagit County.

The United States Forest Service and/or the Washington State Department of Natural Resources manage most of the forest lands in Skagit County. The excellent fire prevention and control capabilities of these two agencies are partially responsible for the lack of large wildland and wildland-urban interface fires experienced by Skagit County. However, the absence of large fires coupled with reduced burning has also resulted in greater fuel loading which could lead to a

catastrophic fire given the right set of conditions.

Current forestry research is focused on climate change. Forests are shaped by climate along with soils, aspect, topography, and elevation. Climate has a large impact on how forests grow as well as their species composition. Healthy forest are the single best long-term land use available to mitigate rising carbon dioxide levels in the atmosphere. Pacific coastal forests can sequester carbon at the rate of 8.3 metric tons per acre per year. Air quality concerns are off-set by promoting vigorous tree growth associated with a healthy forest..



Figure 3 Taylor Bridge Fire 2012 (Wing, 2012)

Good forest management can reduce wildfire intensity by treating extreme hazard areas. Reducing wildland fire intensity results in reduction of greenhouse gas emission and reduces the release of carbon stored in forest biomass. Climate change is predicted to affect the forests and increase the risk to WUI structures substantially across Skagit County. Forests not historically considered fire prone could become more fire prone. Conditions that allow fires to spread will be more common, such as drier summers and more evaporation at lower elevations that result in drier fuels. "Forest health treatments will help mitigate wildfire intensity. The incorporation of climate change strategies will facilitate the planning process addressing negative effects." (Source: "Responding to Climate Change in National Forests: A Guidebook for Developing Adaptation Options", U.S.F.S., General Technical Report PNW-GTR-855.)

An extensive report is referenced in Skagit County's Community Wildfire Protection Plan (CWPP) on the effects of climate change. The benefits of good forest management on air quality are quantified in the report, "Forest Management Solutions for Mitigating Climate Change in the United States", Journal of Forestry, April, 2008. The CWPP follows guidelines in the U.S.F.S. General Technical Report NRS-89, implementing this section of the Natural Hazard Mitigation Plan.

Should a wildland fire or wildland-urban interface fire occur, the impacts of the fire would vary greatly with the size and location of the fire, the weather, and time of year. It is unlikely that a major wildland or wildland- urban interface fire would seriously impact Skagit County as a whole. In the event of a large wildland or wildland-urban interface fire, additional resources could be requested through activation of the Northwest Region Fire Mobilization Plan and/or the Washington State Fire Mobilization Plan in addition to other state and federal fire resources.

While there have always been homes built in wooded areas, in recent years, the numbers of people choosing to build in or very near forest areas has increased dramatically as city limits have expanded into previously unpopulated and forested areas. As the population of Skagit County increases and people desire to live in more rural or isolated areas outside of the floodplain, development in the wildland-urban interface will continue to expand thereby increasing the potential risk to lives and property from wildland and wildland urban-interface fires.

Should a large wildland or wildland-urban interface fire occur in Skagit County, the effects of such an event would not be limited to just the loss of valuable timber, wildlife and habitat, and recreational areas. The loss of large amounts of timber on steep slopes would increase the risk of landslides and mudslides during the winter months and the depositing of large amounts of mud and debris in streams and river channels could threaten valuable fish habitat for many years. In addition, the loss of timber would severely impact the watershed of the Skagit River and could drastically increase the vulnerability to flooding for many years.

The loss of large amounts of timber in the industrial forest areas of Skagit County could severely impact the logging industry and possibly the overall economy of the county for many years. With a



Figure 4. Big Rock 2 Fire. (Smokey Wildfire Closes Hwy. 9, 2013)

fixed number of acres of timber land available for harvest, timber owners must limit the acres harvested each year in order to properly manage their timber holdings and maintain a continual and sustainable supply of timber. The immediate loss of several hundred or thousands of acres of timber could potentially equal several years of timber harvest acreage.

If a significant portion of the business area has been affected, the loss to the community can be overwhelming. Reduction of payrolls and long-term layoffs during recovery from a large fire could have a serious impact on the buying power of a large sector of the population. A long-term business closure could also have a large impact to the community's tax base.

The Washington State Department of Natural Resources, Northwest Region, conducted a region-wide wildland fire hazard assessment in 2002 utilizing the following method:

- R.A.M.S (Risk Assessment and Mitigation Strategies) was developed for fire managers to be an all-inclusive approach to analyzing wildland FUELS, HAZARD, RISK, VALUE, and SUPPRESSION CAPABILITY. This strategy considered the effects of fire on unit ecosystems by taking a coordinated approach to planning at a landscape level. A new methodology for wildland fire hazard in Skagit County is currently being developed. This will result in an updated risk assessment analysis and maps showing the results. This methodology will include assessments based on:
 - a. Ecological sites
 - b. Slope
 - c. Aspect
 - d. Vegetation Types
 - e. Topography
 - f. Elevation

Details on the data and strategy used to develop a new wildfire risk assessment for Skagit County will be included in the Skagit County Community Wildfire Protection Plan that is available at http://www.skagitcd.org/cwpp

PROBABILITY and RISK:

In Skagit County, the fire regime is low frequency, high severity, meaning that the likelihood of having a fire isn't very high, but the potential for ecosystem damage is high.

Based upon the original wildland fire hazard assessments conducted by the Washington State Department of Natural Resources utilizing R.A.M.S. and N.F.P.A. 299, there is a **moderate to high potential** for a <u>large</u> wildland fire to occur in Skagit County with the **potential for moderate to high (with isolated areas of extreme) risk** to people and property as a result of a <u>catastrophic</u> wildland fire. This statement will be updated when the new wildfire risk assessment for Skagit County is completed. An updated map will also be included that shows high risk areas of Skagit County.

CONCLUSION:

Skagit County's typically moist marine climate and low frequency of lightning provide natural protection against large wildland fires. While wildland fires do occur in Skagit County on a fairly regular basis during the warm summer months, these fires are typically very small and are usually extinguished before they get much bigger than 3 acres.

Much of the land in Skagit County is comprised of industrial forest or urban interface lands that are vulnerable to wildland fires. Current zoning regulations limit minimum lot size to 80 acres in the industrial forest, 20 acres in the secondary forest, 40 acres in the rural resources forest (unless clustering is implemented) and 10 acres in the rural reserve forest (unless clustering is implemented). Most of these forest lands are located outside the boundaries of established fire

districts. Building homes or other structures in or near forested areas increases the risk of loss from fires. In the past, structures were often built with minimal awareness regarding the risks associated with wildland fires.

Skagit County Code 14.16.850 (6) addresses fire mitigation for structures located outside the boundaries of established fire protection districts in areas vulnerable to wildland and wildland urban-interface fires. The above-referenced code stipulates requirements for, as well as certain exceptions, regarding the construction of structures located in these areas within Skagit County. The code lists mitigation requirements including but not limited to the following:

(iii) Outside of a fire <u>district</u>, with the exception of lands zoned Industrial Forest-Natural Resource Lands, a single-family dwelling or accessory <u>building permit</u> may be applied for if it meets all of the following or comparable alternative fire protection requirements as determined by the Fire Marshal:

(A) The lot was a lot of record prior to the adoption of interim controls on June 11, 1990.

(B) Approved noncombustible roofing materials must be used.

(C) Slash abatement within 200 feet of any portion of the exterior of the structure.

(D) A safety <u>zone</u> cleared of flammable vegetation 30 feet from any portion of the exterior of the <u>structure</u> on level ground and 100 feet downhill on sloped ground.

(E) <u>Building</u> sprinklers installed per National Fire Protection Association 13D (NFPA 13D).

(F) Exception: Buildings of 800 square feet or less, which are:

(I) Unheated separate accessory <u>structures</u> to a full-time <u>dwelling unit</u> 20 feet from all other <u>buildings</u>; or

(II) A <u>building</u> used as a vacation <u>cabin</u> and not as a full-time residence.

(G) There is availability of 300 gallons of water on-site, 400 feet of 1-inch fire hose with foam applicator, and an internal combustion engine powered pump.

(iv) On saltwater islands that do not contain any land designated <u>Natural Resource Lands</u> (NRLs) or Public <u>Open Space</u> of Statewide/Regional Importance (OSRSI), and that are not within a fire <u>district</u>, a single-family dwelling or accessory <u>building permit</u> may be applied for if it meets all of the following or comparable alternative fire protection requirements as determined by the Fire Marshal:

(A) Approved noncombustible roofing materials must be used.

(B) Slash abatement within 200 feet of any portion of the exterior of the structure.

(C) A safety <u>zone</u> cleared of flammable vegetation 30 feet from any portion of the exterior of the <u>structure</u> on level ground and 100 feet downhill on sloped ground.

(D) There is availability of 300 gallons of water on-site, 400 feet of 1-inch fire hose with foam applicator, and an internal combustion engine powered pump, or an equivalent system as approved by the Skagit <u>County</u> Fire Marshal.

(E) <u>Building</u> sprinklers installed per National Fire Protection Association 13D (NFPA 13D).

Exceptions from the sprinkling requirement in this Subsection may be provided if:

(I) The <u>lot</u> was a <u>legal lot of record</u> prior to the adoption of interim controls on June 11, 1990; and

(II) The proposed single-family dwelling or accessory <u>building</u> does not exceed 1,500 square feet of heated <u>structure</u>.

Using community level wildland-urban interface fire hazard information formulated by the Washington State Department of Natural Resources as a base of information, Skagit County developed a county-wide Community Wildfire Protection Plan (CWPP) in 2009. The plan raises community awareness regarding wildfire prevention and identifies ways to improve the resilience of communities in the wildland-urban interface. The Skagit Conservation District (SCD) was the lead agency in collaboration with Washington State Department of Natural Resources (DNR), Skagit County Department of Emergency Management, Skagit County Fire Marshal's Office, local fire agencies, community stakeholder groups, and other local, state, and federal agencies in the development and updating of this plan.

SCD is implementing key strategies for locally supported fuels reduction projects following criteria identified in the CWPP. The plan includes assessments and prioritization of local wildland fire hazards and hazardous fuels treatments, current protection measures, community demographics, and mitigation strategies that address the risks identified. Targeted areas for fuels reduction projects and community outreach will be those areas identified as high risk for wildfire utilizing DNR risk assessment maps, with those adjacent to the Mount Baker-Snogualmie National Forest receiving the highest priority.

As part of implementing the Skagit County CWPP, extensive community education and outreach is being done. Wildfire planning partners in Skagit County are working together to address wildfire issues using the Fire Adapted Communities® approach. A Fire Adapted Community is one that takes responsibility for its wildfire risk. Actions address resident safety, homes, neighborhoods, businesses and infrastructure, forests, parks, open spaces, and other community assets. The more actions a community takes, the more fire adapted it becomes. The Firewise Communities/USA® Program is a tool that a community working to become more fire adapted can use. Communities in Skagit County are encouraged to participate in the Firewise Communities/USA program and are guided through the Firewise Communities/USA process.

Individual landowners will be provided technical assistance to develop Firewise and forest health plans.

For Additional information please visit:

Skagit County Department of Emergency Management: http://inside.skagit.local/Departments/EmergencyManagement/main.htm

Washington State Emergency Management Division: <u>http://www.emd.wa.gov/hazards/haz_wildfire.shtml</u>

Washington State Department of Natural Resources: <u>http://www.dnr.wa.gov/RecreationEducation/FirePreventionAssistance/Pages/Home.aspx</u>

Fire Adapted Communities: http://www.fireadapted.org

Firewise: http://firewise.org/

Protect Your Property From Wildfire: <u>http://www.disastersafety.org/wp-content/uploads/wildfire-pacific-nw_IBHS.pdf</u>

Ready.gov (FEMA): http://www.wildlandfirersg.org

US Forest Service: http://www.fs.fed.us/fire/













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FLOOD

DEFINITIONS:

Flood – An inundation of dry land with water caused by weather phenomena and events that deliver more precipitation to a drainage basin than can be readily absorbed or stored within the basin. Skagit County primarily experiences river flooding but is also subject to minor tidal flooding and surface flooding.



Figure 12 Samish Basin Flooding. Photo Courtesy Of Washington State Patrol.

Flood Outlook – Issued by the National Weather Service as an initial notice of a potential hazardous flooding event. The flood outlook raises public awareness of the possibility of a severe flooding event. A Flood Outlook is issued 72 to 36 hours before the occurrence of the event.

Flood Watch – Issued by the National Weather Service when the probability of a hazardous flooding event has increased significantly but its occurrence, location, or timing is still uncertain. The public can set their plans in motion to prepare for the event. A Flood Watch is issued from 36 to 12 hours before the occurrence of the event.

Flood Warning – Issued by the National Weather Service when a hazardous flooding event is occurring, is imminent, or has a high probability of occurrence within 12 hours. A Flood Warning is issued for conditions posing a threat to life and/or property.

Flood Stage – A height at which a watercourse overtops its banks and begins to cause damage to any portion of the river valley.

Floodplain – The land area of a river valley that becomes inundated with water during a flood.

Floodway – That portion of the natural floodplain that is regularly inundated during the normal annual flood cycles of a river or stream. For most waterways, the floodway is where the water is likely to be deepest and fastest. It is the area of the floodplain that should be kept free of obstructions to allow floodwaters to move downstream.

100-Year Floodplain – That portion of the floodplain that would be inundated by water during a 100-Year Flood event.

500-Year Floodplain – that portion of the floodplain that would be inundated by water during a 500-Year Flood event.

National Flood Insurance Program (NFIP) – A Federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the Federal Government which states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

Community Rating System (CRS) – A voluntary program within the NFIP that encourages and recognizes community floodplain management activities that exceed the minimum NFIP standards for local mitigation, outreach, and education. Under the CRS, flood insurance rates are adjusted to reflect the reduced flood risk resulting from community activities that reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance.

BACKGROUND INFORMATION:

Except severe storms, floods are the most common of natural disasters that occur in Skagit County; the Federal Emergency Management Agency (FEMA) considers the Skagit River "potentially the most damaging river in the state".

Flooding occurs on rivers and streams when excessive water discharge causes river or stream channels to overflow. The Skagit River, Samish River, Sauk River, Suiattle River, and Cascade River are all susceptible to river flooding.

Floods in the Skagit Basin can be classified as either spring snowmelt or winter rain on snow events. The threat of flooding in Skagit County is greatest in the months of November, December and January, with events occurring as early as October or as late as February. Winter flood events have the potential to produce the highest peak flows when significant low elevation snowfall is present, followed by rising freezing levels, heavy rain, and wind. In addition, high tides that occur during a flood event further increase the potential of flooding due to their restricting effect on river discharge flows.

Based on discharge flows of rivers that empty into salt-water, the Skagit River is the third largest river system on the West Coast of the contiguous United States with only the Columbia River and the Sacramento River being larger.

From its source in Canada, the Skagit River flows 135 miles and empties into Skagit Bay. The river drains an area of approximately 3,115 square miles. Three major tributaries empty into the Skagit River within Skagit County thereby significantly increasing the Skagit's flow. These rivers are the Cascade River, the Sauk River, and the Baker River. Several small watersheds are also tributaries to the Skagit; these include Illabot Creek, Finney Creek, Day Creek, and Noockachamps Creek watersheds. In addition, many small feeder streams also discharge directly into the Skagit.

From Concrete to Sedro-Woolley, the river valley varies from 1 to 3 miles in width bordered by steeply rising timbered hills. Below Sedro-Woolley, the valley descends to nearly sea level and widens to a flat, fertile floodplain that joins the Samish Valley to the north and extends west through Mount Vernon to La Conner and south to the Stillaguamish River. During extremely large flood events, the Skagit River has overflowed the low divide between the Skagit River and the Samish River and has entered the Samish River Basin. At Fir Island, the Skagit divides into the North Fork (carrying about 60% of the discharge flow) and the South Fork (carrying about 40% of the discharge flow).

Levee and dike building in Skagit Valley started in the late 1800's. Over the years there have been numerous floods and levee breaks followed by new levee construction projects to build the levees higher and wider thereby hoping to contain and control the mighty Skagit.

Currently, there are about 56 miles of river levees and 40 miles of salt-water dikes in Skagit County. These levees and dikes are managed by 12 separate Dike Districts with each district governed by a Board of Commissioners. The Districts have broad powers and responsibilities including the protection of lives and property located within their respective district.

The United States Army Corps of Engineers inspects the Skagit River levees on an annual basis to ensure they meet established standards. The Skagit River levee system is constructed to control an event that falls within the 25-year flood to 35-year flood range with a river gauge height of 38 feet and a flow of 140,000 to 155,000 cubic feet per second. In comparison, the Skagit River gauge height averages 10 feet to 14 feet in the summer months and 15 feet to 18 feet in the winter months. Flood Stage corresponds to a gauge height of 28 feet at both Concrete and Mount Vernon.

Dam construction of the of the 5 Skagit Basin dams began in 1924 with the Low Gorge Dam and continued until 1961. All of these dams were designed and built as hydropower generation structures. However, as the magnitude of Skagit Basin flooding problems became more evident, flood control storage was later required in the Ross and Upper Baker Reservoirs. No flood control storage is required in Diablo, Gorge, or Lower Baker Reservoirs. For the past several years, Skagit County has taken steps towards reaching an agreement with Puget Sound Energy to increase the flood control storage within the Baker River Project that would include both the Upper Baker Reservoir and the Lower Baker Reservoir. The General Investigation has recommended 74,000 acre feet at the Upper Baker Dam which can change seasonally. At the Lower Baker Dam 20,000 acre feet may be available. An agreement is currently being analyzed through the USACE General Investigation process.

Dam Construction and Related Flood Control Storage Requirements			
Year	Significant Construction or Flood Control Event		
1924	Low Gorge Dam completed		
1925	Lower Baker Dam completed		
1929	Diablo Dam completed		
1954	120,000 acre-feet of flood storage required in Ross Reservoir by FERC license		
1956	16,000 acre-feet of flood storage required in Upper Baker Reservoir by FERC license		
1959	Upper Baker Dam completed		
1961	High Gorge Dam completed		
1977	58,000 acre-feet of flood storage in Upper Baker Reservoir authorized by Congress		

Figure 13 Information obtained from Seattle City Light, Puget Sound Energy and U.S.A.C.E

During major flood events, the United States Army Corps of Engineers takes control of the Upper Baker Dam and the Ross Dam to maximize flood storage capacity and regulate the release of water in an attempt to minimize the impacts of the event to those areas located downstream. The United States Army Corps of Engineers typically takes control of the Upper Baker Dam and the Ross Dam under the following circumstances: 1) when there is a forecast of a natural flow of 90,000 cubic feet per second at Concrete, and 2) if either dam raises their pool elevation enough to encroach within the designated flood control storage space.

In the event of a predicted flood, the Corps takes control 8 hours prior to the forecasted time of peak flow arrival at Concrete and relinquishes control when the natural flow volume reaches 62,500 cubic feet per second. Depending upon other circumstances, the Corps may retain control of the dams as the situation dictates in order to accommodate response and/or recovery efforts that may be occurring downstream.

In the event the Corps takes control of the dams because of an elevated pool height, the Corps will retain control of the dam until the owner of the dam has evacuated all water above the flood control pool. (For additional information regarding this issue, please refer to the <u>United</u> <u>States Army Corps of Engineers Water Control Manual, Skagit River Project, Skagit River, Washington.</u>)

The actions taken by the United States Army Corps of Engineers to control the dams on the Baker River during the 1990 floods (two events) as well as the 1995 floods (two events) and the 2003 flood significantly reduced peak flow rates and flood damage to government infrastructure and private property in the lower Skagit River Basin.

There is currently much debate regarding climate change, especially pertaining to the uncertainty of how soon (and to what extent) climate change will adversely affect shoreline communities. While climate change and the subsequent rise in sea level may someday significantly affect Skagit County, the mitigation strategies contained within this plan do not take future climate change (and its effects) into account.

HISTORY:

The Skagit River has a long, well-documented history of flooding, several recent flood events have resulted in Presidential Disaster Declarations. While there were many large flood events during the late 1800's and early 1900's with peak flow rates varying between 180,000 cubic feet per second and 210,000 cubic feet per second, recent events have been notably smaller with peak flow rates of 152,000 cubic feet per second in 1990, 151,000 cubic feet per second in 1990, 151,000 cubic feet per second in 1995 and 129,000 cubic feet per second in peak flow rates in peak flow rates between these time periods is most likely



Figure 14 Fir Island during 1990 flood. Photo courtesy of Skagit County Public Works

attributable to the flood storage provided by the Ross Reservoir and the Upper Baker Reservoir as well as the regulating of water released from these reservoirs by the United States Army Corps of Engineers during flood events.

The 1975 flood event served as a "wake-up call" to all Skagit County residents and governmental agencies that the Skagit River posed a significant flood threat to the residents and businesses located within the floodplain and that we could not rely on a levee system to protect us from all flood events. This flood caused considerable damage to transportation systems, river levee systems and wastewater disposal and drainage systems as well as damage to homes, businesses and the local agricultural community. Following the flood, there was a concerted effort by local dike districts and other government agencies to raise and reinforce existing levees as well as increase flood awareness and public education regarding the flood risk in Skagit County.

The two 1990 floods and the two 1995 floods were the largest floods to impact Skagit County since the completion of the hydropower dams on the upper Skagit and the Baker River. Both involved an initial flood peak occurring on or near Veterans Day followed by a second flood peak occurring on or near Thanksgiving Day. Both floods events are considered 16-20 year flood events.

The 1990 floods caused major flooding in the Town of Hamilton as well as many other low-lying areas of Skagit County. In addition, a failure of the levee on Fir Island forcing an emergency evacuation of all residents of Fir Island as well as more than 1,200 head of cattle. Fir Island was inundated with water up to 8 feet in depth, flooding almost all of the homes on the island and damaging agricultural land and crops. Before the water receded, unusually cold temperatures caused the floodwaters to freeze for almost two weeks causing further damage to many homes. Approximately 8,000 acres of farmland was damaged due to floodwaters and flood debris. In some areas, farmland was covered with up to 3 feet of sand and silt.

While the 1995 floods had almost the same peak flows as the 1990 floods, there was less damage from these floods because of the extensive work done to the levee system following the 1990 floods as well as the aggressive and sustained flood-fight efforts on the part of the dike districts and other governmental agencies to prevent a levee failure like the one on Fir Island in 1990.

SUMMARY OF HISTORICAL FLOODS (CFS) (Flows from USGS Records Except as Noted)				
STATION	Skagit River near Concrete		Skagit River near Mt Vernon	
PERIOD OF RECORD	October 1924-Present		October 1940-Present	
	2,737 squ	uare miles	3,093 square miles	
	Peak D	ischarge	Peak Discharge	
Date	cfs	cfs / sq. mi.	cfs	cfs / sq. mi.
1815	510,000	186.3		
1856	340,000	124.2		
16 Nov 1896				
18-19 Nov 1897	265,000	96.8		
16 Nov 1906			180,000	58.2
18 Nov 1908				
29-30 Nov 1909	245,000	89.5		
21 Nov 1910				
29-30 Dec 1917	210,000	76.7		
12-13 Dec 1921	228,000	83.3		
27 Feb 1932	147,000	53.7		
13 Nov 1932	116,000	43.4		
22 Dec 1933	101,000	36.9		
25 Jan 1935	131,000	47.9		
27 Nov 1949 1/	154,000	56.3	114,000	36.9
10 Feb 1951 1/	139,000	50.8	144,000	46.6
3 Nov 1955 2/	106,000	38.7	107,000	34.6
23 Nov 1959 2/3/	89,300	32.6	91,600	29.6
20 Nov 1962 2/3/	114,000	41.7	83,200	26.9
13 Jul 1972 2/3/	91,900	33.6	80,600	26.1
4 Dec 1975 2/3/	122,000	44.6	130,000	42.0
27, 28 Dec 1980 2/3/	148,700	54.3	114,000	36.9
9-12 Nov 1990 2/3/	148,800	54.4	142,000	45.9
22-26 Nov 1990 2/3/	146,000	53.3	152,000	49.1
28-30 Nov 1995 2/3/	160,000	58.5	141,000	45.6
17-21 Oct 2003 2/3/	166,000	60.7	129,000	41.7
6-7 Nov 2006 2/3/	145,000	53.0	125,000	40.4

1/ Ross Dam began storing water in March 1940.

2/ Includes effect of 120,000 acre-feet of flood storage established at Ross Dam in 1953

3/ Upper Baker Dam began storing water in July 1959 (74,000 acre-feet of flood storage at Upper Baker began in 1977) (Engineers, 2013)

FLOOD CONDITIONS RELATED TO THE GAGE SKAGIT RIVER NEAR MOUNT VERNON, WASHINGTON

Stage	Discharge		Character of Flooding
(Ft.)	(cfs)		
25.0	53,200	1.	Beginning of backwater in Nookachamps Creek area with flooding of low-
			lying farmlandsno damage
28.0	67,850	1.	Zero damage
30.3	82,260	1.	Beginning of flooding in town of Hamilton
		2.	South End of Francis Road is overtopped and closed to traffic which is the
			road to Sedro-Woolley via Clear Lake. Those living in this lower area on
			Francis Road no longer have an escape route.
		3.	Beginning of overland flow to levee east of Burlington on Fairhaven Street,
			on north side of river between Sedro-Woolley and Burlington.
32.7	100,300	1	Major damage discharge in the vicinity of Mount Vernon
33.8	110,000	1.	Levee freeboard as follows: Levee east of Burlington on Fairhaven Street -
			3 to 4 feet.
		2.	Levee failures may occur when river remains above this stage more than 24
			hours, with flood conditions varying as levees fail or are overtopped
			throughout the valley
		3.	In view of the inadequate cross-section of practically all Skagit River dikes,
			the following action should be taken by the Corps at this time if a 2-foot
			rise is indicated in the next 24 hours: Be prepared to evacuate flood
			fighting crews from areas below Mount Vernon.
36.60	141,500	1.	Flooding expected in many districts. Dikes on either right or left bank from
			Hwy. 99 bridge downstream to Mt. Vernon may be breached
38.1	160,000	1.	Emergency raising of Burlington and Mount Vernon levees necessary to
			prevent flooding

(Engineers, 2013)

Recent Skagit and Samish River Flood Events Resulting in Presidential Disaster Declaration				
Incident Date	Disaster Number	Gauge Stage In Feet	Maximum Flow (cubic feet/second)	Estimated Damage
Dec. 1975	492	35.7 Feet (mv)	129,000 cf/s	\$365,808
Dec. 1979	612	34.0 Feet (mv)	112,000 cf/s	\$3,341,000
Nov. 1990	883	40.2 Feet (c)	142,000 cf/s	\$36,381,228
Nov. 1990	883	37.37 Feet (mv)	152,000 cf/s	(for both events)
Nov. 1995	1079	37.34 Feet (mv)	92,000 cf/s	\$14,539,982
Nov. 1995	1079	41.57 Feet (c)	151,000 cf/s	(for both events)
Feb. 1996	1100	32.11 Feet (c)	94,000 cf/s	\$1,167,783
Oct. 2003	1499	42.2 Feet (c)	129,000 cf/s	\$10,630,487
Nov. 2006	1672	39.8 Feet (c)	122,000 cf/s	\$10,528,986

NOTES:

1. Flow rates are listed as recorded at the Concrete (c) Gauge or the Mount Vernon (mv) Gauge based upon which gauge location recorded the greatest gauge stage and flow.

2. Damage figures listed are in year of occurrence dollars.

HAZARD IDENTIFICATION:

While the levee system on the Skagit River has controlled much of the flood threat within the lower delta, these levees have also contributed to the vulnerability of the citizens and business of the county. Without the levees, minor flooding would occur on almost an annual basis, sometimes occurring more than once each year. The "inconvenience" of frequent minor flooding would have most likely encouraged residential and commercial development to be located on higher ground and out of flood hazard areas.

With the levees in place, minor flood events have been minimized and residents and business owners of Skagit County have perhaps gained a false sense of security in the levee system - they may mistakenly assume that the levees will protect them from all floods in addition to the smaller, more frequent events. It should be noted that approximately 37,000 people or about 31% of the population of Skagit County live within the floodway and the floodplain of the Skagit River.

Due to the large amount of commercial and industrial development that is located in the lower valley floodplain, the majority of our transportation and communication infrastructure has also been located in the floodplain in order to serve the needs of the community. A major Skagit River flood event that causes large portions of the valley to be inundated with water has the potential to severely impact the overall economy of Skagit County as well as other communities within the North Puget Sound region.

While the Skagit River poses a major flood threat in the lower valley, the Sauk River and Suiattle River (located in the upper valley) also pose a significant threat of their own. These streams do not have levee systems and have a history of changing their channels and eroding their banks during flood events. Because of the *WILD AND SCENIC RIVER* designation,

government entities and private property owners are not allowed to place rip-rap or any other type of material along these river banks to mitigate these channel changes and bank erosion. In areas where erosion is severe or drastic channel changes occur, homes and property are many times simply "lost" to the river.

The severity of flood damage is dependent upon ground elevation, the



Figure 15. 2002 Sauk River bank erosion. Photo Courtesy of Skagit County Department of Emergency Management

surrounding topography, peak flow volumes, surface flow velocities, and proximity to the river or a levee break. Major channel changes are usually associated with high flow volumes, especially in areas characterized by flat, broad floodplains such as the lower Skagit Valley.

The following list of problems includes information contained in the <u>United States Army Corps of</u> <u>Engineers Skagit River Flood Damage Reduction Feasibility Study</u> as well as comments and suggestions made by various stakeholders and the public.

In addition to damaging homes, businesses, property, and the environment, a 100-year flood event in Skagit County could potentially result in the following:

- Portions of Interstate 5, State Route 9, State Route 11, State Route 20, State Route 536 and possibly portions of State Route 530 would be inundated and impassable to traffic.
- The Anacortes Water Treatment Plant could be inoperable for up to 45 days or perhaps longer. This facility serves the City of Anacortes, the Town of La Conner, portions of Fidalgo Island, as well as the Shell and Tesoro refineries in addition to the City of Oak Harbor and Naval Air Station Whidbey Island located in Island County.
- All municipal wastewater treatment facilities as well as major storm water pumping systems could be inoperable for up to 45 days of perhaps longer.
- Standing floodwaters are difficult to remove from behind the dikes, resulting in personal property damages as well as devastating agricultural losses.
- The economy of the entire county could be devastated. According to United States Army Corps of Engineers estimates, damages could exceed \$1 billion dollars locally per 100-year flood event. Road, railroad and pipeline transportation to the refineries would be in jeopardy forcing shutdowns for an industry employing more than 800 workers with annual payrolls exceeding \$57 million and thousands of people would possibly be unable to commute from their homes to work. According to the Washington State Office of Trade and Economic Development, exports to Canada are worth approximately \$6.6 billion and overland imports exceed \$14.3 billion annually; approximately 95% of all commercial goods between British Columbia and Washington are shipped overland, most of them via the I-5 corridor.
- In general, a 100-year flood event would create a wide variety of problems very similar to a large, damage-causing earthquake. Transportation routes and utilities will be greatly affected, local first response agencies will be totally overwhelmed and many personnel may not be able to report for duty as they may be personally affected by the incident and many shelter sites will be unusable due to their location in the floodplain. Health and environmental issues will result due to contaminated floodwaters, contaminated wells, hazardous materials and farm chemicals released into floodwaters, and dead animals.
- Evacuation efforts throughout the floodplain will require special considerations due to the fact that large numbers of dairy cattle will need to be evacuated from numerous farms in addition to the approximately 30,000 people that live in the floodplain. In 1990, over 1,200 dairy cows were transported off of Fir Island and relocated to various dairies in Skagit and Snohomish counties.

 Recovery efforts will focus on re-opening and/or re-building transportation routes, reestablishing essential facilities and governmental services, clearing debris, cleaning and decontaminating homes, businesses, and farm buildings, and re-construction of levees.

VULNERABILITY ASSESSMENT:

As mentioned earlier, the Skagit River is the third largest river system on the West Coast of the contiguous United States based on discharge flows of rivers that empty into salt-water. All persons, property, and businesses located within the floodway and the floodplain of the Skagit River are directly vulnerable to flooding. In addition, the overall economy of Skagit County is directly or indirectly vulnerable to major flood events.

In the past, those mainly affected by flooding were the farm families that lived in the lower portions of the valley and the crops and dairy herds they raised. With the dramatic increases in population and commercial development in the western portion of Skagit County that have occurred in recent years, the effects of a major flood event could be long-term and very difficult to overcome.

With a large increase in commercial and/or industrial development and the requirement that these structures be elevated above the existing floodplain, surface water flows may be altered or diverted from their normal locations thereby causing increased flooding in certain areas that may have previously had little vulnerability to flooding.

After the 1990 and 1995 flood events, there was a renewed interest in providing additional flood protection for the lower valley. As a result, the United States Army Corps of Engineers (USACE) and Skagit County conducted the United States Army Corps of Engineers Skagit River Flood Damage Reduction Feasibility Study.

As part of the United States Army Corps of Engineers Skagit River Flood Risk Management and Ecosystem Restoration Feasibility Study, the USACE produced a Feasibility Scoping Meeting Read Ahead Report in August 2009. This report contains detailed information regarding the potential losses due to flood events of various severity based upon an extensive economic review of the lower valley.

The study area was divided into 10 reaches (areas) for analysis based on their engineering and economic similarities. Land use was inventoried for the area likely to be inundated for flood events of differing severity up to a 500-year flood event.

A complete field survey of all commercial and industrial structures located in the floodplain was undertaken. Residential structures were surveyed through a random sample of the floodplain. The data collected included structure use, type of construction, structure size, condition, and first-floor elevation. Structure values were based on depreciated replacement value.

In addition to the residential and non-residential structure inventory, the USACE also calculated agricultural damages, transportation delays and costs due to the closure of Interstate 5. The

study also includes several critical facilities such as water treatment and wastewater treatment facilities located within the floodplain.

Short-term or long-term economic damage for business and industry located in the floodplain or business and industry that could be affected due to the closure of that portion of State Route 20 located west of Burlington is detailed in the 2014 FEMA Hazus Reports that are included in the Appendix of this plan.

For several years prior to the 2014 update of this plan, FEMA has been working to revise the Skagit River Flood Insurance Rate Maps (FIRM). The preliminary version of the revised FIRM was scheduled to be released on February 19, 2008. It is unknown at this time when the revised Skagit County FIRM will be released. When these maps are released, we expect 100-year flood elevations will increase thereby expanding the boundaries of the floodplain. With an increase in the size of the floodplain, the number of homes, businesses, and government infrastructure within in floodplain also increases thereby increasing the local vulnerability to flood events within Skagit County.

Based upon the historical record of flooding in the Skagit River Basin and the severe impacts large flood events have had on the citizens of Skagit County, there is a **high probability** of future flooding and a **high flood risk** for the people, businesses, and infrastructure located within the floodway and the floodplain of the Skagit River.

The following statement is from the summary section of the <u>United States Army Corps of</u> <u>Engineers Skagit River Flood Damage Reduction Feasibility Study, Without Project Conditions &</u> <u>Economics of the FSM Read-Ahead Report.</u>

Under existing conditions, flooding is a serious and frequently occurring problem for the Skagit River basin. Over 14,200 structures are at risk of flooding with a total property value (structure and content) exceeding \$4.3 billion. Potential total losses from a single flood event could be as great as \$2 billion. Based on study results, expected annual damages to property and associated losses would be nearly \$96.5 million with direct residential damages accounting for nearly 55% of the losses. These damage figures, coupled with the damages expected to occur to agriculture, and the delay costs due to closure of Interstate 5 raise the expected annual damages to a level reaching \$100.9 million (note all values are represented at the October 1st, 2010 price level). Both the highly expected annual damages and high probability of flooding indicate that the existing flood risk should be reduced.

The preceding statement was based on the existing 100-year flood elevation as established by the Skagit County FIRM. Local government officials expect an increase in the 100-year flood elevation will significantly increase the damage losses noted above.

CONCLUSION:

In Skagit County, floods are a major threat to property and the environment, and to a lesser extent, the safety of persons and livestock located within the floodway and the floodplain. Flood damages in Skagit County exceed losses due to all other natural hazards.

Those persons that choose to live and/or work in a flood hazard area need to recognize that government is not able to totally protect them from the impacts of a flood. Those people at risk need to take the necessary actions to prepare themselves, their families, and their businesses <u>before</u> a flood event – not after.

Skagit County participates in the National Flood Insurance Program. Persons buying homes and businesses in the floodway and/or the 100-year flood plain are almost always required to purchase flood insurance as a condition of financing; however, there is no requirement that all residential structures purchase flood insurance if not required by a lending institution.

Skagit County as well as the municipalities of Burlington, La Conner, and Mount Vernon also participate in the National Flood Insurance Program Community Rating System in an effort to provide flood mitigation activities and lower flood insurance premiums for those property owners who live within their jurisdictions and purchase flood insurance.

Warning and evacuation of flood-prone areas continues to improve with river flow gauging systems jointly operated by the United Stated Geological Survey and Skagit County provide the National Weather Service, the River Forecast Center, and Skagit County Government with up-to-date river levels greatly increasing the ability to predict flood events on the Skagit River. The timeliness of these predictions, as well as the familiarity of local agencies as to their roles and responsibilities, significantly improves the county's preparedness level for flood events. During a flood event, every attempt is made to insure that flood warning information is disseminated as widely as possible. In addition, 24-hour flood information is available via telephone and the Internet to aid citizen access to flood information.

Due to the size of the Skagit River and its floodplain and the location of large population centers, critical facilities, governmental services, and major transportation routes relative to the floodplain, the devastation caused by a 50-year or 100-year Skagit River flood event will likely directly or indirectly affect almost all Skagit County residents.

For Additional Flood Information Visit:

Skagit County Department of Emergency Management: http://inside.skagit.local/Departments/EmergencyManagement/main.htm

Skagit County Public Works: <u>http://inside.skagit.local/Departments/Flood/Main.htm</u>

Washington State Emergency Management Division: http://www.emd.wa.gov/hazards/haz_flood.shtml

NOAA Weather: http://www.weather.gov/aly/EMflood

USGS WA State Water Data: <u>http://waterdata.usgs.gov/wa/nwis/</u>

Pet Preparedness: <u>http://www.emd.wa.gov/preparedness/prep_pets.shtml</u>

My State Emergency Alert Notification System: https://mystateusa.com/alertSignup.aspx?region=1157

Ready.gov (FEMA): <u>http://www.ready.gov/floods</u>

FEMA National Flood Insurance Program: <u>http://www.fema.gov/national-flood-insurance-program</u>







LANDSLIDES



Figure 16 Rock slide, Rosario Beach. Photo courtesy of Skagit County Emergency Management

BACKGROUND INFORMATION:

Landslides are simply defined as the movement downslope of a mass of rock, debris, earth, or soil (soil being a mixture of earth and debris). Landslides are generalized as falls, creeps, bedrock failures, slumps and earth flows. If enough water is present, many landslides become debris flows which are the rapid downslope transport of slurry of soil, rocks and organic material (collectively called debris) to valley floors.

Landslides occur in every state and U.S. territory. The Appalachian Mountains, the Rocky Mountains and the Pacific Coastal Ranges and parts of Alaska and Hawaii have severe landslide problems. In the United States 25-50 people die from landslides each year, with about 2 billion dollars in economic losses. (Landslides, 2014) Any area composed of very weak or fractured materials resting on a steep slope can, and will likely, experience landslides. In Skagit County, Coastal bluffs and steep sided river valleys are most prone to sliding.

Landslide occurrence is a result of a variety of geologic characteristics and environmental conditions. Many coastal bluff slides in Skagit County occur in a geologic stratification sequence in which permeable sands and gravels overly impermeable layers of silt and clay, or bedrock.

Water seeps downward through the upper formations and accumulates on the top of the underlying impermeable geologic units, forming a zone of weakness initiating slope failure. Other common factors contributing to slope failure include an excessive accumulation of precipitation, snow, or rain on snow events; stockpiling of heavy material, waste piles, or large structures, at the top of slopes.

Slope material that becomes super-saturated with water may develop into a debris flow or mud flow as it moves downhill. Debris flows, sometimes referred to as mudslides or mudflows, are common types of fast-moving landslides. These flows generally occur during periods of intense rainfall or rapid snowmelt. They usually start on steep hillsides as shallow landslides that liquefy and accelerate to speeds that can exceed 60 mph. The consistency of debris flows ranges from watery mud to thick, rocky mud that can carry large items such as boulders, trees, and cars. Debris flows from many different sources can combine in channels where their destructive power may be greatly increased. They continue flowing down hills and through channels, growing in volume with the addition of water, sand, mud, boulders, trees, and other materials. When the flows reach canyon mouths or flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can damage developed areas.

HISTORY:

Skagit County's somewhat steep terrain, high precipitation, and its abundance of glacial sediments, and the possibility of earthquakes all combine to make the county susceptible to landslides. While small slides and debris flows occur on a somewhat regular basis, there have been several slides and/or debris flows that have resulted in loss of life and/or property damage.

Recent Land Movement Events in Skagit County (Information obtained from Skagit County Department of Emergency Management files)		
Date	Location	Description of Event
November 23, 1939	North of East Concrete	Three homes destroyed in the center of town, by a land slide that released in three stages, no one was injured.
May 18, 1965	Lower Baker Dam Powerhouse – near Town of Concrete	A large landslide that occurred just east of the Town of Concrete that partially buried the Lower Baker Powerhouse owned and operated by Puget Sound Energy. This slide was so large that the powerhouse was abandoned and a new powerhouse was constructed approximately 200 feet east of the original powerhouse.

Recent Land Movement Events in Skagit County

(Information obtained from Skagit County Department of Emergency Management files)			
Date	Location	Description of Event	
January 24, 1982	Various locations throughout Skagit County	Excessive rainfall caused six (6) mudslides in various areas of Skagit County including: Del Mar Drive on Fidalgo Island; along the South Skagit Highway; Burpee Hill near Concrete; Cascade River Road; Concrete-Sauk Valley Road; State Route 530 south of Rockport.	
January 10, 1983	Near Cruse Road north of Sedro- Woolley	A very large debris flow occurred killing one person and 300 veal calves; a large barn and a mobile home were completely destroyed.	
November 2, 1985	Cascade River Park	A large debris flow occurred on the North side of the Cascade River within the Cascade River Park development killing two persons and destroying two mobile homes.	
January 18, 1990	Burpee Hill – north of Concrete	Additional mudslides occurred in various areas on Burpee Hill.	
February 10, 1990	Mill Addition – Town of Concrete	A mudslide occurred on a steep slope above the Mill Addition Plat within the Town of Concrete that potentially threatened seven families.	
November, 1990	Biz Point area – Fidalgo Island	Heavy rains caused excessive runoff from storm water drainage systems and bank erosion in the Biz Point area	
November 10, 1990	Grandy Creek	Heavy rains caused severe flooding throughout Skagit County and numerous mudslides occurred in the Grandy Creek area causing the Grandy Creek Campground to be evacuated.	
November 25, 1990	Burpee Hill – north of Concrete	Numerous mudslides occurred in various areas on Burpee Hill causing property damage and damage to two homes; damage to a portion of Burpee Hill Road; and damage to Puget Sound Energy's facility.	
December 28, 1990	Salmon Beach – Gibralter Road	A slump of a mid-slope bench area near the shoreline of Similk Bay cause damage to several homes and resulted in the temporary evacuation of a total of 28 homes; two homes were severely damaged and officially posted as uninhabitable by the Skagit County Building Official.	

Recent Land Movement Events in Skagit County

(Information obtained from Skagit County Department of Emergency Management files)			
Date	Location	Description of Event	
July 10, 1991	Big Lake	A debris flow caused by a beaver dam break damaged a portion of West Big Lake Boulevard and a Washington State Fishing Access and boat launch and blocking access to two homes.	
May 5, 1994	Highway 20 east of Anacortes	A large rock slide occurred just east of the City of Anacortes blocking traffic for several days.	
May 3, 1995	Big Lake	A debris flow caused by a beaver dam break damaged a portion of West Big Lake Boulevard and a Washington State Fishing Access and boat launch and blocking access to two homes.	
February 8, 1996	Turner Ranch – 5502 East Sauk Prairie Road	A debris flow damaged a barn and adjacent feed shed and killed 1 bull, 20 cows, and 30 calves.	
January 10, 1997	Lonestar Property - East Concrete	Area residents are concerned that the hill above their homes will slide – occupants of 15 homes in the immediate area were advised to leave. Several residents claim that a slide occurred at this same location in the late 1950's or early 1960's and destroyed three or four homes.	
February 8, 1997	Lonestar Property - East Concrete	A small side occurred knocking a garage from its foundation.	
October 16, 1997	Jura Way – Similk Bay	A small slide occurred affecting one home.	
December 13 -14, 2001	Frank's Place – Town of Concrete	A slide occurred affecting three homes.	
February 22, 2002	Cascade River Park	A mud slide occurred along East Cascade Drive washing out a portion of road and requiring the evacuation of six cabins.	
March 20, 2002	North Beach Area Samish Island	A slide occurred blocking access to three homes.	
January 14, 2003	Hill Ditch and Johnson Road area	A debris flow caused by a beaver dam break damaged a portion of the Hill Ditch Levee and blocked access to three homes	

Recent Land Movement Events in Skagit County

(Information obtained from Skagit County Department of Emergency Management files)			
Date	Location	Description of Event	
February 22, 2003	Colony Creek	A large debris flow caused by a beaver dam break damaged a portion of Wood Road and also damaged the access and utilities serving two residences, and a footbridge. This same debris flow also damaged a private well, pond, and fish ladder along Deer Trails Lane further upstream on Colony Creek.	
January 6-13, 2009	Town of Concrete and State Route 20	A slide destroyed a home in the Town of Concrete, trapping an occupant inside who was later rescued. A slide blocked State Route #20 for 8 days and caused loss of electricity for 7 days to approximately 960 households in the communities of Rockport and Marblemount. Minor slides also reported on Burpee Hill.	
April 8, 2013	Rosario Beach	Rock fall near shoreline. No damage to homes or private property.	

In addition to the above-referenced land movement events, one additional land movement event of significant size occurred in Skagit County during the past that we were unable to obtain specific information on. This event involved a large landslide that occurred east of Marblemount on the south side of the Cascade River in the isolated recreational community of Cascade River Park. This slide occurred in the late 1960's and destroyed several recreational cabins and covered a large number of vacant lots with debris; we were unable to determine if persons were injured or killed as a result of this slide. The slide was serious enough that a large portion of the development was permanently abandoned.

HIGH RISK AREAS:

Areas that have experienced landslides in the past tend to be a high risk area due to the high susceptibility of the landslide to re-occur, especially during periods of wet weather. Some areas within Skagit County are known for re-occurring landslide events during the rainy winter months. Those include our coastal bluffs and steep sided river valleys, generally with slopes that exceed 40%. For example, due to its location at the base of steep slopes, certain portions of the Town of Concrete are especially vulnerable to landslides.



Figure 17 Structure destroyed by landslide, January 2009. The property was later acquired and cleared by utilizing disaster mitigation funds. (DEM, 2009)

Slope failures may occur on slopes as low as 15% but are generally associated with slopes in which the geologic formations consist permeable of sediments overlying low permeability sediments or bedrock (springs or groundwater seepage is commonly evident at the contact between the formations), and/or areas in which slopes are parallel or sub parallel to geologic formation bedding planes, joint systems or fault planes.

Another area of high landslide risk includes slopes in which the base has been exposed to stream incision, stream

bank erosion and/or undercutting by wave action. As the base of stream banks or coastal bluffs erode by stream incision or wave action, the unsupported stream bank or bluff becomes unstable and susceptible to failure. Developments at or near the top of stream banks or coastal bluffs area are at risk of inclusion in the landslide event.

Rock formations located above developments pose another high risk area. Jointed rock formations are subject to ice wedging and weathering resulting in rock dislodgement resulting in rock landslides or rock falls. Rock falls occur year round, are dangerous and destructive, resulting in high risk to any life and/or property within its path. Historic snow avalanche paths are also an area of high risk. Developments within its path of snow avalanche areas are at high risk to life and property.

Alluvial fans are another area of high risk. Alluvial fans are a mass of sediment deposited at a point along a river or stream where there is a decrease in gradient, such as from a mountain to a plain or at the mouth of a canyon. Although the alluvial fan sediment does not pose a high risk to life and property, the presence of an alluvial fan may indicate a highly energetic sediment delivery system. As previously mentioned, steep sided valleys and canyons are common location of landslide failures. Landslides within these canyons often deliver significant amounts of sediments to high gradient streams resulting in mud and debris flows. The debris flows, confined to the stream channel, travel downstream often entraining additional sediment through erosion and scour, increasing in size, density, and energy until the flow reaches the mouth of the canyon or the valley floor. Developments on alluvial fans located near the mouth of canyons and on valley floors adjacent to steep slopes maybe at risk of inundation and destruction by debris flows.

As houses, roads, and developments are built on or near steep slopes and mountainsides, landslide hazards become an increasingly serious threat to life and property. In addition, forest
fires, clear-cutting of trees, and land clearing may result in conditions conducive to destabilization of steep slopes thereby increasing the threat of slides and debris flows.

Landslides cannot be accurately predicted with current technology. Due to population density and desire of people to have a home with a view, an increasing number of structures are built on or near slopes that may be at risk to landslides. Landslides in these areas can take lives, destroy homes and businesses, undermine bridges, affect rail traffic, disrupt fish habitat and oyster beds, interrupt transportation infrastructure, and damage utilities.

The following list is a compilation of comments and suggestions made by various stakeholders and the public regarding possible problems that could result from a land movement event.

In addition to damaging homes, businesses, property, and the environment, a landslide event in Skagit County could potentially result in the following:

- Disrupted and/or damaged transportation routes and systems.
- Damage to underground as well as above-ground utilities.
- Secondary damage may occur due erosion caused by broken water transmission lines.
- Streams may be partially or completely blocked and/or diverted from their normal channels. A very large land movement event could possibly block river channels resulting in the formation of a lake upstream of the blockage and the threat of a sudden release of this trapped water upon failure of the material.

VULNERABILITY ASSESSMENT:

Homes, businesses, schools, hospitals, roads, bridges, transportation facilities and other infrastructure located on or near high risk areas are most vulnerable to the impacts of landslides and debris flows. Local roads, state and federal highways are consistently impacted by landslides and debris flow events during moderate to heavy rain events. Life, property and transportation routes as well as utility infrastructure may be significantly impaired or destroyed by landslide events.

PROBABILITY AND RISK:

Based on historical evidence, there is a **moderate probability** of a large, destructive landslide occurring in Skagit County. Because of the infrequency of landslide events occurring in populated areas of Skagit County, there is a **moderate risk** associated with this hazard during the majority of the year **with the risk increasing during the winter and early spring**.

CONCLUSION:

Washington is one of seven states listed by the Federal Emergency Management Agency as being especially vulnerable to severe land stability problems. As with all other hazards, people

need to become familiar with their environment. Slopes where landslides have occurred in the past are likely to experience them in the future.

With an increasing population desiring development of rural property, there is increasing risk of landslides in residential areas. Buildings and developments on or near steep slopes and bluffs could be at risk, particularly during heavy rains or a prolonged precipitation.

The Shannon and Wilson study in Seattle found that 88% of the slides that occurred within the City of Seattle occurred within a potential slide area or along steep slopes. This study also found that only about 1% of the land area of the region is actually vulnerable to slides, 84% of the slides recorded had human-related causes; thus indicating the willingness of people to ignore signs of potential danger in order to possess the most desirable view property.

Landslides are a widespread risk and are one of the most studied, but least represented natural hazards. Although the cause of many landslides cannot be mitigated, geologic investigations, good engineering practices, and effective enforcement of land-use management regulations can reduce the risk of loss due to landslides. By studying landslides and associated geologic conditions conducive to slope failure, future development can be planned and located in safe areas. In addition, the public may be educated to prevent development in unstable areas. Applying established ordinances where geological hazards have been identified will prevent some landslide losses. Careful maintenance of vegetation on slopes, prevention of erosion, and engineered drainage of slopes and mitigation, using qualified professionals, is necessary to protect the public from these critical areas.

The United States Geological Survey suggests the following steps to better understand and prepare for landslide risk in your area (Landslide Facts, 2014):

- Avoid building near steep slopes, close to mountain edges, near drainage ways, or natural erosion valleys.
- Contact <u>local officials</u>, <u>state geological surveys</u> or <u>departments of natural resources</u>, and university departments of geology. Landslides occur where they have before, and in identifiable hazard locations. Ask for information on landslides in your area, specific information on areas vulnerable to landslides, and request a professional referral for a very detailed site analysis of your property, and corrective measures you can take, if necessary.
- Watch the patterns of storm-water drainage near your home, and note the places where runoff water converges, increasing flow in channels. These are areas to avoid during a storm.
- Learn about the emergency-response and evacuation plans for your area. Develop your own emergency plan for your family or business.
- Minimize home hazards:

- Have flexible pipe fittings installed to avoid gas or water leaks, as flexible fittings are more resistant to breakage (only gas company or professionals should install gas fittings).
- Plant ground cover on slopes and build engineered retaining walls.
- In mudflow areas, build channels or deflection walls to direct the flow around buildings. Remember: If you build walls to divert debris flow and the flow lands on a neighbor's property, you may be liable for damages.
- Design and construction of walls and channels strong enough to resist or divert landslides is highly specialized work, best done by qualified professionals.

For additional landslide information please visit:

Skagit County Department of Emergency Management: http://inside.skagit.local/Departments/EmergencyManagement/main.htm

Skagit County Planning and Development Services: http://www.skagitcounty.net/Departments/PlanningAndPermit/main.htm

Washington State Department of Natural Resources: http://www.dnr.wa.gov/Publications/ger_fs1_landslides.pdf

State of Washington Department of Ecology:

http://www.ecy.wa.gov/programs/sea/landslides/maps/maps.html

Washington State Department of Emergency Management: http://www.emd.wa.gov/hazards/haz_landslides.shtml

Ready.gov (FEMA): http://www.ready.gov/landslides-debris-flow

United States Geological Survey: http://www.usgs.gov/natural hazards/





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SEVERE LOCAL STORM

DEFINITIONS:

(National Weather Service Glossary, 2009)

Blizzard – sustained wind or frequent gusts to 35 mph or greater and considerable falling and /or blowing snow that frequently reduces visibility to less than a quarter-mile. Sustained conditions for 3 hours or longer.

Coastal Flooding - Flooding in coastal areas caused by storm surge, astronomical high tides, or a combination of them.



Figure 1 Thunder cloud over Walla Walla. (Mass, 2013)

Dust Storm – Extreme weather characterized by dust filled air created by strong winds over a large area.

El Nino – a major warming of the equatorial waters in the Eastern Pacific Ocean that occur every three to seven years and are characterized by shifts in the "normal" world-wide weather patterns.

Front – a transition zone between two differing air masses. A front is named after the temperature of the advancing air mass, such as a cold front, if cold air is advancing.

Funnel Cloud – a rotating, funnel-shaped cloud that is <u>not</u> in contact with the ground extending downward from a thunderstorm base.

Heavy Snow – accumulations of 4 inches or more of snow in 12 hours or 6 inches or more of snow in 24 hours in non-mountainous areas; accumulations of 8 inches or more of snow in 12 hours **or** 12 inches or more of snow in 24 hours in mountainous areas.

High Wind – sustained wind at greater than 40 miles per hour and/or gusts to greater than 58 miles per hour. Winds not driven by thunderstorm and last longer than an hour or more.

Jet Stream – strong winds concentrated within a narrow horizontal band in the atmosphere between 25,000 and 35,000 feet above the Earth's surface; the jet stream often "steers" fronts and low pressure systems.

La Nina – the phase of the El Nino Southern Oscillation (ENSO) where sea surface temperatures in the Central Equatorial Pacific are cooler than average.

Severe Local Storm – an atmospheric disturbance manifested in strong winds, tornadoes, rain, snow, or other precipitation (hail, sleet, ice), and often accompanied by thunder or

lightning, concentrated over a small local area. Sufficiently intense weather that is a threat to life and/or property, such as heavy rain that may cause flash flooding.

Severe Thunderstorm – a storm that produces hail 1 inch in diameter or larger and/or wind gusts of 58 miles per hour or more.

Storm Surge – the abnormal rise in water level caused by onshore wind and pressure forces.

Surface flooding – localized flooding that typically occurs in urban areas where existing storm water disposal systems are unable to deal with heavy amounts of rainfall and/or snowmelt and thereby cause flooding of streets, parking lots, and low-lying urban areas.

Tidal flooding – localized flooding that can occur in low-lying coastal areas during periods of extreme high tides that occur simultaneously with very low atmospheric pressure and/or high wind events.

Thunderstorm – a local storm usually with gusty winds, heavy rain, and sometimes hail and accompanied by lightning and thunder.

Tornado – a violently rotating column of air attached to a thunderstorm and in contact with the ground.

Waterspout – a violently rotating column of air in contact with a body of water and extending from a cumulonimbus cloud; a tornado over water.

BACKGROUND INFORMATION:

The climate of Washington State (as well as Skagit County) is regulated by two primary factors:

- 1. The strength of the Pacific westerlies, also known as the *jet stream* or the *storm track*.
- 2. The degree to which mountain barriers influence the flow of maritime and continental air masses.

The westerlies affect the weather of Washington State much of the year, growing stronger as autumn progresses, reaching maximum strength in winter, and subsiding again in spring. In summer, the westerlies are usually very weak and are displaced to the north over Alaska and Canada. Rainfall in the summer is infrequent and temperatures across the state are determined by the extent of marine air mass intrusions from the coast. Typical summer rainfall consists of showers and associated thunderstorms – especially over the Cascades and into Eastern Washington. The amount of shower activity is dependent upon the degree to which hot air masses with *monsoon* moisture work their way north from the desert southwest.

The strength, position, and orientation of the westerlies can change from year to year. This is the reason some winters are mild and comparatively dry, while others are cold and wet. The semi-permanent winter low-pressure system in the Gulf of Alaska and the westerlies are also influenced by factors such as El Nino and La Nina. Winter rains can begin early in the autumn of last well into spring depending upon how the Pacific storm track behaves. When the westerlies "sag" south of Washington State, cold, dry wintertime continental air masses can sometimes affect the entire state. It is during the transition period between cold, dry weather patterns and milder, wetter weather patterns when the lowlands of Western Washington experience snow.

Skagit County can experience all types of severe weather except hurricanes, although on occasion, winter windstorms exceed hurricane force winds. While there have not been any documented tornado sightings in Skagit County, there have been five tornado sightings in Snohomish County since 1970. In 1997, there were 14 documented tornado sightings in Washington State. On average, Skagit County experiences less than 10 thunderstorm days each year.

Most storms move into Skagit County from the Pacific Ocean with a southwest to northeast airflow. On occasion however, wind and snow events move into the county from the Frasier River Valley to the north accompanied by cold, arctic air. Windstorms with sustained winds of 50 miles per hour or greater occur with some regularity and are powerful enough to cause significant damage. Most of these storms cause transportation-related problems and damage to utilities. On occasion, homes and other structures are damaged either by high winds or falling trees.

Due to its geographical position between the waters of Puget Sound and the Cascade Range, Skagit County experiences all types of weather events, especially damaging wind and rain events. Furthermore, the Olympic Mountains and the Vancouver Island Range, in addition to local hills and valleys, can generate variable wind patterns and locally accelerated winds. Likewise, the eastern portion of Skagit County can also experience locally accelerated winds due to the narrowing of the river valley and the close proximity to mountain passes. The Cascade Range located to the east, forms a natural barrier to moisture-laden marine air masses resulting in regular rainfall events as these air masses rise in elevation and pass over the mountains.

The Washington State Emergency Management Division lists Skagit County as being highly vulnerable to Meteorological conditions with a reoccurrence rate of 188% possibility of annual reoccurrence and highly vulnerable to meteorological conditions with a 58% chance of occurrence at least once every two years. (Division, 2013)

Recently, there has been much discussion regarding the subject of climate change and the effects the melting of glaciers at the north and south poles <u>and</u> the warming of ocean water may have on costal communities. It is widely accepted that climate change will result in a rise of sea water levels. In October, 2005, The University of Washington Climate Impacts Group published *"CLIMATE CHANGE AND ITS EFFECTS ON PUGET SOUND"* which estimates a possible rise in local sea level of approximately 0.4 meters by 2050 to 2080 as a result of both the warming of ocean waters (which causes thermal expansion) as well as the melting of glaciers, small ice fields, and polar ice sheets. This estimate is supported by research conducted under the sponsorship of the United Nations and published in the <u>Global Environmental Outlook GEO 4</u> <u>environment for development, United Nations Environment Programme</u>, 2007.

There is currently much debate regarding climate change, especially pertaining to the uncertainty of how soon (and to what extent) climate change will adversely affect shoreline communities. While climate change and the subsequent rise in sea level may someday significantly affect Skagit County, the mitigation strategies contained within this plan do not take future climate change (and its effects) into account.

HISTORY:

While there have been many severe storms that have impacted Skagit County in the past, a few of the most notable storms to affect Skagit County were the 1916 Snowstorm, the 1950 Snowstorm, the 1962 Columbus Day Windstorm, the 1990 Arctic Blast Windstorms, the 1993 Inauguration Day Storm, a series of snowstorm and windstorm events in December 1996 and January 1997, and a series of windstorm events in December 2000.



Figure 2 Ice skating on the Skagit River at Conway, 1916. Photo courtesy of Skagit County Historical Museum.

A complete listing of severe storm events is described below.

- February 1916 Snow: Heavy accumulations of snow fell throughout western Washington with accumulations of approximately 4 feet in the western portion of Skagit County. This snow event was followed by very cold temperatures causing many lakes and even the Skagit River to freeze over.
- January 1950 Snow: Heavy accumulations of snow fell throughout western Washington with accumulations of 3 to 4 feet in the western portion of Skagit County with deeper drifts.
- October 1962 Wind: Columbus Day Windstorm affected areas from northern California to British Columbia and is the windstorm all others since are compared to. Recorded wind gusts between 88 and 150 miles per hour were recorded in Washington State; damage in Skagit County ranged from downed trees, broken windows to collapsed barns.
- February 1979 Wind: A series of windstorms caused damage throughout western Washington including Skagit County and in some areas caused more damage than the Columbus Day Windstorm due to sustained winds of 25 to 30 miles per hour over a long period of time.
- December 1990 Wind: A series of arctic-air windstorms caused damage throughout western Washington including \$12,013,257 in public and private damage in Skagit County (FEMA Disaster #896). Thousands of trees were downed in the western portion of Skagit County, mostly on Samish Island, Guemes Island, and in the Anacortes/Fidalgo Island area and large areas of the county were without electrical power for several days. Several homes and vehicles were damaged due to downed trees and 1 person was killed when a tree hit the vehicle the victim was driving.
- January 1993 Wind: Inauguration Day Windstorm caused damage throughout western Washington including Skagit County. While Skagit County received less damage

than other areas, large areas of the county were without electrical power for several days.

- December 1996 & January 1997 Snow & Wind: Heavy accumulations of snow fell throughout Skagit County over several days with depths of 2-3 feet in the western portion and depths of 4-5 feet in the eastern portions of the county. This snow event was followed several days later by high winds and rain. Many roads were impassable and road crews worked 24-hour days to plow snow. Damage to barns, agricultural buildings, and commercial greenhouses exceeded 3 million dollars and many residential carports, unattached garages, and storage buildings were destroyed. Marinas in Skagit County received over 1.7 million dollars in damage to docks and roofs and 30 private boats were damaged due to collapsed marina roof structures. The total amount of public and private damage in Skagit County was \$6,245,145 as a result of these events (FEMA Disaster #1159).
- December 2000 Wind: A series of windstorms with gusts between 60 and 90 miles per hour in the western portion of the county downing trees and power lines and damaging numerous agricultural buildings and barns.
- February 2006 Wind: A severe low pressure weather event accompanied by high winds and coinciding with high tide created a 100-year tidal surge event within the Town of La Conner and the Swinomish Indian Tribal Community. This event caused damage to homes and other structures adjacent to shorelines on Fidalgo Island and caused a break in the dike along Sullivan Slough in La Conner (FEMA Disaster #1682).
- November 2006 Wind: A sustained windstorm with high peak gusts caused significant blow-down of large trees on southeast Fidalgo Island, in the vicinity of the Swinomish Indian Reservation, blocking roads and access within the Reservation for 2-3 days and downing power lines. The combination of loss of power and blocked roads for an extended period forced some temporary relocation of residents to emergency shelters.
- December 2007 Wind and Snow: A series of windstorms in the western portion of the county caused damage to the Skagit County dock at Sinclair Island. Warming temperatures caused an avalanche in eastern Skagit County damaging a Skagit County bridge on the Cascade River Road (FEMA Disaster #1734).
- January 2011 Flooding and Landslides: A weather system deposited snow and rain over much of Western Washington. Water and slides impacted roadways in the eastern portion of Skagit County as well as the Samish Flood Plain. Total damage to public assets \$879,183, (FEMA Disaster # 1963).

HAZARD IDENTIFICATION:

The effects upon Skagit County resulting from a severe storm such as a thunderstorm, tornado, windstorm, ice storm, or snowstorm are likely to be similar in nature. Downed trees and power lines, the interruption of transportation routes, and damage to homes, businesses, and governmental buildings are all possible. Fatalities as a result of such events are uncommon in Skagit County, but they can occur.

Electrical power outages are common with almost all types of severe storm events. Possible problems may be loss of heat, refrigeration, light, cooking, computers, cash registers, gasoline pumps, bank machines and communications. In addition, persons could be electrocuted by coming in contact with downed electrical lines.

High Wind: Possible hazards or problems may be loss of power and phone lines, danger of fire and electrocution. Toppled trees, broken limbs, collapsed barns, damage to residential and commercial structures as well as damage to cars, trucks and trailers. Shipping and water vessel transportation may be stopped due to high waves; ferry transportation to Guemes Island may also be stopped. Extremely violent wind storms could cause damage to large areas of the industrial forest resulting in economic losses.

Lightning: Hazard areas may be sports venues and complexes such as soccer fields, football fields, baseball fields and golf courses that are without adequate shelter for participants and spectators. Lighting may cause electrical transformers to short resulting in power outages

and/or fires in trees located near power lines. Boaters and those persons working outdoors are also vulnerable to lightning strikes. Lighten strikes can also ignite forest fires during dry summer months.

Snow and/or Ice: The majority of problems associated with heavy accumulations of snow and/or ice will most likely be transportation related. Vehicle travel on roadways may be stopped or severely limited; essential government services and businesses may be closed because employees are unable to drive to work. Special transportation may need to be provided in order to insure that hospital and emergency services personnel can report to work. There is a danger to the traveling public who may become trapped in their vehicles for an



Figure 3 Mudslide closes road after heavy rains. (Light, 2009)

extended period of time. The weight of heavy accumulations of snow and/or ice may cause roofs to collapse and trees to fall causing damage to power lines.

Storm Surge / Tidal flooding: This type of flooding is usually very localized and can occur in low-lying coastal areas during periods of extreme high tides that occur simultaneously with very low atmospheric pressure and/or high wind events. Surge and tidal flood events have been increasing in frequency and are expected to continue to increase in frequency and height due to sea level rise and global warming effects.

Surface flooding: Like tidal flooding, surface flooding is localized and typically occurs in urban areas where existing storm water disposal systems are unable to deal with heavy amounts of rainfall and/or snowmelt and thereby cause flooding of streets, parking lots, and low-lying urban areas. While surface flooding is a minor problem in Skagit County, the potential for surface flooding will increase as more natural watershed areas are converted to business and housing developments.

For information regarding river flooding, please refer to the FLOOD portion of this Section.

The following list is a compilation of comments and suggestions made by various stakeholders and the public regarding possible problems that could result from a severe storm.

In addition to damaging homes, businesses, property, and the environment, a severe storm event in Skagit County could potentially result in the following:

- Disrupted and/or damaged transportation routes and systems.
- Disruption of service and/or damage to above-ground utilities.
- Emergency response agencies may be delayed in responding to emergency incidents due to downed trees and utility power poles and lines or unusually heavy accumulations of storm water, snow, or ice.
- Unusually heavy rainfall may cause surface flooding in low lying areas.
- Unusually heavy rainfall could cause landslides and/or debris flows on steep or unstable slopes.

VULNERABILITY ASSESSMENT:

Severe storms, especially severe wind storms are common in Skagit County during the fall and winter months and all areas of Skagit County are vulnerable to the impacts of severe storms.

Some storms are more severe and require assistance from a variety of governmental agencies or emergency responders such as: public works, fire service, emergency medical services, search and rescue, and law enforcement in addition to utility company personnel. While local electrical power outages frequently occur during severe storm events, the loss of power is usually only an inconvenience causing minor consequences unless the outage continues for an extended period of time or during a period of extremely cold temperature. Extended electrical power outages occurring during winter months may require the opening of emergency shelters, particularly in cold weather.

Surface flooding remains a threat although three official storm water plans have been completed: Bayview Ridge, Big Lake, and South Fidalgo, and identified projects from the plans are currently being implemented.

Livestock can be vulnerable to all types of winter storms although most large dairy herds have at least limited shelter available. A severe snow event followed shortly thereafter by extremely cold temperatures can have an adverse affect on wild animals and birds due to a lack of sufficient food, water and shelter.

While all of Skagit County is vulnerable to severe storm events, certain shoreline areas are more vulnerable to occasional tidal flooding that can occur with extremely high tides accompanied by

strong wind events. Historically, these events have occurred during the winter months with winds from the north thereby most affecting low-lying shoreline areas with northerly exposures. The low-lying shoreline areas listed below are especially vulnerable to tidal flooding:

- Portions of the City of Anacortes and other low-lying areas adjoining and adjacent to Burrows Bay, Rosario Strait, Guemes Channel and Fidalgo Bay.
- Portions of the Town of La Conner adjoining and adjacent to Swinomish Channel.
- Portions of the community of Bay View, Samish Island, the community of Edison, and other low-lying areas adjoining and adjacent to Padilla Bay and Bellingham Bay.
- Portions of Fir Island and other low-lying areas adjoining and adjacent to Skagit Bay.

PROBABILITY and RISK:

Based on past events, there is a **High Probability** of a severe storm event occurring in Skagit County. While the probability of such an event is high, there is a **Low to Moderate Risk** associated with this hazard due to the relatively short duration and localized impacts of such events.

CONCLUSION:

Of all natural hazards, severe local storms ... especially severe wind storms are the most likely to affect Skagit County. These storms have the ability to cause considerable destruction and can impact the lives of large numbers of people.

Skagit County experiences nearly every type of weather including wind, rain, drought, snow, fog, extreme heat, hail and thunderstorms. When severe weather events occur, they have the ability to significantly impact Skagit County posing a danger to life and property as well as possible causing economic losses.

Due to the frequency and possible destructive nature of sever storm events, individuals, families, and businesses should be aware of the impacts of a severe local storm and take the necessary actions to prepare themselves, their families, and their businesses <u>before</u> such events occur – not after. Citizens and businesses can prepare for severe storm events just as they plan for floods or earthquakes. To be better prepared for severe storm events, citizens should:

- Have a plan
- Stock extra food, water and other supplies
- Trim trees and limbs away from buildings
- Take advantage of Community Emergency Response Team training
- Purchase and use a NOAA Weather Radio

Continued on next page...

More information regarding Severe Local Storms can be found by visiting:

Skagit County Department of Emergency Management: <u>http://inside.skagit.local/Departments/EmergencyManagement/main.htm</u>

Washington State Department of Emergency Management: <u>http://www.emd.wa.gov/hazards/haz_storms.shtml</u>

My State Emergency Alert Notification System: <u>https://mystateusa.com/alertSignup.aspx?region=1157</u>

National Weather Service: http://www.weather.gov/

National Oceanic and Atmospheric Administration (NOAA): http://www.noaa.gov/

Ready (FEMA): http://www.ready.gov/severe-weather

When the Power goes Out – Food Safety: <u>http://www.emd.wa.gov/preparedness/prep_foodsafety.shtml#Mid</u>

Prepare in a Year: http://www.emd.wa.gov/preparedness/prep_prepare_year.shtml

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TSUNAMI AND SEICHE

DEFINITIONS:

Seiche – The action of a series of standing waves (sloshing action) of an enclosed body or partially enclosed body of water caused by earthquake shaking. Seiche action can affect harbors, bays, lakes, rivers, and canals.

Tsunami – generated by sudden displacements in the sea floor, landslides, or volcanic activity. In the deep ocean, the tsunami wave may only be a few inches high. The tsunami wave may come gently ashore or may increase in height to become a fast moving wall of turbulent water several meters high. (Tsunami, 2014)

BACKGROUND INFORMATION:

Tsunami

The Pacific Coast of Washington is at risk from tsunamis. These destructive waves can be caused by coastal or submarine landslides or volcanism, but they are most commonly caused by large submarine earthquakes. Tsunamis are generated when these geologic events cause large, rapid movements in the sea floor that displace the water column above. That swift change creates a series of high-energy waves that radiate outward like pond ripples. Offshore tsunamis would strike the adjacent shorelines within minutes and also cross the ocean at speeds as great as 600 miles per hour to strike distant shores. Tsunami waves can continue for hours. The first wave can be followed by others a few minutes or a few hours later, and the later waves are commonly larger.



Figure 21 Graphic of an earthquake generated Tsunami. (MAPS & DRAWINGS, 2014)

An Alaskan earthquake in 1964 generated a tsunami Tsunami. (MAPS & DRAWINGS, 2014) that was the most recent significant tsunami to reach

the Washington coast, but geologic investigations indicate that large tsunamis have struck our coast many times in the last few thousand years.

On the Pacific Coast, from southern British Columbia to northern California, people and property are at risk both from distantly and locally generated tsunamis. Recent studies indicate that about a dozen very large earthquakes (with magnitudes of 8 or more) have occurred in the Cascadia Subduction Zone. Computer models indicate that tsunamis waves generated by an

earthquake of this magnitude occurring within the Cascadia Subduction Zone might range from 5 to 55 feet in height and could affect the entire coastal region of Washington State.

Seiche

In the majority of instances, earthquake-induced seiches do not occur close to the epicenter of an earthquake, but hundreds of miles away. This is due to the fact that earthquake shockwaves close to the epicenter consist of high-frequency vibrations, while those at much greater distances are of lower frequency. These low frequency vibrations can enhance the rhythmic movement in a body of water; the largest seiches develop when the period of ground shaking matches the frequency of oscillation of the body of water.



(PTWC, 2014)

HISTORY:

Tsunami

There is no written historical record of a damaging tsunami occurring in or affecting Skagit County. Geologic evidence of tsunamis has been found at Cultus Bay on Whidbey Island and at West Point in Seattle. Researchers believe these tsunami deposits are evidence of earthquake activity along the Seattle Fault or other shallow crustal faults located in the Puget Sound area.

While tsunamis can occur anywhere in the world, they occur more frequently in the Pacific Ocean. Areas that have recently been affected by Pacific Ocean tsunamis are:

Date	Location	Loss of Life
9/29/2009	South Pacific (Samoa, American Samoa and Tonga)	192
2/27/10	Chile	124
3/11/11	Japan	15,885 deceased
		2,623 missing
		(Damage Situation and Police Counter Measures, 2014)
2/6/13	Solomons	9
4/1/14	Chile	7

(List of Tsunamis, 2014)

2011, Pacific Ocean; Japan

On March 11, 2011 a magnitude 9.0 earthquake off of Japan generated a tsunami that hit the Honshu coast 20 minutes later. The damages and loss of life from this event are second only to the 2004 Sumatra tsunami. The tsunami also spread across the Pacific causing millions of dollars in damages in Hawaii, California and Chili. In the aftermath, an area of great concern was the damaged Fukushima Nuclear Power Plant that resulted in a reactor meltdown and radiation release. (Japan Tsunami Event 11 March 2011, 2014)



Figure 22 Water pouring over seawall, Japan 2011 (THAN, 2012)



Figure 23 Tsunami ravaged Sumatra 2004. (TSUNAMI, 2010)

The most damaging tsunami on record occurred in the Indian Ocean in 2004. A summary of that event, as well as other recent tsunami events are listed below.

2004, Indian Ocean; Sumatra

On December 26, 2004, a massive earthquake measuring over 9.0 (Richter) occurred under the Indian Ocean floor just of the coast of the Indonesian island of Sumatra. Violent movement of the Earth's tectonic plates in this area displaced an enormous amount of water, sending powerful tsunami waves in every direction. Within hours, tsunami waves radiating from the earthquake's epicenter slammed into the coastline of 12 Indian Ocean countries with wave heights reaching up to 50 feet. As many at 250,000 persons were either killed or listed as missing and presumed dead. As many as 1,125,000 people were displaced by the earthquake and subsequent tsunami. The economic losses exceed \$10 billion.

1998, Pacific Ocean; New Guinea

On July 17, 1998, an earthquake measuring 7.1 (Richter) occurred about 15 miles off the coast of New Guinea in the southwestern Pacific Ocean. While the magnitude of the quake was not large enough to create the tsunami directly, it is believed the earthquake generated an undersea landslide, which in turn caused the tsunami that generated waves reaching 40 feet killing an estimated 2,200 people.

1976, Pacific Ocean; Philippines

On August 16, 1976, an earthquake measuring approximately 7.6 (Richter) occurred in the Moro Gulf near Philippine island of Mindanao. While the earthquake caused widespread



Figure 24. The Great Alaskan Earthquake, a 9.2 magnitude earthquake that triggered Tsunamis and damages in Alaska, British Columbia and Washington State. 1964 (NOAA, 2006)

damage, its effect paled in comparison to the massive tsunami it helped create that devastated 700 kilometers of coastline and killed over 5,000 people.

1964, Pacific Ocean; West Coast of North America and Hawaii

On March 28, 1964, the Alaska Earthquake occurred in Prince William Sound and measured 9.2 (Richter). This earthquake generated multiple tsunamis that were recorded throughout the Pacific. The most disastrous tsunami to hit the west coast of the contiguous United States and British Columbia, Canada was from this earthquake. A wave height of approximately 200 feet was recorded in Valdez Inlet (the wave height at Ocean Shores, Washington was approximately 10 feet) and a total of 123 people were killed as a result of the tsunami in Alaska, British Columbia, Oregon, and California. While Washington received minor damage as a result of this tsunami, damages totaled \$84 million in Alaska, \$10 million in British Columbia, \$700,000 in Oregon, and \$10 million in California.

1960, Pacific Ocean; Chile and other Pacific Nations On May 22 1960, the biggest earthquake ever recorded at the time occurred just of the coast of Chile, South America. The earthquake measured 9.5 (Richter) with swarms of aftershock earthquakes that measured as large 8.0 (Richter). The earthquakes triggered the creation of a tsunami, which was responsible for most of the ensuing devastation and death.

The tsunami, together with the coastal subsidence and flooding, caused tremendous damage along the Chile coast, where about 2,000 people died. The waves spread outwards across the Pacific and fifteen (15) hours after the earthquake, tsunami waves flooded Hilo, on the island of Hawaii, where they built up to thirty (30) feet in height and caused 61 deaths along the waterfront. Seven hours later, the waves flooded the coastline of Japan where waves at least ten (10) feet in height caused 200 deaths. Tsunami waves also caused damage in the Marquesas, Samoa, and New Zealand.

Seiche

Puget Sound has experienced seiches at various times in the past. In 1891, an earthquake near Port Angeles caused an 8-foot seiche in Lake Washington. Seiches generated by the 1949 Queen Charlotte Islands earthquake were reported on Lake Union and Lake Washington. The 1964 Alaska Earthquake created seiches on 14 inland bodies of water in Washington State. More recently, a 7.9 (Richter) magnitude earthquake that occurred on November 3, 2002 near Denali National Park in Alaska created minor seiche action on Lake Union in Seattle causing minor damage to several houseboat dock moorings.

HAZARD IDENTIFICATION:

Although there is not a written record of a tsunami affecting Skagit County, scientific studies conclude that tsunami inundation resulting from a large-magnitude Cascadia Subduction Zone earthquake does pose a hazard to some areas of Skagit County.

The first warning sign of a coming tsunami generated from the Cascadia Subduction Zone may be a large magnitude 8 (Richter) mega-thrust earthquake with ground shaking possibly lasting as long as 3 minutes. An earthquake of this magnitude



Figure 25 Subduction zone similar to the Cascade Subduction Zone off the Washington coast. (MAPS & DRAWINGS, 2014)

would present all of the typical problems associated with a large earthquake but these problems could be compounded in low-lying shoreline areas of Skagit County due to tsunami and/or seiche action.

Studies indicate that about a dozen very large earthquakes with magnitudes of 8 (Richter) or more have previously occurred in the Cascadia Subduction Zone off the coast of Washington. Computer models indicate that tsunami waves from such an event could be up to 30 feet in height and could affect the entire coast of Washington. Such a tsunami would most likely impact the Pacific coastal areas of Washington but inlets like the Strait of Juan de Fuca, could also be impacted.

If a tsunami were to strike the coast of Washington and Vancouver Island in such a way that a portion of the tsunami directly enters the Strait of Juan de Fuca, a large tsunami wave could travel easterly thereby directly striking the west shore of Whidbey Island (Island County) and would most likely also impact the west shore of Fidalgo Island portions of the City of Anacortes, and other low-lying shoreline areas within Skagit County.

In addition to the direct impact of the tsunami, such an event could produce extensive seiche action of nearby waters resulting in additional damage to nearby shoreline areas not directly impacted by the tsunami.

The *Tsunami Hazard Map of the Anacortes-Whidbey Island Area, Washington* was produced in January, 2005, by the Washington State Department of Natural Resources, Division of Geology and Earth Resources in cooperation with the Washington State Military Department, Emergency Management Division. This map is the result of an extensive computer modeling study conducted by the Center for the Tsunami Inundation Mapping Efforts (TIME) at the National Oceanic and Atmospheric Administration (NOAA) Pacific Marine Environmental Laboratory in Seattle, Washington.

The **Tsunami Hazard Map of the Anacortes-Whidbey Island Area, Washington** is considered a benchmark document and was used to develop both the hazard identification and vulnerability assessment sections of this document.

The *Tsunami Hazard Map of the Anacortes-*Whidbey *Island Area, Washington* map can be found online at: <u>Washington State Department of Natural Resources</u>

According to the above-referenced study, a tsunami induced by a Cascadia Subduction Zone earthquake <u>could</u> generate waves of sufficient height to inundate various shoreline and adjacent low-lying areas of Skagit County with water up to 2 meters in depth. Certain isolated shoreline areas could receive water greater than 2 meters in depth.

Areas with possible inundation depths of 2 meters or less:

- Bay View
- Cypress Island Strawberry Bay and Secret Harbor
- Dewey Beach
- Easterly shoreline of Guemes Island
- Edison
- Fidalgo Bay
- Fir Island
- Guemes Channel

- March Point
- Padilla Bay
- Samish Bay
- Samish Flats north of Joe Leary Slough
- Samish Island Camp Kirby & Blue Heron Beach
- Similk Bay
- Snee-oosh Beach
- Swinomish Channel
- Western shoreline of Fidalgo Island

Areas with possible inundation depths greater than 2 meters:

- Alexander Beach
- Allen Island
- Biz Point
- Bowman's Bay
- Burrows Island
- Eastern shoreline of Fidalgo Bay near Anacortes Marina

- Fidalgo Head and Washington Park
- Rosario Beach
- Skyline
- Southern shoreline of Padilla Bay
- West Beach, Guemes Island

NOTE: The following excerpt is included in the results comments of the study ...

" ... Large areas of inundation occur in areas of low topography surrounding Samish Bay, Padilla Bay and the Swinomish Channel. Though not part of the modeling study, inundation also occurs within the vicinity of Fir Island. These areas are protected by salt-water dikes that were not resolved in the grid used for the modeling, but the height of the dikes suggest they would be overtopped by the model tsunami and so inundation shown there is probably important ... " (Tsunami Hazard Map of the Anacortes–Whidbey Island Area, Washington:Modeled Tsunami Inundation from a Cascadia Subduction Zone Earthquake, 2005)

VULNERABILITY ASSESSMENT:

Tsunamis generated either at a distance or by a local subduction or crustal zone (shallow) earthquake can affect the Pacific coastline and to a lesser extent, the inland waters on the Strait of Juan de Fuca.

Within Skagit County, those areas listed on the preceding page have the greatest vulnerability to possible tsunami and seiche events. In addition, those properties immediately adjacent to the many lakes within Skagit County could also be vulnerable to seiche action.

When considering tsunami hazard vulnerability, it should be noted that local tides will have a strong influence on the magnitude of a tsunami. A tsunami or seiche event occurring at high tide will be more damaging than an event occurring at low tide. While the study did not take into consideration the salt-water dikes in many areas along local shorelines, it was noted that they would likely be overtopped.

In addition to the tremendous hydraulic force of the tsunami waves themselves, floating debris carried by a tsunami can endanger human lives and damage structures. Ships moored at piers and in harbors may be swamped and sunk or left battered and stranded high on the shore. Breakwaters and piers could collapse due to the sheer impact of the waves or because of severe scouring actions that sweep away their foundation materials.

Within Skagit County, government-owned infrastructure owned by the Port of Anacortes and the Port of Skagit County as well as the Washington State Department of Transportation Anacortes Ferry Terminal may be vulnerable to tsunami. In addition, the numerous marina facilities as well as the downtown commercial and industrial/manufacturing areas of the City of Anacortes and the Town of La Conner could be vulnerable to tsunami or severe seiche action.

A tsunami or severe seiche action would most likely cause damage to agricultural crops and washing or erosion of farm ground located near shoreline areas throughout the Skagit Delta, especially in those areas near Samish Bay, Padilla Bay, and Skagit Bay.

PROBABILITY AND RISK:

Considering: there have been no recorded damaging tsunami or seiche events within Skagit County; the primary cause of a damaging tsunami impacting Skagit County is from a large magnitude Cascadia Subduction Zone earthquake; that such events have a historical frequency of occurrence rate averaging between 400 and 600 years; that if such an earthquake were to occur, the Center for the Tsunami Inundation Mapping Efforts has identified only a few areas in Skagit County that could receive possible inundation depths greater than 2 meters there is a **low probability** of a tsunami or seiche event impacting Skagit County and therefore, there is a **low risk** to persons and/or property within Skagit County due to tsunami and/or seiche events.

CONCLUSION:

Should a tsunami or seiche event impact Skagit County, shoreline and nearby low-lying areas would be most seriously impacted. Although a tsunami cannot be prevented, the impact of a tsunami can be mitigated through preparedness, timely warnings, and effective response.

For tsunamis generated by local events such as a Cascadia Subduction Zone event, the time of arrival could be less than two hours. The shaking of an earthquake may be the only warning residents have of an impending tsunami. For tsunamis generated at a distance, local communities should be able to take preventive action to evacuate persons if warning is received early enough (two to five hours) prior to the arrival of the tsunami.

Even though there is a low probability of a tsunami or seiche event impacting Skagit County and a low risk to persons and/or property within Skagit County due to tsunami and/or seiche events, there are a few actions local government could take to help prevent loss of life should such an event occur. These actions include:

- 1. The establishment and maintenance of a comprehensive tsunami public educational program to keep the public informed of the danger and of steps to be taken for personal protection.
- 2. The placement of tsunami hazard informational signs in parks and other public areas that have been identified as being vulnerable to tsunami inundation to alert visitors of the hazard and provide information as to what actions they should take to avoid tsunami. In some areas, it may be useful to identify and sign tsunami evacuation routes.

Additional Tsunami information can be found by visiting:

Skagit County Department of Emergency Management: http://www.skagitcounty.net/Departments/EmergencyManagement/main.htm

Washington State Department of Natural Resources: http://www.dnr.wa.gov/ResearchScience/Topics/GeologicHazardsMapping/Pages/ geologic hazards.aspx

Washington State Department of Emergency Management: http://www.emd.wa.gov/hazards/haz_tsunami.shtml

My State Emergency Alert Notification System: https://mystateusa.com/alertSignup.aspx?region=1157

NOAA Pacific Tsunami Warning Center: <u>http://ptwc.weather.gov/</u>

USGS Coastal and Marine Geology Program: <u>http://marine.usgs.gov/</u>

Ready.gov (FEMA): <u>http://www.ready.gov/tsunamis</u>

International Tsunami Information Center: <u>http://itic.ioc-unesco.org/index.php</u>









VOLCANIC EVENT

DEFINITIONS:

Composite Volcano – typically steep-sided, symmetrical cones of large dimension built of alternating layers of lava flows, volcanic ash and tephra. Typical features include a crater at the summit, which contains a central vent or a clustered group of vents connected to a conduit system through which magma from a reservoir deep in the Earth's crust rises to the surface; sometimes called stratovolcanoes.

Debris Flow – fast-moving slurry of rock, mud, and water that looks and behaves like flowing wet concrete; similar to but coarser and less cohesive than a mudflow.

Lahar – an Indonesian word describing mudflows and debris flows that originate from the slope of a volcano; pyroclastic flows can generate lahars by rapidly melting snow and ice.

Lava – molten rock or magma that erupts, or oozes onto the Earth's surface.

Lava Dome – a mound of hardened lava that forms when viscous lava is erupted slowly and plies up over the vent rather than moving away as a lava flow.

Lava Flow – streams of molten rock or magma that erupt relatively non-explosively from a volcano and move slowly downslope.

Magma – molten rock located below the surface of the Earth.

Mudflow – a fast-moving slurry of rock, mud, and water that looks and behaves like flowing wet concrete; similar to but less coarse and more cohesive than a debris flow.

Pyroclastic Flow – a hot, fast-moving avalanche of ash, rock fragments and gas that moves down the sides of a volcano during explosive eruptions or when the steep edge of a dome breaks apart and collapses.

Tephra – large fragments of rock and natural glass that is blasted from a volcano during a violent eruption and then falls to Earth.

USGS – United States Geological Survey

Volcanic Ash – small fragments of rock and natural glass that is blasted from a volcano during a violent eruption and then falls to Earth. During large events, volcanic ash can travel hundreds of miles.

Volcano – a vent in the earth's crust through which magma (molten rock), rock fragments, gases, and ashes are ejected from the earth's interior. A volcanic mountain is created over time by the accumulation of these erupted products on the earth's surface.



(Volcano Hazards Program, 2013)

BACKGROUND INFORMATION:

The Cascade Range extends more than 1,000 miles forming an arc-shaped band extending from Southern British Columbia to Northern California lying roughly parallel to the Pacific coastline and includes 14 major volcanic centers. The Cascade Range is made up of a band of thousands of very small, short-lived volcanoes that have built a platform of lava and volcanic debris. Rising above this volcanic platform are a few strikingly large volcanoes that dominate the landscape. The Cascades volcanoes define the Pacific Northwest section of the "Ring of Fire", a fiery array of volcanoes that rim the Pacific Ocean.

Many of these volcanoes have erupted in the recent past and will most likely be active again in the future. Given an average rate of two eruptions per century during the past 12,000 years, these disasters are not part of our everyday experience.

Skagit County's Eastern boundary follows the crest of the Cascade Range. While there are no volcanic peaks within Skagit County, Mount Baker lies just to the North in Whatcom County and Glacier Peak lies just to the South in Snohomish County.

Geologic evidence indicates that both Mount Baker and Glacier Peak have erupted in the past and will no doubt erupt again in the foreseeable future. Due to the topography of the region and the location of drainage basins and river systems, eruption events on either Mount Baker or Glacier Peak resulting in lahar's, pyroclastic flows, tephra or ash fall, and lava flows could severely impact portions of Skagit County.

Mount Baker

Mount Baker is an ice-clad stratovolcano located just North of Skagit County in the North Cascades. USGS research in the last decade shows Mount Baker to be one of the youngest volcanoes in the Cascade Range. At 10,781 feet it is the third highest volcano in Washington State. (Volcano Hazards Program, Mt Baker, 2013) After Mount Rainier, Mount Baker is the most heavily glaciated of the Cascade volcanoes: the volume of snow and ice on Mount Baker (about 0.43 cubic miles) is greater than that of all the other Cascades volcanoes (except Rainier) combined. Isolated ridges of



Figure 26 Mount Baker (SCURLOCK, 2002-2014)

lava and hydrothermally altered rock, especially in the area of Sherman Crater, are exposed between glaciers on the upper flanks of the volcano; the lower flanks are steep and heavily vegetated. The volcano rests on a foundation of non-volcanic rocks in a region that is largely non-volcanic in origin.

Glacier Peak



Figure 27 Glacier Peak from the Northeast (SCURLOCK, GLACIER PEAK, 2007)

Glacier Peak is a small stratovolcano and is the most remote of the five active volcanoes in Washington State. At 10,541 feet elevation, it is, next to Mount St Helens, the shortest of the major Washington volcanoes. Glacier Peak is not prominently visible from any major population center, and so its hazards tend to be over-looked. Erupting more than 6 times, this volcano has produced some of the largest and most explosive eruptions in the continuous United States since the last ice age. (Volcano Hazards Program, Glacier Peak, 2013)

HISTORY:

Eruptions in the Cascades have occurred at an average rate of 1-2 per century during the past 4,000 years, and future eruptions are certain. Seven volcanoes in the Cascades have erupted within the past 225 years. Four of those eruptions would have caused considerable property

damage and loss of life if they had occurred today without warning – the next eruption in the Cascades could affect hundreds of thousands of people.

The most recent volcanic eruption events within the Cascade Range occurred at Mount St. Helens in Washington (1980-1986) and at Lassen Peak in California (1914-1917).



Figure 28 Eruption History of Mt Baker. (Mt Baker - Living with an Active Volcano, 2005)

Mount Baker

Geologic evidence in the Mount Baker area reveals a flank collapse near the summit on the West flank of the mountain that transformed into a lahar that is estimated to have been approximately 300 feet deep in the upper reaches of the Middle Fork of the Nooksack River and could have been up to 25 feet deep 30 miles downstream and may have reached Bellingham Bay. A huge hydrovolcanic (water mixed with magma) explosion occurred near the site of present day Sherman Crater, triggering a second collapse of the flank just East of the Roman Wall. This collapse also became a lahar that spilled into tributaries of the Baker River. Finally, an eruption cloud deposited several inches of ash as far as 20 miles downwind to the northeast. Geologic evidence shows lahars large enough to reach Baker Lake have occurred at various times in the past.

Historical activity at Mount Baker includes several explosions during the mid-19th century, which were witnessed from the Bellingham area. Sherman Crater (located just South of the summit) probably originated with a large hydrovolcanic explosion. In 1843, explorers reported a widespread layer of newly fallen rock fragments and several rivers south of the volcano were clogged with ash. A short time later, two collapses of the East side of Sherman Crater produced two lahars, the first and larger of which flowed into the natural Baker Lake, raising its water level at least 10 feet.

In 1975, increased fumarolic activity in the Sherman Crater area caused concern that an eruption might be imminent. Additional monitoring equipment was installed and several geophysical surveys were conducted to try to detect the movement of magma. The level of the

present day Baker Lake reservoir (located to the East and south of the mountain) was lowered and people were restricted from the area due to concerns that an eruption-induced debris

avalanche or debris flow might enter Baker Lake and displace enough water to either cause a wave to overtop the Upper Baker Dam or cause complete failure of the dam. However, few anomalies other than the increased heat flow were recorded during the surveys nor were any other precursory activities observed to indicate that magma was moving up into the volcano. This volcanic activity gradually declined over the next two years but stabilized at a higher level than before 1975. Several small lahars formed from material ejected onto the surrounding glaciers and acidic water was discharged into Baker Lake for many months.



Figure 29 Eruption History of Glacier Peak (Glacier Peak - History and Hazards of a Cascade Volcano, 2005)

Glacier Peak

Unlike Mount Baker, Glacier Peak is not prominently visible from any major city. Glacier Peak has produced larger and more explosive eruptions in post-glacial time than any other Washington volcano with the exception of Mount St. Helens. During this time period, Glacier Peak has erupted multiple times during at least six separate episodes, most recently about 300 years ago.

Glacier Peak and Mount St. Helens are the only volcanoes in Washington State that have generated large, explosive eruptions in the past 15,000 years. Their violent behavior results from the type of magma they produce which is too viscous to flow easily out of the eruptive vent and must be pushed out under high pressure. As the magma approaches the surface, expanding gas bubbles within the magma burst and break into countless fragments of tephra and ash. The largest of these eruptions occurred about 13,000 years ago and ejected more than five times as much tephra as the May 18, 1980, eruption of Mount St. Helens.

During most of Glacier Peak's eruptive episodes, lava domes have extruded onto the volcano's summit or steep flanks. Parts of these domes collapsed repeatedly to produce pyroclastic flows and ash clouds. The remnants of prehistoric lava domes make up Glacier Peak's main summit as well as its "false summit" known as Disappointment Peak. Pyroclastic flow deposits cover the

valley floors east and west of the volcano. Deposits from ash clouds mantle ridges East of the summit.

There is definite evidence that pyroclastic flows have mixed with melted snow and glacial ice to form lahars that have severely affected river valleys that head on Glacier Peak. Approximately 13,000 years ago, dozens of eruption-generated lahars descended down the White Chuck, Suiattle, and Sauk Rivers, inundating valley floors.

Geologic evidence indicates that lahars flowed down both the North Fork Stillaguamish (then an outlet of the upper Sauk River) and the Skagit River to Puget Sound. These lahars deposited more than seven feet of material as far away as 60 miles from Glacier Peak. The Sauk River's course via the Stillaguamish was abandoned and the Sauk River began to drain only into the Skagit River as it still does today.

HAZARD IDENTIFICATION:

We know from geological evidence that Mount Baker and Glacier Peak have produced numerous volcanic events in the past. Several of these events, if they took place would place Skaqit today, County communities at risk. Volcanic hazards from Mount Baker and Glacier Peak result from a variety of different eruptive phenomena such as lahars, ash fall, tephra fall, and pyroclastic flows.



Figure 30 Diagram of hazards associated with volcanic activity. (CVO Popular Graphics, 2013)
LAHARS

Lahars are the primary threat and present the greatest hazard to Skagit County resulting from volcanic activity at either Mount Baker or Glacier Peak. Lahars, also called volcanic mudflows or debris flows, are slurries of volcanic rock, sediment, and ash mixed with water that rush down stream and river valleys leading away from a volcano. They can travel more than 60 miles downstream, commonly reaching speeds between 20 and 35 miles per hour (the fastest lahars on Mount St. Helens traveled over 70 miles per hour). Lahars may obtain depths of several hundred feet in canyons near their point of origin but spread out over ridges downstream. Close to the volcano, lahars have the power to valleys and low

destroy entire forests and demolish large buildings and bridges. Further downstream, they simply entomb everything in mud. A very large lahar could overtop or destroy a dam.

In addition to damaging or destroying transportation routes, homes, and farmland, lahars can restrict or block river channels, and increase the occurrence and/or severity of flood events for years or decades due to filled in stream channels. In some cases, very large lahars may cause river courses to be significantly altered. Lahars damaged or destroyed 200 homes, 27 bridges, 185 miles of roads, and 15 miles of railways during the 1980 eruption of Mount Helens Lahar (USGS, 2010) St. Helens.



Figure 31 House in the path of a Mount Saint

LAVA FLOWS

Lava flows from Cascade Range volcanoes tend to be small and slow moving due to the viscosity of the magma. Lava flows may issue from the main volcanic vent or from nearby cinder cones formed at or near the base of the mountain. The heat of the lava may start forest fires or grass fires. Flows may bock roads and escape routes.

PYROCLASTIC FLOWS

High-speed avalanches of hot ash, rock fragments, and gas can move down the slopes of volcanoes during an explosive eruption or when the dome breaks apart and collapses. Pyroclastic flows can reach temperatures up to 1,000 degrees Celsius and travel at speeds up to 100 miles per hour and are capable of capable of knocking down and burying everything in their path. The May 18, 1980 eruption of Mount St. Helens generated a lateral pyroclastic blast that destroyed an area of approximately 450 square miles with an estimated initial velocity in excess of 500 miles per hour.

STEAM AND GAS EXPLOSIONS

Explosions of steam and other gases, containing suspended, pulverized fragments of older rocks as well as newly erupted lava bombs or blocks may occur at any time hot magma or other material comes in contact with water, glacial ice, or snow.

TEPHRA AND ASH

Not all volcanic eruptions involve the extrusion of large amount of magma. In some cases (as with Glacier Peak and Mount St. Helens) eruption events may be preceded by an extreme buildup of pressure within the volcano and conclude with such a violent and explosive release of tephra and ash particles into the air. Particles may range in size from microscopic ash to boulders 36 inches in diameter. As the ash falls to Earth, it forms a layer that covers broad areas downwind from the volcano, generally decreasing in thickness and particle size as distance from the source increases. Heavy ashfall can blot out sunlight.

Most injuries and fatalities from tephra occur miles away where ash-sized fallout from the eruption accumulates thickly on roofs and other human-made structures - especially when the ash is wet. On average, a one-inch layer of ash weighs approximately ten pounds per square inch. In addition, ash may clog watercourses, cause electrical short circuits, and make driving hazardous or impossible; aircraft are particularly vulnerable to ash. Because winds and air currents easily carry it, ash deposits usually remain a hazard to all types of machinery and transportation for many months following an eruption.

Ash can clog and/or restrict breathing passages and may cause death; however, a short period of exposure has not been found to be harmful to persons in normal health. When an ash cloud mixes with rain, sulfur dioxide combines with water to form diluted sulfuric acid that may cause minor (but painful) burns to skin, eyes, nose, throat, and mucous membranes. In addition, acid rains may also affect water supplies.

VOLCANIC EARTHQUAKES

Volcanic earthquakes are usually centered within or beneath the volcano and are generally categorized as: **pre-eruption earthquakes** caused by explosions of steam or underground magma movements; **eruption earthquakes** caused by explosions and/or collapse of interior crater walls; **post-eruption earthquakes** caused by magma retreat and interior structural collapse of the volcano.

VOLCANIC LANDSLIDES

Avalanches of glacial ice or rock debris may be set in motion without warning by volcanic explosions, earthquakes, flank collapses, or heat-induced melting snow and ice. These landslides may not become a full-fledged mudflow but can cause considerable damage in valleys and drainages close to the slopes of the mountain.

The following list is a compilation of comments and suggestions made by various stakeholders and the public regarding possible problems that could result from a volcanic event.

In addition to damaging homes, businesses, property, and the environment, a volcanic event in Skagit County could potentially result in the following:

- An event on the southeast slopes of Mount Baker could cause a large debris flow that may enter Baker Lake and cause damage to or overtopping of the Upper Baker Dam. Damage to or overtopping of the Upper Baker Dam could result in damage to or overtopping of the Lower Baker Dam thereby causing severe damage and possible loss of life in the Town of Concrete and nearby low-lying areas.
- A severe lahar event from either Mount Baker of Glacier Peak could cover most of the Skagit River Floodplain resulting in a catastrophic disaster and long-term economic impacts throughout the entire county and possibly the region.
- Glaciers could melt resulting in mudflows and flooding of the Baker River, Sauk River, and Skagit River.
- An ash fall event could cause numerous transportation-related problems and delay first response agencies in responding to emergency situations.



Figure 32 Closure signs for Baker Lake campgrounds circa 1975. (Mt Baker - Living with an Active Volcano, 2005)

VULNERABILITY ASSESSMENT:

The degree of volcanic hazard from the volcanoes of the Cascade Range depends upon the type, size, and origin of the eruption. While the possibility of a large volcanic eruption exists, these types of events are typically separated by several hundred to a few thousand years and it is unlikely that we will see such an event in our lifetimes. Clearly, persons, property, and infrastructure closest to the volcano at the time of the eruption are most vulnerable.

LAHAR

The river valleys and associated floodplains of the Baker River, Skagit River, Sauk River, and Suiattle River (along with their associated tributaries) are all especially vulnerable to the effects of large-scale lahars and associated flooding that will no doubt result from a large lahar.

Lahars traveling down the Baker River drainage could rapidly raise the level of Baker Lake leading to overtopping and/or damaging the Upper Baker Dam thereby leading to possible overtopping and/or damage to the Lower Baker Dam resulting in severe flooding of portions of the Town of Concrete and surrounding upriver areas of the Skagit River floodplain.

As demonstrated during the 1980 Mount St. Helens eruption, the hydraulic power of fastmoving lahars and debris flows is astonishing. Sandbags and other "normal" flood fight measures will not be effective to provide any type of protection for such an event.

Furthermore, problems related to lahar debris could last for years and even decades because of the tremendous volume of loose rock and ash that has could potentially have been added to the ground surface near the volcano. This debris could provide a source of material that would no doubt flow downstream during flood events for many years following the eruption event.

On the following page hazard maps highlighting predicted lahars and ash fall inundation zones for both the Mount Baker and the Glacier Peak Volcanos can be found.



Figure 32 Hazard map of Mt Baker eruption. (VOLCANIC HAZARDS OF MT BAKER, 2014)



Figure 33 Hazard map of Glacier Peak eruption. (VOLCANIC HAZARDS OF GLACIER PEAK, 2014)

TEPHRA AND ASH FALL

Because of the location of Mount Baker and Glacier Peak and the flow direction of prevailing winds, the majority of airborne ash would most likely be carried to the Northeast or East and away from population centers in Skagit County should an ash eruption occur. Regardless of wind direction, there would still be considerable amount of ash fall in the immediate vicinity of the volcano during and immediately flowing an explosive tephra and ash eruption.

The 1980 eruption of Mount St. Helens produced enough ash fall to reduce the maximum flow capacity of the Cowlitz River from 76,000 cubic feet per second to less than 15,000 cubic feet per second and also reduced the channel depth of portions of the Columbia River from 40 feet to 14 feet. Should a St. Helens-type event occur from either Mount Baker or Glacier Peak, large portions of the Skagit River floodplain could be severely impacted by flooding in addition to the direct effects of the ash eruption.

PROBABILITY AND RISK:

Because of the historical infrequency of such events, it is unlikely that we will see a volcanic eruption in our lifetimes. However, due to the topography and river drainage basins within Skagit County, the impacts of a major eruption from either Mount Baker or Glacier Peak to persons, property,



Figure 34 Mount Bakers Sherman Peak (SCURLOCK, 2002-2014)

infrastructure, and the environment in Skagit County would be catastrophic.

As previously stated lahars are the primary threat and present the greatest hazard to Skagit County resulting from volcanic activity at either Mount Baker or Glacier Peak. Therefore, there is a **Low Probability** of such an event occurring but a **Moderate to High Risk** to persons, property, and the environment in Skagit County should an eruption occur from either Mount Baker or Glacier Peak.

CONCLUSION:

Although the probability of a volcanic eruption is low, if an eruption were to occur, the greatest threat to life, property, infrastructure, and the environment in Skagit County would most likely be from lahars or debris avalanches originating from either Mount Baker or Glacier Peak.

Based on past events and especially the 1980 eruption of Mount St. Helens, future eruptions from either Mount Baker or Glacier Peak will almost certainly be preceded by an increase in

seismic (earthquake) activity, and possibly by measured swelling of the volcano and emission of volcanic gases. The University of Washington Geophysics Program, in cooperation with the USGS, monitors seismic activity at Mount Baker and other Cascade Range volcanoes that could signal a possible future eruption. In addition, the USGS monitors gas emissions from Sherman Crater on Mount Baker to detect possible changes in the volcano that may be a warning of impending magma activity or an increase in hydro-volcanic activity in an effort to predict the likelihood of an eruption event. This ability to monitor seismic and other types of activity at Mount Baker and Glacier Peak provides a warning system of sorts for volcanic eruptions that could impact Skagit County.

Furthermore, the 1980 Mount St. Helens eruption made it clear that preparing for and responding to a large-scale volcanic eruption must involve a wide variety of agencies and jurisdictions. For this reason, emergency managers from Skagit, Snohomish, and Whatcom Counties, the State of Washington, and the Province of British Columbia, as well as personnel from the United States Forest Service developed the **Mount Baker-Glacier Peak Coordination Plan**. The plan was adopted in April 2001, and updated in 2011 and the plan provides a tool to coordinate the actions that various agencies must take to minimize loss of life and damage to property before, during, and after a hazardous geologic event occurring at either volcano. The plan also includes the necessary legal authorities in addition to statements of responsibilities of County, State, and Federal agencies in the United States as well as Provincial and Federal agencies in Canada.

For more information on volcanoes please visit:

Skagit County Department of Emergency Management: http://www.skagitcounty.net/Departments/EmergencyManagement/main.htm

Pacific Northwest Seismic Network: http://www.pnsn.org/volcanoes

Washington State Department of Emergency Management: http://www.emd.wa.gov/hazards/haz_volcano.shtml

Washington State Department of Natural Resources: http://www.emd.wa.gov/hazards/haz_volcano.shtml

USGS Cascades Volcano Observatory: http://volcanoes.usgs.gov/observatories/cvo/

USGS Volcano Hazards Program: <u>http://volcanoes.usgs.gov/</u>

My State Emergency Notification System: https://mystateusa.com/alertSignup.aspx

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SECTION III: HAZARD MITIGATION

NOTE:

This section of the Skagit County Natural Hazard Mitigation Plan contains information regarding mitigation goals and multiple-hazard mitigation action items that pertain to all of the jurisdictions, Indian tribes, and special purpose districts that have participated in the plan development process. Also included is information as to how mitigation measures will be prioritized, implemented, and administered at the jurisdictional level.

It is the intent of this planning effort that the mitigation goals and multiple-hazard mitigation action items included in this section of the plan are applicable to all entities that participated in the development of this plan.

A listing of multi-jurisdictional mitigation strategies and projects suggested by stakeholders and citizens during the plan-development process is also included in this section of the plan.

In addition, each participating jurisdiction, Indian tribe, and special purpose district has compiled a listing of proposed mitigation strategies and/or projects specific to their community. These entity-specific mitigation strategies and/or projects can be found in SECTION IV of this plan.

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MULTI-JURISDICTION/MULTI-HAZARD MITIGATION

MITIGATION GOALS:

The natural hazard mitigation goals listed in this portion of the plan are multi-jurisdictional in nature and are intended to help guide the direction of and prioritize future natural hazard mitigation activities at the local level aimed at reducing risk and preventing loss from natural hazards. The following mitigation goals were identified as part of the 2008 plan update process, these goals were re-evaluated and determined to remain valid and effective and were re-affirmed by the Skagit Natural Hazard Mitigation Planning Committee for the 2014 update.

1. Protect Life and Property

- Implement mitigation activities that will assist in protecting lives and property by making homes, businesses, infrastructure, and critical facilities more resistant to natural hazards.
- Continue the Skagit Community Emergency Response Team (C.E.R.T.) Program to provide for and promote individual and family disaster preparedness.
- Encourage homeowners and businesses to purchase insurance coverage for damages caused by natural hazards.
- Encourage homeowners and businesses to take preventative actions in areas that are especially vulnerable to natural hazards.

2. Increase Public Awareness

- Develop and implement additional education and outreach programs to increase public awareness of the risks associated with natural hazards.
- Continue the current flood awareness programs conducted by various jurisdictions as part of the National Flood Insurance Program Community Rating System.

3. Encourage Partnerships

 Strengthen inter-jurisdiction and inter-agency communication and coordination and partnering of jurisdictions and agencies to foster the establishment and implementation of natural hazard mitigation strategies and/or projects designed to benefit multiple jurisdictions.

4. Provide for Emergency Services

- Encourage the establishment of policies to help insure the prioritizing and implementation of mitigation strategies and/or projects designed to benefit critical/essential facilities, services, and infrastructure.
- Where appropriate, coordinate and integrate natural hazard mitigation activities with existing local emergency operations plans.

MULTIPLE-HAZARD MITIGATION ACTION ITEMS:

For the purpose of this plan, multiple-hazard action items are those strategies and/or activities that pertain to drought, earthquake, fire, flood, land movement, severe storm, tsunami/seiche, and volcanic event. Action items were not identified for avalanche as explained below:

The avalanche hazard in Skagit County exists in only a small portion of mountainous backcountry in far eastern Skagit County. This locale is not populated and consists of wilderness area within the boundaries of the North Cascades National Park. The area is accessible by trail and State Route #20 which crosses the Cascade Range at Rainy Pass; because of the large snow accumulations in this area, the Washington State Department of Transportation closes State Route #20 during the winter months. Due to the fact that avalanche is a concern only to those persons engaged in isolated, backcountry activities, specific mitigation action items were not identified for this hazard.

The action items included in this section of the plan may be short-term, long-term, or on-going in nature. Some actions may include activities that jurisdictional agencies may implement with existing resources and authorities. Other more complex actions may require new or additional resources or authorities as well as multi-agency and/or multi-jurisdictional partnering.

Some of the mitigation actions and/or projects included in this plan are focused on reducing the effects of various natural hazards on **new** buildings and infrastructure. Examples of these mitigation actions and/or projects include:

- Mitigation strategies, ordinances and codes regarding building regulations and set-backs from unstable or steep slopes, alluvial fans and other critical areas.
- Community Rating System Program activities designed to reduce or limit damage from flooding to structures built within the 100-year floodplain.

Some of the mitigation actions and/or projects included in this plan are focused on reducing the effects of various natural hazards on **existing** buildings and infrastructure.

Examples of these mitigation actions and/or projects include:

- Construction and/or modification of river levee systems.
- Obtaining additional flood storage capacity within existing hydroelectric reservoirs located with the Skagit River and Baker River watersheds.
- Buy-out and/or elevation of flood repetitive loss properties.

2008 – 2013 Mitigation Action Items: Successes and Failures

Due to governmental budget cuts and personnel lay-offs because of the recent economic recession, some multi-jurisdictional mitigation action items were difficult to achieve.

The West Skagit CERT program has been well received by the community and has been deemed a success. The Skagit CERT Program would benefit from additional funding and qualified instructors to support to broaden the reach of the CERT Program to a county wide effort. While we were not able to fully support CERT to the capacity which we had hoped, the program has

proven to be a sought after source of training and community engagement and is considered an on-going priority. It should be noted that since there was limited program funding an extra effort was given to distribute disaster preparedness information at community events.

Because of a group-partnering among many local municipalities, the county, local dike districts, and the United States Army Corps of Engineers, significant progress was made in continuing the United States Corps of Engineers Skagit River Flood Risk and Feasibility Study – also known as the General Investigation (GI) Study.

A separate partnering effort involving local government and industry successfully resulting in the purchase and use of a county-wide emergency notification system – MyStateUSA. This system is used by many local jurisdictions as well as the State of Washington Military Department, Emergency Management Division and has proved to be highly successful within Skagit County.

2014 – 2019 Multiple-Hazard Action Items:

The multiple-hazard mitigation action items listed below support the four basic mitigation goals of protecting life and property, increasing public awareness, encouraging partnerships, and providing for emergency services.

THE FOLLOWING ACTION ITEMS ARE CURRENT AND ON-GOING AND HAVE BEEN CONINUED FROM THE 2008-2013 PLAN. SOME ACTION ITEMS HAVE BEEN SLIGHTLY MODIFIED FOR THE 2014 PLAN.

2014 Multiple-Hazard Action Item #1: Continue and/or enhance existing education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, properties at risk, businesses, and schools.

- Continue to make the Skagit County Natural Hazard Mitigation Plan available to the public by providing a link to the plan on local jurisdictional websites.
- Continue to support the Skagit Community Emergency Response Team (C.E.R.T.) Program.
- Continue participation in the National Flood Insurance Program Community Rating System Program to inform citizens in participating jurisdictions about the flood risk in Skagit County.
- Continue to make public awareness materials and programs available from various sources available to the public to help inform the citizens of all communities within Skagit County as to the risks associated with various natural hazards.

LEAD AGENCY:	Skagit County Emergency Management and Community Rating System
FUNDING SOURCE:	Jurisdiction Budget; various grant monies such as Washington State
	Department of Ecology Flood Control Assistance Account Program
	(FCAAP) funds
TIME-LINE:	All programs are currently active and on-going

2014 Multiple-Hazard Action Item #2: Where appropriate, each jurisdiction and Indian tribe participating in this plan will strive to continue efforts to incorporate the goals and action items identified in this section of the **Skagit County Natural Hazard Mitigation Plan** into other planning mechanisms such as:

- Jurisdictional/Tribal Codes and Ordinances
- Jurisdictional/Tribal Comprehensive Plans and Critical Areas Ordinance(s)
- Jurisdictional/Tribal Capital Facilities and/or Improvement Plans
- Skagit County Comprehensive Economic Development Strategy
- Growth Management Act
- Coordinated Water System Plan
- Skagit County Comprehensive Emergency Management Plan
- County-wide and Jurisdictional Flood Plan(s)
- Jurisdictional National Flood Insurance Program
- Jurisdictional Community Rating System Programs

LEAD AGENCY:	Jurisdiction/Tribal Planning Department or Public Works Department
FUNDING SOURCE:	Jurisdiction/Tribal Budget and/or available grant funding
TIME-LINE:	These efforts are currently active and on-going

Unless stated otherwise within an individual entities portion of SECTION IV of this plan, the process by which mitigation action items and/or activities will be incorporated into existing plans, documents and programs should involve the following components:

- 1. Lead Agency identifies appropriate plans, programs, and directional documents where mitigation action items and/or activities may be incorporated.
- 2. Public hearings and participation of all involved agencies throughout the incorporation process.
- 3. Inter-jurisdictional and/or inter-agency cooperation and partnering; in some cases formalized by signed inter-local agreements.
- 4. Inter-jurisdictional and/or inter-agency studies or work sessions.
- 5. Final approval by the local elected governing body such as the board of county commissioners, citv or town council, tribal senate or tribal council.

2014 Multiple-Hazard Action Item #3: Continue to develop partnerships with various jurisdictions and agencies as well as business and industry to identify and pursue funding opportunities to implement local mitigation activities and to foster coordination and collaboration of natural hazard mitigation goals, strategies, and projects within Skagit County. Possible actions include:

- Identify and encourage partnering with various agencies and organizations within Skagit County that have an interest in or have established natural hazard mitigation programs.
- Identify/encourage partnering with various state/federal agencies that have programs that support natural hazard mitigation programs such as the Flood Control Assistance Account Program administered by the Washington State Department of Ecology.

LEAD AGENCY:	Local elected officials; jurisdiction/Indian tribe department/agency
	directors; Skagit County Department of Emergency Management
FUNDING SOURCE:	Local Jurisdictional/Private Business Funding via Budget Process
TIME-LINE:	Short term (less than 3 years from funding)

2014 Multiple-Hazard Action Item #4: Continue to strengthen emergency services preparedness and response by linking emergency services with natural hazard mitigation programs. Possible ideas include:

- Promote inter-agency response planning and training among various first response agencies within Skagit County.
- Continue involvement at the county level with the Northwest Region Fire Defense Board and the Northwest Region Fire Mobilization Plan.
- Encourage local fire service, emergency medical, and law enforcement agencies to include Skagit C.E.R.T. members in training opportunities.

LEAD AGENCY:	Skagit County Department of Emergency Management
FUNDING SOURCE:	Department of Emergency Management Budget
TIME-LINE:	Short term (less than 3 years from funding)

2014 Multiple-Hazard Action Item #5: Various members of the Skagit Natural Hazards Mitigation Steering Committee will continue their involvement with local efforts to support the United States Army Corps of Engineers General Investigation Study as well as assist in the updating of the <u>Skagit County Comprehensive Flood Hazard Management Plan</u>.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Various federal, state, and local funding
TIME-LINE:	This action item is currently active and on-going

THE FOLLOWING ACTION ITEM IS NEW TO THE PLAN FOR THE 2014-2019 PLAN.

2014 Multiple-Hazard Action Item #6: Develop and implement and awareness and education program to increase the awareness and understanding of local emergency responders regarding existing disaster planning and preparedness programs. Possible ideas include:

- Develop and distribute a variety of written materials to local laws enforcement, fire and emergency medical agencies and organizations.
- Provide agency training regarding emergency warning and public information systems, evacuation planning efforts, and emergency responder roles/responsibilities during a disaster.
- Incorporate this training into existing agency training programs and incident Command system training.

LEAD AGENCY:	Skagit County Emergency Management
FUNDING SOURCE:	Emergency Management Budget
TIME-LINE:	Short term (less than 3 years from funding)

THE FOLLOWING ACTION ITEMS WERE IDENTIFIED IN THE 2008 PLAN. DUE TO OTHER PRIORITIES, THESE ACTION ITEMS HAVE BEEN REMOVED FROM THE PLAN FOR THE 2014 – 2019 PLAN.

2008 Multiple-Hazard Action Item #6: Begin efforts to develop a comprehensive multijurisdictional Tsunami public education program to inform the public of the Tsunami danger in various locations within Skagit County. Elements of this program may include:

- Creation of a tsunami awareness brochure and distribute to property owners located within identified tsunami inundation areas.
- Encourage and coordinate with the Washington State Department of Transportation and local public works agencies to identify and sign tsunami evacuation routes.
- Encourage and coordinate with state and local agencies with developed parks located within identified tsunami inundation areas to post signs to alert visitors of the hazard and provide information as to what actions should be taken to avoid tsunami.

LEAD AGENCY:	Skagit County Department of Emergency Management; WSDOT and local
	public works agencies; Washington State Parks Department, Skagit
	County Parks Department, City of Anacortes Parks Department
FUNDING SOURCE:	Jurisdiction Budget; various state and federal grant funds
TIME-LINE:	Short term (less than 3 years from funding)

2008 Multiple-Hazard Action Item #7: Develop a drought contingency plan that provides for the following:

- Public education and awareness regarding the effects of drought and utilization of water conservation measures.
- The instituting of water conservation practices (as necessary) that encourage residents to employ water saving measures and prioritize or control water use, especially when needed for firefighting.

LEAD AGENCY:	Skagit County Public Utility District #1; City of Anacortes Public Works
	Department; community water systems on Fidalgo Island and Guemes
	Island
FUNDING SOURCE:	Agency Budget; various state and federal grant funds
TIME-LINE:	Short term (less than 3 years from funding)

THE ACTION ITEM LISTED BELOW WAS COMPLETED DURING THE 2008 – 2013 PLAN CYCLE.

2008 Multiple-Hazard Action Item #8: Purchase a county-wide "REVERSE 9-1-1" or similar system such as "MyStateUSA" to assist in providing emergency warning and evacuation information during emergency and disaster events affecting Skagit County.

LEAD AGENCY:	Skagit County Sheriff's Office; Skagit 9-1-1
FUNDING SOURCE:	Grant funding; local jurisdictions
TIME-LINE:	Short term (less than 3 years from funding)

PRIORITIZATION OF MITIGATION MEASURES:

Because this plan is multi-jurisdictional, the prioritizing of mitigation measures will be made at the jurisdictional level with direct involvement of the designated lead agency as well as the local elected governing body such as the board of county commissioners, city or town council, tribal senate or tribal council, school board, or special purpose district board of commissioners.

Due to local budget constraints, most of the mitigation measures incorporated into this plan are dependent upon local jurisdictions receiving outside funding; as a general rule, local funding is not available. As a result, local jurisdictions are unsure as to when these mitigation measures will be implemented and the conditions and/or requirements under which implementation may occur.

Unless stated otherwise within an individual entities portion of SECTION IV of this plan, the individual entities participating in this plan should prioritize their proposed mitigation measures based on the following factors:

- Mitigation measures that have a positive cost/benefit analysis.
- Mitigation measures consistent with the National Flood Insurance Program.
- Mitigation measures that reduce or eliminate repetitive loss properties.
- Mitigation measures that are multi-jurisdictional and or multi-agency in nature.
- Mitigation measures that provide the greatest good for the greatest number.
- Mitigation measures that have broad-based public and/or elected official approval.
- Mitigation measures for which funding has already been secured.
- Mitigation measures that qualify for alternate and/or matching funding.

While it is highly recommended that each of the entities participating in this plan utilize the above-listed factors in prioritizing their mitigation measures, it is recognized that final prioritization of mitigation measures is determined by the entities elected governing body. A change in local elected officials, changing environmental requirements, public acceptance of a project, or the occurrence of an actual disaster event may dramatically affect the priority ranking of mitigation measures at the local level.

If federal funding is involved in the implementation of a hazard mitigation project, the jurisdiction, Indian tribe, or special purpose district will conduct a cost/benefit analysis based on guidelines provided by the United States Department of Homeland Security (FEMA) and the Washington State Military Department, Emergency Management Division on how to determine cost-effectiveness of mitigation projects and how to calculate the benefit-cost ratio.

The purpose of the benefit-cost analysis is to determine if the benefits of the project exceed the federal costs of the project. Both the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Grant Program require a benefit-cost ratio of at least 1.0 for a project to be considered for funding. While it may be important to emphasize a positive cost/benefit analysis in the prioritizing of mitigation measures, it is also important to recognize the influence of local political factors, sovereign authority, community needs, traditional and cultural customs and values, historic properties, and habitat and environmental issues upon the selection of specific mitigation measures.

IMPLEMENTATION OF MITIGATION MEASURES:

Mitigation measures that are already in place at the jurisdiction level through existing plans, codes, and ordinances as well as programs such as the National Flood Insurance Program Community Rating System Program or the Skagit Community Emergency Response Team (C.E.R.T.) Program are current and on-going programs funded through existing and established budgets.

The implementation of new and/or additional mitigation measures is dependent upon the approval of the local elected governing body such as the board of county commissioners, city or town council, tribal senate or tribal council, school board, or special purpose district board of commissioners <u>as well as</u> obtaining funding from outside sources that have not been secured at this time. As a general rule, local funds are not available for implementation of new mitigation measures. Funding for mitigation measures is largely dependent upon individual entities applying for and receiving federal and/or state hazard mitigation grant funding. For each action item listed and described above (as well as the entity-specific mitigation measures contained in SECTION IV) every effort has been made to identify lead agencies, current or possible funding sources, and a time-line for implementation as part of the planning process.

It should be noted that **short term** action items and/or mitigation measures are those activities that are expected to be completed in less than 3 years from the receipt of funding by the local entity. **Long term** action items and/or mitigation measures are those activities that are expected to require more than 3 years to complete from the receipt of funding by the local entity. Those action items and/or mitigation measures that are current and on-going have been so indicated.

The entities participating in the **Skagit County Natural Hazard Mitigation Plan** have a variety of local, state, and federal resources available to support the implementing and administering of the mitigation actions. The Skagit Natural Hazard Mitigation Planning Committee will continue to identify additional resources to support the implementation of the action items. At this time, possible implementation funding sources include the following:

Local Funding Sources

Local implementation resources vary based on each entity's scope of function(s), authorities, and operational capability and capacity. They may include:

- Use and support of existing local personnel (planners, floodplain managers, city engineers, GIS specialists, emergency managers).
- Capital improvement project funding.
- Authority to levy taxes, special bonds.
- Fees for services.

The current economic condition and funding level of the participating local entities drastically limits the use of local resources. State or federal funding will be needed to accomplish many of the action items and mitigation measures referenced in this plan.

State Funding Sources

- State administered Hazard Mitigation Grant Program, Flood Mitigation Act and Pre-Disaster Mitigation Program.
- Department of Ecology Flood Control Assistance Account Program (FCAAP).
- Department of Transportation Emergency Relief Program.
- Department of Community, Trade, and Economic Development Grants such as the Community Development Block Grant Program.
- Programs administered by the Washington State Transportation Improvement Board.
- Programs administered by the Washington State County Road Administration Board.

Federal Funding Sources

- Stafford Act, Section 406 Public Assistance Program Mitigation Grants.
- Stafford Act, Section 404 Hazard Mitigation Grant Program.
- Disaster Mitigation Act of 2000– Pre-Disaster Mitigation Program Competitive Grants.
- United States Fire Administration Assistance to Firefighters Grants.
- United States Small Business Administration Pre and Post Disaster Mitigation Loans.
- United States Department of Economic Development Administration grants.
- United States Department of Housing and Urban Development Grants such as the Community Development Block Grant Program.
- United States Army Corps of Engineers.
- United States Department of the Interior, Bureau of Land Management.
- Federal Highway Administration.
- Other sources as yet to be identified.

An extensive listing of federal funding opportunities is identified in the document *"Federal Mitigation Programs, Activities, & Initiatives"* and is available at the following web site:

http://www.fema.gov/doc/fima/fmpai.doc

MONITORING AND EVALUATING MULTI-JURISDICTIONAL MITIGATION ACTIVITIES:

Purpose: This procedure is established to ensure a sustainable process for monitoring and evaluating multi-jurisdictional mitigation activities.

- 1. The Chairperson shall ensure that written reports are prepared and submitted as required and shall coordinate with the Department of Emergency Management to call the annual meeting.
- 2. A mailing with a survey/questionnaire shall be sent to all participating jurisdictions and special purpose districts no later than August 15th of each calendar year requesting the following information be submitted to the Chairperson:
 - Update on hazard mitigation activities implemented during the past year.
 - Comments on the success of the activities, or recommendations for follow-up.
 - Statement of any new goals, objectives and mitigation activities.
 - Statement of any activities being modified for the following year.

- 3. Community Rating System jurisdictions shall address the elements in #2 above in their respective Floodplain Management Plan Annual Progress Report and a copy of that report shall be submitted to the Chairperson no later than September 15th of each year.
- 4. Notice of the annual meeting will be published twice in the newspaper and sent to the open meeting mailing list.
- 5. The annual meeting will be scheduled on the Wednesday following September 15th of each year.
- 6. One representative of each jurisdiction and/or special purpose district shall be asked to attend the annual meeting.
- 7. Skagit County Department of Emergency Management staff will prepare the required annual report and submit to the Washington State Mitigation Officer. The Skagit County Natural Hazard Mitigation Plan will be updated on a five year cycle. As part of the plan update process, participating jurisdictions will be encouraged to integrate hazard mitigation planning into their Comprehensive Plans and Capital Facilities
- 8. Plans and provide clear links to the Skagit County Natural Hazard Mitigation Plan.

SECTION IV: JURISDICTIONS

Jurisdiction-Specific Information, Hazard Vulnerability Assessment and Proposed Mitigation Strategies

NOTE:

This section of the Skagit County Natural Hazard Mitigation Plan contains jurisdictional-specific information regarding vulnerability to natural hazards and proposed mitigation strategies.

Each entity participating in the multi-jurisdictional process worked independently utilizing various locally-developed forms as well as the Hazus Software provided to Skagit County by FEMA to help assess their vulnerability to various natural hazards. This assessment process was made on a subjective basis considering past events and the best available information. In addition, each entity did their best to list mitigation strategies currently in place as well as identify new mitigation strategies and/or projects that would benefit their specific community.

The information contained in this section regarding vulnerability and mitigation strategies are specific to each participating Indian Tribe, jurisdiction, or special purpose district that participated in the development of this plan.

In addition, some communities that currently participate in the National Flood Insurance Program Community Rating System (CRS) elected to include jurisdictional-specific CRS-related information in this section of the plan.

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NATURAL HAZARD RATING PROCESS

Each jurisdiction participating in the **Skagit County Natural Hazard Mitigation Plan** calculated a risk analysis for the following natural hazards:

Avalanche	Landslide/Erosion
Drought	Severe Storm
Earthquake	Storm Surge/Tsunami
Flooding	Wildfire
High Winds	Volcanic Activity

During the risk analysis process, each jurisdiction utilized a scoring matrix using a subjective evaluation based on historical events by assigning numerical values for each natural hazard based upon the following risk categories:

- The area(s) impacted by the hazard (ranked 0 4)
- Probability of persons injured or killed (ranked 0 3)
- Probability of property damaged or destroyed (ranked 0 3)
- Probability of environmental damage (ranked 0 3)
- Probability of Economic disruption (ranked 0 3)

In addition, a Probability or Frequency of Occurrence value was assigned to each natural hazard (ranked 1–5) based upon the known frequency of incidents resulting from each natural hazard.

For each natural hazard, the numerical values for each risk category were totaled and this number was then multiplied by the Probability or Frequency of Occurrence value to determine the risk rating for each natural hazard.

Based on this scoring matrix, the maximum numerical risk value that could be assigned to calculate the combined risk rating for all natural hazards considered is 800.

This method is based off of Washington State Emergency Management Division's 20/20 scoring matrix and risk rating for each participating Indian Tribe and jurisdiction can be found in their individual portion of SECTION IV of this plan.

FEMA's current methodology for estimating potential losses from disasters is achieved by utilizing Hazus software. Hazus utilizes Geographic Information Systems (GIS) and computer modeling to estimate potential physical, economic and social impacts from natural hazards. In 2014, FEMA provided Hazus information to Skagit County to confirm or update initial risk identification and ranking.

Based upon the risk analysis calculated by the plan participants, the NATURAL HAZARD RATING TABLE shown on the following page was compiled by Skagit County Department of Emergency Management staff.

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				Natura	al Haza	rd Rating					
				Wildland		Land	Winter	High		Volcanic	Total
Jurisdiction/Indian Tribe	Avalanche	Drought	Earthquake	Fire	Flood	Movement	Storm	Winds	Tsunami	Activity	Score
City of Anacortes	0	16	36	21	36	24	37	35	9	2	213
City of Burlington	0	0	30	10	52	18	32	52	0	32	226
Town of Concrete	0	0	18	5	35	40	14	16	0	30	158
Town of Hamilton	0	0	20	5	50	5	14	16	0	30	140
Town of La Conner	0	0	22	5	48	12	50	50	28	22	237
Town of Lyman	0	0	22	5	50	З	14	16	0	30	140
City of Mount Vernon	0	0	20	12	40	5	14	45	0	20	156
City of Sedro-Woolley	0	0	20	12	25	5	14	45	0	20	141
Unincorporated Skagit County	0	9	36	28	48	32	28	40	4	30	252
Samish Indian Nation	0	10	40	20	10	16	44	55	14	8	217
Swinomish Indian Tribal Community	0	14	40	10	10	12	35	40	14	15	190
Upper Skagit Indian Tribe	0	36	60	48	44	12	52	52	0	48	352
	0	82	364	181	448	184	348	462	99	287	

* NOTE: The High Wind and Winter Storm categories have been combined and are described in the Severe Storm portion of this plan.

	Criteria for Scoring - based on 20/20 s	oftware
Probability of Occurance	Impact Area	Health and Safety
1 = Unknown but rare orccurance	1 = Less than 25% of developed areas	1 = Few injuries/illnesses
2 = Unkown but anticipated	2 = Less than 50% of developed areas	2 = Few fatalities but many injuries/illnesses
3 = 100 years or less	3 = Less than 75% of developed areas	3 = Numerous fatalities
4 = 25 years or less	4 = Over 75% of developed areas	
5 = Once per year or more		
Property	Environment	Economic
1 = Few properties destroyed/damaged	1 = Resources damaged with short term recovery	1 = Low direct and/or low indirect costs
2 = Few destroyed/many damaged	2 = Resources damaged with long term recover	2 = High direct and low indirect costs
2 = Few damaged - many destroyed	3 = Resouces damaged beyond recovery	2 = Low direct and high indirect costs
3 = Many properties destroyed and damaged		3 = High direct and high indirect costs
168		

CITY OF ANACORTES

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CITY OF ANACORTES NATURAL HAZARD MITIGATION PLAN

Introduction

The purpose of this section of the plan is to assess the vulnerability of the City of Anacortes in regards to the various natural hazards previously identified in SECTION II of this plan. In addition, mitigation strategies that are currently in place relating to these natural hazards as well as newly proposed mitigation strategies have been included in this section of the plan.

National Flood Insurance Program

The City of Anacortes has participated in the National Flood Insurance Program (NFIP) since 2003. The identifying, analyzing, and prioritizing of mitigation measures is based (and will continue to be based) upon continued participation and compliance with the National Flood Insurance Program. No repetitive loss properties have been identified within the City of Anacortes.

Mitigation Planning Committee

The City has appointed a three person committee consisting of the Building Official, Director of Public Works, and Fire Chief to act as the Mitigation Planning Committee for the City of Anacortes. This committee will work closely with other jurisdictions, agencies, Indian tribes, the public and the Skagit Natural Hazards Planning Committee to develop a comprehensive, coordinated mitigation plan intended to reduce the vulnerability to natural hazards within the City.

The plan is reviewed each year to consider the vulnerabilities, risks, and impacts posed by the natural hazards that affect Anacortes (including Tsunami) as well as changes to city infrastructure, population, development trends, and recent changes to codes and ordinances. Every five years, the disaster events and codes and comprehensive plan portions are updated and mitigation strategies are evaluated. The Skagit County Natural Hazard Mitigation Plan has been determined to still be valid, and re-affirmed for the 2014-2019 plan cycle.

Incorporating Mitigation into Other Planning Mechanisms

The City of Anacortes is governed by the Mayor and City Council members that set policy and oversee the various city departments. The process by which the City will incorporate the mitigation strategy and other information contained in the Skagit County Natural Hazard Mitigation Plan into other planning mechanisms is:

- \neq Adoption of the plan by the Mayor and City Council.
- ≠ Inclusion into City of Anacortes Comprehensive Plan, when appropriate.
- Inclusion into other planning mechanisms subordinate to the City of Anacortes Comprehensive Plan, when appropriate.

It should also be noted that additions and changes made to the City of Anacortes Comprehensive Plan utilize an established process that is consistent with, and in compliance with, Washington State Growth Management requirements.

Since the original adoption of the Skagit County Natural Hazard Mitigation Plan in 2003, Anacortes government has begun incorporating the mitigation strategy and other information contained in the plan pertaining to the local vulnerability and risk associated with natural hazards into the plans and programs listed below:

- ≠ Water Treatment Facilities Plan (Draft 2008)
- ≠ Anacortes Critical Areas Ordinance
- ≠ Anacortes Water System Plan (2011)
- ✓ Storm Water Facilities Plan

Continued participation by the City of Anacortes government in the following programs is consistent with, and in support of, the mitigation strategy as well as the local vulnerability and risk associated with the natural hazards that affect the City of Anacortes:

- ≠ Skagit River Flow Management Committee
- ≠ Flood Control Zone Technical Committee

The Process

The analysis conducted by City of Anacortes staff were based on the best currently available information and data regarding the characteristics of the neighborhoods identified, the natural hazards that threaten the people, property, and environment of these neighborhoods as well as the impacts these neighborhoods have suffered in past disasters. This information includes, when available, United States Census data, local tax records, local and national geographic information system data, Flood Insurance Rate Maps, hazard specific analyses such as Hazus, and other environmental and demographic facts.

As part of the vulnerability assessment process, City of Anacortes government completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process. A list of these facilities will be made available to FEMA personnel in the event this information is required to obtain future hazard mitigation grant funding.

During the update to the 2014 Skagit County Natural Hazard Mitigation Plan, representatives from the City of Anacortes participated in the update process by attending planning committee meetings to identify the hazards, the associated risks and potential mitigation measures. Five public meetings were locally advertised to encourage public participation in the update of the 2014 Skagit County Natural Hazard Plan.

The City of Anacortes government is committed to continuing the mitigation planning process that has resulted in the development of this document, and to the ongoing cooperation with other agencies, organizations, Indian tribes, and jurisdictions to make the City of Anacortes more resistant to the damages and hardships that could otherwise be the result of future natural disasters.

Contact Information:	Don Measamer, Building Official City of Anacortes P.O. Box 547 Anacortes, WA 98221 Telephone: (360) 293-1901 Email: don@cityofanacortes.org		
City Profile			
Population of Jurisdiction:	16,080 and growing slightly		
Principal Economic Base:	Industrial/Manufacturing		
conomic Characteristic: Average for the State			
Land area within the existir	ng city limits (acres):	2008 7,779	2014 7,779
Land area within urban gro	wth area (acres):	2,159	2,159
Land area of park, forest, a	ind/or open space	3,436	3,436
(acres): Land area set aside as reso	ource lands (acres):	1,500	1,500
Population:		15,778	16,080
Expected population in 203	6:	18,300	22,293

\$43,575,982

Population Trends: Steady growth with new and redevelopment at approximately 2% per year.

City Infrastructure Summary:

Annual Budget:

Miles of Streets/Road	2008 123.6	2014 125.2	Approximate Current Value \$9,339,081
Miles of Sanitary Sewer	105.8	106.0	\$12,559,109.54
Miles of Storm Sewer:	83.5	79.4	\$10,172,802.56
Miles of Water Line:	219.8	160.5	\$43,734,720.23

\$45,644,071

Critical Facilities (Emergency Operations Center, Fire Station, Police Station, Sewer Treatment):

Approximate Values

1.	Police/EOC	\$4,485,800
2.	Fire Station #1	\$1,800,000
3.	Fire Station #2	\$750,000
4.	Fire Station #3	\$75,000 leased property
5.	Water Treatment	\$75 million
6.	Wastewater Treatment	\$25 million
7.	Operations Building	\$865,000
8.	Water Tanks (3 @ \$700,000 each)	\$2.1 million
9.	Other municipal facilities	\$26,131,470

Total value of all Municipal Infrastructure: \$212,012,983.33

Flood-Specific Information

Percentage of existing city limits within the 100-year floodplain:	0.8%
Assessor's valuation of private properties within the 100-year floodplain:	\$51,578,000

Critical facilities located within the 100-year floodplain:

1. Water Treatment Plant

Total value of municipal infrastructure located within the 100-year floodplain: **\$100,000,000**

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, Codes, & Plans

15.04 - Building and Fire Codes	17.51.050 - Storm Drainage Ordinance			
17.54.070 - Regulated Slopes	17.65 - Non/Tidal Wetlands 18.12 - Land			
Clearing and Grading	Adopted Land Use/Zoning Code			
Municipal Code	Zoning Code			
Subdivision Code	Flood Damage Prevention Code			
Local Water Quality Plan	Comprehensive Land Use Plan			
Water Comprehensive Plan	Water Treatment Plant Flood Plan			
Storm Water Management Plan	Participation in NFIP Program			
Tsunami Action Plan				
Adopted International Fire Code (2012 International Fire Code)				
Adopted Building Code (2012 International Building Code)				

Existing Prioritized Natural Hazard Mitigation Strategies or Projects

- 1. Power line removal from front of Fire Stations
- 2. Installation of propane tanks for electric generators
- 3. Seismic analysis of existing buildings, infrastructure and upgrade
- 4. New water reservoir
- 5. Inter-tie with PUD Water system

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2014 Natural Hazard Identification and Risk Estimation

**Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental Damage+Economic Disruption multiplied by Probability of Occurrence). Has been updated for 2014 based on changing conditions and recent events.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Drought	-	0	Ł	2	0	4	16
Earthquake	с	2	2	2	e	с	36
Flooding	-	-	1	~	2	2	12
High Winds	2	1	1	~	2	5	35
Infestation/Disease	-	-	0	2	2	ę	18
Landslide/Erosion	-	1	1	~	2	4	24
Lightning	0	1	1	0	0	~	7
Storm Surge	-	1	1	~	2	4	24
Subsidence, expansive Soils	0	0	0	0	0	0	0
Urban Fire	2	2	1	2	2	2	18
Wildfire	1	1	1	2	2	3	21
Winter Storm	с	1	1	~	1	5	35
Volcanic Activity	0	0	0	٢	1	٢	2
Tsunami	1	1	1	٦	1	٢	9
			Total Juri	sdictional Ris	k Estimatio	n Score:	249

		naged, many destroyed 3=Many properties destroyed or damaged		3=High Direct and Indirect Cost	nce a year or more
4=>75%	3=Numerous fatalities	nany damaged or Few dar		direct and High indirect	4=<25 year 5=0
3=<75%	any injuries	2=Few destroyed, n	3=No recovery	Ind Low indirect or Low 0	3= <100 year
2=<50%	2=Few fatalities, ma	or damaged	2=Long term	2=High direct cost a	nticipated
1=<25%	1=Few injuries	1=Few destroyed o	1=Short term	1=Low costs	2=Unknown but an
0=No impact	0=No impact	0=No impact	0=Little or No impact	0=No impact	1=Unknown but rare
Area Impacted:	Health & Safety:	Property:	Environment:	Economic:	Probability:

RECENT ANACORTES DISASTER EVENTS

DATE	DISASTER NO.	DESCRIPTION
Nov. 1990	883	Heavy rains caused flooding of the Skagit River forcing sandbagging of the Anacortes Water Treatment Plant near the City of Mount Vernon; damage to city storm water structures and street flooding.
Dec. 1990	896	High winds downed trees that damaged homes and power lines. Marina damage was extensive.
Nov. 1995	1079	Heavy rains caused flooding of the Skagit River forcing sandbagging of the Anacortes Water Treatment Plant near the City of Mount Vernon.
Feb. 1996	1100	Heavy rains caused flooding of the Skagit River forcing sandbagging of the Anacortes Water Treatment Plant near the City of Mount Vernon.
Dec. 1996 & Jan. 1997	1159	Snow accumulations of 2 to 3 feet followed by heavy rains and wind caused roofs to collapse; covered boat moorage structures suffered extensive damage.
Dec. 2000	not declared	A series of windstorms with gusts between 60 and 90 miles per hour caused numerous downed trees and power lines within the city.
Feb.2001	1361	The 6.8 Magnitude Nisqually Earthquake was felt throughout the community. Several building suffered minor damage that required repair. The unreinforced smoke stack of an abandoned paper mill was severely damaged and subsequently razed.
Oct. 2003	1499	Heavy rains caused flooding of the Skagit River forcing sandbagging of the Anacortes Water Treatment Plant near the City of Mount Vernon.
Feb. 2006	1682	A severe low pressure weather event accompanied by high winds and coinciding with high tide created a 100-year tidal surge event causing damage to homes and other structures adjacent to shorelines on Fidalgo Island.
Nov. 2006	1672	Heavy rains caused flooding of the Skagit River forcing sandbagging of the Anacortes Water Treatment Plant near the City of Mount Vernon.
Nov. 2006	not declared	A sustained windstorm with high peak gusts caused significant blow-down of large trees and power lines on Fidalgo Island blocking roads for 2-3 days and forced some temporary relocation of residents to emergency shelters.
Dec. 2007	1734	A series of windstorms in the western portion of Skagit County caused damage to various structures.

The City of Anacortes is most vulnerable to severe storms, flooding, and earthquakes.

Due to the city's proximity to the marine waters of Skagit County and the surrounding topography, Anacortes is especially vulnerable to severe arctic winds from the north as they exit the Frazier River Valley in British Colombia, Canada.

The city is also vulnerable to flooding of the Skagit River, not because the city is located within the floodplain of the Skagit, but because the city's source of potable water is the Skagit River and the water treatment plant is located adjacent to the Skagit River near the City of Mount Vernon. The City of Anacortes must take action to prevent damage to this vital infrastructure and to insure a source of potable water for residents, business, and industry.

The city's vulnerability to earthquake extends beyond damage to buildings, roads and infrastructure within the city limits. Water transmission lines from Mount Vernon to Anacortes cross the floodplain of the Skagit River in soils that are susceptible to liquefaction; recent studies indicate the shoreline areas of the city are vulnerable to tsunami resulting from a large-magnitude subduction-zone earthquake occurring off the coast of Washington.

Codes and Comprehensive Plan Natural Hazard Reduction

Purpose	Document	Review Schedule
Reduce city exposure to landslides, and to minimize reliance on federal and state programs for disaster	Comprehensive	Annual
mitigation, protect public and private property, save lives,		
and use community resources wisely.		
(a) Integrate regulatory standards such as buffers and		
setbacks with nazard avoidance measures.		
(b) coordinate nazard vumerability assessments with programs for purchase or preservation of open space.		
(c) Update hazard mitigation and disaster plans every		
three years.		
(d) Coordinate related activities of city departments with		
the County, State, and Federal agencies.		
a. Mapping designations – Continue to revise and		
compile mapping of vulnerable areas by using		
City, County, State and Federal database.		
Development Regulations – Revise the Zoning,		
Subdivision, Critical Areas Ordinance and the regulations		
portion of the Shoreline Master Program to incorporate		
nazard avoldance provisions and assure consistency of		
Objectives: (a) Drevent are north damage from flooding	Ctorm Wotor	C Voor
Objectives: (a) Prevent property damage from hooding.		6 fear
solutions for existing flooding problems. (c) Employ	Quality	
condicine for existing nooding problemor (c) Employ	rianagement	

(Updated June 2012)

Purpose	Document	Review Schedule
 management strategies in flood-prone areas to ensure that new development is not exposed to significant flood risk. (d) Preserve wetlands and implement a wetlands management strategy. (e) Review the City's critical areas ordinances to ensure consistency with the surface water management program goals. (f) Ensure adequate funding for program implementation. (g) Coordinate the City program with the Skagit County program. 	Plan	
Identifies drainage basins, general soil conditions, recommends drainage ordinances and drainage system development.	Comprehensive Storm Water Plan	
It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed: (1) To protect human life and health; (2) To minimize expenditure of public money and costly flood control projects; (3) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; (4) To minimize prolonged business interruptions; (5) To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard; (6) To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas; (7) To ensure that potential buyers are notified that property is in an area of special flood hazard; and, (8) to ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.	Flood Damage Prevention Ordinance	2003
The purpose of this code is to provide minimum standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within this jurisdiction.	Building Code 2012 IBC	June 17, 2013
This code prescribes regulations consistent with nationally recognized good practice for the safeguarding to a reasonable degree of life and property from the hazards of fire, explosion, and dangerous conditions arising from the storage, handling and use of hazardous materials and devices, and from conditions hazardous to life or property in the use or occupancy of buildings or premises and provisions to assist emergency response personnel.	Fire Code 2012 IFC	June 17, 2013

Purpose	Document	Review Schedule
The City Council finds that this chapter is necessary to promote sound development policies and construction procedures that respect and preserve the city's watercourses; to minimize water quality degradation and control of sedimentation of creeks, streams, ponds, lakes, and other water bodies; to protect the life, health and property of the general public; to preserve and enhance the suitability of waters for contact recreation and fish habitat; to preserve and enhance the aesthetic quality of the waters; to maintain and protect valuable groundwater quantities, locations and flow patterns; to ensure the safety of city roads and rights-of-ways; and to decrease drainage-related damages to public and private property.	Surface Water Management Code	1997
In part this provides such activities must not threaten public safety or cause nuisances by: (A) Blocking flood flows or destroying flood storage areas, thereby raising flood heights or velocities on other land and increasing flood damages; (B) Causing water pollution through any means, including location of wastewater disposal systems in wet soils; unauthorized or detrimental application of pesticides, herbicides and algaecides; disposal of solid wastes or storm water runoff at inappropriate sites; or the creation of un-stabilized fills (C) Increasing erosion; or (D) Increasing runoff of sediment and storm water. This section also refers to other land altering codes.	Non-tidal Wetland Protection	Annual
In Part: The ordinance is designed to assist in orderly community development, conserve the value of property and safeguard the public welfare by: Implementing the City of Anacortes comprehensive plan policies through land-use regulations; protecting the general public health, safety and welfare;	Zoning Code	Annual
To minimize surface water and ground water runoff and diversion, to reduce siltation of lakes and streams and to deter erosion due to removal of trees and ground cover and the risk of slides.	Land Clearing Code	Annual
A description of how the proposed development and its associated grading plan will or will not impact each of the following on the subject property and adjoining properties. (1) Slope stability, erosion, and landslide hazard. (2) Drainage, surface and subsurface hydrology, and water quality. (3) Existing vegetation as it relates to wetlands, regulated slopes and soil stability.	Regulated Slopes Geologically Hazardous Areas	Annual

Purpose	Document	Review Schedule
There shall be allowed as an accessory use to a permitted use on site hazardous waste treatment and storage facilities provided such facilities comply with the State Hazardous Waste Siting Standards and Anacortes and State Environmental Policy Act Requirements in the following districts	Hazardous Waste Treatment and Storage	Annual
Land to be subdivided shall be of a character that can be used safely for building purposes without danger to health or peril from fire, flood, or other menace.	Subdivision Code	Annual
Coordinate with Skagit County through arrangements such as interlocal agreements, joint programs, consistent standards, or regional boards or committees.	Multi- Jurisdictional All Natural Hazard Mitigation Planning project	Annual maintenanc e with five year update required
Provides long range (5 year) planning for maintenance and replacement of municipal infrastructure, buildings and equipment incorporating strategies for mitigation of natural hazards.	Capital Facilities Plan	Annual

DOCUMENT LOCATION MATRIX									
NO	REQUEST	AVAILABLE YES/NO/?	LOCATION OF INFORMATION	MAINTAINED BY	LAST UPDATE	UPDATE TO PRINTING	NOTES		
1	Critical Areas Map	Yes	Engineering	GIS	7/2005	7/2005			
2	Parks Plan Map	Yes	Parks Dept.	GIS	1/2008	1/2008			
3	Sewer Plan Map	Yes	Engineering	GIS	3/2008	3/2008			
4	Storm Water Plan Map	Yes	Engineering	GIS	3/2008	3/2008			
5	Street Map	Yes	Engineering	GIS	3/2008	3/2008			
6	Zoning Map	Yes	Planning/Bldg.	GIS	1/2008	1/2008			
7	Critical Facilities Map	Yes	Engineering	GIS	6/2007	6/2007			
8	WSRB – Fire	Yes	Fire Department	Fire Department	Nov 2002	1/15/2003			
9	BCEG Rating – Building	Yes	Building Dept.	Building Official	9/28/98	1/15/03	Update Late 2008		
10	Repetitive Loss Properties and Address	Yes	Building Dept.	Building Official		1/21/2014			
11	List of Recent Events	Yes	Building Dept.	Building Official	2008	3/1/2008			
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12	Comprehensive Land Use Plan	Yes	Planning Dept.	Planning	2012	2012			
13	Comprehensive Storm Water Plan	Yes	Public Works	Public Works	11/2007	11/2007	Update Late 2008		
14	Basin Reconnaissance Report	Yes	Building Dept.	Public Works	2007	2007	Contains sensitive area mapping.		
15	Comp. Transportation Plan	Yes		Public Works	3/2008	3/2008	Update Late 2008		
16	Comp Wastewater Plan	Yes	Public Works	Public Works	1993	1/93	Update Late 2008		
17	Comp. Water System Plan	Yes	Public Works	Public Works	2011	2011	2011		
18	Floods Hazard Reduction Plan		Building Dept.	Building Official	2003		Adopted		
19	Disaster Preparedness	Yes	Various	Public Safety Public Works	2001				
20	Capital Improvement Plan	Yes	Planning	Planning	Annual	Annual			
NO	REQUEST	AVAILABLE YES/NO/?	LOCATION OF INFORMATION	MAINTAINED BY	LAST UPDATE	UPDATE TO PRINTING	NOTES		
21	Building Code	Yes	Building Dept.	Building Official	2013	6/13/2013	2012 IBC		
22	Fire Code	Yes	Fire Dept.	Fire Marshal	2006	6/13/2013	2012 IFC		
23	Surface Water Management Code	Yes			9/2007	9/2007			
24	Critical Areas Code	Yes	Planning Dept.	Planning Dir.	7/2005	7/2005			
25	Zoning Code	Yes	Planning Dept.	Planning Dir.	2012	2012	2012		
26	Subdivision Code	Yes	Planning Dept. Engineering Dept.	Planning Dir. City Engineer	2012	2012			
27	Sewer Code		Public Works	Public Works	2008	2008			
28	Traffic and Street Code						Uniform Traffic Code Adopted by Reference		
29	Total Acreage of City and UGA	Yes	Engineering	GIS	3/2008	3/2008			
30	Zoning Acreage Breakdown	Yes	Engineering	GIS	3/2008	3/2008			
31	Vacant Land Available for Development	Yes	Engineering	GIS	3/2008	3/2008			
32	Water Shortage Response Plan	Yes	Public Works	Public Works	2002		Update Late 2008		
33	Tsunami Action Plan	Yes	Fire Dept.	Fire Chief	2005	10/2005			

PRIORITIZATION OF ACTION ITEMS

The City of Anacortes operates under the requirements of the Growth Management Act of the State of Washington. The city government format is a strong mayor with council. City staff evaluates actions based on community needs as expressed in the growth management act and the various comprehensive plans and ordinances adopted by City Council. Staff prepares recommendations for specific actions to the council for consideration. Council weighs the input from staff and citizens before making any decision.

Before an action may proceed, there must be a demonstrated need and funding must be secured. When funding is available and council approval is given, the project is included in the annual budget. Need for an action to proceed may be determined in a variety of ways including but not limited to: action items identified in adopted plans, cost benefit analysis, necessary service, emergency, directive from state or federal agency, safety or other benefit to the community. For planning purposes, projects are evaluated and included in the annual update of the 6 year capital facilities plan. Many projects in the capital facilities plan are dependent on outside funding. Possible sources of funding are the general fund, capital improvement funds, utility reserves, local improvement district, utility district, grant funding from a variety of sources including but not limited to private agencies, economic development organizations, state agencies, federal agencies and philanthropic sources. Others sources of funding may become available for specified actions that may or may not be included in the community planning process.

MITIGATION STRATIGIES

Progress made during the 2008 – 2013 plan cycle has been noted and modifications have been made for the 2014 – 2019 plan cycle to further mitigate natural hazard impacts to existing and future infrastructure, critical facilities and the community investment in housing and commerce.

FACILITY	HAZARD	MITIGATION
Water Distribution	Flood, Storm, Equipment Failure	 2003: Construct an inter-tie with Skagit County PUD. The inter-tie with Skagit County PUD will provide both utilities with capacity should either plant be out of service for a short period of time. 2003-2008 Accomplishments: The inter-tie project with Skagit County PUD is currently in the design phase. This mitigation action is continued for the 2014 plan cycle.
Fire Station 1	Earthquake, winter storm, wind storm	 2014: Install alternate fuel source for emergency generator. 2014: Relocate overhead power lines underground at apparatus access and egress. Due to lack of local funding, these mitigation actions have not been completed and are reaffirmed for the this plan cycle.

FACILITY	HAZARD	MITIGATION
Fire Station 2	Earthquake, winter storm, wind storm	 2003: Install alternate fuel source for emergency generator. 2003: Relocate overhead power lines underground at apparatus access and egress. Due to lack of local funding, these mitigation actions have not been completed and are reaffirmed for the this plan cycle.
Fire Station 3	Earthquake, winter storm, wind storm	 2014: Install emergency generator. 2014: Install alternate fuel source for emergency generator. Fire Station 3 was activated in 2007; these mitigation actions are new to the plan for the 2008-2013 plan cycle.
Municipal Building	Earthquake, winter storm, wind storm	The Municipal building is 90 year's old and houses several critical functions. Installation of an emergency generator and upgrade of the building structural and fire systems is necessary to ensure continued function during and after any natural hazard event. 2003-2008 Accomplishments: 1. Emergency generator was installed in 2005. This mitigation action has been completed and is not continued for the 2008-2013 plan cycle. Seismic evaluation was completed in 2006; implementation is dependent upon future grant funding. This mitigation action is on-going and has been re-affirmed for the 2014-2019 plan cycle. An upgrade of the Fire Alarm System was completed in 2006 and emergency lighting was also installed in 2006; further upgrades are still needed. This mitigation action is on-going and has been re-affirmed for the 2014-2019 plan cycle.

Other Mitigation Strategies:

- \neq Adopt and enforce building codes as adopted by the State of Washington.
- ≠ Participation in the National Flood Insurance Program.
- ≠ Compliance with the State of Washington Growth Management Act.
- \neq A disaster response plan has been implemented and is updated by staff when necessary.
- \neq Develop and implement a natural hazard awareness program.

CITY OF ANACORTES ACTION PLAN FOR NATURAL HAZARD REDUCTION SELECTION OF APPROPRIATE ACTIVITIES

No new activities have been identified for the 2014 plan. Progress is noted within the specific activity listed below.

1. Preventive activities, such as zoning, storm water management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs

ACTIVITY	STAFF ASSIGNMENT	FINANCING PLAN		
	& SCHEDULE			
Earthquake, Severe Storm, fire, Land Movement				
Utilize the latest adopted state building code to insure adequate protection in construction against Earthquakes in Seismic Zone 3, Severe storms with Wind exposure C, Fire with fire	State Legislature has adopted International Codes for implementation in 2013	No financial impact		
Resistive construction Standards, and Land Movement with Grading Standards	City Council adopts updated codes on a 3 year cycle in compliance with RCW 19.27, State Building Code.			
Utilize the latest adopted state fire code to insure adequate protection against fire in construction with standards for fire flow and through the annual Inspection of Commercial Structures	State Legislature has adopted International Codes for implementation in 2013	No financial impact		
	City Council adopts updated codes on a 3 year cycle in compliance with RCW 19.27, State Building Code.			
Flood				
The 100 year Flood zones shall be regulated to protect human life, property and the public health and safety of the citizens of Anacortes; minimize the expenditure of public money; and maintain the city's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer	Planning and Building Department – On-going Administration of model National Flood Insurance Program Ordinance	No financial impact		
Manage storm water runoff to improve drainage control storm water quantity	Public Works & Street Department-Administer Surface	Funded by Surface Water		
dramage, control storm water quantity,	Department-Administer Surface	Ounty lees, bour new		

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
prevent localized flooding of streets and private property during storm events, and protect and enhance water quality. Increase focus on storm water quality.	Water Management Code; Update comprehensive Storm Water Plan – 6 year cycle	construction and monthly rates
Make investigations and corrective actions of problem storm drains, including sampling. Developed a program for operation and maintenance of storm drains, detention systems, ditches, and culverts.	Public Works & StreetDepartments – OngoingAdminister Surface Watermanagement codeNPDES Permit Compliance	Funded by Surface Water Utility fees, both new construction and monthly rates
Flood, Landslide, Earthquake		
Utilizing Best Available science to develop the Critical Areas title to protect, to the greatest extent practical, life, property and the environment from loss, injury and damage by pollution, erosion, flooding, landslides, strong ground motion, soil liquefaction, accelerated soil creep, settlement and subsidence, and other potential hazards, whether from natural causes or from human activity and related goals.	Planning, Building and Public Works Departments – Ongoing program and regulations are in place.	Funding integrated into each department's budget, with dependence on grant funding.
Coordinate with Skagit county through arrangements such as inter-local agreements, joint programs, consistent standards, or regional boards or committees.	Multi-jurisdictional All Natural Hazard Mitigation Planning project – 2003 first plan, 2008 update; 2014 update, occurring Annual maintenance with five year update required	Funded by State/Federal Grant with local participation.
Public Works implementation of drainage utility including improved maintenance and operations, a rate structure and public education element. Drainage Utility rate structure adopted in early 1999; annual inspection and maintenance requirements for all private facilities implemented; previous annual inspections limited to public facilities.	Public Works Department – Ongoing	Funded by Surface Water Utility fees, both new construction and monthly rates

2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Landslide		
Provide protection of steep slopes according to standards in the Critical Areas Ordinance.	Planning, building & Public Works Departments – Ongoing	Local funds, fees and possible grant support.
Flooding		1
Regulations and policies reflect the existing shoreline. Nonstructural solutions to flood hazards shall be encouraged including restricting development in flood-prone areas and storm water runoff management	Planning, building & Public Works Departments – Ongoing	Local funds, fees and possible grant support.
The Building Official has developed a recording system for elevation certificates. Each elevation certificate is maintained by address and copies will be sent to FEMA on disk as requested. <i>Action:</i> Require, review, enter data in computer, and file certificates for all new development in flood zones.	Building Department – Ongoing	Local funds and fees.
The Planning director and the Building Official will continue to provide technical advice to property owners, contractors and design professionals.	Building and Planning Departments	Local funds and fees.
Earthquake, Severe Storm, Flooding		
Increase flood protection for the Water Treatment Plant; Provide Emergency Generator with capacity to operate plant.	Public Works Long term project—2 to 5 years in duration	Dependent on grant funding. Funding has been secured with construction planned for 2009/2010.
Seismic upgrade of Municipal Building	Public Works – long term	Funding to be determined.
Fire protection of Municipal Building	Public Works	Funding to be determined.

3.	The plan reviews activities to protect the natural and beneficial functions of the flood
	zones, such as wetlands protection

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
Protect and restore critical areas, plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of green belts and conservation areas.	Planning, Public Works, Building Departments – Ongoing	Combination of funding including department budgets, grant funds, surface water utility.
Provide habitat for wildlife species, food fish, and saltwater fish in close proximity to an urban area, including Fidalgo Bay.	Planning and Public Works Departments Ongoing	Combination of funding including department budgets, grant funds, surface water utility together with citizen actions on private property.
Plan the Stormwater management system to be consistent with policies regarding flooding, wetlands, land use, and water quality.	Public Works Department – Ongoing	Surface Water Utility funds, department budgets, and grant support.
Apply best management practices to reduce pollutant loading and minimize the effects of contaminated sediments on Fidalgo Bay, Guemes Channel and Burrows Bay.	Planning & Public Works Departments – Ongoing	Funding integrated into department budgets, grant funding
Flooding, Earthquake, Landslide, Fire, Se	evere Storms	
Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks. Integrate the concepts with natural functions such as drainage and topographic features.	Planning & Parks Departments – Ongoing	Parks Fund, general budgets together with citizen actions on private property
Forest Lands fire protection plan	Fire Department – Ongoing	General Budget, Department Budget.

4. The plan reviews emergency services activities

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding, Tsunami, Earthquake		
Developed a specific flood and tsunami warning and evacuation program for affected areas in the City of Anacortes	City Emergency Response Plan Committee Tsunami Action Plan 10/25/05	General Fund, other support to be determined
The transportation plan is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system. Critical for evacuation.	Planning and Public Works Departments On going	Funding integrated into department budgets with occasional grant funding support.
Maintain Police, Fire, and Wastewater Treatment Critical Facilities up to date with most current technology and standards to ensure operation during hazard events.	City of Anacortes Ongoing	Funding integrated into department budgets with occasional grant funding support.
Annual maintenance of the Emergency Response Plan to insure that all Critical Facilities including Nursing Homes, chemical storage facilities, schools, electric and communication substations have working emergency plan in place and that contacts are up to date.	City Emergency Response Plan Committee – Annual Review and update every 3 years	Funding integrated into department budgets.

5. The plan reviews structural projects

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Earthquake		
Seismic upgrade of municipal building, including analysis, design, and completion of work	Public Works Department – Short term project	Variety of funding sources including grant fund, federal, state and local funds.
All Hazards		
Purchase and install emergency generator with capacity to operate water	Public Works Department – Short term projects	Variety of funding sources including grant fund,

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
treatment plant. Construction is estimated for 2015.		federal, state and local funds.
Construct water system inter-tie with Skagit County PUD. The inter-tie with Skagit County PUD will provide both utilities with capacity should either plant is out of service for a short period of time. Dependent on compatible treatment processes.	Public Works Department – Skagit County PUD Short term projects	Variety of funding sources including grant fund, federal, state and local funds.
Install alternate fuel source for emergency generators at Fire Stations 1, 2, and 3.	Fire Department – Short Term Project	General fund and grant funding as available.
Install emergency power generator at Fire Station 3.	Fire Department – Short Term Project	General fund and grant funding as available.
Relocate overhead electrical wires underground at Fire Station 1apparatus access and egress ramp.	Fire Department – Short Term Project	General fund and grant funding.
City Hall—Install emergency generator capable of operating entire building	Public Works - Short Term	General Fund and grant funding.
City Hall—Upgrade fire protection systems. City hall is a 90 year old building that houses several municipal functions. Upgrade of the building structural and fire protection systems to ensure continued function during and after any natural hazard event	Public Works- Short Term	General Fund and grant funding.

The City of Anacortes has been pro-active upgrading facilities to modern codes. Since 1985 the following new facilities have been constructed:

- \neq Three fire stations
- \neq Sewer treatment Plant
- ≠ Police/Court Bldg with EOC
- ≠ Library
- \neq Water distribution system upgrades
- \neq All schools modernized with seismic upgrades
- \neq Hospital upgrades for seismic, fire safety and emergency care needs
- *≠* Water Treatment Plant





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CITY OF BURLINGTON



Flood Plain Management & Natural Hazard Mitigation Plan

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INTRODUCTION

The City of Burlington participates in Skagit County's multi-jurisdictional, Natural Hazard Mitigation Plan. The City of Burlington's objectives are to identify the natural hazards that can occur in the City of Burlington, assess the risk posed to life, property and economic vitality and identify viable hazard mitigation goals to reduce these risks. The City of Burlington has participated in the Skagit County Natural Hazard Mitigation Plan since its inception in 2003. This document serves as the 2014 update to the City of Burlington's portion of the plan.

Natural hazards that are identified for Burlington include Flood, Earthquake, Land Movement (on Burlington Hill), Severe Storms (wind in particular), Volcanic Eruption, Fire and Drought. The other natural hazards are Avalanche and Tsunami/Seiche.

The goal of the combined Natural Hazard Mitigation Plan and Floodplain Management Plan is to produce an on-going program of activities that will address the community's vulnerability to each natural hazard and meet other community needs. All possible activities have been reviewed and implemented so that the most appropriate solutions are used to address each hazard. The activities are coordinated with each other and with other community goals, objectives, and activities, preventing conflicts and reducing the costs of implementing individual activities.

CONTACT INFORMATION

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COMMUNITY PROFILE

Burlington, Washington is centrally located between Seattle to the south and Vancouver, B.C., Canada to the north, the North Cascade Mountain range to the east and upper Puget Sound to its west. Within a 30 minute drive in any direction residents and visitors alike can enjoy access to parks, trails, mountains, rivers, lakes, beaches, boating and other recreational opportunities. Some of the same attractions that draw millions of visitors each year to the Skagit Valley are what also inspired early pioneers to settle here in the first place. (Commerce, 2014)

Business growth is evidenced by the number of retail and specialty stores that have opened their doors in the last 35 years on either side of the Interstate 5 freeway in Burlington. By night the census of Burlington stands at 8,400 residents but that number balloons to more than 55,000 people on average each day. (Then and Now, 2014) The Burlington-Edison School District serves approximately 3,683 students in six separate schools located in and around the communities of Edison and Bow as well as the City of Burlington. Recent 2010 Census data determined a median household income of \$47,051, with an average of 13% of the population over the age of 65, with another 27% under the age of 18, 17% of the population below poverty level and 25% speaking a language other than english in the home. (Quick Facts, Burlington City, 2014)

LAND USE INFORMATION	ACRES	PERCENTAGE OF JURISDICTION
Total Land Area within jurisdiction	2822	100
Residential land area	1027	36
Commercial land area	653	23
Industrial land area	696	25
Agricultural land area	0	0
Open Space/Parks/ Resource land area	222	8
Other designation – Freeway, River & Rail Yard	224	8
TOTAL LAND (includes R-O-W)	2822	
Transportation or utility right-of-way		20-30%
Waterway or wetland		10%
TOTAL Transportation, utility, waterway or wetland		30-40%

PLANNING PROCESS

Introduction

In 1991, the City of Burlington made a commitment to on-going Neighborhood Planning Meetings and regular Land Use Bulletins mailed out to keep on top of events and issues. Through extended public involvement, issues relating to flood hazard reduction were identified early in the process and continue to be incorporated into the City of Burlington's adopted Comprehensive Plan. This plan also identifies the potential hazard to Burlington from other natural hazards, makes a determination about the vulnerability of the community, and recommends additional actions to mitigate those identified. With

the adoption of the Skagit County Natural Hazard Mitigation Plan, the focus is expanded to look at hazards including flood, earthquake, volcano, severe storms, fire, drought, tsunami/seiche, and land movement. Because Burlington is a participant in a multi-jurisdictional Natural Hazard Mitigation Plan, the city has been actively involved in designing and implementing the process, as outlined in the Introduction. The planning process includes the following steps:

Planning Committee

The planning process is organized under the direction of a professional planner and conducted through a committee composed of staff from those community departments that implement the majority of the plan recommendations. In addition to the multi-jurisdictional Natural Hazard Planning Committee the City of Burlington has a planning committee to focus on the unique elements in Burlington.

In an effort to have a diverse range of knowledge and skills contribute to the development and overall success of the plan a variety of decision makers and stakeholders were invited to participate in the planning process. The planning committee and process was formally adopted by City Council Resolution # 2013-18 by the City of Burlington. The City of Burlington's Planning Committee includes the Planning Director, the Fire Chief, the Police Chief, the Building Official, the City Administrator, the Public Works Director/ Engineer, the Skagit County Department of Emergency Management and Dike District #12.

Stakeholder and Public Involvement

The Natural Hazard Mitigation Plan conducted five planning committee meetings and five public meetings in order to encourage participation from both government and public representatives.

The following topics were the major agenda item at each meeting:

Meeting #1:	Focus on the natural hazards and why a mitigation plan is needed
Meeting #2:	Focus on review of the hazards & the problems that can result from the hazards
Meeting #3:	Focus on setting goals to mitigate the natural hazards
Meeting #4:	Review and discuss proposed mitigation strategies
Meeting #5:	Review and discuss draft plan & receive public comments

The multi-jurisdictional plan that includes the City of Burlington's plan element was developed through an exhaustive process. The draft plan is circulated to all jurisdictions and agencies located in the area, along with special purpose districts. Of particular concern to Burlington are the Skagit Department of Emergency Management, Army Corps of Engineers, the State Department of Ecology, the Federal Emergency Management Agency, Skagit County, Mount Vernon, Sedro-Woolley, Drainage Districts #14 and #19, and Dike District #12, and Fire District #6.

The plan is reviewed by the City's Flood and Natural Hazard Mitigation Technical Committee, consisting of Skagit County's flood engineer, Dike District #12 Commissioners, the Department of Emergency Management, Search and Rescue, the Fire Chief, the Police Chief, the Building Official, the City Engineer and the Planning Director. This committee is responsible for development of the early warning, preparedness and evacuation plan specifically tailored to the City of Burlington. See Appendix C. Each

year, the committee reviews the Action Plan and evaluates progress as part of the reporting process, both to the community and to the Community Rating System program. In 2002, the Flood Emergency Plan was updated to add the Evacuation Plan.

Availability of the document for public review is published in the local papers and the city's Planning and Land Use Bulletin and an announcement is posted in the Library and at City Hall. Following revision of the plan to incorporate comments received during the review period there are two public hearings, one before the Planning Commission and one before the City Council.

Plan Implementation Process

Funding for plan implementation is integrated in the city's overall Capital Improvement Plan and in the individual budgets of each participating department. It is an integral part of the city's work program and separate funding is not necessary. Today, diverse responsibilities are managed by each responsible department. Examples include management of the Drainage Utility, development and implementation of the Gages Slough Management Plan, maintenance of the city's drainage system, planning for street closures and evacuation routes and acquiring equipment needed for the operation.

The plan is formally adopted by resolution once it has been approved by Washington State Emergency Management Division and FEMA.

Prioritization of Action Items

The City of Burlington operates under the requirements of the Washington State Growth Management Act. City government format is a strong mayor with council. City staff evaluates actions based on community needs as expressed in the Growth Management Act and the various comprehensive plans adopted by the city council. Staff prepares recommendations for specific actions to the council for consideration. Council weighs the input from staff and citizens before making any decision.

Before an action may proceed there must be a demonstrated need and funding must be secured. When funding is available and approval of council is given, the project is included in the annual budget. Need for an action to proceed may be determined in a variety of ways including but not limited to: action items identified in adopted plans, cost benefit analysis, necessary service, emergency, directive from state or federal agency, safety or other benefit to the community. For planning purposes projects are evaluated and included in the annual update of the 6-year capital improvement plan. Many projects in the capital facilities plan are dependent on outside funding. Possible sources of funding are the general fund, capital improvement funds, utility reserves, local improvement districts, grant funding from a variety of sources including but not limited to private agencies, economic development organizations, state agencies, federal agencies and philanthropic sources. Other sources of funding may, from time to time, become available for specified actions that may or may not be included in the community planning process.

Plan Maintenance & Update Process

The Natural Hazard Mitigation Plan is reviewed by committee annually to address changing conditions and evaluate current and proposed mitigation measures for effectiveness. A formal report summarizing mitigation successes or recommended areas of improvement is submitted along with a copy of the Community Rating System required annual elevation report to the chairperson of the Skagit County Natural Hazard Mitigation plan by the 15th of September each year.

The Skagit County Natural Hazard Mitigation Plan is updated every 5 years. During which time a planning committee works in unison with the public to update the plan with the best available information regarding changing conditions, recent hazard events and continuing and/or new mitigation measures.

The Natural Hazard Mitigation Plan and Floodplain Management plan is required to be developed using a standard planning process, outlined as follows:

- A. Review of existing studies, reports, and technical information and of the community's needs, goals and plans for the area.
- B. Risk Assessment
- C. Assessment of the problem
- D. Mitigation Strategy
- E. Plan Maintenance
 - 1) The plan and later amendments will be officially adopted by the City Council.
 - 2) Implement, evaluate and revise.
 - a. The community has procedures for monitoring implementation, reviewing progress, and recommending revisions to the plan in an annual evaluation report, submitted to the City Council, released to the media and made available to the public.
 - b. The evaluation report should be prepared by the same planning committee that prepared the plan.
 - c. The plan is updated every five years, and this is the 2013-2014 update, reviewed and amended annually as needed.
- F. The Program for Public Information was developed for Burlington a number of years ago, and that program is being updated and refocused in conformance with the 2013 Community Rating System standards and manual. Both an Insurance Agent and a Lender participated in the plan update process, along with Dike District #12 and representatives of the City's emergency planning committee, providing an informative and interesting process that will hopefully enhance as well as update the public information program.

REVIEW OF EXISTING STUDIES, REPORTS AND TECHNICAL INFORMATION AND OF THE COMMUNITY'S NEEDS, GOALS AND PLANS FOR THE AREA

HAZARD MITIGATION PLANNING MAPS	DATE
SEE APPENDIX B	
Critical Areas Map	2012
Parks Plan Map	2010
Sewer Plan Map	2013
Storm Sewer Plan Map	2005
Street/Bridge Map	2003
Evacuation Route Map	2002
Critical Facilities Map	2003

REPETITIVE LOSS DATA	UPDATE	STATUS
Repetitive Loss Properties	2013	None in the City Limits of Burlington

RISK ASSESSMENT - ASSESSMENT OF THE HAZARDS

PLAN REQUIREMENT: Using available data and studies, provide a map of the known flood hazards, a description of the known flood hazards including source of water, depth of flooding, velocities, and warning time, a discussion of past floods, and a map, description and history of other natural hazards, including all natural hazards that affect the community.

See Appendix B, Maps for known flood hazard areas.

History of Natural Hazards

Flooding

Throughout the years, major flooding has occurred in the Skagit River Basin. Because of its geographic location, the Skagit River Basin is subject to winter rain floods and an increase in discharge during spring due to snowmelt runoff. Rain-type floods occur usually in November or December, but may occur as early as October or as late as February. Antecedent precipitation serves to build up ground water

reserves. Frequently, a light snow pack is then formed over most of the entire basin. A heavy rainfall accompanied by warm winds completes the sequence, which produces major floods. The heavy rainfall and accompanying snow melt result in a high rate of runoff, as the ground is already nearly saturated from earlier precipitation. Two or more crests may be experienced within a period of a week or two as a series of storms move across the basin from the west. The winter floods have a considerably higher magnitude than the average annual spring high water.

The snow melt peak is expected during the spring or early summer, caused by the seasonal rise in temperatures with resultant melting of the accumulated snow pack. The spring snowmelt is characterized by relatively slow rise and long duration. While this high water occurs annually, it seldom reaches a damaging stage. During the annual spring or early summer high water, power reservoirs are filling, and as a result, the spring discharges are frequently reduced. 1997 was an exceptional year, with several minor floods occurring during the summer months after the reservoirs were full. 2007 was also interesting with high water until nearly the end of July.

The magnitude and intensity of a storm cannot always be used as an index of the resultant river discharge. Other factors, such as the temperature sequence, degree of soil saturation, and moisture content of the snow pack largely influence the rate of and total runoff produced by a particular storm. Conditions preceding a storm may be such that even a moderate storm could set in motion the related factors that, collectively, result in a flood. Conversely, conditions in the drainage basin may be such that a severe storm results in only minor high water.

There are four flood zones in the City Limits of Burlington, the Floodway (river side of the dike), the 100 Year Flood Zone, the 500 Year Flood Zone, and the Special Flood Risk Zone. If property is located in the vicinity of Gages Slough and the land is three feet or more below the 100-year flood elevation, the risk of flooding is somewhat greater than in the surrounding area. This is because of the potential for floodwaters to be diverted into the Slough, in the event of flooding between here and Sedro Woolley, as occurred in the winter of 1990 and 1995.

However, the likelihood of flooding in the event of a 100-year flood is pretty much the same throughout the City Limits. There are a few spots of relatively high ground classified as 500-year floodplain, and Burlington Hill that is outside of the floodplain.

The term "100 year flood plain" is used to describe the land which has a 1% or greater chance of flooding in any year. Floods that have broken through or overtopped the levee system are generally much smaller.

The 2006 flood event had the potential for disaster and was in fact a disaster upriver. The estimated flow at Concrete was 145,000 cfs, a 17-year frequency, and 122,000 cfs at Mount Vernon, a 12-year frequency. The storm shifted direction and the Skagit River delta area was flooded through the Nookachamps and Sterling areas, but the water did not overtop the railroad tracks in Sterling. Notice of potential evacuation of critical facilities was provided, but the evacuation was cancelled.

The 2003 flood event had an estimated flow at Concrete of 166,000 cfs, a 32-year frequency, while at Mount Vernon; the flow was 135,000 cfs, a 19-year frequency. In Burlington, critical facilities were

evacuated. Many important lessons were learned through this process and a much improved state of readiness and awareness is the result. However, citywide evacuation was not necessary, and the sandbagging operation along the railroad tracks from Lafeyette Road towards Sterling was successful in preventing overtopping.

The 1995 flood event was very comparable to the 1990 event with a river elevation of 37.36 feet. Evacuation was required along Whitmarsh Road. The flood fight was well planned and well executed. Damage was limited to a road that was underwater on the water side of the dike and flood boils at the Wastewater Treatment Plant. Since that flood, major work has taken place to strengthen the dike system, including installing keyways and widening the dikes, along with substantially increasing the backslope of the dikes to provide better protection in the event of overtopping. The city and the Dike District are jointly managing a 132-acre site along the River to improve flood hazard mitigation while providing public open space. One hundred acres were acquired by the City in April 1997 to prevent additional construction near the levee.

The 1990 storm is classified as a 35-year storm, elevation 37.37 feet. Intense flood fighting redirected the water coming over Highway 20 into Gages Slough and kept the town dry. The major damage in the city was underground; an old sanitary sewer line broke under a city street. The ground washed away from around the pipe, which had a long history of problems with infiltration of water. One of the points of discussion was the District Line Road/Highway 20 problem. The water was redirected in the 1990 flood event over the highway and into Gages Slough. This was a very controversial issue. At that meeting, the County indicated that there is a dip of several feet in the grade between road crossings, and that they will, therefore, support the placing of sandbags up to the perceived original height of the railroad tracks.

Before then, there was a 12 year flood in December of 1975 that was essentially a levee full flood with little or no freeboard and, because of extensive flood fighting, the flood was contained.

Earlier floods occurred in 1910, 1917 and 1921 that sent floodwaters throughout Burlington. Extensive structure and property damage occurred in many areas of Skagit County in each of these flood events. Photographs show water down the main street, but there are no reports available in the community regarding damage estimates. There are no repetitive loss areas in the City of Burlington.

Earthquake

The City of Burlington is located in Seismic Zone D and there are extensive seismic requirements in the adopted building code. Much of the City of Burlington lies in the Skagit River Floodplain and that is the type of soil that is known for liquefaction in a major earthquake. There are large areas of Burlington with soil problems.

After the Nisqually Earthquake of 2001, one complaint of damage was received by the City and that was structural damage to the concrete tilt-up building occupied by Cascade Clear, a local water bottling company. There were cracks in numerous locations, and a structural engineer was retained to investigate and repair. There is no other historical data on file in the City.

Fire

The City of Burlington also provides service to Fire District #6 through a long-term contractual relationship, so the overall service area is about 26 square miles. The only wooded area in Burlington is located on Burlington Hill. It only had a few homes until the year 2000 when the east side was cleared and subdivided. There was a brush fire after the 4th of July in about 2005 from fireworks that could have threatened homes but it was extinguished quickly.

Volcanic Event

The City of Burlington is located in an area where volcanic events have occurred in the past. When the dikes were excavated for the purpose of installing a clay keyway, volcanic material was excavated from the site. The material has the consistency of silly putty.

Severe Storm

The City of Burlington experiences severe windstorms on an occasional basis. The area is located in Wind Exposure C for new construction standards. There are also relatively rare snow storms. Heavy rain storms are more related to flood events for Burlington.

There have been numerous serious wind events in Burlington including the collapse of two full height walls of the new Hollywood Video Building while under construction, with gusts of 70 mph plus.

The trusses on the new Fire Station collapsed while the building was under construction from high winds. The most recent event was March 12, 2003, where one older industrial building lost its second story roof, many trees and power lines were down. The winter of 2006-2007 was a year of multiple power outages in the area from a number of storms, but no significant building damage.

Land Movement

The rock on Burlington Hill is very old and due to the steep slopes, must be carefully handled during construction. The road constructed on Burlington Hill in 1998 has two areas of land movement, each in the steepest sloped portion of the road. Reconstruction of the north side was completed in May of 2007 and repairs to the south side completed in the spring of 2008.

Other Natural Hazards Minimal in Burlington

The likelihood of Avalanche, Drought or Tsunami/Seiche is very low.

City of Burlington 2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted + Health and Safety Consequences + Property Damage + Environmental Damage + Economic Disruption multiplied by Probability of Occurrence). Has been updated for 2014 based on changing conditions and recent events.

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Drought	0	0	0	0	0	1	0
Earthquake	4	1	2	1	2	3	30
Flooding	4	2	2	2	3	4	52
High Winds	4	1	2	3	3	4	52
Landslide/Erosion	1	1	1	1	2	4	18
Storm Surge/Tsunami	0	0	0	0	0	1	0
Wildfire	1	1	1	1	1	2	10
Winter Storm	4	1	1	1	1	4	32
Volcanic Activity	4	3	3	3	3	2	32

Total Jurisdictional Risk Estimation Score:

226

Area Impacted: Health &	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%		
Safety:	0=No impact	1=Few injuries	2=Few fatalities, many	y injuries	3=Numerous fataliti	es	
Property:	0=No impact	1=Few destroyed or	damaged	2=Few destroyed	, many damaged or F	ew damaged, many de	stroyed 3=Many properties destroyed or damaged
Environment:	0=Little or No impact	1=Short term	2=Long term	3=No recovery			
Economic:	0=No impact	1=Low costs	2=High direct cost and	d Low indirect or Lo	w direct and High ind	irect	3=High Direct and Indirect Cost
Probability:	1=Unknown but rare	2=Unknown but anti	cipated	3= <100 year	4=<25 year	5=Once a year or mo	re

History of Declared Emergencies

NATURAL HAZARD EMERGENCIES DECLARED BY THE BURLINGTON CITY COUNCIL			
Type of Event	Date	Total Public Damage	
Flood: Section St. Sewer Collapse, holes in line filled with water from Gages Slough	1990	\$500,000 to rebuild street and sewer	
Flood: Sand boils @ Sewer Plant, Whitmarsh Road pavement lifted	1995	\$10,000 @ Plant \$50,000 for road repair	

MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS

The City of Burlington is primarily located in the 100-year floodplain, defined as a Special Flood Hazard Area by the Federal Emergency Management Agency. Burlington participates in the Community Rating System (CRS) with a focus on No Adverse Impact Floodplain Management. There is a substantial benefit to the community for successful participation in the CRS program.

This proactive program is designed to encourage the reduction of the risks associated with flood events. Not only is public awareness and preparedness encouraged, but property owners also benefit from a reduction in Federal Flood Insurance rates. Property owners may also be eligible to receive additional rate reductions by having an Elevation Certificate issued by a licensed civil engineer. All the elevation benchmarks in Burlington have been surveyed and are available for use.

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		POLICY STATEMENT
2005 COMPREHENSIVE PLAN	Chapter 2,	Protect and restore critical areas including Gages
 Land Use Flooding, Landslides 	Section 6	Slough; plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions.
		Provide on going public education at all levels, from the renter to the homeowner, regarding residential, commercial and industrial best management practice issues, flood hazard mitigation, water quality, and related local issues.

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		POLICY STATEMENT
		Update annually.
	Chapter 11, Sections 6,7,11,12	➤ Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks. Integrate the concepts with natural functions such as drainage (Gages Slough), agriculture (surrounding farmland), and topographic features (Burlington Hill).
 2005 COMPREHENSIVE PLAN Environmental and Critical Area Policies Flooding Landslides Fire Volcano Earthquake Severe Storms 	Chapter 12 General, Section 1, 2	 Integrate environmental considerations into applicable ordinances, standards and regulations, as well as into the design of projects. To the extent practicable, fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
 2005 COMPREHENSIVE PLAN Environmental and Critical Area Policies Landslide Erosion 	Chapter 12 Earth, Section 2	Provide protection of steep slopes according to standards in the Critical Areas Ordinance, as generally identified in these policies.
 2005 COMPREHENSIVE PLAN Environmental and Critical Area Policies Flooding Severe Storm 	Chapter 12, Water, Section 1 A	Manage stormwater runoff to improve drainage, control stormwater quality, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality.
		The City shall participate in the Community Rating System to obtain the maximum possible reduction in Flood Insurance Rates from the Federal Emergency Management Agency.

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		POLICY STATEMENT
 2005 COMPREHENSIVE PLAN Environmental and Critical Areas Policies Flooding 	Chapter 12, Land and Shoreline Use Implementation Policies, Section 1, Economic Development	 Land and Shoreline use patterns shall provide for the location of existing and future transportation facilities, utilities, and recreation activities that are dependent on access to the water. Because of the unique floodway and floodplain limitations on the use of the Skagit River shorelines, particularly the dike system, the majority of the shoreline shall be identified and reserved for recreational and open space uses.
2005 COMPREHENSIVE PLAN	Chapter 12,	To protect and restore the wetlands to optimize
& 2012 Shoreline Master	Land and	water quality, habitat, best management practices
Program Environmental and Critical Area Policies • Flooding • Shoreline Master Program	Shoreline Use Implementation Policies, Section 5, Use Shoreline Master Program Adopted 2012 to be Title 18 BMC	and ensure that adjacent land use patterns are compatible with the protection and enhancement of the wetlands and take advantage of the unique attributes of the site, allowing no net loss of wetlands, and for Gages Slough, to also increase the size of culverts, remove obstructions and generally improve the flow characteristics to provide for efficient conveyance of water through the city during flood events.
		 To allow limited use of the Skagit River and its shoreline compatible with the Dike system and with the regulatory constraints of the Floodway and Special Flood Risk Zone, including transportation, levee improvement, utilities and outfall structures, public access and recreation, open space and agriculture and similar uses. To select and establish standards for the uses that enhance the existing environment, while ensuring that proposed uses do not infringe upon the rights of others or upon the rights of private ownership.
2012 COMPREHENSIVE	Goals and	The transportation plan is designed to ensure the
TRANSPORTATION PLAN	Objectives	continued ability of the transportation system to
	1&7	function at a reasonable level of service throughout the urban service area and coordinate the links to

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		POLICY STATEMENT
 Flooding Volcano Fire Earthquake 		 the regional transportation system along with Mount Vernon. The Six Year Road Plan and the transportation element of the annually updated City of Burlington Capital Improvement Plan shall be coordinated with the Land Use, Utilities and other relevant plan elements to ensure a balanced program that is adequately funded and responsive to community interests.
2005 SURFACE WATER MANAGEMENT PLAN Flooding 	Chapter 12 Water Section 1	➤ Manage stormwater runoff to improve drainage, control stormwater quantity, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality.
		Plan the stormwater management system to be consistent with policies regarding flooding, wetlands, land use and water quality.
		➤ Develop an integrated program for quantity and quality control that recognizes the unique situation faced by the City with its location in the 100-year flood plain and needs for flood control in larger storm events, while at the same time needing to control the effects of smaller storms in terms of both quantity and quality of runoff.
		➤ Apply best management practices to reduce pollutant loading and minimize the effects of contaminated sediments on Gages Slough and the Skagit River.
		Provide for ongoing public education aimed at residents, businesses, and industries in the urban area. The education programs are to inform citizens about stormwater and its effects on water quality, flooding, and fish/wildlife habitat, and to discourage dumping of waste material or pollutants into storm drains.

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		POLICY STATEMENT
		 Make investigations and corrective actions of
		problem storm drains, including sampling.
		Develop a program for operation and
		maintenance of storm drains, detention systems,
		ditches, and culverts.
		Coordinate with Skagit County through
		arrangements such as interlocal agreements, joint
		programs, consistent standards, or regional boards
		or committees.
	Wastewater	Provide 100-year flood protection for wastewater
WASTEWATER PLAN	Facilities Plan	treatment plant (Work completed)
		Provide Emergency Generator capability for all
• Flood		pump stations
Earthquake		Ungrade construction to latest seismic and wind
Severe Storm		standards (Work completed)
		·····
2010 PARKS AND	Urban Wildlife	Provide habitat for wildlife species, foodfish, and
RECREATION,	Habitat Plan	freshwater fish in close proximity to an urban area,
COMPREHENSIVE PLAN	Element	including the Skagit River Shoreline, the Gages
Flood		Slough Corridor and Burlington Hill
Volcano		
2013-2018 CAPITAL	Level of Service	➤ Urban Level of Service Standards are established
IMPROVEMENT PLAN	Standards and	to ensure protection of public health, safety and
	Individual	welfare by meeting relevant standards
• Fire	Department	
Earthquake	Submittals	Six-year list of projects including specific actions
Severe Storms		targeted towards natural hazard mitigation

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		
		POLICY STATEMENT
2013 FLOODPLAIN	Action Plan for	Building Official to maintain elevation certificates
MANAGEMENT	Flood Hazard	and copies are sent annually to FEMA.
_	Reduction –	· · · · · · · · · · · · · · · · · · ·
2014 FLOOD HAZARD	Selection of	Action: Require, review and file certificates for all
REDUCTION AND DISASTER	Appropriate	new development in the floodplain development
PREPAREDNESS PLAN	Activities	project. Establish a complete file of pre-FIRM
		certificates, using local incentive program. Timeline
		is ongoing.
• Flood		The Planning Director and the Building Official
		will make flood map determinations in response to
		public inquiry, annual mailing to real estate agents,
		lenders and insurance agents.
		Action: Make map determinations, provide annual
		mailing to users, and maintain accurate records and
		logs. Timeline is ongoing.
		Planning Director continues to mail out a flood bulletin twice appually, including mans elements.
		availability of library materials, and natural and
		beneficial functions.
		Action: Research material and flood bulletins,
		mailed entire community. Continue to participate
		date and involved by bringing timely tonics to
		regular Neighborhood meetings. Timeline is spring
		and fall of each year.
		N Dealtare will continue to provide disclosure of
		Realtors will continue to provide disclosure of flood bazard on a voluntary basis and the Planning
		Department will work to modify the disclosure to
		identify the requirement for flood insurance
		purchase. Action by the state legislature to make
		this mandatory failed in 1995, but is expected to be
		revisited.
		Action: Improve flood bazard disclosure by adding
		requirement for flood insurance purchase. City will
		support legislation at state level. Timeline is
		unpredictable.

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		POLICY STATEMENT
continued from previous page		The City Librarian will continue to maintain the Flood Protection Library and add updated materials. There is a reference on the Floodplain Management Resource Center and instructions on how people can use it. Documents regarding the natural and beneficial functions of floodplains and updated local, state and federal materials are added as they become available.
		Implement a long range Gages Slough Management Plan, adopt and administer the 2012 Shoreline Master Program for Gages Slough and the Skagit River Shorelines in Burlington.
		Encourage use of Low Impact Development techniques for both public and private development.
		Increased preservation of the open space and drainage corridor through easements, deeding land to city
		 Improve water quality; eliminate failed septic systems; fence out livestock;
		 Improve wildlife habitat; do restoration planting projects
		 Increase regulations such as greater setbacks where applicable
		 Implement specialized best management practices to minimize problems in the long run.
		Action : Gages Slough Special Flood Risk Zone is now subject to the new Shoreline Master Program as the major drainage course in the city.
		Public Works implements drainage utility including improved maintenance and operations, a rate structure and public education element.

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POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		
		POLICY STATEMENT
continued from previous page		 Drainage Utility rate structure adopted in early 1997; annual inspection and maintenance requirements for all private facilities implemented; previous annual inspections limited to public facilities. Public education on best management practices is focused on Gages Slough property owners and the businesses that dump storm water into the Slough through a piped system. Action: Annual inspections and maintenance of all public and private drainage facilities; identified pollution problems will be tracked down and best management practices implemented to control source pollutants. Continue to implement Capital Improvements to stormwater system. Maintain updated maps and continue to work on automated base maps and overlays, leading to a planning level geographic information system; data collection and data sources become accessible. Action: Planning Department to continue maintenance and updating of existing land use and topographic maps and continue data entry and development of mapping layers in automated
		system, including parcel and overlay data. Required flood elevations are identified for individual parcels.
		➤ Implement the adopted Surface Water Management Title by Public Works. Each development is regulated and stormwater quality is also regulated. Long-term storm water quality issues are a major focus in the Gages Slough Management Plan.
		Action : Continue and improve surface water management through more in depth review, regulation and training.
		 Using improved citizen involvement, public education and establishing a solid work program to

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		
		POLICY STATEMENT
		 improve maintenance of the drainage system. Plan to increase city maintenance of Gages Slough as drainage easements or public ownership becomes available, or a public/private partnership can be developed. Acquire land in the Gages Slough Corridor through land donation in exchange for Park Impact Fee Credit. Public education is a key focus of the drainage program and specialized best management practices brochures are designed for the residential, agricultural and business issues specific to Burlington. Action: Enhance maintenance of the system, including ability to maintain more of Gages Slough, by working with the property owners and business community.
		 Develop and maintain a specific flood warning and evacuation program for the City of Burlington. The City of Burlington Flood Emergency Plan was developed in 1995 and updated in 1998 and 2002 to reflect the best approach possible. Action: Fire, Police, Planning, Department of
		Emergency Management and other agencies have developed and refined a specific community based plan. The plan will be exercised and tested annually and revised as needed.
		➤ Dike District #12 will continue to maintain and upgrade the levee system with the goal of levee certification. Major improvements have been made to the dike system since the 1990 flood, including the installation of keyways and back sloping the landward toe of the dikes. Land for the work has been made available through an Interlocal Agreement between Dike District #12 and the City of Burlington. The protection of the Wastewater Treatment Plant was improved to 100-year.

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		
		POLICY STATEMENT
		 Action: Continue to keep the dikes in excellent condition. Annual inspections are done; maintenance is on going. Action: Maintain and improve the Flood Protection Library. Additional local documents continue to be added as they become available, including updates to the Flood Plan and local early warning and evacuation plan. ➤ The Planning Director and the Building Official will continue to provide technical advice to property owners, contractors and design professionals. Action: Provide technical advice and update materials to include latest documents. Timeline is on-going.
2012 INTERNATIONAL	Seismic and	► Seismic Zone D
 BUILDING CODE Earthquake Severe Storm Fire Landslide 	Wind Loads, Construction Standards	 Wind Exposure C Fire Resistive Construction Standards Grading Standards
2012 INTERNATIONAL FIRE	Fire protection	► Fire flow
CODE • Fire	and building maintenance standards	 Annual Inspection of Commercial Structures Plan Review
TITLE 14 SURFACE WATER	14.800.020	The provisions of this title shall be liberally
MANAGEMENT	Purpose	construed to accomplish its remedial purposes, which are:
FloodLandslide		1. To protect, to the greatest extent practical, life, property and the environment from loss, injury and damage by pollution, erosion, flooding, landslides, strong ground motion, soil
Severe Storm		liquefaction, accelerated soil creep, settlement and subsidence, and other potential hazards, whether

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD		
		from natural causes or from human activity; 2. To protect the public interest in drainage and related functions of drainage basins, watercourses and shoreline areas; 3. To protect surface waters and receiving waters from pollution, mechanical damage, excessive flows and other conditions in their drainage basins which will increase the rate of downcutting, streambank erosion, and/or the degree of turbidity, siltation and other forms of pollution, or which will reduce their low flows or low levels to levels which degrade the environment, reduce recharging and ground water, or endanger
continued from previous page		aquatic and benthic life within these surface waters and receiving water of the state; 4. To meet the requirements of state and federal law and comply with regulatory standards for the city's municipal storm water, and 5. To fulfill the responsibilities of the city as
		 trustee of the environment for future generations. It is expressly the purpose of this title to provide for and promote the health, safety and welfare of the general public. This title is not intended to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by its terms.
2002 CRITICAL AREAS CODE	Section	► Frequently flooded areas; It is the purpose of this
as modified by the 2012	15.15.020	chapter to promote the public health, safety, and
Snoreline Master Program Flooding	Application- Purpose	general wentare, and to minimize public and private losses due to flood conditions in the floodplain and the floodway according to the provisions established under this code;
Landslide		 Geologically hazardous areas; Geologically hazardous areas include areas susceptible to the
POLICY TYPE AND	CITATION	MITIGATION-RELATED
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APPLICATION TO HAZARD		
		POLICY STATEMENT
		effects of erosion, sliding, earthquake, or other geologic events. They pose a threat to the health and safety of citizens when incompatible residential, commercial, industrial, or infrastructure development is sited in areas of a hazard. Geologic hazards pose a risk to life, property, and resources when steep slopes are destabilized by inappropriate activities and development or when structures or facilities are sited in areas susceptible to natural or human caused geologic events. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices so that risks to health and safety are acceptable. When technology cannot reduce risks to acceptable levels, building and other construction within identified geologically hazardous areas shall be prohibited.
 ZONING CODE Flood Fire Landslide Earthquake 	Section 17.03.020 Purpose	 The purpose of this title is to implement the city of Burlington's comprehensive plan. This title will be used to further the growth and development of the city of Burlington consistent with the adopted comprehensive plan and it's implementing elements. This title will also further the purpose of promoting the health, safety, morals, convenience, comfort, prosperity, and general welfare of the city's population. The specific zones and regulations herein are designed to facilitate adequate provisions of utilities, schools, parks and housing with essential light, air, privacy, and open space; to lessen congestion on streets and facilitate the safe movement of traffic thereon; to stabilize and enhance property values: to prevent the
		enhance property values; to prevent the overcrowding of land; to facilitate adequate provisions for doing public and private business and thereby safeguard the community's economic structure upon which the prosperity and welfare of

APPLICATION TO HAZARD POLICY STATEMENT all depends and through such achievements help ensure the safety and security of home life, foster good citizenship, create and preserve a more good citizenship, create and preserve a more	POLICY TYPE AND	CITATION	MITIGATION-RELATED
all depends and through such achievements help ensure the safety and security of home life, foster good citizenship, create and preserve a more	APPLICATION TO HAZARD		POLICY STATEMENT
 healthful, serviceable and attractive municipality and environment in which to live. ➤ To most effectively accomplish these purposes, this title divides the city into zones wherein the location, height and use of buildings, the use of land, the size of yards and other open space, and the provision of off-street parking and loading are regulated and restricted in accordance with the comprehensive plan for the city of Burlington. These zones and regulations are hereby deemed necessary and are made with reasonable consideration, among other things, as to the character of each zone and its particular suitability for specific uses, the need for such uses, the common rights and interests of all within the zone as well as those of the general public, and with the view of conserving and encouraging the most appropriate use of land throughout the city. 	continued from previous page		 all depends and through such achievements help ensure the safety and security of home life, foster good citizenship, create and preserve a more healthful, serviceable and attractive municipality and environment in which to live. ➤ To most effectively accomplish these purposes, this title divides the city into zones wherein the location, height and use of buildings, the use of land, the size of yards and other open space, and the provision of off-street parking and loading are regulated and restricted in accordance with the comprehensive plan for the city of Burlington. These zones and regulations are hereby deemed necessary and are made with reasonable consideration, among other things, as to the character of each zone and its particular suitability for specific uses, the need for such uses, the common rights and interests of all within the zone as well as those of the general public, and with the view of conserving and encouraging the most appropriate use of land throughout the city.

RISK ASSESSMENT – ASSESS THE PROBLEM

PLAN REQUIREMENT: The assessment of the vulnerability of the community to the hazards identified includes the following elements:

- 1. An overall summary of each hazard identified in the hazard assessment and its impact on the community.
- 2. A description of the impact that the hazards identified in the hazard assessment have on life, safety, and health and the need and procedures for warning and evacuating residents and visitors;
- 3. A description of the impact that the hazards identified in the hazard assessment have on critical facilities and infrastructure;
- 4. The number and types of buildings subject to the hazards identified in the hazard assessment;
- 5. A review of all properties that have received flood insurance claims or an estimate of the potential dollar losses to vulnerable structures;

- 6. A description of areas that provide natural and beneficial functions, such as wetlands, riparian areas, sensitive areas, and habitat for rare or endangered species;
- 7. A description of development, redevelopment, and population trends and a discussion of what the future brings for development and redevelopment in the community, the watershed, and natural resource areas;
- 8. A summary of the impact of each hazard on the community's economy and tax base.
- 1. An overall summary of each hazard identified in the hazard assessment and its impact on the community.

Flood

All areas in Burlington and the surrounding area are subject to flooding with the exception of Burlington Hill.

Levee protection is at approximately the 50-year storm event, with a 25-year profile. This is approximately river elevation thirty-eight (38) feet.

Normal high water is 24-26 feet at the Railroad Bridge. Elevation 22 represents the vegetation line. The dike is 14 - 16 feet above that point. The top of the levee is from 39-40 feet. Whitmarsh Road is blocked at 23.5'. The elevation of the bottom of the bridge is 28.3'.

The basic rule of thumb is that the level of the river decreases at the rate of about 1.5 feet per mile.

Possible water height in a 100-year flood in Burlington is approximately five (5) feet of water. Most of the Skagit River valley will require evacuation in that scenario.

The 1990 flood reached 37.37 and 1995 flood reached 37.36', very close to overtopping the levees. In an event larger than that, or a similar event with a levee failure, more extensive evacuation will be required.

From 2007 to 2014, a major dispute has been in process with respect to how much water will reach the Skagit River Delta area in a 100-year flood event, how high the 100-year base flood elevations should be, what options there are for establishing something comparable to a regulatory floodway, and how the computer modeling process should be handled with respect to policy changes in assumptions about levee failures. In addition, homeowners are getting their flood insurance policies rerated and

substantially increased based on changing interpretations of crawl spaces and basements, in spite of lip service being given to "grandfathering" in at the time of issuance of the original elevation certificate for the home.

It is possible that the General Investigation will have recommendations in 2014 for long term flood hazard mitigation that are focused on urban flood protection. At the same time, the FEMA program is changing to allow for certification of levee segments, which will allow Burlington to certify its levee segments without a high ground tieback to minimize the effects on upstream flooding.

In order to provide for certainty for property owners and to maximize flood hazard mitigation in Burlington, the City of Burlington and Dike District #12 are working aggressively towards Levee Certification. Under the new FEMA process, levee segments will qualify for certification followed by FEMA accreditation. In depth studies are complete and work is in process on levee improvements, so the levees will be counted as providing flood protection in the computer modeling that is done to determine flood levels.

Areas Subject to Inundation if Dike is overtopped or if Storm Exceeds Levee Design Capacity and Dikes are Widely Overtopped (theoretical case)

- 1. Historical overtopping has occurred along SR 20 east of District Line Road. This occurred in the flood in the winter of 1990. Path is across the Railroad tracks and down SR 20 into town unless diverted to Gages Slough, which also occurred in 1990.
 - In the flood of November 29 and 30, 1995, the flood fight for SR 20 was well planned in advance by Assistant Fire Chief Roger Tjeerdsma. The night before the crest was expected, 12,000 sandbags were stacked along the river side (south) of the railroad tracks, brought in on flatcars by the railroad from the Dike District #12 EOC, also located next to the railroad. These were then carefully placed to the correct height to fill in the low spot in the railroad grade and provide for controlled overtopping. See Photographs. It was previously agreed that the levy would not be built higher than the District Line Road elevation at the Railroad Crossing.
 - Overtopping can also be expected at Whitmarsh Road at the crossdike, at the point east of Burlington Boulevard where the underpass takes off, and at points east along the dike (Natagani estate property). Photographs of the flood fight at those locations are shown.
- 2. If the levee overtops at District Line Road and water is directed both north of Burlington Hill and into Gages Slough, homes north of SR 20 and west of Vista View Drive (where the water crosses the road), and along Gages Slough will be evacuated. Depending on the severity of the situation, the Northeast, North/Central and South Sectors may also require evacuation. See Evacuation Plan for Evacuation Routes by Sector.

3. If the storm exceeds the 50-year design of the levee system, citywide evacuation is likely required when the river elevation reaches 38 feet. There will be widespread overtopping at a minimum.

Areas subject to Inundation if Dike Fails – See Evacuation Route Map for Sector Listings

- 1. Numerous levee breaks have occurred east of town in the vicinity of District Line Road with the old levees. The potential is always present and must be anticipated in the planning process.
 - Path is across the Railroad tracks and down SR 20 into town unless diverted to Gages Slough.
 - If water is diverted to Gages Slough, the area along the slough is subject to inundation.
 - If not diverted, it will go down the road and inundate the Northeast and North /Central Sectors, at a minimum.
 - If extent of flooding has water going north of Burlington Hill, the Burlington Hill Industrial Park will be inundated (North/Central Sector).
- 2. Potential levee failure near the Wastewater Treatment Plant at the bend in the river.
 - At this location, the Northeast and South Evacuation Sectors will be inundated.
- 3. Potential levee failure between the railroad bridge and Burlington Boulevard or between Burlington Boulevard / I-5.
 - At this location, inundation will occur in the South Sector, a major commercial and industrial area.
- 4. Potential levee failure west of I-5 near I-5 Auto World
 - At this location, there are few residences, primary use is auto dealership; the Southwest Sector west of I-5 will be inundated. It is not likely that this will extend north of SR 20.
- 5. Potential levee failure at or near Avon Not in City Limits
 - This is west of the Urban Growth Area; however, numerous residences are located adjacent to the levee.

Because flooding occurs fairly often, the Community has a high level of awareness of flooding and preventive structural and non-structural measures to mitigate the impact. In a 100-year flood event, most of the city will be inundated with water up to three feet in depth. Water depths will exceed eight feet in some areas in the Gages Slough corridor, but the velocity is minimal.

Burlington is working toward the goal of having the Levee System Certified for 100-year Flood Protection. That is the goal and the Dike District is building levees with wide tops, clay keyways and long backslopes for overtopping. Engineering and geotechnical studies are complete along with a detailed scope of work and construction is underway on the two levee segments upstream from the BNSF Railroad Bridge.

Burlington is fronted by a well-constructed and maintained levee that extends approximately one mile upstream of the city, but the levee will not protect the city from a 100-year flood on the Skagit River. Each year, the levees are inspected by the Army Corps of Engineers. The levees are in excellent condition and exceptionally well maintained. Dike District #12 has been very busy with levee improvements following the 1990 flood.

The danger of flooding in Burlington is imminent when the river reaches the stage 38.1 feet. Maximum flood fighting using expedient flood works are employed and evacuation is necessary, according to Skagit County's Emergency Management Department. Upstream of the Burlington Northern Railroad

Bridge, the water is 3 to 4 feet higher because of debris and logjams and the effect of the bridge structure itself. In 2014, BNSF has started the discussion on seeking funding to replace the bridge or at a minimum to remove the central piers of the bridge structure utilizing current construction technology.

Compare this with the earliest flooding, which occurs at stage 25.5 feet with backwater in Nookachamps Creek, flooding of low-lying farmland and no damage, and you can easily see that the flood hazard in Burlington is severe when it happens. It is very difficult to visualize this without having seen a flood, but considering the fact that the 100 year elevation for protecting structures is 27 feet at Interstate 5 and 40 feet at Gardner Road, one can see how frightening this situation would be when the river reaches the stage 38.1 feet.

Earthquake

With many earthquake faults in the region and the potential for a wide variety of seismic events, there is very little additional mitigation possible beyond compliance with the latest Building Codes.

There is no doubt that there will be widespread damage in a major earthquake in Burlington, such as chimney collapses, buildings off foundations, foundation cracking, utility line failures, and structural damage of various types. The majority of the unreinforced masonry buildings in Burlington are located in old Downtown, and none exceed two stories in height. These have the potential to collapse.

Fire

There is limited potential for urban wildland interface fire except for Burlington Hill. In the recently subdivided area, most of the trees have been cleared, but the potential does exist. Otherwise, there are some structure fires.

Volcanic Event

If there is a volcanic event, Burlington lies in its path and would have to evacuate.

Severe Storm

The impact of severe storms is mitigated for new construction by current code standards for wind and snow loads. Impacts range from structure failures to down trees and power lines.

Land Movement

Land movement on Burlington Hill appears to be the result of improper construction techniques, and if adequate testing, engineering and inspection are done on all roads and structures, minimal impacts are expected over time.

Other Natural Hazards Minimal in Burlington

The likelihood and thus the impact of Avalanche, Drought or Tsunami/Seiche are very low.

1. A description of the impact that the hazards identified have on life, safety, and health and the need and procedures for warning and evacuating residents and visitors;

The location of the City of Burlington primarily in the 100-year floodplain results in such a high flood hazard that the City has developed a detailed disaster preparedness plan and procedures for warning and evacuating residents and visitors. This plan is reviewed, tested and updated annually. See Appendix A Maps for Evacuation Routes. There are permanent Evacuation Route signs posted as mapped. The Evacuation procedure can be easily adapted to address any hazard. There is a detailed early warning system in the Burlington Disaster Preparedness Plan.

2. A description of the impact that the hazards identified in the hazard assessment have on critical facilities and infrastructure;

Critical facilities are defined in the Community Rating System Manual as follows:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic and/or water-reactive materials;
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a flood;
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during, and after a flood; and

Public and private utility facilities that are vital to maintaining or restoring normal services to flooded areas before, during, and after a flood.

ELEMENT	MEASUREMENT	APPROXIMATE VALUE
Streets/Road	41.6 Miles	\$40,000,000
Storm Drains	43.6 Miles	\$7,000,000
Storm Drain Pump Stations	6 stations	\$5,000,000
Bridges	2 new bridges	\$13,000,000
Sanitary Sewer	51 miles	\$14,000,000
Sanitary Pump Stations	21 stations	\$5,750,000
Wastewater Treatment Plant	3.79 mgd	\$25,000,000
Fire Station	N/A	\$3,600,000
Police Station	N/A	\$3,200,000

Infrastructure and Critical Facilities Summary

The location of Burlington on major rail, truck and pipeline routes that are expanding in transport of potentially explosive materials, presents an increased hazard that could have devastating consequences

in conjunction with any natural hazard event. Burlington is expanding its overall emergency plan to better address evacuation and shelter-in-place issues. There is a definite gap in training to handle extreme emergency situations in this region.

Critical Facilities and other Uses to be Evacuated including status of Emergency Planning:

Flood Fight Headquarters (Dike District #12 EOC) will determine the need and notify the appropriate parties of required evacuation.

The Burlington Police Chief is in charge of evacuation. This list includes the names and telephone numbers of the operators of the facilities that require early notice. Early notification at river elevation 36' is provided to Burlington RV Park; they are required to evacuate at 37'. This facility is closely monitored and receives annual inspections to ensure that units are ready to move.

Other facilities are required to evacuate when so directed by the appropriate authority via the Emergency Alert System, mobile speaker units and sirens or door-to-door notification, or citywide evacuation when notified by the fixed siren on the Fire Station. This siren is planned to be updated and replaced with up to 4 sirens to improve citywide alert.

Uses to be evacuated:

- Country Court Mobile Home Park is located in Urban Growth Area at intersection of Lafayette and Peter Anderson Road. 45 units. Manager's telephone number is not listed.
- Burton's Nursing Home at 1036 E. Victoria Population is 47. Telephone number is 360-755-0711.
- Wee Care Day Care at 210 N. Skagit. Telephone number is 360-755-0264.
- Homeplace Alzheimer's facility at 210 N. Skagit. Telephone number is 360-755-7000.
- Ovenell Nursing Home at 625 Washington Population is 31. Telephone number is 360-755-9100.
- Burlington Little School in Urban Growth Area at 207 S. Gardner Road. Telephone number is 360-757-8257.
- Lucille Umbarger School at 820 South Skagit Street. Burlington Edison School District Administration coordinates evacuation at 360-757-3387 and 360-757-3311
- Burlington Edison School District Administration located at 927 E. Fairhaven Avenue coordinates evacuation at 360-757-3387 and 360-757-3311.
- Westview School located at 515 West Victoria. Telephone number is 360-757-3391.
- Burlington-Edison High School located at 301 North Burlington Boulevard. Telephone number is 360-757-4074.

- Where the Heart Is Assisted Living at 410 Norris Place. Population is growing. Telephone number is 360-755-8007.
- Burlington RV Park at 275 E. Whitmarsh Road. Telephone number at site is 360-757-4229. Owner's home phone is 360-766-4000. They have an evacuation plan and contracts with towing companies. 50 units.
- Creekside Retirement Community at 1150 South Spruce. Population is growing. Telephone number is 360-755-5550.
- Cedars at 1001 Sinclair Way & Cedar Point at 1155 Sinclair Way. Cedars telephone number is Boyd Omdal at 757-2151.

CRITICAL FACILITY VULNERABILITY ASSESSMENT

The Burlington Fire Station and the Burlington Police Station are new and constructed to the 1997 Uniform Building Code. Each facility has standby power.

The Burlington Wastewater Treatment Plant was substantially upgraded and expanded in 2000 and meets all current codes. The Chlorine disinfection was replaced by ultraviolet, lowering the hazard presented by the facility, in addition to increasing the 100-year flood protection for the facility. Standby power is available for the plant and the pump stations.

Additional information continued on the following page:

3. The number and types of buildings subject to the identified hazards

This information was first presented in the 1999 City of Burlington Floodplain Management Plan and is updated here:

Single Family and Duplex Dwellings			Multi-f	amily Str	uctures
			(more tha	n two dwe	lling units)
1998 & Prior	990	Units	1998 & Prior	684	Units
1999 Total =	34	Units	1999 Total =	11	Units
2000 Total =	98	Units	2000 Total =	11	Units
2001 Total =	109	Units	2001 Total =	96	Units

Single Family and Duplex Dwellings		Multi-family Structures			
			(more tha	(more than two dwelling units)	
2002 Total =	41	Units	2002 Total =	0	Units
2003 Total =	82	Units	2003 Total =	0	Units
2004 Total =	97	Units	2004 Total =	0	Units
2005 Total =	146	Units	2005 Total =	8	Units
2006 Total =	28	Units	2006 Total =	14	Units
2007 Total =	33	Units	2007 Total =	4	Units
2008 Total =	13	Units	2008 Total =	0	Units
2009 Total =	25	Units	2009 Total =	0	Units
2010 Total =	10	Units	2010 Total =	0	Units
2011 Total =	3	Units	2011 Total =	0	Units
2012 Total =	6	Units	2012 Total =	0	Units
2013 Total =	3	Units	2013 Total =	0	Units
TOTAL	1,718	Units	TOTAL	828	Units

NUMBER, TYPES AND IF AVAILABLE, ELEVATIONS OF BUILDINGS (continued)

This information was first presented in the 1999 City of Burlington Floodplain Management Plan and is updated here:

Commercial Structures		Indus	trial Stru	ctures	
(includes chur	ches & pub	lic buildings)			
1998 & Prior	332	Structures	1998 & Prior	94	Structures
1999 Total =	15	Structures	1999 Total =	10	Structures
2000 Total =	12	Structures	2000 Total =	4	Structures
2001 Total =	8	Structures	2001 Total =	4	Structures
2002 Total =	5	Structures	2002 Total =	4	Structures
2003 Total =	10	Structures	2003 Total =	6	Structures

Commercial Structures		Indus	trial Stru	ctures	
(includes chur	ches & pub	lic buildings)			
2004 Total =	10	Structures	2004 Total =	8	Structures
2005 Total =	7	Structures	2005 Total =	12	Structures
2006 Total =	16	Structures	2006 Total =	9	Structures
2007 Total =	4	Structures	2007 Total =	7	Structures
2008 Total =	11	Structures	2008 Total =	9	Structures
2009 Total =	0	Structures	2009 Total =	1	Structures
2010 Total =	5	Structures	2010 Total =	0	Structures
2011 Total =	2	Structures	2011 Total =	1	Structures
2012 Total =	4	Structures	2012 Total =	4	Structures
2013 Total =	2	Structures	2013 Total =	4	Structures
TOTAL	443	Structures	TOTAL	177	Structures

This inventory was compiled from the regularly updated existing Land Use Maps, and supplemented with building permit records. Buildings constructed since 1985 are elevated to one foot above the 100-year flood elevation. Some industrial buildings have opted for flood proofing when elevating the structure interfered with operations, such as truck access. Elevation Certificates are available on all buildings constructed since the building department was opened in 1989. Prior to that time, inspection was handled by Skagit County and the records are not accessible.

Beginning in 1996, the City of Burlington had all the elevation benchmarks in the City Limits surveyed and mapped in AutoCAD. Since then, over 211 homeowners have requested and obtained courtesy Elevation Certificates for structures built prior to 1989, and of them, all but about 10 have met or exceeded the elevation requirements and were able to obtain a substantial reduction in flood insurance rates. 1999 was the last year that the Elevation Certificate form was able to be completed by the city. Subsequent Certificates require a license surveyor to complete a number of elevations, and to document the condition of the crawlspace.

The 100-year flood elevation ranges from 23 feet at Pulver Road to the west, to 40 feet at Gardner Road to the east.

Neighborhood Characterization

1.	Residential Neighborhood:	1,779	single family and duplex units
		828	multi-family units

Single family structure median:	\$142,9	00
Predominant structure type:	Wood f	frame (all residential including multi-family)
Estimated neighborhood population:	8,445	
Commercial/Industrial:	468	Commercial Structures
	197	Industrial Structures

Predominant structure type: Concrete tilt-up

Estimated neighborhood population during workday:

Estimated value of each structure:

2.

10,000 employees

\$854,573 on average

50,000 visitors

4. A review of all properties that have received flood insurance claims or an estimate of the potential dollar losses to vulnerable structures;

Flood insurance claims in Burlington since 1975 were limited to elevating one house after the 1990 Flood, replacing the sanitary sewer in Section Street that collapsed, and repairing Whitmarsh Road that is underwater in flood events.

Estimate of potential dollar losses to vulnerable structures:

- Vulnerable structures in Burlington are typically older structures that do not meet current codes. In a major flood event, millions of dollars in losses is possible.
- Structures built in the last 20 years that comply with current codes for flood, seismic, wind and snow loads are less vulnerable to hazards.
- 5. A description of areas that provide natural and beneficial functions, such as wetlands, riparian areas, sensitive areas, and habitat for rare or endangered species.

The City of Burlington is committed to the enhancement and improvement of water quality, fish and wildlife habitat along Gages Slough and the Skagit River shoreline with an approved element of the plan that addresses habitat and wildlife issues and protects local fish and wildlife species that are identified at the federal, state and local level, including the species of local significance listed in the Burlington Critical Areas Code. A Shoreline Master Program for Gages Slough and the Skagit River Shorelines was adopted in 2012.

The Urban Wildlife Habitat Plan element of the Parks and Recreation Comprehensive Plan is designed to focus on providing habitat for wildlife species, foodfish, and freshwater fish in close proximity to a metropolitan area, this is the Skagit River shoreline specifically relative to salmon and bull trout and the need for riparian habitat along the diked riverfront. The Gages Slough corridor contains species of local significance as identified in the new Critical Areas Ordinance. The third area is Burlington Hill, where development is in process on approximately half of the hill, and there is some remaining forested land forming a habitat corridor and also bald eagle habitat, although the closest nest site is in the Gages Slough area.

Burlington Hill provides a significant greenbelt and habitat area, and because of its steep slopes, it is also environmentally sensitive relative to geologic hazards in the form of falling rock, erosion and drainage. It has a public street that crosses the hill and this is one of the Evacuation Routes where everyone is basically directed to the north in the event of a major flood event.

Gages Slough is the major wetland that travels through the City of Burlington. It is also the major storm drainage outfall and provides a backup flood control channel in a flood event. It provides a significant wildlife habitat and suffers from poor water quality at this time. It is the subject of a series of planned actions, beginning with a survey of property owners in the fall of 1995, followed by establishing a Citizen's Advisory Committee, and then development and adoption of the Gages Slough Management Plan that provides both regulatory and non-regulatory elements designed to work together to enhance the natural wetland functions, while improving the water holding and flow-through capacity of the system. A wetland functional assessment, water quality and water level monitoring study were completed in 1998 and a Storm Water Quality Comprehensive Plan Element is in development in 2003 to focus on water quality in Gages Slough. A new Critical Areas Ordinance that applies Best Available Science was adopted in 2002. In 2007, the Gages Slough Habitat Management Plan was updated with the identification of 15 potential wetland mitigation sites. Upgrading habitat in areas adjacent to the Skagit River also helps improve the overall habitat qualities of the river corridor.

General Development trends

The City of Burlington annexed 863 acres between 1989 and 2007. Between 1989 and 2013 over 5.6 million square feet of new commercial and industrial space has been occupied; 545 apartment units and 968 single family/duplex residences have been constructed. The county as a whole is growing rapidly, and Burlington is the commercial hub of Skagit County. About 316 acres of commercial and industrial land were developed between 1995-2013. Because there is a finite supply of available land for development in Burlington, and it is located in the Interstate 5 corridor, development and redevelopment is expected to proceed at a steady pace.

6. A description of development, redevelopment, and population trends and a discussion of what the future brings for development and redevelopment in the community, the watershed, and natural resource areas;

Development in commercial and industrial areas on next page....

Year	Commercial &	Single Family	Multi Family	
	Industrial			
1989	733,029 sq. ft.	7 units	126 units	
1990	188,228 sq. ft.	23 units	169 units	
1991	287,680 sq. ft.	8 units	6 units	
1992	91,091 sq. ft.	6 units	0 units	
1993	287,455 sq. ft.	66 units	40 units	
1994	169,196 sq. ft.	45 units	4 units	
1995	70,229 sq. ft.	44 units	53 units	
1996	140,402 sq. ft.	9 units	0 units	
1997	244,701 sq. ft.	15 units	0 units	
1998	438,873 sq. ft.	17 units	3 units	
1999	334,356 sq. ft.	34 units	11 units	
2000	269,726 sq. ft.	98 units	11 units	
2001	170,061 sq. ft.	109 units	96 units	
2002	208,098 sq. ft.	41 units	0 units	
2003	88,027 sq. ft.	82 units	0 units	
2004	348,337 sq. ft.	97 units	0 units	
2005	503,663 sq. ft.	146 units	8 units	
2006	483,963 sq. ft.	28 units	14 units	
2007	81,140 sq.ft.	33 units	4 units	
2008	192,150 sq.ft.	13 units	0 units	
2009	95,786 sq.ft.	25 units	0 units	
2010	41,391 sq.ft.	10 units	0 units	
2011	49,554 sq.ft.	3 units	0 units	
2012	66,471 sq.ft.	6 units	0 units	
2013*	102,433 sq. ft.	3 units	0 units	
TOTAL	5,686,040 sq.ft.	968 units	545 units	

New Construction 1989 – 2013*

*Stats as of 12/31/2013

COMMERCIAL AND INDUSTRIAL LAND CAPACITY

Industrial Development Activity from 1995-2013

Structures =	1,601,285 Square Feet
Total Acreage of Developed Area =	170.98 Acres

Commercial Development Activity from 1995-2013

Structures =	2,226,608 Square Feet
Total Acreage of Developed Area =	145.54 Acres

Land Allocation	Commercial	Industrial	Total
1. Total zoned acreage	653	696	1,349
2. Acreage unbuildable*	71	76	147
3. Undeveloped acreage - vacant	80	152	232
4. Existing developed land (acres)	502	468	970
5. Acreage for infrastructure (15%)	15	24	39
6. Available supply (acres) = (#3 – #5)	65	128	193

*unbuildable = open space, drainage, wetlands, dike setback in C-1, C-2 & M-1 properties.

Assessed Value

Number of Residential Parcels (incl. multi-family) =	2,193
Assessed Value Residential =	\$403,209,900
Number of Commercial/Industrial Parcels = (excludes. city, churches, apartment & school	976
parcels)	
Assessed Value Commercial =	\$834,063,772

Population Trends

2035 POPULATION FORECAST

City Limits 2013 =	8,445 Population
City Limits Forecast for the Year 2015 =	8,539 Population
2015-2036 Forecast for the City Limits =	9,453 Population

NEW DWELLING UNIT FORECAST FOR THE YEAR 2036

- Vacant Residential Land available for development is 75 acres.
- This will accommodate 352 units at about 4.4 units/acre, which could accommodate a population of 1,549. Actual development will vary depending on zoning and market.

7. A summary of the impact of each hazard on the community's economy and tax base.

There appears to be virtually no impact of any of the identified hazards on the economy and tax base except for Flooding.

However, an overriding factor is the location of the City at the intersection of the major regional and interstate transportation corridors has led to rapid development and a healthy economy and tax base, even though nearly every site pays Flood Insurance.

MITIGATION STRATEGY

Set Goals – a statement of the goals of the community's floodplain management and hazard mitigation program.

The goals of the community's floodplain management and hazard mitigation program are integrated into the city's planning and regulatory framework in a variety of ways, and they are sorted here by category with identification of the hazards they address. Because flood hazard mitigation is so key to Burlington, there is a multitude of goals and objectives sprinkled throughout existing adopted planning documents. The 2013-2014 edition of the Natural Hazard Mitigation Plan goals and strategy for flood hazard mitigation is intended to ensure predictability for the future of the community. Key components include the following elements:

- 1. Complete the upgrade of the levee system along the main stem of the Skagit River to provide 100year flood protection with certified levees through the FEMA map revision process.
- 3. Work to ensure that the hydrologic and hydraulic assumptions about how much water reaches Burlington are correct and accurate based on the best available science.
- 5. Work closely with cities, towns, Skagit County and the Diking Districts for a balanced program that meets the requirements for maintaining existing rural areas in the floodplain.
- 6. Keep the commitment of the City of Burlington for no net increase in the amount of land in the Urban Growth Area.

Preventive Goals

Earthquake, Severe Storm, Fire, Land Movement

- Utilize the latest adopted state building code to insure adequate protection in construction against Earthquakes in Seismic Zone D, Severe storms with Wind Exposure C, Fire with Fire Resistive Construction Standards, and Land Movement with Grading Standards
- Utilize the latest adopted state fire code to insure adequate protection against Fire in construction with standards for Fire flow and through the annual Inspection of Commercial Structures

Flood

- The Floodway, the Special Flood Risk Zone and the 100 year Floodplain shall be regulated to protect human life, property and the public health and safety of the citizens of Burlington; minimize the expenditure of public money; and maintain the city's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer.
- Complete design development and implementation of the strategy to provide 100-year flood protection for the Burlington Urban Area, including levee certification along the main stem of the Skagit River and related components.
- Frequently flooded areas: it is the purpose of the critical areas code to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in the floodplain and the floodway.
- Manage stormwater runoff to improve drainage, control stormwater quantity, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality.
- The City shall participate in the Community Rating System to obtain the maximum possible reduction in Flood Insurance Rates from the Federal Emergency Management Agency.
- Because of the unique floodway and floodplain limitations on the use of the Skagit River shorelines, particularly the dike system, the majority of the shoreline shall be identified and reserved for recreational and open space uses.
- Establish and implement shoreline master program policies and regulations based on applicable comprehensive management plans for the watershed's geohydrological system that reduce the risk of flood damage.
- Consider other regulations and programs associated with flood hazard management. Where there is a conflict, the more stringent in terms of long-term management of the ecological resource and natural geohydrological systems shall take precedence.

- Restrict development in the 100-year floodplain that potentially increases flood hazard unless it complies with the Flood Hazard management plan, and the critical areas code. The impacts of floodplain shall be addressed by one of the following means:
 - The shoreline master program shall prohibit structural flood control measures for new development that would potentially increase the risk of flooding, significantly alter the course, speed or flow of the waterway, significantly reduce flood storage capacity, or increase flood heights on unprotected property.
 - Standards for flood control measures for new development are based on recommendations from the comprehensive Flood Hazard Management Plan.
 - Shoreline master program policies and regulations shall be established and implemented to retain or restore natural conditions of shorelands associated with frequently flooded areas.
 - Make investigations and corrective actions of problem storm drains, including sampling.
 - Develop a program for operation and maintenance of storm drains, detention systems, ditches, and culverts.

Flood, Landslide, Earthquake

- Utilizing Best Available Science to develop the Critical Areas title, the provisions of this title shall be liberally construed to accomplish its remedial purposes, which are: To protect, to the greatest extent practical, life, property and the environment from loss, injury and damage by pollution, erosion, flooding, landslides, strong ground motion, soil liquefaction, accelerated soil creep, settlement and subsidence, and other potential hazards, whether from natural causes or from human activity; To protect the public interest in drainage and related functions of drainage basins, watercourses and shoreline areas; To protect surface waters and receiving waters from pollution, mechanical damage, excessive flows and other conditions in their drainage basins which will increase the rate of downcutting, streambank erosion, and/or the degree of turbidity, siltation and other forms of pollution, or which will reduce their low flows or low levels to levels which degrade the environment, reduce recharging and ground water, or endanger aquatic and benthic life within these surface waters and receiving water of the state; To meet the requirements of state and federal law and comply with regulatory standards for the city's municipal storm water, and To fulfill the responsibilities of the city as trustee of the environment for future generations.
- Geologically hazardous areas; Geologically hazardous areas include areas susceptible to the
 effects of erosion, sliding, earthquake, or other geologic events. They pose a threat to the
 health and safety of citizens when incompatible residential, commercial, industrial, or
 infrastructure development is sited in areas of a hazard. Geologic hazards pose a risk to life,
 property, and resources when steep slopes are destabilized by inappropriate activities and
 development or when structures or facilities are sited in areas susceptible to natural or human
 caused geologic events. Some geologic hazards can be reduced or mitigated by engineering,

design, or modified construction practices so that risks to health and safety are acceptable. When technology cannot reduce risks to acceptable levels, building and other construction within identified geologically hazardous areas shall be prohibited.

- Coordinate with Skagit County through arrangements such as interlocal agreements, joint programs, consistent standards, or regional boards or committees.
- Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards
- Public Works will continue to implement drainage utility including improved maintenance and operations, a rate structure and public education element. Drainage Utility rate structure adopted in early 1997; annual inspection and maintenance requirements for all private facilities implemented; previous annual inspections limited to public facilities. Public education on best management practices is focused on Gages Slough property owners and the businesses that dump storm water into the Slough through a piped system. Current requirements include annual inspections and maintenance of all public and private drainage facilities; identified pollution problems will be tracked down and best management practices implemented to control source pollutants. Continue to implement Capital Improvements to stormwater system.
- Burlington is subject to a state municipal stormwater permit program, called NPDES Phase II. This program includes a number of components such as water quality monitoring, annual drainage inspections, and public education, all of which the city is already engaged in to some extent.

Property Protection Goals

Landslide

• Provide protection of steep slopes according to standards in the Critical Areas Ordinance, as generally identified in these policies.

Flooding

- Regulations and policies shall reflect the existing dikes along the Skagit River. Nonstructural solutions to flood hazards shall be encouraged including restricting development in floodprone areas, storm water runoff management, setback levees, and up-stream watershed vegetation management.
- Levee enlargement to provide 100-year flood protection in the Urban Areas and a maximum
 of 80-year flood protection in Rural Areas shall be constructed and approved pursuant to
 FEMA guidelines that includes application for a Conditional Letter of Map Revision (CLOMR),
 then completion of any additional levee construction and analysis, followed by a Letter of Map
 Revision (LOMR) that certifies the levees for 100-year flood protection.

- Insure that standards for flood control measures protect and enhance the biological systems and public access opportunities of the shoreline and adjacent uplands.
- The Building Official will continue to maintain elevation certificates. Each elevation certificate is maintained by address and copies are sent annually to FEMA on disk. Continue to work towards establishing a complete file of pre-FIRM certificates.
- The Planning Director and the Building Official will continue to provide technical advice to property owners, contractors and design professionals to include latest documents.

Earthquake, Severe Storm, Flooding

- Provide 100-year flood protection for Wastewater Treatment Plant; provide Emergency Generator capability for all pump stations; upgrade construction to latest seismic and wind standards.
- <u>Provide 100-year flood protection for the City Limits.</u>

Natural Resource Protection Goals

All Hazards

• To the extent practicable, fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

Flooding

- Protect and restore critical areas including Gages Slough; plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions.
- Provide habitat for wildlife species, foodfish, and freshwater fish in close proximity to an urban area, including the Skagit River Shoreline, the Gages Slough Corridor and Burlington Hill.
- To protect and restore the wetlands to optimize water quality, habitat, best management practices and ensure that adjacent land use patterns are compatible with the protection and enhancement of the wetlands and take advantage of the unique attributes of the site, allowing no net loss of wetlands, and for Gages Slough, to also increase the size of culverts, remove obstructions and generally improve the flow characteristics to provide for efficient conveyance of water through the city during flood events.
- To allow limited use of the Skagit River and its shoreline compatible with the Dike system and with the regulatory constraints of the Floodway and Special Flood Risk Zone, including transportation, levee improvement, utilities and outfall structures, public access and recreation, open space and agriculture and similar uses.

- Plan the stormwater management system to be consistent with policies regarding flooding, wetlands, land-use and water quality.
- Develop an integrated program for quantity and quality control that recognizes the unique situation faced by the City with its location in the 100-year floodplain and needs for flood control in larger storm events, while at the same time needing to control the effects of smaller storms in terms of both quantity and quality of runoff.
- Apply best management practices to reduce pollutant loading and minimize the effects of contaminated sediments on Gages Slough and the Skagit River.
- Implement the long range Gages Slough Management Plan, administer the 2012 Shoreline Master Program for Gages Slough and the Skagit River Shorelines in Burlington; increased preservation of the open space and drainage corridor through easements, deeding land to city; improve water quality; eliminate failed septic systems; fence out livestock; improve wildlife habitat; do restoration planting projects; increase regulations such as greater setbacks where applicable; implement specialized best management practices to minimize problems in the long run. Gages Slough is considered a corridor to remove floodwaters after a major flood event. It only has the capacity for about 6,000 cfs of water, which is minimal in a flood event. Action: Add voluntary and regulatory protection to the Gages Slough Special Flood Risk Zone, the major drainage course in the city.
- Implement the Gages Slough habitat management plan including the restoration projects, developing an on-going maintenance program, and acquiring land for public open space in the wetland corridor.

Flooding, Earthquake, Landslide, Fire, Severe Storms

• Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks. Integrate the concepts with natural functions such as drainage (Gages Slough), agriculture (surrounding farmland), and topographic features (Burlington Hill).

Emergency Services Goals

Flooding, Earthquake, Volcano

 Develop and maintain a specific flood warning and evacuation program for the City of Burlington. The City of Burlington Flood Emergency Plan was developed in 1995 and updated in 1998 and 2002 to reflect the best approach possible. Fire, Police, Planning, Department of Emergency Management and other agencies have developed and refined a specific community based plan. The plan is exercised and tested annually and revised as needed.

- The transportation plan is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system along with Mount Vernon.
- Maintain Critical Facilities such as Police, Fire, and Waste Water Treatment facilities up to date with most current technology and standards to ensure operation during hazard events.
- Annual maintenance of the Emergency Plan to insure that all Critical Facilities including nursing homes, chemical storage facilities, schools, electric and telephone substations have a working emergency plan in place and contacts are up to date.
- Upgrade Flood Emergency Plan to include Earthquakes, Volcanoes, and Severe Storms as the major natural hazards. Fire is covered by the Fire Department and construction standards and Landslide is covered by the Grading and Critical Areas Codes; only potential landslide site is on Burlington Hill.
- Droughts, Avalanche, Tsunami/Seiche are unlikely to impact Burlington.

Structural Projects Goals

Flooding

- Structural Measures Complete environmental review, design and construct 100-year certified levees through the three bridge corridor along the south City Limits. These will be setback levees on both the Burlington and Mount Vernon sides of the Skagit River. The river is constrained by levees and three bridges, limiting the ability of the Skagit River to handle flood flows, starting at the Railroad Bridge and heading west. Only 150,000 cfs of water can pass under the bridge and the capacity is needed for over 200,000+ cfs. Options include retaining the existing levees, or excavating the bank and reestablishing shoreline vegetation along the riverbank and providing opportunities for public access at times other than high water.
- Structural Measures The second major element of the Burlington Plan is underway to enlarge the levees, primarily on the landward side from the easterly end of the levee system at Lafayette Road south to the Gardner Road Bar; then continuing along the River past the Wastewater Treatment Plant to the Whitmarsh Road crossdike to a point that connects with the three-bridge corridor setback levee. Design components include installation of clay keyways to prevent water seeping through the levees, widening of the levee top and a backslope of 1:7-8 to allow for overtopping.
- Dike District #12 will continue to maintain and upgrade the levee system to the 100-year flood. Major improvements have been made to the dike system since the 1990 flood, including the installation of keyways and backsloping the landward toe of the dikes. Land for the work has been made available through an Interlocal Agreement between Dike District #12 and the City of Burlington, and acquisition of additional land by the District. The protection of the Wastewater Treatment Plant was improved to 100-year when the plant was upgraded.

All Hazards

- The Six Year Road Plan and the transportation element of the annually updated City of Burlington Capital Improvement Plan shall be coordinated with the Land Use, Utilities and other relevant plan elements to ensure a balanced program that is adequately funded and responsive to community interests.
- Six-year list of capital projects including specific actions targeted towards natural hazard mitigation. Continue to implement the Surface Water Management code and related capital improvement plan. Each development is regulated and stormwater quality is also regulated. Long-term storm water quality issues are a major focus in the Gages Slough Management Plan.
- Upgrade all city-owned critical facilities. Construction is completed of both the new Fire Station and Police Station, and the major upgrade of the Wastewater Treatment Plant.

Public Information Goals

Flooding

- Provide on going public education at all levels, from the renter to the homeowner, regarding residential, commercial and industrial best management practice issues, flood hazard mitigation, water quality, and related local issues. Update annually.
- The City shall provide on going public education about flooding and shall adopt a flood hazard reduction plan, consistent and compatible with any countywide efforts and plans, using the community newsletter, special targeted mailings to Realtors, insurance agents and lenders, training sessions at neighborhood meetings, the public library, and other means that may be identified.
- Provide for ongoing public education aimed at residents, businesses, and industries in the urban area. The education programs are to inform citizens about stormwater and its effects on water quality, flooding, and fish/wildlife habitat, and to discourage dumping of waste material or pollutants into storm drains.
- The Planning Director and the Building Official will continue to make flood map determinations in response to public inquiry, along with an annual mailing to real estate agents, lenders and insurance agents, and maintaining accurate records and logs.
- The Planning Director will continue to mail out a flood bulletin twice annually, including elements for map determinations, availability of library materials, and natural and beneficial functions, as well as an annual bulletin focused on flood issues to all properties in the local zip code.
- Realtors will continue to provide disclosure of flood hazard on a voluntary basis and the Planning Department will work to modify the disclosure to identify the requirement for flood

insurance purchase. Action by the state legislature to make this mandatory failed in 1995, but it is expected to be revisited.

- The City Librarian will continue to maintain and improve the Flood Protection Library and add updated materials. There is a reference on the Floodplain Management Resource Center and instructions on how people can use it. Documents regarding the natural and beneficial functions of floodplains and updated local, state and federal materials are added as they become available.
- Maintain updated maps and continue to work on automated base maps and overlays, leading to a planning level geographic information system; data collection and data entry to continue as new information and data sources become accessible.
- Using improved citizen involvement, public education and establishing a solid work program to improve maintenance of the drainage system. Plan to increase city maintenance of Gages Slough as drainage easements or public ownership becomes available, or a public/private partnership can be developed. Acquire land in the Gages Slough Corridor through land donation in exchange for Park Impact Fee Credit. Public education is a key focus of the drainage program and specialized best management practices brochures are designed for the residential, agricultural and business issues specific to Burlington. Enhance maintenance of the system, including ability to maintain more of Gages Slough, by working with the property owners and business community.

All Hazards

Expand the Public Information program to address other natural hazards where additional public information will be helpful, such as seismic retrofits for homes, how to make your home firewise, and other topics including exacerbation of natural hazards because of increased use of railroad for transport of hazardous and explosive materials.

REVIEW OF POSSIBLE ACTIVITIES

The plan must describe those activities that were considered and note why they were or were not recommended. If the activity is currently being implemented, the plan must note whether it should be modified. The discussion needs to be detailed enough to be useful to the lay reader.

- 1. The plan reviews preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;
- 2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance;
- 3. The plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;

- 4. The plan reviews emergency services activities, such as warning and sandbagging;
- 5. The plan reviews structural projects, such as reservoirs and channel modifications.
- 6. The plan reviews public information activities, such as outreach projects and environmental education programs.

Preventative Activities

1. The plan reviews preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;

ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
Earthquake, Severe Storm, Fire, Land Movement		
Utilize the latest adopted state building code to insure adequate protection in construction against Earthquakes in Seismic Zone D, Severe storms with Wind Exposure C, Fire with Fire Resistive Construction Standards, and Land Movement with Grading Standards	2012 International Building Code & 2012 International Existing Buildings Code	State Legislature adoption of the International Codes
Utilize the latest adopted state fire code to insure adequate protection against Fire in construction with standards for Fire flow and through the annual Inspection of Commercial Structures	2012 International Fire Code	State Legislature adoption of the International Codes
Flood		
The Floodway, the Special Flood Risk Zone and the 100 year Floodplain shall be regulated to protect human life, property and the public health and safety of the citizens of Burlington; minimize the expenditure of public money; and maintain the city's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer.	2002 Critical Areas Code 2012 Shoreline Master Program	Up to date meeting state requirements for use of Best Available Science
Frequently flooded areas; It is the purpose of this Chapter to promote the public health, safety, and	2002 Critical Areas Code	Continue Land Acquisition program
general welfare, and to minimize public and	2012 Shoreline Master	

ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
private losses due to flood conditions in the floodplain and the floodway according to the provisions established under this code;	Program Land Acquisition program along River and Slough	
Manage stormwater runoff to improve drainage, control stormwater quantity, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality.	Surface Water Management Code is up to date; NPDES II permit; program is staffed and funded	Increase focus on storm water quality; Additional funding in place by state for program development
The City shall participate in the Community Rating System to obtain the maximum possible reduction in Flood Insurance Rates from the Federal Emergency Management Agency.	Program is up to date Revisions to comply with 2013 CRS manual changes underway	Review program for new activities
ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
Flood – continued		
Because of the unique floodway and floodplain limitations on the use of the Skagit River shorelines, particularly the dike system, the majority of the shoreline shall be identified and reserved for recreational and open space uses.	Interim Controls in place in three bridge corridor; park land and other land acquisition in process	Continue land acquisition program; establish a new levee setback line and make progress towards construction of setback levee in three-bridge corridor.
Restrict development in the 100-year floodplain that potentially increases flood hazard unless it complies with the Flood Hazard management plan, and the critical areas code.	Coordinating with Skagit County on Flood Hazard Mitigation Feasibility Study; continue process of levee certification	Continue program
Make investigations and corrective actions of problem storm drains, including sampling. Develop a program for operation and maintenance of storm drains, detention systems, ditches, and culverts.	Program is in place	Continue program
Flood, Landslide, Earthquake		
Utilizing Best Available Science to develop the Critical Areas title to protect, to the greatest extent practical, life, property and the	Program and regulations are in place, as updated with the 2012 Shoreline	Continue program and refine critical areas code as new data is available

ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
environment from loss, injury and damage by	Master Program	
pollution, erosion, flooding, landslides, strong		
ground motion, soil liquefaction, accelerated soil		
creep, settlement and subsidence, and other		
potential hazards, whether from natural causes		
or from human activity and related goals.		
Coordinate with Skagit County through	Multi-iurisdictional All	Annual maintenance with five
arrangements such as interlocal agreements.	Natural Hazards Mitigation	vear update required
joint programs, consistent standards, or regional	Planning project	,
boards or committees.		
Urban Level of Service Standards are established	Standards are reviewed	Annual review and update
to ensure protection of public health, safety and	annually	
welfare by meeting relevant standards		

ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
Flood, Landslide, Earthquake – continued		
Public Works continues to implement drainage	Annual inspections and	On-going program that is
utility including improved maintenance and	maintenance of all public	updated regularly
operations, a rate structure and public education	and private drainage	
element. Drainage Utility rate structure adopted	facilities; identified	
in early 1997; annual inspection and	pollution problems will be	
maintenance requirements for all facilities	tracked down and best	
implemented. Public education on best	management practices	
management practices is focused on Gages	implemented to control	
Slough property owners and the businesses that	source pollutants.	
dump storm water into the Slough through a	Continue to implement	
piped system.	Capital Improvements to	
	stormwater system.	

Property Protection Actions

2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance;

ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
Landslide		
Provide protection of steep slopes according to standards in the Critical Areas Ordinance.	2002 Critical Areas Ordinance update	Regular review as new information is available
Flooding		
Regulations and policies shall reflect the existing dikes along the Skagit River. Nonstructural solutions to flood hazards shall be encouraged including restricting development in flood-prone areas, storm water runoff management, setback levees, and up-stream watershed vegetation management.	Innovative approaches to long term flood hazard mitigation are being developed	Program is a work in progress.
Levee enlargement to provide 100-year flood protection in the Urban Area shall be constructed and approved pursuant to FEMA guidelines that includes application for a Conditional Letter of Map Revision (CLOMR), then completion of any additional levee construction and analysis, followed by a Letter of Map Revision (LOMR) that certifies the levees for 100-year flood protection.	Permits issued for work in City Limits; process is underway for work in Skagit County	Levee upgrade is under construction.
Flooding		
Insure that standards for flood control measures protect and enhance the biological systems and public access opportunities of the shoreline and adjacent uplands.	Innovative approaches to long term flood hazard mitigation are being developed.	Program is a work in progress.
The Building Official will continue to maintain elevation certificates. Each elevation certificate is maintained by address and copies are sent annually to FEMA on disk.	Require, review, and file certificates for all new development in the floodplain development project. Continue to work towards establishing a complete file of pre-FIRM certificates, using local	Annual Report

ΑCTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
	incentive program.	
	Timeline is on going.	
The Planning Director and the Building Official	Provide technical advice	Annual Report
will continue to provide technical advice to	and update materials to	
property owners, contractors and design	include latest documents.	
professionals.	Timeline is on going.	
Earthquake, Severe Storm, Flooding		
Provide 100-year flood protection for	Project completed	Maintenance
Wastewater Treatment Plant; provide		
Emergency Generator capability for all pump		
stations; upgrade construction to latest seismic		
and wind standards		

Protection of Natural & Beneficial Functions

3. The plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;

ΑCTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
Flooding		
Protect and restore critical areas including Gages Slough; plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions.	Gages Slough Management Plan is adopted; 2012 adoption of the Shoreline Master Program also addresses these issues	Work in progress
Provide habitat for wildlife species, foodfish, and freshwater fish in close proximity to an urban area, including the Skagit River Shoreline, the Gages Slough Corridor and Burlington Hill.	Land acquisition and restoration projects on going	Monitoring program needed

ΑCTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
To protect and restore the wetlands to optimize water quality, habitat, best management practices and ensure that adjacent land use patterns are compatible with the protection and enhancement of the wetlands and take advantage of the unique attributes of the site, allowing no net loss of wetlands, and for Gages Slough, to also increase the size of culverts, remove obstructions and generally improve the flow characteristics to provide for efficient conveyance of water through the city during flood events.	On-going program	Monitoring program needed
To allow limited use of the Skagit River and its shoreline compatible with the levee system and with the regulatory constraints of the Floodway and Special Flood Risk Zone, including transportation, levee improvement, utilities and outfall structures, public access and recreation, open space and agriculture and similar uses.	Regulations in place	Review based on individual permits
Plan the stormwater management system to be consistent with policies regarding flooding, wetlands, land use and water quality.	Water Quality Element added	Monitoring program in place for Gages Slough
Apply best management practices to reduce pollutant loading and minimize the effects of contaminated sediments on Gages Slough and the Skagit River.	On-going program	Annual review for additional opportunities

ACTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
Flooding – continued		
Implement a long range Gages Slough	Shoreline Master Program	Work in process, annual report.
Management Plan, adopt and administer	adopted in 2012. Adds	Opportunity to donate land for
administer a Shoreline Master Program for	voluntary and regulatory	open space without the need to
Gages Slough and the Skagit River Shorelines in	protection to the Gages	subdivide is now available, along
Burlington; increased preservation of the open	Slough Special Flood Risk	with tax incentives.
space and drainage corridor through	Zone, the major drainage	
easements, deeding land to city; improve water	course in the city.	

ΑCTIVITY	CURRENT STATUS	NEED FOR MODIFICATION
quality; eliminate failed septic systems; fence out livestock; improve wildlife habitat; do restoration planting projects; increase regulations such as greater setbacks where applicable; implement specialized best management practices to minimize problems in the long run. Gages Slough is considered a corridor to remove floodwaters after a major flood event. It only has the capacity for about 6,000 cfs of water, which is minimal in a flood event.		
Flooding, Earthquake, Landslide, Fire, Severe Sto	orms	
Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks. Integrate the concepts with natural functions such as drainage (Gages Slough), agriculture (surrounding farmland), and topographic features (Burlington Hill).	New Urban Wildlife Habitat Element added to Parks and Recreation Comprehensive Plan in 2003 Parks and Recreation Comprehensive Plan updated in 2010	Annual review

Emergency Services & Activities

4. The plan reviews emergency services activities, such as warning and sandbagging;

ACTION	CURRENT STATUS	NEED FOR MODIFICATION
Flooding, Earthquake, Volcano		
Develop and maintain a specific flood warning	Action: Fire, Police, Planning,	Annual review. The overall
and evacuation program for the City of	Department of Emergency	approach to evacuation is
Burlington. The City of Burlington Flood	Management and other	being reevaluated in light of
Emergency Plan was developed in 1995 and	agencies have developed and	increased use of railroad for
updated in 1998 and 2002 to reflect the best	refined a specific community	hazardous/explosive material
approach possible. Annual update is a	based plan. The plan is	transport.
requirement of the Community Rating System	exercised and tested annually	
Program; changes are tracked	and revised as needed.	

ACTION	CURRENT STATUS	NEED FOR MODIFICATION
The transportation plan is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system along with Mount Vernon.	The transportation system is a critical facility in a community where evacuation is likely to be necessary	Annual Review
Maintain Police, Fire, Wastewater Treatment Critical Facilities up to date with most current technology and standards to ensure operation during hazard events.	Facilities are relatively new and up to date	On-going
Annual maintenance of the Emergency Plan to insure that all Critical Facilities including Nursing Homes, chemical storage facilities, schools, electric and telephone substations have a working emergency plan in place and contacts are up to date.	Emergency Plan updated in 2002 to add Evacuation Plan and Routes	Annual Review including contacting every facility in early fall.
Upgrade Flood Emergency Plan to include Earthquakes, Volcanoes, and Severe Storms as the major natural hazards. Fire is covered by the Fire Department and construction standards and Landslide is covered by the Grading and Critical Areas Codes; only potential landslide site is on Burlington Hill. Droughts, Avalanche, Tsunami/Seiche are unlikely to impact Burlington.	Emergency Plan is currently focused on Flooding	Emergency Plan to be upgraded for other hazards, and specifically looking at natural hazards in light of increased hazardous/explosive material transport through the region.

Structural Mediation

5. The plan reviews structural projects, such as reservoirs and channel modifications.

ACTION	CURRENT STATUS	NEED FOR MODIFICATION	
Flooding			
Structural Measures – Construct setback levees through the 3- bridge corridor.	Planning in process including land acquisition	Project in process	
Structural Measures – Reconstruct existing levees along the easterly city limits to allow for overtopping and upgrade to meet standards for levee certification and accreditation.	Land Acquisition is completed, levee improvements are being made.	On-going	
Dike District #12 will continue to maintain and upgrade the levee system to the 100-year storm. Major improvements have been made to the dike system since the 1990 flood, including the installation of keyways and backsloping the landward toe of the dikes. Land for the work has been made available through an Interlocal Agreement between Dike District #12 and the City of Burlington. The protection of the Wastewater Treatment Plant was improved to 100-year.	Continue to keep the dikes in excellent condition. Annual inspections are done; maintenance is on- going. Geotechnical work and levee upgrade designs are in place for eventual levee certification.	On-going. The proposed plan of action is to upgrade the levees to provide 100-year flood protection. Substantial progress has been made and the goal is to get the framework for levee certification in place and complete the work once a final decision is made on base flood elevations.	
All Hazards			
The Six Year Road Plan and the transportation element of the annually updated City of Burlington Capital Improvement Plan shall be coordinated with the Land Use, Utilities and other relevant plan elements to ensure a balanced program that is adequately funded and responsive to community interests.	Transportation plan updated in 2012	Annual Review	

Six-year list of capital projects including specific	Annual update	Annual update
actions targeted towards natural hazard		
mitigation. Continue to implement the adopted		
Surface Water Management code and capital		
Improvement plan. All development is		
regulated and stormwater quality is also		
regulated. Long-term storm water quality		
issues are a major focus in the Gages Slough		
Management Plan. Continue and improve		
surface water management including water		
quality monitoring.		
Upgrade all city-owned critical facilities.	Completed	Completed
Construction is completed of the Fire Station,		
Police Station, Wastewater Treatment Plant		
and City Hall.		

Public Outreach & Education

6. The plan reviews public information activities, such as outreach projects and environmental education programs.

ACTION	CURRENT STATUS	NEED FOR MODIFICATION
Flooding		
Provide on-going public education at all levels, from the renter to the homeowner, regarding residential, commercial and industrial best management practice issues, flood hazard mitigation, water quality, and related local issues. Update annually.	On-going – new Program for Public Information (PPI) committee formed and providing ideas and advice for activities	Additional ideas to reach the public always needed – the PPI committee includes a lender, an insurance agent, a dike district commission, city administrator and public works
The City shall provide on going public education on flooding and shall adopt a flood hazard reduction plan, consistent and compatible with countywide efforts and plans, using the community newsletter, targeted mailings to Realtors, insurance agents and lenders, training sessions at neighborhood meetings, the public library, and other means that may	On-going	Annual report

ACTION	CURRENT STATUS	NEED FOR MODIFICATION
be identified.		
Provide for ongoing public education aimed at residents, businesses, and industries in the urban area. The education programs are to inform citizens about stormwater and its effects on water quality, flooding, and fish/wildlife habitat, and to discourage dumping of waste material or pollutants into storm drains.	On-going	Annual report
The Planning Director will continue to mail out a flood bulletin twice annually, including elements for map determinations, availability of library materials, and natural and beneficial functions.	Research material and prepare flood bulletins, mail to all citizens in floodplain and entire community. Continue to participate in Flood Awareness Week. Keep citizens up to date and involved by bringing timely topics to community meetings.	Annual Report - More targeted public involvement is proposed on evacuation planning including meetings, working with apartment managers, condominium associations and others to expand current program that is focused on nursing homes, senior housing projects and the neighbor-to- neighbor program.
Realtors will continue to provide disclosure of flood hazard on a voluntary basis and the Planning Department will work to modify the disclosure to identify the requirement for flood insurance purchase. Action by the state legislature to make this mandatory has failed several times.	Improve flood hazard disclosure by adding requirement for flood insurance purchase. City will support legislation at state level. Timeline is unpredictable.	Annual Report
The City Librarian will continue to maintain the Flood Protection Library and add updated materials. Documents regarding the natural and beneficial functions of floodplains and updated local, state and federal materials are added as they become available.	Maintain and improve the Flood Protection Library. Additional local documents continue to be added as they become available, including updates to the Flood Plan and local early warning and evacuation plan.	Annual Report

ACTION	CURRENT STATUS	NEED FOR MODIFICATION
Maintain updated maps and continue to work on automated base maps and overlays, leading to a planning level geographic information system; data collection and data entry to continue as new information as it becomes accessible.	Planning Department to maintain and update existing land use and topographic maps and continue development of mapping system, including parcel and overlay data.	Annual Report

ACTION	CURRENT STATUS	NEED FOR MODIFICATION
Flooding – <i>continued</i>		
Using improved citizen involvement, public education and establishing a solid work program to improve maintenance of the drainage system. Plan to increase city maintenance of Gages Slough as drainage easements or public ownership becomes available, or a public/private partnership can be developed. Acquire land in the Gages Slough Corridor through land donation in exchange for Park Impact Fee Credit. Public education is a key focus of the drainage program and specialized best management practices brochures are designed for the residential, agricultural and business issues specific to Burlington.	Enhance maintenance of the system, including ability to maintain more of Gages Slough, by working with the property owners and business community.	Annual Report
All Hazards		
Expand the Public Information program to address other natural hazards where additional public information will be helpful, such as seismic retrofits for homes, how to make your home firewise, recommendations for sheltering in place depending on the hazard, and other topics.	Hazards identified through Multi-jurisdictional Planning process	Plan update needed in light of recent landslide in Snohomish County AND increased truck, rail and pipeline movement of hazardous and potentially explosive materials. This requires consideration of new approaches to evacuation planning.
ACTION PLAN - SELECTION OF APPROPRIATE ACTIVITIES

2013-2014: The action plan specifies those activities appropriate to the community's resources, hazards, and vulnerable properties. For each recommendation, the action plan must identify who does what, when it will be done, and how it will be financed.

Regulatory improvements exceeding NFIP minimum requirements are credited.

Post-disaster mitigation policies and procedures.

Action items to mitigate the effects of the other natural hazards identified.

***At least two of these six categories must be included in the multi-jurisdictional plan for each CRS community.

Preventative Activities

1. Preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Earthquake, Severe Storm, Fire, Land Move	nent	
Utilize the latest adopted state building code to insure adequate protection in construction against Earthquakes in Seismic Zone D, Severe storms with Wind Exposure C, Fire with Fire Resistive Construction Standards, and Land Movement with Grading Standards	2012 International Codes adopted in 2013	No financial impact
Utilize the latest adopted state fire code to insure adequate protection against Fire in construction with standards for Fire flow and through the annual Inspection of Commercial Structures	2012 International Codes adopted in 2013	No financial impact
Flood		
The Floodway, the Special Flood Risk Zone and the 100 year Floodplain shall be regulated to protect human life, property and the public health and safety of the citizens of Burlington; minimize the expenditure of public money; and	Planning and Building Department – ON-GOING Administration of 2002 Critical Areas Code that includes the	No financial impact

maintain the city's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer.	Flood Code. The adopted 2012 Shoreline Master Program has the most recent updates regarding Critical Areas in Shorelines.		
	SCHEDULE	FINANCING PLAN	
Flood – continued			
Manage stormwater runoff to improve drainage, control stormwater quantity, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality. NPDES II permit application filed; Increase focus on storm water quality.	Public Works & Street Department – Administer Surface Water Management Code; significant update in 2010.	Funded by Surface Water Utility fees, both new construction and monthly rates	
The City shall participate in the Community Rating System to obtain the maximum possible reduction in Flood Insurance Rates from the Federal Emergency Management Agency.	Planning Department – ON- GOING with Annual Report and Recertification process every 3 years	Funding integrated into each department's budget	
Because of the unique floodway and floodplain limitations on the use of the Skagit River shorelines, particularly the dike system, the majority of the shoreline shall be identified and reserved for recreational and open space uses. Interim Controls in place in three bridge corridor; park land and other land acquisition in process; Urban Wildlife Habitat Element added to Parks Comprehensive Plan	Planning and Parks Department - Parks and Recreation Comprehensive Plan updated in 2010. Every permit is reviewed for	Grant funding actively being sought for land acquisition, as well as Dike District #12 property tax funding No financial impact	
that potentially increases flood hazard unless it complies with the Flood Hazard management plan, and the Critical Areas Code. Make investigations and corrective actions of	compliance with flood standards Public Works & Street	Funded by Surface Water	
problem storm drains, including sampling.	Departments – ON-GOING	Utility fees, both new	

Develop a program for operation and	Administer Surface Water	construction and monthly	
maintenance of storm drains, detention	Management Code	rates	
systems, ditches, and culverts.			

ΑCTIVITY	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Flood, Landslide, Earthquake		
Utilizing Best Available Science to develop the Critical Areas title to protect, to the greatest extent practical, life, property and the environment from loss, injury and damage by pollution, erosion, flooding, landslides, strong ground motion, soil liquefaction, accelerated soil creep, settlement and subsidence, and other potential hazards, whether from natural causes or from human activity and related goals.	Planning, Building and Public Works Departments – ON- GOING- Program and regulations are in place.	Funding integrated into each department's budget
Coordinate with Skagit County through arrangements such as interlocal agreements, joint programs, consistent standards, or regional boards or committees.	Planning, Building and Public Works Departments Multi- jurisdictional All Natural Hazards Mitigation Planning project- 2013-2014 update	Initial development funded by State/Federal Grant; follow-up funded locally or with additional grants if available.
Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards	All City Departments SHORT TERM – annual review through Capital Facilities Plan process	Funding integrated into each department's budget

Public Works will implement drainage	Public Works Department;	Funded by Surface Water
utility including improved maintenance and	Planning Department; ON-	Utility fees, both new
operations, a rate structure and public	GOING	construction and monthly
education element. Drainage Utility rate		rates
structure adopted in early 1997; annual		
inspection and maintenance requirements		
for all private facilities implemented;		
previous annual inspections limited to		
public facilities. Public education on best		
management practices is focused on Gages		
Slough property owners and the businesses		
that dump storm water into the Slough		
through a piped system.		

Property Protection Actions

2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance;

The purpose of the plan is to take the goals and objectives specified in the Comprehensive Plan and refine them into an action plan that will be implemented over time. There has been substantial progress in implementing the action plan, and it is now timely to add new projects and to update the status of ongoing projects and programs. In the 2003 update of the plan the Burlington Evacuation Plan was integrated into the flood disaster preparedness plans that exist including the Skagit County Disaster Plan and the Dike District #12 guidelines with specifics that are tailored to the conditions of the City of Burlington.

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN	
Landslide			
Provide protection of steep slopes according to	Planning, Building & Public	Funding integrated into	
standards in the Critical Areas Ordinance.	Works Departments –ON-	each department's budget	
	GOING		
Flooding			
Regulations and policies shall reflect the	Planning Department, Public	Grant funding actively	
existing levees along the Skagit River.	Works Department, and Dike	being sought for land	
Nonstructural solutions to flood hazards shall	District #12 – ON-GOING; Dike	acquisition, as well as Dike	
be encouraged including restricting	District #12 – LONG TERM -	District #12 property tax	
development in flood-prone areas, storm water	Construction is in progress on	funding	
runoff management, setback levees, and up-	eastern leg of levee.		
stream watershed vegetation management.			

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN	
Levee Certification with federal accreditation is the goal for urban areas to provide certainty to the community over the long term.			
Insure that standards for flood control measures protect and enhance the biological systems and public access opportunities of the shoreline and adjacent uplands. Process permits, develop and implement shoreline master program and update overall Comprehensive Plan	Planning Department – Shoreline Master Program adopted in 2012 2016 for update of Comprehensive Plans	Funding integrated into department budget	
The Building Official will continue to maintain elevation certificates. Each elevation certificate is maintained by address and copies are sent annually to FEMA on disk. Continue to work towards establishing a complete file of pre- FIRM certificates.	Building Department - On-going	Funding integrated into department budget	
The Planning Director and the Building Official will continue to provide technical advice to property owners, contractors and design professionals.	Planning and Building Departments – on-going	Funding integrated into department budgets	

ΑCTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Earthquake, Severe Storm, Flooding		
Provide 100-year flood protection for	Sewer Department – All	Sewer Utility Fund
Wastewater Treatment Plant; provide	critical pump stations have	
Emergency Generator capability for all pump	generators and by-passes and	
stations; upgrade construction to latest seismic	meet current standards.	
and wind standards		

Protect Natural & Beneficial Functions

3. The plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN	
Flooding			
Protect and restore critical areas including Gages Slough; plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions. Gages Slough Management Plan is adopted and being implement over time	Planning, Public Works, Dike District #12 – on-going as funding is available	Combination of funding including department budgets, grant funds, surface water utility	
Provide habitat for wildlife species, foodfish, and freshwater fish in close proximity to an urban area, including the Skagit River Shoreline, the Gages Slough Corridor and Burlington Hill. Monitoring program needed	Planning and Parks Department, Dike District #12, Public Works Department - SHORT TERM – Gages Slough monitoring program in place LONG TERM – as funded	Combination of funding including department budgets, grant funds, surface water utility	
To protect and restore the wetlands to optimize water quality, habitat, best management practices and ensure that adjacent land use patterns are compatible with the protection and enhancement of the wetlands and take advantage of the unique attributes of the site, allowing no net loss of wetlands, and for Gages Slough, to also increase the size of culverts, remove obstructions and generally improve the flow characteristics to provide for efficient conveyance of water through the city during flood events.	Planning, Parks, Public Works Departments – ON-GOING with individual dates for specific capital projects; schedule updated annually	Combination of funding including department budgets, grant funds, surface water utility	

ΑCTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN					
Flooding – continued	Flooding – continued						
To allow limited use of the Skagit River and its shoreline compatible with the Dike system and with the regulatory constraints of the Floodway and Special Flood Risk Zone, including transportation, levee improvement, utilities and outfall structures, public access and recreation, open space and agriculture and similar uses. Review based on individual permits.	Planning Department and Public Works Department – ONGOING	Combination of funding including department budgets, grant funds					
Plan the stormwater management system to be consistent with policies regarding flooding, wetlands, land use and water quality. Water Quality Element being added.	Public Works Department Plan update scheduled.	Surface Water Utility funds and department budgets					
Apply best management practices to reduce pollutant loading and minimize the effects of contaminated sediments on Gages Slough and the Skagit River.	Planning, Parks, Public Works – ON-GOING with annual review for additional opportunities	Funding integrated into department budgets					
Implement a long range Gages Slough Management Plan, adopt a Shoreline Master Program for Gages Slough and the Skagit River Shorelines in Burlington; increased preservation of the open space and drainage corridor through easements, deeding land to city; improve water quality; eliminate failed septic systems; fence out livestock; improve wildlife habitat; do restoration planting projects; increase regulations such as greater setbacks where applicable; implement best management practices to minimize problems. Gages Slough is considered a corridor to remove floodwaters after a major flood event. It only has the capacity for about 6,000 cfs of water, which is minimal in a flood event	Planning, Parks & Public Works Departments – ON- GOING with Annual Report	Shoreline Master Program is complete and adopted. Other work is combination of funding from general budget, to grant funds, to surface water utility and parks capital funds					

ACTIVITY	STAFF ASSIGNMENT &	FINANCING PLAN
	SCHEDULE	
Flooding, Earthquake, Landslide, Fire, Severe S	torms	
Encourage the retention of open space and	Planning, Parks Departments –	Parks Fund, general
development of recreational opportunities,	ON-GOING Parks and	budgets
conserve fish and wildlife habitat, increase	Recreation Comprehensive	
access to natural resource lands and water,	Plan updated in 2010,	
and develop parks. Integrate the concepts	following a community survey	
with natural functions such as drainage	to gather public input.	
(Gages Slough), agriculture (surrounding		
farmland), and topographic features		
(Burlington Hill). Urban Wildlife Habitat		
Element added to Parks and Recreation		
Comprehensive Plan		

Emergency Services & Activities

4	The plan reviews	emergency ser	vices activities,	such as	warning and	sandbagging;
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ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding, Earthquake, Volcano		
Develop and maintain a specific flood	City Emergency Plan	Funding integrated into
warning and evacuation program for the City	Committee – ON-GOING with	department budgets
of Burlington. The City of Burlington Flood	Annual Review and exercise.	
Emergency Plan was developed in 1995 and		
updated annually to reflect the best		
approach possible. Fire, Police, Planning,		
Department of Emergency Management and		
other agencies have developed and refined a		
specific community based plan that us		
updated annually.		
The transportation plan is designed to ensure	Planning and Public Works	Funding integrated into
the continued ability of the transportation	Departments – SHORT TERM -	department budgets
system to function at a reasonable level of	2012 plan update	
service throughout the urban service area		
and coordinate the links to the regional		
transportation system along with Mount		

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Vernon. Critical for evacuation.		
Maintain Police, Fire, Wastewater Treatment Critical Facilities up to date with most current technology and standards to ensure operation during hazard events.	Funding integrated into department budgets	
Flooding, Earthquake, Volcano – continued		
Annual maintenance of the Emergency Plan to insure that all Critical Facilities including Nursing Homes, chemical storage facilities, schools, electric and telephone substations have a working emergency plan in place and contacts are up to date.	City Emergency Plan Committee – ON-GOING - Annual Review and exercise including contacting every facility.	Funding integrated into department budgets
Upgrade Flood Emergency Plan to include Earthquakes, Volcanoes, and Severe Storms as the major natural hazards. Fire is covered by the Fire Department and construction standards and Landslide is covered by the Grading and Critical Areas Codes; only potential landslide site is on Burlington Hill. Droughts, Avalanche, Tsunami/Seiche are unlikely to impact Burlington.	City Emergency Plan Committee – Annual Review with updates as needed.	Funding integrated into department budgets

Structural Projects

5. The plan reviews structural projects, such as reservoirs and channel modifications.

ACTION	STAFF ASSIGNMENT AND SCHEDULE	FINANCING PLAN
Flooding		
Structural Measures – Construct setback levee through the 3-bridge corridor; redesign levees for overtopping, complete geotechnical work required to get all levee segments certified, followed by federal	Planning, Public Works, Dike District #12 – Work is in process, both short and long term.	Variety of funding sources including grant funds, federal, state and local funds and property tax funds

ACTION	STAFF ASSIGNMENT AND	FINANCING PLAN
	SCHEDULE	
accreditation.		
Dike District #12 will continue to maintain and	Dike District #12, City of	Property tax funds, Sewer
upgrade the levee system to the 100-year	Burlington – ON-GOING	Utility Funds. City funds
flood event. Major improvements have been	U U	, , ,
made to the dike system since the 1990 flood.		
including the installation of keyways and		
backsloping the landward toe of the dikes.		
Land for the work has been made available		
through an Interlocal Agreement between		
Dike District #12 and the City of Burlington.		
and land acquisition by Dike District #12. The		
protection of the Wastewater Treatment Plant		
was improved to 100-year. Continue to keep		
the dikes in excellent condition. Annual		
inspections are done: maintenance is on going.		
All Hazards		
The Six Year Road Plan and the transportation	Planning & Public Works	General City Funds
element of the annually updated City of	Department – SHORT TERM -	
Burlington Capital Improvement Plan shall be	plan updated in 2012; ON-	
coordinated with the Land Use, Utilities and	GOING -Annual review and	
other relevant plan elements to ensure a	update of project list	
balanced program that is adequately funded		
and responsive to community interests.		
Civer and list of consistent and in charling		Concerned City From de Althiliter
Six-year list of capital projects including	All City Departments – SHORT	General City Funds, Utility
specific actions targeted towards natural	TERIVI -Annual update	Funds, grant lunds
nazard miligation. Implement the adopted		
Surface water Management fille that		
provides far more extensive regulation than		
the adoption by reference of the Department		
of Ecology Technical Manual, by Public Works.		
capital improvement plan is implemented		
Including a new pump station at the end of		
Gages Slougn, a new storm drainage trunk on		
the west side. Each development is regulated		
and stormwater quality is also regulated.		
Long-term storm water quality issues are a		
major focus in the Gages Slough Management		

ACTION	STAFF ASSIGNMENT AND SCHEDULE	FINANCING PLAN
Plan. Action: Continue and improve surface water management through more in depth review, regulation and training. The first two major capital projects are scheduled and funded.		
Upgrade all city-owned critical facilities. Construction is completed of both the new Fire Station and Police Station, and the major upgrade of the Wastewater Treatment Plant.	City of Burlington –ON- GOING –All facilities updated over past 5 years	General City Funds, Utility Funds, Grant funds

Public Outreach & Education

6. The plan reviews public information activities, such as outreach projects and environmental education programs.

In 2014 public education and outreach will be enhanced with the update to the Program for Public Information. The program will now have a 5 member committee that includes a local insurance agent and a local lender to bring a fresh perspective to the outreach program. Residents will receive continuing public education about; the hazards, loss reduction measures, and the natural and beneficial functions of floodplains. Public and political support is strong for projects that prevent new problems, reduce losses and protect the natural and built environment. The community and associated special districts and other jurisdictions in the area want to see the plan's recommendations implemented.

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
riooding		
Provide on going public education at all	Planning Department ON-	Integrated in Department
levels, from the renter to the homeowner,	GOING -with Annual Report	Budget.
regarding residential, commercial and		
industrial best management practice issues,		
flood hazard mitigation, water quality, and		
related local issues. Update annually.		
The City shall provide on going public	Planning Department ON-	Integrated in Department
education about flooding and shall adopt a	GOING with Annual Report	Budget.
flood hazard reduction plan, consistent and		
compatible with any countywide efforts and		
plans, using the community newsletter,		

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
special targeted mailings to Realtors, insurance agents and lenders, training sessions at neighborhood meetings, the public library, and other means that may be identified.		
Provide for ongoing public education aimed at residents, businesses, and industries in the urban area. The education programs are to inform citizens about stormwater and its effects on water quality, flooding, and fish/wildlife habitat, and to discourage dumping of waste material or pollutants into storm drains.	Planning Department ON- GOING with Annual Report	Integrated in Department Budget.
The Planning Director and the Building Official will continue to make flood map determinations in response to public inquiry, along with an annual mailing to real estate agents, lenders and insurance agents. Make map determinations, provide annual mailing to users, and maintain accurate records and logs. Timeline is on going.	Planning Department ON- GOING with Annual Report	Integrated in Department Budget.

ACTION	STAFF ASSIGNMENT &	FINANCING PLAN
	SCHEDULE	
Flooding – <i>continued</i>		
The Planning Director will continue to mail	Planning Department ON-	Integrated in Department
out a flood bulletin twice annually, including	GOING with Annual Report	Budget.
elements for map determinations,		
availability of library materials, and natural		
and beneficial functions. Research material		
and prepare flood bulletins, mail to all		
citizens in floodplain and entire community.		
Continue to participate in Flood Awareness		
Week and to keep citizens up to date and		
involved by bringing timely topics to regular		
Neighborhood meetings.		
Realtors will continue to provide disclosure	Planning Department ON-	Integrated in Department
of flood hazard on a voluntary basis and the	GOING with Annual Report	Budget.
Planning Department will work to modify the		
disclosure to identify the requirement for		
flood insurance purchase. Action by the		
state legislature to make this mandatory		
failed in 1995, but it is expected to be		
revisited. Improve flood hazard disclosure		
by adding requirement for flood insurance		
purchase. City will support legislation at		
state level. Timeline is unpredictable.		
Maintain updated maps and continue to	Planning Department ON-	Integrated in Department
work on automated base maps and overlays,	GOING with Annual Report	Budget.
leading to a planning level geographic		
information system; data collection and data		
entry to continue as new information and		
data sources become accessible. Planning		
Department to continue maintenance and		
updating of existing land use and		
topographic maps and continue data entry		
and development of mapping layers in		
automated system, including parcel and		
overlay data.		

Using improved citizen involvement, public	Planning Department ON-	Integrated in Department
education and establishing a solid work	GOING with Annual Report	Budget
program to improve maintenance of the		
drainage system. Plan to increase city		
maintenance of Gages Slough as drainage		
easements or public ownership becomes		
available, or a public/private partnership can		
be developed. Acquire land in the Gages		
Slough Corridor through land donation in		
exchange for Park Impact Fee Credit. Public		
education is a key focus of the drainage		
program and specialized best management		
practices brochures are designed for the		
residential, agricultural and business issues		
specific to Burlington. Enhance		
maintenance of the system, including ability		
to maintain more of Gages Slough, by		
working with the property owners and		
business community.		
All Hazards		
Expand the Public Information program to	Planning Department ON-	Integrated in Department
address other natural hazards where	GOING with Annual Report	Budget.
additional public information will be helpful,		
such as seismic retrofits for homes, how to		
make your home firewise, sheltering in		
place, alternatives for evacuation and other		
topics. Hazards identified through Multi-		
jurisdictional Planning process.		

APPENDIX A

EXAMPLE OF RECENT FLOOD HAZARD REDUCTION PUBLIC INFORMATION BULLETIN



"Summer Nights" in Downtown

"BURLINGTON SUMMER NIGHTS" at Railroad Park begins Friday, July 11.

There will be a Farmer's Market from 3:00 p.m. to 7:00 p.m. each Friday this summer (vendors have option to stay later if they like). This will be free to Vendors. Live entertainment including music is planned and details will be available in advance.



Visitor Information Center in Railroad Park 520 E. Fairhaven Avenue, Burlington WA

Fiber-Optic is now available!

FIBER is available to serve your business in Burlington! The City of Burlington is now partnering with Internet Service Providers (ISP's) to provide high speed fiber optic communications services to Burlington businesses. Check the city of Burlington web site for details, or e-mail <u>fiber@burlingtonwa.gov</u> Take a moment to review the enclosed Flood & Natural Hazard Public Information Bulletin. BE PREPARED!









Capital Improvement Planning for OURTOWN



Burlington Public Library

"It is time for <u>YOU</u> to get involved and let the City know what the *Public's* Capital Improvement Plan needs to include!" Member of the Public? Live in Burlington? Work in Burlington? Have a Business in Burlington? NOW is the time to make your ideas, issues and concerns for future Capital Improvements known.

One of the most important issues for every resident and business is the Capital Improvement Plan for the community. It is time for YOU to get involved and let the City know what the Public's Capital Improvement Plan needs to include!!!!! Where do you want to see the public investment??

This requires investing limited resources wisely for the community as a whole, including some wise investing in key community infrastructure. Parks, trails, gathering places, schools, sewer, public safety facilities, and well-functioning transportation and communication networks are a vital part of community quality. They are the features that attract residents and businesses to a community. At first glance, capital facilities (improvements) planning may not seem as alluring as visioning. Yet, there is considerable evidence that capital facilities planning can be a more powerful tool than zoning to implement a community's grand plans.

The priorities of the city departments are driven by a number of things, including access to funding, known system deficiencies, and NOW, YOU! The following list quickly grew in just a few weeks of asking the question:

POSSIBLE IDEAS FOR PUBLIC/BUSINESS CAPITAL IMPROVEMENT PLAN

- >> All new street furniture on Fairhaven
- Good looking Bus Shelters all over town
- Banners and Flower Baskets on Fairhaven and Burlington Blvd (every other pole is fine on Burlington Blvd)
- Get the signs up at entrance to Fairhaven
- >> Curb height on Fairhaven
- >> Pilot project for back-in angle parking
- Complete Streets
 - Set up 1, 3 and five mile walking/biking loops around Burlington; Plant a tree with its name on a plaque at key street corners and install benches.
 - Finish at least the North/South Bike Lanes
 - Interim bike access routes connecting SR 20 trail to new trail under I-5 (built late summer 2014) and to Skagit River Park via Pease Road
- Sewer main access to all of Burlington and to known unserved areas in the Urban Growth Area – Gardner Road, N. Skagit, Anacortes, S. of Peterson Rd
- Neighborhood Playgrounds/Parks need work
 - Fix Children's area at Country Aire playground
 - Fix dirt and lawn at Boerner Memorial Park
- Consider Dark Sky Ordinance to shield night views

 LET the City know about your: IDEAS, CONCERNS & INTERESTS

- Plan to attend a COMMUNITY MEETING on MAY 28 @City Hall, 7:00 p.m.
- EMAIL: bplanning@burlingtonwa.gov
- CALL: (360) 755-9717
- VISIT or SEND LETTER: 833 S. Spruce St, Burlington WA 98233



This Bulletin is being sent to you because your property has been determined to be in the floodplain.

> e ready for anything! Everyone in Burlington should already be prepared for disaster because of living in the floodplain. That includes earthquakes that could result in flooding in the event of a problem at one of the upriver dams. Keep that Emergency Kit updated and have your family plan organized at all times! A small Emergency Kit is easily added to your vehicle as well. As we continue to learn when disaster strikes, like the collapse of the I-5 bridge over the Skagit River last year, cell phone and land lines will be jammed and everyone will be on their own for a period of time.

The Skagit River General Investigation study has arrived at a practical proposal for action to improve flood control, in two parts, improving urban levees and getting more flood storage at upper and lower Baker dams north of Concrete. This plan is consistent with the work of Dike District #12 around Burlington. The levees are being strengthened, widening the tops, extending the back slopes to allow for overtopping and raising the height. This is a systematic plan for enlarging the levees so that they will first qualify for credit to help keep flood insurance rates lower, and eventually, they will provide 100-year flood protection under federal standards. Construction is underway from the end of the levee at Lafayette Road, to the Railroad Bridge.

MAP DETERMINATION and LIBRARY INFORMATION

A map determination is figuring out where the 100 year flood elevation is located relative to the first occupied floor of your home of business. This information is used to prepare an Elevation Certificate. A citywide system of elevation benchmarks is maintained in the Building Department. An average of an additional \$200 in savings is possible on your flood insurance policy if you have an elevation certificate, in addition to the 25% rate reduction available in Burlington as a result of community participation in the federal Community Rating System program. There are issues with lenders and flood insurance providers, and if you feel that you are not getting good information, please contact the city for help.

Information on other flood improvements, such as elevating your building, filling the crawl space, or floodproofing the lower portion, is available from the City and in the Burlington Public Library. There is a flood reference area in the library and staff will assist in directing you to the information you need.

DRAINAGE SYSTEM MAINTENANCE

Water quality studies in Gages Slough and wetland restoration projects to improve water quality are a high priority. The commitment to long term maintenance, monitoring and habitat improvement is beginning to show, with the success of the first three wetland restoration projects that are beginning to mature. Clean water, efficient flow of water when needed, and a quality environment are the goals. Gages Slough and the Skagit River are important amenities for the community. Burlington is fortunate to have the Skagit Conservation District as a partner in Gages Slough water quality sampling. There is still a long way to go to deliver clean water to the River.

The drainage maintenance and inspection program is part of flood hazard mitigation. Each year, every owner of a drainage system was mailed a Self-Inspection Checklist and asked to

inspect and make corrections as needed to all detention ponds, pipes, catch basins and other drainage control structures, to ensure that the capacity of the ponds is maintained and that the ability of the system to clean the storm water is retained. As the results come in, the city will do follow-up inspections, in addition to inspection and maintenance of the city street system. The public drainage system, including culverts, pipes and ditches is well maintained. Gages Slough is maintained at each street intersection and culvert location. A well maintained drainage system that functions in small storms will provide the best assistance possible in large storms and floods, by quickly and efficiently carrying the excess water out of town.

Thank you for respecting the signs that state "No Dumping thank you" at public access points to Gages Slough! Each property owner along the Slough is responsible for cleaning up any litter or trash that is on their property. The problem of

PROPERTY PROTECTION MEASURES

Let's get started on improving flood protection in your home! Staff is available to provide site specific flood and flood-related data, make site visits to review flood, drainage and sewer problems and to advise and assist on retrofitting techniques.

Stop by the Permit Center or give the Building Department a call at 755-0077 and let the city provide you with technical assistance on improving flood protection in your home. A site visit will be scheduled at your convenience to put a checklist together for home flood protection improvements. Staff is also available from the Public Works Department if additional assistance is needed to assist with drainage and sewer problems.

If you want to do your own research, here are some of the recommended FEMA technical bulletins that you will find at the Burlington Public Library and the Building Department for your use:

- Homeowner's Guide to Retrofitting, FEMA-312
- Design Manual for Retrofitting Flood-prone Residential Structures, FEMA-114
- Protecting Building Utilities from Flood Damage, FEMA-348

Take a few minutes to look over the possible areas where you may need to floodproof important parts of your home. A good example is protecting utility systems. This is one of the easiest and least expensive retrofitting methods to accomplish. Whether it is elevating, relocating, or anchoring; items such as electrical panel boxes, furnaces, water heaters, washers/dryers and heating fuel tanks are typically very cost effective items to upgrade. There are also recommendations for drainage and crawl space improvements.

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Skagit County Natural Hazard Mitigation Plan

FLOOD INSURANCE

Flood insurance rates are increasing because of changes in federal law, and property owners should review options, whether it is getting an Elevation Certificate, or perhaps making changes to the building that might be cost effective.

Any property owner in the City of Burlington is eligible to obtain Flood Hazard Insurance, since the city participates in the National Flood insurance Program. Purchasing or refinancing a home will trigger a requirement for flood insurance by the lender. Coverage in the event of flooding is not included in typical homeowner's insurance policies. Flood insurance is available through your own agency or broker and includes flooding from ponding/drainage problems, snowmelt flooding, runoff on hillsides, or any flooding involving surface water. Contents of the building are a separate addition to the policy. There is limited coverage available for flood-related erosion and mudslide. Replacement cost coverage is available for principal residences. Concerned about high Flood Insurance Rates? You may qualify for a substantial reduction if you have an Elevation Certificate that show a your home or business is located at or above the 100 year flood elevation. You will have to retain the services of a Licensed Engineer to complete the paperwork, unless an Elevation Certificate is on file already with the Building Department, so please check here first.

NATURAL & BENEFICIAL FUNCTIONS OF FLOODPLAINS

Elling property to increase elevation in the floodplain is allowed today. Total fill across Burlington is monitored to meet federal standards. The long term goal is to minimize fill to protect fish and wildlife habitat. Burlington supports habitat improvements in the floodplain, and the Gages Slough restoration projects are a major effort in the city. Storm water quality monitoring in Burlington clearly shows that better water quality treatment systems are needed and this is a major focus of the surface water utility. The use of natural rain gardens is one of the ideas included in the low impact development approach that is being promoted as a way to get storm water runoff back into the ground, and to clean up water quality.

The Gages Slough habitat management plan has identified locations for restoration and water quality improvement

projects. There are three completed restoration sites today, and about 15 more in need of work! The community is working towards the goal of clean water entering the Skagit River as the top priority, along with improving public access to habitat areas. The construction of a nonmotorized trail along Gages Slough that extends under Interstate 5 at Cascade Mall is scheduled for construction in 2014.

Protecting agricultural lands is part of **protecting the Natural** and Beneficial Functions of Floodplains. The city has implemented the Burlington Agricultural Heritage Credit program which is a density bonus credit option that will help raise funds for farmland preservation in exchange for increased residential density in mixed use business and commercial areas of the city.

Key elements of the Skagit **County Natural Hazard Mitigation Plan include protecting existing urban areas and preserving** farmland and open space, looking at a variety of measures

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SUBSTANTIAL IMPROVEMENT/DAMAGE REQUIREMENTS — The National Flood Insurance Program requires that if the cost of reconstruction, rehabilitation, addition, or other improvements to a building equals or exceeds 50% of the building's market value, then the building must meet the construction requirements for a new building. Substantially damaged buildings must also be brought up to the same standard. The major issue is elevating the structure one foot above the 100 year flood elevation, along with all mechanical equipment, ductwork and electrical equipment, and installing properly located and sized vents. However, if you are located in the Gages Slough Special Flood Risk Zone, "breakaway walls" are required below the 100 year flood elevation, and they must be designed by a licensed structural engineer.

FLOODPLAIN DEVELOPMENT PERMIT REQUIREMENTS — Before you build, add fill, or make changes to your property and structures, be sure to contact the Planning and Building Departments to determine if any permits or approvals are necessary. The Federal Emergency Management Agency and the insurance industry make frequent changes in the interpretation of floodplain standards, and you need to be sure you are using the most current information for any

Skagit County Natural Hazard Mitigation Plan

FLOOD WARNING SYSTEM

Each and every citizen has a role to play in the event of a flood. BE PREPARED!!! The Burlington Flood Emergency Team prepares and coordinates activities needed to be ready for any flood event with the involvement of all the responsible agencies.

The procedure for warning the public is coordinated through the Skagit County Department of Emergency Management. The Emergency Alert System is activated when necessary and includes the following local radio stations:

KBRC - 1430 AM 💻 KWLE - 1340 AM 💻 KAPS - 660 AM

One of the most used information sources in this area is <u>https://www.facebook.com/SkagitBreaking</u>. If evacuation is necessary, there will also be door-to-door notification and loudspeakers broadcasting from public safety vehicles in the neighborhood. Flaggers and/or portable signs directing traffic will be stationed at key intersections along the Evacuation Route.

Today, there are several neighborhoods in the Neighbor-to-Neighbor notification plan for very early warning. Contact your neighbors to ask if they want to be part of taking responsibility for each other, through a simple Telephone Tree, and call the Planning Department to get on the list. Now is the perfect time to identify your block captains and work together to BE PREPARED.

FLOOD SAFETY & DISASTER PREPAREDNESS

Every home needs to be prepared and STAY PREPARED!

Review your Flood procedure at home with your household and take the time to put your Emergency Preparedness Kit together, or check your flashlight batteries in your existing kit. Remember, a supply of drinking water, emergency food and first aid kit are the bare minimums, along with flashlights. In addition to the basic three day supply of food and water, consider having supplies for sheltering for up to two weeks. Keep a small "grab and go" kit for your place of work with food, water, first aid supplies. For the emergency kit in the car, add flares, jumper cables and seasonal supplies.

There is an excellent FEMA publication available, entitled "Are You Ready? An In-depth Guide to Citizen Preparedness". This publication offers disaster information for natural hazards, technological hazards and terrorism. It will guide you for preparation in advance and recovery from a disaster. If you want to order a free copy for your home, call 1-800-480-2520. On the internet,

http://www.fema.gov/areyouready/ is the website link. A copy is available in the Burlington Public Library. THIS COVERS THE BASIC DISASTER SUPPLIES KIT IN DETAIL.

LOCAL FLOOD HAZARD AREAS

There are three flood zones in the City Limits of Burlington, the Floodway (river side of the levee), the 100 Year Flood Zone and the Special Flood Risk Zone. Most of Burlington in the 100 Year Flood Zone.

The Special Flood Risk Zone includes all land within 300 feet of the landward toe of the levee. All structures must be designed so that floodwaters can pass underneath and there is no occupied space below one foot above the 100 year flood elevation, unless the site is within 100 feet of the levee where nothing can be built. All property in Gages Slough that is three feet or more below the 100 year flood elevation is also designated as Special Flood Risk.

The goal for Burlington is to get credit for the levees when the 100-year flood elevations are established on the Flood Insurance Rate Maps. This is only possible if the levees are certified as having 100-year flood protection and the work is accredited by FEMA. The process is underway and all monitoring and design is in place to complete.

Skagit County Natural Hazard Mitigation Plan

State Growth Management Act Mandatory Update—2016 Deadline

State law mandates a major update of comprehensive plans and development regulations no later than 2016 for all jurisdictions in Skagit County and Burlington is actively working to get this completed in about one year. This is a general timeline, because the Planning Department adjusts the workload and schedule based on many variables. The deadline for statewide update has been changed several times because of the economic recession, and this timeline should be a final date.

Because Burlington has fewer than 10,000 residents, the state is allocating \$9,000 in grant funds later this year, which will be used for incidental costs and to help pay planner salaries. There may be an additional \$9,000 next year, if the legislature funds it. Burlington is very fortunate because the visioning process for the future of Burlington was inspired in 2013 by the work of the UW Green Futures Lab and the Urban Land Institute Technical Assistance Panel. Burlington is rich in ideas! Now is the time to come together and evaluate the alternatives and concepts that will work best for the long term future of Burlington. Fortunately for the city, one of the major projects is the Shoreline Master Program and this work has already been completed and adopted. Remaining tasks include:

Description of the overall Comprehensive Plan- many major components are up to date and their goals and policies will simply be included: sewer, parks and recreation, shorelines. Others may need work such as storm drainage, but of that list only a few have components that are required to be completed in this timeline.

▶ Design and planning for the Complete Streets program to support pedestrian, bicycle and transit options, including Gages Slough nonmotorized trail route – a state law requirement since 2005, many great ideas generated by the Burlington Community Task Force as well as the UW and ULI studies.

Review of the Zoning map and code to consider rezoning and revisions in the regulatory framework – zoning standards need to be revisited in several locations. Should changes be made to the zoning code to allow additional height or change the development standards for building size, density.

Dpdating the Critical Areas code to comply with "best available science" – the state has fluctuated over time as a result of litigation and scientific studies, so the result likely reflects lawsuits and politics as much as science.

>> A Planned Action component, provided for by state law, will be included in the Environmental Impact Statement, to eliminate the need for individual environmental review for projects in defined locations, a great recommendation from the Urban Land Institute.

What are the best alternatives for Burlington? A programmatic environmental impact statement is planned to evaluate the alternatives so that solid decisions can be made.

The Planning Commission has agreed to be the sounding board for the update process, including providing general advice and conducting public meetings/hearings that may be needed. Direction from the Community is needed on the best way to gather input as the process moves forward. There are several issues/opportunities that need discussion. At a minimum, concurrence is needed on the "Direction from the Community is needed on the best way to gather input as the process moves forward."



general scope of the project, which could easily be accomplished with a workshop. It is important for us all to be clear on what options would work the best for Burlington long term.



833 S. Spruce Street Burlington WA 98233

Phone: 360-755-0531 Fax: 360-755-9565 E-mail: cityhall@burlingtonwa.gov

www.burlingtonwa.gov

Community Meeting

PARTICIPATE IN THE CONVERSATION ABOUT PLANS, PROJECTS AND IDEAS FOR BURLINGTON'S FUTURE!!!



7:00 -- 9:00 P.M.

CITY HALL COUNCIL CHAMBERS

833 S. SPRUCE STREET BURLINGTON, WA

> Invite your friends & neighbors!

APPENDIX B

MAPS OF CITY OF BURLINGTON FLOODPLAIN

CRITICAL FACILITIES

100-YEAR FLOODPLAIN









APPENDIX C

CITY OF BURLINGTON FLOOD EMERGENCY PLAN 2013-2018

INCLUDING SKAGIT COUNTY DIKE DISTRICT #12 STANDARD OPERATING PROCEDURE

COMPLETE DOCUMENTATION OF OPERATIONAL PROCEDURES AVAILABLE AT BURLINGTON PLANNING DEPARTMENT

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EXHIBIT II.

HISTORIC DIKE BREAKS OF THE SKAGIT RIVER VALLEY



EXHIBIT III.

SKAGIT RIVER FLOOD STAGE

ROAD WARNING AND CLOSURES

SKAGIT RIVER FLOOD STAGE ROAD WARNINGS AND CLOSURES

<u>River Height</u> 24.0 C	Location Possible water over roadway - Shore Lane, N. @ Cape Horn Rd.
24.0 MV	Possible water over roadway - Whitmarsh Rd. @ Pease Rd.
24.0 MV	Possible road closing - Whitmarsh Rd. @ BN RR Crossing
24.9 MV	Possible water over roadway - Whitmarsh Rd, @ BN RR Crossing
24.9 MV	Dessible water over roadway - Debay's Isle Rd. @ Francis Rd.
.25.2 MV	Possible Water order that a grant Rd. @ Glenwood Rd.
26.7 MV	Possible road closing - Swan red @ Babcock Bd.
26.7 MV.	Possible road closing - Swan Ru. @ Dabcook nat
27.3 MV	Possible water over roadway - Sterling Rd. @ Lalayette Hd.
27.9 MV	Possible road closing - Francis Rd. @ SR 9
27,9 MV	Possible road closing - Third Street, S. @ River Rd.
27.9 MV	Possible road closing - Francis Rd. @ Nookachamps Creek
27.9 MV	Possible road closing - Francis Rd. @ Thillberg Rd.
27.9 MV	Possible road closing - Francis Rd. @ Debay's Isle Rd.
227.0 1.0	Possible road wash out - Cabin Creek Rd. @ Lyman Hamilton Hwy.
20.2,0	Possible road wash out - Lyman Hamilton Hwy. @ Cabin Creek Rd.
28.2 C	Possible road closing - Sterling Rd. @ Lafayette Rd.
28.9 MV	Possible road closing - Francis Rd. @ Swan Rd.
20.2 MV	Possible water over roadway - Lafayette Rd. @ Collins Rd.
23.2 111	Possible road closing - Cabin Creek Rd. @ Lyman Hamilton Hwy.
29.4.0	Possible water over roadway - Lyman Hamilton Hwy. @ Cabin Creek Rd.
29.4 C	Receible road closing - Howey Rd. Access @ S. Skagit Hwy.
30.0 MV	Possible road closing - Behren Millett Rd. @ Lyman Hamilton Hwy.
	Possible road closing - Lafayette Rd. @ Sterling Rd.
31.1 MV .	Pueste road closing - Lafayette Rd. @ Anderson Rd.
31.1 MV	Possible toda diodina - Entry

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			Button Millet Bd. @ MV City Limits	
;	31.1 MV		Possible road closing - Benren Miller Ad. e and a	
:	31.6 MV		Possible road closing - Babcock Rd. @ SR 9	
	24-2 C		Possible water over roadway - Martin Ranch Rd. @ Barnaby slough	a
	3,4.2 0		Possible water over roadway - Cockreham Island Rd. @ Lyman	
	34.2 C	S 14	Beerible water level with road - Utopia Rd. @ Atwell Rd.	2
	34.8 C		Possible Water ever roadway - Lyman Hamilton Hwy. @ Cockreham Rd.	
	34.8 C	÷	Possible Water over rousing, Possible Water over rousing, Atwell Rd.	19.3 1.2
	35.4 C		Possible road closing - Otopia ner C road @ I yman Hamilton Hwy.	
	36.5 C		Possible water over roadway - Heary Hu. @ Junitary Hury @ Healy Bd.	
2	36.5 C	1.1.5.	Possible water over roadway - Lyman Hamilton may, e most and Creek	
	36.8 C		Possible water over roadway - S. Skagit Hwy. @ Cumberland electric	
	26.00	4	Possible road closing - cockreham Island Rd. @ Lyman Hamilton Hwy.	a.
	30.0 0		Possible water over roadway - S. Skagit Hwy. @ Cumberland Creek	14
	36,8 0		Possible water over roadway - Cape Horn Rd. @ Shangri-La Dr.	
2	37,5 C		Rescible road closing - S. Skagit Hwy. @ Savage Rd.	: ·
	37.5 C		Possible read closing - S. Skagit Hwy. @ Elwick Rd.	•
	37.5 C		Possible Toad closing - Gilligan Creek Rd. @ S. Skagit Hwy.	
Ĩ	-38.5 Ċ		Possible road closing Charge - Dalles Rd. @ Grassmere Rd.	÷.+
	38.6.C	8.75	Possible water over roadway	
	38.6 C		Possible road closing - Dalles Ru. & Glacomere	÷.,
	39.0 C	1.1	Possible road closing - Thunderbird Ln. W Moen no.	
	39.0 C	•	Possible road closing - Pressentin Rd. @ Cape Horn Rd.	
	39 0 C	×.	Possible road closing - S. Skagit Hwy. @ Cumberland Creek	
	00.00		Possible road closing - Cape Horn Rd. @ Shangri-La Dr.	- 614
	39.3 0		Possible road closing - Lyman Hamilton Hwy. @ Cape Horn Rd.	· · · ·
	39,3 C		Provible road closing - Healy Rd. @ SR 20	
	39,3 C	4. 25	Fossible load closing - Cape Horn Rd. @ Alder Creek	
	39.3 C	d a	Possible road diosing Cone Horn Rd. @ BN RR Crossing	*
	39.3 C		Possible road closing - Cape Home Dr. @ Cape Hom Hwy.	
	39.3 C		Possible road closing - Shangri-La Dr. @ Cape Homen Ar	

Skagit County Natural Hazard Mitigation Plan

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Skagit County Natural Hazard Mitigation Plan

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EXHIBIT IV.

MAP OF EVACUATION ROUTES AND EVACUATION PLAN

BEFORE, DURING AND AFTER A FLOOD EVENT -SAFETY






KEEP THIS MAP IN CASE OF EMERGENCY!

The City of Burlington Evacuation Map is on the back of this plan. In case of evacuation, please follow the arrows on the Evacuation Route Signs. Members of the Emergency Response Team MAY BE stationed at each critical corner as Flaggers to provide direction, if available. There are basically three routes out of Burlington, all leading to the NORTH, and every route on the Plan will lead you to Gardner Road, Old Highway 99, and Interstate 5.

This Evacuation Plan is for ALL Hazards. The order of Evacuation may change based on the type of Emergency. A suggestion is to keep this plan and map in your Emergency Preparedness Kit.

Every effort will be made to notify people in dangerous areas door-to-door, but this may not be possible. When an emergency is pending turn on your radio and listen for instructions on one of the following local Emergency Broadcast Stations or call (360) 428-3250:

KBRC 1430 AM • KLKI 1340 AM • KAPS 660 AM

SECURE YOUR HOME BEFORE LEAVING: turn off electricity, gas and water if possible.

WHERE TO GO: If you do not have a relative or friend to go to, plans have been made for you to stay in a designated shelter. The exact location of shelters will be designated on the Emergency Broadcast Stations or by calling (360) 428-3250.

WHAT TO TAKE WITH YOU: If there is time, take a brief moment to gather a few important items you may need. DO NOT DELAY, do this quickly and leave as soon as you can.

- 1. CLOTHING plan to be away at least 24 hours
- 2. PERSONAL ITEMS such as toilet articles, documents, photo albums, etc.
- 3. **PRESCRIPTION DRUGS** insulin, nitroglycerin, antihistamine, etc.
- 4. BEDDING sleeping bags, pillows, blankets, etc.
- 5. EYEGLASSES
- 6. FOOD if a special diet is required
- 7. BABY OR CHILD SUPPLIES food, diapers, toys, etc.
- 8. **PROPER IDENTIFICATION** important for small children, adults.
- 9. **PETS** provisions will be made for pets, they will stay in separate housing, bring food if readily available, and <u>dogs must be leashed</u>.
- 10. MONEY, CREDIT CARDS, CHECKS, ETC.
- 11. VEHICLE SUPPLIES flashlight, first aid kit.

HOW TO MAINTAIN CONTACT WITH FRIENDS OR RELATIVES AFTER YOU HAVE

LEFT: A registration center has been set up at all the shelters. You may go there in person or contact them by telephone (listen to the radio for instructions).

EXHIBIT V.

SKAGIT GRID SYSTEM & FLOOD PROGRESSION MAPS

PREPARED BY CORPS OF ENGINEERS

RECEIVED IN BURLINGTON 2006













EXHIBIT VI.

HYPERLINKS FOR COMPUTER DATA

Skagit County Natural Hazard Mitigation Plan

Flood Related Links:

1. National Weather Service (warnings, forecasts for Skagit County) <u>http://www.wrh.noaa.gov/sew/</u>

2. National Oceanic and Atmospheric Administration (NOAA) <u>http://www.noaa.gov/</u> Hundreds of topics and indices to help you find NOAA products, data and information.

- Satellite imagery
- Weather
- Emergency information

3. Federal Emergency Management Agency (FEMA)

- Flood Preparedness
- Flood Insurance Questions and Answers
- What to do after a flood
- Disaster assistance available

4. U.S. Geological Survey

- Current river gauge information
- List of Skagit County river gauges

5. U.S. Army Corps of Engineers

http://www.nws.usace.army.mil/

http://wa.water.usgs.gov/realtime/htmls/skagit.html

http://www.fema.gov/

Skagit River Flood Damage Reduction Feasibility and Salmon Recovery Study

6. Washington State Dept. of Ecology Water Resources http://www.ecv.wa.gov/programs/wr/wrhome.html

- Water quality information
- Surface and ground water information
- Dam safety information

7. Dike District #12

site under construction

Local information on Dike District #12 with other Skagit River information

8. Skagit 911 Center

Web site for the Skagit 911 Center

9. American Red Cross on the Internet

- American National Red Cross website
- Skagit Valley Chapter of the Red Cross

http://www.redcross.org/

http://www.skagit911.com/

http://www.mtbakerredcross.org/

10. National Weather Service Flood Warnings http://www.weather.gov/view/prodsByState.php?state=wa&prodtype=flood

EXHIBIT VIII.

PROGRAM FOR PUBLIC INFORMATION

PROGRAM FOR PUBLIC INFORMATION -2013-2018

Because Burlington has a standing emergency plan committee, the public information program strategy is designed to take advantage of that fact. The public information strategy is included in the Burlington Emergency Plan as Exhibit VIII. With the update of the Community Rating System program to the 2013 Manual, the City of Burlington is also updating the public information program and strategy, with the goal of completing the update process over the 2013-2014 planning horizon.

Establishing a Program for Public Information Committee

The new Committee will include at least five people. This includes a representative of the Public Works Department, which is considered to be the floodplain management office coordinating with Dike District #12, responsible for drainage/surface water management; a representative of the Planning Department, responsible for coordinating the Community Rating System program and Public Information and Outreach, the City Administrator, a representative of Dike District #12, a Local Insurance Agent who handles many flood insurance policies from Farmer's Insurance Agency and a Local Lender from Skagit State Bank. Further updates to the plan will be added as the team meets.

<u>Strategy Team</u>

The Burlington Emergency Plan Committee has a regionally coordinated strategy for public outreach projects. In addition to being represented on the Skagit County strategy team, an indepth local strategy is critical because of Burlington's location primarily in the 100-year floodplain. The team meets before Flood Awareness Week each year to update the plan and review the strategies that are in place, make updates and revisions and report on issues. There is a follow-up meeting during flood season to go over the updates to the plan. If there is a flood event, the entire team is on call. For the purpose of coordinating the public information outreach strategy the Community Rating System Coordinator is the floodplain manager. In a flood event, the Mayor is the flood boss for the city.

Steve Sexton, Mayor David Nielson, Fire Chief Bill VanWeiringen, Police Chief Marv Pulst, Public Works Director Aaron Bradshaw, Street Supervisor Margaret Fleek, Community Rating System Coordinator Lorna Ellested, Dike District #12 Commissioner John Burt, Dike District #12 Commissioner Eddie Tjeerdsma, Dike District #12 Commissioner Jan Flagan, Skagit County Surface Water Manager Skagit County Director of Emergency Services Mark Watkinson, Emergency Services Coordinator Skagit County Search and Rescue John Leander, Burlington-Edison School District

The Flood Hazard Analysis

General

There are three flood zones in the City Limits of Burlington, the Floodway (river side of the dike), the 100 Year Flood Zone and the Special Flood Risk Zone. Most of Burlington is in the 100 Year Flood Zone.

The Special Flood Risk Zone includes all land within 300 feet of the landward toe of the Dike. All structures must be designed so that floodwaters can pass underneath and there is no occupied space below one foot above the 100 year flood elevation, unless the site is within 100 feet of the Dike where nothing can be built. All property in Gages Slough that is three feet or more below the 100 year flood elevation was designated as Special Flood Risk in the mid-1980's as part of a negotiating process over the uniquely complex Skagit River delta area when the Flood Insurance Rate Maps were finalized. The status of Gages Slough will be revisited in the future. A focus of the Fall 2012 Public Information outreach will be an explanation of the status of the remapping program.

New proposed National Flood Insurance Program rate maps were issued June 30, 2010, and a timely appeal was filed by the City and others on how much water gets here. The request for a Scientific Resolution Panel of flood hydrology will likely be held until the new Levee Analysis Mapping Approach (LAMP) is approved, the restudy is funded, and maps are available to see the outcome.

The Director of FEMA has placed all new map adoptions on hold because they are changing their computer modeling (LAMP) to give some credit for existing levees, even when not certified as providing 100 year flood protection. No dates have been identified for action by FEMA.

Burlington and Dike District #12 have signed an Interlocal Agreement to move ahead with plans for Levee Certification, to get 100-year flood protection for Burlington. Engineering analysis and Geotechnical evaluation is in place; a new Shoreline Substantial Development Permit has recently been issued for the levee upgrades from Gardner Road to Whitmarsh to get to the Corps of Engineers current 25-year flood elevation. This will get credit in the Community Rating System program and may be very close to 100-year protection after the restudy is done by FEMA.

All areas in Burlington and the surrounding area are subject to flooding with the exception of Burlington Hill.

Levee protection is at approximately the 50-year storm event, with a 25-year profile. This is approximately river elevation thirty-eight (38) feet.

Elevation 22 represents the vegetation line, the area where fishing occurs. The dike is 14 - 16 feet above that point. The top of the levee is 44' upstream and 37' at the Anacortes Water Treatment Plant. Whitmarsh Road is blocked at 23.5'. The elevation of the road under the Old 99 bridge is 28.3'.

West Whitmarsh Road is closed at 35'. It is blocked at Burlington Boulevard, the Home Depot entrance, and Bouslog Road by the city street department. A coordinating call of the Dike Commissioner in consultation with the County Sector person is made for closing the road at Pulver/Bennett. It is planned to place a "road closed ahead" sign at that location and provide a U-turn at the Whitmarsh/Pulver road intersection.

The street department is responsible for valve closures.

The basic rule of thumb is that the level of the river decreases at the rate of about 1.5 feet per mile.

Possible water height in a 100-year flood in Burlington is approximately five (5) feet of water. Most of the Skagit River valley will require evacuation in that scenario.

The 1990 flood reached 37.37 and 1995 flood reached 37.36', very close to overtopping the levees. In an event larger than that, or a similar event with a levee failure, more extensive evacuation will be required.

<u>Areas Subject to Inundation if Dike is Overtopped or if Storm Exceeds Levee Design</u> <u>Capacity and Dikes are Widely Overtopped (theoretical case)</u>

- 1. Historical overtopping has occurred along SR 20 east of District Line Road. This occurred in the flood in the winter of 1990. Path is across the Railroad tracks and down SR 20 into town unless diverted to Gages Slough, which also occurred in 1990.
 - In the flood of November 29 and 30, 1995, the flood fight for SR 20 was well planned in advance by Assistant Fire Chief Roger Tjeerdsma. The night before the crest was expected, 12,000 sandbags were stacked along the river side (south) of the railroad tracks, brought in on flatcars by the railroad from the Dike District #12 EOC, also located next to the railroad. These were then carefully placed to the correct height to fill in the low spot in the railroad grade and provide for controlled overtopping. It was previously agreed that the levy would not be built higher than the District Line Road elevation at the Railroad Crossing. Long term plan is to develop a permanent structure so there is no further need for sandbagging.
 - Overtopping can also be expected at Whitmarsh Road at the crossdike, at the point east of Burlington Boulevard where the underpass takes off, and at points east along the dike (Natagani estate property).
- 2. If the levee overtops at District Line Road and water is directed both north of Burlington Hill and into Gages Slough, homes north of SR 20 and west of Vista View Drive (where the water crosses the road), and along Gages Slough will be evacuated. Depending on the

severity of the situation, the Northeast, North/Central and South Sectors may also require evacuation. See Evacuation Plan for Evacuation Routes by Sector.

3. If the storm exceeds the 50-year design of the levee system, citywide evacuation is likely required when the river elevation reaches 38 feet. There will be widespread overtopping at a minimum.

Areas subject to Inundation – See Evacuation Route Map for Sector Listings

- 1. Numerous levee breaks have occurred east of town in the vicinity of District Line Road with the old levees. The potential is always present and must be anticipated in the planning process. The dike profile is being reinforced and backsloped to facilitate sheet flow overtopping in the area from the railroad to Gardner Road, so the likelihood of an end run is more probable.
 - Path is across the Railroad tracks and down SR 20 into town unless diverted to Gages Slough.
 - If water is diverted to Gages Slough area along the slough is subject to inundation.
 - If not diverted, it will go down the road and inundate the Northeast and North /Central Sectors, at a minimum.
 - If extent of flooding has water going north of Burlington Hill, the Burlington Hill Industrial Park will be inundated (North/Central Sector).

2. Potential levee failure/overtopping near the Wastewater Treatment Plant at the bend in the river.

- At this location, the Northeast and South Evacuation Sectors will be inundated.
- 3. Potential levee failure between the railroad bridge and Burlington Boulevard or between Burlington Boulevard / I-5.
 - At this location, inundation will occur in the South Sector, a major commercial and industrial area.
- 4. Potential levee failure west of I-5 near I-5 Auto World
 - At this location, there are few residences, primary use is auto dealership; the Southwest Sector west of I-5 will be inundated. It is not likely that this will extend north of SR 20.
- 5. Potential levee failure at or near Avon Not in City Limits
 - This is west of the Urban Growth Area; however, numerous residences are located adjacent to the levee.

Because flooding occurs fairly often, the Community has a high level of awareness of flooding and preventive structural and non-structural measures to mitigate the impact. In a 100-year flood event, most of the city will be inundated with water up to three feet in depth. Water depths will exceed eight feet in some areas in the Gages Slough corridor, but the velocity is minimal.

Burlington is fronted by a well constructed and maintained levee that extends approximately one mile upstream of the city, but the levee will not protect the city from a 100-year flood on the Skagit River. Each year, the levees are inspected by the Army Corps of Engineers. The levees are in excellent condition and exceptionally well maintained. Dike District #12 has made substantial levee improvements following the 1990 flood, including placing clay keyways in the dikes, widening the top and extending the landward toe to create a design that should not fail if overtopped.

The danger of flooding in Burlington is imminent when the river reaches the stage 38.1 feet. Maximum flood fighting using expedient flood works are employed and evacuation is necessary, according to Skagit County's Emergency Management Department. Upstream of the Burlington Northern Railroad Bridge, the water is 3 to 4 feet higher because of debris and logjams and the effect of the bridge structure itself. Compare this with the earliest flooding, which occurs at stage 25.5 feet with backwater in Nookachamps Creek, flooding of low-lying farmland and no damage, and you can easily see that the flood hazard in Burlington is severe when it happens. *See Flood Inundation Maps Exhibit V provided by the Corps of Engineers computer model.*

It is very difficult to visualize this without having seen a flood, but considering the fact that the 100 year elevation for protecting structures is 27 feet at Interstate 5 and 40 feet at Gardner Road, one can see how frightening this situation would be when the river reaches the stage 38.1 feet.

Flood safety and property protection measures and other natural hazards

Everyone in Burlington, with very few exceptions, with a mortgage knows they are in a floodplain. There are many new and old residents who are getting together with their neighbors to form a "Neighbor to Neighbor" Plan, consisting of a telephone tree to notify everyone, and to help anyone in the neighborhood that may need evacuation assistance. Each fall season, there is a meeting with each group and representatives of the city including the CRS coordinator. A new system, called MystateUSA is getting started through the 911 center, paid for by the oil refineries at Marches Point. This system will be able to notify relatives of disabled or older citizens as we do by hand today so that they will have extra time before a required evacuation. Citywide notification about this program, and a form to sign up and turn in to the city, as well as a computer link to sign up, will be provided to city residents Fall 2012.

With the support of the City Council to get involved in the Promotion of Flood Insurance with a mailing to every Postal Patron, every renter in addition to home owners are getting better informed on issues and preparation. Additional tips on flood safety are included. This is scheduled for mailing each fall at the beginning of the flood season.

The city informs residents in the two annual city flood mailings that free technical assistance on retrofitting is available, the Building Department and the Library have lots of resource materials.

The Building Department is actively involved in field visits to work on problem issues, such as crawl space elevation and venting, two examples of common problems.

Improving flood protection in every home is a high priority. Residents are encouraged to take a few minutes to look over the possible areas where they may need to floodproof important parts of the home. Electrical panel boxes, furnaces, water heaters, and washers/dryers should be elevated or relocated to a location less likely to be flooded. If heating with propane, pour a slab and anchor the tanks to the ground with straps or bolts or they will become floating bombs. Basement floor drains and interior and exterior backwater valves can be installed, and interior floodwalls can be placed around utilities. If they have a newer (post 1985) home, check to be sure these items have been taken care of when the home was constructed. Identify the potential for moving essential items and furniture to upper floors or the attic of the home. Materials like sandbags, plywood, plastic sheeting, and lumber handy for emergency waterproofing can already be on hand. This action will help minimize the amount of damage caused by floodwaters and requires minimal storage space.

This program is also an extension of the Skagit County Natural Hazard Mitigation Plan, and a copy is attached to this report where all the natural hazards affecting this area are detailed along with the appropriate safety and property protection measures, and at least one hazard is covered in each of Burlington Flood and Natural Hazard Mitigation Bulletins. To summarize from the Action Plan, this is a recap of the types of flood safety measures appropriate for the flood hazard, the flood related activities that address flood safety and the goals for flood safety:

- 1. Regulatory controls are very important and the proper administration of the critical areas code that includes the flood code with particular attention to the details is a key goal and measure.
- 2. Maintenance and management of stormwater runoff prevents localized flooding in smaller storms and ensures that the system is working at capacity in a larger flood event.
- 3. Participating in the CRS program is a vital component of keeping the public involved and informed.
- 4. Protecting and restoring the Skagit River Shoreline as open space and habitat and parks protects endangered species and enhances water quality, both public benefits.
- 5. Limiting floodplain development to tightly regulated activities meeting all codes is a necessary component to optimize flood safety.
- 6. Monitoring storm drains and sampling water quality enhances flood safety.
- 7. Intergovernmental coordination is the key to long term flood hazard mitigation, including the multi-jurisdictional plan and other components such as interlocal agreements.
- 8. Clean water leaving the drainage system is a major goal and program, with a focus on best management practices through public education and annual inspection and maintenance.
- 9. Improving the levees with the goal of levee certification in urban areas combined with a strong focus on nonstructural solutions is a major program focus and goal to keep the urban areas vitality and at the same time, enhance the riparian habitat.
- 10. Maintain elevation certificates and ensure total quality control to maximize the benefit of the floodplain construction standards.
- 11. Provide technical information to all comers to keep in compliance.
- 12. Provide 100-year flood protection for the Sewer Plant.

- 13. Maintain an excellent flood warning and evacuation plan that has regular updates and community involvement.
- 14. Keep critical facilities functioning during flood events.
- 15. Maintain and update the Emergency Plan annually.
- 16. Set the levees back from the River through the three bridge corridor.
- 17. Upgrade the levee system to provide flood protection for the 100-year storm.
- 18. Provide on-going public education at all levels on hazard mitigation.
- 19. Make flood map determinations, keep the insurance and real estate and lending institutions up to date, and maintain accurate records.

Current Flood-related Public Information Outreach Activities

This program consists of the following major elements:

- 1. Twice annual Flood Hazard Public Information Bulletin with detailed public outreach information.
- 2. Annual review of program and flood preparation, early warning and evacuation procedures.

3. Flood Awareness Week annual system test and news media outreach. This is part of the Skagit County coordinated annual event. There is also a meeting with the Sector people, the Burlington Emergency Team, the Red Cross, and the Corps of Engineers to keep coordination and communication clear and open.

The Burlington-Edison School District encourages students to participate in the annual Sandbag filling training. Those same students provide help during flood events.

Flood Safety information is specifically part of the media outreach program, as detailed in the attached exhibit.

4. Monthly Land Use Bulletin to all desiring to be on the mailing list that includes a regular column on Gages Slough and the Skagit River Corridor.

5. Promotion of the Neighbor to Neighbor Plan for early notice to make sure that anyone who wants to evacuate early gets a phone call and contact by their neighbors, with assistance provided to special needs residents. This is part of the program that includes early notice to all critical facilities, and coordinates special needs evacuation with the Burlington-Edison School District and the Red Cross. If it is a Homeowner's or Condominium Association, they are contacted at the beginning of each flood season, and staff conducts meetings annually on the program. Promotion is in the regular twice a year Citywide Newsletter. New opportunities are solicited by staff, such as Retirement Centers and Block Watch areas (a police program).

6. Promotion of Flood Insurance.

2012 will be the fourth of an annual mailing to all postal patrons on the importance of flood insurance. Previous mailings have resulted in close to 100 walk-ins and phone calls, and requests for meetings at Senior only complexes regarding flood insurance.

The Fall Community Meeting will include a discussion on the Flood Insurance Rate Map study and the Endangered Species Act Biological Opinion issued to FEMA. With remapping now on long term hold with no schedule, the city continues to coordinate with local insurance providers and the citizens on a case by case basis; several requests weekly for EC's and information.

In 2007, a series of five workshops was conducted with the Planning Commission. In 2008, five public meetings were held regarding the update of the Natural Hazard Mitigation Plan. After the proposed new maps came out, there were several public meetings as folks were extremely concerned because of inaccuracies and massive changes. With the project on hold, a flood topic is included with each community meeting.

The process is now complete on the final environmental impact statement on the options for Burlington, as of July 2010.

7. TCI cable airs the video titled *The Skagit River – Will it Flood Again?*, at the beginning of the flood season.

8. Skagit County and the Skagit Valley Herald publish an annual flood insert page in the newspaper that contains articles on flood preparedness, flood insurance, an evacuation map, and the names of contractors able to retrofit structures.

9. Burlington and Skagit County provide extensive public information on their websites and they are maintained up to date.

Goals for the Public Information Program

1. Encourage all property owners to purchase flood insurance, particularly homeowners.

2. Encourage all residents and property owners to be prepared for a flood and other natural hazard emergency at all times, with flood and earthquake the two most likely in Burlington, and to protect their own property.

3. Early flood evacuation and helping people with special needs is greatly facilitated by the Neighbor to Neighbor Program. The goal is to get every block, every homeowner's association, in addition to all critical facilities, in Burlington to participate in the Neighbor to Neighbor Plan to facilitate early and effective public notice and encourage residents to help their neighbors. Annual meetings are held with each group.

4. Develop innovative approaches to public outreach, such as specific topic workshops, speaking at organizations, and working with individuals at the Public Information Counter to educate the community on the hazards, opportunities, and preparedness.

5. Coordinate with the County's regional flood hazard outreach programs to make sure the Burlington issues are represented.

6. Design projects to address all of the priority natural hazards affecting the community.

Projects planned that will be done each year to reach the goals.

2012-2013 will focus on flood preparedness, opportunities for retrofit for existing buildings to lower rates, and emergency preparedness. In addition to the regular programs in place, the most important components that have been prioritized for 2008-2013 are the following:

1. Promotion of Flood Insurance. This is promoted through the three public outreach mailings, and detailed information provided in person and over the phone. This is a topic at each community meeting; there are many uncertainties about the program so the focus is on preparing today regardless of the long term changes to the flood insurance program.

2. The city has a developed a new bulletin on the importance of flood insurance and it is mailed to all postal patrons to make sure that renters are notified, in addition to homeowners.

3. Workshops are planned on specific flood topics as FEMA moves ahead with revising FIRM's and as Burlington continues to make progress with levee certification. Current schedule:

2008 Workshops: River Hydrology and Hydraulics; FEMA flood insurance; Flood Hazard Mitigation Alternatives for Burlington; new FIRM maps out – what do they mean for you?; series of meetings in October on Flood Evacuation and Preparedness and being ready year around for other hazards such as earthquake.

2009 Workshops: The FEMA Technical Appeal on H &H – the case for Burlington; River Hydrology and Hydraulics; FEMA flood insurance; Flood Hazard Mitigation Alternatives for Burlington; new FIRM maps out – what do they mean for you?; series of meetings in October on Flood Evacuation and Preparedness and being ready year around for other hazards such as earthquake.

2010-11 Workshops: Fall 2010 FEMA workshop on new maps; January 2011 workshop on Flood Insurance, status of FIRM map appeal, next steps, also long range nonmotorized plan that includes public access to levees in 3-bridge corridor.

2012-13 Workshops: Spring and Fall Community meetings; Fall focus on the Flood Insurance Rate Map study since remapping is on long term hold, and the Endangered Species Act Biological Opinion issued to FEMA; Implement the automated Community Notification System.

4. Promotion of the Neighbor to Neighbor Plan for early notice to make sure that anyone who wants to evacuate early gets a phone call and contact by their neighbors, with assistance provided to special needs residents. This is part of the program that includes early notice to all critical facilities, and coordinates special needs evacuation with the Burlington-Edison School District. If it is a Homeowner's or Condominium Association, they are contacted at the beginning of each flood season, and staff conducts meetings as requested on the program. Promotion is in the regular twice a year Citywide Newsletter. Meetings scheduled for October 2012 to emphasize Flood Awareness Week. A focus in 2012 is to get local residents to sign up for Skagit 911 Community Notification System providing alerts to home phone, work phone, cell phone, email, or text message at the Fall Community Meeting, through the Fall Newsletter, posters in City Hall and Library and other means. Provide forms on paper as well as the computer sign-up to get more Seniors and others without computers involved.

6. This program is also an extension of the Skagit County Natural Hazard Mitigation Plan, and a copy is attached to this report where all the natural hazards affecting this area are detailed along with the appropriate safety and property protection measures, and at least one hazard is covered in each of Burlington Flood and Natural Hazard Mitigation Bulletins. Projects being considered for the future include a workshop on the International Existing Buildings Code, with a focus on seismic retrofit.

Documentation

See attached letter from the Mayor documenting that the strategy will be implemented.

Annual Evaluation

This report will be included in the Annual Report to the community on the Natural Hazard Mitigation Plan, that is also submitted as part of the CRS annual recertification. The regular meetings of the Team and annual update of the plan are very much institutionalized, because of the specific high flood risk in the community.

The following points will be covered:

- > The goals of the community's public information strategy.
- > A list of the projects implemented to meet those goals and their objectives.
- > A list of those projects that were not implemented or that did not reach their objectives.
- Revisions to the current projects and new projects to be implemented during the coming year, if they are different from the original strategy.

EXHIBIT IX

PHOTOGRAPHS OF 1990, 1995, 2003 & 2006 FLOOD EVENTS



November 25, 1990 – Skagit River looking west at Burlington Boulevard/Riverside Bridge





Kiniting set Mount Verrior

Aerial view of flooding – looking northeast

Skagit County Natural Hazard Mitigation Plan

1995 Flood

Railroad Bridge collapse



Whitmarsh Road – looking east toward Railroad bridge



Whitmarsh Road @ crossdike - looking south



9:00 a.m. Sandbagging along BNSF at SR 20 with lots of volunteers. (near District Line Rd.)

BNSF along SR 20– looking east. Lafayette Road and Sterling area flooded south of tracks.





BNSF along SR 20. Both sides of railroad flooded. Large piles of sandbags are covering boils.

Skagit County Natural Hazard Mitigation Plan



North side of SR 20 flooded @ District Line Road



Sandbaggers along RR tracks @ SR 20



Mount Vernon revetment - looking south from Westside Bridge









Skagit County Natural Hazard Mitigation Plan



Landing at Skagit River Park







Flooding south of BNSF on Lafayette Road

Skagit County Natural Hazard Mitigation Plan



Rocks brought in to strengthen along RR tracks



Sandbagging at BNSF at SR 20



Whitmarsh Road underwater near crossdike



Whitmarsh Road @ crossdike



Lafayette Rod – south of BNSF @ SR 20





Lafayette Road – south of BNSF



Whitmarsh Road – looking east under Burlington Blvd/Riverside bridge

APPENDIX D

OVERVIEW LEVEE CERTIFICATION CITY OF BURLINGTON

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BURLINGTON LEVEE CERTIFICATION PROJECT

Overview

The goal of the Burlington Levee Certification project is to upgrade the levee segments to meet 100-year flood protection standards, while not having an adverse effect upstream. Work is in process to fully comply with standards and at such time as final decisions are made on levee elevation through the federal process, the levee segment work will be completed. Under the updated FEMA procedures for establishing base flood elevations, the levees will be included in the restudy for mapping updates. Flood maps have not been amended since they were originally established in 1985. While the Corps of Engineers General Investigation has made a preliminary determination that urban levee upgrades are the best long term program for flood hazard mitigation, this work is not finalized, so the City and Dike District #12 are prepared to adjust the project to achieve the best protection feasible for the community.

The process the City is following in order to change the map to show 100-year protection along the Skagit River frontage involves submitting an application for a Conditional Letter of Map Revision (CLOMR) to FEMA. This must occur prior to any work starting on the project itself because it will be FEMA's detailed review of the engineering plans and specifications to determine whether or not the levee will meet their standards, found at 44 CFR 65.10 of the NFIP regulations. This process is FEMA's statement that, if a project is built as planned, it will meet all of their requirements. A Letter of Map Revision (LOMR) application must then be submitted by the City after the project is built in order to change the maps.

Testing and Engineering Reports and Requirements for Levees

See also the FEMA March 2007 Fact Sheet, Requirements of 44 CFR Section 65.10: Mapping of Areas Protected by Levee Systems.

The objective of this report is to identify the testing and engineering reports and requirements for upgrading the existing levees to meet levee certification requirements, so that a Conditional Letter of Map Revision (CLOMR) may be applied for and issued through the Federal Emergency Management Agency (FEMA), setting the stage for completing the work to the satisfaction of the US Army Corps of Engineers with the final product being Certified Levees and a Letter of Map Revision (LOMR) issued by FEMA changing the BFEs accordingly.

This is a summary of the requirements from the US Army Corps of Engineer's Manual. Today, the City is required to hire a private engineering firm to prepare the design for submittal to FEMA. However, this information is still useful.

The US Army Corps of Engineers is the agency responsible for technical review of the design and construction of levees. The City of Burlington and Dike District #12 are working together to upgrade the existing levees so they will be certified as providing 100-year flood protection. By this means, the levees will be considered in computer models that may be used now and in the future to modify base flood elevations (BFEs). The goal is long term stability in the Base Flood Elevations that will specifically accommodate the revitalization of the historic Downtown Burlington that is designed with 30 foot wide lots, or the buildout and future redevelopment of both residential and commercial land over the long term. The historic small lot sizes cannot accommodate a significant increase in Base Flood Elevations.

The US Army Corps of Engineers Manual EM 1110-2-1913, 30 April 2000, Design and Construction of Levees is the framework document for the project. Looking at Table 1-1, Major and Minimum Requirements, a procedure is summarized for the design and construction of new levees, as follows:

Step	Procedure					
1	Conduct geological study based on a thorough review of available data including					
	Analysis of aerial photographs. Initiate preliminary subsurface explorations.					
2.	Analyze preliminary exploration data and from this analysis establish preliminary					
	soil profiles, borrow locations, and embankment sections.					
3	Initiate final exploration to provide:					
	a. Additional information on soil profiles.					
	b. Undisturbed strengths of foundation materials.					
	c. More detailed information onborrow areas and other required excavations.					
4	Using the information obtained in Step 3:					
	a. Determine both embankment and foundation soil parameters and refine preliminary sections where needed, noting all					
	possible problem areas.					
	b. Compute rough quantities of suitable material and refine borrow area locations.					
5	Divide the entire levee into reaches of similar foundation conditions, embankment height, and fill material and assign a					
	typical trial section to each reach.					
6	Analyze each trial section as needed for:					
	a. Underseepage and through seepage.					
	b. Slope stability.					
	c. Settlement.					
	d. Trafficability of the levee surface.					
7	Design special treatment to preclude any problems as determined from Step 6. Determine					
	surfacing requirements for the levee based on future use.					
8	Based on the results of Step 7, establish final sections for each reach.					
9	Compute final quantities needed; determine final borrow area locations.					
10	Design embankment slope protection.					

In addition to determining the scope of work for Engineering studies to document existing conditions, identify any gaps in the work, establish final design parameters for each reach, and ensure that the levees now in place and any additional levee construction meets standards, there may be a need for Ring Levees and Setback Levees in the program. These will be new levees subject to the standards in the Design Manual. The height may exceed 3-4 feet, but that has not yet been determined. If so, a most rigorous engineering analysis is required.

Section 8-12, Earth-Levee Enlargement, sets out the engineering requirements for the Burlington main stem levees. Earth-Levee Enlargement is the technique being employed by Dike District #12 in constructing the addition to the existing mainline levees which raises the grade, widens the levee top, and extends the landside backslope to meet overtopping design standards. Riverside and Straddle levee enlargement is used as applicable in specific reaches.

Engineering Scope for Levee Enlargement as stated in EM 1110-2-1913, Section III Levee Enlargements, 8-11 and 8-12.

1. The modified levee section should be checked for through seepage and underseepage.

The two methods employed by Dike District #12 include cutoffs and landside seepage berms. Cutoffs in the form of clay keyways have been installed in stretches of the levee where landside boils have occurred in previous flood events. At other locations where major strengthening of the levee system was clearly prescribed because of previous flood event experience, landside berms have been installed as part of the long backslope.

A. Underseepage: Documentation of the work completed is required and further analysis may be required if the potential exists for underseepage. Principal seepage control measures for foundation underseepage are (a) cutoff trenches, (b) riverside impervious blankets, (c) landside

seepage berms, (d) pervious toe trenches, and (e) pressure relief wells. There are substantial literature references as needed in EM 1110-2-1913 and additional references utilizing seepage control methods as given in Turnbull and Mansur (1959), EM 1110-2-1901 and EM 1110-2-1914. If there is a determination of underscepage problems, as generally occurs most acutely where a pervious substratum underlies a levee and extends both landward and riverward of the levee and where a relatively thin top stratum exists on the landside of the levee.

B. Seepage through Embankments: This is unlikely to occur with long landside slopes that are adequately bermed, as constructed in the Dike District #12 levee upgrade program. Additional information on seepage control is presented in EM 1110-2-1913 and Chapter 8 of EM 1110-2-1901.

2. The modified levee section should be checked for foundation and embankment stability. Sufficient soil borings should be taken to determine the in situ soil properties of the existing levee embankment for design purposes.

Key features of the enlarged levees along the mainstem in Burlington are the long landside backslopes at 1V on 5-7H, and the extra wide crowns.

For existing levees, the minimum factors of safety for levee slope stability are 1.4 for Long-Term (Steady Seepage) and 1.0-1.2 for Rapid Drawdown. Detailed information on applicable shear strengths, methods of analysis and assumptions made for each case is referenced in EM 1110-2-1902.

3. An earth-levee enlargement should be made integral with the existing levee.

A. Enlargement shall have at least the same degree of compaction as the existing levee on which it is constructed.

B. Preparation of the interface along the existing levee surface and upon the foundation shall be made to ensure good bond between the enlargement and the surfaces on which it rests.

C. Foundation surface shall be cleared, grubbed, and stripped. Existing levee surface upon which the levee enlargement is placed shall also be stripped of all low-growing vegetation and organic topsoil. The stripped surfaces of the foundation and existing levee shall be scarified before the first lifts of the enlargement are placed.

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CITY OF MOUNT VERNON

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City of Mount Vernon Hazard Mitigation Plan, updated 2014. This plan includes the City's Natural Hazard Plans required by FEMA along with other Hazards that could impact the City.

HAZARD MITIGATION PLAN



Post Office Box 809 910 Cleveland Avenue Mount Vernon, WA 98273 (360) 336-6211 www.mountvernonwa.gov

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1.1: INTRODUCTION

This Hazard Mitigation Plan is the City's planning document that identifies both natural and man-made hazards that could, and have (for some) historically impacted the City, it lists and organizes mitigation strategies, and it contains an adaptive management component to ensure that change is possible when new information is obtained or better ways of mitigating risks are brought forward.

This plan is intended to help guide and coordinate mitigation activities by providing local decision makers with the information they need to make land use decisions and policies in the future. Mount Vernon wishes to be proactive in its mitigation planning to help reduce the cost of disaster response and recovery.

Hazards are inevitable; however, the City can be prepared to minimize the negative impacts of such hazards. Natural hazards that can, and do, impact Mount Vernon include flooding and severe storms; and to a lesser extent landslides, earthquakes, and fires. In addition, Skagit County's Hazard Mitigation Plan also identifies volcanic activity, avalanche, drought, tsunami, and seiche as hazards that could affect areas in close proximity to Mount Vernon. Other man-made/induced hazards that could impact the City include incidents involving hazardous materials, plane crashes, train derailments, bomb threats, civil disorder, domestic terrorism, and cyber attacks.

Knowing that these hazards are possible and being prepared to respond is of the upmost importance. The Federal Emergency Management Agency (FEMA) defines hazard mitigation as, "any sustained action taken to reduce or eliminate long-term risk to life and property from natural hazards". The hazard mitigation process that is found within this document can be conceptualized as the prevention component of the emergency management process. In its simplest terms this process can be visualized as follows:



1.2: PLAN ORGANIZATION

This plan is divided into seven (7) sections with a number of appendices, tables, graphs and maps as outlined within the foregoing Table of Contents.

Following the Introduction and discussion on how the plan is organized, this document will begin with an overall profile of Mount Vernon including its history, setting, physical form, demographics (both current and future), and general landscape patterns.

Sections 3 to 5 identify and assess the hazards the City is planning for; they outline the goals strategies and policies to mitigate these hazards, and specific mitigation plans and projects are described.

Section 6 describes how this plan is related to other documents and plans like the Community Rating System. Section 7 contains information how this plan was originally created and how it has been updated to date; and it outlines the planning/public participation process involved with this plan.

Lastly, Appendices A – D include the City's 2014 Emergency Plan, the 2014 Flood Response Manual, the City's Flood Season Preparation, and Critical Facility Location and Contact Information. To summarize:

- **Section 1:** Introduction and Plan Organization
- **Section 2:** Profile of Mount Vernon
- **Section 3:** Identification & Assessment of Hazards
- **Section 4:** Goals/Regulations to Avoid and Mitigate Hazards
- **Section 5:** Mitigation Projects
- **Section 6:** Relationship to Other Documents
- **Section 7:** Plan Management and Planning Process

2.1: HISTORY OF MOUNT VERNONⁱ

The earliest recorded settlers in what would later become 'Mount Vernon' were Jasper Gates and Joseph F. Dwelley, in 1870. These two likely stopped in Mount Vernon because the Skagit River was not navigable beyond this point due to enormous log jams. In 1876 the log jams were removed permitting river travel to the towns that had grown upriver from Mount Vernon. With the river being opened new logging activities and access to Ruby Creek (where gold had been found) were both possible. These two events reinforced Mount Vernon's position as an important transportation and trading center along the river.

Whatcom County was divided in 1883/1884, and its southern portion became Skagit County. In

1877 Harrison Clotheir purchased five acres (although some sources state it was 10 acres) from Jasper Gates along the riverfront for \$100.00 and platted a town site that he named 'Mount Vernon' in recognition of George Washington's Potomac River estate. Mount Vernon was able to beat out LaConner and Anacortes to become the County seat in 1884; and was incorporated six (6) years later in **1890**.

Until 1891, the City was dependent on the river for access to sternwheelers and steamers, fifteen of which connected it to Puget Sound. In 1891, a series of events turned the City away from its dependency. A huge fire destroyed most of the businesses and hotels situated along the waterfront, and many relocated to First Street. The railroad was also being laid through town, 4-5 blocks east of the river. Finally, the river bank eroded, taking Front Street and the west side of Main Street. The construction of the revetment in the 1950s as a final attempt to stabilize the river banks was also the last blow to the City's increasingly tenuous relationship to the Skagit River.



Photos courtesy of the Skagit County Historical Museum.

The major floods of 1892 and 1894 motivated the construction of a massive dike system in the summer of 1894. The construction of the wagon bridge over the river in 1893 also symbolizes the beginning of a still continuing battle between Mount Vernon and the river. The floods may have also been the impetus for the construction of homes on The Hill, though it had begun as early as 1891. Indicative of the shift in residential population was the construction of the first Lincoln School (the first brick building in town) in 1881, and the Roosevelt School in 1908. By 1902, the town was described as being situated on several hundred yards of flatlands on either side of the river, and the remainder on The Hill.

The routing of the railroad and the successful battle in 1892 to keep the courthouse, secured Mount Vernon's preeminent position. Though the county still pivoted around Mount Vernon, the axis of dependence and transportation had shifted from east-west along the river to north-south along the railroad. The construction of Highway 99 and Interstate-5 would further underscore this axis.

In 1912, the Sanborn Map Company lists the City population at 2,600. Expansion of the city continued until 1920, when the population decreased, and it was not until 1930 that the population again began to steadily increase.

The construction of Interstate-5 during the mid-1950s, reinforced the existing separation of



Photo taken near the current day intersection of First Street and Kincaid Street looking north – picture taken sometime in the 1940s.

Photo courtesy of the Skagit County Historical Museum.

downtown and The Hill, but a replacement for the Second Street Viaduct, as well as the construction of the Blackburn Road Viaduct, possibly improved movement between these two areas.

Though Mount Vernon's influence grew extensively during the 1940s and 1950s, it was not until the 1970s that major portions (2.32 square miles) of the County were annexed by the City. This inaugurated a conversion of the agricultural lands north and east of the City to significant new commercial and residential zones.

The City is organized as a non-chartered code city that has a strong mayor-council form of government.

2.2: LANDSCAPE SETTING AND PHYSICAL FORM

The City of Mount Vernon, Washington lies within the Skagit River Valley at elevations ranging up to approximately 200 feet above sea level. Mount Vernon occupies approximately 12 square miles (~8,034 acres) within the Skagit River watershed. The City is just six miles east of Puget Sound and has Interstate-5 running north/south through the City and State Routes 20, 536 and 538 running east/west through the City; please see **Map 2.1**.

The climate of Mount Vernon, similar to that of the Puget Sound Region, consists of mild winters with frequent light rain and cool, sunny summers. The warmest month of the year, on average is August with an average temperature of 74.10 degrees Fahrenheit; with January being the coldest month of the year with an average temperature of 34.1 degrees Fahrenheit. The annual average precipitation for the City is approximately 32.7-inches with rainfall fairly evenly distributed throughout the yearⁱⁱ.

Located on the left and right bank of the Skagit River Valley, elevations within Mount Vernon range from approximately 10 feet in the southwestern part of the city along the river to 180 plus feet in the eastern part of the city. Mount Vernon is at the eastern edge of the Skagit River delta and to the east are the foothills of the Cascades.

There are 23 primary streams flowing through the City that extend approximately 24.85 miles. The Skagit River, a "shoreline of statewide significance", is a major salmon system, that flows through the City in addition to Kulshan, Trumpeter, Logan, Thunderbird, Lindgren, Kiowa, Edgemont, Carpenter, Maddox, GC, Monte Vista, Flowers, Martha Washington, and Little Mountain (tributary to Maddox) Creeks. The City is also laced with category II and III wetlands and smaller stream systems that feed into the listed streams, please see **Map 2.2ⁱⁱⁱ**.



Photo of the headwaters of Maddox Creek.



Photo of a forested wetland area near Little Mountain.



The major geologic influences in the City include plate tectonics, glacial advancement and recession, and volcanic activity. Dominant surface features and topography of the Puget Lowland (which the City is located within) can be attributed to the most recent ice-sheet advance (known as the Vashon stade of the Fraser glaciation) which culminated around 16,000 years ago. As glaciers receded from Washington around 13,000 years ago, glacial deposits 60 meters thick or more were left behind. Subsequently, post glacial modifications, primarily from fluvial processes, began creating the landscape features that are present today^{iv}.

Mount Vernon is located in the heart of a rich agricultural area with a mild climate and good soils well suited to vegetable, seed, berry and bulb production. Mount Vernon is made up of two main groups of soil, near the river are alluvial soils consisting of fine sandy loam and loam, and away from the river are glaciated, upland soils consisting of gravelly loam. Due to agriculture and the alluvial area the valley the limits of the city have been cleared of native vegetation. The areas that are undeveloped are predominately grass, blackberry vines and deciduous trees such as alder, vine maple, with second growth evergreens in the lowlands and the higher elevations.



2.3: DEMOGRAPHICS

The following tables and graphs quantify and illustrate general demographic characteristics of the City. This demographic information is important because to protect the City from disasters we need to know exactly what we are protecting and where these inventoried areas are within the City.

Table 2.3.1:	Demographic Overall Summary	ľ
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Year	Population	Residential Structures	School Enrollment (Source: MVSD #320)
2012	32,250	12,322	6,256
2013	32,710	12,462	6,243
2014	33,170 (OFM estimate)	Not Yet Available	Not Yet Available



Graph 2.3.2: Population Increase over the Last Decade^{vi}

Using the 2010 and the 2008 - 2012 5-Year Estimates from the U.S. Census Bureau coupled with City building permit data the breakdown of existing homes and the City population in the year 2013 within the City is as follows.

Total	Total Housing Units: 12,462						
OCCUPIED		Occupied: 92% Vacant: 8%		Va	icant	Occupied	
UNIT TYPE	Sing	le Family: 58% Duplexes: 6% 3+units: 29% ile Home: 6.5% Other: .05%	M	1obile Home .	Multi-Family Duplexes	Single Family	
YEAR BUILT	1939 194 197 199 201	or earlier: 11% 0 to 1969: 17% 0 to 1989: 31% 0 to 2009: 40% 0 and later: 1%	:	2010 and later	1990 to 2009	1970 to 1989	1939 or earlier \ 1940 to 1969
HEATING TYPE	Na I	atural Gas: 56% Electricity: 39% Wood: 2% Other: 3%			Electricity	Other Natural Gas	
VALUE	Less than \$50k to 150k to 300k to 50	\$50,000.00: 7% 5 149,999: 10% \$299,999: 62% \$499,999: 17% 00k and up: 4%	500k	< and up	3004 \$499, 1 \$5	550k to 149,9 99 150k to 299,999	_Less than \$50k
Renter	Occupied:	5 044 (43 8%)		Owner (Occupied:		6 476 (56 2%)
Median	Home value:	\$240,400.00		Median	Residential R	ent:	\$865.00

 Table 2.3.3: Housing Characteristics^{vii}



Table 2.3.4: Population Characteristics 2013^{viii}

2.4: FUTURE PLANNED DEMOGRAPHICS

The City operates under the requirements of the Washington State Growth Management Act; and as such, the City's Comprehensive Plan is updated on a regular basis, as mandated by the State. In anticipation of the City's required update in 2016 planners from Skagit County, and its cities, worked together to reach consensus with regard to the future population and employment forecasts.

Graph 2.4.1 (on the following page) was created by BERK Consulting for the County as the starting point in determining which population forecast would be recommended for adoption. This graph shows historic growth and the 2012 to 2040 Office of Financial Management (OFM) growth projections.



Graph 2.4.1 Population Growth for the City^{ix}

In the course of the planning process with the County and City planners it was agreed that OFM's Medium Population Projection would be recommended and that the urban/rural split for this population would remain as it currently is with eighty percent (80%) of the future anticipated growth being allocated to urban areas and the remaining twenty percent (20%) of the anticipated growth being allocated to rural areas (i.e., the County).

Once this population estimate and urban/rural split was determined the jurisdictions that would receive the 'urban' share of the future population growth within the County then needed to figure out how much of this future growth would be allocated. As a starting point, for planning purposes, the Planner's group decided to allocate future population growth based on the growth trends in the recent past.

At the time of this document update the following population forecast and distribution has not been adopted by Skagit County or the City; however, at this point in time it is anticipated that this is the population growth and distribution that will be used in the City's next Comprehensive Plan update and it provides a good idea of the growth that the City will likely realize in the next 20 years.

Jurisdiction	2012 Population	2012 – 2036 Growth Forecast	2036 Population Growth Forecast Allocation
Mount Vernon	32,710	14,693	47,403

Table 2.4.2 Count	y and Mount V	/ernon Future	Population Growth
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2.5: LAND USE PATTERNS^{*}

The City's land use patterns have over time been heavily influenced by the location of the Skagit River, the Burlington Northern Railroad, Interstate-5, State Routes 536 and 538, and the topographic changes that occur as one heads east and southeast through the City.

The City's first business district was formed on the east side of the river where the City's historic downtown district still exists today (generally between Division and Kincaid Streets). Additional business/commercial/industrial areas have development around major transportation corridors such as Interstate-5, Riverside Drive, College Way (SR 536) and more recently in the South Mount Vernon area where both Old Highway 99 and Interstate-5 run north/south.

Historically natural disasters such as floods and fires spurred residential growth at higher elevations on the east side of the City moving away from the Skagit River and Interstate-5. In large part these land use patterns still exist today.

For ease of reference, following is **Map 2.3** on which the City's overall land use types are identified; e.g., commercial, residential, public, and open spaces. In addition to this map following is a table and graph that outline and illustrate the City's different overall land use types. Evident from this map and graph is that the City is composed predominately of areas used for residential purposes.

	Table 2.5.1:	Mount	Vernon	Land	Uses
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LAND USE INFORMATION	ACRES	% OF JURISDICTION
Total Land Area within Jurisdiction	8,034	100%
Residential Land Area	4,178	52%
Commercial & Industrial Land Area	1,149	14%
River, Floodplain & Right-of-Way	1,279	16%
Public	1,389	17%

Graph 2.5.2: General Land Uses within the City





3.1 NATURAL HAZARD IDENTIFICATION

Following is a list of the natural hazards that could affect the City. Section 3.2 provides information on the location of these hazards, it details previous occurrences by hazard type and speaks to the probability of future hazards events.

Natural Hazards:	Brief Description of Hazard:		
Avalanche	When a layer of snow loses its grip on a slope and slides downhill an avalanche occurs. Avalanche hazards are much higher in alpine areas; but can occur from November until early summer in mountainous areas.		
Drought	A prolonged period of low precipitation that is severe enough to reduce soil moisture, water and snow levels below the minimum that is necessary for sustaining plant, animal, and economic systems.		
Earthquake	The sudden release of stored energy that radiates seismic waves and produces a rapid displacement on a fault.		
Fire (wildfire, structure, and wildland/urban interface)	Fires caused by humans or nature that result in uncontrolled destruction of forests, brush, field crops, grasslands, and property (homes, businesses, public and the belongings associated with this property).		
Flood	The overflow of water onto land that is normally dry, but is usually within a river's floodplain, due to excessive or abnormal rainfall and associated runoff.		
Landslide	The movement of rock, soil, unconsolidated sediment and debris down a slope under the influence of gravity.		
Severe Storm	An atmospheric disturbance that has sustained 40+ MPH winds and/or significant rain or snow and may include: thunderstorms, hail, wind storms, lightning, or tornadoes.		
Tsunami	A series of unusually large waves generally caused by an underwater earthquake or volcanic eruption.		
Volcano	A mountain with a crater or vent, which lava, rock, vapor and gas can erupt from.		

3.2 NATURAL HAZARD LOCATIONS, HISTORIC OCCURRENCES, AND RISK POTENTIAL^{xii}

AVALANCHE – LOW PROBABILITY

Avalanches have killed more than 190 people in the past century in the State of Washington; which exceeds deaths from any other type of natural hazard. Skagit County is not identified as a "jurisdiction most vulnerable to avalanches". Highway closures due to avalanche could, however, impact Skagit County and Mount Vernon^{xiii}.

In proximity to the City the State has identified both Diablo Canyon SR 20 and SR 542 to the Mount Baker Ski Area as mountain passes/highways that pose avalanche problems or that have the potential for problems in the worst conditions.

DROUGHT – LOW PROBABILITY

Statewide in 1977 and again in 2001 there were droughts that resulted in thousands of job losses (mainly in the power and agricultural industries) with estimated losses to the state's economy close to \$500 million. The risk of drought is significantly higher in eastern Washington, except for the eastern foothills of the Cascade Mountains.

Skagit County is not one of the counties that the State has identified as being of "greatest risk" to droughts. In addition to the economic impacts, droughts elsewhere in the State could threaten the supply of electricity and they do affect groundwater sources.

EARTHQUAKE – LOW PROBABILITY

FEMA has determined that Washington State ranks second, with California ranking first, among states that are most susceptible to earthquakes that are damaging in terms of economic loss. Washington is located near the collision boundary of two major tectonic plates making our coast and the greater Puget Sound Basin particularly vulnerable to earthquakes.

There are three different sources for damaging earthquakes in the Pacific Northwest. The first of these is the "Cascadia Subduction Zone", a 1000 km long thrust fault which is the convergent boundary between the Juan de Fuca and North American plates and is the most extensive fault in the Pacific Northwest area. It surfaces about 50 miles offshore along the coasts of British Columbia, Washington, Oregon and northern California. No historic earthquakes have been directly recorded from this source zone. According to recent research, an earthquake estimated to be as large as 8.0 to 9.0 occurred in this zone in January of 1700.

Devils Mountain Fault zone located in the southern part of Skagit County is the most active with small earthquakes consistently detected at a depth of approximately 15 kilometers. Devils mountain fault has been rated by the United States Geologic Survey as capable of producing an earthquake with a magnitude of 8.5 on the Richter Scale^{xiv}. Impacts of a quake are forecasted to be quite mild because of remote location and away from population centers.

The City is located in seismic zone D1 & D2 as determined by the International Building Code. Damage and loss due to earthquake was experienced as recently as the 2001 Nisqually earthquake.

The severity of an earthquake can be expressed in terms of intensity or magnitude. Intensity represents the observed effects of ground shaking at any specified location. The intensity of earthquake shaking lessens with distance from the earthquake epicenter. Tabulated peak ground accelerations for a listed "maximum credible earthquakes" (MCE) are a measure of how a site will be affected by seismic events on distant faults. Magnitude represents the amount of seismic energy released at the hypocenter of the earthquake. It is based on the amplitude of the earthquake waves recorded on instruments. Magnitude is thus represented by a single, instrumentally determined value.

The strength of ground shaking generally decreases with distance from the earthquake source, but locally can be much higher than adjacent areas, due to amplification. Strong shaking of long duration is one of the most damaging characteristics of great subduction zone earthquakes. Strong shaking is a hazard both near the epicenter of an earthquake and in areas where amplification occurs. West Seattle and certain areas of downtown Olympia are examples of places where ground motion has been documented as being significantly stronger than in adjacent areas during the same earthquake. Most of the damage and deaths in earthquakes are caused by strong ground motion.^{xv}

The main ways earthquakes cause damage are by strong ground shaking, by the secondary effects of ground failures (surface rupture, ground cracking, landslides, liquefaction, subsidence), or by tsunamis and seiches. Most building damage is caused by ground shaking.

Liquefaction, one of the above listed secondary effects from earthquakes, involves loose sandy soil with a high water content that undermines the ground's ability to solidly support building structures during an earthquake. Foundations supported on liquefiable soils can lose their ability to support load, and can experience settlement on the order of several inches or more. Differential settlement can cause significant damage to buildings, lifelines, and transportation structures, with partial or total collapse.

The Puget Sound Basin has had damaging earthquakes in 1909, 1939, 1946, 1949, 1965 and 2001. Earthquakes cause direct damage to structures and infrastructure but also have a variety of secondary effects like ground failure, landslides, liquefaction and they tend to have a high potential for causalities due, in part, to their sudden onset.

There is no current reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that use the low energy waves that precede major earthquakes. These potential warning systems would give approximately 40 seconds notice that a major earthquake is about to occur. The warning time is very short but it could allow for someone to get under a desk, step away from a hazardous material they are working with or shut down a computer system.

FIRE – LOW PROBABILITY

Skagit County has identified three types of fire threats: structure fires, wildland fires, and wildland-urban interface fires. Due in large part to the more urban nature of the City, structure fires are the most common of the three identified types of fires.

Given the City's moist marine climate and low frequency of lighting there is a 'built in' natural protection against large wildland or wildland urban-interface fires that are more typically experienced in Eastern Washington, California, Colorado and other areas of the United States.

There is a low probability of major wild fire due to the urban population and City codes that are in place. While wildland and wildland urban-interface fires do occur in Skagit County on a fairly regular basis during the warm summer months, these fires are typically very small and are usually extinguished with personnel and equipment.

The City has its own fire department with three fire stations and currently (2014) has 37 full time firefighters.

FLOOD – LOW PROBABILITY^{xvi}

Second only to severe storms (discussed below) flooding is the most common natural disaster that the City experiences. Flowing through the northern and western portions of the City is the Skagit River, which is the third largest river system on the west coast that empties into salt-water (based on discharge flows). Major tributaries of the Skagit River in Skagit County are the Cascade, Sauk and Baker Rivers which join the Skagit River at the Communities of Marblemount, Rockport and Concrete. In addition to the Skagit River the City has a number of smaller urban streams including: Kulshan Creek, Maddox Creek, Carpenter Creek, Nookachamps Creek, Trumpeter Creek, and Britt Slough that discharge into the Skagit River.

Damage during a flood is typically caused by one of two river processes active during flooding. The first process is inundation, defined as floodwater and debris flowing through an area. Inundation occurs when the water in the river channel rises to the level where it flows over the riverbanks and onto the surrounding floodplain. The level of damage caused by inundation is determined by the velocity and depth of the water, the amount of debris in the water, and the level of development in the inundated area. Areas of flood inundation can be determined through hydrologic analysis and study of historical records. Inundation areas may vary from flood to flood because of the impact of different hydraulic responses from the river system or possible failures of flood control structures.

The second river process that causes damage during a flood is bank erosion. Bank erosion occurs when a river scours its banks, causing the channel to shift position. Sometimes the river will actually move to an entirely new channel during a flood. Bank erosion can also threaten structures high above the floodplain by undermining the bank near where the structure is located. Areas prone to bank erosion can be identified through mapping and hydrologic analysis, but the occurrence of channel migration cannot be predicted with confidence.

Rivers and streams flood because of prolonged heavy rainfall, a rapidly melting snow pack or a combination of the two. Historically, heavy rainfall with snow and warmer weather for a duration of two or three days in a row creates a great scenario for flooding to occur in the Skagit River. The actual duration and rainfall amounts needed to cause flooding depend on the condition of the river or stream, groundwater conditions, and run off conditions. However, once the conditions are right, water within the river or stream channel overflows onto normally dry land and the area floods. In Skagit County floods are generally the result of either spring snowmelt or winter rain on snow; with the greatest threat of flooding is in the months of November through February.

A significant portion of Mount Vernon is located within the 100-year floodplain; and there are portions of the City that are located within a designated floodway. Floodplains are the areas that are frequently covered by water when rivers overflow their banks. Floodplains are also defined as low-lying area of land formed by river channels as the channels have occupied portions of the river valley over time. The lateral movement of channels and depositing of sediment raises or lowers the overall elevation of the river valleys by aggradation or erosion. Encroachment on floodplains, whether by structures or by fill material, reduces the flood- carrying capacity of the river, increased the flood heights and velocities, and increase the flood hazards in areas outside of the encroachment.

The channels of rivers meander across floodplains as the flow downstream. Channel bends reduce the amount of energy or velocity of flowing water. The degree of meander can vary, from almost straight channels, which migrate laterally slowly, to fully developed meander patters, to braided patterns were a stream or river is characterized by mid-channel islands and unpredictable channel changes.

There are no levees that are certified by the U.S. Army Corps of Engineers in the vicinity of the City; however, there does exist non-certified levees that are maintained by Dike Districts #3 and #17. In addition, the City is in the process of constructing certified flood protection through its historic downtown district that will, once the final phase of this project is complete, protect a large portion of the City with certified flood protection that is currently vulnerable during flood events.

The following two (2) photos show flood events that impacted the City in 1913 (on the left), and 1935 (on the right).



Photos courtesy of the Skagit County Historical Museum.

In the more recent past the City experienced impactful flooding in 1975, 1990, 1995, 1996, 2003, and 2006. Each of these events is described in greater detail below. The City has sustained minimal losses due to the flooding that occurred because of the 1990 and 1995 flood events. Following the 1995 events, all repetitive loss properties were bought out via hazard mitigation grant funds as well as other grants. The city was again able to avoid significant losses during the 2003 and 2006 flood events.

1975 - A major flood occurred in December of 1975. A series of severe storms with heavy rains beginning on November 29 and early on November 30th without decreasing until later on the in the night. Snow had fallen in the Cascades on the 24th and began to turn to heavy rains. With this combination the river banks were full with no freeboard.

1990 - November 1990 had two (2) significant flood events, with the first one occurring on November 9th and the second beginning on the 24th. The significant event occurring during these two floods was the levee breech on Fir Island which inundated most of the interior farmland. Extensive flood fighting was required to protect Mount Vernon and vicinity.

1995 - With a crest of 37.34 feet the flood was equal to the 1990 flood crest height. Mount Vernon was above a major potential for flood damage for three days. Due to the reservoir regulations and sandbagging efforts Mount Vernon was able to withstand the flood without failing.





Both of the above pictures were taken during the flood of 1995.

2003 - The floods of October 2003 started with a small disturbance and quickly followed by a larger storm peak. The first smaller flood occurred on October 17th and 18th but did not impact Mount Vernon much. The second flood event on October 21st posed a high water threat for 48 hours. Levees and dam regulations along with sandbagging efforts allowed Mount Vernon and Fir Island to withstand the flood without failure.













All six (6) of the above pictures were taken during the flood of 2003

2006 - Rainfall records were set across Western Washington in November of 2006, including 8.22 inches at Stampede Pass breaking an all-time rain record of 7.29 inches set on Nov. 19, 1962. The Skagit River posed a threat again to the City of Mount Vernon and surrounding vicinities, planning, preparation and warning allowed the levees and sandbagging to not fail.





Both of the above pictures were taken during the flood of 2006

The City of Mount Vernon as of June 1, 2014 has no repetitive loss properties. The City addresses repetitive loss properties that are residential by elevating, relocating or buying out the homes.

Map 2.4 that follows identifies those areas within the City that are located in the 100-year floodplain as identified by FEMA.



LANDSLIDE – LOW PROBABILITY

Historically, statewide landslides have occurred during large storm events and earthquakes. Areas susceptible to landslides are difficult to determine. Typically hillsides with slopes of 20% or more, convergent topography and landforms (such as steep shoreline bluffs, inner gorges, rugged topography, alluvial fans) are of greatest risk for landslides.

The risk of landslides is higher in western Washington (compared to eastern WA) due to the higher amount of precipitation. Landslides destroy structures (homes, businesses, and public) and infrastructure, can injure or kill, and impact the environment largely by covering aquatic (or other) habitat.

Landslides can be initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by man-made construction activities, or any combination of these factors.

Failure of a slope occurs when the force that is pulling the slope downward (gravity) exceeds the strength of the earth materials that compose the slope. They can move slowly, (millimeters per year) or can move quickly and disastrously, as is the case with debris-flows. Debris-flows can travel down a hillside of speeds up to 200 miles per hour (more commonly, 30 - 50 miles per hour), depending on the slope angle, water content, and type of earth and debris in the flow. These flows are initiated by heavy, usually sustained, periods of rainfall, but sometimes can happen as a result of short bursts of concentrated rainfall in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions.

Mount Vernon is located on relatively level terrain, with land that gradually increases in slope to the South and east. Some developed lots may be impacted by earthquakes due to the steepness of the terrain. Portions of Mount Vernon are prone to landslide due to steep slopes, soil erosion, fractured rock faces, etc. Landslides occur with some frequency during winter storms, resulting in temporary road closures. The City has no large scale, documented landslides; however, as stated above, since areas susceptible to landslides are difficult to determine the City is still proactive in adopting and applying development regulations to minimize the potential risk of these types of events.

SEVERE STORMS – MEDIUM/HIGH PROBABILITY

Severe storms that include high winds, lightning, snow and/or ice, and flooding can and do occur in the City. In fact, severe storms are the natural hazard most likely to affect the City. Severe storms almost always cause electrical power outages and generally result in downed trees and other damage to infrastructure like roadways and utilities and also cause damage to homes, businesses, and public buildings.

Severe storms generally move into Washington from the Pacific Ocean. On the west side of the Cascade Mountains the State's climatic elements produce a predominately marine-type climate. Rainstorms are most likely in December and January (wettest months), windstorms are more likely from October to March, and snow storms November to mid-March.

Mount Vernon is located in a borderline high wind area. The design wind speed for Mount Vernon is 85 mph. Some portions of Mount Vernon are located in exposure D1 (2006 IBC) areas where some protection from winds is provided by forests and hills. Other portions of the City are in exposure C areas where there is little or no protection from high wind.

Notable storms affecting the City include heavy snow accumulations in 1916 and 1950, wind storms in 1962, 1979, 1990, 1993, 2000, and 2006; along with storms with both heavy snow and high winds in the winter of 1996/1997 and in 2007.

TSUNAMI – LOW PROBABILITY

Areas along the Pacific Coast and the Strait of Juan de Fuca are at the greatest risk of experiencing impacts from a tsunami. Skagit County is identified as an area that is vulnerable to tsunami according to the WA DNR's Division of Geology and Earth Resources modeling.

Seiche is the swaying of surface water in an enclosed or semi-enclosed body of water, like a lake or a bay.

The City has no records of a tsunami or seiche ever historically affecting the City.

VOLCANO – LOW PROBABILITY

The City of Mount Vernon is located in an area where volcanic events have occurred in both the ancient and recent past. Volcanoes produce a wide variety of hazards that can cause personal harm and destroy property. Large explosive eruptions can endanger people and property hundreds of miles away and even affect global climate. Some of the volcano hazards, such as landslides, can occur even when a volcano is not erupting. Volcano hazards include: eruption columns and clouds, volcanic gases, lava flows and domes, ash fall, pyroclastic flows, volcano landslides, and lahar mudflows or debris flows.

The five active volcanoes in the State of Washington (Mount Baker, Glacier Peak, Mount Rainier, Mount St. Helens, and Mount Adams) are all capable of producing lahars, ash fall, lava/pyroclastic flows, and debris avalanches. The most recent eruption of these volcanoes was from Mount Saint Helens in the 1980s. The two prominent volcanos in the geological area surrounding Mount Vernon are Mount Baker or Glacier Peak. The next eruption of Mount Baker may produce lava flows, pyroclastic flows, volcanic ash (tephra), and lahars. Lahars are the greatest concern at Mount Baker because of its history of frequent lahars, distance lahars may flow and the potential hazardous future impacts of lahars on Baker Lake and Lake Shannon.

In 1975 it was recommended that the levels be dropped in Baker Lake to accommodate a lahar inflow without displacing water from the reservoir that could flood the downstream Skagit River valley and inundate the areas around the lake.

Although historically volcanic events do not occur often and would be considered a low risk event to affect the City; when these events do occur they have the potential of impacting the City.

3.3 NATURAL HAZARD ASSESSMENT

In 2008 the Emergency Management Division of the WA Military Department provided software for Skagit County and other jurisdictions to complete a risk analysis for a number of natural hazards. This analysis was initially used to evaluate the risk of natural hazard events; and it has been reviewed considering recent events and changing conditions for the 2014 update and remains current in its assumptions. Additionally, a 2014 HAZUS analysis was provided by FEMA for the Devils Mountain Fault and 100-year flood scenarios; a copy of which can be found within Skagit County's Natural Hazard Mitigation Plan.

City of Mount Vernon								
2014 Natural Hazard Identification and Risk Estimation								
*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental								
Damage+Economic Disruption multiplied by Probability of Occurrence)								
**The greater the Risk Score, th	**The greater the Risk Score, the greater the risk.							
	Area	Health &					Risk	
	Impacted	Safety	Property	Environment	Economic	Probability	Score	
Drought	0	0	0	0	0	0	0	
Earthquake	4	2	2	1	1	2	20	
Flooding	2	1	2	1	2	5	40	
High Winds	4	1	2	1	1	5	45	
Infestation/Disease	0	0	0	0	0	0	0	
Landslide/Erosion	1	1	1	1	1	1	5	
Lightning	0	0	0	0	0	0	0	
Storm Surge/Tsunami	0	0	0	0	0	0	0	
Subsidence, expansive								
Soils	1	0	1	1	1	1	4	
Urban Fire	1	1	1	1	2	2	12	
Wildfire	1	1	2	1	1	2	12	
Winter Storm	4	1	1	0	1	2	14	
Volcanic Activity	4	1	2	2	1	2	20	
Total Jurisdictional Risk Estimation Score:							172	

Following is the criteria for the scoring (based on the software provided) listed in the table above.

Area Impacted:	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%
Health &			2=Few fatalities, many	3=Numerous	
Safety:	0=No impact	1=Few injuries	injuries	fatalities	NA
				2= Few damaged,	3=Many properties
		1=Few destroyed or	2=Few destroyed, many	many destroyed	destroyed or
Property:	0=No impact	damaged	damaged		damaged
	0=Little or No				
Environment:	impact	1=Short term	2=Long term	3=No recovery	NA
			2=High direct cost and	2= Low direct and	3=High Direct and
Economic:	0=No impact	1=Low costs	Low indirect	High indirect	Indirect Cost
	1=Unknown but	2=Unknown but			5=Once a year or
Probability:	rare	anticipated	3= <100 year	4=<25 year	more
3.5 CRITICAL FACILITIES AND INFRASTRUCTURE

Following is a list of critical facilities and infrastructure that have the potential to be impacted by hazard(s). To identify critical facilities the City started with the Community Rating System Manual definition for critical facilities (that follows); and then also included the same structures and facilities that could potentially be impacted by other hazards, both natural and man-made.

CRS Manual definition of critical facilities:

- Structures or facilities that produce use, or store highly volatile, flammable, explosive, toxic and/or water-reactive materials;
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a flood;
- Police and fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during, and after a flood; and,
- Public and private utility facilities vital to maintaining or restoring normal services to flooded areas before, during and after a flood.

STRUCTURE OR FACILITY	LOCATION	SIZE	
			VALUE
HOMES:			
Structures with Living Areas ³	City Wide	12,462 ² dwelling units	\$2,568,781,485.00 ³ (market value - 2013)
PUBLIC FACILITIES:			
Police Station/Court Campus	1805 Continental Place	29,679 s.f.	\$4,497,100.00
Skagit County Sheriff	600 S 3 rd Street	44,000 s.f.	\$4,480,000.00
Fire Stations	901 S. 2 nd	9,500 s.f.	
	1901 N. LaVenture	13,728 s.f.	\$8,544,500.00
	4701 E Division	6,644 s.f.	
Skagit Consolidated Communication	2911 College Way	9845 s.f.	\$3,137,200.00
Center			
City Hall	910 Cleveland Avenue	25,198 s.f.	\$2,245,900.00
Mount Vernon Public Works	1024 Cleveland Ave	4080 s.f.	\$400,000.00
Library	315 Snoqualmie	12,305 s.f.	\$1,279,000.00
Skagit County Court House and	205 West Kincaid St	148,060 s.f.	\$15,548,000.00
Nearby Administrative/Justice	115 W Kincaid St		
Buildings	600 S 3rd		
Skagit County Administrative	1800 Continental Place	25,360 s.f.	7,520,400
Buildings			
EDUCATIONAL FACILITIES:			
Immaculate Conception	1321 Division	24,922 s.f.	\$4,202,600.00
Lincoln Elementary	1005 S 11 th Street	40,681 s.f.	\$3,588,300.00
Mount Vernon High School	314 9 th Street	140,000 s.f.	\$26,000,000.00
Jefferson Elementary	1801 E Blackburn	51,863 s.f.	\$9,465,700.00
Little Mountain Elementary	1514 LaVenture	39,226 s.f.	\$5,883,900.00
Washington Elementary	1020 McLean Road	53,605 s.f.	\$4,173,500.00

Table 3.5.1: Summary of Structures, Facilities, and Infrastructure

Centennial Elementary 3100 Martin Road 50.948 s.f. \$9.686.000.00 I.Aventure Middle School 1230 N LaVenture 75.885 sf. \$12.686.800.00 Malison Elementary 907 E Fir \$5.326 s.f. \$6,176,400.00 Mount Vernon Christen School 820 Blackburn 13.880 sf. \$88,176,600.00 Youthet 227 N 4 th Street, #102 21,696 s.f. \$839,300.00 Cascade Commons LaVenture/Section 46,6575.f. \$6,998,500.00 Northwest Career Academy 2205 West Campus PI 33,160 s.f. \$83,300.00 Skagit Valley College 2405 F. College Way 424,876 s.f. \$64,400.00 Northwest Career Academy Skagit Valley Public Hospital 1415 F. Kincaid 404,000 s.f. \$126,720.500.00 Skagit Valley Public Hospital 1415 F. Kincaid 33,194 sf. \$6,300.00 Skagit Valley Thospital Cancer Care 307 S 13" St 83,303 sf \$6101.028.00 Skagit Vy Hospital Cancer Care 307 S 13" St 83,303 sf \$2,000.00 Skagit Vy Hospital Cancer Care 307 S 13" St 83,303 sf \$2,000.00 Skagit Vy Hospital Cancer Care 307 S 13" St 83,230 sf	EDUCATIONAL FACILITIES CONT.:			
LaVenture Middle School 1200 N LaVenture 75.885 s.f. \$12.686.800.00 Mit Baker Middle School 2310 Section Street 43.752 s.f. \$6.557.000.00 Madison Elementary 907 E Fir 55.326 s.f. \$8.176.600.00 Youthnet 227.74 M ⁶ Street, #102 21.606 s.f. \$8.176.600.00 Cascade Commons LaVenture/Section 46.657s.f. \$6.998.500.00 Kagit Valley College 2405 E College Way 424.876 s.f. \$64.500.000 Northwest Carcer Academy 2205 West Campus P1 33.160 s.f. \$8.306.000.00 HEALTH CARE FACLITIES: Stagit Regional Health Clinic 2320 Freeway Drive 40.166 s.f. \$2.045.300.00 Skagit Regional Health Clinic 2320 Freeway Drive 40.166 s.f. \$2.045.300.00 Skagit Vly Hospital Cancer Care 307 S. 13 ³ St \$3.303 af \$6101.028.00 Skagit Vly Hospital Cancer Care 307 S. 13 ³ St \$3.303 af \$5109.200.00 Skagit Vly Hospital Cancer Care 307 S. 13 ³ St \$3.303 af \$5109.200.00 Skagit Vly Hospital Cancer Care 307 S. 13 ³ St \$2.2456,700.00 \$2.900.00.00 </td <td>Centennial Elementary</td> <td>3100 Martin Road</td> <td>50,948 s.f.</td> <td>\$9,686,000.00</td>	Centennial Elementary	3100 Martin Road	50,948 s.f.	\$9,686,000.00
Mt. Baker Middle School 2310 Section Street 43,762 s.f. \$6,57,000.00 Madison Elementary 907 F. Firi 55,326 s.f. \$6,176,400.00 Mount Vernon Christen School 820 Blackburn 13,580 s.f. \$8,176,600.00 Youthnet 227 N 4 ¹⁶ Street, #102 21,696 s.f. \$83,930.00 Cascade Commons La Venture/Section 46,657 s.f. \$6,998,500.00 Northwest Carcer Academy 2205 West Campus PI 33,160 s.f. \$8,306,000.00 Northwest Carcer Academy 2205 West Campus PI 33,160 s.f. \$8,306,000.00 Kagit Valley Public Hospital 1415 F. Kincaid 404,000 s.f. \$126,720,500.00 Skagit Valley Public Hospital 1410 F. Kincaid 33,194 sf \$6,340,400.00 NW Orthopedic Surgeons 1500 Continental PI 19,952 sf \$5,169,200.00 Skagit Vly Hospital Cancer Care 307 S.13" St 83,33 sf \$5101,028.00 Skagit Pediatrics 2101 Little Mtn Ln 17,860 sf \$2,856,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,826,700.00 Skagit Pediatrics 21	LaVenture Middle School	1200 N LaVenture	75,885 s.f.	\$12,686,800.00
Madison Elementary 907 E Fir 55,326 s.f. S6,17,640.00 Mount Vernon Christen School 820 Blackburn 13,580 s.f. 58,176,600.00 Outlant 227 N 4 ^m Street, #102 21,696 s.f. 58,39,300.00 Cascade Commons LaVenture/Section 46,657 s.f. 56,98,000.00 Northwest Career Academy 2205 West Campus PI 33,160 s.f. 58,306,000.00 HEALTH CARE FACILITIES: Skagit Valley Public Hospital 1415 E Kincaid 404,000 s.f. \$126,720,500.00 Skagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. \$22,040.00 Skagit Nagional Health Clinic 2320 Freeway Drive 40,166 s.f. \$22,000.00 Skagit Regional Health Clemer 1400 E Kincaid 33,194 sf 56,340,400.00 Skagit Ny Hospital Kidney 208 Hospital Pky 14,352 sf \$22,900.00.00 Skagit Ny Hospital Kidney 208 Hospital Pky 14,352 sf \$22,856,700.00 Skagit Pediatrises 2100 Little Mm Ln 12,325 sf \$28,25,000.00 Skagit Pediatrises 2101 Little Mm Ln 12,325 sf \$28,25,000.00 Skagit Pediatrises 2101 Little Mm Ln 12,325 sf \$28,25,000.00	Mt. Baker Middle School	2310 Section Street	43,762 s.f.	\$6,567,000.00
Mount Vernon Christen School 820 Blackburn 13,580 s.f. 58,17,600.00 Youthnet 227 N 4 th Street, #102 21,696 s.f. 5839,300.00 Cascade Commons 1.aVenture/Section 46,657 s.f. 5849,300.00 Skagit Valley College 2405 E College Way 424,876 s.f. 584,000.00 Northwest Career Academy 2205 West Campus PI 33,160 s.f. 583,000.00 HEALTH CARE FACILITIES: Skagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. 52,045,300.00 Skagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. 52,045,300.00 Skagit Ny Hospital Cancer Care 307 S. 1.3 th St 83,303 sf 56101,028.00 Skagit VJ Hospital Cancer Care 307 S. 1.3 th St 83,303 sf 56101,028.00 Skagit VJ Hospital Kidney 208 Hospital Pky 14,352 sf 52,900.00 Skagit VJ Hospital Kidney 2010 Little Mm Ln 12,325 sf 52,857,000.00 Skagit Hajiand Orthopedic 1401 S 1 aVenture Rd 8,200 s.f. S14,45,500.00 Ctr. . 100 N LaVenture Rd 8,200 s.f. S450,000.00 S448git Matus Matus Matus Matus Matus Matus Ma	Madison Elementary	907 E Fir	55,326 s.f.	\$6,176,400.00
Youthet 227 N 4 th Street, #102 21,696 s.f. S83300.00 Cascade Commons LaVenture/Section 46,657s.f. S6,998,500.00 Skagit Valley College 2405 E College Way 424,876 s.f. S64,500,000.00 Northwest Career Academy 2205 West Campus PI 33,160 s.f. S8,306,000.00 HEALTH CARE FACILITIES: Stagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. S2,040,000 Skagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. S2,040,000 S6,340,400,00 NW Orthopedic Surgeons 1500 Continental PI 19,952 sf S5,169,200,00 Skagit VI Hospital Cancer Care 307 S , 13 th St 83,303 sf S6101,028.00 Skagit VI Hospital Kirney 208 Hospital Pky 14,352 sf S2,856,700,00 Skagit VI Hospital Kirney 208 Hospital Pky 14,352 sf S2,856,700,00 Skagit Pediatrics 2100 Little Mm Ln 17,860 sf S2,856,700,00 Skagit Pediatrics S120,128,00 S124,508,50 S1,445,500,00 Ctr. Benson Medical Group 110 N LaVenture Rd 20,368 sf S5,27,900,00 S2,856,700,00 S446,845, f	Mount Vernon Christen School	820 Blackburn	13,580 s.f.	\$8,176,600.00
Cascade Commons La Venture/Section 46,657.6.f. 56,98,00.00 Skagit Valley College 2405 E College Way 424,876 s.f. \$64,500,000.00 Morthwest Career Academy 2205 West Campus Pl 33,100 s.f. \$83,306,000.00 HEALTH CARE FACULTIES: 33,100 s.f. \$81,26,720,500.00 Skagit Regional Health Clinic 2220 Freeway Drive 40,166 s.f. \$22,045,300.00 Skagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. \$2,045,300.00 Skagit Vy Hospital Cancer Care 307 S. 13 th St 83,303 sf \$6101,028,00 Skagit VJy Hospital Kidney 208 Hospital Pky 14,352 sf \$2,800,000 Dialysis 1 111 Litle Mtn Ln 12,325 sf \$2,825,700.00 Skagit Poliaditricis 2100 Litle Mtn Ln 12,325 sf \$2,825,700.00 Straggry 1401 S LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr. 1400 L Aventure Rd 8,200 s.f. \$1,445,500.00 Ctr. 1400 L Aventure Road 3,010 s.f. \$22,700.00 College Way Animal Hospital 3801 E College Way 2,246	Youthnet	227 N 4 th Street, #102	21,696 s.f.	\$839,300.00
Skagit Valley College 2405 E College Way 424.876 s.f. \$64.500,000.00 Northwest Career Academy 2205 West Campus Pl 33,160 s.f. \$84,306,000.00 HEALTH CARE FACILITIES:	Cascade Commons	LaVenture/Section	46,657s.f.	\$6,998,500.00
Northwest Career Academy 2205 West Campus Pl 33,160 s.f. \$8,306,00.00 HEALTH CARE FACILITIES:	Skagit Valley College	2405 E College Way	424,876 s.f.	\$64,500,000.00
HEALTH CARE FACILITIES: Skagit Valley Public Hospital 1415 E Kincaid 404,000 s.f. \$126,720.500.00 Skagit Regional Health Center 1400 E Kincaid 33,194 sf \$6,340,400.00 NW Orthopedre Surgeons 1500 Continental PI 19,952 sf \$5,169,200.00 Skagit Vly Hospital Cancer Care 307 S. 13 ⁸ St \$3,303 sf \$6101,028.00 Skagit Vly Hospital Kidney 208 Hospital Pky 14,352 sf \$2,900,00.00 Dialysis North Cascade Eye Assoc. 2100 Little Min Lin 17,860 sf \$2,856,700.00 Skagit Pediatrics 2101 Little Min Lin 12,325 sf \$2,825,000.00 Surgery Stagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 S5,927,900.00 Surgery Stagit Island Orthopedic 1400 LaVenture Rd \$,200 s.f. \$1,445,500.00 Ctr. Stagit Island Orthopedic 1400 LaVenture Rod 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$1,442,500.00 Mount Vernon Womens Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00	Northwest Career Academy	2205 West Campus Pl	33,160 s.f.	\$8,306,000.00
Skagit Valley Public Hospital 1415 E Kincaid 40,166 s.f. \$126,720.500.00 Skagit Regional Health Chinic 2320 Freeway Drive 40,166 s.f. \$2,045,300.00 Skagit Regional Health Center 1400 E Kincaid 33,194 sf \$5,340,400.00 Skagit Vly Hospital Cancer Care 30.7 S. 13 th St \$8,303 sf \$6101,028.00 Skagit Vly Hospital Kidney 208 Hospital Pky 14,352 sf \$2,900,00.00 North Cascade Eye Assoc. 2100 Little Mtn Ln 17,360 sf \$2,856,700.00 Skagit Vly Hospital Kidney 2101 Little Mtn Ln 12,325 sf \$5,287,900.00 Skagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 Straget Island Orthopedic 1400 LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr.	HEALTH CARE FACILITIES:			
Skagit Regional Health Clinic 2320 Freeway Drive 40,166 s.f. \$2,045,300.00 Skagit Regional Health Center 1400 F. Kincaid 33,194 sf \$6,340,400.00 NW Orthopedic Surgeons 1500 Continental PI 19,952 sf \$5,160,200.00 Skagit Vly Hospital Cancer Care 307 S. 13 th St 83,303 sf \$6101,028.00 Skagit Vly Hospital Kidney 208 Hospital Pky 14,352 sf \$2,900,00.00 Skagit Pediatrics 2101 Little Mtn Ln 17,860 sf \$2,855,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,825,000.00 Stragery 1401 S LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr. Stragery 1401 N LaVenture Road 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$450,000.00 Workers Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00 Cascade Facial Surgery & 111 S 12 th Street 2,400 s.f. \$444,500.00 Cascade Facial Surgery & 112 S1 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Radiology	Skagit Valley Public Hospital	1415 E Kincaid	404,000 s.f.	\$126,720.500.00
Skagit Regional Health Center 1400 E Kincaid 33,194 sf \$6,340,400.00 NW Orthopedic Surgeons 1500 Continental Pl 19,952 sf \$5,169,200.00 Skagit Vly Hospital Cancer Care 307 S. 13 ^m St 83,303 sf \$6101,028.00 Dialysis North Cascade Eye Assoc. 2100 Little Mtn Ln 17,860 sf \$2,856,700.00 Skagit Vly Hospital Kidney 208 Hospital Pky 14,352 sf \$2,856,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,856,700.00 Skagit Jsland Orthopedic 1401 S LaVenture Rd 20,068 sf \$5,927,900.00 Surgery St \$1,445,500.00 Ctr. Benson Medical Group 110 N LaVenture Road 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$1,642,300.00 Mount Vernon Womens Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00 North Cascade Womens Clinic 125 N 18 th Street 3,852 s.f. \$448,80.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Radiology	Skagit Regional Health Clinic	2320 Freeway Drive	40,166 s.f.	\$2,045,300.00
NW Orthopedic Surgeons 1500 Continental Pl 19.952 sf \$5,169,200.00 Skagit Vly Hospital Cancer Care 307 S. 13 th St 83,303 sf \$5010,028.00 Skagit Vly Hospital Kidney 208 Hospital Pky 14,352 sf \$2,900,00.00 Dialysis 14,352 sf \$2,856,700.00 \$2,856,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,825 sf \$2,856,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,856,700.00 Stagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 Stea MAR Community Health 1400 LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr. Benson Medical Group 110 N LaVenture Road 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$450,000.00 Mount Vernon Womens Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00 North Cascade Womens Clinic 111 N 17 th Street 3,852 s.f. \$443,50.00 Cascade Facial Surgery & 111 S 12 th Street 2,400 s.f. \$574,300.00 Skagit Radiolog	Skagit Regional Health Center	1400 E Kincaid	33,194 sf	\$6,340,400.00
Skagit Vly Hospital Cancer Care 307 S. 13 th St 83,303 sf \$6101,028.00 Skagit Vly Hospital Kidney 208 Hospital Pky 14,352 sf \$2,900,00.00 North Cascade Eye Assoc. 2100 Little Mtn Ln 17,860 sf \$2,856,700.00 Skagit Iland Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 Striggt Island Orthopedic 1401 S LaVenture Rd 82,00 s.f. \$1,445,500.00 Ctr. 205 Stewart Rd 3,010 s.f. \$72,700.00 Benson Medical Group 110 N LaVenture Road 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$1,642,300.00 Workers Clinic 205 Stewart Rd 24,684 s.f. \$1,642,300.00 Nouth Vernon Womens Clinic 125 N 18 th , Suite A 4,436 s.f. \$4,494,500.00 Cascade Facial Surgery & 111 N 17 th Street 3,852 s.f. \$349,900.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Radiology 125 N 18 th Street 3,534 s.f. \$216,600.00 Skagit Radiology 325 Chenoweth St	NW Orthopedic Surgeons	1500 Continental Pl	19,952 sf	\$5,169,200.00
Skagit Vi Hospital Kidney 208 Hospital Pky 14,352 sf \$2,900,00.00 Dialysis North Cascade Eye Assoc. 2100 Little Mtn Ln 17,860 sf \$2,856,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,856,700.00 Skagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 Surgery SEA MAR Community Health 1400 LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr. Benson Medical Group 110 N LaVenture Rod 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$450,000.00 Workers Clinic 205 Stewart Rd 24,684 s.f. \$1,642,300.00 Mourt Vernon Womens Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00 North Cascade Womens Clinic 125 N 18 th Street 2,400 s.f. \$552,200.00 Cascade Facial Surgery & 111 S 12 th Street 2,344 sf \$574,300.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Matural Family Medicine 916 S 3 rd St 2,344 sf \$574,300.00<	Skagit Vly Hospital Cancer Care	307 S. 13 th St	83,303 sf	\$6101,028.00
Dialysis Image: Constraint of the system of th	Skagit Vly Hospital Kidney	208 Hospital Pky	14,352 sf	\$2,900,00.00
North Cascade Eye Assoc. 2100 Little Mtn Ln 17,860 sf \$2,856,700.00 Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,825,000.00 Skagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 Surgery SEA MAR Community Health 1400 LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr. Benson Medical Group 110 N LaVenture Road 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$450,000.00 Workers Clinic 205 Stewart Rd 24,684 s.f. \$1,642,300.00 North Cascade Worens Clinic 125 N 18 th , Suite A 4,436 s.f. \$449,450.00 Cascade Facial Surgery & 111 N 17 th Street 2,400 s.f. \$582,200.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit R	Dialysis			
Skagit Pediatrics 2101 Little Mtn Ln 12,325 sf \$2,825,000.00 Skagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 SEA MAR Community Health 1400 LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr.	North Cascade Eye Assoc.	2100 Little Mtn Ln	17,860 sf	\$2,856,700.00
Skagit Island Orthopedic 1401 S LaVenture Rd 20,368 sf \$5,927,900.00 SEA MAR Community Health 1400 LaVenture Rd 8,200 s.f. \$1,445,500.00 Ctr. Benson Medical Group 110 N LaVenture Road 3,010 s.f. \$72,700.00 College Way Animal Hospital 3801 E College Way 2,246 s.f. \$450,000.00 Workers Clinic 205 Stewart Rd 24,684 s.f. \$1642,300.00 Mount Vernon Womens Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00 North Cascade Womens Clinic 125 N 18 th , Suite A 4,436 s.f. \$494,500.00 Cascade Facial Surgery & 111 S 12 th Street 2,400 s.f. \$552,200.00 Aesthetics - - \$552,200.00 \$582,200.00 Skagit Natural Family Medicine 916 S 3 rd St 2,344 sf \$574,300.00 CHLDCARE FACILITES: Stagit Stallands Head Start & 320 Pacific Pl 12,000 s.f. \$685,200.00 Shagit Natural Family Medicine 915 LaVenture 5,360 s.f. \$114,900.00 Stagit Stallands Head Start & 320 Pacific Pl 12,000 s.f. \$687,200.00 <tr< td=""><td>Skagit Pediatrics</td><td>2101 Little Mtn Ln</td><td>12,325 sf</td><td>\$2,825,000.00</td></tr<>	Skagit Pediatrics	2101 Little Mtn Ln	12,325 sf	\$2,825,000.00
SEA MAR Community Health Ctr. 1400 LaVenture Rd $8,200 \text{ s.f.}$ $\$1,445,500.00$ Ctr. Benson Medical Group 110 N LaVenture Road $3,010 \text{ s.f.}$ $\$72,700.00$ College Way Animal Hospital 3801 E College Way $2,246 \text{ s.f.}$ $\$450,000.00$ Workers Clinic 205 Stewart Rd $24,684 \text{ s.f.}$ $\$1,642,300.00$ Mount Vernon Womens Clinic 111 N 17 th Street $3,575 \text{ s.f.}$ $\$349,900.00$ North Cascade Womens Clinic 125 N 18 th , Suite A $4,436 \text{ s.f.}$ $\$494,500.00$ Cascade Facial Surgery & 111 S 12 th Street $2,400 \text{ s.f.}$ $\$582,200.00$ Aesthetics 916 S 3^{rd} St $2,344 \text{ sf}$ $\$574,300.00$ Skagit Natural Family Medicine 916 S 3^{rd} St $2,344 \text{ sf}$ $\$574,300.00$ CHLDCARE FACILITES: Stagit/Islands Head Start & 320 Pacific Pl $12,000 \text{ s.f.}$ $\$685,200.00$ Shagit Nu's 325 Chenoweth St $10,412 \text{ s.f.}$ $\$1,562,200.00$ $\$14,900.00$ The Learning Tree Kids Campus 3523 E College Way $2,550 \text{ s.f.}$ $\$114,900.00$	Skagit Island Orthopedic Surgery	1401 S LaVenture Rd	20,368 sf	\$5,927,900.00
Benson Medical Group 110 N LaVenture Road $3,010 \text{ s.f.}$ \$72,700.00 College Way Animal Hospital 3801 E College Way $2,246 \text{ s.f.}$ \$450,000.00 Workers Clinic 205 Stewart Rd $24,684 \text{ s.f.}$ \$1,642,300.00 Mount Vernon Womens Clinic 111 N 17 th Street $3,575 \text{ s.f.}$ \$349,900.00 North Cascade Womens Clinic 125 N 18 th , Suite A $4,436 \text{ s.f.}$ \$494,500.00 Cascade Facial Surgery & 111 S 12 th Street $2,400 \text{ s.f.}$ \$582,200.00 Skagit Natural Family Medicine 916 S 3 rd St $2,344 \text{ sf}$ \$574,300.00 CHILDCARE FACILITIES: Street $3,634 \text{ s.f.}$ \$216,600.00 Skagit/Islands Head Start & 320 Pacific Pl $12,000 \text{ s.f.}$ \$685,200.00 SPARC 900 McLean Road $3,534 \text{ s.f.}$ \$216,600.00 Kids 'N Us 325 Chenoweth St $10,412 \text{ s.f.}$ \$11,562,200.00 The Learning Tree Kids Campus 3523 E College Way $2,550 \text{ s.f.}$ \$114,900.00 Tomorrows Future 915 LaVenture $5,360 \text{ s.f.}$ \$221,400.00	SEA MAR Community Health Ctr.	1400 LaVenture Rd	8,200 s.f.	\$1,445,500.00
College Way Animal Hospital 3801 E College Way $2,246 \text{ s.f.}$ \$450,000.00 Workers Clinic 205 Stewart Rd $24,684 \text{ s.f.}$ \$1,642,300.00 Mount Vernon Womens Clinic 111 N 17 th Street $3,575 \text{ s.f.}$ \$349,900.00 North Cascade Womens Clinic 125 N 18 th , Suite A $4,436 \text{ s.f.}$ \$4494,500.00 Cascade Facial Surgery & 111 S 12 th Street $2,400 \text{ s.f.}$ \$582,200.00 Aesthetics 125 N 18 th Street $3,852 \text{ s.f.}$ \$438,900.00 Skagit Natural Family Medicine 916 S 3 rd St $2,344 \text{ sf}$ \$574,300.00 CHILDCARE FACILITIES: Street $3,534 \text{ s.f.}$ \$216,600.00 Kids 'N Us 325 Chenoweth St $10,412 \text{ s.f.}$ \$11,502,200.00 The Learning Tree Kids Campus 3523 E College Way $2,550 \text{ s.f.}$ \$114,900.00 Tomorrows Future 915 LaVenture $5,360 \text{ s.f.}$ \$327,00.00 Summersun Montessori 1804 Martin Road $3,169 \text{ s.f.}$ \$221,400.00 Citipoint Early Education 830 N 16 th St $6,720 \text{ s.f.}$ \$270,000.00 Skagit County Fairgrounds 479 W Taylor 14 acres	Benson Medical Group	110 N LaVenture Road	3.010 s.f.	\$72,700.00
Workers Clinic 205 Stewart Rd 24,684 s.f. \$1,642,300.00 Mount Vernon Womens Clinic 111 N 17 th Street 3,575 s.f. \$349,900.00 North Cascade Womens Clinic 125 N 18 th , Suite A 4,436 s.f. \$494,500.00 Cascade Facial Surgery & 111 S 12 th Street 2,400 s.f. \$582,200.00 Aesthetics 111 S 12 th Street 3,852 s.f. \$438,900.00 Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Natural Family Medicine 916 S 3 rd St 2,344 sf \$574,300.00 CHILDCARE FACILITIES: Street 3,632 s.f. \$438,900.00 Shagit/Islands Head Start & 320 Pacific Pl 12,000 s.f. \$685,200.00 Shagit/Islands Head Start & 320 Pacific Pl 12,000 s.f. \$16,600.00 Shagit/Islands Head Start & 320 Pacific Pl 12,000 s.f. \$216,600.00 Small World Child Care 900 McLean Road 3,534 s.f. \$216,600.00 Small World Child Care 915 LaVenture 5,360 s.f. \$367,200.00 The Learning Tree Kids Campus 3523 E College Way </td <td>College Way Animal Hospital</td> <td>3801 E College Way</td> <td>2.246 s.f.</td> <td>\$450,000,00</td>	College Way Animal Hospital	3801 E College Way	2.246 s.f.	\$450,000,00
Mount Vernon Womens Clinic 111 N 17 th Street $3,575 \text{ s.f.}$ $\$349,900.00$ North Cascade Womens Clinic 125 N 18 th , Suite A $4,436 \text{ s.f.}$ $\$494,500.00$ Cascade Facial Surgery & 111 S 12 th Street $2,400 \text{ s.f.}$ $\$582,200.00$ Aesthetics	Workers Clinic	205 Stewart Rd	24,684 s.f.	\$1,642,300.00
North Cascade Womens Clinic $125 N 18^{th}$, Suite A $4,436 \text{ s.f.}$ $\$494,500.00$ Cascade Facial Surgery & $111 S 12^{th}$ Street $2,400 \text{ s.f.}$ $\$582,200.00$ Skagit Radiology $125 N 18^{th}$ Street $2,400 \text{ s.f.}$ $\$582,200.00$ Skagit Natural Family Medicine $916 S 3^{rd}$ St $2,344 \text{ sf}$ $\$574,300.00$ CHIDCARE FACILITIES:Skagit/Islands Head Start & 320 Pacific Pl $12,000 \text{ s.f.}$ $\$685,200.00$ Shagit/Islands Head Start &Size College Way $2,550 \text{ s.f.}$ $\$114,900.00$ Timere Kids Campus 3523 E College Way $2,550 \text{ s.f.}$ $\$114,900.00$ Tomorrows Future 915 LaVenture $5,360 \text{ s.f.}$ $\$221,400.00$ Citipient Early Education830 N 16 th St $6,720 \text{ s.f.}$ $\$270,000.00$ PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Slaget County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Slaget County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Slaget County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Short County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Short County Fairgrounds <td>Mount Vernon Womens Clinic</td> <td>111 N 17th Street</td> <td>3,575 s.f.</td> <td>\$349,900.00</td>	Mount Vernon Womens Clinic	111 N 17 th Street	3,575 s.f.	\$349,900.00
Cascade Facial Surgery & Aesthetics111 S 12^{th} Street2,400 s.f.\$582,200.00Skagit Radiology125 N 18^{th} Street3,852 s.f.\$438,900.00Skagit Natural Family Medicine916 S 3^{rd} St2,344 sf\$574,300.00CHIDCARE FACILITIES:Skagit/Islands Head Start & SPARCSmall World Child Care900 McLean Road3,534 s.f.\$216,600.00Kids 'N Us325 Chenoweth St10,412 s.f.\$11,562,200.00The Learning Tree Kids Campus3523 E College Way2,550 s.f.\$114,900.00Tomorows Future915 LaVenture5,360 s.f.\$367,200.00Summersun Montessori1804 Martin Road3,169 s.f.\$221,400.00Citipoint Early Education830 N 16 th St6,720 s.f.\$216,500.00Skagit County Fairgrounds479 W Taylor14 acres\$2,164,500.00Surger colspan="4">Staget ParkSolo S 6 th St0.5 acres\$515,900.00Solo S 6 th StStart Park1601 LaVenture Rd12 acres\$626,100.00Summersun Montessori1804 Martin Road3,169 s.f.\$221,440.000Citipoint Early EducationStart Park1601 Cleveland Ave3.55 acres\$2,164,500.00Shagit County Fairgrounds <t< td=""><td>North Cascade Womens Clinic</td><td>125 N 18th, Suite A</td><td>4,436 s.f.</td><td>\$494,500.00</td></t<>	North Cascade Womens Clinic	125 N 18 th , Suite A	4,436 s.f.	\$494,500.00
Aesthetics125 N 18 th Street3,852 s.f.\$438,900.00Skagit Radiology125 N 18 th Street3,852 s.f.\$438,900.00Skagit Natural Family Medicine916 S 3 rd St2,344 sf\$574,300.00CHILDCARE FACILITIES:Skagit/Islands Head Start & SpARCSmall World Child Care900 McLean Road3,534 s.f.\$216,600.00Kids 'N Us325 Chenoweth St10,412 s.f.\$1,562,200.00The Earning Tree Kids Campus3523 E College Way2,550 s.f.\$114,900.00Tomorows Future915 LaVenture5,360 s.f.\$367,200.00Summersun Montessori1804 Martin Road3,169 s.f.\$221,400.00Citipoint Early Education830 N 16 th St6,720 s.f.\$210,000.00PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds479 W Taylor14 acres\$2,164,500.00Subart dott Street Park1360 S 6 th St0.5 acre\$19,000.00South 6th Street Park1360 S 6 th St0.5 acre\$47,500.00Bonnie Ray Park2601 LaVenture Rd12 acres\$626,100.00South 6th Street Park1360 S 6 th St2.5 acres\$248,000.00South 6th Street Park827 S 25 th St2.0 acres\$68,000.00South 6th Street Park827 S 25 th St2.0 acres\$6	Cascade Facial Surgery &	111 S 12 th Street	2,400 s.f.	\$582,200.00
Skagit Radiology 125 N 18 th Street 3,852 s.f. \$438,900.00 Skagit Natural Family Medicine 916 S 3 rd St 2,344 sf \$574,300.00 CHILDCARE FACILITIES: S <ths< th=""> S S</ths<>	Aesthetics		*	
Skagit Natural Family Medicine $916 \pm 3^{rd} \pm 12,344 \pm 12,$	Skagit Radiology	125 N 18 th Street	3,852 s.f.	\$438,900.00
CHILDCARE FACILITIES:Skagit/Islands Head Start &320 Pacific Pl12,000 s.f.\$685,200.00SPARC	Skagit Natural Family Medicine	916 S 3 rd St	2,344 sf	\$574,300.00
Skagit/Islands Head Start & 320 Pacific Pl $12,000$ s.f. $\$685,200.00$ SPARCSmall World Child Care900 McLean Road $3,534$ s.f. $\$216,600.00$ Kids 'N Us 325 Chenoweth St $10,412$ s.f. $\$1,562,200.00$ The Learning Tree Kids Campus 3523 E College Way $2,550$ s.f. $\$114,900.00$ Tomorrows Future915 LaVenture $5,360$ s.f. $\$14,900.00$ Summersun Montessori1804 Martin Road $3,169$ s.f. $\$221,400.00$ Citipoint Early Education 830 N 16 th St $6,720$ s.f. $\$270,000.00$ PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Sherman Anderson Ball Park 1501 Cleveland Ave 3.55 acres $\$515,900.00$ Cleveland Park1401 Cleveland Ave 1 acre $\$19,000.00$ South 6th Street Park 1360 S 6 th St 0.5 acre $\$47,500.00$ Bonnie Ray Park2601 LaVenture Rd 12 acres $\$626,100.00$ South 18th Street Park (Kiwanis)201 S 18 th St 2.5 acres $\$248,000.00$ 25th & Section Street Park 827 S 25^{th} St 2.0 acres $\$68,000.00$ Bakerview Court Park 4501 Eaglemont Dr 0.5 acre $\$18,00.00$ Fire Station Park 4671 E Division St 1.0 acres $\$16,00.00$ Division Street Park Playground 2020 E Division St 1.0 acres $\$67,00.00$	CHILDCARE FACILITIES:			
SPARCImage: Sparse intermediate	Skagit/Islands Head Start &	320 Pacific Pl	12,000 s.f.	\$685,200.00
Small World Child Care900 McLean Road $3,534$ s.f. $\$216,600.00$ Kids 'N Us 325 Chenoweth St $10,412$ s.f. $\$1,562,200.00$ The Learning Tree Kids Campus 3523 E College Way $2,550$ s.f. $\$114,900.00$ Tomorrows Future 915 LaVenture $5,360$ s.f. $\$114,900.00$ Summersun Montessori 1804 Martin Road $3,169$ s.f. $\$221,400.00$ Citipoint Early Education 830 N 16^{th} St $6,720$ s.f. $\$221,400.00$ PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Sherman Anderson Ball Park 1501 Cleveland Ave 3.55 acres $\$515,900.00$ Cleveland Park 1401 Cleveland Ave 1 acree $\$19,000.00$ South 6th Street Park 1360 S 6^{th} St 0.5 acre $\$47,500.00$ Bonnie Ray Park 2601 LaVenture Rd 12 acres $\$626,100.00$ South 18th Street Park (Kiwanis) 201 S 18^{th} St 2.5 acres $\$248,000.00$ 25th & Section Street Park 827 S 25^{th} St 2.0 acres $\$68,000.00$ Bakerview Court Park 4501 Eaglemont Dr 0.5 acre $\$118,000.00$ Fire Station Park 4671 E Division St 1.0 acre $\$150,000.00$	SPARC		2.524	\$21 ((00,00)
Kids 'N Us325 Chenoweth St $10,412$ s.r. $$1,562,200.00$ The Learning Tree Kids Campus 3523 E College Way $2,550$ s.f. $$114,900.00$ Tomorrows Future 915 LaVenture $5,360$ s.f. $$367,200.00$ Summersun Montessori 1804 Martin Road $3,169$ s.f. $$221,400.00$ Citipoint Early Education 830 N 16^{th} St $6,720$ s.f. $$270,000.00$ PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds 479 W Taylor 14 acres $$2,164,500.00$ Sherman Anderson Ball Park 1501 Cleveland Ave 3.55 acres $$515,900.00$ Cleveland Park 1401 Cleveland Ave 1 acre $$19,000.00$ South 6th Street Park 1360 S 6^{th} St 0.5 acre $$47,500.00$ Bonnie Ray Park 2601 LaVenture Rd 12 acres $$626,100.00$ South 18th Street Park (Kiwanis) 201 S 18^{th} St 2.0 acres $$68,000.00$ 25th & Section Street Park 4501 Eaglemont Dr 0.5 acre $$118,000.00$ Bakerview Court Park 4671 E Division St 1.0 acree $$150,000.00$ Fire Station Park 4671 E Division St 1.0 acree $$150,000.00$	Small World Child Care	900 McLean Road	3,534 s.f.	\$216,600.00
The Learning Tree Kids Campus 3523 E College Way $2,530 \text{ s.f.}$ $\$114,900.00$ Tomorrows Future 915 LaVenture $5,360 \text{ s.f.}$ $\$367,200.00$ Summersun Montessori 1804 Martin Road $3,169 \text{ s.f.}$ $\$221,400.00$ Citipoint Early Education $830 \text{ N 16}^{th} \text{ St}$ $6,720 \text{ s.f.}$ $\$221,400.00$ PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds 479 W Taylor 14 acres $\$2,164,500.00$ Sherman Anderson Ball Park $1501 \text{ Cleveland Ave}$ 3.55 acres $\$515,900.00$ Cleveland Park $1401 \text{ Cleveland Ave}$ 1 acre $\$19,000.00$ South 6th Street Park $1360 \text{ S} 6^{th} \text{ St}$ 0.5 acre $\$47,500.00$ Bonnie Ray Park $2601 \text{ LaVenture Rd}$ 12 acres $\$626,100.00$ South 18th Street Park (Kiwanis) $201 \text{ S} 18^{th} \text{ St}$ 2.5 acres $\$248,000.00$ Suth 827 S 25^{th} St 2.0 acres $\$68,000.00$ Station Park $4501 \text{ Eaglemont Dr}$ 0.5 acre $\$118,000.00$ Fire Station Park 4671 E Division St 1.0 acres Blayground 2020 E Division St 1.0 acres	KIOS NUS	325 Chenoweth St	10,412 S.I.	\$1,562,200.00
Tomorrows Future915 Laventure $5,360$ s.f. $5367,200.00$ Summersun Montessori1804 Martin Road $3,169$ s.f. $$221,400.00$ Citipoint Early Education830 N 16 th St $6,720$ s.f. $$270,000.00$ PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds479 W Taylor14 acres $$2,164,500.00$ Sherman Anderson Ball Park1501 Cleveland Ave 3.55 acres\$515,900.00Cleveland Park1401 Cleveland Ave1 acre\$19,000.00South 6th Street Park1360 S 6 th St 0.5 acre\$47,500.00Bonnie Ray Park2601 LaVenture Rd12 acres\$626,100.00South 18th Street Park (Kiwanis)201 S 18 th St2.5 acres\$248,000.0025th & Section Street Park827 S 25 th St2.0 acres\$68,000.00Bakerview Court Park4501 Eaglemont Dr 0.5 acre\$118,000.00Fire Station Park4671 E Division St 1.0 acre\$150,000.00Fire Station Park400 E Division St 1.0 acree\$150,000.00	The Learning Tree Kids Campus	3523 E College Way	2,550 S.I.	\$114,900.00
Summersun Montesson1804 Martin Road5,169 S.1.\$221,400.00Citipoint Early Education830 N 16 th St6,720 s.f.\$270,000.00PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds479 W Taylor14 acres\$2,164,500.00Sherman Anderson Ball Park1501 Cleveland Ave3.55 acres\$515,900.00Cleveland Park1401 Cleveland Ave1 acre\$19,000.00South 6th Street Park1360 S 6 th St0.5 acre\$47,500.00Bonnie Ray Park2601 LaVenture Rd12 acres\$626,100.00South 18th Street Park (Kiwanis)201 S 18 th St2.5 acres\$248,000.0025th & Section Street Park827 S 25 th St2.0 acres\$68,000.00Bakerview Court Park4501 Eaglemont Dr0.5 acre\$118,000.00Fire Station Park4671 E Division St1.0 acre\$150,000.00Division Street Playground2020 E Division St1.0 acree\$150,000.00	Tomorrows Future	915 Laventure	5,360 S.I.	\$307,200.00
Chipolitic Early Education830 N 16 St6,720 St.\$270,000.00PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds479 W Taylor14 acres\$2,164,500.00Sherman Anderson Ball Park1501 Cleveland Ave3.55 acres\$515,900.00Cleveland Park1401 Cleveland Ave1 acre\$19,000.00South 6th Street Park1360 S 6 th St0.5 acre\$47,500.00Bonnie Ray Park2601 LaVenture Rd12 acres\$626,100.00South 18th Street Park (Kiwanis)201 S 18 th St2.5 acres\$248,000.0025th & Section Street Park827 S 25 th St2.0 acres\$68,000.00Bakerview Court Park4501 Eaglemont Dr0.5 acre\$118,000.00Fire Station Park4671 E Division St1.0 acre\$150,000.00Division Street Plang2020 E Division St1.0 acree\$150,000.00	Citingint Early Education	820 NI 16 th St	5,109 S.I.	\$221,400.00
PARKS, OPEN SPACES & OTHER RECREATIONAL FACILITIES:Skagit County Fairgrounds479 W Taylor14 acres\$2,164,500.00Sherman Anderson Ball Park1501 Cleveland Ave3.55 acres\$515,900.00Cleveland Park1401 Cleveland Ave1 acre\$19,000.00South 6th Street Park1360 S 6 th St0.5 acre\$47,500.00Bonnie Ray Park2601 LaVenture Rd12 acres\$626,100.00South 18th Street Park (Kiwanis)201 S 18 th St2.5 acres\$248,000.0025th & Section Street Park827 S 25 th St2.0 acres\$68,000.00Bakerview Court Park4501 Eaglemont Dr0.5 acre\$118,000.00Fire Station Park4671 E Division St1.0 acre\$150,000.00Division Street Plang2020 E Division St1.0 acree\$150,000.00			0,720 \$.1.	\$270,000.00
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South our Succer and1300 3 0° St 0.5 acte $347,500.00$ Bonnie Ray Park2601 LaVenture Rd12 acres $$626,100.00$ South 18th Street Park (Kiwanis)201 S 18 th St2.5 acres $$248,000.00$ 25th & Section Street Park827 S 25 th St2.0 acres $$68,000.00$ Bakerview Court Park4501 Eaglemont Dr0.5 acre\$118,000.00Fire Station Park4671 E Division St1.0 acre\$150,000.00Division Street Playground2020 E Division St1.0 acres\$67,800.00	South 6th Street Park	1260 S 6 th St		\$19,000.00
South 18th Street Park201 S 18th St2.5 acres $$248,000.00$ 25th & Section Street Park $827 S 25^{th} St$ 2.0 acres $$68,000.00$ Bakerview Court Park 4501 Eaglemont Dr 0.5 acre $$118,000.00$ Fire Station Park 4671 E Division St 1.0 acre $$150,000.00$	Bonnie Ray Park	2601 LaVantura Dd	12 acres	\$626 100 00
South Four Street Park201 S 18 St2.5 acres3248,000.0025th & Section Street Park827 S 25 th St2.0 acres\$68,000.00Bakerview Court Park4501 Eaglemont Dr0.5 acre\$118,000.00Fire Station Park4671 E Division St1.0 acre\$150,000.00Division Street Playground2020 E Division St1.0 acres\$150,000.00	South 18th Street Park (Kiwanis)	$\frac{2001 \text{ S } 18^{\text{th}} \text{ St}}{201 \text{ S } 18^{\text{th}} \text{ St}}$	25 acres	\$248,000,00
Division Street Playground327 S 25 St2.0 acres303,000.00Bakerview Court Park4501 Eaglemont Dr0.5 acre\$118,000.00Fire Station Park4671 E Division St1.0 acre\$150,000.00Division Street Playground2020 E Division St1.0 acres\$57,800.00	25th & Section Street Park	827 S 25 th St	2.0 acres	\$68,000,00
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1 Division Succes 1 avground 1 SUZU E Division St 1 1.0 acres 1 SS / X00.00	Division Street Playground	3020 E Division St	1.0 acres	\$57.800.00

Bakerview Park	3301 E Fir St	40.0 acres	\$956,300.00
Edgewater Park	216 S Ball St	66.3 acres	\$2,500,000.00
Higgins Park	3201 E Division St	23.5 acres	\$856,000.00
Hillcrest Park	1717 S 13 th St	30.8 acres	\$1,176,200.00
Kiwanis Park	500 S 18 th St	8.0 acres	\$268,000.00
Lions Park North & South	501 Freeway Dr	17 acres	\$385,000.00
Little Mountain Park	3000 Little Mtn Rd	522 acres	\$1,280,000.00
Skagit County Playfields	2800 Martin Rd	25 acres	\$5,106,100.00
PUD Fields	1415 Freeway Dr	6 acres	\$6,385,600.00
Indoor Soccer	3301 E Division St	22,000	\$1,262,900.00
Lincoln Theater	700 S 1 st St	6,650	\$933,200.00
Skagit County Senior Center	1401 Cleveland Ave	8,275 sf	\$449,300.00
Skagit Valley YMCA	215 East Fulton Street	18,600 s.f.	\$902,500.00
Boys & Girls Club of Skagit	1100 North LaVenture	3,696 sf	\$1,736,000.00
County	St		
RETIREMENT HOMES AND A	ASSISTED LIVING FACILITI	ES:	
Ashley Gardens	3807 College Way	6,504 s.f.	\$1,778,200.00
Mira Vista Center	300 S 18 th Street	34,200 s.f.	\$3,565,,300.00
The Bridge	301 S LaVenture Road	37,243 s.f.	\$3,120,300.00
Mountain Glenn Retirement	1810 East Division	135,000 s.f.	\$12,241,700.00
Logan Creek Retirement	2311 E Division Street	32,471 s.f.	\$2,916,200.00
Community			
Life Care Center	2120 E Division Street	26,188 s.f.	\$3,046,200.00
Alpine Ridge Retirement	401 N 17 th Street	58,242 s.f.	\$\$3,109,600.00
Apartments			
Highland Greens Senior	3100 N 30 th Street	43,582 s.f.	\$4,278,100.00
Apartments			
INFRASTRUCTURE & NATUR	RAL RESOURCES:		
Roads (center lane miles of	City Wide	122 miles	\$41,176,027.00 ⁴
paved roads)			
Traffic Signals	City Wide	32	\$4,919,417.00 ⁴
Pubic Trails	City Wide	25 miles	\$481,029 ^{4&5}
Wastewater Treatment Plant	1408 Britt Road		\$10,799,900.00
Sanitary Sewer Mainline	City Wide	122 miles	\$35,084,796.00 ⁴
Storm Sewer Collection Lines	City Wide	115 miles	\$13,535,430.00 ⁴
Stormwater Detention Ponds -	City Wide	93	\$1,561,351.00
public			
23 Streams	City Wide	24.85 miles	NA
Numerous delineated wetlands	City Wide	Unknown	NA

1 Total Market Value from the Skagit County Assessor from 2013. For Public, Educational, Health Care,& Retirement Homes/Assisted Living Facilities the Market Value listed is for the building/structures only and does not include the land values. For Parks, Open Spaces, and Other Recreational Facilities the Market Value includes buildings (if present) and the land values.

2 Using the 2010 and the 2008 - 2012 5-Year Estimates from the U.S. Census Bureau coupled with City building permit data.

3 Total Market Value from the Skagit County Assessor from 2013 for all structures with listed living area within them.

4 These values represent the construction cost when they were originally constructed.

5 This cost does not include the land under the trails, only the trails themselves.

From this table one can see that within the City limits there are a number of critical facilities and a great deal of infrastructure that the City maintains. The approximate value of these facilities/infrastructure is provided so that one can see the magnitude of what these items are worth should they ever need to be replaced.

Contained with the accompanying **Appendix D** is a modified version of Table 3.4.1 that contains the site address and telephone number for the places on this list that could be contacted in the event of an emergency, along with a map of these same facilities.

While the City's businesses are not inventoried as Critical Facilities or Infrastructure, a hazard event could have devastating impacts on the City's businesses and employees. As such, **Table 3.4.2** provides a list of the principal property taxpayers in the City along with their taxable assessed valuation; and, **Table 3.4.3** provides a list of the top employers in the City.

TAXPAYER	TAXABLE ASSESSED VALUATION
Wal-Mart Stores	\$18,101,400
Frontier (formerly Verizon)	\$17,802,542
Medical Center	\$17,265,900
Cascade West Apartments	\$15,323,500
100 310 East College Way Holdings (retail store)	\$14,052,800
Watson Properties (retirement homes)	\$13,368,100
Coastal Farm	\$10,328,900
Puget Sound Energy	\$10,268,147
MRM Mt. Vernon (hardware store)	\$9,424,500
Frost Family LLC	\$9,208,600

Table 3.5.2: Principal Property Taxpayers – 2013

(Source: Skagit County Assessor)

Table 3.5.3: Principal Employers – 2013

EMPLOYER	NUMBER OF EMPLOYEES
Skagit Regional Health	1,741
Skagit County	588
Mount Vernon School District	552
Draper Valley Farms	520
Skagit Valley College	414
Walmart	370
Skagit Gardens	214
City of Mount Vernon	192
Lowes Hardware	140

(Source: WA Dept. of Labor & Industries, business self -reporting and City licenses)

4.1: ADOPTED GOALS AND POLICIES

The goals, objectives and policies that form the basis for this plan are integrated into the city's planning and regulatory framework in a number of ways. This section outlines the adopted goals and policies; and the following section, Section 4.2, lists the actual development regulations and other plans that have been created and adopted (when required) to implement the goals and policies contained below.

The City has implemented mitigation strategies for dealing with natural hazards, in large part, by adopting and enforcing preventative measures. This includes actions such as planning and development regulations that are intended to avoid or keep problems from getting worse. The following table organizes the Goals, Objectives, Policies that the City has adopted to mitigate these hazards.

Since 1985, the City of Mount Vernon continues to be active participant in the National Flood Insurance Program (NFIP). Mount Vernon has also participated in the Community Rating System (CRS) program since May of 1997. Mount Vernon will continue to actively participate in the NFIP and CRS programs to insure that flood mitigation is crucial to current and future mitigation efforts within the City. City of Mount Vernon's mitigation strategy will include continued participation and compliance with the National Flood Insurance Program and the Community rating System. The identifying, analyzing and prioritizing of mitigation measures is based (and will continue to be based) on continued participation and compliance with the NFIP. Mount Vernon has no repetitive loss properties at this time.

GOAL, OBJECTIVE OR POLICY:	REFERENCE	NATURAL
		HAZARD
2008 CITY NATURAL HAZARD MITIGATI	ON PLAN	
Provide for an increased level of safety to the citizens of Mount	Mitigation	General to all types
Vernon. The City of Mount Vernon has been proactive in looking out	Strategies Sub-	of Natural Hazards
for the safety of the citizens of Mount Vernon. With the adoption of the	Section	
International building Codes, more efficient services from police and		
fire, these changes have provided better quality of life, safety and		
health. Citizen training through the C.E.R.T program and Mount		
Vernon Police Citizens on Patrol are ways of getting the public		
involved in the community and their welfare.		
Provide for an increased level of protection for public infrastructure.	Mitigation	General to all types
Mount Vernon's ongoing commitment to protect our infrastructure will	Strategies Sub-	of Natural Hazards
be programs such as the ring dike around the waste water treatment	Section	
plant, raising pump stations above the 100 year flood plain. All of these		
projects are current and to continue will require funding and staffing.		

Table 4.1.1: Hazard Planning Goals, Objectives, and Policies

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Provide for an increased level of protection for private property within the boundaries of the City of Mount Vernon jurisdiction .Through regulatory measures such as codes, ordinances and higher regulated requirements the City of Mount Vernon is working towards less loss of property. Actions such as continued compliance with NFIP and CRS programs, higher floodplain regulations as addressed in the Floodplain Ordinance and better design standards.	Mitigation Strategies Sub- Section	General to all types of Natural Hazards
Provide for increased maximum flow capacity within the river channel and/or floodway downstream of the Burlington Northern Santa Fe railroad bridge including but not limited to property buy-outs and the set-back of existing levees. These projects are deferred at this time due to lack of funding.	Mitigation Strategies Sub- Section	General to all types of Natural Hazards
COMPREHENSIVE PLAN		
 Goal LU-20: Protect public health, safety, and property from the effects of natural hazards. Provide for an increased level of safety to the citizens of Mount Vernon, and provide for an increased level of protection for public infrastructure. Policy LU-20.1 Protect Life and Property. Implement mitigation activities that will assist in protecting lives and property by making homes, businesses, infrastructure, and critical facilities more resistant to natural hazards. Support the continuation of the Skagit Community Emergency Response Team (C.E.R.T.) Program to provide citizens from all areas of Skagit County with the information and tools they need to help themselves, their families, and their neighbors in the hours and days immediately following an emergency or disaster event. Policy LU-20.2 Encourage homeowners and businesses to purchase insurance coverage for damages caused by natural hazards. Policy LU-20.4 Develop and implement additional education and outreach programs to increase public awareness of the risks associated with natural hazards. Continue the current flood awareness programs conducted by various jurisdictions as part of the National Flood 	2005 Comprehensive Plan, Land Use Element (Chapter 2)	General to all types of Natural Hazards
Objective CF-9.3 Utilize communications links such as the Department Web Site, TV10, radio, newspaper and neighborhood newsletters to provide educational and emergency information.	2005 Comprehensive Plan, Land Capital Facilities Element (Chapter 7)	General to all types of Natural Hazards

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
 Goal LU-1: Preserve, protect, and where possible, restore natural habitat for the conservation of salmonid species listed under the federal ESA, through the use of management zones, development regulations, incentives for voluntary effort of private landowners and developers, land use classifications or designations, habitat acquisition programs or habitat restoration projects. Objective LU-1.1 Preserve fish and wildlife habitat, where appropriate. 	2005 Comprehensive Plan, Land Use Element (Chapter 2)	Flooding and Landslides
 Goal CF-18: Provide, maintain and upgrade surface water management systems to minimize impacts on natural systems and to protect the public, property, surface water bodies, and groundwater from changes in the quantity and quality of stormwater runoff due to land use changes. Objective CF-18.1 Provide storm drainage collection and discharge systems that protect public and private property and the natural environment. Ensure that existing and future stormwater systems are property operated and maintained. Policy CF-18.1.1 Design storm drainage systems to minimize potential erosion and sedimentation problems, and to preserve natural drainage systems including rivers, streams, flood plains, lakes, ponds and wetlands. 	2005 Comprehensive Plan, Land Capital Facilities Element (Chapter 7)	Flooding and Landslides
 Goal LU-2: Preserve and protect, where possible, identified wetlands within the City. Objective LU-2.1 Preserve wetlands and implement a wetlands management strategy. Policy LU-2.1.3 Promote mitigation projects that create or restore wetland areas or enhance existing wetland areas. Ensure wetland mitigation projects in the City attain the same ecological functions as natural wetlands of equivalent quality. Preserve land used for wetland mitigation in perpetuity. Monitoring and maintenance should be provided until the success of the site is established. 	2005 Comprehensive Plan, Land Use Element (Chapter 2)	Flooding and Landslides
 Goal LU-4: Protect, enhance, and restore existing flood storage and conveyance functions and ecological values of floodplains. Objective LU-4.1 Implement strategies to prevent property damage from flooding. Policy LU-4.1.1 Prevent property damage from flooding by implementing the following development regulations: Require adequate peak flow controls for new development. Perform the necessary analysis and recommend solutions for existing flooding problems. Employ management strategies in flood prone areas to ensure that new development is not exposed to significant flood risk. 	2005 Comprehensive Plan, Land Use Element (Chapter 2)	Flooding
regulations.		

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Policy LU-4.1.3 Identify locations for regional surface water facilities in areas of anticipated extensive development and redevelopment,	2005 Comprehensive	Flooding
particularly in Downtown. Promote the establishment of regional surface water management facilities to support infill development and	Plan, Land Use	
preclude the need for individual on-site ponds and facilities, provide	(Chapter 2)	
development incentives, encourage efficient use of land, and reduce overall facility maintenance costs.		
Policy LU-4.1.5 Require adequate peak flow controls for new development.		
Policy LU-4.1.6 Perform the necessary analysis and recommend solutions for existing flooding problems.		
Policy LU-4.1.7 Employ management strategies in flood prone areas to ensure that new development is not exposed to significant flood risk.		
Goal LU-5 Find long term, environmentally responsible, and cost effective methods to reduce the risk from flood damage.		
Policy LU-5.1 Work within the Skagit River Impact Partnership Agreement to become engaged and well informed to diligently address and implement measures to systematically reduce the risks from flooding.		
Policy LU-5.2 Through the Skagit River Impact Partnership systematically eliminate as many threats from flooding as possible which will achieve long term economic posterity for the region as well as the City.		
Goal LU-6: Shoreline use - To allow for compatible uses of the shorelines in relationship to the limitations of their physical and	2005 Comprehensive	Flooding and Landslide
environmental characteristics. Such uses should enhance rather than detract from, or adversely impact, the existing shoreline environment.	Plan, Land Use Element	Lundshut
Goal LU-7: Conservation - To preserve, protect, and restore the natural resources of Skagit County's shorelines in the public interest and for future generations. These natural resources include but are not necessarily limited to fish, wildlife, vegetation, and natural features found in shoreline regions. Only renewable resources should be extracted and in a manner that will not adversely affect the shoreline environment.	(Chapter 2)	
Goal LU-9: Circulation - To permit safe, adequate, and diversified transportation systems that are compatible with the shorelines, resulting in minimum disruptions to the shoreline environment.		
Goal LU-13: Restoration and enhancement - To restore and enhance those shoreline areas and facilities that are presently unsuitable for public or private access and use.		

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Goal LU-15: Preserve and protect, where possible, identified steep and erosive slopes within the City. Policy LU-15.1 Minimize soil disturbance and maximize retention and	2005 Comprehensive Plan, Land Use Element	Landslide
replacement of native vegetative cover in erosion hazard areas through development regulations.	(Chapter 2)	
Policy LU-15.2 Require increased surface water requirements in areas draining over steep and erosive slopes.		
Policy LU-15.3 Discourage development on landslide hazard areas, including steep slopes over 40 percent. Restrict development unless the risks and adverse impacts associated with such development can be reduced to a non-significant level.		
Policy LU-15.4 In areas with severe seismic hazards, apply Uniform Building Code, and any other necessary special building design and construction measures to minimize the risk of structural damage, fire and injury to occupants and to prevent post-seismic collapse.		
Policy LU-17.9 Review adopted clearing and grading regulations and revise them to address critical area protection. These regulations should set seasonal clearing restrictions that limit clearing and grading activities during the rainy seasons. Critical areas, including sloped and riparian areas, should not be exposed during this time.		
Policy LU-17.10 Grading and construction activities should implement erosion control Best Management Practices and other development controls as necessary to reduce sediment and pollution discharge from construction sites to minimal levels.		
Policy LU-18.1 Require adequate erosion and sedimentation controls from new construction sites.		
 Policy LU-16.1.3 With development regulations, support retention of natural areas and include design criteria to achieve subdivision and site layouts which will be sensitive to the environmental constraints and optimize open space and views. Key areas of consideration and emphasis for development include: Steep slopes; Streams with associated wetlands; Habitat areas Natural vegetation. Programs should be expanded for non-detrimental access to these areas 	2005 Comprehensive Plan, Land Use Element (Chapter 2)	Landslide
and opportunities for interpretation and education be provided.		
maintain varied uses.		
Goal LU-17: Identify critical areas as defined in RCW 36.70A.030 that include: floodways of 100 year floodplains; landslide, erosion, and seismic hazards, including steep slopes over 40 percent; wetlands and their protective buffers; streams and their protective buffers; critical aquifer recharge areas; and fish and wildlife habitat conservation areas.		

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Policy LU-17.1 Maintain an up-to-date inventory of environmentally sensitive areas including descriptions of criteria for designation and maps. The inventory of environmentally sensitive areas should be reviewed and updated regularly based upon changing conditions or new information. The final identification of environmentally sensitive or critical areas, hazardous sites or portions of sites should be established during the review of project proposals.	2005 Comprehensive Plan, Land Use Element (Chapter 2)	Flooding and Landslide
Policy LU-17.2 Consider the best available science to determine critical area buffers and maintain achievable ecological functions of those buffers. Use easements or equivalent protective measures to protect critical areas and critical area buffers that are not protected through public ownership.		
Policy LU-17.3 Use acquisition, enhancement, regulations, and incentive programs independently or in combination with one another to protect and enhance critical area functions.		
 Policy LU-17.4 Consider allowing alterations to critical areas, after all ecological functions are evaluated, the least harmful and reasonable alternatives are identified, and affected significant functions are appropriately mitigated, to: Maintain and improve a critical area; or, Avoid denial of reasonable use of the property; or Meet other priority growth management goals and programs consistent with GMA and the City Comprehensive Plan. 		
Policy LU-17.5 Establish mitigation priorities such as impact avoidance, impact minimization, and compensation in critical area regulations. Mitigation sites should be located strategically to alleviate habitat fragmentation.		
Policy LU-17.6 Provide incentives to private land owners, and develop City or inter-jurisdictional programs, designed to protect ecological functions for streams, riparian area, and wetlands.		
 Policy LU-17.7 Consider voluntary or required Low Impact Development standards that: Cluster or focus growth in developable areas. Minimize percent impervious area after development. Minimize disturbance of soils and vegetation. Promote surface water management designs that minimize water quality impacts. 		
Policy LU-17.11 Encourage the use of native plants in landscaping requirements, erosion control projects, and the restoration of stream banks, lakes, shorelines and wetlands.		
Policy LU-18.2 Require adequate water controls for new development.		
Goal LU-19.1 Develop a continuous and comprehensive program for managing surface water.		

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Policy ED-1.4.7 Provide necessary flood control improvements to protect the Downtown and promote redevelopment activities.	2005 Comprehensive Plan, Economic Development Element (Chapter 5)	Flooding
Provide a Surface Water Management framework that will protect the public's safety, health and property, conserve and enhance natural systems within the City, and comply with local, state, and federal regulations.	Surface Water Management Plan (2005) Chapter 1	Flooding Landslides
 Goal #1: Prevent property damage from flooding. Objective: Require adequate peak flow controls for new development. Objective: Perform the necessary analysis and recommend solutions for existing flooding problems. Objective: Employ management strategies in flood prone areas to ensure that new development is not exposed to significant flood risk. Objective: Require adequate erosion and sedimentation controls from 	Surface Water Management Plan (1995) Section II	Flooding Landslides
new construction sites.		
Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards	2014 – 2019 CIP	General to all types of Natural Hazards
POLICY STATEMENTS IN ADOPTED DEVELOPMENT REGULATIONS:	L	L
Surface Water Management The purpose of this chapter is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impact associated with increased runoff and reduced water quality and to comply with state and federal storm water management requirements.	Chapter 13.33 MVMC	Flooding Landslide
Building Code These sections are enacted as an exercise of the police power of the city for the benefit of the public at large. No section is intended to create a special relationship with any individual, or individuals, nor to identify and protect any particular class of persons. The purpose of these sections is to provide minimum standards to safeguard life or limb, health or property, construction and public welfare, by regulating and controlling building and related work thereto.	Chapter 15.04	Landslide Flooding Fire

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Grading, Excavation and Fill	Chapter 15.16	Landslide
The purpose of this chapter is to protect, maintain and enhance the		Flooding
public health, safety and general welfare by establishing minimum		
requirements and procedures to control the adverse impact associated		
with earthwork grading activity.		
Grading activity specifically associated with building construction		
shall comply with International Building Code Chapter 18, Sections		
1803 and 1804.		
Land Clearing	Chapter 15.18	Landslide
This chapter is adopted for the following purposes:		Flooding
A. To promote the public health, safety and general welfare of the		Fire
citizens of Mount Vernon;		
B. To preserve and enhance the city's physical and aesthetic character		
by preventing indiscriminate removal or destruction of trees on		
undeveloped property;		
D. To promote building and site planning practices that are consistent		
with the city's natural topographic and forest features while at the		
disease danger of falling etc.) provimity to existing and proposed		
structures and improvements interference with utility services		
protection of scenic views and the realization of a reasonable		
enjoyment of property may require removal of trees:		
E To ensure prompt development restoration and replanting and		
effective erosion control of property after land clearing through the use		
of phased development, performance bonds, and other reasonable		
controls;		
F. To implement the goals and objectives of the Washington State		
Environmental Policy Act (SEPA);		
G. Implement the policies of the State Forest Practices Act pursuant to		
Chapter 76.09 RCW and Chapter 222-20 WAC;		
H. To protect and enhance critical areas and their buffers.		
Floodplain Management Standards	Chapter 15.36	Flooding
It is the purpose of this chapter to promote the public health, safety and	MVMC	
general welfare, and to minimize public and private losses due to flood		
conditions in specific areas by provisions designed:		
A. To protect numan life and nealth;		
B. To minimize expenditures of public money and costry flood-control		
C. To minimize the need for rescue and relief efforts associated with		
flooding and generally undertaken at the expense of the general nublic:		
D To minimize prolonged business interruption:		
E. To minimize damage to public facilities and utilities such as water		
and gas mains, electric, telephone and sewer lines, and streets and		
bridges located in areas of special flood hazards:		
F. To help maintain a stable tax base by providing for the sound use		
and development of areas of special flood hazard so as to minimize		
future flood-blight areas;		
G. To ensure that potential buyers are notified that property is in an		
area of special flood hazard; and		
H. To ensure that those who occupy the areas of special flood hazard		
assume responsibility for their actions.		

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Critical Areas	Chapter 15.40	Flooding
Critical areas as defined are of special concern to the city. The	MVMC	Landslides
standards and mechanisms established in this chapter are intended to		
achieve no net loss of critical area function and value within the		
identified basins and sub-basins within the city while encouraging cost		
effective and efficient use of lands within the urban areas and		
accomplishing the city's comprehensive plan and growth management		
goals. By regulating land development activities and alterations to		
critical areas, this chapter seeks to:		
A. General Purpose.		
1. Protect the public health, safety, and welfare by avoiding or		
mitigating the potential adverse impacts of new development;		
2. Educate the public as to the long-term importance of		
environmentally sensitive areas and the responsibilities of the city and		
private property owners to protect and preserve the natural		
environment for future generations;		
3. Manage development activities to protect environmental quality;		
4. Avoid, minimize, or mitigate potential unavoidable impacts to		
environmentally sensitive areas by regulating alterations in and		
adjacent to critical areas;		
5. Provide city officials with the information they need to evaluate,		
approve, condition, or deny public or private development proposals;		
6. Protect life, health, safety, welfare, and property by minimizing and		
managing the adverse environmental impacts of development within		
and adjacent to critical areas;		
7. Effectively manage limited city resources by avoiding:		
a. Preventable maintenance and replacement of public facilities when		
critical area functioning is impaired;		
b. Unnecessary costs for public emergency rescue and relief		
operations; and		
c. Potential litigation on improper construction practices occurring in		
critical areas;		
8. Alert realtors, appraisers, assessors, owners, and potential buyers or		
lessees to the development limitations in and adjacent to		
environmentally sensitive areas;		
9. Provide predictability and consistency to the city's development		
review process; and		
10. Assist of lutther the implementation of the policies of the City		
Comprehensive plan, an city functional plans and policies, the State		
Chapter 42 21C DCW		
Critical Aroas	Chapter 15 10	Landelidee
Critical Areas	MVMC	Lanushues
A Purpose The purposes of the geologic hazard and hillside	15 40 070	
A. I upose. The purposes of the geologic hazard and misside development regulations are to:	13.40.070	
1 Minimize damage due to landslide erosion subsidence and alluvial		
fans through the control of development and		
2. Reduce the risks to the city and its citizens from development		
occurring on unstable slopes: and		
3. Control erosion and sediment runoff from development.		

Table 4.1.1 continued from above - Goal, Objective or Policy:	Reference:	Natural Hazard:
Critical Areas	Chapter 15.40	Flooding
The purposes of the wetland regulations are to:	MVMC	Landslides
1. Ensure that development activities in or affecting wetlands do not	15.40.070	
threaten public safety, cause nuisances, or destroy or degrade natural		
wetland functions and values; and		
2. Protect wetlands by regulating development activities within and		
around them; and		
3. Protect the public from costs associated with repair of downstream		
properties resulting from erosion and flooding due to the loss of water		
storage capacity provided by wetlands; and		
4. Prevent the net loss of wetland acreage and functions.		
Subdivision Regulations	Chapter 16.04	Flooding
The purpose of this title is to regulate the subdivision of land and to	MVMC	Landslide
promote the public health, safety and general welfare in accordance		Fire
with the standards established by the state to prevent the overcrowding		
of land; to provide for orderly growth and development; to preserve		
and enhance property values; to lessen congestion in the streets and on		
the highways; to provide for adequate light and air; to facilitate		
adequate provisions for water, sewage, parks and recreation areas, sites		
for schools and school grounds and other public requirements; to		
provide for proper traffic circulation and to require uniform		
monumenting of land subdivisions and conveyancing by accurate legal		
description.		
Zoning Regulations	Chapter 17.03	Flooding
The provisions of land use adopted and established in this title are	MVMC	Landslide
intended to promote the most appropriate and compatible uses of the		Fire
land within the city; prevent undue concentration of population and		
avoid overcrowding of land; encourage coordinated development of		
unbuilt areas; conserve or restore natural beauty and other natural		
resources; preserve areas and buildings of architectural, cultural or		
historic significance; facilitate the orderly development and use of		
transportation, water, sewage and other public services; provide		
adequate light and air; lessen traffic congestion; and secure safety from		
fire.		

4.2: ADOPTED DEVELOPMENT REGULATIONS & ACTION PLANS

Mount Vernon has adopted a number of different development regulations intended to provide minimum standards to safeguard life and limb, health, property and public welfare. The main of which include Mount Vernon Municipal Code Chapter 15.04 (Building Code), Chapter 15.08 (International Fore Code and Fire Prevention Bureau), Chapter 15.16 (Grading, Excavation and Fill, Chapter 15.36 (Floodplain Management Standards, and Chapter 15.40 (Critical Areas).

- Chapter 15.04 MVMC adopts by reference the 2012 International Building Code (IBC). The IBC, among other things, contains regulations and standards for construction activities to mitigate potential damage from earthquakes, storms, fires and landslides. In addition to the general standards for construction, the Building Code provides for geographically specific requirements for seismic design, high wind design and high snow load design.
- Chapter 15.08 MVMC adopts by reference the 2012 International Fire Code (IFC). The IFC has regulations and standards for fire protection and building maintenance standards; including minimum fire flow, inspection requirements, and requirements for plan review.
- Chapter 15.16 regulates grading, excavation and fill activities within the City. In addition to having its own development regulations regarding these activities this code adopts by reference Chapter 18, Sections 1803 and 1804 of the IBC.
- Chapter 15.36 MVMC is the City's Floodplain Management Standards. The Floodplain Management Standards provide an action plan for flood hazard reduction and the selection of appropriate activities to minimize flood risks.
- Chapter 15.40 is the City's Critical Areas Code that regulates activities that could impact critical areas within the City including (among other things) wetlands, streams, and steep slopes. This chapter of the municipal code was completely overhauled in 2007 to include Best Available Science in the protection and regulation of critical areas.

The following Table, identified as **Table 4.2.1**, provides detailed information regarding all of the different development regulations that the City has adopted that includes all of the above-listed codes and others that the City uses on a day-to-day basis to review and approve activities within the City.

DEVELOPMENT REGULATION	CODE	NATURAL
SUMMARY	CITATION	HAZARD
TITLE 12 – STREETS, SIDEWALKS AND PUE		
Requires house numbers and street names	12.24 MVMC	All types, assists emergency responders traveling around the City and to incidences
TITLE 13 – SEWERS		
Includes methods and provisions for the following: A. Storm water management measures are designed, constructed, and maintained in accordance with the standards and specifications required in the 2005 Ecology Stormwater Management Manual for Western Washington and the City of Mount Vernon engineering standards.	13.33.050 MVMC	Flood Landslides
All storm water management measures shall be analyzed with the continuous modeling program Western Washington Hydrology Model, hereinafter referred to as WWHM, or as otherwise approved by the public works director.		
TITLE 15 – BUILDINGS AND CONSTRU	JCTION	
 Includes methods and provisions for the following: A. Delineates amounts and areas where flammable, combustible, or hazardous materials can be located. B. Prohibits certain explosives and blasting agents. C. Contains requirements pertaining to emergency planning and preparedness, access roads, gates, identification of buildings, emergency responder radio coverage, when sprinkler systems and 	15.08 MVMC Adopts by reference the: 2009 International Fire Code	Fire
associated fire suppression methods are required, and fire alarms.	15.10.010	 '
Allows the connection of private fire alarm systems to the City's system.	15.12.010 MVMC	Fire
Includes methods and provisions for the following:A. Location, spacing, and distribution of fire hydrants.B. Technical specifications for the installation of fire hydrants.	15.14 MVMC	Fire
 Includes methods and provisions for the following: A. All grading design and construction activity shall comply with this code and all Mount Vernon Municipal Code provisions, including but not limited to Chapter 13.33 MVMC, Storm Water Drainage Utility, and Chapter 15.40 MVMC, Critical Areas. In case of conflict the more stringent code shall apply. B. All grading design and construction activity shall comply with the city of Mount Vernon Engineering Standards as they are currently written and as they may be amended in the future. C. No grading activity may occur within a critical area or critical area buffer without specific approval for this activity. E. It shall be the responsibility of both the permittee and the property owner to advise the city immediately of any discrepancies, hazardous conditions or problems affecting safety and stability of the project. 	15.16.040 MVMC	Landslides

Table 4.2.1: Development Regulations Specific to Natural Hazards

Table 4.1.2 continued from above - Regulation:	Citation:	Natural Hazard:
Includes methods and provisions for the following:	15.16.060 to	Landslides
A. Specific requirements for the maximum steepness of both cuts and	.130	
fills unless otherwise recommended in the geotechnical report.	MVMC	
B. Specifications for fill material type, compaction, and ground		
surface preparation.		
C. Setbacks specific to individual sites.		
D. Drainage requirements including terracing, benching, interceptor		
Grannis, and down drains.		
E. Broston and sedment control, both temporary and permanent.		
where a "hazard to life or limb endangers property adversely affects		
the environment or the safety use or stability of a public way or		
adversely affects a drainage channel or other natural watercourse by		
siltation, erosion diversion, concentration, or an increase in storm		
water runoff' is created.		
Includes methods and provisions for the following:	15.18	Landslides
A. On undeveloped land no land clearing is permitted until permits are	MVMC	
approved unless an exempt activity is planned. Exemptions include		
removal of less than 5,000 board feet of timber, clearing less than two		
acres, sites where a DNR 'no conversion' has been previously		
submitted, and sites of contiguous forested lands of 20 acres or greater		
that comply with RCW $76.09.240(1)(a)(1)$.		
B. All clearing activities shall be conducted so as to minimize impacts		
to forested areas, surface waters, critical areas, groundwater recharge,		
adjacent properties, and natural leatures. C All debris storage and handling resulting from clearing shall occur		
within the right of way so as to avoid damage to the adjacent land. No		
debris shall be stored for more than one year from the time of		
completion of the clearing activity		
D. Slash from clearing should preferably be chipped and used in native		
vegetation areas on the site within one year of the clearing activity.		
E. Prior to initiating any clearing activities on the site, trees to be		
protected and preserved shall be protected from potentially damaging		
activities as follows unless otherwise approved by the city of Mount		
Vernon.		
F. Projects shall be phased to the maximum degree practical to account		
for seasonal limitations, to reduce areas of exposed soils, and to aid in		
the stabilization of disturbed areas. The director shall have the		
authority to require a phased land clearing plan.	15 26 020	Flooding
A Postricting of prohibiting uses which are democrate to health	15.50.020 MVMC	Flooding
A. Restricting of promotioning uses which are dangelous to health, safety and property due to water or erosion bazards, or which result in	IVI V IVIC	
damaging increases in erosion or in flood heights or velocities:		
B Requiring that uses vulnerable to floods including facilities which		
serve such uses, be protected against flood damage at the time of initial		
construction;		
C. Controlling the alteration of natural floodplains, stream channels,		
and natural protective barriers, which help accommodate or channel		
floodwaters;		
D. Controlling filling, grading, dredging and other development which		
may increase flood damage; and		
E. Preventing or regulating the construction of flood barriers which		
will unnaturally divert floodwaters, or which may increase flood		
nazarus in outer areas.		
		1

Table 4.1.2 continued from above - Regulation:	Citation:	Natural Hazard:
New construction and substantial improvements are required to be elevated so that finished floor height is 1 foot above the base flood elevation, and shall be constructed with materials and utility equipment resistant to flood damage. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or must be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.	15.36 MVMC	Flooding
All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure. In all buildings, construction materials used below the base flood elevation must be resistant to damage by floodwaters.		
Elevation certificates are required on all elevated buildings. Certificates are collected by office or field inspection staff and are kept in a maintained file at the Development Services Department. Agricultural buildings and private garages not elevated are required to be wet floodproofed. A professional engineer or registered architect is required to verify that there is low potential for damage from velocities, debris, and scouring as well as verifying adequate opening area to allow free passage of flood water. In areas of shallow flooding where velocities exceed 5 fps and when located within 500 feet of the toe of a dike, buildings are required to be elevated on columns, piles or an engineered foundation.		
Fill, for purposes of elevation, is prohibited except where proven by a professional engineer that the fill does not reduce flood storage, increase base flood elevations, reduce flood conveyance or prohibit natural flow.		
Mount Vernon shall enforce protective restrictions within areas of special flood hazards (floodways), since the floodway is an extremely hazardous area.		
Construction in a designated floodway is prohibited except where it can be demonstrated by a professional engineer that there is no rise in the floodway. The current FEMA no-rise procedure is the standard by which this must be demonstrated.		
All new buildings not meeting the strict prescriptive requirements of the IBC are required to have their structural elements designed by a professional engineer or registered architect. Such design is required to include seismic analysis of the building in addition to wind, gravity and other forces	15.04.020 MVMC Adopts by reference the:	Earthquake
Building permits are issued for repair of seismically damaged buildings, normally based on a site inspection by the field inspection staff. All repair construction must meet the current building code requirements for seismic design.	2012 International Building Code, including its special provisions for	
In areas of the City with steep or unstable slopes, or with soil prone to liquefaction, geotechnical reports, prepared by a professional engineer, are required as a part of a building permit application. Such reports must include an analysis of the effects of a seismic event	seismic D1 and D2.	

Table 4.1.2 continued from above - Regulation:	Citation:	Natural Hazard:
All new buildings not meeting the strict prescriptive requirements of	15.04.020	High Winds
the building code for adequate wall bracing, are required to have their	MVMC	(Severe Storms)
structural elements designed by a professional engineer or registered	Adopts by	
architect utilizing the wind design requirements of the building code.	reference the:	
The Mount Vernon Building Official renders decisions on which	2012	
exposure group an individual property is located	International	
exposure group an individual property is located.	Building Code	
Includes provisions for the requirement of setbacks from the top and	15 04 020	Land Movement
bottom of slopes.	MVMC	
······································	Adopts by	
Geologically Hazardous Areas include slopes of 40% or more,	reference the:	
landslide hazards, seismic hazards and erosion hazards, and other areas		
which the city has reason to believe are geologically unstable.	The 2012	
	International	
	Building Code.	
Includes methods and provisions for the following:	15.40 MVMC	Landslides
A. Classifies geologic hazards into the following categories based on		
specific criteria: erosion hazard areas, landslide hazard areas, seismic		
hazard areas, volcanic hazard areas, or alluvial fan hazard areas.		
B. Contains performance standards based on sites with slopes less than 150° slopes less than 150° slopes less than 150°		
15%, slopes between $15%$ and $40%$, and those greater than $40%$.		
C. Depending on the site conditions requires temporary sediment and		
replanting and buffers		
Includes methods and provisions for the following:	15.40 MVMC	Flooding
A Identification and classification of different types of streams and	15.40 MIVINE	Tiooding
wetlands found in the City.		
B. Buffers, based on the classification of the wetland or stream to be		
observed for streams and wetlands.		
TITLE 16 – SUBDIVISIONS		-
Includes methods and provisions for the following to ensure that both	16.16 MVMC	All types, assists
public and private roads in the City are designed and built to assist, in		emergency
part, emergency responders. This code contains minimum road widths,		responders traveling
maximum steepness, and other requirements such as turn arounds and		around the City and
turning radi.		to incidences
TITLE 17 – ZONING	15 50 000	
Contains specific requirements for fire lanes to ensure fire truck access	17.72.080	Fire
to sites.	MVMC	

The list of action items contained in **Table 4.2.2**, below, are not codified within the Mount Vernon Municipal Code; none-the-less they are items that have historically been done or are on-going to mitigate potential hazards.

Table 4.2.2: Other City Actions Specific to Natural Hazards

ACTION ITEM DESCRIPTION

GENE	RAL TO ALL HAZARDS
•	Continue to maintain the City's Emergency Plan. This plan was last updated in 2014 and contains detailed information on the organization and responsibilities of those appointed to handle emergencies threatening the City. Appended to this document as Appendix A is the Incident Command System, as Appendix B the Evacuation, Movement, and Transportation Plan, as Appendix C the Public Information Plan, Functional Checklists for different departments, and as Appendix F the 2014 Flood Response Manual.
•	This plan will be exercised and tested annually and will continue to be revised as needed.
•	The City developed a new updated website with more flood information in 2010. The City's website provides information on everything from flood insurance to flood elevation certificates, along with history of flooding in the Skagit Valley. Mount Vernon's website allows property owners to view flood elevation certificates and other flood documents that may be attached to permits or other documents.
FLOO	DING
•	Copies of all elevation certifications are kept, organized and are sent annually to FEMA.
•	Building Official reviews and files certificates for all new development in the floodplain development project; and has a complete file of pre-FIRM certificates.
•	On an on-going basis, the Building Official makes map determinations, provides information to users, and maintains accurate records and logs.
•	Flood information is mailed to the entire community.
•	The Community & Economic Development Department currently does, and will continue to work with realtors and the public by disclosure of flood hazards and requirements for purchasing flood insurance.
•	The Building Official and Engineering Services Engineering staff will continue to provide technical advice to property owners, contractors and design professionals.
•	Provide technical advice and update materials to include latest documents.
•	The Public Works Department will continue its inspections and maintenance of all public and private drainage facilities; which includes identifying pollution problems and implementing best management practices to control source pollutants.
•	The Community & Economic Development Department will continue maintenance and updating of existing land use and topographic maps and continue data entry and development of mapping layers in automated system, including parcel and overlay data. Required flood elevations are identified for individual parcels.
•	The City will continue to actively work with Dike District's 1, 3 and 17 in their efforts to maintain and upgrade the existing levee systems that provide flood protection to areas of the City.

Table 4.2.2 continued from above – Action Item Description

ADMINISTRATIVE & TECHNICAL CAPABILITY

The following staff, with the listed technical skills, are employed by the City:

- 1. Planners and Engineers with knowledge of land development and land management practices that work in the City's Community & Economic Development and Public Works Departments.
- 2. Professionals trained in construction practices related to building structures and infrastructure in the City's Community & Economic Development Department (Building Official, Plans Examiners, and Inspectors).
- 3. Floodplain Manager Building Official
- 4. Mapping Expertise (GIS and AutoCad) in the Community & Economic Development Department and Public Works Departments).
- 5. Emergency Manager appointed.
- 6. Staff with expertise and training in cost/benefit analysis Building Official
- 7. Staff with Stormwater Management Expertise Stormwater Manager in the Public Works Department and Engineering Services Manager in the Community & Economic Development Department.

The following sub-sections have been organized into mitigation projects that are in the planning stages and projects that are either under construction or have been completed in the recent past. Each project that is listed includes information on the Department(s) responsible for the project, funding sources, and timelines.

5.1: PLANNED MITIGATION PROJECTS

1. WASTEWATER TREATMENT PLANT RING LEVEE

Construct a levee around the Mount Vernon Waste Water Treatment Plant to provide for 100year flood protection. A ring dike for 100-year flood protection was part of the plan from 2003 and has been deferred until the completion of the expansion project. This project is still valid and is included as part of the Downtown Waterfront Development Plan, Phase III that is listed as number 6 within this sub-section, below.

Responsible Department:	City Public Works
Funding:	Identified in the Mount Vernon Capital Improvement Plan
Timeline:	1 to 2 years after funding is secured

2. SR 536 BRIDGE EXTENDED

Extend the State Route 536 Bridge to the west to provide increased flow capacity within the existing floodway. This mitigation measure was listed on the 2003 mitigation plan. The measure was not completed due to lack of funding and staff. As part of the 2014 mitigation plan it has been reaffirmed to the 2014-2019 Mitigation Plan.

Responsible Department:	City Public Works
Funding:	Identified in the Mount Vernon Capital Improvement Plan
Timeline:	Long Term (greater than 3 years after funding is secured)

3. KULSHAN PUMP STATION CAPACITY INCREASED

Increase the capacity of the Kulshan pump station and/or construct additional pump facilities as needed at various locations within the city limits of Mount Vernon to improve the capacity and better manage interior drainage of the commercial area following a flood or severe storm event. This mitigation project for stormwater management is in the planning and development stages. Planning for the future quality control of storm water and the BMP's for the city of Mount Vernon will be a priority and this mitigation measure will be reaffirmed to the 2014-2019 Plan. Additional pump station was installed on East College Way for increased capacity.

Responsible Department:	City Public Works
Funding:	Identified in the Mount Vernon Capital Improvement Plan
Timeline:	Long Term (greater than 3 years after funding is secured)

4. SEWER PIPES IN FLOODPLAIN REPLACED

Replace all clay line sanitary pipes in the flood plain to limit environmental damage and help protect treatment plant infrastructure. Mitigation hazard of this magnitude is an ongoing process. Mount Vernon is in the process of relining existing pipe with cured in place pipe (CIPP). Mitigation will continue and completed as funds become available. This mitigation measure will be reaffirmed in the 2014-2019 Mitigation Plan.

Responsible Department:	City Public Works
Funding:	Identified in the Mount Vernon Capital Improvement Plan
Timeline:	Long Term (greater than 3 years after funding is secured)

5. INFRASTRUCTURE RAISED ABOVE 100-YEAR FLOOD ELEVATIONS

As needed, raise existing streets/roads and sanitary pump station facilities above 100-year flood elevation. Projects completed within the time frame of the 2003 plan have been placed above the 100 year flood elevation as per FIRM maps dated January 3, 1985. Mount Vernon was not able to retrofit any existing structures below the flood elevation due to lack of funds. This mitigation measure is reaffirmed in the 2008-2013 Plan. *Note: This project was listed in the 2003 plan to provide for 50 –year flood protection for the downtown area of Mount Vernon. This project has been modified for the 2014-2019 plan cycle to provide 100-year flood protection to this area.*

Responsible Department:	City Public Works
Funding:	Identified in the Mount Vernon Capital Improvement Plan
Timeline:	Long Term (greater than 3 years after funding is secured)

6. DOWNTOWN WATERFRONT REDEVELOPMENT - PHASE III

This final phase of the City's project will include the construction of 1.2 miles of floodwall and earthen levee and .9 miles of riverwalk and trail connection to regional trail systems. Once completed the City's Historic Downtown will be protected with FEMA certified flood protection.

Responsible Department:	City Public Works and CEDD	
Funding:	Identified in the Mount Vernon Capital Improvement Plan –	
	Partially funded.	
Timeline:	1 to 2 years after funding is secured	

5.2: MITIGATION PROJECTS IN PROCESS

1. DOWNTOWN WATERFRONT REDEVELOPMENT – PHASE II

Following the completion of Phase I of this project, described in greater detail below in subsection 5.3, the City is currently in the process of having Phase II of this project completed. Phase II includes construction of a new floodwall engineered to protect historic downtown Mount Vernon, a riverwalk and trail connections.

Responsible Department:	Public Works	
Funding:	Identified in the Mount Vernon Capital Improvement Plan –	
	Funded Project	
Timeline:	In process, anticipated to be finished in 2014/2015.	

5.3: COMPLETED MITIGATION PROJECTS

1. PURCHASE OF FLOODFENCE

Flooding on the Skagit River has, for over a century, caused millions of dollars in damage to land and infrastructure and put human lives at risk. For years, the City relies on over 2000 volunteers and 150, 000 bags of sand to protect downtown during a flood event. In 2006 the City purchased a flood fence for the protection of Mount Vernon during a flood event in lieu of sandbagging.

Responsible Department:	Public Works
Timeline:	Finished

2. DOWNTOWN WATERFRONT REDEVELOPMENT - PHASE I

In 2006 the City commenced the necessary planning and engineering studies for the design and construction of a permanent flood control project in the downtown area of Mount Vernon. The proposed project is designed to protect the City of Mount Vernon's historic downtown area from flood damage up to and including the 100-year event on the Skagit River.

Due to the magnitude of this project it was split into three (3) phases. Phase I, that is now complete, included the construction of a floodwall and river trail from the Division Street Bridge north to Lions Park.

Responsible Department:	Public Works
Timeline:	Finished in October of 2010

3. EDGEWATER PARK FLOODWAY EXCAVATION

Excavate the Edgewater Landfill to provide increased flow capacity within the existing floodway. This project was completed in 2006 with the excavation and removal of large debris to increase the capacity of the floodway.

Responsible Department:	Public Works
Timeline:	Finished

Below is a handout that identifies all three Phases of the City's Downtown Waterfront Redevelopment projects.



Map 5.1: Downtown Waterfront Redevelopment Map

6.1: INTRODUCTION

The National Flood Insurance Program (NFIP) provides federally backed flood insurance in exchange for communities enacting and enforcing floodplain regulations. Since its inception in 1968, the NFIP has been very successful in implementing requirements for all new buildings to be protected from a one-hundred year flood event.

The Code of Federal Regulations Parts 59 through 79 of 44CFR stipulates the requirements for participation in the program. Funding eligibility under the Robert T. Stafford Act requires cities to participate and be in good standing with the NFIP; which the City is.

The NFIP's Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. The CRS was implemented in 1990 and is administered by the Federal Emergency Management Agency (FEMA). The National Flood Insurance Reform Act of 1994 codified the CRS in the NFIP. To date, approximately 1,100 out of 20,000 NFIP communities from across the Nation participate in the CRS.

6.2: THE COMMUNITY RATING SYSTEM (CRS)

As stated above, Community Rating System (CRS), is a voluntary program that rewards counties and cities that participate in the National Flood Insurance Program National Flood Insurance Program (NFIP) who wish to exceed the minimum requirements of the NFIP by further reducing the risk of flooding and increasing the effectiveness of flood protection, by increasing community awareness of the flood risks and building requirements associated with living in a floodplain, and to encourage a more comprehensive and environmental approach to floodplain management.

The CRS has been developed to provide financial incentives in the form of flood insurance policy discounts for communities to go beyond the minimum floodplain protection requirements to develop extra measures to provide protection from flooding. Discounts are determined based on the level of reduced flood risk resulting from the community's ability to meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

There are 18 programs or "activities" in the CRS that are intended to reduce or eliminate exposure to floods. Activities range in complexity from distribution of public outreach brochures to purchasing floodplain properties for environmental protection and restoration. These activities are organized under four main categories:

- Public Information
- Mapping and Regulations
- Flood Damage Reduction
- Flood Preparedness

6.3: MOUNT VERNON CURRENT CRS RATING

Each year, a community must recertify by October 1st that it is continuing to implement the activities for which it has earned credit. Recertification is done on the recertification worksheet, AW-214, which is prepared by the Insurance Services Office, Inc (ISO)/CRS Specialist and sent to the community each August.

The recertification worksheet lists community data and the activities and elements the community is implementing for CRS credit. There are 18 activities for which a community can receive points for. The City is currently ranked a Class 6 as of February 1, 2013, and residents receive a 15 percent (15%) discount on flood insurance rates. The City is currently in the midst of a 5-year CRS audit, and hopes to achieve a Class 4 or 5 ranking through the 2016 recertification process.

COMMUNITY CLASSIFICATIONS		
PROGRAM	CLASSIFICATION	DATE CLASSIFIED
NFIP Community Rating System	6	2/1/2013
Building Code Effectiveness	3/3	9/1/2012
Grading		

To calculate the number of points a municipality receives, a few term definitions are necessary:

- Series The CRS activities are divided into four series: Public Information, Mapping and Regulation, Damage Reduction, and Flood Preparedness. Their titles are self-explanatory, and the credits within them follow the main objective of the titles.
- Activity Each series has from three to six activities. Each activity has a title, such as "Additional Flood Data" or "Flood Warning Program." The titles are mostly self-explanatory, but they may include components that are not specifically named in the title. At the end of the credit calculation process, the credits for all activities are added together to get the community's total score.
- Elements Within each activity, there are one or more elements. These are discrete pieces of a community's floodplain management program, and each receives a certain number of credit points.

The first step is to review each activity proposed by the community for adequacy and completeness. Under each activity in the CRS Schedule is a section entitled "Credit Points." Each element has a maximum number of credit points that can be earned if the element is being implemented to certain standards throughout the community or throughout the floodplain. A community will receive less than the maximum points if its program does not include all the elements listed in the Credit Points section.

Community participation in any of the 18 flood loss reduction programs earns CRS points. Based on the number of points earned, the community will be given a CRS Class rating between 1 and 10. All communities start out with a Class 10 rating (which provides no policy premium discount). A Class 1 rating requires the most credit points (4,500 points) and gives the greatest premium discount (up to 45%). Visit www.floodsmart.gov for more information on flood insurance.

6.4: BENEFITS OF BEING A COMMUNITY RATING SYSTEM COMMUNITY

The money saved through reduced flood insurance premiums stays within our community and thus helps our local economy. Every time residents of Mount Vernon pay their insurance premiums, they are reminded that the City is working to reduce the cost of flood insurance and protect them from flood losses. The activities credited by the CRS provide direct benefits to the community, including enhanced public safety, reduction in damage to property and public infrastructure, reduction of human suffering, and protection to the environment.

The public outreach activities will build a more knowledgeable constituency interested in supporting and improving flood protection measures, and the protection of natural floodplains. CRS activities improve flood protection and mitigation coordination between County and other community organizations.

The CRS increases public awareness of the importance of having flood insurance as well as helps facilitate more accurate insurance rating for the benefit of policy holders.

SECTION 7.1: OVERVIEW

In its simplest terms following is a summary of the process that the City has, and will continue to engage in to manage this Hazard Mitigation Plan.

- A. Identify Issues and Assess Risks
 - Review and assess existing technical data and Comprehensive Planning documents
 - Review and assess existing and changing conditions and recent hazard events
 - Review and assess projects that are planned or are on-going in addition to ones that have been completed
- B. Assess the Issues/Problems and Create Plans to Mitigate
- C. Prioritize Plans and Mitigation Strategies
- D. Implement
- E. Evaluate and make changes as necessary

The following sub-sections describe in greater detail each of these steps and elaborate on processes associated with this management scheme.

SECTION 7.2: CITY'S PLANNING PROCESSES

Before describing how the City's Hazard Mitigation Plan is created and managed it is important to understanding the general framework in which the City operates regarding the adoption of its Comprehensive Plan, the development regulations that implement the Comprehensive Plan, and other plans like the Hazard Mitigation Plan.

The City is organized as a non-chartered code City, having a strong Mayor-Council form of government. The City operates under the requirements of the Washington State Growth Management Act; and as such, the City has an adopted Comprehensive Plan that expresses the City's Goals, Objectives and Policies. To carry out the Comprehensive Plan's Goals, Objectives, and Policies the City has adopted development regulations that are codified within the City's municipal code.

The City's current Comprehensive Plan was completely overhauled and updated in 2005; then in 2008 its Transportation and its Parks, Recreation and Open Space Elements were updated, and in 2010 the City updated its Buildable Lands Analysis which is part of the Land Use Element.

Throughout any given year the City keeps track of changes to its Comprehensive Plan that will be suggested for adoption the following year. In January of each year the City compiles staff's recommended changes along with changes/amendments submitted by the public and brings all of the suggested changes to the City Council through a docketing process. Once proposed amendments are docketed by the City Council City staff spends the following year processing these changes. Within this context the City's Comprehensive Plan is kept current. Additionally, consistent with current State law, every eight (8) years the City also completes a major update of the Comprehensive Plan to include updated population and employment forecasts and other similar data. The City's next major update will be completed in 2016.

To ensure active and on-going public participation in the creation, updates, and changes of the Comprehensive Plan the City has a formal public participation program that is outlined within Resolution 491. The public participation process for land use decisions that are not covered in Resolution 491, are outlined within Chapter 14.05 of the Mount Vernon Municipal Code. Both Resolution 491 and Chapter 14.05 MVMC contain provisions that mandate meeting and hearings that the public can participate in, public notification in the form of individual notices mailed to property owners and the publishing of these notices in a newspaper of local circulation, and the posting of land use change signs.

As well as creating development regulations to carry out the Goals, Objectives and Policies of the Comprehensive Plan the City, on an annual basis, goes through a Budget process and a Capital Improvement Plan process whereby, among other things, department budgets and priorities are set and specific projects are either funded, partially funded, or placed on a list for future implementation. For example, it is through this process that the projects described in **Section 5.3** (above) were designed and eventually built.

The implementation of projects relies heavily on being able to fund them. Possible sources of City funds for projects include the general fund, capital improvement funds, and utility reserves. Outside funding is necessary for many of the projects that the City prioritizes. This outside funding can come from local improvement districts, grant funding from private agencies, economic development organizations, State agencies, Federal agencies, and philanthropic sources. **Table 7.2.1**, below, provides additional details regarding funding sources available to the City.

Before a City project may proceed there must be a demonstrated need and funding must be secured. When funding is available and approval of Council is given, the project is included in the annual budget. Need for an action to proceed may be determined in a variety of ways including, but not limited to: action items identified in adopted plans, cost benefit analysis, necessary service, emergency, directive from state or federal agency, safety or other benefit to the community.

Table 7.2.1: Funding Sources

FUNDING SOURCES		
Financial Resources	Accessible or Eligible	
1. Community Development Block Grants	Yes	
2. Capital Improvements Project funding	Yes	
3. Authority to Levy taxes for specific Purposes	Yes	
4. User Fees for water & sewer	Yes	
 Impact Fees for homebuyers or developers of new development/homes 	Yes, Schools, Parks, Fire & Transportation New construction is charged for water and sewer impacts.	
6. Incur debt through general obligation bonds	Yes, in the past	
7. Incur debt through special tax bonds	Yes, in the past	
8. Incur debt through private activity bonds	No	
9. Withhold public expenditures in hazard-prone areas	No	
10. State sponsored grant programs such as FCAAP	Yes	
11. Other	Councilmatic Bonds, Real Estate Excise Tax(REET)	

SECTION 7.3: HISTORIC HAZARD MITIGATION PLANS

The multi-jurisdictional plan that includes Mount Vernon's plan element (this document) was originally developed in 2003 through an exhaustive process. This process included input from virtually all of the County's jurisdictions (cities, towns, districts and the Swinomish and Upper Skagit Tribes). On five (5) different dates in 2003 public meetings were held to solicit input from citizens and stakeholders along with the various jurisdictions, districts, and Tribes. Finally, in June of 2003 the final draft of the Skagit County Natural Hazards Mitigation Plan was distributed for review and comment.

The SEPA process was completed in July of 2003 with a final Mitigated Determination of Nonsignificance issued. The final draft of the plan was adopted in August of 2003 by Skagit County (via Resolution Number: R20030274). The other jurisdictions (and districts) followed suit by adopting this plan as well. For Mount Vernon, this plan was adopted with Resolution Number 638.

This 2003 plan was updated in 2008, again, through an extensive process. Similar to the 2003 process, in 2008 a total of five (5) public meetings were held to provide an opportunity for citizens, stakeholders, jurisdictions, districts and the Tribes to participate in the update of the 2008 plan. The update process in 2008 was completed following the commencement of a public review and comment period that ended in September that was followed by staff delivering final copies of the updated plan (on September 29, 2008) to the Washington State EMD. Mount Vernon adopted the 2008 updated plan with Resolution Number 780 in January of 2009.

Please see the Skagit County Natural Hazards Mitigation Plan section entitled, "Plan Development Process" should one wish to view additional details regarding the 2003 and 2008 processes outlined above. Please see **Section 7.4**, below, for a detailed description of the public process involved in getting this 2014 – 2019 plan update completed.

SECTION 7.4: 2014 PLAN UPDATE PROCESS

The City of Mount Vernon has been, and will be committed to reviewing, updating and evaluating the plan on a continued basis. Following the 2008 adoption of the Skagit County Natural Hazard Mitigation plan, the City created a more formal committee, the Natural Hazard Mitigation Committee, to review and make recommendations for updates to the City's portion of this plan.

This City committee is composed of staff from the Community & Economic Development Department, the Public Works Department, the Parks Department, the Police Department, and the Fire Department. Staff from each of these departments were selected due to the nature of their jobs and the specialized knowledge they have to make informed recommendations regarding things that may need to be changed or updated from the 2008 plan. This group meets on a semi-annual basis to discuss and bring forward Mount Vernon specific issues/recommendations in addition to being part of the multi-jurisdictional Natural Hazard Planning Committee. This committee, by its nature, is able to focus on features of the City that are unique and different from other jurisdictions. Table 7.4.1 below, lists the specific staff involved with this committee.

Staff Person	Title	Department
Rick Prosser	Building Official	Community & Economic Development
Doug Nathe	Associate Engineer, GIS	Community & Economic Development
Rebecca Bradley-Lowell	Senior Planner	Community & Economic Development
Esco Bell, P.E.	Public Works Director	Public Works
Mikael Love, P.E.	Assistant Public Works Director	Public Works
Blaine Chesterfield	Engineering Manager	Public Works
Roy Hari	Fire Chief	Fire Department
Steve Riggs	Fire Marshall	Fire Department
Brian Harris	Battalion Chief,	Fire Department
	Department Training Officer	
Jerry Dodd	Police Chief	Police Department
Chris Cammock	Lieutenant	Police Department
Larry Otos	Parks & Recreation Director	Parks & Recreation Department
James Weppler	Operations Supervisor	Parks & Recreation Department

 Table 7.4.1: Natural Hazard Mitigation Committee

The public will continue to be involved in the mitigation process by educating them on flood insurance, flood safety and other mitigation activities to help reduce or eliminate the risk of loss of life and property.

The public will continue to be involved in the mitigation process by educating them on flood insurance, flood safety and other mitigation activities to help reduce or eliminate the risk of loss of life and property.

The following adopted documents are reviewed by the City Natural Hazard Planning Committee:

- Existing Natural Hazards Mitigation Plan
- City's Comprehensive Plan: Land Use Element (Chapter 2), Housing Element (Chapter 3), Parks, Recreation and Open Space Plan (Chapter 4), Transportation Element (Chapter 6), and the Capital Facilities, Public Services and Utilities Element (Chapter 7)
- City's Capital Facilities Plans
- City's mapping and inventory of utilities, critical areas, natural features, land use, transportation and housing

This committee also reviews the following:

- Recent Hazard Event
- Physical conditions
- Response Protocols
- Mitigation Strategies

Since the 2008 update the City has been proactive in educating the public about different natural hazards; in particular, flooding. To-date City staff has distributed notices on flood safety that were mailed to all City residents with their utility bills, the City has had flood videos produced and aired on the City's local television station, TV 10, handouts and brochures have been created and distributed, and City staff have made presentations to realtor groups on flood risks and flood certification processes.

The following document has also been prepared since the 2008 process:

- 1. City of Mount Vernon Emergency Plan, prepared by the Fire Department, Revised April 2014. Included as part of this Emergency Plan the City Fire Department also has assembled a Flood Season Preparation Plan.
- 2. The City's Public Works Department has prepared a Draft Levee operation & Maintenance Plan

These plans are incorporated into this document by reference, and are attached labeled as Appendices A, B and C.

In addition to the items outlined above the City has a number of physical projects that are planned, are in the process of being constructed, or have been completed. Please see Section 5 for additional details. Sections 4 and 5 contain exhaustive lists of the Goals, Policies,

Objectives along with development regulations many of which are new, or were updated following the 2008 Plan adoption.

The process the City of Mount Vernon will use to incorporate the mitigation strategy and other information contained in the plan into other planning processes/mechanisms when appropriate are listed below:

- Mount Vernon City Council will adopt the Skagit County Natural Hazard Mitigation Plan – anticipated public hearing in the Fall of 2014.
- Following formal adoption of the Plan, on an annual basis City Departments participate in the Capital Facilities Plan where they can prioritize projects based on the Goals, Objectives and Policies, a good part of which are based on abating natural hazards.

Skagit County and each of the municipalities were involved in the plan development process through regular plan development meetings with the planning committee and regularly scheduled Skagit Emergency Management Council meetings. In addition, each of these jurisdictions as well as each of the participating Indian Tribes participated in reviewing and commenting on the final draft of the plan. The development of this plan has been beneficial to the citizens of Skagit County if just for the fact that such a large number of various entities have come together to accomplish a common goal.

To involve the public in the planning process, the Skagit Natural Hazards Mitigation Steering Committee advertised and conducted a total of five (5) public meetings held in conjunction with the Skagit Natural Hazards Mitigation Planning Committee including citizens and stakeholders to solicit information and comments from the citizens of Skagit County to better involve them in the plan development process. With the dates of these meetings listed below: January 20, 2014, Public Meeting

- March 20, 2014, Public Meeting
- April 29, 2014, Public Meeting
- May 20, 2014, Public Meeting

There is one (1) additional public meeting planned in 2014 as part of the public participation process.

The Mount Vernon City Council will be presented with a copy of this plan and staff will request that it be adopted by a resolution.

SECTION 7.5: EVALUATE AND CHANGE AS NECESSARY

As outlined above, the City's Natural Hazard Mitigation Plan is reviewed on a semi-annual basis by a committee that has been formed due, in large part, to their specific specialized knowledge of an array of natural hazards and mitigation strategies. On an annual basis the City is part of the Skagit Natural Hazards Mitigation Planning Committee that completes an annual review of the Hazard Mitigation Plan each July. The County's Department of Emergency Management coordinates this annual review that the City is part of.

The City reviews and updates its Comprehensive Plan on a yearly basis; and every eight (8) years completes a major overhaul of this document. The City also actively participates in the five (5) year update to Skagit County's Natural Hazard Mitigation Plan.

If changes in policy, procedure, or rules/regulations are necessary at the City level those changes are made to ensure that the City is operating within the best possible framework to mitigate disasters.

REFERENCES - ENDNOTES

ⁱ Sources for the historical information include:

- 1. Mount Vernon Comprehensive Plan, Background Analysis. Mount Vernon, WA; 1998
- 2. John Graham and Company. Mount Vernon Comprehensive Plan, History. Mount Vernon, WA; 1960
- 3. Dick Fallis. Walking Tour of Historic Mount Vernon, 'The Enterprising Town of Mount Vernon. Mount Vernon, WA; 1986.
- Noel V. Bourasaw. <u>Skagit River Journal, Jasper Gates: Mount Vernon Pioneer and the related Kimble and Bozarth families</u>. Document accessed via website on August 28, 2012: <u>www.stumpranchonline.com/skagitjournal</u>, website states that article was posted January 9, 2002 and updated December 15, 2004
- ⁱⁱ "Climatography of the United States NO. 81" National Oceanic and Atmospheric Administration. June 2011. Retrieved July 2014.

^{III} Mount Vernon, Washington, Draft EIS for Critical Area Code Update. November 2006.

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^v Sources for the demographic information include:

- 1. U.S. Census Bureau. (2010). Profile of General Population and Housing Characteristics: 2010. Retrieved from http://www.census.gov/prod/cen2010/doc/dpsf.pdf
- 2. U.S. Census Bureau. (2014). Selected Economic Characteristics, 2008 2012 American Community Survey 5-Year Estimates.
- 3. U.S. Census Bureau. (2014). Selected Housing Characteristics, 2008 2012 American Community Survey 5-Year Estimates.
- 4. Office of Financial Management. (2013). April 1, 2013 Population of Cities, Towns and Counties Used for Allocation of Selected State Revenues State of Washington.
- 5. City of Mount Vernon. (2014). Building Permit Reports from 2010 to 2014. Community & Economic Development Department.

^{vi} Sources for the demographic information include:

- 1. U.S. Census Bureau. (2010). Profile of General Population and Housing Characteristics: 2010. Retrieved from http://www.census.gov/prod/cen2010/doc/dpsf.pdf
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- 2. U.S. Census Bureau. (2014). Selected Economic Characteristics, 2008 2012 American Community Survey 5-Year Estimates.
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- 4. City of Mount Vernon. (2014). Building Permit Reports from 2010 to 2014. Community & Economic Development Department.

viii Sources for the demographic information include:

- 1. U.S. Census Bureau. (2010). Profile of General Population and Housing Characteristics: 2010. Retrieved from http://www.census.gov/prod/cen2010/doc/dpsf.pdf
- 2. U.S. Census Bureau. (2014). Selected Economic Characteristics, 2008 2012 American Community Survey 5-Year Estimates.
- 3. U.S. Census Bureau. (2014). Selected Housing Characteristics, 2008 2012 American Community Survey 5-Year Estimates.
- 4. City of Mount Vernon. (2014). Building Permit Reports from 2010 to 2014. Community & Economic Development Department.

^{ix} BERK Consulting. (2014). Skagit County Growth Allocations Methods Summary. Unpublished raw data.

^x City of Mount Vernon, WA. (2006). City of Mount Vernon Comprehensive Plan.

^{xi} Sources for the Hazard information include:

- 1. Washington Military Department, Emergency Management Division. (2013). Washington State Enhanced Hazard Mitigation Plan. Retrieved from: <u>http://www.emd.wa.gov/plans/washington_state_hazard_mitigation_plan.shtml</u> in June of 2014.
- 2. Skagit County. (2008). Skagit County Natural Hazards Mitigation Plan. Retrieved from: <u>http://www.skagitcounty.net/EmergencyManagement/Documents/2008HazPlanFinal/Preceeding%20Final%20documents/</u> <u>1%20Hazard%20Mitigation%20Plan%20Cover%20Sheet.pdf</u> in June of 2014.

^{xii} Sources for the Hazard information include:

- 1. Washington Military Department, Emergency Management Division. (2013). Washington State Enhanced Hazard Mitigation Plan. Retrieved from: <u>http://www.emd.wa.gov/plans/washington_state_hazard_mitigation_plan.shtml</u> in June of 2014.
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xⁱⁱⁱ Washington Military Department, Emergency Management Division. (2013). Washington State Enhanced Hazard Mitigation Plan. Retrieved from: <u>http://www.emd.wa.gov/plans/washington_state_hazard_mitigation_plan.shtml</u> in June of 2014.

x^{iv} Johnson, S.Y., Blakely, R.J., and Brocher, T.M., compilers, 2001, Fault number 574, Devils Mountain fault, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/hazards/qfaults, accessed July 2014.

^{xv} Map: Seismic Hazard Map for the Pacific Northwest. Source: U.S. Department of the Interior/U.S. Geological Survey URL: <u>http://earthquake.usgs.gov/regional/pacnw/hazmap/</u>

^{xvi} Sources for the Hazard information include:

- 1. Washington Military Department, Emergency Management Division. (2013). Washington State Enhanced Hazard Mitigation Plan. Retrieved from: <u>http://www.emd.wa.gov/plans/washington_state_hazard_mitigation_plan.shtml</u> in June of 2014.
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- 4. Stewart, J.E., Bodhaine, G.L. (1961). Floods in the Skagit River Basin Washington (Prepared for the U.S. Department of the Interior, Geological Survey Water Supply Paper 1527). Washington: United States Government Printing Office.

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CITY OF SEDRO-WOOLLEY

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CITY OF SEDRO-WOOLLEY

INTRODUCTION

The City of Sedro-Woolley, in partnership with other local governments and tribes, has been an active participant in the planning process to develop the Skagit County Natural Hazards Mitigation Plan.

The City of Sedro-Woolley's portion of the plan reflects committee contributions from the Building, Planning, Engineering, Public Works, and Finance departments. The Planning Department acted as the lead entity. The Planning Director reviewed the City of Sedro-Woolley portion of the Skagit County Natural Hazards Mitigation Plan in its entirety and forwarded the appropriate portions of the plan to the department head responsible for that section for recommendations and revisions.

Each department head reviewed the their relevant section to consider the vulnerabilities, risks, and impacts posed by the natural hazards identified in the Skagit County Natural Hazards Mitigation Plan. Each department head provided amendments based on changes to city infrastructure, population, development trends and codes since the last update to the Plan in 2008. Upon review of Sedro-Woolley's portion of the Skagit County Natural Hazards Mitigation Plan and relevant sections of the Sedro-Woolley Municipal Code and Comprehensive Plan it was determined that the City's mitigation goals and strategies have remained valid and no new priority projects have been identified since the 2008 plan was adopted. After collecting the revised information, the Planning Director compiled and synthesized the appropriate contributions into the City of Sedro-Woolley portion of the 2014 Skagit County Natural Hazards Mitigation Plan.

The Building, Planning, Engineering, Public Works, and Finance departments have created an overall profile of the City of Sedro-Woolley based on size, population, growth trends, economic base and current/future predominant land uses. From this profile, City of Sedro-Woolley was segmented into 4 distinct "neighborhoods" based on geography, land use, and hazard risk elements that are specific to each. The use of these neighborhood profiles has allowed for the development of area-specific risk assessments and has thereby promoted efficient mitigation planning.

The amendments were reviewed in a public forum as part of the multijurisdictional planning process described in the SECTION I of the Skagit County Natural Hazards Mitigation Plan. Upon completion of the draft updates to the Skagit County Natural Hazards Mitigation Plan, the Sedro-Woolley City Council will pass a resolution adopting the 2014 Skagit County Natural Hazards Mitigation Plan as the official natural hazards mitigation plan for the City of Sedro-Woolley. After adoption of the 2014 Skagit County Natural Hazard Mitigation Plan, the plan shall be reviewed and updated in its entirety again under a similar process every five years under the direction of the Skagit County Department of Emergency Management. Throughout the 2014 update, the public was encouraged to participate in the planning process during meetings and comment periods; public participation will continue to be encouraged in future updates to the Plan. The Planning Department will annually monitor and evaluate the City of Sedro-Woolley section of the Plan and the status of mitigation measures (as needed) to insure consistency with the Plan.

City of Sedro-Woolley Overview:

Contact Information:	John Coleman, Planning Director City of Sedro-Woolley 325 Metcalf Street Sedro Woolley, WA 98284 Telephone: (360) 855-0771
Population of Jurisdiction:	10,610 per April 1, 2014 Washington Sate Office of Financial Management Estimates
Estimated Geographical Size:	4.16 square miles
Principal Economic Base:	Retail and Commercial
Economic Characteristic:	Economically disadvantaged

The three neighborhoods are defined as follows:

- The Residential North Neighborhood is defined according to Land Use/Zoning regulations and is predominantly residential housing. This neighborhood is bordered to the south by Cook Rd. and SR 20.
- The Residential South Neighborhood is defined according to Land Use/Zoning regulations and is predominantly residential housing. This neighborhood is bordered to the north by Cook Rd. and SR 20.
- 3) The Central Commercial/Industrial Neighborhood is defined according to Land Use/Zoning regulations and is predominantly commercial and industrial. This neighborhood encompasses the central area within the city bordered by the north and south residential neighborhoods, and includes the SW arm containing United General Hospital.
- 4) The Parks and Open Space Neighborhood is defined as publicly owned properties used for public facilities, parks, schools and open space.

The City of Sedro-Woolley, because of geographical, geological and topographical diversities, is subject to a wide variety of hazards. This document

is intended to identify the types of hazards that pose a high degree of risk of occurrence, and the mitigation measures that are currently in place to reduce or mitigate loss to health, life, property, and the environment.

The City of Sedro-Woolley has adopted the 2012 edition of the following buildingrelated codes: International Building Code (IBC); International Residential Code (IRC); International Fire Code; International Mechanical Code; International Fuel Gas Code; International Property Maintenance Code; International Existing Building Code; Uniform Plumbing Code; International Energy Conservation Code; and the Washington State Ventilation and Indoor Air Quality Code [SWMC 15.04.020]. The purpose of these codes is to provide minimum standards to safeguard life and limb, health, property and public welfare. In addition to the general standards for construction, the Building Code provides for geographically specific requirements for seismic design, high wind design and high snow load design. The Building Code also includes construction requirements for construction in a flood plain.

The City of Sedro-Woolley adopted a revised Flood Damage Prevention Ordinance [SWMC 17.66] in 2004. The purpose of this ordinance is to promote public, health, safety and general welfare and minimize public and private losses due to flood conditions in specific areas by provisions designed; To protect human life and health; To minimize expenditure of public money and costly flood control projects; To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; To minimize prolonged business interruptions; To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard; To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas; To ensure that potential buyers are notified that property is in an area of special flood hazard; and To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions [SWMC17.66.020].

The City of Sedro-Woolley Critical Areas Ordinance [Chapter 17.65 SWMC] addresses regulations for flood hazard areas and geologically hazardous areas, as well as wetlands, critical aquifer recharge areas and fish and wildlife habitat conservation areas. Within this ordinance are requirements and restrictions relating to flood-prone areas, steep, unstable or otherwise hazardous slopes which could impact human safety during flood, earthquake and sliding events and as a result ongoing erosion. The purpose of this portion of the Critical Areas Ordinance is to safeguard citizens, property and resources through identification of hazardous areas, requirements for mitigation through engineered design and construction methods; and, when design and construction methods cannot reduce risks to acceptable levels, to prohibit building and construction.

Hazard Mitigation analyses conducted by City of Sedro-Woolley staff was based on the best currently available information and data regarding the characteristics of the neighborhoods identified, the natural hazards that threaten the people, property, and environment of these neighborhoods as well as the impacts these neighborhoods have suffered in past disasters. This information includes the following:

- State Office of Financial Management population estimates, April 2014.
- Assessor tax records.
- FEMA Flood Insurance Rate Maps.
- Skagit County GIS data of various types.
- Department of Natural Resources data.
- US Geological Survey elevation and slope data.
- Natural Resource Conservation Soil Data.
- Washington State Geological Survey Geological Data.
- City of Sedro-Woolley native data sets.
- Sedro-Woolley and Skagit County GIS data sets.
- Other information as available.

In some cases the experience, knowledge and judgment of local officials representing City of Sedro-Woolley government were used in the planning, including assumptions and approximations that were believed to be reasonable. In addition, straightforward, simplified technical analyses were used for tasks such as estimating property values, determining the size of populations affected, and so forth. The reliance on the judgment of knowledgeable officials and simplified analyses is considered acceptable at this stage to allow the participating organizations to complete the tasks needed to develop this multijurisdictional natural hazards mitigation plan. As the planning continues in future years, or at the time when a proposed mitigation initiative is intended to be funded and/or implemented, the participating organizations recognize that additional information and analyses may be required.

National Flood Insurance Program

The City of Sedro-Woolley participates in the National Flood Insurance Program (NFIP). The identifying, analyzing, and prioritizing of mitigation measures is based on (and will continue to be based on) continued participation and compliance with the National Flood Insurance Program.

Repetitive Loss Properties

Several properties are located within the floodway and 100 year floodplain as identified in the 1989 F.E.M.A. Flood Insurance Rate Map. These properties are located at the southern most border of the City, next to the Skagit River and in the "arm" of Sedro-Woolley that extends southwest to United General Hospital. However, there are no structures located on these properties that are classified

as repetitive loss properties. In 2007, the city purchased and demolished the last remaining residence that was in the floodway.

Incorporating Mitigation Into Other Planning Mechanisms

The City of Sedro-Woolley is governed by the Mayor and City Council members that set policy and oversee the various city departments. The process by which the City will incorporate the requirements of the mitigation plan and other information contained in the Skagit County Natural Hazards Mitigation Plan into other planning mechanisms is as follows:

- 1. Adoption of the plan by the Mayor and City Council.
- 2. Inclusion into Comprehensive Plan, when appropriate.
- 3. Inclusion into other planning mechanisms subordinate to the Comprehensive Plan, when appropriate.

Amendments to the Comprehensive Plan are made following an established public review process defined in the Washington State Growth Management Act.

Current Hazard Mitigation Codes/Plans/Ordinances cited below:

- Comprehensive Land Use Plan
- Adopted Land Use/Zoning Code including the Critical Areas Ordinance
- Adopted Fire or Life Safety Code
- Adopted Building Code (2012 International Building/Residential Code)

City of Sedro-Woolley 2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted + Health and Safety Consequences + Property Damage + Environmental Damage + Economic Disruption multiplied by Probability of Occurrence). Has been updated for 2014 based on changing conditions and recent events.

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Earthquake	4	2	2	1	1	2	20
Flooding	1	1	1	1	1	5	25
High Winds	4	1	2	1	1	5	45
Landslide/Erosion	1	1	1	1	1	1	5
Storm Surge/Tsunami	0	0	0	0	0	1	0
Subsidence, expansive Soils	1	0	1	1	1	1	4
Urban Fire	1	1	1	1	2	2	12
Wildfire	1	1	2	1	1	2	12
Winter Storm	4	1	1	0	1	2	14
Volcanic Activity	4	1	1	1	1	2	16

Total Jurisdictional Risk Estimation Score:

153	

Area Impacted:	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%	
Health & Safety:	0=No impact	1=Few injuries	2=Few fatalities, mar	ny injuries	3=Numerous fataliti	es
Property:	0=No impact	1=Few destroyed of	or damaged	2=Few destroyed,	many damaged or Fe	w damaged, many destroyed 3=Many properties destroyed or damaged
Environment:	0=Little or No impact	1=Short term	2=Long term	3=No recovery		
Economic:	0=No impact	1=Low costs	2=High direct cost ar	nd Low indirect or Lo	ow direct and High ind	irect 3=High Direct and Indirect Cost
Probability:	1=Unknown but rare	2=Unknown but an	ticipated	3= <100 vear	4=<25 vear	5=Once a vear or more

Hazard Type	Mitigation
FLOODING A small portion of the City of Sedro-Woolley is located within the 100-year floodplain, while a	The City's Comprehensive Plan Goals and Policies and the Skagit County Countywide Planning Policies (CPPs) directly address flood hazard reduction:
moderate amount is located within the 500 year floodplain. Flooding events in 1990, 1995, 2003 and 2006 have come close to causing significant damage to structures and	Skagit County and Cities and Towns, in cooperation with appropriate local, state and Federal agencies, shall develop and implement flood hazard reduction programs, consistent with and supportive of the Corps Feasibility Study. (CPP 10.13)
property within the City.	The purpose of the Floodplain Management chapter (SWMC 17.66) is to protect human life and property; minimize the expenditure of public money; ensure that those who occupy the areas of special flood hazard assume responsibility for their actions and maintain the city's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer.
	Skagit County and Cities and Towns shall work together to provide ongoing public education about flooding in a coordinated and consistent program, and shall adopt a flood hazard reduction plan, that works together with the natural and beneficial functions of floodplains. (CPP 10.15)
	SW Comp Plan Policy LU 4.1: Promote open space, recreation, and agriculture as the highest and best use of land in flood-prone areas.
	Policy LU 4.2: Implement a community flood- preparedness program.
	Under requirements of the state Growth Management Act, the Comprehensive Plan also identifies, designates, and protects wetlands, aquifer recharge areas, and frequently flooded areas. This is done through numerous education, incentive, and protection and conservation measures contained in Comprehensive Plan Critical and Sensitive Areas (CSA) Goals and Policies and Development Regulations (SWMC 17.65 & SWMC 17.66).
	Policy LU16.6: Develop funding mechanisms to permit the City acquisition of sensitive/open space

areas for the public benefit. Integrate public park and/or trail systems with natural areas where appropriate, but ensure that such uses do not degrade the natural function of these areas.
Policy LU17.12: Preserve natural stream environments along the Skagit River and Hansen Creek. Restrict development within two hundred (200) feet of both streams, in compliance with the Shoreline Management Act.
The purpose of the Floodplain Management is to promote public, health, safety and general welfare and minimize public and private losses due to flood conditions in specific areas by provisions designed; To protect human life and health; To minimize expenditure of public money and costly flood control projects; To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; To minimize prolonged business interruptions; To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard; To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas; To ensure that potential buyers are notified that property is in an area of special flood hazard; and To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions (SWMC17.66.020).
In all areas of special flood hazard where base flood elevation data has been provided as set forth in SCC 14.34.050 or 14.34.120(2), the provisions in SCC 14.34.160 are required in addition to the general regulations per SCC 14.34.150. (SCC 14.34.160)
New construction and substantial improvement of any residential structure shall have the finished floor elevation of the lowest floor elevated 1 foot or more above the base flood elevation. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited from occupancy and shall be designed to automatically equalize hydrostatic flood forces on

exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect licensed in the State of Washington or must meet or exceed the following minimum criteria: (i) A minimum of 2 openings having a total net area of not less than 1 square inch for every square foot of enclosed area subject to flooding shall be provided. (ii) The bottom of all openings shall be no higher than 1 foot above finished grade. (iii) Openings may be equipped with screens, louvers, or other coverings or devices; provided, that they permit the automatic entry and exit of floodwaters.

All new or substantially improved manufactured homes to be placed or substantially improved within flood hazard zones where base flood elevation data is provided shall be elevated on a permanent foundation such that finished floor elevation of the lowest floor of the manufactured home is 1 foot or more above the base flood elevation and be securely anchored to an adequately anchored foundation system in accordance with the provisions of SCC 14.34.150(6)(b).

New construction and substantial improvements of any commercial, industrial or other nonresidential use structure shall either have the finished floor elevation of the lowest floor elevated 1 foot or more above the base flood elevation or, together with attendant utility and sanitary facilities, shall: (i) Be floodproofed so that below 1 foot above the base flood elevation the structure is watertight with walls substantially impermeable to the passage of water. (ii) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. (iii) Be certified by a registered professional engineer or architect licensed in the State of Washington that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this Subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in SCC 14.34.140. (iv) Nonresidential use structures that are elevated, not floodproofed, must meet the standards for space

below the lowest floor as set forth in Subsection (1) of this Section. (v) Applicants floodproofing nonresidential use buildings shall be notified that flood insurance premiums will be based on rates that are 1 foot below the floodproofed level (e.g., a building constructed to the base flood level will be rated as 1 foot below that level).
Wet Floodproofing Standards for Agricultural and Utility Use Structures. New construction or substantial improvements of any agricultural building, as defined in Chapter 14.04 SCC (Definitions), or utility use structure, when not meeting floodproofing or elevation requirements of Subsection (3) of this Section shall: (i) Not be used for human habitation. (ii) Be anchored to prevent flotation, collapse or lateral movement. (iii) Use flood-resistant materials below the BFE. (iv) Be limited to parking and limited storage. (v) Have a low potential for structural damage from inundation, scouring, velocities or debris impact. (vi) Be designed and oriented to automatically allow the free passage of floodwater through the structure in a manner affording minimum damage to the structure or its contents. (vii) All electrical and mechanical equipment permanently affixed to the structure is elevated 1 foot above base flood elevation; or be made waterproof by accepted systems to the appropriate code. (viii) When valuation of the structure exceeds \$50,000, the provisions in Subsections (4)(a)(i), (ii) and (iii) of this Section shall be verified by a currently registered professional engineer or architect licensed in the State of Washington. The valuation used shall be that currently used by the Administrative Official for determining building permit fees.
Critical facilities should be afforded additional flood protection due to their nature. Construction of new critical facilities should be, to the extent possible, located outside the limits of the 100-year floodplain as identified on the County's FIRM. Construction of new critical facilities may be permissible within the 100- year frequency floodplain if no feasible alternative site is available. When allowed, critical facilities constructed within the 100-year frequency floodplain shall have the lowest floor elevated to 3 or more feet above the level of the 100-year frequency flood.

	 Floodproofing and sealing measures shall be taken to ensure that toxic substances will not be displaced by or released into floodwaters. Access routes elevated to or above the level of the 100-year frequency flood shall be provided to all critical facilities to the extent possible. Through federal and state grants, a significant number of repetitive loss properties, in areas prone to flooding, have been purchased by the City or County and the buildings either demolished or removed.
EARTHQUAKE The City of Sedro-Woolley is located in seismic zone D-1 as determined by the International Building Code. Damage and loss due to earthquake was experienced as recently as the 2001 Nisqually earthquake.	All new buildings not meeting the strict prescriptive requirements of the IBC or IRC are required to have their structural elements designed by a professional engineer or registered architect. Such design is required to include seismic analysis of the building in addition to wind, gravity and other forces. Building permits are issued for repair of seismically damaged buildings, normally based on a site inspection by the field inspection staff. All repair construction must meet the current building code requirements for seismic design. In areas of the County with steep or unstable slopes, or with soil prone to liquefaction, geotechnical reports, prepared by a professional engineer, are required as part of a building permit application. Such reports must include an analysis of the effects of a seismic event.
HIGH WINDS	SWMC 15.04.020. The 2012 International Building
The City of Sedro-Woolley is located in a borderline high wind area. The design wind speed for City of Sedro- Woolley is 85 mph. The entire city is also classified as exposure B (2012 IBC/IRC), where forests and hills provide some protection from winds.	All new buildings not meeting the strict prescriptive requirements of the building code for adequate wall bracing, are required to have their structural elements designed by a professional engineer or registered architect utilizing the wind design requirements of the building code.
LANDSLIDE	Mitigation: Article IV, Chapter 17.65 SWMC includes the standards for geologically hazardous areas. Geologically hazardous areas include erosion

Portions of City of Sedro- Woolley are prone to landslide due to steep slopes, soil erosion, fractured rock faces, etc.	hazards, landslide hazards, mine hazards, volcanic hazards and seismic hazards, and shall be designated consistent with the definitions provided in WAC 365-190-080(4). Geologically hazardous areas shall be classified as "known or suspected risk," or "unknown risk."
	A site visit shall be conducted by the director to determine whether: (1) "Areas of Known or Suspected Risk" identified below are or may be present within two hundred feet of the project or activity; (2) the proposed project or activity is or may be within a distance from the base of an adjacent landslide hazard area equal to the vertical relief of such hazard area; (3) the proposed activity may result in or contribute to an increase in hazard; and (4) whether the project or hazard areas pose a risk to life, property, or other critical areas on or off the project area sufficient to require a site assessment.
	Site Visit Determination. The director shall make a determination using the following progressive order: 1. No Site Assessment. Where the director determines that the project or activity area has no potential for impacting adjacent ownership and property, other types of critical areas, public property (such as roads and other facilities) or living quarters of any kind, including any existing or proposed offsite, the director shall not require additional site assessments prior to approval under the provisions of this chapter. 2. Site Assessment Required. If the director determines during the site visit described in SWMC
	Section 17.65.410 that the proposed development activity falls within two hundred feet of an "Area of Known or Suspected Risk" and the geologic condition may pose a risk to life and property on or off the project area, then a geologically hazardous area site assessment of the project area by a qualified professional as described in subsection (B)(2) of this section shall be required as part of the complete development permit application. B. Geologically Hazardous Area Site Assessment. When required by the director, a site assessment report shall be prepared by a qualified professional. Portions of the report relating to recommended

design or mitigation shall be prepared under supervision of a licensed professional engineer. A qualified professional shall mean an engineer, licensed in the state of Washington, with training and experience analyzing geologic, hydrologic, and groundwater flow systems in Washington State; or by a geologist who earns his or her livelihood from the field of geology and/or geotechnical analysis, with training and experience analyzing geologic, hydrologic and groundwater flow systems in Washington State, who has received a relevant degree from an accredited four-year institution of higher education.

The geologically hazardous area site assessment report shall classify the type of hazard in accordance with SWMC Sections 17.65.400 and 17.65.410. The site assessment report shall include the following as appropriate:

1. A site plan must be prepared in accordance with the development permit requirements. The site plan shall depict the height of slope, slope gradient and cross section of the site. The site plan shall indicate the location of all existing structures, proposed structures and any significant known geologic features on the subject site. The site plan shall also include the location of springs, seeps, or other surface expressions of groundwater. The site plan shall also depict any evidence of surface or stormwater runoff;

2. A detailed description of the project, its relationship to potential geologic hazard(s), and its potential impact upon the hazard area(s), the subject property and adjacent properties. The description shall make a determination if a geologically hazardous area(s), as described in SWMC Section 17.65.020(C)(5), is present on the subject site. The narrative shall include a full discussion of the geologic factors and conditions on the subject site resulting in the qualified professionals conclusions;

3. An assessment of the geologic characteristics and engineering properties of the soils, sediments, and/or rock of the subject property and potentially affected adjacent properties. Soils analysis shall be accomplished in accordance with the Unified Soil Classification System; 4. A description of load intensity including surface and groundwater conditions, public and private sewage disposal systems, fills and excavations and all structural development; 5. An assessment describing the extent and type of vegetative cover to include tree attitude; 6. For Potential Landslide Hazards. Estimate slope stability and the effect construction and placement of structures will have on the slope over the estimated life of the structure. Quantitative analysis of slope stability or slope stability modeling may be required by the director; 7. Additional site assessment standards may be required by the director. C. Site Assessment Conclusions. 1. Where the gualified professional determines that a geologically hazardous condition is not present on the subject site and/or will not occur as a result of the proposed project, will have no potential for impacting adjacent ownership and property, other types of critical areas, public property (such as roads and other facilities) or living guarters of any kind, including any existing or proposed off-site, the director shall not require additional site assessments prior to approval under the provisions of this chapter. The gualified professional shall be required to certify that a geologic hazard is not present on the subject parcel as described in SWMC Section 17.65.020(C)(5). 2. Properties identified by the director and the gualified professional containing geologically hazardous conditions shall require a geologically hazardous area mitigation plan. Critical facilities as defined under SWMC Chapter 14.04 shall not be sited within designated geologically hazardous areas (Exception: volcanic hazard areas). No residential structures shall be located in geologically hazardous areas or their buffers that cannot be fully mitigated. The mitigation plan shall be prepared by a professional engineer or geologist under supervision of a professional engineer and include a discussion on how the project has been designed to avoid and minimize the impacts discussed under Section 17.65.420(B)(2) of this chapter. The plan shall also make a recommendation for the minimum building setback from any bluff or slope edge and/or other

geologic hazard shall be based upon the
geotechnical analysis under Sections 17.65.420(B)(2)
and (B)(3) of this chapter required. Mitigation plans
shall include the location and methods of drainage
locations and methods of erosion control a
vogetation management and/or restaration plan
vegetation management and/or restoration plan
and/or other means for maintaining long-term stability
of geologic hazards. The plan shall also address the
potential impact of mitigation on the hazard area, the
subject property and affected adjacent properties.
The mitigation plan must be approved by the director
and be implemented as a condition of project
approval.
Within designated geologic hazards, mitigation plans
shall address the appropriate items listed below as
required by the site assessment. One or more of the
following mitigation atondards, as required by the
lonowing miligation standards, as required by the
director, shall be included as components of a
mitigation plan pursuant to the requirements of
SWMC Section 17.65.420 (site assessment report).
Other mitigation standards, other than those listed
below, may be required by the director depending on
the geologic hazard and the site conditions.
A. Mitigation Standards.
1. A temporary erosion and sedimentation control plan
prepared in accordance with the requirements of
SWMC Title 15. Buildings and Construction as
amended.
2 A drainage plan for the collection transport
treatment discharge and/or recycle of water in
accordance with the requirements of SWMC Title 15
Buildings and Construction as amonded
2 All proposale involving everyations and placement
3. All proposals involving excavations and placement
of fills shall be subject to structural review under the
appropriate provisions as found in the Uniform
Building Code.
4. Critical facilities shall not be sited within designated
geologically hazardous areas. (Exception: volcanic
hazard areas).
5. Surface drainage shall not be directed across the
face of a landslide hazard (including ravines). If
drainage must be discharged from the bazard area
into adjacent waters, it shall be collected above the
have a by a bound of the sector by tract line drain
nazaru anu uirecteu to the water by tight line drain
and provided with an energy dissipating device at the

point of discharge.
6. All infiltration systems such as, stormwater
detention and retention facilities, and curtain drains
utilizing buried pipe or French drain, are prohibited in
geologically hazardous areas and their buffers unless
a site assessment report indicates such facilities or
systems will not affect slope stability and the systems
are designed by a licensed civil engineer. The
and designed by a licensed civil engineer. The
facilities are installed as designed
A Vesetation Removal and Replanting Removal of
7. Vegetation Removal and Replanting. Removal of
vegetation in landslide nazard, erosion nazard and
coastal bluff nazard areas shall be minimized. Any
replanting that occurs shall consist of trees, shrubs,
and ground cover that is compatible with the existing
surrounding vegetation, meets the objectives of
erosion prevention and site stabilization, and does not
require permanent irrigation for long-term survival.
8. A minimum buffer with a width of thirty feet shall be
established from the top, toe and all edges of all
landslide hazardous areas. Existing native vegetation
shall be maintained in accordance with mitigation
recommendations within the buffer area. Any
modifications to the buffer requirement shall be based
on the report and recommendations of the
professional geologist under supervision of a licensed
professional engineer. The buffer may be reduced to
a minimum of ten feet when, supported by a
geotechnical report, and the applicant demonstrates
to the director that the reduction will adequately
protect the proposed development, adjacent
developments and uses and the subject critical area.
The buffer may be increased by the director for
development adjacent to a ravine which is designated
as unstable on the Coastal Zone Atlas. Washington.
Volume Two Skagit County (1978) or where the
director determines a larger buffer is necessary to
prevent risk of damage to proposed and existing
development (as in the case where the area
potentially impacted by a landslide exceeds thirty
feet). Normal nondestructive pruning and trimming of
vegetation for maintenance purposes or thinning of
limbs of individual trees to provide a view corridor
shall not be subject to these buffer requirements
9 Seismic Hazard Areas Structural development
nronosals shall meet all annlicable provisions of the
יוטעטטט אין איזער איז

International Building Code
The director shall evaluate documentation submitted pursuant to SWMC Section 17.65.420(B)(2) (site assessment report) and condition permit approvals to minimize the risk on both the subject property and affected adjacent properties. All conditions on approvals shall be based on known, available, and
treatment. Evaluation of geotechnical reports may also constitute grounds for denial of the proposal. B. Alterations of the buffer and/or geologically
hazardous area. Alterations of the buffer and/or geologically hazardous area may occur for development meeting the following criteria:
1. No reasonable alternative exists; and
2. A site assessment report is submitted and certifies that:
a. There is a minimal hazard as proven by evidence of no landslide activity in the past in the vicinity of the
proposed development and a qualitative analysis of slope stability indicates no significant risk to the
development proposal and adjacent properties; or the geologically hazardous area can be modified or the
development proposal can be designed so that the hazard is eliminated or mitigated so that the site is as safe as a site without a geologically hazardous area
b. The development will not significantly increase surface water discharge or sedimentation to adjacent properties beyond predevelopment conditions
c. The development will not decrease slope stability on adjacent properties, and
d. Such alterations will not adversely impact other critical areas.
C. Noncompliance and Failed Mitigation Plans.1. Projects found to be in noncompliance with the mitigation conditions issued as part of the
development approval are subject to enforcement actions necessary to bring the development into compliance with this chapter.
2. Mitigation plans which do not fulfill the performance required based on the site assessment/geotechnical
this chapter shall be revised and the subject
mitigation plan.

	3. Mitigation Plan Certification. Upon completion of the project, a qualified professional shall certify that the mitigation plan has been properly implemented. The certification shall be required prior to final approval of the project by the director.
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Mitigation Goals

In addition to the mitigation goals identified in Section III of this plan, the City of Sedro-Woolley has identified the following jurisdiction-specific mitigation goals:

- Provide for an increased level of safety to the citizens of Sedro-Woolley.
- Provide for an increased level of protection for public infrastructure.
- Work with other neighboring jurisdictions to add additional flow capacity to the Skagit River in order to minimize catastrophic flooding losses

The mitigation goals and strategies and other information contained in the plan have been incorporated into the Critical Areas ordinance, other sections of the Sedro-Woolley Municipal Code and the Comprehensive Plan. See preceding table.

Mitigation Projects

Below is a list of possible mitigation projects that need to be performed in the City of Sedro-Woolley and projects that have been completed since the 2008 Hazard Mitigation Plan. Progress that has been made since the 2008 Hazard Mitigation Plan has also been noted. The following list generally reflects the potential mitigation projects identified during the 2003 Natural Hazard Mitigation Plan development process less the projects that have been completed. The City's mitigation objectives have remained consistent and no new priority projects have since been identified. Funding and other resources, as available, shall be applied to the already identified potential mitigation projects. Prioritization was based on the criteria established in Section III of the Skagit County Natural Hazard Mitigation Plan.

FLOODING

Wastewater Treatment Plant

The sewer treatment plant is located within the 100-year floodplain, and could be disabled if a large flooding event or lahar were to occur. If it were to become inoperable then a serious human health hazard would exist. Construct a ring dike, flood wall or otherwise mitigate the wastewater treatment plant against a

75-year flood event or volcanic lahars. Dike improvements were made since 2003 to armor the existing dike.

- Responsible Entity Sedro-Woolley Public Works Dept.
- Funding Source Sewer funds, other local sources, and state and federal grants
- No funding has been secured to protect the plant from a more severe flooding event or lahar.

Relocate Public Works Shops and Offices

The Street Department shop and offices are located in the floodplain. This should be mitigated in place or moved out of the floodplain.

- Responsible Entity Sedro-Woolley Public Works Dept.
- Funding Source Local sources, and state and federal grants
- Funding not yet available to move the Streets Department

Riverfront Park Landfill Site

Riverfront Park, located at the very southern end of the city limits, is an old abandoned landfill. When flooded, this site has been known to have garbage enter the floodwaters. This site should be excavated and the materials disposed of properly, or mitigated in place.

- Responsible Entity Sedro-Woolley Public Works Dept.
- Funding Source Local sources, and state and federal grants
- No funding yet available

Brickyard Creek Flood Storage and Fish Enhancement

Brickyard Creek has had a significant amount of its floodwater storage capacity eliminated due to development. With very little storage capacity left, any discharges into the stream system immediately surge downstream. Increasing this storage capacity would help to attenuate stream discharges. The Washington State Fisheries Department has identified a potential site for additional flood storage on property south of Jones Road and west of the railroad, known as the Belles property. Transforming this site would help minimize local flooding. This enhancement project would serve multiple functions: flood storage, salmon rearing, wetlands restoration, recreation, and amenities for future adjacent commercial development. A similar project has been identified at a large stretch of Brickyard Creek west of N. Township Street, south of Sapp Road and east of Brickyard Street. The City is actively pursuing the acquisition of this property and designing stream channel and riparian zone improvements to both enhance flood storage capacity and fish and wildlife habitat. A floodwater storage project as described above was completed on Brickyard Creek west of Fruitdale Road parallel to McGarigile Road in 2010.

- Responsible Entity Sedro-Woolley Public Works Dept.
- Funding Source Local sources, and state and federal grants
- Progress has been made towards completing this project. Funding, staff availability and coordination with outside agencies has delayed its completion.

Alluvial Fan Hazards

Alluvial Fans are known to exist in parts of Skagit County, but there hasn't been an alluvial fan hazard previously identified in Sedro-Woolley. A survey of possible alluvial fan hazards by a Professional Geologist in Sedro-Woolley would help clarify if these hazards exist in Sedro-Woolley or not. Any such properties at risk could then be purchased as a mitigation measure to help reduce future loses.

- Responsible Entity Sedro-Woolley Planning Dept.
- Funding Source Local sources, and state and federal grants
- Timeline Long term (greater than three years after funding is secured)

EARTHQUAKE

Sedro-Woolley City Hall

In 2008 the City relocated its administrative offices into a newly constructed City Hall building at 325 Metcalf Street. City Hall is no longer at risk to earthquake damage. The City Council Chambers within the new City Hall is designed to serve as the city's emergency operations center in the case of a disaster – natural or man-made. There are no longer any anticipated problems that may affect critical facilities as a result of an earthquake event.

Volcano

Lahar Early Warning System

The US Geological Survey has designed a number of systems that automatically detect lahars as they descend neighboring valleys. These systems then automatically trigger various types of early warning systems, such as sirens or telephone based warning systems.

- Responsible Entity Sedro-Woolley Fire Dept.
- Funding Source Local sources, and state and federal grants
- No funding yet available.

COMMUNICATIONS

Community Early Warning System

Could be built to help provide broad community notice for evacuation in the event of flooding, Lahars, Dam Failures, etc. Such an early earning system would typically be a series of sirens that could be triggered in the event the City needed to be evacuated.

- Responsible Entity Sedro-Woolley Fire Dept.
- Funding Source Local sources, and state and federal grants
- No funding yet available.

Telephone Based Early Warning System

A computerized early warning system would automatically dial every telephone number within a specified area, and play a recorded message to whoever picked up the phone. Such a system could be very useful for a variety of natural and man made problems. Skagit County 911 Services recently developed a telephone based early warning system.

- Responsible Entity Sedro-Woolley Fire Dept.
- Funding Source Local sources, and state and federal grants
- No funding yet available.

Tone Radio Based Early Warning System

Tone Radios turn on when triggered by a central transmitter and then information or instructions are announced over the radio. Such a system is currently used for various types of weather radios, for tornados and severe storms hazard areas. A similar system could be put into place for warning of flooding, lahars, and other related natural hazards.

- Responsible Entity Sedro-Woolley Fire Dept.
- Funding Source Local sources, and state and federal grants
- No funding yet available.

Earthquake Early Warning System

Such a system could warn residence of an impending earthquake. Technology doesn't currently exist for such a system, but will likely be possible in the future.

- Responsible Entity Sedro-Woolley Fire Dept.
- Funding Source Local sources, and state and federal grants
- No funding yet available.





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SAMISH INDIAN NATION

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Samish Indian Nation Jurisdiction-Specific Tribal Requirements, Vulnerability Assessment, and Mitigation Initiatives

BACKGROUND

The Samish Indian Nation is the successor to the large and powerful Samish Nation, a signatory to the Treaty of Point Elliott in 1855. The Tribes traditional territory stretches over a wide seven-county region of Northwest Washington. This area, which ranges from the mountain tops of the Cascades westerly along the hills, woodlands, and river deltas, arriving at the far western shores of the San Juan Islands, which provides a backdrop for our history and cultural traditions that remain strong today.

In March of 1958, the Indian Claims Commission (ICC) made two significant findings regarding the Samish Tribe in their efforts to pursue land claims against the federal government for land that was taken by the Treaty of Point Elliot in 1855. The first, regarding the treaty status of the Samish, the ICC held that, "The Samish held Samish Island, Guemes Island, eastern Lopez Island, Cypress Island, and Fidalgo Island." The second finding made by the ICC held that, "The treaty cession includes the whole of the areas alleged by petitioner to have been used and occupied by the Samish Indians in aboriginal times."

In spite of these and other positive findings regarding the legal and political history of the Samish Indian Nation and in spite of the fact the tribe was on the list of federally recognized tribes that was published by the Bureau of Indian Affairs in 1966, Samish's status as a federally recognized Indian tribe was lost when through a clerical error in 1969 we were simply left off the list when the Bureau of Indian Affairs republished it. This is assumed to have been an oversight very similar to the one that again happened to the Samish in the late 1960's when a BIA clerk left them off the list of Federally Recognized Tribes. It took over 26 year's of administrative and federal court proceedings to finally regain recognition for the Samish Indian Nation in April of 1996.

The tribe's assets are located within and around the City of Anacortes, which is situated on Fidalgo Island, accessible by bridge to the mainland. Seattle is 80 miles south, and Vancouver is 90 miles north.

In 1971, the tribe was awarded US \$5,754.96 for lands taken by the Point Elliott Treaty. The judgment deemed that they had exclusively occupied 9,233 acres (37 km²) of land at the time of the treaty.

As of 2014 the Samish has 79 out of 220 total acres in trust, with active Fee to Trust applications on most of the tribe's other properties.

GOVERNMENTAL ORGANIZATION

A seven member Tribal Council elected to oversee the welfare and resources of the Tribe governs the Samish Indian Nation.

ANTICIPATED DEVELOPMENT AND POPULATION TRENDS

The Samish Indian Nation has no reservation at this time, and therefore does not comprise a residential community. It is the long term goal of the Nation to provide housing for its members, once land has been successfully taken into trust status.

CULTURAL USE SITES

The Samish Indian Nation has identified historically and archaeologically significant cultural use sites as part of this planning process. These sites have been documented, and are considered proprietary.

LAND USE

As previous stated, the Tribe does not currently have any reservation lands but anticipates development after lands are established in trust.

PLAN JURISDICTION

Contact Information:

Samish Indian Nation Edie Hill Health & Human Services Director PO Box 217 2918 Commercial Ave. Anacortes, WA 98221 ehill@samishtribe.nsn.us (www.samishtribe.nsn.us)

PROFILE: SAMISH INDIAN NATION

General

Land area: 79 acres (with active Fee to Trust applications, no reservation lands at this time) Land area of park, forest, and/or open space: ---Land area set aside as resource lands: 1,550 Current population: Expected population in 2025: unknown Population of Jurisdiction: approximately 1,550 Total Structure Value: \$3,646,674 Estimated Size of Jurisdiction: 220+ acres (with pending Fee to Trust applications) Economic Characteristic: Economically Disadvantaged

Current Hazard Mitigation Codes/Plans/Ordinances:

- Burn Ban to mitigate wildland fire risk
- Skagit County Natural Hazards Plan

Public Works Infrastructure Summary

Miles of Streets/Road:	0
Number of Bridges:	2
Miles of Sanitary Sewer:	0
Miles of Storm Sewer:	0
Miles of Water Line:	0
Other:	
Other:	

ASSURANCES

The Samish Indian Nation's participation as a jurisdiction in the Skagit County Multi-Jurisdictional Hazard Mitigation Plan (HMP) meets the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000. This includes meeting the requirement that the HMP be adopted by the Tribe. In addition, as required by 44 CFR 13.11(c) and 13.11(d), the Tribe will comply with all applicable Federal statutes and regulations during the periods for which grant funding is received, and will amend the plan whenever necessary to reflect changes in Tribal or Federal laws and statutes.

At the conclusion of the plan update process, and following receipt from FEMA of a notice of pre-adoption approval of the plan, the Tribe will sign a resolution formally re-adopting the updated **Skagit County Natural Hazard Mitigation Plan**. A copy of the resolution, adopted by the Samish Indian Nation (herein referred to as the Tribe), assures FEMA that the Tribe will comply with both of the CFR requirements. The resolution is presented in Appendix A.

PLANNING PROCESS

The Samish Indian Nation was identified as a new jurisdiction as part of the 2008 HMP update. In 2014 the Skagit County Hazard Mitigation Planning team held five planning meetings and five public meetings as part of the update process for the participating jurisdictions. The Samish Indian Nation began attending the planning meetings immediately after notification and attended its first planning meeting on April 17, 2014. The tribe continued to attend all subsequent planning meetings.

During the planning meetings, the Skagit County Hazard Mitigation Planning team lead, Mark Watkinson, reviewed the plan update process, the plan outline, and the plan schedule. The Planning Team also assessed a matrix of hazards addressed in the State HMP and 2008 HMP. Using this information, each committee representative developed a list of new and additional hazards to be addressed in the 2014 HMP.

Each section of the Samish Indian Nation Natural Hazard Mitigation Plan was reviewed and updated by Health and Human Services Director and Emergency Management Team Lead, Edie Hill as well as all members of the Emergency Management Team and Tribal Council, listed below. Emergency Management Team Sam Barr, Natural Resources Leslie Eastwood, General Manager Edie Hill, Health & Human Services Adam Lorio, Education Mitch Markovich, RN, Public Health Stephanie Rice, Human Resources Larry Thomas, Maintenance Sam Thomas, Accounting JR Walters, IT Samish Tribal Council Tom Wooten, Chairman Tim King, Vice-Chair Tamara Rogers, Treasurer Dana Matthews, Secretary Dave Blackinton, At-large Jenna Strand, At-large Gary Hatch, At-large

RISK ASSESSMENT PROCESS, 2014

The hazards were reviewed based on a range of factors, including prior knowledge or perception of the relative risk presented by each hazard, and the ability to mitigate the hazard. The Planning Team determined that nine hazards pose the greatest threat to the county: avalanche, drought, earthquake, fire, flood, land movement, severe storms, tsunami/seiche, volcanic event. Based on the initial county-level screening of hazards, the Samish Indian Nation's representative identified those hazards that were specific to the jurisdiction.

	Should It Be	
Hazard Type	Profiled?	Explanation
Avalanche	No	Samish Indian Nation critical facilities are not located in an area prone to frequent or significant snowfall or steep slopes.
Drought	Yes	Similar to the entire County, Samish Indian Nation is subject to impacts associated with drought: especially those associated with drinking water.
Earthquake	Yes	Samish Indian Nation is subject to impacts associated with earthquakes.
Fire: Wildland/Urban Conflagration	Yes	The terrain, vegetation, and weather conditions are favorable for the ignition and rapid spread of wildland fires. Older wood- frame structures that are clustered close together may also be subject to impacts associated with urban conflagration.
Flood	Yes	Samish Indian Nation is subject to impacts associated with flooding.
Land movement	Yes	Samish Indian Nation is subject to impacts associated with land movement (landslides).
Severe storm	Yes	Samish Indian Nation is subject to impacts associated with severe storms (high winds, tidal surge, and winter storm have been combined under this section of the plan).

Identification and Jurisdiction-Specific Screening of Hazards

Identification and Jurisdiction-Specific Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Tsunami / seiche	Yes	Samish Indian Nation is subject to impacts associated with tsunami.
Volcanic event	Yes	Samish Indian Nation is subject to impacts associated with volcanic events.

NATURAL HAZARD EVENT HISTORY

NATURAL HAZARD EVENTS (1975-PRESENT) THAT HAVE RESULTED IN DECLARED EMERGENCIES				
Type of Event	Date	Total Public Damage		
Nisqually Earthquake	Feb. 2001	minor		

VULNERABILITY ANALYSIS

The Samish Indian Nation reviewed the hazards identified in Section 2 of this plan to assess the vulnerability of the Tribe's assets.

To complete this process, tribal staff reviewed data regarding risk in both FEMA Hazus data and previous 20/20 Mitigation Software that was provided to Skagit County by the Washington State Military Department, Emergency Management Division. The information collected with these forms is included in this portion of the plan.

As part of the vulnerability assessment process, the Samish Indian Nation completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process. Critical facilities identified during the process include: Samish Indian Nation Administration Building, Samish Health & Human Services Building, Samish Dept. of Natural Resources, Tribal Cultural Resources and Archives Department, Samish Longhouse Head Start/Early Learning Center & Elders, Samish Accounting Department, Samish IT Department, Fidalgo Bay RV Park, Deception Pass Bridge, Pass Bridge, Lake Campbell, Weaverling Spit Tidelands.

NATURAL HAZARD VULNERABILITY ANALYSIS RATING

The Samish Indian Nation is most vulnerable to the following natural hazards ranked in order:

- 1. Tsunami
- 2. Earthquake
- 3. Storm Surge
- 4. Winter Storm

The updated hazard profiles located in the main text of this plan describe the nature, location, extent, history, and probability of future events for the hazards that affect the entire county as

well as those identified above. The data tables were revised and updated based on newly collected information and provide a summary of the Samish Indian Nation's overall vulnerability regarding each hazard.

Hazard	Population at Risk ⁽¹⁾	No. of Residential Buildings at Risk ⁽²⁾	No. of Critical Facilities at Risk	Estimated Values	Summary of Jurisdiction Vulnerability
Avalanche	unknown	n/a	0	0	Avalanche hazard areas have not been identified in areas associated with Tribal critical facilities.
Drought ⁽²⁾	1,550	n/a	n/a	n/a	Droughts are region-wide, and all residents are equally at risk. Structural damage from drought is not expected; rather the risks are present to humans and resources. Agriculture, fishing, and timber have historically been impacted, as well as local and regional economies.
Earthquake	1,550	n/a	11	\$3,646,674	Based on PGA probability maps produced by the USGS, areas with Tribal critical facilities are likely to experience a greater than 5.0 M (strong shaking) (15-20 percent of the acceleration of gravity). This rating represents the peak acceleration of the ground caused by the earthquake.
					All Tribal critical facilities and infrastructure and the entire population are vulnerable earthquake impacts.
Fire	1,550	n/a	11	\$3,646,674	Based on the NFPA 299 Risk Assessment Compartments data presented on Fire Map 3, all tribal critical facilities and residents are located in a moderate fire hazard area.
Flood	500+	n/a	3	\$500,000+	FEMA FIRMs were used to outline the 100-year floodplains for Skagit County. The 100-year floodplain delineates an area of high risk.
					Tribal critical facilities within the 100-year flood hazard area are the Fidalgo Bay RV Park, Weaverling Spit Tidelands, and areas surrounding Lake Campbell (future areas of planned development).
Land Movement	unknown	n/a	unknown	unknown	WADNR Soil Survey data were used to determine the slope stability hazard areas. Areas surrounding Lake Campbell (future areas of planned development) are located in areas identified as very unstable slope under disturbed conditions.
Severe Storms	1,550	n/a	11	\$3,646,674	The natural hazards resulting from severe storms, such as high wind, winter storm, and tidal surge, are often widespread. A single event is capable of impacting all Tribal critical facilities and infrastructure, including the entire tribal population.
Tsunami/seiche	500+	n/a	unknown	\$500,000+	Based on the potential tsunami and storm surge hazard map created for the City of Anacortes areas of moderate risk were
					identified based on elevations of less than or equal to 10 feet above mean high tide. Critical facilities within the hazard area include the Fidalgo Bay RV Park and Weaverling Spit Tidelands.
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Volcano	1,550	n/a	11	\$3,646,674	Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all Tribal critical facilities and infrastructure including the entire population are at risk from volcano impacts.

1 – There are no reservation lands at this time, therefore population by hazard area has not been evaluated at this time. Once reservation lands are placed in trust this task will be accomplished.

2 – There are no reservation lands at this time, therefore residential structures have not been evaluated for hazard vulnerability. Once reservation lands are placed in trust this task will be accomplished.

3 – There are no estimated damages to critical facilities or residential structures associated with drought.

The Samish Indian Nation is a National Flood Insurance Program participant. There are no repetitive loss properties or records of claims for the two identified policies.

MITIGATION STRATEGY UPDATE PROCESS, 2014

The Mitigation Goals identified in Section 2 of this plan were identified after reviewing the results of the risk assessment and are intended to reduce the impacts to the Samish Indian Nation's people and property within Skagit County. The goals identified during the planning process are summarized below and are described in detail in Section 2.

- ≠ Protect Life and Property
- ≠ Increase Public Awareness
- ≠ Encourage Partnerships
- ≠ Provide for Emergency Services

In addition, the Planning Team reviewed and revised a list of potential mitigation projects associated with the hazards identified during the planning process. The Planning Committee reviewed different evaluation criteria, such as cost-benefit, local/community support, and funding availability for each jurisdiction to prioritize mitigation actions. Additional mitigation actions reviewed by the Samish Indian Nation Community Representative and Environmental Director include the following:

Hazard	Mitigation Actions	Consider (X)	Completed (X or On-going)
ard	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.		Completed
Multi-Haza	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc. to demonstrate multi- benefit considerations and facilitate using multiple funding source consideration.	Х	

Hazard	Mitigation Actions	Consider (X)	Completed (X or On-going)
	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.		On-going
	Based on known high-risk hazard areas, identify hazard-specific signage needs and purchase and install hazard warning signs near these areas to notify and educate the public of potential hazards (Specific Hazards addressed - Flood, Storm Surge, Tsunami). (High Priority for the Fidalgo RV Park and Resort)	х	
	Identify and pursue funding opportunities to implement mitigation actions. Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning	Х	On-going
	Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.		On-going
	Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.		On-going
	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.		On-going
	Develop, implement, and enforce floodplain management ordinances.		On-going
Flood	Install new stream flow and rainfall measuring gauges. Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.	x	
	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.		Completed
	increase water flow and reduce debris catchment.	Х	
	debris management from severe winter storms.	Х	
	proritize, seek funding and implement mitigation actions.	Х	
	utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.	х	
storm	Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).		Completed
vere St	Install new stream flow and precipitation measuring gauges and develop monitoring and early warning program.	Х	
S	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.	Х	
	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.	х	
	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Х	
Landslide	Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc.).	Х	

Hazard	Mitigation Actions	Consider (X)	Completed (X or On-going)
Wild land Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.		On-going
	Supplement State Seismic Needs Analysis data (schools, fire, and law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.	Х	
arthquake	Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.	Х	
ш	Update existing (or adopt the most current) Uniform Building Code Develop public outreach program to train earthquake safety; perform drop- cover-hold drills at schools and public facilities.	Х	On-going
Volcano	Update public emergency notification procedures and develop an outreach program for ash fall events.	х	
g	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.	х	
Wino	Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.	Х	
Drought	Coordinate with City of Anacortes to ensure adequate supply of drinking water and identify contingency.	х	

The Samish Indian Nation Community Representative worked with the Tribal government to develop a list of high-priority projects to be listed in the jurisdiction specific implementation strategy. Priorities were based on funding availability and focused on the reduction of loss of life and property, as well as increasing public awareness. After the projects had been prioritized, information for each project was collected to include: detailed project information, a project timeline, details of project funding, and details of project administration.

The Samish Indian Nation has no reservation at this time, and therefore limited plans or ordinances associated with reducing the impacts of hazards within the jurisdiction. The Tribe follows hazard development restrictions identified by the City of Anacortes. It is anticipated that reservation lands will be established and when formalized, this plan will be updated to reflect the plans developed to mitigate the hazards identified through this process as well as use this information identified in this plan to develop other Tribal planning documents.

As reservation land is established, initiatives consistent with tribal planning efforts and FEMA programs will be considered during the course of adopting new land use codes and ordinances.

The mitigation planning process will be integrated with other ongoing Tribal and FEMA planning efforts to include incorporating hazard profiles and mitigation actions into the Tribe's comprehensive planning process.

As the Tribe does not currently have any reservation land, they have limited legal or regulatory resources available for hazard mitigation. They do enforce burn bans associated with wildland fire mitigation and post signs to support this effort. In the future, the Tribe anticipates supporting pre- and post- disaster hazard mitigation through regulations and plans.

The following fiscal capability assessment lists specific financial and budgetary tools that are currently available, as well as potentially available, to the Tribe for hazard mitigation actions. These resources, which are listed below, include private, state and federal entitlements. General Tribal funds can be used for hazard mitigation, although the mitigation projects must be consistent with other needs of the Tribe.

Sources	Financial Resource	Effect on Hazard Mitigation		
Current	Indian Community Development Block Grant Program	U.S. Housing and Urban Development provides critical housing and community development resources to aid disaster recovery.		
Potential	Imminent Threat, Indian Community Development Block Grant Program	Funding to alleviate or remove imminent threats to health or safety.		
Current	Indian Reservation Roads Transportation Funding	Providing safe access through hazard-prone areas.		
Potential	Administration for Native Americans (ANA) Grant Programs	These discretionary funds can be used to fund a variety of environmental management programs, including the identification and assessment of human and natural hazards and their associated risks, and the development and implementation of plans, policies and ordinances.		
Potential	Department of Homeland Security Preparedness Technical Assistance Program	This grant provides direct assistance to communities to improve their ability to prevent, protect against, respond to and recover from major events. A primary objective of the program is to enhance the capacity of the community to develop, plan and implement effective strategies for human- made preparedness.		
Potential	Assistance to Firefighters Grant (AFG) Program's Fire Prevention and Safety Grant	The AFG funds the Fire Prevention and Safety activity and the Firefighter Safety Research and Development activity. These grants are to be used for fire prevention or safety programs and activities.		

Current and Potential Financial Resources for Hazard Mitigation

Sources	Financial Resource	Effect on Hazard Mitigation
Potential	FEMA Hazard Mitigation Grant Program, Flood Mitigation Assistance (FMA) grants, and Pre Disaster Mitigation Grants	HMGP grant funding is available to State, Tribal and local communities after a Presidentially- declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund PDM plans and projects. FMA grant funding assists States, Tribes, and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to structures insurable under the NFIP.
Potential	National Flood Insurance Program	The NFIP makes Federally backed flood insurance available to homeowners, renters and business owners in NFIP-participating States, Tribes, and communities.
Potential	Lindbergh Grants Program	Annual grants program that provides \$10,580 per project to balance the advance of technology and the preservation of the natural/human environment. Can be used for conservation of natural resources (i.e., sustainable development codes) and public outreach/education projects.

Current and Potential Financial Resources for Hazard Mitigation

The Samish Indian Nation considers the public to be those Tribal and non-Tribal residents that live in, or in close proximity to land, residences, or critical facilities within the boundaries of Skagit County, Washington. Since this planning process was completed as part of a multijurisdictional process with the County, other Tribes and incorporated cities, opportunities for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved through area-wide invitations to participate in the planning update process. Notices of public meetings and workshops were advertised through a variety of methods to include websites, newspapers, and public service announcements.

MONITORING, EVALUATING, AND UPDATING

The Tribe will use the Samish Indian Nation Emergency Management Team to monitor, evaluate and update the HMP. In addition, other interested parties can participate in this process. A team representative (currently Edie Hill) will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate and revise the jurisdiction specific aspects of this HMP.

The Tribal HMP representative will conduct an annual review to monitor progress in implementing the HMP, particularly the Mitigation Action Plan. In order to ensure continued public involvement in the planning process, the Emergency Management Team will assure that copies of the HMP are available at all Samish Indian Nation sites. The Plan will also be available on the Samish Indian Nation website with an email address and phone number for the public's use for submitting comments and concerns.

The annual review will provide the basis for possible changes in the HMP's Mitigation Action Plan, by refocusing on new or more threatening hazards, adjusting to changes to or increases in

resource allocations, and engaging additional support for the HMP implementation. The Tribal HMP representative will initiate an annual review by questionnaire one month prior to the next date of consideration of adoption.

The Tribal HMP representative will collect the questionnaire and summarize the results into an annual report. This report will be distributed to all Steering Committee members, Tribal Council members and other interested agencies, departments and persons. This process was in place for the 2008-2014 Plan Cycle and after review, this method remains valid and will continue through the 2014-2019 Plan Cycle.

A report will be forwarded to Skagit County Emergency Management for inclusion in the annual report that is sent to the Washington State Mitigation Officer no later than September 30th of each year as described in the Plan Evaluation and Update Schedule 2014-2019 located in Section 6 of this plan.

As described in Section 6 of this plan, updates shall commence no later than March 1st of the scheduled update year according to the Plan Evaluation and Update Schedule 2014-2019. As part of this process, the Steering Committee will undertake the following activities to evaluate the plan and ensure that the HMP is readopted in the fifth year:

- \neq Thoroughly analyze and update the Tribe's risk of natural hazards.
- \neq Review the previous annual reviews, including the mitigation activities progress reports.
- \neq Provide a detailed review and revision of the Mitigation Strategy.
- ✓ Prepare a new Mitigation Action Plan with prioritized actions, responsible parties and resources.
- ✓ Prepare a new jurisdiction specific draft HMP and submit it to the Tribal Council for approval.
- \neq Coordinate with the County to submit an updated HMP to FEMA for approval.

MONITORING PROGRESS OF MITIGATION ACTIONS

The Tribal HMP representative will be responsible for monitoring mitigation project implementation and closeout. If more than one department and/or agency are identified for a mitigation project, the Tribal HMP representative will work with the Steering Committee to identify a single department or agency to monitor the mitigation project implementation and closeout. The chosen department will monitor the status of the project implementation using the Mitigation Action Progress Report.

The Mitigation Action Progress Report will include the current status of the mitigation project, including any changes made to the project, total project costs and expected overruns, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped to achieve the appropriate goals identified in the plan.

Each overseeing agency and/or department will complete the report on a quarterly basis as a way to monitor and, if necessary, revise project implementation. Prior to each annual review, the overseeing agency and/or department will summarize the quarterly reports into one report and submit this report to the Steering Committee for review. The Steering Committee will review each report to determine if progress has been made toward achieving the completion of each mitigation project as well as the overall goals identified in the Mitigation Strategy.

Additionally, the report will be submitted annually to the Planning and Grants Department, which will oversee all of the grants associated with this plan. If necessary, the Steering Committee leader may also request that these reports be submitted quarterly to the Planning and Grants Department for grant management purposes. Finally, each overseeing agency and/or department will be required to submit a closeout report to the Tribal HMP representative at the conclusion of any mitigation project.

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

1. 2008 Skagit County Natural Hazard Mitigation Plan

MITIGATION MEASURES

Mitigation measures for the 2008-2013 plan cycle:

Completed Measures

The following mitigation measures were completed in the 2008-2013 HMP Cycle.

- 1. Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
 - A. Completed
 - B. Ordinances not developed, but follow City of Anacortes codes
 - C. Buildings inspected by Fire Marshall and Indian Health Services Environmental Health Inspector
- 2. Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings.
 - A. Completed
 - B. Staff resources will be provided by the Samish Indian Nation
- 3. Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
 - A. Completed
 - B. NOAA Weather radios purchased and on site at all critical facilities
- 4. Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
 - A. Completed
 - B. Staff resources will be provided by the Samish Indian Nation

Mitigation measures for the 2014-2019 plan cycle:

Existing or On-Going Mitigation Measures

The following mitigation measures are on-going or long-term in nature and will continue to be prioritized goals for the Samish Indian Nation. Progress and pace will be dependent on funding, but measures still remain valid.

- 5. Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
 - A. This will be an ongoing project
 - B. Staff resources will be provided by the Samish Indian Nation
- 6. Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
 - A. This will be a long term ongoing project
 - B. Staff resources will be provided by the Samish Indian Nation
- 7. Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
 - A. This will be a long term and ongoing project as Samish obtains additional land, property, and facilities
 - B. Staff resources will be provided by the Samish Indian Nation
- 8. Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
 - A. This will be a long term and ongoing project as Samish obtains additional land, property, and facilities
 - B. Staff resources will be provided by the Samish Indian Nation
- 9. Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
 - A. This will be an ongoing project
 - B. Staff resources will be provided by the Samish Indian Nation
- 10. Develop, implement, and enforce floodplain management ordinances.
 - A. This will be a long term project
 - B. Staff resources will be provided by the Samish Indian Nation
- 11. Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.

- A. This will be an ongoing project
- B. Staff resources will be provided by the Samish Indian Nation

Proposed Mitigation Measures

- 1. Utilize the Tribal Emergency Management Team to assist in the implementation of mitigation actions and monitoring and updating the mitigation plan.
 - A. This will be an ongoing project
 - B. Staff resources will be provided by the Samish Indian Nation
- 2. Incorporate goals and actions identified in this HMP into other future and existing Tribal plans and regulatory documents and programs such as:

Tribal Codes and Ordinances Tribal Comprehensive Plans and Critical Areas Ordinance(s) Tribal Capital Facilities and/or Improvement Plans Flood Plan(s) National Flood Insurance Program Community Rating System Programs

- A. This will be a long term project
- B. Staff resources will be provided by the Samish Indian Nation

Samish Indian Nation 2014 Natural Hazard Identification and Risk Estimation **Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental Damage+Economic Disruption multiplied by Probability of Occurrence). Has been updated for 2014 based on changing conditions and recent events.

**The greater the Risk Score, the greater the risk.

	Area	Health &					
	Impacted	Safety	Property	Environment	Economic	Probability	Risk Score
Drought	1	-	1	1	-	2	10
Earthquake	3	1	1	2	3	4	40
Flooding	۱	Ţ	٢	1	Ł	2	10
High Winds	4	Ł	2	2	2	5	55
Landslide/Erosion	2	Ł	2	1	2	2	16
Storm Surge/Tsunami	4	2	3	2	З	Ļ	14
Wildfire	L	с	٢	3	2	2	20
Winter Storm	4	1	2	2	2	4	44
Volcanic Activity	1	1	3	1	2	1	8

	nany destroyed 3=Many properties destroyed or			3=High Direct and Indirect Cost	r or more
0	erous fatalities amaged or Few damaged, n)		t and High indirect	year 5=Once a yea
4=>75%	3=Nume ed. many da			r Low direct	4=<25 y
3=<75%	many injuries 2=Few destrov	damaged	3=No recovery	st and Low indirect or	3= <100 year
2=<50%	2=Few fatalities,	or damaged	2=Long term	2=High direct co	nticipated
1=<25%	1=Few injuries	1=Few destroyed	1=Short term	1=Low costs	2=Unknown but ar
0=No impact	0=No impact	0=No impact	0=Little or No impact	0=No impact	1=Unknown but rare
Area Impacted: Health &	Safety:	Property:	Environment:	Economic:	Probability:

217

Total Jurisdictional Risk Estimation Score:



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SWINOMISH INDIAN TRIBAL COMMUNITY

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Swinomish Indian Tribal Community Jurisdiction-Specific Tribal Requirements, Vulnerability Assessment, and Mitigation Initiatives

Assurances

The Swinomish Indian Tribal Community's participation as a Tribal jurisdiction in the **Skagit County Natural Hazards Mitigation Plan** (HMP) meets the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000. This includes meeting the requirement that the HMP be adopted by the Tribe. In addition, as required by 44 CFR 13.11(c) and 13.11(d), the Tribe will comply with all applicable Federal statutes and regulations during the periods for which grant funding is received, and will amend the plan whenever necessary to reflect changes in Tribal or Federal laws and statutes. 2

At the conclusion of the plan update process, and following receipt from FEMA of a notice of pre-adoption approval of the plan, the Tribe will sign a resolution formally re-adopting the updated **Skagit County Natural Hazards Mitigation Plan**. A copy of the resolution, adopted by the Swinomish Indian Tribal Community (herein referred to as the Tribe), assures FEMA that the Tribe will comply with both of the CFR requirements. The resolution is presented in Appendix A.

Planning Process

The Swinomish Tribal Community has participated in the **Skagit County Natural Hazard Mitigation Plan** since it's inception in 2003 and continued participation in the 2008 and now in the 2014 plan update. The Swinomish Indian Tribal Community, as well as other tribes, jurisdictions, special districts, and Skagit County, began the 2014 **Skagit County Natural Hazards Mitigation Plan** (hereafter referred to as the 2014 HMP) plan update process in January 2014. The Skagit Natural Hazards Mitigation Planning Committee was formed as a means to gather and share information, assess vulnerabilities, identify critical facilities, assist in developing mitigation strategies, and provide continuity throughout the planning process. The Skagit Natural Hazards Mitigation Planning Committee to establish an outline and schedule, develop plan goals and objectives, adhere to the DMA 2000, and ultimately update the plan.

During the planning period, the Skagit Natural Hazards Mitigation Steering Committee, in close cooperation with the Skagit County Department of Emergency Management, compiled information and collected data for nine natural hazards: avalanche, drought, earthquake, fire, flood, land movement, severe storms, tsunami/seiche, and volcanic activity. Information was obtained from local historical records, and a wide variety of local, state, and federal agencies, Hazus and 20/20 Mitigation Software. In addition, the Planning Committee obtained public input in which community members could participate in the planning process during 5 public meetings held from March 2014 to July 2014.

Participation in and review of the plan update by the Swinomish Tribe was coordinated by the Swinomish Planning Department, with the Planning Director serving as lead. The Planning Director represented the Swinomish Tribe on the Skagit Natural Hazards Mitigation Planning Committee, conveyed the developments of the committee work and public meetings to other

staff and tribal leadership within the Tribe, and coordinated with other Swinomish staff to develop updated information for Swinomish participation in the plan. Swinomish staff and officials who participated in review and update of the plan include the following:

- Associate Planner, who assisted with update of narrative, mitigation actions and strategies, and jurisdictional description and summary;
- GIS Specialist, who created updated mapping information for Swinomish, including critical facilities;
- Public Works Director, who reviewed and advised on critical facilities;
- Emergency Management lead (within Swinomish Police Department), who reviewed and advised on updated information in the plan; and
- Swinomish Planning Commission, which oversaw activities to update the plan and recommended approval to the Swinomish Indian Senate.

In addition to the above, Swinomish legal staff reviewed the document and the Swinomish Indian Senate took action to formally approve and adopt the plan with the Swinomish portion to be incorporated into the Multi-Jurisdictional Plan document.

Plan Update Process

As required by DMA 2000, a Tribal HMP must be updated every 5 years or when substantial changes are made to the plan. On March 12, 2014 the Skagit Hazard Mitigation Planning Committee held a meeting to begin the plan-update process for the participating jurisdictions involved in the 2014 HMP. As such, Ed Knight represented the Swinomish Indian Tribal Community as the Community Representative on the Planning Committee.

During the initial update meeting, the Skagit Natural Hazards Mitigation Planning Committee, members reviewed the DMA 2000, the plan update process, the plan outline, and a proposed plan update schedule. The Planning Committee also assessed a matrix of hazards addressed in the recently updated Washington State HMP and 2014 HMP.

A summary overview of the plan update actions is listed in SECTION I of this plan. A summary of the 2008 plan update actions accomplished by the Swinomish Indian Tribal Community is listed below:

2008 HMP	2014 Actions Taken
SECTION I: The Planning	
Process	
SECTION II: Multi-	Updated the hazard profiles for recent disaster information, change in
Jurisdictional Hazard	hazard locations, extent, and probability of future events.
Identification	
SECTION III: Multi-	Reviewed and re-evaluated mitigation goals and action items; updated to
Jurisdiction/Multi-Hazard	reflect current vulnerability assessment and needs.
Mitigation	

Summary of Initial Update Findings

2008 HMP	2014 Actions Taken
SECTION IV: Jurisdiction Specific Information:	Completed two-year vulnerability assessment, risk analysis, and action plan as relevant to projected climate impacts.
Hazard Vulnerability Assessment & Mitigation Strategies	Updated Jurisdiction Summary to include new critical facilities specific to the Swinomish Indian Tribal Community.
	Reviewed Current Land Uses & Potential for New Development included addition of new lands near the Reservation.
	Reviewed Future Land Uses & General Development, addressed vulnerability as part of climate impacts study.
	Reviewed Neighborhood Types and Structure Characterization.
	Reviewed Comparison of Jurisdictional Relative Risk.
	Updated Basic Demographic Information.
	Reviewed Mitigation Initiatives.

Summary of Initial Update Findings

Risk Assessment Update Process, 2014

The Swinomish Indian Tribal Community representative worked with the Skagit Natural Hazards Mitigation Planning Committee to develop draft hazard and asset figures and the draft vulnerability analysis. The Fire, Flood, Severe Local Storm and Tsunami-Seiche sections were updated. Based on the results of the vulnerability analysis, the following hazards were ranked according to the potential risk to the Swinomish Indian Tribal Community:

Primary Hazards: Earthquake, High Winds, Severe Local Storm

<u>Secondary Hazards:</u> Wildfire, Volcano, Tsunami/Seiche, Severe Local Storm The updated hazard profiles located in the main text of this plan describe the nature, location, extent, history, and probability of future events for the hazards that affect the entire county as well as those identified above. The Swinomish Indian Tribal Community does not participate in the National Flood Insurance Program, and there are no floodplains or frequently flooded areas identified, delineated, or mapped within the Swinomish Indian Reservation. There are no repetitive loss properties located within the Swinomish Indian Reservation. Given that, below is a table summarizing presumed impacts of identified hazards on Reservation lands, structures, and infrastructure. Based on the limited geographic area of the Reservation, as compared to Skagit County, most potential hazards are presumed to impact the Reservation as a whole, except where noted. The 20/20 data tables were revised and updated based on newly collected information and provide a summary of the Swinomish Indian Tribal Community's overall vulnerability regarding each hazard.

An analysis of the risks and impacts to the Swinomish Indian Tribal Community related to the local natural hazards was developed using FEMA-supplied HAZUS and previous 20/20 mitigation software. A summary of these risks and impacts follow. The risk and impact analysis and scoring matrix is described on pages 1 & 2 of SECTION IV of this plan.

Hazard	Residential	Population	Non-	Estimated	Summary of Jurisdiction
	Structures		residential	Value	

	At Risk	At Risk	Facilities At Risk	Facilities At Risk	Vulnerability
Earthquake	1400	3100	20 ¹	\$86,261,000 ¹	Based on PGA probability maps produced by the USGS, areas with Tribal critical facilities are likely to experience a greater than 5.0 M (strong shaking) (15-20 percent of the acceleration of gravity). This rating represents the peak acceleration of the ground caused by the earthquake.
					All Tribal critical facilities and infrastructure and the entire population are vulnerable earthquake impacts.
High Winds	1400	3100	20 ¹	\$86,261,000 ¹	The natural hazards resulting from severe storms, such as high wind
Severe Local Storm	1400	3100	20 ¹	\$86,261,000 ¹	and tidal surge, are often widespread. A single event is capable of impacting all Tribal critical facilities and infrastructure, including the entire tribal population.
Wildfire ²	300	500	1	\$200,000	Based on proximity to upland forested areas of the Reservation
Volcano ³	1400	3100	20 ¹	\$86,261,000 ¹	Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all Tribal critical facilities and infrastructure including the entire population are at risk from volcano impacts.
Tsunami/Seiche ⁴	150	250	4	\$15,500,000	Based on proximity to low-lying shoreline areas surrounding the reservation.

¹Includes some non-tribal facilities, such as neighborhood churches and community buildings.

²Figures estimated based on proximity to upland forested areas of the Reservation.

³Threat/impact is only in event of major eruption impacting the entire region; distance from known volcanoes and prevailing winds limit the immediate threat from lesser eruptions.

⁴Impacts limited to low-lying shoreline areas surrounding the Reservation; majority of upland areas not impacted.

Mitigation Strategy Update Process, 2014

The Mitigation Goals identified in SECTION III of this plan were identified after reviewing the results of the risk assessment and are intended to reduce the impacts to the people and property within the Swinomish Indian Reservation. The goals identified in the 2003 and 2008 plans were re-evaluated and re-affirmed as part of the 2014 update process. The goals are summarized below and are described in detail in SECTION III.

- Protect Life and Property
- Increase Public Awareness

- Encourage Partnerships
- Provide for Emergency Services

In addition, the Skagit Natural Hazards Mitigation Planning Committee reviewed and revised a list of potential multi-jurisdiction/multi-hazard action items associated with the hazards identified during the initial and update process. Each action item that had been identified was reviewed to determine whether it had been completed, was still applicable, or needed revision based on the newly acquired information that had been developed as part of the update process. The Swinomish Indian Tribal Community representative worked with the Tribal government to develop a list of high-priority mitigation measures to be listed in the jurisdiction specific implementation strategy. These measures were reviewed based on the following evaluation criteria, such as cost-benefit, local/community support, and funding availability for each jurisdiction. After the measures had been prioritized, information for each measure was collected to include an estimated timeline, potential funding basis, and administration.

The Swinomish Indian Tribal Community reviewed the current plans and ordinances identified on the next page and incorporated updated information into this jurisdiction specific vulnerability assessment. This was primarily related to land development and demographic information updates.

Since the Swinomish Indian Tribal Community has been an active participant in the hazard mitigation planning process over the last 10 years, the integration of the process with ongoing tribal planning efforts and FEMA programs and initiatives has been considered, primarily during the course of updating and adopting new land use codes and ordinances, such as the Swinomish Zoning Ordinance, Subdivision & Binding Site Plan Ordinance, Swinomish Building Code, Shorelines & Sensitive Areas Ordinance, and Land Clearing Ordinance to address future development in hazard areas.

The mitigation planning process was integrated with other ongoing Tribal and FEMA planning efforts to include:

- expanding the Tribe's geographic information system (GIS) database to include hazard information;
- incorporating hazard profiles and mitigation actions into Tribal planning processes, including the Tribal comprehensive plan, transportation plan, and forest management plan.

As shown below, the Tribe currently supports pre-disaster and post-disaster hazard mitigation through regulations, plans and programs. Tribal mitigation policies include enforcing the International Building Code through permit and inspection.

Type of	Regulatory	Name/Type	Evaluation of Regulatory Tool on Hazard
Mitigation	Tool		Mitigation
Pre-Disaster Mitigation	Policies	Swinomish Building Code (2003 IBC)	The International Building Code applies to Tribal structures. Structures built to code are less likely to be vulnerable to hazardous conditions, including windstorms, wild land fires, etc. The Tribe issues building permits and performs building inspections as required by the code.

Legal and Regulatory Resources Available for Hazard Mitigation

Type of Mitigation	Regulatory Tool	Name/Type	Evaluation of Regulatory Tool on Hazard Mitigation
		Zoning Ordinance	Designates allowable land uses and provides for control of site development parameters.
		Subdivision & Binding Site Plans	Provides comprehensive review of proposed land divisions and uses and control of site development, including any applicable restrictions, conditions, and/or mitigation.
		Shorelines & Sensitive Areas	Provides for review of environmental issues and potential impacts related to development in shoreline zones and designated sensitive areas, including any applicable restrictions, conditions, and/or mitigation for hazards.
		Land Clearing	Provides for review of proposed land clearing activity, including any applicable restrictions, conditions, and/or mitigation for potential hazards.
	Programs	Geographical Information Systems	The Tribal GIS Department currently manages Tribal land-cover information. This information can be used to identifying existing hazard-prone areas and areas for future Tribal development.
Post-Disaster Mitigation	Plans	Forest Management Plan	The Forest Management Plan provides both pre-and post disaster guidance associated with healthy forests.

Legal and Regulatory Resources Available for Hazard Mitigation

The following fiscal capability assessment lists specific financial and budgetary tools that are currently available, as well as potentially available, to the Tribe for hazard mitigation actions. These resources, which are listed below, include private, state and federal entitlements. General Tribal funds can be used for hazard mitigation, although the mitigation projects must be consistent with other needs of the Tribe.

Sources	Financial Resource	Effect on Hazard Mitigation
Current	Indian Community Development Block Grant Program	U.S. Housing and Urban Development provides critical housing and community development resources to aid disaster recovery.
Potential	Imminent Threat, Indian Community Development Block Grant Program	Funding to alleviate or remove imminent threats to health or safety.
Current	Tribal Transportation Program Funding	Providing safe access through hazard-prone areas.

Current and Potential Financial Resources for Hazard Mitigation

Sources	Financial Resource	Effect on Hazard Mitigation
Potential	Administration for Native Americans (ANA) Grant Programs	These discretionary funds can be used to fund a variety of environmental management programs, including the identification and assessment of human and natural hazards and their associated risks, and the development and implementation of plans, policies and ordinances.
Potential	Department of Homeland Security Preparedness Technical Assistance Program	This grant provides direct assistance to communities to improve their ability to prevent, protect against, respond to and recover from major events. A primary objective of the program is to enhance the capacity of the community to develop, plan and implement effective strategies for human- made preparedness.
Potential	Assistance to Firefighters Grant (AFG) Program's Fire Prevention and Safety Grant	The AFG funds the Fire Prevention and Safety activity and the Firefighter Safety Research and Development activity. These grants are to be used for fire prevention or safety programs and activities.
Potential	FEMA Hazard Mitigation Grant Program, Flood Mitigation Assistance (FMA) grants, and Pre Disaster Mitigation Grants	HMGP grant funding is available to State, Tribal and local communities after a Presidentially- declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund PDM plans and projects. FMA grant funding assists States, Tribes, and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to structures insurable under the NFIP.
Potential	National Flood Insurance Program ¹	The NFIP makes Federally backed flood insurance available to homeowners, renters and business owners in NFIP-participating States, Tribes, and communities.

Current and Potential Financial Resources for Hazard Mitigation

The Swinomish Indian Tribal Community considers the public to be those Tribal and non-Tribal residents that live in, or in close proximity to land, residences, or critical facilities within the exterior boundaries of the Swinomish Indian Reservation. Since this planning process was completed as part of a multi-jurisdictional process with the County, other Tribes and incorporated cities, opportunities for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved through area-wide invitations to participate in the planning update process. Notices of public meetings were advertised through newspapers.

Monitoring, Evaluating, and Updating

¹ Flood zones have not been mapped on the Reservation by FEMA.

The Tribe will use the Swinomish Indian Tribal Planning representative to monitor, evaluate and update the HMP. In addition, other interested parties can participate in this process. The representative (currently Ed Knight) will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate and revise the jurisdiction specific aspects of this HMP.

The Tribal HMP representative will conduct an annual review to monitor progress in implementing the HMP, particularly the Mitigation Action Plan.

A report should be forwarded to Skagit County Emergency Management for inclusion in the annual report that is sent to the Washington State Mitigation Officer no later than September 30th of each year as described in the Plan Evaluation and Update Schedule 2014-2019 located in the Plan Maintenance portion of this plan.

The annual review will provide the basis for possible changes in the HMP's Mitigation Action Plan, by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the HMP implementation. The Tribal HMP representative will initiate an annual review by questionnaire one month prior to the next date of consideration of adoption.

The Tribal HMP representative will collect the questionnaire and summarize the results into an annual report. This report will be distributed to all Steering Committee members, Tribal Senate members and other interested agencies, departments and persons.

As described in the Plan Maintenance portion of this plan, updates shall commence no later than March 1st of the scheduled update year according to the Plan Evaluation and Update Schedule 2014-2019. As part of this process, the Skagit Natural Hazards Mitigation Steering Committee will undertake the following activities to evaluate the plan and ensure that the HMP is readopted in the fifth year:

- Thoroughly analyze and update the Tribe's risk to the community, facilities, and infrastructure from natural hazards.
- Review the previous annual reviews, including the mitigation activities progress reports.
- Provide a detailed review and revision of the Mitigation Strategy.
- Prepare a new Mitigation Action Plan with prioritized actions, responsible parties and resources.
- Prepare a new jurisdiction specific draft HMP and submit it to the Tribal Council for approval.
- Coordinate with the County to submit an updated HMP to FEMA for approval.

Monitoring Progress of Mitigation Actions

The Tribal HMP representative will be responsible for monitoring mitigation project implementation and closeout. If more than one department and/or agency are identified for a mitigation project, the Tribal HMP representative will work with the Steering Committee to identify a single department or agency to monitor the mitigation project implementation and closeout. The chosen department will monitor the status of the project implementation using the Mitigation Action Progress Report.

The Mitigation Action Progress Report will include the current status of the mitigation project, including any changes made to the project, total project costs and expected overruns, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped to achieve the appropriate goals identified in the plan.

Each overseeing agency and/or department will complete the report on a quarterly basis as a way to monitor and, if necessary, revise project implementation. Prior to each annual review, the overseeing agency and/or department will summarize the quarterly reports into one report and submit this report to the Steering Committee for review. The Steering Committee will review each report to determine if progress has been made toward achieving the completion of each mitigation project as well as the overall goals identified in the Mitigation Strategy.

Additionally, the report will be submitted annually to the Planning and Grants Department, which will oversee all of the grants associated with this plan. If necessary, the Steering Committee leader may also request that these reports be submitted quarterly to the Planning and Grants Department for grant management purposes. Finally, each overseeing agency and/or department will be required to submit a closeout report to the Tribal HMP representative at the conclusion of any mitigation project.

Swinomish Indian Tribal Community

The Swinomish Indian Tribal Community (SITC) is a political successor in interest to tribes, bands, and groups of Indians, including those known as the Lower Skagit, Kikiallus, Swinomish, and Samish, that were signatories to the Treaty of Point Elliot of January 22, 1855, as ratified by Congress on March 8, 1859. The Tribe is federally recognized and operates under Constitution and By-laws adopted in 1936 pursuant to the Indian Reorganization Act of 1934. The Tribe is governed by an 11 member Senate led by the Tribal Chairman. The Tribe's administrative structure includes a Planning and Community Development Department, Social Services Department, Utility Authority, Housing Authority, Police Department, Tribal Court, and Fisheries Office.

The Tribe's land base is the Swinomish Indian Reservation located west of the Swinomish Channel near La Conner, Washington, approximately 70 miles north of Seattle. The Reservation occupies the Southeast peninsula of Fidalgo Island, encompassing 7,450 acres of upland area and 2,900 acres of tribally owned tidelands. Ownership of the Reservation uplands consists of 36% alienated fee land (2,670 acres), 38% individual trust land (2,835 acres), and 26% tribal trust land (1,945 acres).

The Reservation population is approximately 3,300, of which approximately 23% are enrolled Tribal members or of other Indian nationality. The non-Indian majority principally occupies about 800 homes on leased Tribal trust land in the Shelter Bay residential area and about 100 homes in the west shore area of the Reservation. Five hundred Tribal members live in the Swinomish Village housing complex, with remaining Tribal members living throughout the Reservation. Additional residential areas are clustered throughout the shoreline zone, and forestry and other low-density land uses occupy the uplands.

CULTURAL USE SITES

The Swinomish Indian Tribal Community has identified historically significant cultural use sites as part of its planning process. Due to the proprietary and sensitive nature of data on tribal

cultural use areas and sites, the Tribe maintains confidential access to this data and addresses potential impacts on such areas through consultation with the Tribe by outside entities.

PLAN JURISDICTION

Contact Information:	Ed Knight, Director, Planning Department Swinomish Indian Tribal Community 11430 Moorage Way La Conner, WA 98257 Telephone: (360) 466-7280 Email: eknight@swinomish.nsn.us
Neighborhood Characterization:	Reservation boundaries (Figure 1) define plan neighborhood limits. Figure 3 illustrates zoning, Figure 4 provides aerial view, Figure 5 illustrates buildings, roads and topography
Population of Jurisdiction:	3,300 and growing slightly
Geographical Size:	7,450 upland acres + 2,900 acres tidelands
Economic Characteristic: Current Adopted Hazard	Economically disadvantaged <i>*Economically distressed as per the State</i>
<u>Ordinances</u> :	1996 Comprehensive Land Use Plan, 2005 Zoning Code, 2003 International Building Code, 2003 International Fire Code, Forest Management Plan, Transportation Plan, 2005 Shorelines & Sensitive Areas Code, 2005 Land Clearing Code
<u>Critical Facilities:</u>	Social Services/Police Station, Medical Center, Dental Clinic/Senior Center, Tribal Administration Office, Planning Department, Housing and Utilities Department, Gymnasium/Daycare/ Community Center, Fisheries Office, Public Works Department, Sewage Treatment Plant/System, Swinomish Casino, Casino RV Park, Swinomish Lodge, Village Gas Station, North End Gas Station, Fish Plant, Water System, Swadabs Park Pavilion, Tribal Archive Building, Tribal Canoe Shed, Domestic Violence Shelter, Northwest Indian College ² , Skagit County Fire District 13 ³ ,Kukutali Preserve Caretaker House, Summers Court Caretaker House, Tribal Wells Pump House, Communication Tower, Swinomish Links Golf Course, McGlinn Island boat repair shed, Public Works pole building, Waste Oil Facility, Tribal Fishing Docks, Air Quality Monitoring Station (Figure 2)
Primary Hazards:	Earthquake, High Winds, Winter Storm

² Not a Tribal facility but a critical facility located within the Reservation.
³ Not a Tribal facility but a critical facility located within the Reservation.

MITIGATION INITIATIVES

- 1. Seismic Retrofitting of Critical Facilities
- 2. Assessment and Provision of Emergency Power Supplies
- 3. Development of Warning and Evacuation Plan, and Infrastructure Implementation
- 4. Public Emergency Preparedness Education Program Development and Implementation
- 5. Adaptation/mitigation planning for low-lying and other at-risk areas

Jurisdiction Summary Swinomish Indian Tribal Community: Swinomish Reservation

Jurisdiction Profile

Land area within the existing jurisdiction:	(upland) 7,450 acres
Land area within urban growth area/residential zone:	<u> </u>
Land area of park, forest, and/or open space:	<u> </u>
Land area set aside as resource lands:	<u>350</u> acres
Land area designated commercial/economic zone:	<u>615</u> acres
Current population:	3,300 residents
Expected population in 2025:	4,000+ residents
Approximate Annual Budget:	\$40,000,000

Current and Anticipated Development and Population Trends: <u>Slow to moderate increase in</u> <u>mixed use commercial and residential development is projected.</u>

Jurisdiction Infrastructure Summary

Miles of Streets/Road:	42	approximate value:	<u>\$30,450,000</u>
Number of Bridges:	<u>3</u>	approximate value:	<u>\$21,000,000</u>
Miles of Sanitary Sewer:	7	approximate value:	(included below
Miles of Storm Sewer:	4	approximate value:	<u>\$ 600,000</u>
Miles of Water Line:	<u>16</u>	approximate value:	<u>\$ listed below</u>

Critical Facilities:

1.	Social Services/ Police Station	_approximate value:	\$	3,860,000
2.	Medical Center	_approximate value:	<u>\$</u>	1,527,000
3.	Dental Clinic/ Senior Center	_approximate value:	\$	928,000
4.	Tribal Administration Office	_approximate value:	\$	2,000,000
5.	Planning Department	_approximate value:	\$	1,500,000
6.	Housing Department/Utility Office	_approximate value:	<u>\$</u>	209,000
7.	Gymnasium/ Daycare/ Community Center	_approximate value:	\$	1,828,000
8.	Fisheries (Skagit River Systems Cooperative	<u>approximate value:</u>	\$	284,000

9.	Sewage Treatment Plant/System	approximate value:	\$ 4,000,000
10.	Swinomish Casino	approximate value:	<u>\$ 9,500,000</u>
11.	Swinomish Lodge	approximate value:	<u>\$ 35,000,000</u>
12.	Fish Plant	approximate value:	<u>\$ 1,880,000</u>
13.	Water System	approximate value:	<u>\$ 2,100,000</u>
14.	Public Works Department	approximate value:	<u>\$ 243,000</u>
15.	North End Gas Station	approximate value:	<u>\$ 2,000,000</u>
16.	Village Gas Station	_approximate value:	<u>\$ 1,000,000</u>
17.	Casino RV Park	_approximate value:	<u>\$ 600,000</u>
18.	Swadabs Park Pavilion	approximate value:	<u>\$ 400,000</u>
19.	Tribal Archive Building	approximate value:	<u>\$ 23,000</u>
20.	Tribal Canoe Shed	approximate value:	<u>\$ 59,000</u>
21.	Domestic Violence Shelter	approximate value:	<u>\$ 600,000</u>
22.	Northwest Indian College	approximate value:	<u>\$550,000</u>
23.	Skagit County Fire District # 13	approximate value:	<u>\$ 411,000</u>
24.	Kukutali Caretaker House	approximate value:	<u>\$ 93,000</u>
25.	Summers Court Caretaker House	approximate value:	<u>\$ 239,000</u>
26.	Communication Tower	approximate value:	\$ <u>200,000</u>
27.	Swinomish Links Golf Course	approximate value:	\$ <u>6,000,000</u>
28.	McGlinn Island Boat Repair Shed	approximate value:	<u>\$ 46,000</u>
29.	Waste Oil Facility	approximate value:	<u>\$ 15,000</u>
30.	Tribal Docks	approximate value:	<u>\$ 693,000</u>
31.	North End Air Quality Monitoring Station	approximate value:	<u>\$ 4,000</u>

Total estimated value of relevant municipal infrastructure:

<u>\$ 129,842,000</u>

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT) THAT HAVE RESULTED IN DECLARED EMERGENCIES					
Type of Event	Date	Total Public Damage			
Nisqually Earthquake	February 2001	\$6,000			
High tide storm surge	February 2006	Unknown			
High wind storm	November 2006	Unknown			

Natural Hazard Vulnerability Analysis Rating

The Swinomish Reservation is most vulnerable to the following natural hazards ranked in order:

- 1. Earthquake_____
- 2. <u>High Winds______</u>_____
- 3. <u>Winter Storm</u>_____
- 4. Tsunami/seiche

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

- 1. 2003 International Building Code
- 2. 2003 International Fire Code
- 3. <u>1996 Comprehensive Land Use Plan</u>
- 4. 2003 Forest Management Plan
- 5. 2011 Transportation Plan (latest update)
- 6. 2005 Zoning Ordinance (latest update)
- 7. 2005 Shorelines & Sensitive Areas Ordinance
- 8. 2005 Land Clearing Ordinance_

Mitigation Measure	Lead Agency	Funding Source	Time Line	Status
Seismic Retrofitting of Critical Facilities	Public Works Department	Grant Funding	5-8 years	Existing Action – Not addressed due to lack of available resources to implement
Assessment and Provision of Emergency Power Supplies	Public Works Department	Grant & Tribal Funding	1-3 years	In Progress- In coordination with general emergency response planning
Development of Warning and Evacuation Plan, and Infrastructure Implementation	Office of Planning and Community Development	Grant & Tribal Funding	1-3 years	In Progress- In coordination with general emergency response planning
Public Emergency Preparedness Education Program Development and Implementation	Office of Planning and Community Development	Grant & Tribal Funding	1-3 years	In Progress- In coordination with general emergency response planning
Adaptation/Mitigation Planning for Low- Lying and Other At- Risk Areas	Office of Planning and Community Development	Grant Funding	Ongoing	Adaptation Plan completed, working on implementation

Mitigation Measures

Swinomish Indian Tribal Community 2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental Damage+Economic Disruption multiplied by Probability of Occurrence)

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Earthquake	4	2	2	1	2	4	44
High Winds	4	1	1	0	2	5	40
Storm Surge/Tsunami	1	1	3	2	3	2	20
Wildfire	3	1	2	2	2	2	20
Winter Storm	4	1	1	1	1	5	40
Volcanic Activity	4	3	3	2	3	1	15

Total Jurisdictional Risk Estimation Score:

179

Area Impacted: Health &	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%		
Safety:	0=No impact	1=Few injuries	2=Few fatalities, man	ıy injuries	3=Numerous fatalit	ties	
Property:	0=No impact	1=Few destroyed o	r damaged	2=Few destroy 3=No	ed, many damaged o	or Few damaged, many destroyed 3=Many properties destroyed or d	amaged
Environment:	0=Little or No impact	1=Short term	2=Long term	recovery			
Economic:	0=No impact	1=Low costs	2=High direct cost an	d Low indirect o 3= <100	r Low direct and High	n indirect 3=High Direct and Indirect Cost	
Probability:	1=Unknown but rare	2=Unknown but ant	ticipated	year	4=<25 year	5=Once a year or more	





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TOWN OF CONCRETE

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TOWN OF CONCRETE

Natural Hazard Mitigation Plan

JURISDICTION PROFILE:

Population of Jurisdiction:	750 and growing slightly
Estimated Geographic Size:	1.2 square miles
Principal Economic Base:	Institutional
Economic Characteristic:	Economically disadvantaged
Neighborhood Characteristics:	The Town of Concrete is a modest community consisting of 515 structures with an average value of \$85,500
CONTACT INFORMATION:	Jason Miller, Mayor Town of Concrete P.O. Box 39 Concrete, WA 98237 Phone: 360.853.8213 E-mail: goodwords@frontier.com

INTRODUCTION:

This document aims to identify the specific natural hazards threatening the Town of Concrete, to characterize the vulnerability to these hazards, and to identify current and proposed mitigation strategies to address those vulnerabilities.

Located near the confluence of the Baker and Skagit Rivers and on the fringe of the North Cascades National Park, The Town of Concrete is vulnerable to various natural hazards including flooding, landslides, volcanic activity, severe weather and earthquake.

Because of environmental conditions such as weather and geography, the natural hazards of primary concern for the Town of Concrete include landslide and flood events. Concrete receives more than 71 inches of rainfall annually with October through January receiving the highest rainfall, averaging up to inches per month. This rainfall, as well as snow melt from the surrounding mountains, contributes to flood events and landslides that have damaged property and/or impacted travel corridors on an almost annual basis. The proximity of the Baker and the Skagit rivers leads to frequent flood events that have damaged homes, property, and roadways.

Earthquake activity in the region from the active Devils Mountain Fault or the Cascadia Subduction Zone could trigger slope failure and/or dam failure. Volcanic activity from nearby Mt. Baker or Glacier Peak has potential to cause severe damage and loss that can be incurred from lahar flows and ash fall. The Town of Concrete is located downstream of two major dams; the Baker and Gorge Dams. Although there is a low probability of occurrence, should dam failure occur, it would cause immense damage to life and property.

HAZARD IDENTIFICATION AND RISK ASSESMENT

Please visit the Section II: Multi-Jurisdictional Hazard Identification portion of the Skagit County Natural Hazard Mitigation Plan for in-depth details of the identified hazards. To complete the vulnerability assessment process, town staff utilized a series of locally developed forms, as well as recently updated 2014 Hazus information and forms available in the 20/20 Mitigation software. The Town of Concrete government completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process.

The analyses conducted by Town of Concrete staff were based on the best currently available information and data regarding the characteristics of the neighborhoods identified, the natural hazards that threaten the people, property, and environment of these neighborhoods, as well as the impacts these neighborhoods have suffered in past disasters. This information includes, when available, United States Census data, local tax records, local and national geographic information system data, Flood Insurance Rate Maps, hazard specific analyses, and other environmental and demographic facts. Where authoritative or current information was not available for the planning effort; experience, knowledge, and judgment of local officials representing the Town of Concrete was utilized.

DEVELOPMENT

The Town of Concrete rate of development has remained relatively steady since the early 1970s. The town began efforts in June 2014 to revitalize its economy and draw new residents within town limits. One key step in this direction is the construction of a secondary access road connecting State Route 20 and the Concrete School District and Mears Field (municipal airport). While the primary reason for this project is safety and additional access to high ground, a tertiary benefit will be access to a large area already identified as developable for approximately 110 single-family dwellings. This could represent a population increase of 200 to 400 souls. The long-term goal is to increase the town's population to approximately match that of its numbers during the decades when it thrived from the cement industry: approximately 2,000 to 2,200 souls between 1920 and 1968.
2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted + Health and Safety Consequences + Property Damage + Environmental Damage + Economic Disruption multiplied by Probability of Occurrence). Has been updated for 2014 based on changing conditions and recent events.

**The greater the Risk Score, the greater the risk.

ImpactedEarthquake4Earthquake4Flooding2High Winds4Landslide/Erosion2Storm Surge/Tsunami0Subsidence, expansive0	Safety					
Earthquake4Flooding2Flooding2High Winds4Landslide/Erosion2Storm Surge/Tsunami0Subsidence, expansive1		Property	nt	c	ty	Score
Flooding2High Winds4Landslide/Erosion2Storm Surge/Tsunami0Subsidence, expansive1	2	1	1	1	2	18
High Winds4Landslide/Erosion2Storm Surge/Tsunami0Subsidence, expansive1	1	1	1	2	5	35
Landslide/Erosion2Storm Surge/Tsunami0Subsidence, expansive	1	1	1	1	2	16
Storm Surge/Tsunami 0 Subsidence, expansive	1	2	2	3	4	40
Subsidence, expansive	0	0	0	0	1	0
Soils 1	0	0	0	0	1	٢
Urban Fire 1	-	1	~	2	2	12
Wildfire 1	1	1	1	1	1	5
Winter Storm 4	1	1	0	1	2	14
Volcanic Activity 4	2	3	3	3	2	30

171	
Total Jurisdictional Risk Estimation Score:	

Area Impacted:	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%	
Health &						
Safety:	0=No impact	1=Few injuries	2=Few fatalities, man	ny injuries	3=Numerous fatalities	
				2=Few destroye	d, many damaged or Few damaged, many de	stroyed 3=Many properties destroyed
Property:	0=No impact	1=Few destroyed or	r damaged	or damaged		
				3=No		
Environment:	0=Little or No impact	1=Short term	2=Long term	recovery		
					3=High [birect and Indirect
Economic:	0=No impact	1=Low costs	2=High direct cost an	nd Low indirect or	Low direct and High indirect Cost	
				3= <100		
Probability:	1=Unknown but rare	2=Unknown but anti	icipated	vear	4=<25 vear 5=Once a vear or more	

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2014 PLANNNING PROCESS:

Concrete Mayor Jason Miller has developed the town's 2014 Natural Hazard Mitigation Plan update, following earlier efforts from former town planner Rick Cisar and the town's current Fire Chief, Rich Philips. Mayor Miller provided information to be included in the updated plan and coordinated the plan update with Skagit County Department of Emergency Management personnel.

Representatives from Town of Concrete government worked closely with other jurisdictions, agencies, Indian tribes, and the Skagit Natural Hazards Planning Committee to develop a comprehensive, coordinated mitigation plan intended to reduce the vulnerability to natural hazards within the Town of Concrete. Mayor Miller also participated in multiple Natural Hazard Mitigation Planning committee meetings and public meetings created specifically to discuss plan goals and gather public comment on the plan.

PLAN REVIEW, EVALUATION AND IMPLEMENTATION

The plan will be reviewed each year by the Town of Concrete Town Council, in which time the hazards, vulnerabilities, and mitigation measures will be evaluated to identify changing conditions, as well as the progress and effectiveness of proposed mitigation measures. The Town of Concrete shall submit an annual evaluation report to the Chairperson of the Skagit Natural Hazard Mitigation Planning Committee no later than September 15 to be included in the annual Hazard Mitigation Plan evaluation report. The Skagit County Natural Hazard Mitigation Plan evaluation report. The Skagit County Natural Hazard Mitigation Plan be reviewed and updated in its entirety every 5 years under the direction of the Skagit County Department of Emergency Management. Throughout the update, the public also will be encouraged to participate in the planning process during meetings and comment periods.

Hard copies of the plan will be made available throughout the county through local libraries and various government offices for public review. The plan will also be available online through the Skagit County Web site.

Town of Concrete is committed to the implementation of the mitigation-related projects and/or programs described in this section of the plan when and if resources become available. The Town of Concrete is also committed to continuing the mitigation planning process that has resulted in the development of this document, and to the ongoing cooperation with other agencies, organizations, Indian tribes, and jurisdictions to make the Town of Concrete more resistant to the damages and hardships that otherwise could be the result of future natural disasters.

PLAN ADOPTION

The plan will be formally adopted by resolution by the Town of Concrete as the official Natural Hazard Mitigation Plan pending review and approval by Washington State Emergency Management Division and FEMA.

INCORPORATING MITIGATION INTO OTHER PLANNING MECHANISMS:

Since the development of the **Skagit County Natural Hazard Mitigation Plan** in 2003, the Town of Concrete has adopted and is implementing the 2012 International Building Code and the 2006 International Fire Code. In 2012 the Town of Concrete amended its Critical Area Regulations, which include frequently flooded and geologically hazardous areas.

Town of Concrete has adopted the basic planning and code framework as required by the Washington State Growth Management Act. The Town of Concrete Comprehensive Plan and Code was amended and adopted in 2005; a full update is scheduled for 2016. As part of the 2016 update of the Comprehensive Plan, the Town of Concrete will incorporate the mitigation strategy and other information contained in the mitigation plan (as appropriate) into the Comprehensive Plan. The process followed in updating the Comprehensive Plan will serve as the process for incorporating the mitigation strategy and other information contained within the plan (as appropriate) into the Comprehensive Plan during the 2016 update process.

Current Hazard Mitigation Codes/Plans/Ordinances:

- Comprehensive Land Use Plan
- Adopted Land Use/Zoning Code
- o Critical Areas Regulations
- 2012 International Building Code
- 2006 International Fire Code
- Participation in NFIP Program

The Town of Concrete participates in the National Flood Insurance Program (NFIP). The identifying, analyzing, and prioritizing of mitigation measures is based (and will continue to be based) upon continued participation and compliance with the National Flood Insurance Program. Based on the 2014 FEMA-provided map of repetitive loss structures, there is only one (1) repetitive loss property (residential) within the Town of Concrete.

COMPLETED MITIGATION MEASURES

For the past several years, the Town of Concrete has been working to mitigate the effects of natural and technological hazards. The following projects have been completed to help protect the citizens of the Town of Concrete:

- 1. The Town of Concrete has worked with Puget Sound Energy to install a siren warning system for the Town of Concrete to warn residents and business owners in the event of a dam failure. Siren installation is complete and operational.
- 2. To help mitigate the problem of flooding, the Town of Concrete maintains a stock of sandbags from the United States Army Corps of Engineers as well as a ready supply of sand that is available to local citizens in the event of a flood.
- 3. To help mitigate the effects of severe winter storm events, the Town of Concrete has snow plows, a backhoe, and a road grader that are available for use on a 24-hour basis.
- 4. The Town has contracted with the Skagit County Sheriff's Office to improve and increase police services and the town's ability to respond to natural disaster events within the Town of

Concrete, such as landslides and volcanic unrest. The former town library has been remodeled to provide office space for Sheriff's Office personnel assigned to the Town of Concrete; that space is now known as the SCSO East Detachment office.

- 5. In 2006 the Washington State Rating Bureau improved the rating of the Concrete Fire Department from Class 7 to Class 6.
- 6. Town of Concrete has applied for a variety of equipment through Department of Homeland Security grant programs. It is anticipated that some of this equipment, especially communications equipment, will be used to improve response and recovery efforts during natural hazard events.
- 7. To help ensure adequate potable water storage for the citizens of Town of Concrete, two new water storage reservoirs (each with a capacity of 200,000 gallons) have been installed in the past 10 years. In addition, the town has also refurbished the old wood storage tank that has a capacity of 100,000 gallons. An additional 500,000 gallon storage tank is proposed to provide capacity/ storage for future residential developments. Funding for the new storage tank will involve a public/private partnership with the development community.
- 8. To help evaluate possible sewage line problems resulting from earthquake or land movement problems, the town completed in 2014 a systemwide camera surveillance project of all sewage lines, which identified three locations requiring upgrades. These upgrade needs have been prioritized and will be completed as funding becomes available.
- 9. The town's wastewater treatment plant went online in fall 2008. The previously used 1.7 milliongallon sewage lagoon saw a decommissioning delay because of lack of funds. New conversations with the Washington State Dept. of Ecology have developed new, less expensive options for decommissioning the lagoon, with a land application option tentatively scheduled for May 2015.

PROPOSED MITIGATION MEASURES:

In addition to the multiple-hazard mitigation action items listed in Section III of this plan, the Town of Concrete has proposed the following jurisdiction-specific mitigation measures (ranked in order of importance) for the 2014 – 2019 plan cycle:

1. **Construct a new Fire Station/Pubic Safety Building on high ground and out of the 100-year floodplain on Main Street.** *This mitigation measure should be completed during the 2014 – 2019 plan cycle.*

Because of its age and its location at the top of an unstable slope that has been designated as a Critical Area (preventing any attempts to stabilize it), the current public safety building is vulnerable to partial or complete collapse because of an earthquake or bank erosion due to a severe flood event or dam failure. The building currently houses all fire apparatus and associated fire fighting equipment owned by the Town of Concrete.

- LEAD AGENCY: Fire Department and Public Works Department
- FUNDING SOURCE: CDBG and WA state budget appropriation
- TIME-LINE: August 2014 through May 2015
- 2. Replace existing wood and trancite water lines with ductile iron or similar material to minimize the breakage of water lines due to land movement.

This mitigation measure is ongoing; a Main Street project in 2013 included some water line

replacements; the town's "Mill Addition" neighborhood has been engineered for replacement. Replacement of remaining substandard water lines has been re-affirmed for the 2014 – 2019 plan cycle.

- LEAD AGENCY: Public Works Department
- FUNDING SOURCE: Various grant funding sources
- TIMELINE: Long Term (more than 3 years from funding)
- 3. **Replace existing 1989 pumper engine to provide an increased level of fire protection for the Town of Concrete.** *This mitigation measure was not accomplished due to lack of funding and has been re-affirmed for the 2008 – 2013 plan cycle.*

The fire apparatus currently owned by the Town of Concrete is in need of upgrading and is not appropriate for wildland fire response. (During the 2008 – 2013 plan cycle, the town's 1968 pumper engine was replaced with a previously owned pumper from City of Sedro-Woolley, engine No. 2813.)

- LEAD AGENCY: Fire Department
- FUNDING SOURCE: Various grant funding sources
- TIME-LINE: Long Term (more than 3 years from funding)
- 4. Modify existing electrical service for Concrete Town Hall and SCSO East Detachment Office to allow for the rapid installation/connection of a 65KW generator in the event of power outage. This mitigation measure has been separated from the previous measure that included similar electrical service for the town's three sewer lift stations; that measure was completed during the 2008 – 2013 plan cycle. The new measure has been identified for the 2014 – 2019 plan cycle.
 - LEAD AGENCY: Public Works Department
 - FUNDING SOURCE: Various grant funding sources
 - TIMELINE: Short Term (less than 3 years from funding)





TOWN OF HAMILTON

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TOWN OF HAMILTON

PROFILE

Population of Jurisdiction: Estimated Geographical Size: Principal Economic Base: Homes in City Limits: Predominant Structure Type: Estimated Structure Value:

CONTACT INFORMATION

301 (2010 Census) .94 Square Miles (over 50% located in Floodway) Business and Industrial; 315 acres in use 103 Single Family, 2 Multi-Family Wood Frame Median Value \$95,950

Margaret Fleek, Town Planner 584 Maple Street P.O. Box 528 Hamilton, WA 98255 Telephone: (360) 826-3027 Email: townofhamilton.2010@gmail.com

INTRODUCTION

Representatives from Town of Hamilton government worked closely with other jurisdictions, agencies, Indian tribes, the public and the Skagit Natural Hazards Planning Committee to develop a comprehensive, coordinated mitigation plan intended to reduce the vulnerability to natural hazards within the Town of Hamilton. The information contained in this document identifies the specific natural hazards threatening the Town of Hamilton, characterizes the vulnerability of the Town of Hamilton regarding these hazards, and identifies current and proposed mitigation strategies to address those vulnerabilities.

2014 PLAN UPDATE & PROCESS

The Town Council acts as the Natural Hazard Mitigation Planning Committee for the Town of Hamilton. Information for the 2014 plan update was provided by Ms. Lauren Tracy, Hamilton Public Development Authority contractor, and Ms. Margaret Fleek, Town Planner. Ms. Fleek coordinated the 2014 plan update with Skagit County Department of Emergency Management personnel. The plan is updated every 5 years, during which time mitigation goals are reviewed and new goals identified for the up-coming five years. The plan is reviewed to identify any changes in development, mitigation efforts and priorities. Five public meetings were held to engage the community and encourage participation in the plan update. The plan is reviewed annually during which time additional public meetings are held to include community input. The 2014 update of the Natural Hazard Mitigation Plan is adopted by Resolution.

To complete the vulnerability assessment, the Town of Hamilton utilized 2014 FEMA Hazus reports, 20/20 Mitigation software provided by the Washington State Emergency Management Division and local analysis tools. This information includes, when available, United States Census data, local tax records, local geographic information system data, Flood Insurance Rate Maps, hazard specific analyses, and other environmental and demographic facts. As part of the

vulnerability assessment process, the Town of Hamilton completed an inventory of all critical facilities and has considered these critical facilities in the planning and mitigation strategy development process.

INCORPORATING MITIGATION INTO OTHER PLANNING MECHANISMS

The Town of Hamilton is governed by a Mayor and 5 Town Council members that set policy and oversee the budget, the comprehensive plans, the water system, the volunteer Fire Department and the maintenance department. The process by which Hamilton will incorporate the mitigation strategy and other information contained in the **Skagit County Natural Hazards Mitigation Plan** into other planning mechanisms is:

- 1. Adoption of the plan by the Town Council.
- 2. Inclusion into the Town of Hamilton Comprehensive Plan, when appropriate.
- 3. Inclusion in the Land Use Code, the Critical Areas Code and the Flood Code.

The Town of Hamilton participates in the National Flood Insurance Program (NFIP). There have been 131 losses collectively reported since 1980 amounting to more than \$2.7 million in flood insurance claims paid for buildings that have a total value (from FEMA data) of \$4.8 million. The Town of Hamilton Repetitive Loss Mitigation Strategy Report dated June 2005 and the April 2007 Update identify issues of concern, and propose a comprehensive approach to address direct and indirect issues associated with repetitive flooding experienced in Hamilton and surrounding areas of the Skagit River floodway.

At the time of the 2008 update of the Natural Hazard Mitigation Plan, the Town of Hamilton had an active Public Development Authority (formed in 2004) that was working on relocating the town out of the Skagit River Floodway. Since then, all funding has been expended and the Town made the decision to eliminate the PDA until such time as funding is available. The 2014 update of the plan reflects the fact that the project to relocate the historic area of Hamilton out of the Floodway is not funded, although the framework is in place.

The Town of Hamilton has successfully completed a Sub Area Planning process which includes an Urban Growth Area expansion request to accommodate town relocation. In August 2008 the Board of County Commissioners adopted the Urban Growth Area expansion request (Ordinance #020080010). Following adoption, the Town annexed the remainder of the industrial land that is out of the floodplain. This action provides the framework for the relocation of the Town of Hamilton out of the Skagit River floodway by establishing developable land within the Town's jurisdiction. This mitigation strategy is the major focus for all actions of the Town because of the extreme flood problem and the previous lack of developable land within the Town. As an NFIP community, the ability to develop a relocation site is a critical step in providing environmental justice to residents and more effectively enforcing floodplain management requirements under WAC 173-158-070.

The Flood Code was updated in 2011 to the most current standards, along with implementing a Code Enforcement ordinance and action plan to ensure compliance with the Flood Code in the Town. In addition to the Comprehensive Sub Area Plan, Hamilton has also adopted the most recent editions of the International Building Code and International Fire Code.

An annual letter is sent to all residents and property owners regarding the flood hazard, copy attached. Town of Hamilton government is committed to the implementation of the mitigation-related projects described in this section of the plan if and when resources become available.



TOWN OF HAMILTON - 2003 Flood Event



Town of Hamilton 2008 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental Damage+Economic Disruption multiplied by Probability of Occurence)

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Earthquake	4	1	2	1	2	2	20
Flooding	4	1	2	1	2	5	50
High Winds	4	1	1	1	1	2	16
Landslide/Erosion	1	1	1	1	1	1	5
Storm Surge/Tsunami	0	0	0	0	0	1	0
Subsidence, expansive Soils	1	0	0	0	0	1	1
Urban Fire	1	1	1	1	2	2	12
Wildfire	1	1	1	1	1	1	5
Winter Storm	4	1	1	0	1	2	14
Volcanic Activity	4	2	3	3	3	2	30

Total Jurisdictional Risk Estimation Score: 153

Area Impacted:	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%		
Health & Safety:	0=No impact	1=Few injuries	2=Few fatalities, mar	ny injuries	3=Numerous fataliti	ies Four demogradium o	nu destroued 2-Manu properties destroued or
Property:	0=No impact	1=Few destroyed or	damaged	damaged	a, many damaged of	rew damaged, ma	ny destroyed 3=many properties destroyed of
Environment:	0=Little or No impact	1=Short term	2=Long term	3=No recovery			
Economic:	0=No impact	1=Low costs	2=High direct cost ar	nd Low indirect or I	Low direct and High in	ndirect	3=High Direct and Indirect Cost
Probability:	1=Unknown but rare	2=Unknown but antic	ipated	3= <100 year	4=<25 year	5=Once a year o	r more

TOWN OF HAMILTON MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
2005 COMPREHENSIVE PLAN & 2007 SUBAREA PLAN Flooding	Major Findings	Redevelop the Town north of SR 20 on land that is not in the Floodway or Flood Plain. 310 acres, or 50% of the Town is located in the Floodway and 100-year Flood Plain.
		Encourage the continued purchase, relocation, or elevation of eligible buildings through FEMA Section 1362 Acquisition of Flood Damaged Properties Program, and convert the land to open space, recreation and park areas.
1994, 1999 CAPITAL FACILITIES PLAN Flooding, Severe Storm,	Major Findings	Construct new well and storage tank outside the floodway; establish well-head protection program (completed in 2003).
Earthquake		Construct new Fire Station and Shop complex outside floodway (completed in 1999).
		➤ To provide needed public facilities to all residents within Hamilton in a manner which protects investments in existing facilities, and maximizes the use of existing facilities, and promotes orderly compact urban growth.
2005 COMPREHENSIVE PLAN and COMPREHENSIVE WATER SYSTEM PLAN as updated Flooding, Earthquake, Severe Storm, Fire	Major Findings	➤ Level of Service should be at a minimum of C. The transportation plan is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system along SR 20.
		➤ The Town of Hamilton Water System Supply Plan Update is hereby adopted by reference, as may be further amended.
		➤ The area is currently served by the Town of Hamilton Fire Department Service is currently made up of volunteers.
2005 COMPREHENSIVE PLAN UPDATE Flooding	Major Findings	➤ Use innovative land use techniques include Transfer or Purchase of Development Rights and establishing a coordinated redevelopment plan to move housing and business out of the Floodway.

MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS - continued

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
2007 COMPREHENSIVE SUBAREA PLAN Flooding	Major Findings	➤ Add land to the Hamilton Urban Growth Area and Town limits that is located outside of the 100- year flood plain for the purpose of relocating the Town of Hamilton central residential and business district from its existing floodway location.
		➤ Use the Hamilton Public Development Authority (established by Ordinance #241, amended by Ordinance #261) to facilitate transition of town residential and business areas out of the floodway, and to assume the lead on securing real land for town relocation, planning infrastructure and capital facilities, transferring population from floodway areas in Hamilton and identified areas of Skagit County, and restoring developed riparian corridor areas to open space for flood storage, long- term habitat, fish and wildlife conservation, and conservation-minded recreation purposes.
2005 COMPREHENSIVE PLAN Steep Slopes, Flooding, Earthquake, Severe Storm	Goal LU6	To improve, enhance, and protect the quality and quantity of surface and ground water.
2005 COMPREHENSIVE PLAN Fire, Land Movement, Flooding	GOAL LU8 AND POLICY LU8.2	 Protect and conserve forest land, agricultural land, mineral resources, and critical areas as defined under the Growth Management Act. Conversion of designated forest lands to non forest designations and of Industrial Forest lands to Secondary Forest lands will be strongly discouraged through clearly defined land use regulations.
2005 COMPREHENSIVE PLAN Flooding	Policy H3.6	Measures should be taken to economically and effectively protect existing housing stock from flood damage through various techniques including the relocation, elevation and sealing of buildings. Other forms of protection that should be promoted include levees and flood walls.

MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS - continued

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
2002 CRITICAL AREAS ORDINANCE and 2011 FLOOD CODE Land Movement, Earthquake		Provide adequate erosion and sedimentation control during construction and additional construction practices, methods and requirements, including but not limited to best management practices and limitations on construction equipment permitted on the site, to protect critical areas on the site, on adjacent sites and within the drainage basin.
		All grading in critical areas shall be stabilized by October 31st unless demonstrated to the satisfaction of the Town based on approved technical analysis that no environmental harm or safety issues would result from grading between November 1st and March 31st.
		Provide protection of steep slopes according to standards in the Critical Areas Ordinance (#239).
2007 COMPREHENSIVE SUBAREA PLAN Flooding	Goal H10	Encourage all new development to be outside of the flood plain. Encourage existing properties which have suffered from repetitive loss due to flooding, to locate outside of the flood plain.
	Goal H11	Promote a variety of residential densities and housing types in the relocated Town site north of SR 20.
	Goal H12	Preserve and conserve existing housing stocks in Hamilton. Initiate incentive programs towards the renovation, rebuilding, elevating in areas of special flood hazard and upgrading of existing housing stock. Encourage the relocation of existing housing outside of the flood plain through a Transfer of Development Rights Program (Ordinance #179, amended by Ordinance #273, authorizing the Hamilton Floodway Relocation and Mitigation Credit Program). Measures should be taken to economically and effectively protect existing housing stock from flood damage through various techniques including relocating and elevating buildings.

MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS - continued

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
2007 COMPREHENSIVE SUBAREA PLAN Flooding continued from the previous page Ordinance 292 Flooding	Floodway Mitigation Element	 The Hamilton Public Development Authority will undertake, assist with and otherwise facilitate activities (cited in Ordinance 241, amended with Ordinance 261) for the purpose of improving the general living conditions, economic and environmental conditions within the Town of Hamilton and unincorporated areas of Skagit County in the vicinity of Hamilton. Code is updated to the latest FEMA standards
CAPITAL IMPROVEMENT PLAN Fire, Earthquake, Severe Storms	Level of Service Standards and Individual Department Submittals	 Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards Six-year list of projects including specific actions targeted towards natural hazard mitigation
2012 INTERNATIONAL BUILDING CODE Earthquake, Severe Storm, Fire, Landslide	Seismic and Wind Loads, Construction Standards	 Seismic Zone D Wind Exposure C Fire Resistive Construction Standards Grading Standards
2012 INTERNATIONAL FIRE CODE	Fire protection and building maintenance standards	 Fire flow Annual Inspection of Commercial Structures Plan Review
2002 CRITICAL AREAS CODE AND ORDINANCE 292 FLOOD DAMAGE PREVENTION Flooding, Land Movement	Section 15.15.020 Application- Purpose	 ➤ Frequently flooded areas; It is the purpose of this Chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in the flood plain and the floodway according to the provisions established under this code; ➤ Geologically hazardous areas; Geologically hazardous areas include areas susceptible to the effects of erosion, sliding, earthquake, or other geologic events.

MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS – continued

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
ZONING CODE Flood, Fire, Landslide, Earthquake	Section 17.03.020 Purpose	➤ The purpose of this title is to implement the Town of Hamilton's comprehensive plan. This title will be used to further the growth and development of the Town of Hamilton consistent with the adopted comprehensive plan and it's implementing elements. This title will also further the purpose of promoting the health, safety, morals, convenience, comfort, prosperity, and general welfare of the city's population
		➤ The specific zones and regulations herein are designed to facilitate adequate provisions of utilities, schools, parks and housing with essential light, air, privacy, and open space; to lessen congestion on streets and facilitate the safe movement of traffic thereon; to stabilize and enhance property values; to prevent the overcrowding of land; to facilitate adequate provisions for doing public and private business and thereby safeguard the community's economic structure upon which the prosperity and welfare of all depends and through such achievements help ensure the safety and security of home life, foster good citizenship, create and preserve a more healthful, serviceable and attractive municipality and environment in which to live.
		➤ To most effectively accomplish these purposes, this title divides the city into zones wherein the location, height and use of buildings, the use of land, the size of yards and other open space, and the provision of off-street parking and loading are regulated and restricted in accordance with the comprehensive plan for the Town of Hamilton. These zones and regulations are hereby deemed necessary and are made with reasonable consideration, among other things, as to the character of each zone and its particular suitability for specific uses, the need for such uses, the common rights and interests of all within the zone as well as those of the general public, and with the view of conserving and encouraging the most appropriate use of land throughout the town.

TOWN OF HAMILTON ACTION PLAN FOR FLOOD HAZARD REDUCTION - SELECTION OF APPROPRIATE ACTIVITIES

1. Preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;

ACTIVITY	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Earthquake, Severe Storm, Fire, Land Movemen	t	
Utilize the latest adopted state building code to insure adequate protection in construction against Earthquakes in Seismic Zone D, Severe storms with Wind Exposure C, Fire with Fire Resistive Construction Standards, and Land Movement with Grading Standards	2012 International Codes adopted	No financial impact
Utilize the latest adopted state fire code to insure adequate protection against Fire in construction with standards for Fire flow and through the annual Inspection of Commercial Structures	2012 International Codes adopted	No financial impact
Flood		
The Floodway, Special Flood Risk Zone and the 100 year Flood Plain shall be regulated and flood mitigation activities implemented to protect human life, property and the public health and safety of the citizens of Hamilton; minimize expenditure of public money; and to maintain the town's flood insurance eligibility while avoiding unnecessarily restrictive or administratively difficult regulations.	Administration of 2002 Critical Areas Code and the 2011 Flood Code update along with improved code enforcement	No financial impact
Manage storm water runoff to improve drainage, control storm water quantity, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality.	Town Council and staff	Funded by general tax revenues
Identify and reserve the majority of Skagit River shoreline for open space and recreational uses due to the unique floodway and flood plain limitations imposed on shoreline uses, particularly with the dike system.	Town Council maintain open space zoning – Ongoing	Pursuit of grants and non- governmental funding for open space habitat creation and restoration.
Flood, Landslide, Earthquake	-	
Utilizing Best Available Science to develop the Critical Areas title to protect, to the greatest extent practical, life, property and the environment from loss, injury and damage by pollution, erosion, flooding, landslides, strong ground motion soil liquefaction accelerated	Town Council, Planner and consultants - Ongoing program and regulations are in place.	None required

soil creep, settlement and subsidence, and other potential hazards, whether from natural causes or from human activity and related goals.		
Coordinate with Skagit County through arrangements such as interlocal agreements, joint programs, consistent standards, and regional boards or committees such as with the Hamilton Public Development Authority.	Town Council and Planner - Multi-jurisdictional All Natural Hazards Mitigation Planning project	Initial development funded by State/Federal grant
		No financial impact
Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards	Town Council - Update with 2007 Comprehensive Subarea Plan amendment.	Funding provided on an individual project basis

2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Landslide		
Provide protection of steep slopes according to standards in the Critical Areas Ordinance.	Town Council	Funding on a project by project basis
Flooding		
Regulations and policies shall reflect the existing dikes along the Skagit River until such time as the removal of hydro-modifications is deemed appropriate for Hamilton long-term floodway management and open space habitat creation and restoration.	Flood code	Current grant funding framework is focused on salmon habitat and NOT on towns with problems
Flooding		
Nonstructural solutions to flood hazards shall be encouraged including restricting new development and reducing existing development in flood-prone areas and storm water runoff management.	Town Council	General budget
Insure that standards for flood control measures protect and enhance the biological systems and public access opportunities of the shoreline and adjacent uplands.	Town Council	General budget
The Building Official will continue to maintain elevation certificates. Elevation certificates will be pursued for properties without one on record.	Building Official - Ongoing	General budget
The Town staff will continue to provide technical advice to property owners, contractors and design professionals.	Town Clerk, Planner.	Funding on individual project basis.

Provide adequate emergency power for Town water system and Fire Department. Update emergency radios to narrow band frequency	Town Council and Town Council and Fire Department – Completed in 2008.	Grant funding
Earthquake, Severe Storm, Flooding		
Move water system including wells, storage and treatment facilities out of the flood plain; provide Emergency Generator capability; upgrade construction to latest seismic and wind standards	Town Council & consultants Completed water system storage, treatment, and generator upgrades in 2008.	Water utility and grants

3. The plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
Protect and restore critical areas; plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions.	Town Council, Hamilton Public Development Authority and consultants – Ongoing and re-affirmed for the 2008 – 2013 plan cycle.	Funding needed for urban areas; currently only available in rural areas
Provide habitat for wildlife species and freshwater fish in close proximity to an urban area.	Town Council	Funding needed for urban areas; currently only available in rural areas
To protect and restore the wetlands to optimize water quality, habitat, best management practices and ensure that adjacent land use patterns are compatible with the protection and enhancement of the wetlands and take advantage of the unique attributes of the site, allowing no net loss of wetlands, and to remove obstructions and generally improve the flow characteristics to provide for efficient conveyance of water through the city during flood events.	Town Council, Street Department.	Funding needed for urban areas; currently only available in rural areas
To allow limited use of the Skagit River and its shoreline compatible with the Dike system and with the regulatory constraints of the Floodway and Special Flood Risk Zone, including transportation, levee improvement, utilities and outfall structures, public access and recreation, open space and agriculture and similar uses. Review based on individual permits.	Planning Department and Public Works Department	Combination of funding including grant funds, department budgets and pursuit of non- governmental funding for habitat creation/restoration.
Flooding, Earthquake, Landslide, Fire, Se	vere Storms	
Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase	Town Council	Seeking opportunities for funding for open space habitat conservation and

access to natural resource lands and water, and	appropriate recreation.
develop parks. Integrate the concepts with	
natural functions such as drainage, agriculture,	
and topographic features.	

4. The plan reviews emergency services activities, such as warning and sandbagging;

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding, Earthquake, Volcano		
Develop and maintain an emergency plan that includes flood warning, earthquake response, and evacuation program for the Town.	Town Council – Annual review	Funding integrated into overall budget
The transportation planning goals and level of service is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system. Critical for evacuation	Town Council – Review with update of Comprehensive Plan.	Funding integrated into overall budget
Maintain Fire, Water Treatment Critical Facilities up to date with most current technology and standards to ensure operation during hazard events.	Town Council, Volunteer Fire Department and Water System	Grant funds, loans, utility rate structure

5. The plan reviews structural projects, such as reservoirs and channel modifications;

ACTION	STAFF ASSIGNMENT AND SCHEDULE	FINANCING PLAN
Flooding		
Structural Measures – Maintain existing dike system	Town Council	Funds needed
Relocate the town out of the floodway and north across State Route 20; acquire and transfer development rights from floodway properties.	Town Council	Public-private partnerships, grant funding not available.
All Hazards -		
Six-year list of capital projects including specific actions targeted towards natural hazard mitigation.	Town Council – Regular Update	General Funds, Utility Funds, grant funds, loans
Upgrade and maintain all community owned critical facilities, including Fire Station and Water System.	Town Council - All facilities updated	General Funds, Utility Funds, Grant funds, loans

6. The plan reviews public information activities, such as outreach projects and environmental education programs;

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
Provide ongoing public education and outreach using electronic and printed materials and meetings regarding town relocation activities, residential, commercial and industrial best management practice issues, flood hazard mitigation, water quality, and related local issues.	Town Clerk	Water utility, grant funds, publication of program information
Make flood map determinations in response to public inquiries.	Town Planner	General fund
All Hazards		
Expand the Public Information program to address other natural hazards where additional public information will be helpful, such as seismic retrofits for homes, and other topics. Hazards identified through Multi- jurisdictional Planning process.	Town Clerk	Grant funds and reference electronic and print materials available to the general public from Skagit County.

Listed below is a summary of natural hazard mitigation actions identified in the 2008 update of the *Skagit County Natural Hazards Mitigation Plan.* Progress made during the 2008-2013 plan cycle regarding these actions is noted.

Maintain the existing flood-warning and evacuation program to protect life and property.

The Town of Hamilton has continued this program through the 2008-2013 plan cycle to provide advance flood warning to residents. This program is initiated by the Hamilton Fire Department in coordination with the Mayor.

This mitigation action is current and on-going and has been re-affirmed for the 2014-2019 plan cycle.

Provide public education and outreach to inform residents of the local flood hazard.

The Town of Hamilton provides information regarding flood hazard and the community flood-warning and evacuation program in the October utility billing. Emergency preparedness brochures were also provided to all residents in 2014 in coordination with Skagit County Emergency Management. Emergency preparedness information is also available at Town Hall.

This mitigation action is current and on-going and has been re-affirmed for the 2014-2019 plan cycle.

Continue existing efforts to restrict development and regulate flood hazard areas to protect life and property.

(Floodway, Special Flood Risk Zone, 100-Year Floodplain)

Continue existing Surface Water Management efforts to assist in preventing localized flooding of streets and private property during storm events.

Continue existing efforts to reserve the majority of shoreline along the Skagit River for open space and recreational use to mitigate flood damage.

Continue existing efforts to protect and restore wetlands to improve conveyance of water through the town during flood events.

Maintain involvement in the Hamilton Public Development Authority and encourage revitalization of efforts to relocate the Town of Hamilton out of the floodplain.

Continue existing efforts to identify and protect steep slopes in accordance with the Critical Areas Ordinance.

Pursue federal mitigation funds (if available) to acquire and remove repetitive loss properties and severe repetitive loss properties.

Explore funding opportunities to maintain the existing dike system along the Skagit River.

ANNUAL LETTER SENT IN 2013

ATTENTION ALL HAMILTON RESIDENTS

This notice is to remind you that we are approaching flood season here in the Town of Hamilton. To help you prepare we are informing you of the following:

Please have any recreational vehicles currently licensed and road-ready at all times. As stated in Ordinance 292, you are responsible for having on site a towing vehicle maintained in operable and licensed condition for any recreational vehicles that require towing and any connected utilities to recreational vehicles to have quick disconnect fittings. Monthly inspections by a Town Representative are conducted to record violations as required by FEMA. Resolution 06-11 requires all recreational vehicles to have a use permit and owners to sign the permit agreeing to restrictions and conditions of the Town of Hamilton.

All residences when evacuating please shut all power off at your main panel box and shut off propane at the propane tank. When you evacuate, stop by and notify the Fire Department. Please provide a contact phone number to assist any family and friends trying to find you. If you are staying at your residence during the flood, please notify the Fire Department. Once you leave and flood water is in the town, you will not be allowed back in until it is declared safe by the Fire Department and Mayor (NO EXCEPTIONS). The Fire Department will secure all roads leading in and out of the Town of Hamilton for your safety and to help protect your private property.

As per Ordinance 179, junk storage and the keeping of more than one inoperable vehicle, including recreational vehicles, is prohibited outdoors unless in a solid fenced yard and not visible from the street. If you need assistance in removing inoperable vehicles from your property now, please let us know and we will try to assist you. The Town of Hamilton does not have the resources to move inoperable vehicles during an evacuation. In the event of a flood, anything loose in your yard will quickly spread to other yards and possibly cause damage. Please help now by keeping your property cleaned up.

Please have an emergency plan for your pets and animals. In the event of a flood, the Town of Hamilton does not have the resources to provide shelter or transportation for animals.

In the event of a possible flood evacuation warning sirens will be sounded as follows:

FLOOD ALERT- 1 minute siren (possible flooding)

PREPARE TO EVACUATE – 1 minute siren, 30 second break, 1 minute siren (Lower areas of town could see minor flooding).

COMPLETE EVACUATION -1 minute siren, 30 second break, 1 minute siren, 30 second break, 1 minute siren. This means to completely leave your residence and move to higher ground and be prepared not to be able to return for up to 3 to 5 days.

All emergency operations will be handled by the Hamilton Fire Department at an Emergency Operation Center at the Fire Department. The Emergency Operation phone number is **826-3983**.

BE PREPARED, BE SAFE!

THE TOWN OF HAMILTON MAYOR CROMLEY AND COUNCIL MEMBERS

TOWN OF HAMILTON: Adopted Urban Growth Area for Town Relocation





TOWN OF HAMILTON: Commercial & Residential Area of Town Relocation Urban Growth Area

TOWN OF LA CONNER

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TOWN OF LA CONNER

Natural Hazard Mitigation Plan 2014 Update

Introduction

The information contained in this document presents the results of this effort to identify the specific natural hazards threatening the Town of La Conner, to characterize the vulnerability of the Town of La Conner regarding these hazards, and to identify current as well as proposed mitigation strategies, projects and/or programs to address those vulnerabilities.

The analyses conducted by Town of La Conner staff were based on the best currently available information regarding the characteristics of the identified neighborhoods, the natural hazards that threaten the people, property, and environment of these neighborhoods as well as the impacts these neighborhoods have suffered in past disasters. This information includes, when available, United States Census data, local tax records, local and national geographic information system data, Flood Insurance Rate Maps, hazard specific analyses, and other environmental and demographic facts. In some cases, the experience, knowledge and judgment of local officials representing Town of La Conner government were used in the planning, including assumptions and approximations that were believed to be reasonable.

Town of La Conner government is committed to the implementation of the mitigation-related projects/programs described in this section of the plan when and if resources become available. Town of La Conner government is also committed to continuing the mitigation planning process that has resulted in the development of this document, and to the ongoing cooperation with other agencies, organizations, Indian tribes, and jurisdictions to make the Town of La Conner more resistant to the damages and hardships that could otherwise be the result of future natural disasters. The Town of La Conner will formally adopt the 2015 Natural Hazard Mitigation plan upon its approval by Washington State Emergency Management Division and FEMA.

The Town of La Conner has participated in the Skagit County Multi-Jurisdictional Natural Hazard Mitigation Plan since its inception in 2003. The plan is reviewed each year and updated on a 5 year cycle. During the annual review process, Town of La Conner staff will assess the plan to identify changing conditions, progress towards mitigation goals and identify areas for improvement. A report summarizing review findings drafted by La Conner staff should be submitted to the Skagit County Natural Hazard Mitigation Planning Committee for inclusion to a formal multi-jurisdictional report sent to Washington State Emergency Management Division. Every 5 years the plan is reviewed in depth and updated to reflect new or changing natural hazards and the risks they pose to life and property, mitigation goals are re-evaluated and reaffirmed for another five year plan cycle. The Local Multi-Hazard Mitigation Planning Guidance

dated October 1, 2011 was also reviewed to determine new components that needed to be added to the plan as part of the 2014 plan update process.

The public is encouraged to participate in the plan review and update process. In addition to planning committee meetings, 5 public meeting were held and advertised in local newspapers and on the Skagit County Website. The purpose of these meetings was to explain the planning process and solicit public input regarding concerns regarding risks and generate mitigation goals. Additional public input will be solicited during the annual review and the 5 year update.

Town staff working on the plan 2014 update are:

- John Doyle Town Administrator
- Lori Clumpner Planning Assistant
- Brian Lease Public Works Director

Town of La Conner Overview

Contact Information:	John Doyle, Administrator/Town Planner Town of La Conner P.O. Box 400 La Conner, WA 98257 Telephone: (360) 466-3125 Email administrator@townoflaconner.org
Population of Jurisdiction:	895 (2014)
Estimated Geographical Size:	0.41 square miles
Principal Economic Base:	Tourism, Boat Building and Recreation
Economic Characteristic:	Affluent

Neighborhood Characterization:

Commercial Waterfront/Business: Business district along the Swinomish Channel, beginning at South Basin Street extending south to Sherman Avenue, bordered to the east by structures belonging to South First Street; northern section of the neighborhood begins at South Pearle Jensen south to South Basin Street.

Industrial: Southern section bordered by the southern town limit, Pioneer Park to the east, the Swinomish Channel to the west and Sherman Avenue to the north; northern section begins at South Pearle Jensen Way to northern and east city limits with the Swinomish Channel to the west.

Residential: Southern and central sections bordered by town limit to the South and East; bordered by the commercial district west of South Third Street; and north to Morris Street;

Northern section bordered by public use school property beginning at Birch Lane to the north, and North Third Street to the east and Morris Street to the south.

Current Land Use and Development

This jurisdiction is considered to be fully developed. There have been no significant changes in development, and there are no predicted future changes in development at this time.

Percent of Current Land Use Category Jurisdiction

Commercial	24%
Industrial	12%
Residential	42%
Public	22%

Future Land Uses and General Development Trends

Development/Redevelopment Currently Controlled By:

• Building code

• Zoning code

• Land use plan

- Shoreline Master Program
- Hazard-specific ordinance: Flood
- Hazard-specific ordinance: Fire-structural
- Hazard-specific ordinance: Regulated slopes (Critical Areas)
- Hazard-specific ordinance: Wetlands (Critical Areas)

Natural Hazard Caused Events:

The Town has experienced a range of natural hazards in recent years. The primary threat is from flooding. The flooding potential comes from three sources:

- 1. Stormwater run-off
- 2. Storm surge with high tide
- 3. Skagit River system dike breech

The first two sources are more frequent and less damaging. The Town has taken measures to minimize the incursion from the Swinomish Channel during storm surge events and the stormwater collection systems has been upgraded with a new forced main pumping system. Storm surge levels have continued to increase and surpass predicted highs and there is concern of Global Warming and increased storm intensities continuing to contribute to coastal flooding.

To complete the vulnerability assessment process, various town staff utilized a series of locally developed forms, 2014 Hazus information provided by FEMA Region X, as well as previous 20/20 Mitigation Software runs that were provided by the Washington State Military Department, Emergency Management Division.

Town of La Conner 2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental Damage+Economic Disruption multiplied by Probability of Occurence)

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Scor
Earthquake	4	1	2	2	2	4	44
Flooding	3	1	3	2	2	4	44
High Winds	4	1	2	2	1	5	50
Infestation/Disease	0	0	0	0	0	0	0
Landslide/Erosion	2	1	1	1	1	2	12
Storm Surge/Tsunami	2	2	2	2	2	2	20
Subsidence, expansive Soils	1	0	1	1	1	1	4
Urban Fire	2	1	1	1	2	2	14
Wildfire	4	1	1	1	1	1	8
Winter Storm	4	1	2	1	2	5	50
Volcanic Activity	4	1	2	2	2	2	22
			Total Juri	sdictional Risl	k Estimatio	n Score:	268

Area Impacted:	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%		
Health & Safety:	0=No impact	1=Few injuries	2=Few fatalities, ma	ny injuries 2=Few destroye	3=Numerous fatalitie ed, many damaged or l	es Few damaged, ma	ny destroyed 3=Many properties destroyed or
Property:	0=No impact	1=Few destroyed or	damaged	damaged 3=No		U I	
Environment:	0=Little or No impact	1=Short term	2=Long term	recovery			
Economic:	0=No impact	1=Low costs	2=High direct cost a	nd Low indirect o 3= <100	r Low direct and High	indirect	3=High Direct and Indirect Cost
Probability:	1=Unknown but rare	2=Unknown but antic	cipated	year	4=<25 year	5=Once a year of	r more

Skagit County Natural Hazard Mitigation Plan

Population at Risk by Hazard

Hazard	Neighborhood	Total	Percent	Estimated At
		Population	Population	Risk Population
			Considered	
Couth gualso		-		
Еагтпquake	Commoraiol	115	1000/	115
		115	100%	115
		8	100%	4
Fleeding.	Residential	175	100%	//5
Flooding	Common and all	115	000/	02
	Commercial	115	80%	92
	Industrial	8	100%	8
	Residential	//5	60%	465
Landslide				
	Commercial	115	25%	29
	Industrial	8	50%	4
	Residential	775	25%	194
Power Outage				
	Commercial	115	100%	115
	Industrial	8	100%	8
	Residential	775	100%	775
Loss of Gas Service				
	Commercial	115	100%	115
	Industrial	8	100%	8
	Residential	775	100%	775
Loss of Sewer Service				
	Commercial	115	100%	115
	Industrial	8	100%	8
	Residential	775	100%	775
Loss of Water Service				
	Commercial	115	100%	115
	Industrial	8	100%	8
	Residential	775	100%	775
Storm Surge, Tsunami				
	Commercial	115	90%	104
	Industrial	8	100%	8
	Residential	775	65%	504

As part of the vulnerability assessment process, Town of La Conner government completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process.

Critical Facilities Identified

Facility Name or		Facility	Street or Location	1		
Designation	Facility Owner	Function	Description	City	State	Zipcode
Waste Water Plant	Town of LaConner	WW Treatment	12154 Chilberg Road	La Conner	WA	98257
Fire Hall	La Conner/FD#13	Apparatus Station	12154 Chilberg Road	La Conner		
Harbor Villa		Nursing Home	403 State Street	La Conner	WA	98257
La Conner Elementary	La Conner School Dist.	School/Library	503 North Sixth Street	La Conner	WA	98257
La Conner High School	La Conner School Dist.	School/Library	502 North Sixth Street	La Conner	WA	98257
La Conner Middle School	La Conner School Dist.	School/Library	404 North Sixth Street	La Conner	WA	98257
La Conner Retirement Inn		Assisted living	204 North First Street	La Conner	WA	98257
La Conner Water Tank	Town of La Conner	Water system	1200 - 4th Street	La Conner	WA	98257
Sheriff's Detachment	Town of La Conner	Emergency	204 Douglas Street	La Conner	WA	98257
Town Hall	Town of La Conner	Administration	204 Douglas Street	La Conner	WA	98257
Channel Cove Housing	Skagit County	Low Income Housing	920 Park Place	La Conner	WA	98257

<u>Infrastructure</u>	Units (LF)	Total Replacement Cost		
Water Piping	109,291	\$12,559,435		
Sewer	32,148	\$ 10,062,324		
Stormwater	34,800	\$ 9,116,270		
Current Hazard Mitigation Codes/Plans/Ordinances

- Comprehensive Land Use Plan
- Adopted Land Use/Zoning Code
- Adopted Fire or Life Safety Code
- Capital Facilities Plan
- Comprehensive Water Plan
- Sewer Facilities Plan
- Stormwater Management Plan
- Hazard-specific Code
- Adopted Building Code (2012 International Building Code)
- Participation in NFIP Program
- Participation in the CRS Program (Current Rating: 7)
- Town of La Conner Flood Response Plan

National Flood Insurance Program and CRS Participation

La Conner has participated in the National Flood Insurance Program since 1985 and has been in Community Rating System (CRS) since 1995. Sixty-five (65) percent of the Town is within the 100-year floodplain. The Town has a program of activity communications with the citizens, business and the building industry to ensure that construction in flood prone areas will minimize damage from possible flood events. La Conner has never experienced repetitive loss damage claims.

TOWN OF LA CONNER MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
2005 COMPREHENSIVE PLAN • Land Use • Flooding	I. Land Use Element, App. 5-A. Inventory Analysis	 The Federal Emergency Management Agency (FEMA) has defined areas showing the extent of the 100-year floodplain in order to establish flood insurance rates and assist communities in efforts to promote sound floodplain management. FEMA maps depicting the official floodplain zones for La Conner are available at Town Hall. La Conner is a participant in the National Flood Insurance Program. Ensure consistent application of the Eloodplain
		Ordinance, Stormwater Drainage Comprehensive Plan, state and Federal policies to shoreline areas and adjacent lands.
	Land Use Goal U.	A significant portion of the Town of La Conner lies within the 100-year floodplain of the Skagit River, making it susceptible to periodic flooding. In response to this threat to public safety and infrastructure, the Washington State Department of Ecology and the Town of La Conner provided funds for the development the Town of La Conner Flood Emergency Response Plan 2003. Proposed emergency ring dike as 100 year event protection.
	Plan Adopted by the Town June 2003	
2003 TOWN OF LA CONNER FLOOD EMERGENCY RESPONSE PLAN		

2005 COMPREHENSIVE PLAN Severe Storm	Land Use Element Public Facilities	To address severe storm flooding issue Comprehensive Stormwater Manageme completed in 1995 and updated in 2007 tasks included inventory, mapping and existing drainage system, and suggeste nonstructural solutions. The Phase II to preparation of a flood/stormwater haza measures analysis associated with the S Swinomish Channel and the surroundin accompanying structural and nonstructure recommendations.	s, a nt Plan was 7. The Phase I analysis of the d structural and asks include rd reduction Skagit River, the g dikes, with ural solutions and
POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT	
2005 COMPREHENSIVE PLAN Severe Storm	Land Use Element Public Facilities	In 2000, Skagit County and the Tow secured grant funding for a storm di street improvement project on Morri project was completed in 2003. The an innovative community stormwate facility using a bio-swale adjacent to Treatment and Public Works facilitie	n of La Conner rainage and s Street. The project includes r treatment the Sewer s.
1996 COMPREHENSIVE SEWER PLAN		In August 1996, the Town of La Conner Comprehensive Sewer Plan to address needs of the Town and surrounding cor update is scheduled for 2009.	adopted a current and future mmunities. An
2007 COMPREHENSIVE WATER PLAN		In May 2001, the Town of La Conner ac Comprehensive Water Plan to ensure a quality water to the Town and adjacent The Plan was updated in 2007.	lopted a availability and communities.

2005COMPREHENSIVE PLAN Fire	Land Use: Analysis Police and Fire Protection (B)	 The Sheriff's Department has created a La Conner Detachment that is based in La Conner, but responds to an adjacent patrol area surrounding the Town. There are four full-time officers and one sergeant assigned to the La Conner Detachment. The Detachment continues to use the County Jail facilities in Mount Vernon. Fire protection for the La Conner area is provided by a mutual aid agreement between the La Conner Volunteer Fire Department and all other fire departments in the County. There is also a cost sharing agreement between Fire District 13 and the Town of La Conner. As development has progressed, and based on an analysis of the impact of growth, the Town will have to increase response capacity for fire and emergency medical demands. Accordingly, the Town and Fire District #13 have jointly built a new five-bay fire hall near the wastewater treatment plant with provisions for sleeping quarters.
POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
2005COMPREHENSIVE PLAN Fire	Land Use Element: Emergency Management Disaster Preparedness	The Town of La Conner is covered under the umbrella of the Skagit County Department of Emergency Management Disaster Preparedness Plan and the Emergency Management Council. The plan provides guidelines for coping with, and mitigating the effects of, a natural or manmade disaster or emergency in order to preserve lives and property. The Town of La Conner completed an Emergency Response Plan in 2003 to coordinate with the June 1999 Skagit County Emergency Management Plan.
 6-YEAR CAPITAL IMPROVEMENT PLAN Fire, Earthquake, Severe Storms 	Level of Service Standards and Individual Department Submittals	 Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards Six-year list of projects including specific actions targeted towards natural hazard mitigation

 2012 INTERNATIONAL BUILDING CODE Earthquake, Severe Storm, Fire, Landslide 2012 INTERNATIONAL FIRE CODE Fire 	Seismic and Wind Loads, Construction Standards Fire protection and building maintenance standards	 Seismic Zone 3 Wind Exposure C Fire Resistive Construction Standards Grading Standards Fire flow Annual Inspection of Commercial Structures Plan Review
LA CONNER MUNICIPAL CODE • Critical Areas - landsides	Chapter 15.65.080 Geologically hazardous areas.	(1) Development shall be prohibited, restricted, or otherwise controlled in areas designated or adjacent to "known or potential risk".
LA CONNER MUNICIPAL CODE • Fire	Chapter 15.107 Automatic Fire Sprinkler Systems	Automatic fire sprinkler systems installation shall be required for all new residential construction where the portion of the building occupied as a residence exceeds 4,000 square feet as measured from the inside surface of exterior walls, and for multifamily dwellings (LCMC 15.10.390), commercial, industrial and public use construction.
POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
LA CONNER MUNICIPAL CODE • Flood	Chapter 15.70 Floodplain Management	 It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to: (1) Protect human life and health; (2) Minimize expenditure of public money and costly flood control projects; (3) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

LA CONNER	Chapter	(4) Minimize prolonged business interruptions:
MUNICIPAL CODE	15.70	(5) Minimize damage to public facilities and utilities such as water and gas mains, electric telephone and sewer
• Flood	Floodplain Management	 lines, streets, and bridges located in areas of special flood hazard; (6) Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas; (7) Ensure that potential buyers are notified that property is in an area of special flood hazard; (8) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.
LA CONNER MUNICIPAL CODE * Storm	Chapter 15.100 Storm Water Management	(1) The town of La Conner intends to comply with the requirements of RCW 90.70.070 in establishing and implementing a storm water management program consistent with the Puget Sound Water Quality Management Plan. Further, the town finds that the provisions of the 1992 Storm Water Management Manual for the Puget Sound Basin (The Technical Manual), and subsequent amendments thereto, would best serve as a guideline for implementing this code.

LA CONNER MUNICIPAL CODEChapter 15.100* StormStorm Water Management(2) The provisions of this code are intended to guide new development or redevelopment within the town of La Conner and establish the minimum level of compliance which must be met to permit a property to be developed or redeveloped within the town. It is the purpose of this code to: (a) Minimize water quality degradation and sedimentation in the Swinomish Channel and other water bodies within the town of La Conner and surrounding areas. (b) Minimize the impact of increased runoff, erosion and sedimentation caused by land development and maintenance practices.(c) Decrease potential landslide, flood and erosion damage to public and private property. (d) Promote site planning and construction practices that are consistent with natural topographical, vegetation and hydrological conditions. (e) Maintain and protect the town storm water management infrastructure.(f) Provide a means of regulating clearing and grading of private and public land while minimizing water quality impacts in order to protect public health and safety. (g) Provide minimum development regulations and construction procedures which will preserve, replace or enhance, to the maximum extent practicable, existing vegetation to preserve and enhance the natural qualities of lands, wetlands and water bodies.FCAAP Ring Dike Feasibility Study • FloodFCAAP Grant 2008An engineering feasibility study was completed in 2008 of potential dike routes and enjancering ocst estimates and strategy in 2014. Also in 2014, the Army Corps of Engineers (ACE) followed up on the Section 205 reguest and will be ormuting with the Toruw has updated the study estimates and strategy in 2014. Also in 2014, the Army Corps of Engineers	POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
LA CONNER MUNICIPAL CODEChapter 15.100(2) The provisions of this code are intended to guide new development or redevelopment within the town of La Conner and establish the minimum level of compliance which must be met to permit a property to be developed or redeveloped within the town. It is the purpose of this code to: (a) Minimize water quality degradation and sedimentation in the Swinomish Channel and 			
 * Storm * Storm * Storm * Storm Storm Water Management * Storm * Storm Storm Water Management (a) Minimize water quality degradation and sedimentation in the Swinomish Channel and other water bodies within the town of La Conner and surrounding areas. (b) Minimize the impact of increased runoff, erosion and sedimentation caused by land development and maintenance practices. (c) Decrease potential landside, flood and erosion damage to public and private property. (d) Promote site planning and construction practices that are consistent with natural topographical, vegetation and hydrological conditions. (e) Maintain and protect the town storm water management infrastructure. (f) Provide a means of regulating clearing and grading of private and public land while minimizing water quality impacts in order to protect public health and safety. (g) Provide minimum development regulations and construction procedures which will preserve, replace or enhance, to the maximum extent practicable, existing vegetation to preserve and enhance the natural qualities of lands, wetlands and water bodies. FCAAP Ring Dike FCAAP Grant Flood 	LA CONNER MUNICIPAL CODE	Chantan	(2) The manificant of this code are intended to midd now
 * Storm Storm Water Management Storm Water Management Storm Water Management Compliance which must be met to permit a property to be developed or redeveloped within the town. It is the purpose of this code to: (a) Minimize water quality degradation and sedimentation in the Swinomish Channel and other water bodies within the town of La Conner and surrounding areas. (b) Minimize the impact of increased runoff, erosion and sedimentation caused by land development and maintenance practices. (c) Decrease potential landslide, flood and erosion damage to public and private property. (d) Promote site planning and construction practices that are consistent with natural topographical, vegetation and hydrological conditions. (e) Maintain and protect the town storm water management infrastructure. (f) Provide a means of regulating clearing and grading of private and public land while minimizing water quality impacts in order to protect public health and safety. (g) Provide minimum development regulations and construction procedures which will preserve, replace or enhance, to the maximum extent practicable, existing vegetation to preserve and enhance the natural qualities of lands, wetlands and water bodies. FCAAP Ring Dike FCAAP Grant Flood 		15.100	(2) The provisions of this code are intended to guide new development or redevelopment within the town of La
FCAAP Ring Dike FCAAP Grant An engineering feasibility study was completed in 2008 of Feasibility Study 2008 potential dike routes and engineering cost estimates of a ring • Flood dike closure. The Town has updated the study estimates and strategy in 2014. Also in 2014, the Army Corps of Engineers (ACE) followed up on the Section 205 request and will be	* Storm	Storm Water Management	 conner and establish the minimultimeter of compliance which must be met to permit a property to be developed or redeveloped within the town. It is the purpose of this code to: (a) Minimize water quality degradation and sedimentation in the Swinomish Channel and other water bodies within the town of La Conner and surrounding areas. (b) Minimize the impact of increased runoff, erosion and sedimentation caused by land development and maintenance practices. (c) Decrease potential landslide, flood and erosion damage to public and private property. (d) Promote site planning and construction practices that are consistent with natural topographical, vegetation and hydrological conditions. (e) Maintain and protect the town storm water management infrastructure. (f) Provide a means of regulating clearing and grading of private and public land while minimizing water quality impacts in order to protect public health and safety. (g) Provide minimum development regulations and construction procedures which will preserve, replace or enhance, to the maximum extent practicable, existing vegetation to preserve and enhance the natural qualities of lands, wetlands
 Feasibility Study Flood 2008 potential dike routes and engineering cost estimates of a ring dike closure. The Town has updated the study estimates and strategy in 2014. Also in 2014, the Army Corps of Engineers (ACE) followed up on the Section 205 request and will be consulting with the Town stoff regarding on ACE face/bility. 	FCAAP Ring Dike	FCAAP Grant	An engineering feasibility study was completed in 2008 of
• Flood • F	Feasibility Study	2008	potential dike routes and engineering cost estimates of a ring
Flood strategy in 2014. Also in 2014, the Army Corps of Engineers (ACE) followed up on the Section 205 request and will be songulting with the Town staff regarding on ACE face/bility.			dike closure. The Town has updated the study estimates and
(ACE) followed up on the Section 205 request and will be	Flood		strategy in 2014. Also in 2014, the Army Corps of Engineers
conculting with the Town staff regarding on ACE feesibility			(ACE) followed up on the Section 205 request and will be
study and follow up project proposal.			consulting with the Town staff regarding an ACE feasibility study and follow up project proposal.

TOWN OF LA CONNER ACTION PLAN FOR NATURAL HAZARD REDUCTION - SELECTION OF APPROPRIATE ACTIVITIES

1. Preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;

ACTIVITY	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Flood Event		
Skagit County and the Army Corps of Engineers (Corps) are conducting a Skagit River Feasibility Study and General Investigation to evaluate flood damage reduction alternatives for the Skagit River. The study includes topographic mapping of the floodplain, development of hydraulic and economic models for predicting potential flood damage, extensive public involvement, and development of alternatives for feasibility analyses. A key study finding is that the current dike protection system is inadequate to withstand large floods.	Skagit County/Corps of Engineers - 2008	No financial impact
La Conner conducted a feasibility study to evaluate the installation of a section of dike in the north-east quadrant adjacent to the Town to complete the dike systems that surround the Town.	FCAAP - Dike Feasibility Study Grant 2008, costs and strategy update in 2014	Grant from the Department of Ecology and local funding Local match funds
As a member organization of the Skagit Emergency Management Council, La Conner will receive periodic situation reports from the Skagit County EOC during flood emergencies. These will include crucial information such as flood levels, forecasts, dike breaks, evacuation areas, road closures, etc.	Skagit County Emergency Management – On- going	No financial impact

ΔΟΤΙΛΙΤΑ	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Flood Event		
 In order to reduce flood losses, this chapter includes methods and provisions for: (1) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities. (2) Requiring that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction. (3) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters. 	La Conner Planning and Public Works Flood Management - 15.70.030 Methods of reducing flood losses. On-going.	No financial impact
 (4) Controlling filling, grading, and other development which may increase flood damage. (5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas. 		
 Stormwater Management – General Requirements. (1) Storm Water Management Manual Adopted. The latest edition, now or as hereafter amended, of the Washington State Department of Ecology's Storm Water Management Manual for the Puget Sound Basin (The Technical Manual) is hereby adopted by reference and is hereinafter referred to as the manual. (2) Storm Water Best Management Practices (BMPs). BMPs shall be used to control storm water quantity and quality. BMPs shall be used to comply with the standards in this code. BMPs are in the manual. (3) Illicit Discharges. Illicit discharges to storm water drainage systems are 	Public Works- Administer Chapter 15.100.070 Stormwater Management On-going	Funded by general tax revenues; new projects require grants or loan

prohibited.		
ACTIVITY	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Landslide, Earthquake		
The town shall require the implementation of recommendations in the hydro- geotechnical reports received for the proposal to mitigate identified impacts. Additionally, the town may require:	Planning Department – Code Enforcement LCMC Chapter 15.65	None required.
 That the applicant provide an environmentally sensitive area protection easement. The applicant's professional engineer be present on site during all clearing, grading, and filling activities. Trees and ground cover be retained and additional vegetation be added. All structures be set back an appropriate distance from the top of a regulated slope. All structures and excavations be set back from the toe of a slope the distance necessary to protect such structure from landslide hazard based upon hydro-geotechnical analysis. 	Environmentally Sensitive And Critical Area Lands LCMC 15.65.160 Geologically hazardous areas. On-going.	
Coordinate with Skagit County through arrangements such as interlocal agreements, joint programs, consistent standards, or regional boards or committees.	Multi-jurisdictional All Natural Hazards Mitigation Planning project – 2014; Annual maintenance with five year update required	Initial development funded by State/Federal Grant.
Urban Level of Service Standards are established to ensure protection of public health, safety and welfare by meeting relevant standards	Updated by Town Council when Comprehensive Plan is amended	Funding provided on a project basis

2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Landslide		
Provide protection of steep slopes according to standards in the Critical Areas Ordinance.	Planning Department – individual project reviews On-going	General budget, grants, Ioans
Flooding		
Ring dike completion at the northeast boundary of the Town limits. Currently, this action is an emergency response to emanate flood warning. The Town has conducted a feasibility study to apply for Army Corps of Engineers project support	Administrator – Follow- up on grant applications for each stage of project. Time Line: Short term	Grant funding: ACE Section 205 – Ring dike engineering and construction in 2015
The town staff will continue to provide technical advice to property owners, contractors and design professionals.	Planning and Public Works On-going	Funding from Town of La Conner General Fund based on individual projects
Provide adequate emergency power for Town water system and for Fire Department;	Public Works – Annual update	None Required

3. The plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
Protect and restore critical areas; plan for flood hazard mitigation, surface water management and pollution control, establishment and conservation areas and coordinate with adjoining jurisdictions.	Planning and Public Works - Ongoing	Combination of funding including town budget, grant funds, local fund raising
To protect and restore the shorelines to optimize water quality and habitat using best management practices and ensure that adjacent land use patterns are	Planning and Public Works – On-going with individual dates for specific capital projects; schedule	Combination of funding including general budget, grant funds

compatible with the protection and enhancement of the shorelines.	updated annually	
ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding, Earthquake, Landslide, Fl	ire, Severe Storms	
Encourage the retention of open space and development of recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks.	Planning and Public Works –On-going	Grant funds, fund raising

4. The plan reviews emergency services activities, such as warning and sandbagging;

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding, Earthquake, Volcano		
The Town has an Flood Emergency Response Plan that includes flood warning, earthquake response, and evacuation program for the Town.	Town Council and Planning – Annual review	Funding integrated into overall budget
In the event of dike breaks at any point along the north and west banks of the Skagit River, transportation routes in and out of La Conner will be closed as floodwaters expand westward toward La Conner. The La Conner Flood Response Plan identifies evacuation routes and means.	Town Council and Planning – Maintain	None Required
Sandbagging operations, requests for sandbags or materials will be requested through the Sector C personnel or Skagit County EOC. La Conner requests should specify the number of sandbags, volume of sand, and delivery location (La Conner Public Works shops are likely locations).	Public Works Department Time Line: Short term	Funding integrated into overall budget
Maintain Fire, Water Treatment Critical Facilities up to date with most current technology and standards to ensure operation during hazard events.	Town Council, Volunteer Fire Department and Water System– On- going	Grant funds, loans, utility rate structure

5. The plan reviews structural projects, such as reservoirs and channel modifications.

ACTION	STAFF ASSIGNMENT AND SCHEDULE	FINANCING PLAN
Flooding		
Ring dike completion	Town Council and Public Works. Time Line: 3-years	Variety of funding sources including grant funds, federal, state and local funds
Continue improvements to the stormwater utilities system	Town Council Projects are listed in the Town's Capital Facilities Plan and is reviewed annually.	Grant funds, Federal and State funds.
All Hazards -		
Six-year list of capital projects including specific actions targeted towards natural hazard mitigation.	Public Works and Planning – Regular Update	General Funds, Utility Funds, grant funds, loans
Upgrade and maintain all community owned critical facilities, including Fire Station, Wastewater Treatment Plant and Water System.	Town Council –On- going	General Funds, Utility Funds, Grant funds, Ioans

6. The plan reviews public information activities, such as outreach projects and environmental education programs.

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
Real estate agents, and bankers receive updated information on flood plain properties and flood management provisions.	Planning Department– annual mailing	None required
Provide on going public education at all levels, from the renter to the homeowner, regarding residential, commercial and industrial best management practice issues, flood	Planning Department – On-going	Water and sewer utility

hazard mitigation, water quality, and related local issues. Update annually.		
Provide FEMA flood map to public in response to inquiries.	Planning Department	None Required
ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
All Hazards		
Expand the Public Information program to address other natural hazards where additional public information will be helpful, such as seismic retrofits for homes, and other topics. Hazards identified through Multi-jurisdictional planning process.	Planning Department and Skagit County Building Department – On-going	None Required

TOWN OF LA CONNER ACTION PLAN FOR NATURAL HAZARD REDUCTION

Listed below are the natural hazard mitigation measures and action items identified in the 2008 update of the *Skagit County Natural Hazards Mitigation Plan.* Progress made during the 2008-2013 plan cycle and continuance of mitigation measures for the 2014-2019 plan cycles is noted.

1. Preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;

The Town is working with the Army Corps of Engineers and Skagit County to follow through with measures (Ring Dike Completion) in La Conner. In 2015, the Corps is undertaking an FCAAP Feasibility Study to quantify and specify the project for Section 205 funding.

2. Property protection actions, such as acquisition, retrofitting, and insurance;

For the project mentioned above (ring dike), the Town has begun discussions and planning with the property owners (La Conner School District, Drainage District 15, Arne Lervick Estate) regarding project impacts, easements and related issues.

3. Protect the natural and beneficial functions of the floodplain, such as wetlands protection;

The Town has recently approved a waterfront parks project that includes shoreline protection and habitat restoration of about 700 linear feet of shoreline along the Swinomish Channel. The Town has limited sites and capacity to enable restoration. The stormwater treatment is done through a Town-wide treatment facility. The Town is pursuing funding to connect the south basin to the treatment facility which would then meet Phase II treatment level.

4. Emergency services activities, such as warning and sandbagging;

The Town is an active member of the EOC during emergency event with a liaison connection to events. We annually review and exercise the plan to refine effectiveness. La Conner Public Works annually stages sandbags and bagging materials at known location in Town to optimize response times to storm surge events.

5. Structural projects, such as reservoirs and channel modifications.

As mentioned in Items 1 & 2, the Town is planning to construct a ring dike at the northeast border to the Town to prevent potential flooding from a breech in the Skagit River Dike system in Burlington or Mount Vernon. This will be funded through FCAAP, Section 205 and La Conner General Funds.

6. Public information activities, such as outreach projects and environmental education programs.

The Town participates annually in the "Flood Awareness Week" activities in the Fall. The Planning Department annually sends Flood Safety and NFIP information brochures to realtors, mortgage companies and home owner so that property owners can minimize potential damage and flood insurance costs.





TOWN OF LYMAN

TOWN OF LYMAN

PROFILE

Population of Jurisdiction: Estimated Geographical Size: Principal Economic Base: Homes in City Limits: Predominant Structure Type: Estimated Structure Value: 438 (2010 Census) .76 Square Miles (60.6% in Floodway) Some Business and Industrial; Primarily Residential 165 Single Family, 1 Multi-Family Wood Frame Median Value \$124,600

CONTACT INFORMATION

Debbie Boyd, City Clerk Town of Lyman 8405 South Main PO Box 1248 Lyman, WA 98263 Telephone: (360) 826-3033 Email: <u>clerk_lyman@msn.com</u>

INTRODUCTION

Representatives from Town of Lyman government worked closely with other jurisdictions, agencies, Indian tribes, and the Skagit Natural Hazards Planning Committee to develop a comprehensive, coordinated mitigation plan intended to reduce the vulnerability to natural hazards within the Town of Lyman. The information contained in this document presents the results of this effort to identify the specific natural hazards threatening the Town of Lyman, to characterize the vulnerability of the Town of Lyman regarding these hazards, and to identify current as well as proposed mitigation strategies, projects and/or programs to address those vulnerabilities.

2014 PLAN UPDATE & PROCESS

The Town Council acts as the Natural Hazard Mitigation Planning Committee for the Town of Lyman. Information for the 2014 plan update was provided by Mayor Heinzman and Ms. Boyd, Lyman City Clerk, and Ms. Margaret Fleek, Town Planner. Ms. Fleek coordinated the 2014 plan update with Skagit County Department of Emergency Management personnel. The plan is updated every 5 years, during which time mitigation goals are reviewed and new goals identified for the up-coming five years. The plan is reviewed to identify any changes in development, mitigation efforts and priorities. Five public meetings were held to engage the community and encourage participation in the plan update. The plan is reviewed annually during which time additional public meetings are held to include community input. The 2014 update of the Natural Hazard Mitigation Plan is adopted by Resolution.

To complete the vulnerability assessment, the Town of Lyman utilized 2014 FEMA Hazus reports, 20/20 Mitigation software provided by the Washington State Emergency Management Division and local analysis tools. This information includes, when available, United States Census data, local tax records, local geographic information system data, Flood Insurance Rate Maps, hazard specific analyses, and other environmental and demographic facts. As part of the vulnerability assessment process, the Town of Lyman completed an inventory of all critical facilities and has considered these critical facilities in the planning and mitigation strategy development process.

INCORPORATING MITIGATION INTO OTHER PLANNING MECHANISMS

The Town of Lyman has adopted the basic planning and code framework as required by the Washington State Growth Management Act. The Town of Lyman Comprehensive Plan and Code was adopted in 2002; minor revisions to correct typographical errors were made in 2005 and a full update of the Comprehensive Plan is scheduled for 2016.

The Town of Lyman typically updates its Comprehensive Plan following Untied States Census dates (2000, 2010) and has therefore not yet incorporated the mitigation strategy and other information contained in the **Skagit County Natural Hazards Mitigation Plan** into the Comprehensive Plan. The Town of Lyman expects this activity will take place during the scheduled 2016 update of the Comprehensive Plan. The process followed in updating the Comprehensive Plan will serve as the process for incorporating the mitigation strategy and other information contained within this plan (as appropriate) into the Comprehensive Plan.

The Town of Lyman participates in the National Flood Insurance Program but does not participate in the NFIP Community Rating System program. As an NFIP community, the Town of Lyman is very fortunate that almost the entire developed portion of the Town is located outside of the floodplain and that there are no homes located in the Skagit River Floodway within the Town of Lyman. Areas within the Town of Lyman and adjacent to the Skagit River are protected by a small rip-rap levee. This levee was damaged during the floods of 1990; repairs were made by the United States Army Corps of Engineers. There are no repetitive loss properties in the Town of Lyman.

Town of Lyman government is committed to the implementation of the mitigation-related projects/programs described in this section of the plan if and when resources become available. Town of Lyman government is also committed to continuing the mitigation planning process that has resulted in the development of this document, and to the ongoing cooperation with other agencies, organizations, Indian tribes, and jurisdictions to make the Town of Lyman more resistant to the damages and hardships that could otherwise be the result of future natural disasters.

2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted+Health and Safety Consequences+Property Damage+Environmental Damage+Economic Disruption multiplied by Probability of Occurence)

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Earthquake	4	2	2	1	2	2	22
Flooding	4	1	2	1	2	5	50
High Winds	4	1	1	1	1	2	16
Landslide/Erosion	1	1	1	0	0	1	3
Storm Surge/Tsunami	0	0	0	0	0	1	0
Subsidence, expansive Soils	1	0	0	0	0	1	1
Urban Fire	1	1	1	1	2	2	12
Wildfire	1	1	1	1	1	1	5
Winter Storm	4	1	1	0	1	2	14
Volcanic Activity	4	2	3	3	3	2	30

Total Jurisdictional Risk Estimation Score:

1	53

Area	0=No impact						
Impacted:		1=<25%	2=<50%	3=<75%	4=>75%		
Health &	0=No impact						
Safety:		1=Few injuries	2=Few fatalities, man	ny injuries	3=Numerous fataliti	es	
-	0=No impact	-		2=Few destroye	ed, many damaged or	Few damaged, ma	any destroyed 3=Many properties destroyed or
Property:		1=Few destroyed or	r damaged	damaged		•	
	0=Little or No impact	•	, i i i i i i i i i i i i i i i i i i i	3=No			
Environment:	·	1=Short term	2=Long term	recovery			
F	0=No impact	4.1.5			a construction and the term		
Economic:	· · · · · · · · · · · · · · · · · · ·	1=Low costs	2=High direct cost an	id Low indirect or	Low direct and High	indirect	3=High Direct and Indirect Cost
Probability:	1=Unknown but rare	2=Unknown but ant	icipated	3= <100 year	4=<25 year	5=Once a year or	r more

Current Hazard Mitigation Codes/Plans/Ordinances:

- Comprehensive Land Use Plan
- Zoning Code
- Building and Fire Code (County does inspections under the 2006 International Code)
- Capital Facilities Plan
- Critical Areas Code
- Participation in the NFIP Program
- Comprehensive Water System Plan

TOWN OF LYMAN MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
 2002 COMPREHENSIVE PLAN Land Use Flooding, Landslides 	Chapter 2, Section C 6 & 9	Protect and restore critical areas; plan for surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions.
		Maintain an active program for citizen participation to review proposed development projects, changes to plans, policies, codes and regulations, and to provide an opportunity for discussion and problem solving as appropriate.
2002 COMPREHENSIVE PLAN Flooding Earthquake Severe Storm Fire	Chapter 5 B	➤ The transportation plan is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system along SR 20.
		 The Town of Lyman 2001 Water System Supply Plan Update is hereby adopted by reference, as may be further amended.
		The area is currently served by Fire District #8, under a contractual agreement. There is a station in the Town Limits. Service is currently made up of volunteers.
2002 COMPREHENSIVE PLAN Flooding	Chapter 8 B	 Use a variety of innovative land use techniques to maintain the character and quality of parks

POLICY TYPE AND	CITATION	MITIGATION-RELATED
APPLICATION TO HAZARD	CHAHON	POLICY STATEMENT
2002 COMPREHENSIVE	Chapter 0. A	and open space, including but not limited to conservation and open space easements, public trust, public lands, transfer and purchase of development rights and other means.
2002 COMPREHENSIVE PLAN Steep Slopes Flooding Earthquake Severe Storm	Chapter 9 A	 Of the total 489.51 acres, there are approximately 296.89 acres of Skagit River floodway. This area is zoned for Open Space. Wetlands on private property are required to be delineated prior to any permits being issued. The Town of Lyman is unique with respect to the fact that 60.6% of the incorporated land is in the Skagit River floodway, extending south to include the old Lyman Ferry Road across the Skagit River. A Critical Areas Ordinance that complies with Best Available Science is adopted in conjunction with these policies, based on work completed by Skagit County.
2002 COMDEHENSIVE	Chapter 0 P	Managa starmwatar runoff ta improva drainaga
PLAN Flooding Severe Storms Earthquake Land Movement		 Initial ge stormwater funori to improve drainage, control stormwater quantity, prevent localized flooding of streets and private property during high water table and rainy conditions, and protect and enhance water quality. Plan the stormwater management system to be consistent with policies regarding flooding, wetlands, land use and water quality.

\triangleright	Develop an integrated program for quantity and
	quality control that recognizes the unique
	situation with much of the town in the floodway
	and needs for flood control in larger storm
	events, while at the same time needing to
	control the effects of smaller storms in terms of
	both quantity and quality of runoff.

\triangleright	Apply best management practices to reduce
	pollutant loading and minimize the effects of
	contaminated sediments on the Skagit River.

		Provide for ongoing public education aimed at residents, businesses, and industries in the area. The education programs are to inform citizens about stormwater and its effects on water quality, flooding, and fish/wildlife habitat, and to discourage dumping of waste material or pollutants into storm drains.
		Implement the goal of the Puget Sound Water Quality Management Plan which is to protect shellfish beds, fish habitat, and other resources, to prevent the contamination of sediments from urban runoff, and to achieve standards for water and sediment quality by reducing, and eventually eliminating harm from pollution discharges from stormwater throughout Puget Sound.
		Make investigations and corrective actions of problem storm drains, including sampling.
continued		Require new development and re-development to comply with the standards of the Department of Ecology's Stormwater Management Manual.
		Develop a program for operation and maintenance of storm drains, detention systems, ditches, and culverts.
		The Floodway shall be regulated to protect human life, property and the public health and safety of the citizens of Lyman; minimize the expenditure of public money; and maintain the town's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer.
		There shall be a buffer that is based on the classification in the Critical Areas Ordinance of wetlands and riparian corridors. A wetlands reconnaissance or delineation may be required by the Town to verify the ordinary high water mark and whether unique site features warrant any additional setbacks. No removal of native vegetation or wildlife shall be permitted within the protected wetlands and riparian corridors

and their buffers, except as part of an approved restoration or parks open space enhancement program or other approved plan.
Wetland determinations shall be based on the Washington State Wetlands Identification and Delineation Manual (Department of Ecology, 1997).
When development is proposed on sites with wetlands, and/or riparian corridors, the Town may restrict developmental coverage and construction activity areas to the most environmentally suitable portion of the site. Grading activities shall be strictly limited to areas as determined by the Town.

MITIGATION-RELATED POLICY STATEMENTS AND CITATIONS - continued

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
CAPITAL IMPROVEMENT	Level of	➤ Urban Level of Service Standards are established
PLAN	Service	to ensure protection of public health, safety and
 Fire, Earthquake, Severe 	Standards and	welfare by meeting relevant standards
Storms	Individual	Six-year list of projects including specific actions
	Department	targeted towards natural hazard mitigation
	Submittals	targeted towards natural nazard initigation
2012 INTERNATIONAL	Seismic and	► Seismic Zone D
BUILDING CODE	Wind Loads,	Wind Exposure C
• Earthquake, Severe Storm,	Construction	wind Exposure C
Fire, Landslide	Standards	 Fire Resistive Construction Standards
		➤ Grading Standards
2012 INTERNATIONAL	Fire protection	► Fire flow
FIRE CODE • Fire	and building maintenance	► Annual Inspection of Commercial Structures
	standards	► Plan Review

2002 CRITICAL AREAS CODEFlooding, Landslide	Section 15.15.020 Application- Purpose	➤ Frequently flooded areas; It is the purpose of this Chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in the floodplain and the floodway according to the provisions established under this code;
		➤ Geologically hazardous areas; Geologically hazardous areas include areas susceptible to the effects of erosion, sliding, earthquake, or other geologic events. They pose a threat to the health and safety of citizens when incompatible residential, commercial, industrial, or infrastructure development is sited in areas of a hazard. Geologic hazards pose a risk to life, property, and resources when steep slopes are destabilized by inappropriate activities and development or when structures or facilities are sited in areas susceptible to natural or human caused geologic events. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices so that risks to health and safety are acceptable. When technology cannot reduce risks to acceptable levels, building and other construction within identified geologically hazardous areas shall be prohibited.

POLICY TYPE AND APPLICATION TO HAZARD	CITATION	MITIGATION-RELATED POLICY STATEMENT
ZONING CODE	Section	➤ The purpose of this title is to implement the
• Flood, Fire, Landslide,	17.03.020	Town of Lyman's comprehensive plan. This title
Earthquake	Purpose	will be used to further the growth and development
		of the Town of Lyman consistent with the adopted comprehensive plan and its implementing elements. This title will also further the purpose of promoting the health, safety, morals, convenience, comfort, prosperity, and general welfare of the city's population.
		➤ The specific zones and regulations herein are designed to facilitate adequate provisions of utilities, schools, parks and housing with essential light, air, privacy, and open space; to lessen congestion on streets and facilitate the safe movement of traffic thereon; to stabilize and enhance property values; to prevent the overcrowding of land; to facilitate adequate

provisions for doing public and private business and thereby safeguard the community's economic structure upon which the prosperity and welfare of all depends and through such achievements help ensure the safety and security of home life, foster good citizenship, create and preserve a more healthful, serviceable and attractive municipality and environment in which to live.
➤ To most effectively accomplish these purposes, this title divides the city into zones wherein the location, height and use of buildings, the use of land, the size of yards and other open space, and the provision of off-street parking and loading are regulated and restricted in accordance with the comprehensive plan for the Town of Lyman. These zones and regulations are hereby deemed necessary and are made with reasonable consideration, among other things, as to the character of each zone and its particular suitability for specific uses, the need for such uses, the common rights and interests of all within the zone as well as those of the general public, and with the view of conserving and encouraging the most appropriate use of land throughout the city.

TOWN OF LYMAN ACTION PLAN FOR FLOOD HAZARD REDUCTION -SELECTION OF APPROPRIATE ACTIVITIES – SHORT TERM UP TO 3 YEARS AFTER FUNDING; LONG TERM MORE THAN 3 YEARS AFTER FUNDING

1. Preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;

ACTIVITY	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Earthquake, Severe Storm, Fire, Land Move	ment	
Utilize the latest adopted state building code to insure adequate protection in construction against Earthquakes in Seismic Zone D, Severe storms with Wind Exposure C, Fire with Fire Resistive Construction Standards, and Land Movement with Grading Standards	ADOPTION OF 2012 INTERNATIONAL BUILDING CODE COMPLETED	No financial impact
Utilize the latest adopted state fire code to insure adequate protection against Fire in	ADOPTION OF 2012 INTERNATIONAL FIRE	No financial impact

construction with standards for Fire flow and through the annual Inspection of Commercial Structures	CODE COMPLETED	
Flood		
The Floodway, the Special Flood Risk Zone and the 100 year Floodplain shall be regulated to protect human life, property and the public health and safety of the citizens of Lyman; minimize the expenditure of public money; and maintain the town's flood insurance eligibility while avoiding regulations which are unnecessarily restrictive or difficult to administer.	Town Council & Staff ON- GOING Administration of 2002 Critical Areas Code that includes the Flood Code	No financial impact
Manage stormwater runoff to improve	Street Department –	Funded by general tax
drainage, control stormwater quantity,	Administer Surface Water	revenues; new projects
private property during high water table and rainy conditions, and protect and enhance water quality.	in Critical Areas Code; ON- GOING	require grants or loan
Because of the unique floodway and	Town Council – maintain	Funding would provide
floodplain limitations on the use of the	open space zoning; ON-	for some recreation
Skagit River shorelines, particularly the dike	GOING	improvements;
system, the majority of the shoreline shall		generally not needed
be identified and reserved for recreational		
and open space uses.		

ACTIVITY	STAFF ASSIGNMENT& SCHEDULE	FINANCING PLAN
Flood, Landslide, Earthquake		
Utilizing Best Available Science to develop the Critical Areas title to protect, to the greatest extent practical, life, property and the environment from loss, injury and damage by pollution, erosion, flooding, landslides, strong ground motion, soil liquefaction, accelerated soil creep, settlement and subsidence, and other potential hazards, whether from natural causes or from human activity and related goals.	Town Council and Staff – ON-GOING Program and regulations are in place.	None required.
Coordinate with Skagit County through arrangements such as interlocal	Town Council - Multi- jurisdictional All Natural	Initial development funded by State/Federal
agreements, joint programs, consistent standards, or regional boards or committees.	Hazards Mitigation Planning project – 2013- 2014 UPDATE	Grant.

Urban Level of Service Standards are	Town Council – LONG	Funding provided on a
established to ensure protection of	TERM - when	project by project basis
public health, safety and welfare by	Comprehensive Plan is	
meeting relevant standards	amended	

2. The plan reviews property protection actions, such as acquisition, retrofitting, and insurance;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Landslide		
Provide protection of steep slopes according to standards in the Critical Areas Ordinance.	Town Council – ON- GOING individual project reviews	General budget, grants, loans
Flooding		
Regulations and policies shall reflect the existing dikes along the Skagit River. Nonstructural solutions to flood hazards shall be encouraged including restricting development in flood-prone areas and storm water runoff management.	Town Council – SHORT TERM - dike recently upgraded.	Grant funding for dike improvements or repairs following flood event
Insure that standards for flood control measures protect and enhance the biological systems and public access opportunities of the shoreline and adjacent uplands.	Town Council – LONG TERM	Funding based on individual projects
The town staff will continue to provide technical advice to property owners, contractors and design professionals.	Town Clerk & Consultants – ON-GOING	Funding based on individual projects
Provide adequate emergency power for Town water system and for Fire Department; Update emergency radios to narrow band frequency	Town Council – SHORT TERM - as soon as feasible	Grant funding
Upgrade Water system including wells, pipes, storage and add a treatment system provide Emergency Generator capability; upgrade construction to latest seismic and wind standards.	Town Council & consultants – Completed	Grant funding and Loans; water utility

3. The plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;

ACTIVITY	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding		
Protect and restore critical areas; plan for flood hazard mitigation, surface water management and pollution control, establishment and maintenance of greenbelts and conservation areas and coordinate with adjoining jurisdictions.	Town Council – LONG TERM	Combination of funding including town budget, grant funds, local fund raising
Provide habitat for wildlife species, foodfish, and freshwater fish in close proximity to an urban area.	Town Council – LONG TERM	Combination of funding including town budget, grant funds
To protect and restore the wetlands to optimize water quality, habitat, best management practices and ensure that adjacent land use patterns are compatible with the protection and enhancement of the wetlands and take advantage of the unique attributes of the site, allowing no net loss of wetlands, and to remove obstructions and generally improve the flow characteristics to provide for efficient conveyance of water through the city during flood events.	Town Council and Street Department – LONG TERM - individual dates for specific capital projects; schedule updated annually	Combination of funding including general budget, grant funds
To allow limited use of the Skagit River and its shoreline compatible with the Dike system and with the regulatory constraints of the Floodway and Special Flood Risk Zone, including transportation, levee improvement, utilities and outfall structures, public access and recreation, open space and agriculture and similar uses. Review based on individual permits.	Planning Department and Public Works Department – LONG TERM	Combination of funding including department budgets, grant funds

Flooding, Earthquake, Landslide, Fire, Severe Storms			
Encourage the retention of open space and	Town Council –LONG	Grant funds, fund raising	
development of recreational opportunities,	TERM		
conserve fish and wildlife habitat, increase			
access to natural resource lands and water,			
and develop parks. Integrate the concepts			
with natural functions such as drainage,			
agriculture, and topographic features.			

4. The plan reviews emergency services activities, such as warning and sandbagging;

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN
Flooding, Earthquake, Volcano		
Develop and maintain an emergency plan that includes flood warning, earthquake response, and evacuation program for the Town.	Town Council – SHORT TERM - Annual review	Funding integrated into overall budget
The transportation planning goals and level of service is designed to ensure the continued ability of the transportation system to function at a reasonable level of service throughout the urban service area and coordinate the links to the regional transportation system that is critical for evacuation.	Town Council – LONG TERM -Review with update of Comprehensive Plan	Funding integrated into overall budget
Maintain Fire, Water Treatment Critical Facilities up to date with most current technology and standards to ensure operation during hazard events.	Town Council, Volunteer Fire Department and Water System Staff– ON- GOING	Grant funds, loans, utility rate structure

5. The plan reviews structural projects, such as reservoirs and channel modifications.

ACTION	STAFF ASSIGNMENT AND SCHEDULE	FINANCING PLAN
Flooding		
Structural Measures – Maintain existing dike system	Town Council – SHORT TERM	Variety of funding sources including grant funds, federal, state and local funds
All Hazards -		
Six-year list of capital projects including	Town Council – LONG	General Funds, Utility
specific actions targeted towards natural	TERM - Regular Update	Funds, grant funds, loans
hazard mitigation.		
Upgrade and maintain all community owned critical facilities, including Fire	Town Council –LONG TERM –All facilities	General Funds, Utility Funds, Grant funds, loans
Station and Water System.	updated	

6. The plan reviews public information activities, such as outreach projects and environmental education programs.

ACTION	STAFF ASSIGNMENT & SCHEDULE	FINANCING PLAN		
Flooding				
Provide on going public education at all levels, from the renter to the homeowner, regarding residential, commercial and industrial best management practice issues, flood hazard mitigation, water quality, and related local issues. Update annually.	Town Clerk – ON-GOING	Water utility, grant funds		
Make flood map determinations in response to public inquiries.	Town Clerk – ON-GOING	General Funds		
All Hazards				
Expand the Public Information program to address other natural hazards where additional public information will be helpful, such as seismic retrofits for homes, and other topics. Hazards identified through Multi-jurisdictional planning process.	Town Clerk – SHORT TERM	Grant funds		
Mitigation Measures

As identified in the 2008 update of the *Skagit County Natural Hazards Mitigation Plan*, the single mitigation measure for the Town of Lyman was the repair of the Skagit River Revetment. This revetment is a 550 foot section of levee adjacent to the Skagit River that helps to protect the Town of Lyman during flood incidents involving the Skagit River.

Progress made during the 2008-2013 plan cycle and continuance of this mitigation measure, as well as other mitigation measures proposed by the Town of Lyman for the 2014-2019 plan cycle is noted below.

Continue existing efforts to repair the Lyman Rock Revetment to protect life and property.

The Town of Lyman has received a grant of approximately \$338,000 to complete repairs to the revetment. The permitting process for this project has been lengthy and difficult. The Town of Lyman continues to work with the United States Army Corps of Engineers, the Washington State Fisheries Department, and the Washington State Military Department, Emergency Management Division for the purpose of permitting and completing this project.

This mitigation measure remains a priority for the Town of Lyman. This project is current and on-going and has been re-affirmed for the 2014-2019 plan cycle.

Continue existing efforts to restrict development and retain Open Space designation of property located within the Skagit River Floodway to protect life and property.

This mitigation measure is provided for in the Comprehensive Plan and Critical Areas Ordinance for the Town of Lyman.

This mitigation measure is current and on-going and has been re-affirmed for the 2014-2019 plan cycle.

Continue existing Surface Water Management efforts to assist in preventing localized flooding of streets and private property during storm events.

This mitigation measure is identified in the Town of Lyman Comprehensive Plan. Additional funding is needed to fully accomplish this task. This mitigation measure remains valid for the 2014-2019 plan cycle.

Increase efforts to coordinate and cooperate with Skagit County Emergency Management to provide disaster preparedness information to residents within the Town of Lyman.

This project is new and has been included as a mitigation action for the 2014-2019 plan cycle.





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UNINCORPORATED SKAGIT COUNTY

UNINCORPORATED SKAGIT COUNTY

Jurisdiction-Specific Hazard Mitigation Information

INTRODUCTION:

The information contained in this document strives to identify the specific natural hazards threatening unincorporated Skagit County, to characterize the vulnerability of unincorporated Skagit County regarding these hazards, and to identify current as well as proposed mitigation strategies, projects and/or programs to address those vulnerabilities.

MITIGATION PLANNING COMMITTEE:

The Mitigation Planning Committee assists in selecting, prioritizing, and evaluating mitigation measures specific to the jurisdiction. At the present time, the Mitigation Planning Committee for unincorporated Skagit County consists of the following individuals:

Dan Berentson; Director, Skagit County Public Works

John Cooper; Natural Resource Planner/Geologist, Skagit County Planning and

Development Services

Kerri Love; Mitigation Specialist Skagit County Public Works - Emergency Management

Jack Moore; Building Official & Floodplain Manager, Skagit County Planning and

Development Services

Kara Symonds; Watershed Planner, Skagit County Public Works

Mark Watkinson; Manager, Skagit County Public Works - Emergency Management

CONTACT INFORMATION:	Mark Watkinson; Manager, Skagit County Public Works -
	Emergency Management Division
	2911 College Way, Suite B
	Mount Vernon, WA 98273
	Telephone: (360) 428-3250
	Email: dem@co.skagit.wa.us

PLANNING PROCESS, REVIEW, EVALUATION AND IMPLEMENTATION

Skagit County Government, in partnership with municipal and tribal governments, has been an active participant throughout 2014 process to update the **Skagit County Natural Hazard Mitigation Plan**.

The plan will be reviewed each year by the Skagit County Department of Emergency Management, in which time the hazards, vulnerabilities, and mitigation measures will be evaluated to identify changing conditions as well as the progress and effectiveness of proposed mitigation measures. Skagit County shall submit an annual evaluation report to the Chairperson of the Skagit Natural Hazard Mitigation Planning Committee no later than September 15th to be included in the annual Hazard Mitigation Plan evaluation report. The Skagit County Natural Hazard Mitigation Plan evaluation report. The Skagit County Natural Hazard Mitigation Plan evaluation report. The Skagit County Natural Hazard Mitigation Plan evaluation report.

Throughout the update the public was encouraged to participate in the planning process via public meetings and comment periods. During the 2014 update 5 public meetings were advertised in local papers and online on the Skagit County website and were held in the City of Burlington Council Chambers. Engagement with the public and other public entities was also accomplished by participating in educational and community gatherings.

Date	Location
2/20/14	Burlington City Council Chambers
3/12/14	Burlington City Council Chambers
4/16/14	Dike District Meeting
4/29/14	Burlington City Council Chambers
4/30/14	Concrete - Annie's Pizza
5/13/2014	Conservation District - Climate Change
5/20/14	Burlington City Council Chambers
5/21/2014	Skagit PUD
09/09/2014	Burlington City Council Chambers

Table 1 Public Meetings and Engagements During 2014 Natural Hazard Mitigation Plan Update

Hard copies of the plan will be made available throughout the county through local libraries and various government offices for public review. The plan will also be available online through the Skagit County website.

The plan will be formally adopted by resolution by Skagit County as the official Natural Hazard Mitigation Plan pending review and approval by Washington State Emergency Management Division and FEMA.

Unincorporated Skagit County Information:

Population of Jurisdiction:	48,117 (2010 Census)
Geographical Size:	1,735 square miles

Future Land Uses and General Development Trends:

- 1. The current rate of development of vacant or unused land has been minimal. The current rate of expansion, reconstruction, or redevelopment of existing properties has been slow but increasing.
- 2. Future land uses and development/redevelopment are controlled by various federal, state, and local codes, ordinances and policies, including the Skagit County Comprehensive Plan and Flood Damage Prevention Ordinance, which considers the flood threat of the Skagit River, Sauk River, and Samish River.

Future Land Use Category	Percent of Jurisdiction
Agricultural	9%
Developed with Mixed Uses	8%
Parks/Restricted Wildland and Wildlife Refuge	48%
Waterway/Lake/Wetland	17%
Other Land Uses	18%

IDENTIFICATION OF COUNTY INFRASTRUCTURE:

In order to identify county infrastructure, county staff considered:

Critical facilities:

Buildings owned by Skagit County

Skagit County owned transportation routes and bridges

Municipal water treatment facilities that supply water to portions of unincorporated Skagit County

Facilities/structures owned and/or operated by various special purpose districts including:

Hospital Districts Public Utility Districts Fire Districts Dike Districts Drainage Districts Port Districts It was important to determine the location of this infrastructure (especially critical facilities) relative to the floodplain of the Skagit River. For security reasons, Skagit County has not listed individual facilities or the value of these individual facilities in this plan but has completed an inventory of all facilities and has considered these facilities in our planning and mitigation strategy development process.

NATURAL HAZARD CAUSED EVENTS:

Skagit County has experienced a wide variety of emergency and/or disaster events as a result of the natural hazards that affect the area. Throughout the 2014 plan update, a substantial effort was made by Skagit County staff to gather as much information as possible regarding past emergency and/or disaster events caused by natural hazards. For specific information regarding these events, please refer to the MULTI-JURISDICTIONAL HAZARD IDENTIFICATION portion of this plan found in SECTION II.

DETERMINING VULNERABILITY:

The analysis conducted by Skagit County staff was based on the best available information and data regarding the characteristics of the neighborhoods identified, the natural hazards that threaten the people, property, and environment of these neighborhoods, and the impacts these neighborhoods have suffered in past disasters. Sources of information in this analysis included Washington State Census data, local tax records, local geographic information system data, Flood Insurance Rate Maps, hazard specific data, and other environmental and demographic facts.

Skagit County also obtained 2014 Hazus information from FEMA Region X to identify critical facilities and potential loss. Hazus software utilizes Geographic Information Systems (GIS) technology to estimate physical and economic impacts of disasters to model potential losses from earthquakes, floods and hurricanes.

For the purpose of this plan, FEMA ran a Hazus 100 year flood event scenario for Skagit County assuming a full dike and levy breach along the Skagit River. In addition FEMA ran a Hazus 7.4 magnitude earthquake scenario generated along the Devils Mountain Fault. The Devils Mountain Fault scenario was chosen as it has been predicted to cause more local damage within Skagit County than a Cascadia Subduction Zone earthquake event. These Hazus runs have been created to estimate damages to essential facilities, building related economic losses and shelter requirements for those displaced from their homes. The full reports from these Hazus scenarios are located in Appendix C.

Unincorporated Skagit County 2014 Natural Hazard Identification and Risk Estimation

*Based on Mitigation 20/20 Risk Assessment Formula (Area Impacted + Health and Safety Consequences + Property Damage + Environmental Damage + Economic Disruption multiplied by Probability of Occurrence). Has been updated for 2014 based on changing conditions and recent events.

**The greater the Risk Score, the greater the risk.

	Area Impacted	Health & Safety	Property	Environment	Economic	Probability	Risk Score
Drought	1	1	1	2	1	1	6
Earthquake	4	2	3	1	2	3	36
Flooding	4	1	3	1	3	4	48
High Winds	3	1	2	1	1	5	40
Landslide/Erosion	1	2	1	2	2	4	32
Storm Surge/Tsunami	1	1	1	0	1	1	4
Wildfire	1	1	1	2	2	4	28
Winter Storm	3	1	1	1	1	4	28
Volcanic Activity	4	2	3	3	3	2	30

Total Jurisdictional Risk Estimation Score:

252

Area Impacted: Health &	0=No impact	1=<25%	2=<50%	3=<75%	4=>75%		
Safety:	0=No impact	1=Few injuries	2=Few fatalities, man	y injuries	3=Numerous fataliti	ies	
Property:	0=No impact	1=Few destroyed or	damaged	2=Few destroyed	l, many damaged or F	ew damaged, many d	lestroyed 3=Many properties destroyed or damaged
Environment:	0=Little or No impact	1=Short term	2=Long term	3=No recovery			
Economic:	0=No impact	1=Low costs	2=High direct cost an	d Low indirect or Lo	ow direct and High ind	lirect	3=High Direct and Indirect Cost
Probability:	1=Unknown but rare	2=Unknown but ant	icipated	3= <100 year	4=<25 year	5=Once a year or n	nore

Identifying Neighborhoods:

Consideration was given to the size of the county, the variety of physical geography, the vast differences between the more densely populated western portion of the county in relationship to the sparsely populated mountainous eastern portion of the county, and the natural hazards that affect the different portions of the county. After considering various options, it was decided to divide the unincorporated portion of Skagit County into four neighborhoods based upon the types of natural hazards these areas were most vulnerable to.

Neighborhood #1

Neighborhood #1, referred to as **"Fidalgo,"** includes all portions of unincorporated Skagit County lying westerly of the Swinomish Channel including Fidalgo Island, Guemes Island, Cypress Island, and Sinclair Island.

This neighborhood is located out of the floodplain of the Skagit River and typically receives far less rainfall than the remainder of Skagit County and is therefore more susceptible to summer drought conditions and wildland-urban interface fires due to the high percentage of homes located in timbered interface areas. The shoreline areas of Neighborhood #1 are also vulnerable to storm surge and could be vulnerable to bluff sloughing and tsunami. This area of the county is also very vulnerable to high wind events and snow events originating in the arctic and traveling southerly through the Frazier Valley of British Columbia and across Whatcom County before striking the western portion of Skagit County.

Neighborhood #2

Neighborhood #2, referred to as **"Lower Elevation,"** includes all portions of unincorporated Skagit County below 500 feet in elevation and lying westerly of Range 7 East, Willamette Meridian, and easterly of the Swinomish Channel.

The boundaries of this neighborhood follow the boundaries of the 100-year flood plain of the Skagit River. This portion of unincorporated Skagit County is highly vulnerable to the flood events of the Skagit River. Due to the soils typical of this area and the high percentage of the population and infrastructure located within the floodplain, this neighborhood is also highly vulnerable to damage caused by severe earthquakes.

Neighborhood #3

Neighborhood #3, referred to as **"Higher Elevation,"** includes all portions of unincorporated Skagit County below 500 feet in elevation and lying easterly of Range 6 East, Willamette Meridian to the crest of the Cascades. This neighborhood is located outside of the 100-year flood plain of the Skagit River. This portion of unincorporated Skagit County is sparsely populated but is more vulnerable to winter storms than Neighborhood #2 and can become

isolated from the rest of the county during flood events due to limited access and water over roadways downriver.

Neighborhood #4

Neighborhood #4, referred to as "Wildlands," includes all portions of unincorporated Skagit County above 500 feet in elevation. This neighborhood is located outside of the 100-year flood plain of the Skagit River. This portion of unincorporated Skagit County is sparsely populated and contains the majority of the industrial forest areas of Skagit County as well as forest and recreational lands owned by the State of Washington and the federal government.

CURRENT POLICIES, CODES, AND ORDINANCES:

Skagit County has adopted the 2012 edition of the International Building Code through Ordinance 20130001, effective July, 2013. The purpose of these codes is to provide minimum standards to safeguard life and limb, health, property and public welfare. In addition to the general standards for construction, the Building Code provides for geographically specific requirements for seismic design, high wind design and high snow load design.

Skagit County adopted the Flood Damage Prevention Ordinance, as revised, as a part of the Unified Development Code, Section 14.34, Ordinance 17938, Skagit County Code, effective January, 2007. The purpose of this ordinance is to protect life and health, minimize public money expenditure, minimize the need for rescue and relief associated with flooding, and minimize prolonged business interruption and to minimize damage to public facilities and utilities.

Skagit County adopted the Critical Areas Ordinance as a part of the Unified Development Code, Section 14.24, Ordinance 020080014, Skagit County Code, effective Feb, 2009. Within this ordinance are requirements and restrictions relating to steep, unstable or otherwise hazardous slopes which could impact human safety during earthquakes, sliding and erosion. The purpose of this portion of the Critical Areas Ordinance is to safeguard citizens, property and resources through identification of hazardous areas, requirements for mitigation through engineered design and construction methods; and, when design and construction methods cannot reduce risks to acceptable levels, to prohibit building and construction.

Listed below are other applicable Skagit County Hazard Mitigation Codes/Plans/Ordinances:

- Comprehensive Land Use Plan
- Adopted Land Use/Zoning Code
- Adopted Fire or Life Safety Code
- Drainage Ordinance
- Drainage Utility Ordinance
- Dike District Ordinance
- Drainage District Ordinance

- Sub-Flood Control Zone Ordinance
- Countywide Planning Policies (CPP)
- 2008-2013 Skagit County Capital Facilities Plan
- Skagit County Comprehensive Emergency Management Plan

• United States Army Corps of Engineers Skagit River Flood Risk Management Feasibility Study (also known as The United States Army Corps of Engineers General Investigation) . this study is current and on-going at this time.

- 1989 Skagit County Flood Management Plan
- Sauk River Erosion/Flood Hazard Management Plan
- Participation in National Flood Insurance Program (NFIP)

• Participation in the NFIP Community Rating System (CRS) Program with a current classification rating of "4"

Flood:

A significant portion of Skagit County is located within the 100 year floodplain. In addition, portions of the County are located within a designated floodway or are located in a coastal high-hazard V zone. Substantial losses due to flooding have occurred most recently as a result of the 1990, 1995, 2003, 2006 and 2009 flood events. Through federal and state grants, a number of repetitive loss properties, in areas prone to flooding, have been purchased by the County and the buildings either demolished or removed.

Other flood hazard mitigation policies, codes, and ordinances include:

The Skagit County Countywide Planning Policies (CPPs) are the foundation of the County's Comprehensive Plan. The CPPs were most recently updated in 2007. Three CPPs directly address flood hazard reduction:

- Skagit County and Cities and Towns, in cooperation with appropriate local, state and Federal agencies, shall develop and implement flood hazard reduction programs, consistent with and supportive of the Corps Feasibility Study. (CPP 10.13)
- The Skagit River Floodway and the Skagit River Floodplain shall be regulated to protect human life, property and the public health and safety of the citizens of Skagit County; minimize the expenditure of public money; and maintain flood insurance eligibility while avoiding regulations which are unnecessary restrictive or difficult to administer. (CPP 10.14)
- Skagit County and Cities and Towns shall work together to provide ongoing public education about flooding in a coordinated and consistent program, and shall adopt a flood hazard reduction plan, that works together with the natural and beneficial functions of floodplains. (CPP 10.15)

Under requirements of the state Growth Management Act, the Comprehensive Plan also identifies, designates, and protects wetlands, aquifer recharge areas, and frequently flooded areas. This is done through numerous education, incentive, and protection and conservation measures contained in Comprehensive Plan Chapter 13, the Environment Element.

Policy 13A-5.1 Frequently Flooded Areas

- (j) Undisturbed natural rivers, streams, lakes, wetlands, and floodplains shall be protected to avoid increases in flood elevations, to reduce flood damage, and to allow proper conveyance of flood flows.
- Policy 13A-5.2 Frequently Flooded Areas
 - (a) Low intensity land use activities such as agricultural, forestry, and recreational land uses should be encouraged in floodplain areas and other land uses in these areas should be discouraged."
 - (b) Land uses, densities, and development activities in the floodplain and coastal high hazard areas should be limited to protect public health, safety, and welfare, to minimize expenditure of public money and costly flood control projects, and to maintain hydrologic systems.
- New construction and substantial improvements are required to be elevated so that finished floor height is 1 foot above the base flood elevation. (SCC 14.34.170)
- Elevation certificates are required on all elevated buildings. Certificates are collected by office or field inspection staff and are kept in a maintained file at the Planning & Permit Center. (SCC14.34.140)
- Agricultural buildings and private garages not elevated are required to be wet flood proofed. A professional engineer or registered architect is required to verify that there is low potential for damage from velocities, debris, and scouring as well as verifying adequate opening area to allow free passage of flood water. (SCC 14.34.170.4)
- In all buildings, construction materials used below the base flood elevation must be resistant to damage by flood waters. (SCC 14.34.160)
- In V zones, and in areas of shallow flooding where velocities exceed 5 fps and when located within 500 feet of the toe of a dike, buildings are required to be elevated on columns or piles. (SCC 14.34.190 & 14.34.180)
- Construction in a designated floodway is prohibited except where it can be demonstrated by a professional engineer that there is no rise in the floodway. The current FEMA no-rise procedure is the standard by which this must be demonstrated. (SCC 14.34.200)

Earthquake:

Skagit County is located in seismic zone DI as determined by the International Building Code. Damage and loss due to earthquake was experienced as recently as the 2001 Nisqually earthquake. Earthquake hazard mitigation policies, codes, and ordinances include:

- Skagit County Code 15.04, the 2012 International Building Code and International Residential Code, including its special provisions for seismic zone D1.
 - All new buildings not meeting the strict prescriptive requirements of the International Building Code are required to have their structural elements designed by a professional engineer or registered architect. Such design is required to include seismic analysis of the building in addition to wind, gravity and other forces.
 - Building permits are issued for repair of seismically damaged buildings, normally based on a site inspection by the field inspection staff. All repair construction must meet the current building code requirements for seismic design.

3) In areas of the County with steep or unstable slopes, or with soil prone to liquefaction, geotechnical reports, prepared by a professional engineer, are required as part of a building permit application. Such reports must include an analysis of the effects of a seismic event.

High Wind:

Skagit County is located in a borderline high wind area. The design wind speed for Skagit County is 85 mph. Some portions of Skagit County are located in exposure B (2006 IBC) areas where some protection from winds is provided by forests and hills. Other portions of the County are in exposure C areas where there is little or no protection from high wind. High wind mitigation policies, codes, and ordinances include:

- Skagit County Code 15.04, the 2012 International Building Code and International Residential Code. All new buildings not meeting the strict prescriptive requirements of the building code for adequate wall bracing, are required to have their structural elements designed by a professional engineer or registered architect utilizing the wind design requirements of the building code.
- The Skagit County Building Official renders decisions on which exposure group an individual property is located in.

Landslide/Avalanche:

Portions of Skagit County are prone to landslide due to steep slopes, soil erosion, fractured rock faces, etc. Landslides occur with some frequency during winter storms, resulting in temporary road closures. Landslide/avalanche mitigation policies, codes, and ordinances include:

- 2012 International Building Code, including provisions for the requirement of setbacks from the top and bottom of slopes, Section J108.1, appendix chapter J.
- The Comprehensive Plan contains the following policies regarding geologically hazardous areas.

Policy 13A-5.2:

- (c) Low land use densities and intensities or open space shall be preferred in geologically hazardous areas where this practice can provide site specific mitigation.
- (d) Land use regulations and practices for geologically hazardous areas shall be established so that development does not cause or exacerbate natural processes that endanger lives, property, infrastructure, and resources on or off site.
 Policy 13A-5.3:

Geologically Hazardous Areas include erosion hazards, landslide hazards, mine hazards, volcanic hazards and seismic hazards.

• Critical Areas Ordinance, Section 14.24, Ordinance #17938. This document sets forth review and mitigation standards for development within geologically hazardous areas. The

hazardous areas include seismic hazards, soil liquefaction, volcanic hazards, landslide hazards and erosion hazards.

POLICY TYPE	CITATION	DESCRIPTION
Skagit County Code	Title 14	Limit Land Use
Skagit County Resolution	20020310	Burn Permit Fee and Information
Skagit County Resolution	20120001	International Code
Skagit County Resolution	14375	Fireworks Limitations
Skagit County Resolution	14255/14384	Road Standards

Fire-Related Mitigation Policy Statements and Citations:

NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION:

Skagit County government has actively participated in the National Flood Insurance Program (NFIP) since 1985 and has also participated in the Community Rating System (CRS) program since 1997. Skagit County government has made a concerted effort to exceed minimum floodplain management requirements and provide increased public awareness regarding the local flood hazard and provide protection from flooding.

At the present time, there are 85 repetitive loss properties within unincorporated Skagit County, of these, 3 properties are categorized as severe repetitive loss properties. All the repetitive loss properties are residential. These residential properties were analyzed and considered as part of the vulnerability assessment process.

to protect confidentiality, specific information regarding these properties is not included in this plan. However, for the purposes of hazard mitigation planning, the following information regarding these properties should be noted:

- About 35% of these properties (including 2 repetitive loss properties) are located in two separate low-lying areas adjacent to the Skagit River near the Town of Concrete. These areas are especially vulnerable to flooding – even during minor flood incidents.
- Another 35% of these properties (including 1 repetitive loss property) are located in two separate low-lying areas adjacent to the Skagit River upstream of the towns of Burlington and Mount Vernon. These areas are vulnerable to moderate flood incidents.
- About 10% of these properties are located near the Samish River and are vulnerable to flooding incidents involving the Samish River as well as Thomas Creek, a tributary of the Samish River.
- The remaining properties are scattered in other areas throughout Skagit County.

The majority of these properties were affected during the 1990 and 1995 floods of the Skagit River. Many of these same properties were also affected during the 2003 and 2006 floods of the Skagit River. The properties located within the Samish River flood zone were most recently affected during the 2009 flooding of the Samish River.

Because of the flood hazard affecting Skagit County, continued participation by Skagit County government in both the NFIP and the CRS program is integral to current and future flood mitigation efforts within the unincorporated portion of Skagit County. As a result, the mitigation strategy for unincorporated Skagit County is based upon continued participation and compliance with the National Flood Insurance Program as well as the Community Rating System program.

Skagit County Community Rating System Mitigation Activities:

The following activities are carried out as part of Skagit County's participation in the NFIP Community Rating System program in an effort to further reduce the effects of flooding in the unincorporated portions of Skagit County.

- 1. <u>Elevation Certificates:</u> Skagit County maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available upon request and may be viewed on the County website.
- <u>Map Information</u>: Skagit County furnishes flood zone information from the community's latest Flood Insurance Rate Map (F.I.R.M.), annually publicizes the service and maintains records.
- <u>Outreach Projects:</u> A brochure is mailed to all properties in Skagit County on an annual basis; a separate brochure is mailed annually to all properties in the Special Flood Hazard Area. Flood hazard information is also provided through displays at public buildings.
- 4. <u>Hazard Disclosure</u>: Skagit County recognizes the disclosure requirements of the State of Washington disclosure law.
- 5. <u>Flood Protection Information</u>: Documents relating to floodplain management and locally pertinent flood issues are available throughout the Skagit County library system and its web site.
- 6. <u>Flood Protection Assistance:</u> Skagit County provides technical advice and assistance to interested property owners and annually publicizes the service.
- 7. <u>Additional Flood Data</u>: Skagit County maintains a high-level restrictive floodway standard and has conducted and adopted flood studies for areas not included on the flood insurance rate maps exceeding minimum mapping standards. Skagit County is a participant in the Cooperating Technical Partnership (C.T.P.) Program.
- 8. <u>Open Space Preservation:</u> Skagit County is preserving approximately 40,785 acres in the special flood hazard area as open space.

- Higher Regulatory Standards: Skagit County enforces regulations that require freeboard for new construction and substantial improvement, protection of critical facilities, natural and beneficial functions, other higher regulatory standards, land development criteria and state mandated regulatory standards. The County also maintains a Building Code Effectiveness Grading Schedule (B.C.E.G.S.) classification of 3/3.
- 10. <u>Flood Data Maintenance:</u> Skagit County maintains and uses digitized overlay maps in the day-to-day management of the floodplain. The County has also established and maintains a system of elevation reference marks and maintains copies of all previous F.I.R.M. maps and Flood Insurance Study Reports.
- 11. <u>Stormwater Management</u>: The State of Washington has instituted a Clean Water Program and the County has adopted the Department of Ecology's Stormwater Manual for Puget Sound. The County enforces regulations for stormwater management, freeboard in non-special flood hazard area zones, soil and erosion control and water quality.
- 12. <u>Repetitive Loss</u>: As of the NFIP Report of Repetitive Losses dated April 16, 2014, the County has 85 repetitive loss properties and is a Category 4 in the FEMA Community Rating System program. An adopted Multi-Jurisdictional Multi Natural Hazard Mitigation Plan was approved by FEMA on April 2, 2009 and is being updated in 2014.
- 13. <u>Acquisition and Relocation:</u> Skagit County has acquired and demolished or removed 48 properties in the flood hazard area thus removing them from the repetitive loss roster.
- 14. <u>Flood Protection:</u> Skagit County receives credit for buildings that have been flood proofed, elevated or otherwise modified to protect them from flood damage.
- 15. <u>Drainage System Maintenance:</u> Skagit County's drainage system is inspected regularly throughout the year and maintenance is performed as needed by the Skagit County Public Works Department. Records are maintained for both inspections and required maintenance. The Capital Facilities Program is a planning and budgeting tool used for drainage improvement projects. The County also enforces a regulation prohibiting dumping in the drainage system.
- 16. <u>Flood Warning Program</u>: Skagit County utilizes a reverse 911 and MyState program for timely identification of impending flood threats, disseminating warnings to appropriate floodplain residents and coordinating flood response activities. The County has been designated as a Storm Ready Community by the National Weather Service.
- 17. <u>Dam Safety:</u> All Washington communities currently receive Community Rating System credit for the Washington State Department of Ecology Dam Safety Program.

For additional information regarding the National Flood Insurance Program Community Rating system and Skagit County's participation in the CRS Program, please contact: Jack Moore, Skagit County CRS Coordinator, (360) 336-9410.

Incorporating Mitigation into other Planning Mechanisms:

The primary purpose of hazard mitigation is to identify community policies, actions, and tools for implementation over the long term that will result in a reduction in risk and potential for future losses community-wide. Skagit County is governed by a Board of County Commissioners that set policy and oversee the various county offices and departments. The process by which Skagit County will incorporate the mitigation strategy and other information contained in the **Skagit County Natural Hazard Mitigation Plan** into other planning mechanisms is:

- 1. Adoption of the plan by the Board of Skagit County Commissioners.
- 2. Inclusion into the Skagit County Comprehensive Plan, when appropriate.
- 3. Inclusion into other planning mechanisms subordinate to the Skagit County Comprehensive Plan, when appropriate.

Since the original adoption of the **Skagit County Natural Hazard Mitigation Plan** in 2003, Skagit County government has begun incorporating the mitigation strategy and other information contained in the plan pertaining to the local vulnerability and risk associated with natural hazards into the plans and programs listed below:

- Skagit County Comprehensive Plan
- Skagit County Flood Damage Prevention Ordinance
- Skagit County Critical Areas Ordinance
- Skagit County Community Wildfire Protection Plan

In addition to the Comprehensive Plan - Natural Resource Element; the Flood Damage Prevention Ordinance; the Critical Areas Ordinance; and the Community Wildfire protection plan, Skagit County has also adopted the most recent editions of the International Building Code and International Fire Code.

Continued participation by Skagit County government in the following programs is consistent with, and in support of, the mitigation strategy as well as the local vulnerability and risk associated with the natural hazards that affect unincorporated Skagit County:

- NFIP Community Rating System program.
- National Weather Service Storm Ready program.
- United States Army Corps of Engineers Skagit River Flood Risk Management Feasibility Study also known as the General Investigation or GI.

During the 2014 - 2019 hazard mitigation plan cycle, information regarding the county's vulnerability and risk associated with flooding is expected to be incorporated into the following flood hazard studies, plans and programs:

- United States Army Corps of Engineers Skagit River Flood Risk Management Feasibility Study (GI).
- Update of the 1989 Skagit River Comprehensive Flood Hazard Management Plan.
- Update of the Skagit County Comprehensive Emergency Management Plan (2018).

Jurisdiction-Specific Suggested Mitigation Strategies and Projects:

It should be noted that although the various mitigation strategies and/or projects listed on the following pages are contained in the Unincorporated Skagit County portion of this section of the Skagit County Natural Hazard Mitigation Plan, many of these mitigation strategies and/or projects would most likely benefit multiple jurisdictions and may ultimately be paid for from a variety of sources.

While these mitigation strategies and/or projects have been suggested by various county officials and staff throughout the plan development process, these strategies and/or projects have not been officially approved by the Skagit County Board of Commissioners and funding for these strategies and/or projects has not been allocated. In many cases, funding for these mitigation strategies and/or projects is dependent upon Skagit County receiving future federal and/or state hazard mitigation grant funding.

EARTHQUAKE:

 Continue existing public education programs within Skagit County to better inform citizens as to the earthquake hazard that exists locally and provide citizens with information to better prepare for and recover from a damaging earthquake. This mitigation activity is current and on-going. This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:Skagit County Department of Emergency ManagementFUNDING SOURCE:Pre-Disaster Mitigation ProgramTIME-LINE:Current and On-Going

 Provide for the increased safety of employees and the public through the implementation of a non-structural earthquake mitigation program in all county-owned buildings. This mitigation activity was identified in the 2008 - 2013 plan but has not been funded; it has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Facility Management Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Long Term (more than 3 years from funding)

3. Evaluate, and prioritize all Skagit County transportation infrastructure systems for needed seismic retro-fitting. This mitigation activity was identified in the 2008 - 2013 plan but has not been funded; it has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Short Term (less than 3 years from funding)

 Retro-fit and/or reconstruct county-owned transportation systems/facilities, and drainage structures to better withstand damage from a major earthquake. This mitigation activity was identified in the 2008 - 2013 plan but has not been funded; it has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Long Term (more than 3 years from funding)

 Retro-fit and/or reconstruct county-owned buildings/facilities to better withstand damage from a major earthquake. This mitigation activity was identified in the 2008 -2013 plan and has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Facility Management Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Long Term (more than 3 years from funding)

 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. This mitigation activity was identified in the 2008 - 2013 plan but has not been funded; it has been reaffirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit 9-1-1
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Long Term (more than 3 years from funding)

Previous earthquake mitigation activity eliminated from the 2014 – 2019 plan:

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. This mitigation activity was identified in the 2008 - 2013 plan but has not been funded. Due to cost and other priorities, this mitigation project is no longer considered viable; it has been eliminated from the plan.

FIRE:

 In cooperation with the Skagit Conservation District and the Washington State Department of Natural Resources, continue to maintain and update the Skagit County Community Wildfire Protection Plan and utilize the plan to raise awareness and provide public education regarding the wildland-urban interface fire hazard that exists locally.

This mitigation activity has been modified from the 2008 - 2013 plan to reflect the adoption of the Skagit County Community Wildfire Protection Plan that was initiated in 2008 and updated in 2012. This mitigation project has been re-affirmed (as modified) for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Conservation District
FUNDING SOURCE:	Skagit County Title III funds
TIME-LINE:	Current and On-Going

Continue to implement the Firewise Communities/USA Program that addresses wildfire preparedness with in communities. This mitigation activity is current and on-going. This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Conservation District
FUNDING SOURCE:	Skagit County Title III funds
TIME-LINE:	Current and On-Going

FLOOD:

NOTE: As previously stated in the Unincorporated Skagit County Jurisdiction-Specific Vulnerability Assessment, the following flood mitigation strategies are based on continued participation and compliance with the National Flood Insurance Program (NFIP) as well as the Community Rating System (CRS) program. Furthermore, flood related mitigation strategies will be further defined at a later date upon completion and approval of the United States Army Corps of Engineers Skagit River Flood Risk Management Feasibility Study – also known as the General Investigation Study or GI.

 Skagit County government will continue its participation in the NFIP Community Rating System program, and continue to improve its CRS classification rating through current and on-going efforts to: encourage the residents of Skagit County to purchase flood insurance; inform citizens as to the flood risk in Skagit County; and provide information for persons to prepare for a catastrophic flood event. Since 2003, unincorporated Skagit County has increased the CRS Classification rating from a 6 to a 4. Skagit County will continue to undertake a series of significant activities to protect its citizens from losses caused by flooding and effectively manage the floodplain.

This mitigation activity is current and on-going. This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Planning & Development
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Current and On-Going

 In cooperation with various Community Rating System programs that currently exist in Skagit County, continue to conduct an on-going public education/awareness program to encourage those persons who live and/or own property within the 100-year floodplain to purchase flood insurance.

This mitigation activity is current and on-going. This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Current and On-Going

4. Continue efforts to enhance the capabilities and/or systems/programs of the Skagit County GIS Department to provide for increased services and information to aid the citizens of Skagit County during a natural disaster event.

This mitigation activity is current and on-going. This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County GIS Department
FUNDING SOURCE:	Local Funding
TIME-LINE:	Current and On-Going

5. Enact additional regulations at the local level that will serve to restrict future construction of residential structures and non-agricultural related development within the 100-year floodplain.

This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014-2019 plan cycle.

LEAD AGENCY:	Skagit County Planning Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program/Local Funding
TIME-LINE:	Long Term (more than 3 years from funding)

 Develop evacuation plans for the 100-year floodplain that may include signed flood evacuation routes as well as an early flood siren warning systems and/or telephone warning systems to alert residents of imminent danger.

This mitigation activity was identified in the 2008 - 2013 plan and has been re-affirmed for the 2014-2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program/Local Funding
TIME-LINE:	Long Term (more than 3 years from funding)

 Continue current efforts to increase the storage capacity at various hydro-electric dams in the upper Skagit Valley. This mitigation activity is vital to providing an increased level of flood protection for the citizens of Skagit County.

This mitigation activity was identified in the 2008 - 2013 plan as a short-term activity. This mitigation activity is integral to the United States Army Corps of Engineers General Investigation Study. This mitigation activity is a current and on-going long-term activity and has been re-affirmed for the 2014-2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program/Water Resources Development
	Act/Local Funding
TIME-LINE:	Long Term (more than 3 years from funding)

8. Continue to conduct buy-out programs, elevation programs, and/or flood-proofing programs for repetitive loss properties within the 100-year floodplain.

This mitigation activity was identified in the 2008 - 2013 plan. Despite increased difficulties in obtaining a positive benefit-cost ratio for these types of projects, this mitigation activity has been re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Planning Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program
TIME-LINE:	Short Term (less than 3 years from funding)

9. Work cooperatively with and assist local municipalities and special purpose districts to implement a variety of structural and non-structural flood control projects throughout the western portion of Skagit County designed to reduce flood risk and that are consistent with the United States Army Corps of Engineers General Investigation Study.

This mitigation activity was identified in the 2008 - 2013 plan and is re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program; Hazard Mitigation Grant
	Program, Water Resources Development Act
TIME-LINE:	Long Term (more than 3 years from funding)

10. Continue existing efforts to assist local municipalities and special purpose districts implement a program to retro-fit the existing municipal, county, state, and railway transportation infrastructure and design newly constructed municipal, county, state and railway transportation infrastructure to allow for the passage of high flows of floodwaters presently impeded by the design and construction of this infrastructure.

This mitigation activity was identified in the 2008 2013 plan and is re-affirmed for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program/Federal Highway Administration
TIME-LINE:	Long Term (more than 3 years from funding)

11. Assist local municipalities and special purpose districts implement a program to enhance and manage interior drainage as well as plan for the expedient drainage of floodwater via natural channels and engineered drainage systems.

This mitigation activity was identified in the 2008 - 2013 plan. This mitigation activity has been modified and is re-affirmed for the 2014-2019 plan cycle.

LEAD AGENCY:	Skagit County Public Works Department
FUNDING SOURCE:	Pre-Disaster Mitigation Program/Water Resources Development
	Act/Washington State Department of Ecology Flood Control
	Assistance Account Program (FCAAP)/Local Funding
TIME-LINE:	Long Term (more than 3 years from funding)

Skagit County government is committed to the implementation of the mitigation-related projects/programs described in this section of the plan when and if resources become available. Skagit County government is also committed to continuing the mitigation planning process that has resulted in the development and subsequent updates of this plan, and to the ongoing cooperation with other agencies, organizations, Indian tribes, and jurisdictions to make Skagit County more resistant to the damages and hardships that could otherwise be the result of future natural disasters.

Completed flood mitigation activities:

1. Re-locate the Skagit County Information Services Department facilities and equipment out of the floodplain of the Skagit River.

Although no mitigation funding was obtained for this project, a new computer server facility was constructed outside of the floodplain and activated in the fall of 2008. This facility meets the needs of this mitigation activity.

This mitigation activity was identified in the 2008 - 2013 plan; this mitigation activity is complete.

2. Continue current and on-going efforts to provide for inter-operability of emergency communications systems to enhance post-disaster communications capabilities of first response agencies.

This mitigation activity was identified in the 2008 - 2013 plan and efforts to complete this activity were underway in 2008. Washington State Homeland Security Region 1 utilized a Public Safety Interoperability Communications Grant to greatly increase

command coordination and inter-operability of emergency communications systems within Skagit County as well as neighboring counties.

This mitigation activity is complete.

Previous flood mitigation activity eliminated from the 2014 – 2019 plan:

1. Help develop and assist local municipalities and special purpose districts implement a variety of flood control projects designed to manage high flows of the Skagit River during flood events.

This mitigation activity was identified in the 2008 - 2013 plan and was deemed repetitive and eliminated from the 2014 - 2019 plan.

2. Help develop and assist responsible jurisdictions implement a program to provide 50year or greater flood protection for the State Route #20 corridor between Interstate #5 and the Swinomish Channel.

This mitigation activity was identified in the 2008 - 2013 plan. Due to inconsistency with the United States Army Corps of Engineers General Investigation Study, this mitigation activity has been eliminated from the 2014 - 2019 plan.

LAND MOVEMENT:

 Enhance public information and awareness regarding the land movement hazard within the unincorporated portions of Skagit County. This mitigation activity should be a cooperative effort involving the Skagit County Planning Department, the Skagit County Mapping Department, and the Skagit County Public Works Department - Emergency Management Division.

This mitigation activity is new to the plan for the 2014 - 2019 plan cycle.

LEAD AGENCY:	Skagit County Planning Department
FUNDING SOURCE:	Local Funding
TIME-LINE:	Long Term (more than 3 years from funding



UPPER SKAGIT INDIAN TRIBE

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Upper Skagit Indian Tribe

Jurisdiction-Specific Tribal Requirements Vulnerability Assessment and Mitigation Initiatives 2014 Plan Update

Upper Skagit Indian Tribe

Jurisdiction-Specific Tribal Requirements Vulnerability Assessment, and Mitigation Initiatives 2014 Plan Update

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Introduction

The Upper Skagit Indian Tribe is the successor in interest to 11 bands of treaty signatories to the Treaty of Point Elliot signed on January 22, 1855, ratified by Congress on March 8, 1859. The ancestors of the present day, federally recognized Upper Skagit Indian Tribe have been residing in the Skagit Basin and the Saratoga Passage, Skagit Bay, Padilla Bay, Samish Bay and Chuckanut Bay areas for thousands of years. Village sites in salt water areas and along the Skagit River and its tributaries are found from Utsallady on Camano Island and Mount Vernon on the Skagit River to the North Cascade Mountain crest and along the Baker, Sauk, Suiattle and Cascade Rivers as well as the tributaries, in addition to the Samish River and its tributaries. Ancestors of the Upper Skagits hunted, fished, gathered, had religious sites and harvested from salt water sites in northern Puget Sound, Skagit Basin prairies, forests, and across the Cascade range into eastern Washington along routes that took them to the Stehekin River, Methow River and Chewuch River and their tributaries, Lake Chelan and down to the areas around Yakima. Hunting, gathering, fishing and religious and cultural activities also occurred traveling in today's North Cascades National Park and Mount Baker-Snoqualmie National Forest range inclusive of the Mount Baker Wilderness, Stephen Mather Wilderness, Paysaten Wilderness, Noisy-Diobsud Wilderness, Glacier Peak Wilderness, Ross Lake and Lake Chelan National Recreation Areas. Upper Skagits lived and traveled to and from Chuckanut, Padilla and Samish Bays, Penn Cove on Whidbey Island to Utsallady, Cama Beach and Saratoga Passage on Camano Island to fish, trade and harvest shellfish and other shore resources. The natural resources of the Skagit/Samish watersheds and adjacent marine areas and fresh water watersheds are rooted in the Tribe's history and are important in maintaining the continuing cultural and Treaty right identity of the Tribe.

From 1855 to the present, including the United States taking land into trust in 1914, the Tribe has been under federal jurisdiction. The Tribe voted to accept the Indian Reorganization Act, in accordance with section sixteen of the Indian Reorganization Act of 1934, 25 U.S.C., Section 476. On December 4, 1974, the Tribe voted and the United States approved its current Constitution and Bylaws. The Upper Skagit Tribal Council is the governing body of the Upper Skagit Indian Tribe, responsible for and empowered with governmental duties for safeguarding the health, safety and welfare of the members of the Upper Skagit Tribe and residents of Upper Skagit Indian Reservation lands. The Tribe's current checkerboard Reservation at Bow Hill on I-5 and Helmick Road in Sedro Woolley, WA was established by Executive Order on September 10, 1981.

Helmick Road Reservation

The Helmick Road Reservation land base includes approximately 145 acres of Reservation and trust lands which the Tribe owns. The Helmick Reservation site serves as the government administrative center for its program services, housing, and community center for the members of Tribe. Tribal allotment trust lands exist throughout the Skagit and adjacent watersheds.

Critical facilities include sewer, water, roads, community facilities and residential housing.

Bow Hill Complex

The Bow Hill Reservation and adjacent trust lands are the economic enterprise zone for the Upper Skagit that includes over 600 acres of Reservation, trust lands, individual trust lands of which the Tribe has an interest, and fee parcels which the Tribe owns.

Critical facilities include sewer, water, roads and commercial facilities.



Figure 1 Map of Bow Hill and Helmick Road Community Lands

ASSURANCES

The Upper Skagit Indian Tribe's participation as a jurisdiction in the Skagit County Natural Hazards Mitigation Plan (HMP) meets the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000. This includes meeting the requirement that the HMP be adopted by the Tribe. In addition, as required by 44 CFR 13.11(c) and 13.11(d), the Tribe will comply with all applicable Federal statutes and regulations during the periods for which grant funding is received, and will amend the plan whenever necessary to reflect changes in Tribal or Federal laws and statutes.

At the conclusion of the plan update process, and following receipt from FEMA of a notice of preadoption approval of the plan, the Tribe will sign a resolution formally re-adopting the updated Skagit County Natural Hazards Mitigation Plan. A copy of the resolution, adopted by the Upper Skagit Indian Tribe (herein referred to as the Tribe), assures FEMA that the Tribe will comply with both of the CFR requirements. The resolution is presented in Appendix A.

PLANNING PROCESS, 2003 to Present (2014)

The Upper Skagit Indian Tribe has participated in the Skagit County Natural Hazard Mitigation Plan since it's inception in 2003 and continued participation in the 2008 and now 2014 plan update.

Following completion of the plan in 2003 and the 2008 Update, the Upper Skagit Tribal Council formally adopted the Skagit County Natural Hazards Mitigation Plan, and has now participated in the Skagit County Natural Hazard Mitigation Plan 2014 update and this updated Tribal HMP for incorporation.

As required by the Disaster Mitigation Act of 2000, a Tribal Hazards Mitigation Plan must be updated every 5 years or when substantial changes are made to the plan. On March 12, 2014 the Skagit Natural Hazards Mitigation Planning Committee held a meeting to begin the plan-update process for the participating jurisdictions involved in the 2014 Hazards Mitigation Plan. Joe Hemmerich represented the Upper Skagit Indian Tribe on the Planning Committee.

During the initial plan update meeting, Skagit Natural Hazards Mitigation Planning Committee members reviewed the Disaster Mitigation Act of 2000, the plan update process, the plan update outline, and a proposed plan update schedule. The Planning Committee also assessed a matrix of hazards addressed in the recently updated Washington State Hazards Mitigation Plan, and the 2014 Hazards Mitigation Plans, providing reference tools on hazards mitigation planning process and additionally on climate change.

A summary overview of the plan update actions is listed in Section I of the 2014 Skagit County Natural Hazard Mitigation Plan. A summary of the 2014 plan update actions accomplished by the Upper Skagit Indian Tribe is listed below:

- 1. Reviewed and updated: Tribal Community Introduction to include updated information to address Tribal community profile changes and Update Specific criteria
- 2. Reviewed and updated: Planning Process (2003 to Present 2014.

- Reviewed and updated: Vulnerability Analysis for Helmick and Bow Hill lands including the new critical facilities specific to the Upper Skagit Indian Tribe (Internal Information Only – To be released upon request by FEMA).
- 4. Reviewed and updated: Risk Assessment to include Current Land Uses & Potential for New Development, Future Land Uses & General Development, Neighborhood Types and Structure Characterization, Jurisdictional Relative Risk, and Basic Demographic Information.
- 5. Reviewed and updated: Mitigation Strategy, Evaluation, Progress and Measures.

Tribal Public Works, led by the Public Works Director, the Environmental Planning and Community Development Manager, and the Facilities Manager for Economic Development were engaged in the review and plan update. The Public Works Director represented the Upper Skagit Indian Tribe on the Skagit Natural Hazards Mitigation Planning Committee, conveyed the developments of the committee work and public meetings, and supported the informational updates for the Helmick Road Reservation. The Environmental Planning and Community Development Manager led the editing process for the plan update. The Facilities Manager for Economic Development contributed the informational updates for the Bow Hill Complex. Tribal legal reviewed the document and Tribal Council was presented the plan update for review and approval to submit as its portion to be incorporated into the Multi-Jurisdictional Plan document.

VULNERABILITY ANALYSIS

The purpose of this section of the plan is to assess the vulnerability of the Upper Skagit Indian Tribe in regards to the various natural hazards previously identified in SECTION II of the 2014 Skagit County Natural Hazard Mitigation Plan.

To complete the vulnerability assessment process, various tribal staff utilized a series of locally developed forms as well as forms available in the 20/20 Mitigation Software that was provided to Skagit County by the Washington State Military Department, Emergency Management Division. The information collected with these forms is included in this portion of the plan.

As part of the vulnerability assessment process, Upper Skagit Indian Tribal government completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process. However, due to post 9/11 concerns, those facilities are not listed separately in this document. A list of these facilities will be made available to FEMA personnel in the event this information is required to obtain future hazard mitigation grant funding.

Representatives from Upper Skagit Indian Tribe government worked closely with other jurisdictions, agencies, Indian tribes, and the Skagit Natural Hazards Planning Committee to develop a comprehensive, coordinated mitigation plan intended to reduce the vulnerability to natural hazards within the Upper Skagit Indian Tribe.

The information contained in this document presents the results of this effort to identify the specific natural hazards threatening the Upper Skagit Indian Tribe, to characterize the vulnerability of the Upper Skagit Indian Tribe regarding these hazards, and to identify current as well as proposed mitigation strategies, projects and/or programs to address those vulnerabilities.

The analyses conducted by Upper Skagit Indian Tribe staff were based on the best currently available information and data regarding the characteristics of the neighborhoods identified, the natural hazards that threaten the people, property, and environment of these neighborhoods as well as the impacts these neighborhoods have suffered in past disasters. This information includes, when available, United States Census data, audit records, local and national geographic information system data, Flood Insurance Rate Maps, hazard specific analyses, and other environmental and demographic facts. However, very often authoritative or current information simply was not available for the planning effort. In these cases, the experience, knowledge and judgment of local officials representing Upper Skagit Indian Tribe government were used in the planning, including assumptions and approximations that were believed to be reasonable. In addition, straight-forward, simplified technical analyses were used for tasks such as estimating property values, determining the size of populations affected, and so forth. The reliance on the judgment of knowledgeable officials and simplified analyses is considered acceptable at this stage to allow the participating organizations to complete the tasks needed to develop this multi-jurisdictional natural hazards mitigation plan. As the planning continues in future years, or at the time when a proposed mitigation initiative is intended to be funded and/or implemented, the participating organizations/jurisdictions recognize that additional information and analyses may be required.

The Upper Skagit Indian Tribe does not participate in the National Flood Insurance Program. There are no floodplains or frequently flooded areas identified, delineated, or mapped within the Helmick Road Reservation or the Bow Hill Complex. There are no repetitive loss properties located within the Helmick Road Reservation or the Bow Hill Complex.

The Upper Skagit Indian Tribe government is committed to the implementation of the mitigationrelated projects/programs described in this section of the plan when and if resources become available. The Upper Skagit Indian Tribe government is also committed to continuing the mitigation planning process that has resulted in the development of this document, and to the ongoing cooperation with other agencies, organizations, Indian tribes, and jurisdictions to make the Upper Skagit Indian Tribe more resistant to the damages and hardships that could otherwise be the result of future natural disasters.

NOTE¹: For security reasons the Upper Skagit Indian Tribe has not listed the values of individual facilities but has completed an inventory of all facilities and has considered these facilities in our planning and mitigation strategy development process. The values of these individual facilities will be made available to FEMA personnel if this information is required to obtain future hazard mitigation grant funding.

NOTE²: For security reasons the Upper Skagit Indian Tribe has not described cultural and sacred site vulnerabilities separately in the assessment, however they have considered the resources within the planning and mitigation strategy development process.

Helmick Road Reservation Profile:

General Information

Total Land Area	145
	acres

Land area of park, forest, and/or open space	23 acres
Land area set aside as resource lands	4 acres
Current population	275
Expected population in 2025	360

Anticipated Development and Population Trends:

Infrastructure for water, sewer, roads and related utilities to support residential and community facility development.

Public Works Infrastructure Summary

Miles of Streets/Road	2.0
Miles of Pedestrian Paths	0.5
Number of Bridges	0
Miles of Sanitary Sewer	2.5
Miles of Storm Sewer	1.0
Miles of Water Line	2.0
Other	Arch Culvert
Other	Pedestrian Bridge (±130 Feet)
Other	Fish Hatchery Water Collection and Conveyance
	System
Other	Fish Hatchery Well Water Supply Line: 0.5

Bow Hill Complex Profile:

General Information

Total Land Area	646
	acres
Land area of park, forest, and/or open space	616
	acres
Land area set aside as resource lands	0 acres
Current population	445
Expected population in 2025	650

Anticipated Development and Population Trends:

Construction of Water Park, Strip Mall and Interpretive Center.

Public Works Infrastructure Summary

Miles of Streets/Road	6.7
Number of Bridges	0
Miles of Sanitary Sewer	2.2
-------------------------	--------------
Miles of Storm Sewer	1.2
Miles of Water Line	2.2
Other	Arch Culvert
Other	

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT) THAT HAVE RESULTED IN DECLARED EMERGENCIES				
Type of Event Date Total Public Damage				
Nisqually Earthquake	Feb. 2001	minor		
Flood (snow/rain runoff)	Jan. 2009	minor		

Based on the review of the plan and the vulnerabilities related to the natural hazards that affect the Upper Skagit Indian Tribe, the following hazards were ranked according to the potential risk to the Upper Skagit Indian Tribe's residents and property:

Helmick Road Reservation:	Windstorm, Wildfire/Urb	Winter an Fire	Storm,	Earthquake,	Land	Movement,
Bow Hill Complex:	Winter Storn	n, Wildfire	e/Urban	Fire, Windstor	m, Eart	hquake

Additional information regarding the Upper Skagit Indian Tribe's vulnerabilities to these natural hazards is described below:

HELMICK ROAD RESERV	/ATION
Windstorm	Injury or death to persons; damage to homes and tribal buildings and/or facilities; blockage of emergency ingress/egress due to falling trees and/or flying debris. Inoperable infrastructure (wastewater system and pumps) due to loss of electricity.
Winter Storm	Injury or death to persons; damage to homes and tribal buildings and/or facilities; blockage of emergency ingress/egress due to falling trees. Inoperable infrastructure (wastewater system and pumps) due to loss of electricity.
	Electrical hazard caused by downed high-voltage electrical transmission lines operated by the Bonneville Power Administration adjoining the easterly boundary of the reservation.
Earthquake	Injury or death to persons; damage to homes and tribal buildings and/or facilities.
	Damage to tribal infrastructure (roads and utility systems) due to ground displacement.

Land Movement	Injury or death to persons; damage to homes and tribal buildings			
	and/or racinties, blockage of emergency ingress/egress due to debris now.			
	Inoperable infrastructure due to debris flow and/or ground displacement.			
	Loss of revenue due to damage and/or loss of homes and tribal buildings and/or facilities.			
Wildfire/Urban Fire	Injury or death to persons; damage to homes and tribal buildings and/or facilities; blockage of emergency ingress/egress due to fire hazard.			
	Loss of revenue due to threat of fire and/or damage to tribal facilities.			
BOW HILL COMPLEX				
Winter Storm	Injury or death to persons; damage to homes and tribal buildings and/or facilities; blockage of emergency ingress/egress due to falling trees.			
	Inoperable infrastructure (wastewater system and pumps) due to loss of electricity.			
	Electrical hazard caused by downed high-voltage electrical transmission lines operated by the Bonneville Power Administration adjoining the easterly boundary of the reservation.			
Wildfire/Urban Fire	Injury or death to persons; damage to homes and tribal buildings and/or facilities; blockage of emergency ingress/egress due to fire hazard.			
	Loss of revenue due to threat of fire and/or damage to tribal facilities.			
Windstorm	Injury or death to persons; damage to homes and tribal buildings and/or facilities; blockage of emergency ingress/egress due to falling trees and/or flying debris.			
	Inoperable infrastructure (wastewater system and pumps) due to loss of electricity.			
	Loss of revenue due to threat of windstorm and/or damage to tribal facilities.			
Earthquake	Injury or death to persons; damage to homes and tribal buildings and/or facilities.			
	Damage to tribal infrastructure (roads and utility systems) due to ground displacement.			
	Loss of revenue due to threat of structural damage to tribal facilities.			

Though not directly vulnerable to flood events that commonly occur in Skagit County, the Upper Skagit Indian Tribe could be inconvenienced by a severe flood event and expects a severe flood event would also cause a substantial loss of revenue from the Bow Hill Complex.

RISK ASSESSMENT UPDATE PROCESS, 2014

Throughout the 2014 plan update process, the Upper Skagit Indian Tribe's representative worked with the Skagit Natural Hazards Mitigation Planning Committee to:

- Review the plan as well as the vulnerabilities, risks, and impacts to the Upper Skagit Indian Tribe related to the local natural hazards.
- Determine what revisions/additions were needed to meet current conditions and needs.
- Review and approve the updated documents pertaining to the Upper Skagit Indian Tribe's portion of the plan.

The updated hazard profiles located in the main text of this plan describe the nature, location, extent, history, and probability of future events for the hazards that affect the entire county as well as those identified above. An analysis of the risks and impacts to the Upper Skagit Indian Tribe related to the local natural hazards was developed using FEMA-supplied 20/20 mitigation software. A summary of these risks and impacts are shown on page 16 of this portion of the plan. The risk and impact analysis and scoring matrix is described on pages 1 & 2 of SECTION IV of the 2014 Skagit County Natural Hazard Mitigation Plan.

Population of Jurisdiction	275 and growing slightly by 2025	
Total Structure Value	\$81 million	
Estimated Size of Jurisdiction	745 acres	
Economic Characteristic	Economically Disadvantaged	

The Upper Skagit Indian Tribe has identified the following tribal facilities are at risk from the hazards identified and updated their estimated value.

NATURAL HAZARD RISK ASSESSMENT INFORMATION							
Hazard	Residential Structures At Risk	Populati on At Risk	Non- residential Facilities At Risk	Estimated Value OF Facilities At Risk			
Earthquake	56	675	17	\$81,000,000			
Windstorm	56	675	17	\$81,000,000			
Winter Storm	56	275	10	\$41,000,000			
Landslide/Erosion	76	275	12	\$30,000,000			
Wildland/Urban Fire	76	12	10	\$55,000,000			

MITIGATION STRATEGY UPDATE PROCESS, 2014

The Mitigation Goals identified in Section III of the 2014 Skagit County Natural Hazard Mitigation Plan were identified after reviewing the results of the risk assessment and are intended to reduce the impacts to the Upper Skagit Indian Tribe's people and property within Skagit County at the Helmick Road Reservation and Bow Hill Complex. The goals identified in the 2003 plan were re-evaluated and reaffirmed as part of the 2008 update process and again in the 2014 update process. The goals are summarized below and are described in detail in Section III.

- Protect Life and Property
- Increase Public Awareness
- Encourage Partnerships
- Provide for Emergency Services

In addition, the Skagit Natural Hazards Mitigation Planning Committee reviewed and revised a list of potential multi-jurisdiction/multi-hazard action items associated with the hazards identified during the initial and update process. Each action item that had been identified was reviewed to determine whether it had been completed, was still applicable, or needed revision based on the newly acquired information that had been developed as part of the update process.

The Upper Skagit Indian Tribe Community Representative worked with the Tribal government to develop a list of high-priority mitigation measures to be listed within the Tribe's portion of the plan. After the projects had been prioritized, information for each mitigation measure was collected to include: detailed project information, a project timeline, details of project funding, and details of project administration.

Mitigation measures were prioritized according to the criteria listed below:

- 1. Mitigation measures that provide for the greatest reduction in risk to members of the community and Tribal infrastructure.
- 2. Mitigation measures that have a positive cost/benefit analysis.
- 3. Mitigation measures that have broad-based public and/or Tribal Council approval.
- 4. Mitigation measures that utilize best-management practices.
- 5. Mitigation measures for which funding has already been secured.
- 6. Mitigation measures that qualify for alternate and/or matching funding.
- 7. Mitigation measures that are multi-jurisdictional and/or multi-agency in nature.

The Upper Skagit Indian Tribe Community Representative reviewed the current plans and ordinances identified on the following page and incorporated updated information into this jurisdiction specific mitigation strategy.

Since the Upper Skagit Indian Tribe has been an active participant in the hazard mitigation planning process over the last eleven years, the integration of the process with ongoing tribal planning efforts and FEMA programs and initiatives has been considered, primarily during the course of updating and adopting new land use codes and ordinances, such as the Comprehensive Land Use Plan, Land Use/Zone Code, Fire and Life Safety Code, and Building Code.

The mitigation planning process was integrated with other ongoing Tribal and FEMA planning efforts to include incorporating hazard profiles and mitigation actions into the Tribe's comprehensive planning process. Disaster response and recovery mechanisms are included in the Tribe's Comprehensive Emergency Management Plan.

As shown below, the Tribe currently supports pre-disaster and post-disaster hazard mitigation through existing regulations and plans. Tribal policies include implementing Fire and Life Safety Codes as well as the current International Building Code to also enhance our mitigation strategy.

The Upper Skagit Indian Tribe anticipates updating its Comprehensive Plan in 2020. As part of this update, the Tribe will further incorporate the mitigation strategy and other information contained in the plan (risk assessment information) into the Comprehensive Plan (as appropriate) and with approval of the Tribal Council. The process the Tribe will utilize for this action will be the established process used to update the Comprehensive Plan which includes public notification and input.

LEGAL AND REGULATORY RESOURCES AVAILABLE FOR HAZARD MITIGATION (2014 Update)					
Type of Regulato Mitigation ry Tool		Name/Typ e	Evaluation of Regulatory Tool on Hazard Mitigation		
		Building Code (current I- Code)	The I-Code Code applies to Tribal structures. Structures built to code are less likely to be vulnerable to hazardous conditions, including windstorms, wild land fires, and other natural hazards. The Tribe issues building permits and conducts inspections as required by the Code.		
Pre- Disaster Mitigation	on Policies si O O Program	Comprehen sive Plan	Establishes future development and land use mitigation measures to reduce risks to potential hazards.		
		Zoning Ordinance	Designates allowable land uses and provides for control of site development parameters.		
		GIS	Capability to develop Hazard Identification and Vulnerability Assessment (HIVA)		
Post- Disaster Mitigation	Plans	Comprehen sive Emergency Management Plan	The CEMP provides both pre-and post disaster guidance associated with responding to an emergency		

The following fiscal capability assessment lists specific financial and budgetary tools that are currently available, as well as potentially available, to the Tribe for hazard mitigation actions. These resources, which are listed below, include private, state and federal entitlements. General Tribal funds can be used for hazard mitigation, although the mitigation projects must be consistent with other needs of the Tribe.

CURRENT AND POTENTIAL FINANCIAL RESOURCES FOR HAZARD MITIGATION			
Sources Financial Resource Effect on Hazard Mitigation			

CURRENT AND POTENTIAL FINANCIAL RESOURCES FOR HAZARD MITIGATION					
Sources	Financial Resource	Effect on Hazard Mitigation			
Potential	Indian Community Development Block Grant Program	U.S. Housing and Urban Development provides critical housing and community development resources to aid disaster recovery.			
Potential	Imminent Threat, Indian Community Development Block Grant Program	Funding to alleviate or remove imminent threats to health or safety.			
Current	Indian Reservation Roads Transportation Funding	Providing safe access through hazard-prone areas.			
Potential	Administration for Native Americans (ANA) Grant Programs	These discretionary funds can be used to fund a variety of environmental management programs, including the identification and assessment of human and natural hazards and their associated risks, and the development and implementation of plans, policies and ordinances.			

The Upper Skagit Indian Tribe considers the public to be those Tribal and non-Tribal residents that live in, or in close proximity to land, residences, or critical facilities within the exterior boundaries of the Helmick Road Reservation and Bow Hill Complex. Since this planning process was completed as part of a multi-jurisdictional process with the County, other Tribes and incorporated cities, opportunities for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties were involved through area-wide invitations to participate in the planning update process. Notices of public meetings were advertised through notice of public meetings in newspapers.

MONITORING, EVALUATING, AND UPDATING

The Tribe will use the Upper Skagit Indian Tribe's Community Representative to monitor, evaluate and update the HMP. In addition, other interested parties can participate in this process. The representative (currently Joe Hemmerich) will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate and revise the Tribe's portion of this HMP.

The Tribal HMP representative will conduct an annual review, as directed by the Tribal Council, to monitor progress in implementing the HMP, particularly the Mitigation Action Plan. The annual review will provide the basis for possible changes in the HMP's Mitigation Action Plan, by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the HMP implementation.

A report should be made available to Skagit County Emergency Management for inclusion in the annual report that is sent to the Washington State Mitigation Officer no later than September 30th of each year as described in the Plan Evaluation and Update Schedule 2014 - 2019 located in the Plan Maintenance portion of this plan.

As stated earlier, the Upper Skagit Indian Tribe considers the public to be those Tribal and non-Tribal residents that live in, or in close proximity to land, residences, or critical facilities within the exterior boundaries of the Helmick Road Reservation and Bow Hill Complex. As stated in the Plan Maintenance portion of SECTION I of this plan, continued public involvement in the natural hazards mitigation process will be accomplished via the advertised public meeting held each year as part of the annual plan evaluation process.

As described in the Plan Maintenance portion of this plan, updates shall commence no later than March 1st of the scheduled update year according to the Plan Evaluation and Update Schedule 2014 - 2019. As part of this process, the Skagit Natural Hazards Mitigation Steering Committee will undertake the following activities to evaluate the plan and ensure that the HMP is re-adopted in the fifth year:

- Thoroughly analyze and update the Tribe's risk to natural hazards.
- Review the previous annual reviews, including the mitigation activities progress reports.
- Provide a detailed review and revision of the Mitigation Strategy.
- Prepare a new Mitigation Action Plan with prioritized actions, responsible parties and resources.
- Prepare a new jurisdiction-specific draft HMP and submit it to the Tribal Council for approval.
- Coordinate with the County to submit an updated HMP to FEMA for approval.

MONITORING PROGRESS OF MITIGATION ACTIONS

The Tribal HMP representative and/or other personnel assigned by the Tribal Council, will be responsible for monitoring mitigation project implementation and closeout. Mitigation project files and documents shall be incorporated into (and as part of) the HMP evaluation and update process. Project-specific reports will be included in the annual review report sent to Skagit County Department of Emergency Management for forwarding to the Washington State Mitigation Officer. In addition, project-specific reports will be made available to the community at the annual public meeting described earlier. Finally, The Tribal HMP representative will submit a closeout report to the Tribal Council for final approval at the conclusion of any mitigation project.

MITIGATION MEASURES

The following mitigation measures were proposed when the plan was originally developed in 2003, retained in 2008 and retained in the 2014 Plan:

- 1. Seismic Retrofitting of Critical Facilities and Infrastructures (2003).
 - A. This will be a long term (3 yrs. +) project.
 - B. Schedule will be dependent on grant funding.

NO PROGRESS HAS BEEN MADE TOWARDS ACCOMPLISHING THIS MITIGATION MEASURE DUE TO LACK OF FUNDING. THE MEASURE REMAINS VALID AND HAS BEEN RE-AFFIRMED FOR THE 2014 – 2019 PLAN CYCLE.

- 2. Emergency Electrical Power for Critical Facilities and Infrastructure Systems (2008).
 - A. This will be a long term (3+ yrs.) project.
 - B. Schedule will be dependent on grant funding.

THIS MITIGATION MEASURE WAS PROPOSED IN 2007 AND IS ON-GOING, with most critical infrastructure systems now served by emergency power; COMPLETION IS CONTINGENT UPON FUTURE FUNDING. THIS MITIGATION MEASURE HAS BEEN RE-AFFIRMED FOR THE 2014 – 2019 PLAN CYCLE.

- 3. Construct emergency egress route to provide an alternate means of escape from the Helmick Road Reservation (2008).
 - A. This will be a long term (3+ yrs.) project.
 - B. Schedule will be dependent on grant funding.

THIS MITIGATION MEASURE WAS PROPOSED IN 2008, NO PROGRESS HAS BEEN MADE TOWARDS THIS MITIGATION MEASURE DUE TO LACK OF FUNDING. THE MEASURE REMAINS VALID AND HAS BEEN RE-AFFIRMED FOR THE 2014 – 2019 PLAN CYCLE.

Mitigation measures proposed for the 2014 – 2019 plan cycle:

In addition to the multi-jurisdiction/multi-hazard mitigation action items listed in SECTION III of this plan, and the mitigation measures listed above, the Upper Skagit Indian Tribe proposes the mitigation measure listed below for the 2014 – 2019 plan cycle.

- 4. Emergency Water Supply for Helmick Road Reservation (2014).
 - a. This will be a short term (1-3 yrs.) project.
 - b. Schedule will be dependent on grant funding.

THIS MITIGATION MEASURE WAS INITIATED IN 2013 AND IS ON-GOING; COMPLETION IS CONTINGENT UPON FUTURE FUNDING. THIS MITIGATION MEASURE IS NEW TO THIS PLAN AND HAS BEEN RE-AFFIRMED FOR THE 2014 – 2019 PLAN CYCLE.

NOTE: All Tribal Mitigation Projects will be subordinate to the following:

- A. The Tribal Council will direct the implementation and set project priority.
- B. The Tribal Council will administer and assign appropriate department(s) to implement projects.
- C. The Tribal Council will secure project funding thru Federal and State grants as well as Tribal Capital Improvement funds.
- D. The Tribal Council will review cost benefit analysis of projects thru the funding application process.

Contact Information: Joe Hemmerich, Public Works Director

Upper Skagit Indian Tribe 25944 Community Plaza Way Sedro Woolley, WA 98284 Telephone: (360) 854-7045 joeh@upperskagit.com

SPECIAL PURPOSE DISTRICTS

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DIKE DISTRICTS

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SKAGIT COUNTY DIKE DISTRICT #1

Dike District Profile

Land Area Owned Miles of Dike/Levee: Value of Dike/Levee: @ \$3,500 / linear ft Number of Pumps: Value of Pumps: Number of Tide gates: Value of Tide gates: Value of Equipment Owned: Value of Area Served: 20 +/- acres 9 miles \$166,320,000 0 0 0 \$135,000 \$135,000

Critical Facilities (Owned by District)

1. Dike District Building

approx. value: \$114,700

Outline of Area Served

Beginning at the intersection of the County Road, or present dike, with E point of what is known as Pleasant Ridge, in Section 10, Township 33 N, R 3 E.W.M.; thence S to the North Fork of the Skagit River, thence NE along the river bank, to the intersection with Skagit River; thence NE, N and NW along the W bank of Skagit River to what is known as Wiles Slough in Section 13, Township 34 N, R 3 E.W.M.; thence SW along said slough to its intersection with the W line of the SE I/4 of Section 14, thence S to the center of Section 23, thence W and SW along the County Road to the W line of the SE I/4 of Section 21, thence S to the center of Section 28, thence W I/2 mile, thence S to the intersection of a dike on the N bank of what is commonly known as Wallace Slough, thence SW, along the outer line of said dike, to the dike dividing what has heretofore been known as dike districts No.s 1 and 9, thence SE along the center of the last mentioned dike to the intersection with the N point of the aforesaid Pleasant Ridge in Section 32, Township 34 N, R 3 E.W.M.; thence along the County Road in a SE direction to the place of beginning. (Res., 19)

Current and Anticipated Service Trends

- Improving levees through potential relocation which would involve land acquisition, construction
 of keyways, sheet piling, seepage berms and routine maintenance.
- Development of evacuation plan and emergency warning system for protection of life and property.
- Flood fighting equipment upgrades which could include possible 45kw commercial generator

Natural Hazard Event History (1975 to Present)

1.	High River Flood Stage; 129,000 c.f.s.	12/04/75	Damage Unknown
2.	High River Flood Stage; 142,000 c.f.s.	11/11/90	see figure below
3.	High River Flood Stage; 152,000 c.f.s.	11/25/90	\$2,000,000
4.	High River Flood Stage; 151,000 c.f.s.	11/30/95	\$2,500,000
5.	High River Flood Stage; 135,000 c.f.s.	10/22/03	\$ 803,853
6.	High River Flood Stage; 138,000 c.f.s.	11/07/06	\$3,105,000

Natural Hazard Vulnerability Analysis Rating

The District is most vulnerable to the following natural hazards – ranked in order:

1. Flooding 2. Volcano (causing flooding) 3. Earthquake (rupturing dams and levees)

Existing Applicable Natural Hazard Mitigation Policies, Ordinances and Codes

- 1. All levees are constructed to Army Corps of Engineers standards and are inspected on an annual basis.
- 2. County, State and Federal permits are required for all construction and repair work.
- 3. RCW 85
- 4. Skagit County Comp Flood Haz Management Plan 1989
- 5. ACOE PL84-99
- 6. USACE ER 500-1-1; ETL 1110-2-571, and related Regulations and Guidance

Prior Proposed Natural Hazard Mitigation Measures (2003 - 2013)

Mitigation Measure	Lead Agency	Funding Source	Time Line
Sheet piling installation	Commissioners	Grant funding/District	Short Term
		Assessments	
Keyway installation	Commissioners	Grant funding/District	Short Term
		Assessments	
14 Seepage berm installations	Commissioners	Grant funding/District	Short Term/Ongoing
		Assessments	

Mitigation Accomplishments (2003 – 2013)

Between 2003 and 2013, Dike District #1 completed installation of 14 seepage berm projects in the District. This also included PL84-99 repairs and projects from 2007 - 2011 for repairs of seven different sites in the District, with extensive habitat mitigation.

Proposed Natural Hazard Mitigation Measures (2014 – 2019)

Mitigation Measure	Lead Agency	Funding Source	Time Line
3 Sheet piling installations	Commissioners	Grant funding/District	Short Term
		Assessments	(2014 – 2015)
Youngquist Seepage berm	Commissioners	Grant funding/District	Short Term
		Assessments	(2014 – 2015)
WDFW Seepage berm	Commissioners	Grant funding/District	Short Term
		Assessments	(2014 – 2015)

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

- 1. Existing construction for strengthening of levee
- 2. Skagit County Comprehensive Flood Hazard Management Plan 1989
- 3. Skagit County Natural Hazard Mitigation Plan 2008

Additional Concerns Affecting Dike District #1

With the potential 3 Bridge Corridor Project and levee setback proposed by the upriver Dike District and Skagit County, the additional conveyance of water and debris coming downstream could create a "bottleneck" with possible loss of the Westside Bridge with flood waters exceeding 160,000 cubic feet per second. Upgrading and raising the Westside Bridge approaches would be a necessity, as well as setting levees back in West Mount Vernon and in other areas within the District downstream of this proposed project. Wing dikes were built in 2002 to help protect the west bridge approach. Also, upstream, the BNSF Bridge and replacement is a critical component which has affects on downstream Dike and Drainage Districts, including Dike District No. 1.

SKAGIT COUNTY DIKE DISTRICT #3

Dike District Profile

Land Area Owned:	<u>8</u> acres
Miles of Dike/Levee:	<u>13</u> miles
Value of Dike/Levee:	\$ <u>68,640,000</u>
Number of Pumps:	0
Value of Pumps:	\$ <u>0</u>
Number of Tidegates:	7
Value of Tidegates:	\$ <u>350,000</u>
Value of Equipment Owned:	\$ <u>50,000</u>
Value of Area Served:	\$ <u>505,131,800</u>

Critical Facilities (Owned by District)

Dike 3 Bld.

approximate value: \$250,000

Outline of Area Served: <u>Starting at Lions Park in Mount Vernon south the Co. Line along</u> <u>Skagit River (main stem - south fork; east to foothills - Devils and Little Mountains; north to</u> <u>P.O.B.)</u>

Current and Anticipated Service Trends: Continue to maintain existing dikes and implement capital project for levy improvements.

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)				
Type of Event Date Total Public Damage				
Flood	1975			
Flood - Fir Island	1990	Hill Ditch		
Flood	1995			
Flood	2003			
Flood	2006			

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

Flood

Tsunami

Lahar

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes _____C.O.E ph 84-99 and 500-1-1 standards _____

RCW 85

Proposed Natural Hazard Mitigation Measures

Mitigation Measure	Lead Agency	Funding Source	Time Line
Levy Setback Project	Commissioners	Grant funding	Completed
Levy Improvement – Sewer Treatment Plant	Commissioners	Grant funding	Completed
Clean Carpenter Creek Hill Ditch	Commissioners	District funding	Long Term
Fill void between Pioneer Highway and Burlington Northern Railroad Tracks	Commissioners	District funding	Short Term
Find a permanent solution for the situation at the revetment in	Commissioners / Working with the	Grant funding	Phase 1 Completed 2011
Mount Vernon	City of Mt Vernon		Phase 2 Complete 2014
			Phase 3 Complete 2015
Working with the Nature Conservancy on levee set back at Fisher Slough	Nature Conservancy	Nature Conservancy	Completed 2012
Seepage berm (1500') on land side of levee from Britt Slough south.	Commissioners	District funding	Completed 2011
Construct a berm south of Fisher's Slough to Milltown	Commissioners	Grant funding	Short term

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

___Skagit Co. Comprehensive Flood Management plan-1989_____

Skagit Co. Flood Reduction Study

SKAGIT COUNTY DIKE DISTRICT #4

Dike District Profile

Miles of Dike/Levee:	<u>13,500</u> feet
Value of Dike/Levee: \$3,000/ft 2008 USACE	\$ <u>40,500,000</u>
Value of Area Served:	\$ <u>28,311,500</u>
Critical Facilities (Owned by District):	_ approximate value: \$ 13,500,000

Outline of Area Served: Blanchard to Edison slough saltwater dike along Samish Bay

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)				
Type of Event	Date	Total Public Damage		
Floods				

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

Flood
Earthguake/ Tsunami
Severe winter storm low pressure during high-tides with high winds, waves

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

≠ RCW 85

Proposed Natural Hazard Mitigation Measures

Mitigation Measure	Lead Agency	Funding Source	Time Line
Rip-Rap to Dike – Rebuild in some sections	Commissioners	Grant funding	Due to permitting problems, this mitigation goal was deferred and is hereby re-affirmed for the 2014 - 2019 plan cycle.

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

Skagit Co. Comprehensive Flood Management Plan - 1989 ______ 2008 Hazard Mitigation Plan

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SKAGIT COUNTY DIKE/DRAINAGE DISTRICT #5

Dike District Profile

Miles of Dike/Levee:	<u>D: 7 ½ L: 4</u> miles
Value of Dike/Levee: \$3,000/ft 2008 USACE	<u>\$182,160,000</u>
Number of Pumps:	2
Value of Pumps:	\$ <u>100,000</u>
Number of Tidegates:	7
Value of Tidegates:	\$ <u>150,000</u>
Number of Floodgates:	4
Value of Floodgates:	\$ 65,000
Value of Area Served:	\$ <u>12,041,300</u>
Critical Facilities (Owned by District):	

Tide gate pumps approximate value: \$ 250,000

Outline of Area Served: <u>West side along Padilla Bay from north at D'Arcy Road to Samish Island - End 1/2 mile from Samish Island, Alice Bay, Samish Bay, West Bank of Samish, down Farm to Market Road, Farm to Market Road serves as the boundary.</u>

Current and Anticipated Service Trends: Development upstream Bow Hill effect Samish River Runoff

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)				
Type of Event Date Total Public Damage				
Flood	(2) 1990			
	(2) 1995			
High Tide, Severe Storm	2005	\$60,000		
Flood	2009	Unknown		

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

Flood

Severe winter storm- low pressure, high tide/ wind waves

<u>Earthquake/ Tsunami</u>

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

RCW 85.06 for Drainage #5

RCW 85 for Dike

Proposed Natural Hazard Mitigation Measures

Mitigation Measure	Lead Agency	Funding Source	Time Line
Install pump at tide gates	Commissioners	Grant funding	Work completed
Re-lining Flood Gates	Commissioners	Skagit County Drainage Utility Funding	2-3 years

Existing Prioritized Natural Hazard Mitigation Strategies or Projects

<u>Install Pump at tide gates – completed</u> <u>Installing new flood gate liners near the mouth of the Samish River</u>

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

Skagit County Comprehensive Flood Management Plan- 1989 2008 Hazard Mitigation Plan

SKAGIT COUNTY DIKE DIST #12

Skagit County Dike District #12 was originally incorporated in 1895. Additional areas have been annexed into the district since that time; areas east of Burlington to including the area where United General Hospital is was annexed in early 1950's and an additional area near the southerly portion of Padilla Bay was annexed in 1994. In 2004 the District annexed Skagit County Dike/ Drainage District #8. This brought the total area served by Dike District #12 to about 20,000 acres.

Over the years farmland provided the bulk of monies for the Districts budget. In the late 1970's and early 1980's an increase in commercial development began in the Burlington area. In the 1990's, and continuing on through the present, the area in and around Burlington has become extremely developed with additional residences as well as commercial, industrial, and retail development. While this explosion in growth has benefited the Skagit County Dike District #12 financially, due to a large tax base to draw from, it has, none the less, caused some difficulties as well. While the District has worked diligently to upgrade the levee since 1998 major upgrades, in an effort to provide increased flood protection, this work has resulted in increased development and greater sense of security creates the need to do even more to protect the area in addition to increasing the liability and responsibility that Skagit County Dike District #12 has to protect its constituents and an ever increasing tax base creating a catch 22 situation. The District continues to work with the City of Burlington to fend off development pressure in the area next to the levee, allowing the district time to purchase the properties next to the levee.

The 1990 floods were a wakeup call for flood control in Skagit County. With back to back floods again in 1995 and additional flooding in 1996, it was clear that something else had to be done to increase the level of flood protection within the lower floodplain. The existing Skagit River levees were being pushed to their maximum and, in the case of Fir Island, beyond their capabilities to protect life and property. In 1998 Dike District 12 embarked on a bold plan to try to provide better protection for its constituents.

Since 1997 the District has reconstructed its levees upstream of the Burlington Northern Santa Fe Railroad Bridge. These levees were reconstructed to exceed United States Army Corps of Engineers standards (15' top with 2:1 slope) with levee tops varying from 30' to 50' in width and with levee back-slopes as great as 18:1. This was done in the hopes to prevent a catastrophic failure during a future flood event. The wider tops coupled with longer, gentle back-slopes will allow flood waters high enough to over-top the levee to flow slowly and smoothly onto the floodplain in a more controlled manner thus allowing time for an evacuation. The district continues with this work in the Lafayette Road area where the river makes a hairpin turn, around Strawberry Point.

The District has been actively purchasing land adjacent to the levee downstream of the Burlington Northern Santa Fe Railroad Bridge to allow for wider levees with longer back slopes to allow flood waters high enough to overtop the levee in a more controlled manner onto the flood plain, allowing for more time for safer evacuation. Skagit County Dike District #12 has worked a great deal with the Seattle District of the United States Army Corps of Engineers since the 1990 floods. In addition, the District works with other local governmental agencies including law, fire, emergency management, search and rescue, and other dike districts. Skagit County Dike District #12 has a mutual aid policy within its Standard Operating Guidelines which allows it to help others in flood emergencies, as was the case in 1990 floods when the District delivered over 90,000 sandbags to Mt. Vernon, Conway, Fir Island and several other areas. The district continued to provide mutual aid in the 2003 and 2006 floods.

The District will remain committed to its duty to protect its constituents and to prepare for emergency situations. The District recently worked with the City of Burlington to develop an evacuation plan that can be activated for flooding as well as other hazards.

Currently the district and the City of Burlington are working together to get district levee protecting urban area (city limits) certified for the 100 year flood. District plans 80 year protection for rural areas to limit urban sprawl and development on flood plain outside city limits.

Dike District Profile

Land Area Owned	160) + acres
Miles of Dike - Padilla Bay (value @\$3,000/foot)	9.5	5 (\$150,480,000)
Miles of Levee – Skagit River (value @\$3,000/foot)	5	(\$79,200,000)
Miles of Levee – Skagit River (value @\$5,000/foot)	5	(\$132,000,000)
Number of Pumps (value)	3	(\$170,000)
Number of Tide gates (value)	11	(\$225,000)
Value of Equipment Owned	\$	2,000,000
Value of Area Served	\$ 1,	650,637,750

Critical Facilities Owned by Dike District #12:

Headquarters Building; approximate value: \$850,000 Equipment Building, built in 2008; approximate value: \$500,000

Outline of Area Served:

An area approximately 20,000 acres in size located westerly of the city of Sedro-Woolley and easterly of the Swinomish Channel bounded by Bayview Ridge on the north and McLean Road, Barrett Road, and the Skagit River on the south.

Current and Anticipated Service Trends:

Increase in development and value of service area especially in Burlington area. Dike 12 annexed Dike/Drainage 8 area. In 2004 Dike 12 added drainage to its duties, then irrigation. Increase storm water runoff in Bayview drainage area due to development.

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)				
Type of Event	Date	Total Public Damage		
FLOOD	1975	Damage Unknown		
FLOOD	1979	Damage Unknown		
FLOOD	1990	\$2,500,000		
FLOOD	1995	\$4,500,000		
FLOOD	2006	\$1,070,000		

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

- \neq Flood
- \neq Severe Storm 25 year event (1" of rain in 24 hours)
- ≠ Earthquake causing liquefaction and/or damage to levees and dikes
- ≠ Volcanic event causing a dam failure or a lahar

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

- \neq Corps of Engineers PL 84-99 and 500-1-1 standards for levees
- ≠ RCW 85 & 85.06

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

- ≠ Evacuation Plan for Burlington
- ≠ Skagit County Comprehensive Flood Hazard Management Plan (1989)
- ≠ Skagit County Natural Hazard Mitigation Plan (2008)
- ∠ Corps of Engineers Skagit County Flood Damage Reduction Study (on-going)

Mitigation measures completed during the 2008 – 2013 hazard mitigation plan cycle

- ≠ Levees widened from S. Gardner Road to the upstream end of Dike District 12 Levee System.
- ≠ Sea dikes upgraded to a 12' wide top from Telegraph Slough to the Swinomish Channel.
- ✓ Army Corps of Engineers completed levee repairs throughout the districts system length from damage received during the 2006 high flow in 2011. Toe rock was improved to increase stability.
- ≠ Three culverts removed and replaced by bridges on No Name Slough to increase drainage capacity.

Proposed Natural Hazard Mitigation Measures

Mitigation Measure	Lead Agency	Funding Source	Time Line
Provide minimum 50 year and maximum 80 year protection for flood plain, 100 year for Burlington	Dike District Commissioners	Grant funding; District Budget	Long Term / Ongoing
Widen and increase back slope on levees from the Avon bend to BNSF bridge	Dike District Commissioners	Grant funding; District Budget; Other sources as available	Long Term
Buy-outs in Sterling and Nookachamps areas and upriver along with extra storage area behind dams on the Skagit River when funding is available (GI study)	Dike District Commissioners	Grant funding; District Budget; Other sources as available	Long Term / Ongoing
Additional flood protection for United General Hospital	Dike District Commissioners	Grant funding; District Budget; Other sources as available	Long Term
Complete dredging, repair culverts and improve pump house at No Name Slough	Dike District Commissioners	Grant funding; District Budget; Other sources as available	2014
Widen, raise and increase back slope on levees from BNSF Bridge upstream to SR20	Dike District Commissioners	District Budget, other sources as available	2014-2020

SKAGIT COUNTY DIKE DISTRICT #17

Overview:

Dike District 17 was established on January 1907. The original goals of the Dike District were to keep fall and spring high waters off of the farmland in the district. There was no development in the area at the time and farmers simply wanted to preserve the land in order to maximize crop production.

As time went on, the levees were developed to provide increased flood control. As the citizens of Skagit County found security in the level of flood risk management of Dike District 17, residential and commercial encroachment began into the Districts' boundaries. The building of Interstate 5 created additional demand on flood risk management and the Dike District. Continued development and commercial sprawl creates a demand for larger levees to further lower flood risk.

Today, the demands on Dike District 17 for flood risk management are higher than ever. The proposed revisions of the FEMA flood mapping in Skagit Valley will place the 1% 100 year flood level well above the risk management level of the existing levees. Development demands are growing at an exponential rate as population growth continues. Environmental constraints on levee construction further increase costs to provide flood protection. In order for Dike District 17 to evolve to meet the new demands and environmental impacts, we will need to take a team approach to flood risk management with the Dike District as the lead.

The short term goal of Dike District 17 is to continue our current maintenance strategy in order to insure existing infrastructure meets or exceeds federal requirements imposed by the United States Army Corps of Engineers PL8499. The long term goal of Dike District 17 is to provide the best possible flood risk reduction to our district given the financial, geographic, ecological and biological constraints placed on the district. The district's long-term goals include:

- 1. Foremost, Dike District 17 will focus on efforts to reduce flood risk and promote life and property safety within the district.
- 2. In partnership with the City of Mount Vernon, Skagit County, Washington State Department of Transportation, and Federal agencies, Dike District 17 will work to strengthen enhance capacity of the levees in the three bridge corridor in an effort to provide 100-year flood risk reduction for Mount Vernon and other properties within this portion of the floodplain.
- 3. Dike District 17 will partner with the City of Mount Vernon, Skagit County, State, and Federal entities to provide a minimum of 100-year flood risk reduction for the properties within the city limits of Mount Vernon.
- 4. Dike District 17 will partner with Skagit County, State, and Federal entities to provide a minimum of 50-year and a maximum of 80-year flood risk reduction for all properties in the district and outside the city limits of Mount Vernon.

Dike district 17 mitigation efforts will be ongoing for many years. These efforts will not be achieved without partnerships and cooperation from a multitude of other entities and stakeholders both within and outside Skagit County. Dike District 17 will continue its efforts toward achieving these goals.

Dike District #17 Profile:

Land Area Owned:	15 ac	cres
Miles of Dike/Levee:	5.5 m	niles
Value of Dike/Levee (at \$3,000 per foot):	\$87,1	L20,000
Number of Tide Gates:	1	
Value of Tide Gates:	\$	50,000
Value of Equipment Owned:	\$	150,000
Value of Area Served:	\$370	,238,800

Critical Facilities (Owned by District):

32. Dike Building/Headquarters; approximate value: \$450,000

Outline of Area Served:

Beginning at the Mount Vernon side of the Skagit River at the BNRR Bridge downstream to Lions Park in Mount Vernon.

Current and Anticipated Service Trends:

- \neq Continued maintenance and ongoing repair of the levee.
- \neq Continue efforts to improve the levee via raising and set-back or layback efforts.
- ✓ The district has purchased 15 properties (with an approximate value of \$4,500,000) to allow for future set-back or layback of the levee; it is anticipated this effort will continue.

Natural Hazard Event History:

NATURAL HAZARD EVENTS (1975-PRESENT)				
Type of Event	Date	Total Public Damage		
Flood	1990	\$ 300,000 to levee		
Flood	1995	\$1,500,000 to levee		
Flood	2003	\$ 850,000 to levee		
Flood	2006	\$2,500,000 to levee		

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

- ≠ Flood
- ≠ Earthquake
- ≠ Volcanic Activity

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

Washington State RCW 85- PL 8499 - 500 - 1 - 1 COE Standards

Proposed Natural Hazard Mitigation Measures:

In 2003, Skagit County Dike District #17 listed only one mitigation measure, to purchase property towards an established long-term goal of setting the existing levee back or layback to provide an increase in flood protection. Since 2003, Dike District #17 was successful in purchasing additional properties towards this goal.

The mitigation measures proposed by Skagit County Dike District #17 for the 2014 – 2019 plan cycle are listed below:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Provide 50 year minimum flood risk reduction in rural areas within the floodplain	Dike District 17 Commissioners	Grants, Local taxes, PL8499 funding	Long term & on going
Provide minimum of 80 year with a goal of 100 year flood risk reduction in urban populated areas within the floodplain	Dike District 17 Commissioners	Grants, local taxes, PL8499 funding	Long term & on going
Set back or layback levies from BNSF Bridge to Mount Vernon city limits along Hoag and Stewart Road and create a tie-in with the Mount Vernon Flood Wall	Dike District 17 Commissioners	Grants, local taxes, State and Federal funding assistance, WSDOT and Federal DOT funding	Long term & on going
Replace the BNSF Railroad bridge	BNSF Railroad	Federal grants and assistance	Long Term
Supplement levy system along I5 with goal of 100 year flood risk reduction	Dike District 17 Commissioners	Grants, local taxes, State and Federal funding assistance, WSDOT and Federal DOT funding	Long Term
Increase hard flood storage capacity in the Baker River system	U.S. Army Corps of Engineers	Local taxes & federal funding	Long term
Increase drainage in Riverbend area	Skagit County	Local taxes & Grants	Short Term
Evacuation plan for residents within the district	Skagit County / City of Mount Vernon	Local taxes & Grants	Short Term
Provide public information and education regarding flood risk	Skagit County	Local taxes & Grants	Short Term

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SKAGIT COUNTY CONSOLIDATED DIKING IMPROVEMENT DISTRICT # 22

Critical Facilities:

Miles of Dike/Levee: Value of Dike/Levee (at \$3,500 per lineal foot): Miles of Ditches (value): Number of Pumps (value): Number of Tide Gates (value): 21 miles \$388,080,000 100 miles (\$2,000,000) 2 (\$100,000) 18 (\$360,000)

Outline of Area Served: Fir Island; Skagit County, Washington

Approximate Value of Area Served (2013 Assessor Data): \$49,565,000

Natural Hazard Vulnerability Analysis Rating:

This District is most vulnerable to the following natural hazards - ranked in order:

1. Flood 2. Earthquake/Tsunami 3. Windstorm/Severe Storm

Natural Hazard Event History (1975 – Present):

Type of Event	Date	Total Public Damage
Flood	1975	unknown
Flood	1990	8,000,000
Flood	1995	3,000,000
Flood	2003	unknown
Flood	2006	1,012,000

Proposed Natural Hazard Mitigation Measures (2008 – 2013):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Continue to pursue opportunities to conduct	Dike District	Grant funding	Short Term
property buy-outs to allow for setting back river	Commissioners		
levees.			
Due to a lack of funding, the above-l	isted mitigation measu	ıre is no longer conside	pred
a viable option and has been eliminat	ed from the plan for t	he 2014 – 2019 plan cy	/cle.
Continue to improve existing levees to provide	Dike District	Grant funding	Short Term
50-year flood protection.	Commissioners		
Continue to pursue opportunities to increase	Dike District	Grant funding	Short Term
flow capacity of both the north fork and south	Commissioners		
fork of the Skagit River via setback of existing			
levees.			
Due to concerns regarding salmon habitat rest	oration projects, the a	bove-listed mitigation r	neasure is no
longer considered a viable option and has been	n eliminated from the	plan for the 2013 – 201	19 plan cycle.
As needed and depending upon funding,	Dike District	Grant funding	Short Term
construct keyways to stop leakage.	Commissioners		
Widen and strengthen existing levees by	Dike District	Grant funding	Short Term
installing keyways and raising roads on the toe	Commissioners		
of dikes			

Designate areas on the bay dike to level in order to allow drainage of water on the island in the event of a flood	Dike District Commissioners	Grant funding	Short Term
event of a nood.			

Mitigation Accomplishments (2008 – 2013):

During the 2008 – 2013 plan cycle, the district continued its on-going levee improvement program to provide greater flood protection. Improvements made were:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Improvements to access roads along Moore Road.	Dike District Commissioners	20% District 80% Army Core of Engineers	Completed 2011
Repair to reshape 300 linear feet of the riverward slope on the South Fork of the Skagit River.	Dike District Commissioners	20% District 80% Army Core of Engineers	Completed 2011
Repair 800 linear feet of back slope to prevent seepage and re-establish grass on top of levee on the South Fork of the Skagit River.	Dike District Commissioners	20% District 80% Army Core of Engineers	Completed 2011
Repair 124 linear feet of the riverward face of dike to prevent sloughing on the North Fork of the Skagit River.	Dike District Commissioners	20% District 80% Army Core of Engineers	Completed 2011
Replacement of tide gate near Fir Island Road and lining of pipe under Fir Island Road at Brown Slough.	Dike District Commissioners	Dike District 60% Drainage Utility District 40%	Completed 2013

Due to a lack of local funding, no other mitigation measures were accomplished during the 2008 - 2013 plan cycle.

Proposed Natural Hazard Mitigation Measures (2014 – 2019):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Provide for enhanced interior drainage and	Dike District	Grant funding	Short Term
control of surface waters from flood, tsunami or	Commissioners		
severe storm by adding tide-gates, pumps and			
at-grade flood-gates at strategic locations.			
The above-listed mitigation measure is compate States Army Corps of Engineers (USACE) and Ska	able with alternatives . ait County as part of t	studied and suggested he current USGS Gener	by the United al Investigation.
Continue to improve existing levees to provide	Dike District	Grant funding	Short Term
50-year flood protection.	Commissioners	5	
Continue to improve and strengthen existing	Dike District	Grant funding	Short Term
levees by adding seepage berms, installing	Commissioners		
keyways, and raising road surfaces, as needed.			
Designate areas on the bay dike to level in order	Dike District	Grant funding	Short Term
to allow drainage of water on the island in the	Commissioners		
event of a flood, if timely installation of			
floodgates is not achieved.			
Continue to utilize National Weather Service	Dike District	Local, State and	Short Term
flood warning systems, weather data and river	Commissioners	Federal funding	
level data to assist in flood response efforts.			
Increase the level of flood preparedness within	Dike District	Local, State and	Short Term
the district through increased involvement with	Commissioners	Federal funding	

Mitigation Measure	Lead Agency	Funding Source	Time Line
the USACE and Skagit County Emergency			
Management and participation in annual Flood			
Awareness Week activities.			
Encourage Dike District Commissioners and key	Dike District	Local, State and	Short Term
flood response personnel to obtain additional	Commissioners	Federal funding	
Incident Command System (ICS) training.			
Collaborate with Skagit County Emergency	Dike District	Local, State and	Short Term
Management and other local agencies to	Commissioners	Federal funding	
develop an evacuation plan for people and			
animals within the district.			
Add 2 pumps at Wiley Slough to restore	WDFW	WDFW	Short Term
agricultural drainage lost during salmon			
restoration work at Wiley Slough and build			
gravity drainage to replace defective tidegates at			
Freshwater/Wiley Slough. Implement			
agricultural drainage plan for Fir Island Farm			
Habitat Restoration Project with adequate			
reservoir and interior drainage capacity,			
including pump station and floodgate(s).			

NOTE: Due to a lack of local funding, many of the mitigation measures listed above are dependent upon Skagit County Consolidated Diking Improvement District # 22 receiving state and/or federal funding.

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SKAGIT COUNTY DIKE DISTRICT #25

Dike District Profile:

Miles of Levee: Value of Dike/Levee: \$3,000/ft 2008 USACE Value of Area Served: 4 miles \$63,360,000 \$\$58,310,450

Critical Facilities (Owned by District): River levee identified above

Outline of Area Served: Samish River area west of the Burlington Northern-Santa Fe Railroad; Field Road to North; Allen West/Bradley Road to south; Dike Dist 5 to the west.

Current and Anticipated Service Trends: No changes at this time

Natural Hazard Vulnerability Analysis Rating: The District is most vulnerable to the following natural hazards - ranked in order:

- \neq Flood
- ≠ Severe storm (causing high tidal surge, 25 year event)
- *≠* Earthquake
- ≠ Tsunami

Natural Hazard Event History (2008 – 2013):

The District was not impacted directly by natural hazard events during the 2008 – 2013 plan cycle. However, during the winter of 2008 the district was forced to take action to repair and stabilize an eroded portion of river bank near State Route #9 to prevent damage to a nearby levee.

Existing Applicable Natural Hazard Mitigation Plans, Policies, Ordinances, & Codes:

- ≠ RCW 85
- ≠ Skagit County Comprehensive Flood Hazard Management Plan 1989
- ≠ Corps of Engineers Skagit County Flood Damage Reduction Study on-going
- ≠ Skagit County Natural Hazard Mitigation Plan

Proposed Natural Hazard Mitigation Measures (2008 – 2013):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Improve levee to provide	Dike District	Grant Funding	Short Term
increased level of flood protection	Commissioners		
Install 1 4' floodgate in existing	Dike District	Grand Funding	Short Term
levee at Farm to Market Road to	Commissioners		
provide for return of floodwaters			
to the Samish River			
Install new bridge on Samish River	Dike District	Grant Funding; Tax	Long Term
in Allen on Chuckanut Drive to	Commissioners	Revenues; Other sources as	_
prevent water back-up		available	

Hazard Mitigation Accomplishments (2008-2013):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Install screw gate at south corner of existing tiled area off Omdal Lane to provide increased capacity for return of flood waters to Samish River.	Dike District Commissioners	Budget; Tax Revenues	Short Term (Completed 2012)

Proposed Natural Hazard Mitigation Measures (2014 – 2019):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Continue existing levee maintenance program	Dike District Commissioners	Budget; Tax Revenues	Current and on-going
Continue efforts to obtain grant funding to improve levee so as to provide an increased level of flood protection	Dike District Commissioners	Grant Funding	Long Term
Install 1 4' floodgate in existing levee 1/4 mile upstream of Farm to Market Road to provide increased capacity for return of floodwaters to the Samish River	Dike District Commissioners	Grant Funding	Short Term
Continue efforts with Washington State Department of Transportation in requesting the construction of a new bridge across the Samish River in Allen to mitigate water back-up upstream of State Route #9	Dike District Commissioners	Grant Funding; State Transportation Funds; Other funding sources	Long Term

DRAINAGE DISTRICTS

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SKAGIT COUNTY DRAINAGE DISTRICT #15

District Profile

Miles of Ditches:	75miles
Value of Ditches:	\$ <u>3,960,000 @ 10.00 per foot</u>
Number of Pumps:	5
Value of Pumps:	\$ <u>475,000 @ \$95,000 each</u>
Number of Tide Gates:	5
Value of Tide Gates:	\$ <u>250,000</u>
Value of Area Served:	\$ <u>184,512,100</u>

Critical Facilities (Owned by District):

Pump Stations	approximate value: <u>\$475,000</u>
TLO	
lide Gates	approximate value: <u>\$250,000</u>
Tractor/Brushcutter	approximate value: <u>\$150,000</u>

Outline of Service Area: 11,500 acres North of the North Fork of the Skagit River between

Mount Vernon and La Conner.

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)			
Type of Event	Date	Total Public Damage	
Flood	1990		
Flood	1995	\$30,000 extra electricity bill from water entering from out of the district	

Natural Hazard Vulnerability Analysis Rating

Power outages tend to do the most detriment to the functions of the drainage district. Because of this, the District is most vulnerable to the following natural hazards - ranked in order:

Severe Storms - Wind

Bird Strikes

Proposed Natural Hazard Mitigation Measures

Mitigation Measure	Lead Agency	Funding Source	Time Line
Make oversized projects so they are available during a flood	Commissioners	Grant funding	Ongoing
Install additional pumps and tide gates to allow for drainage in the event of a large flood	Commissioners	Grant Funding	Due to permit and fish issues, these mitigation goals were deferred and are hereby re-affirmed for the 2014 – 2019 plan cycle
Maintenance of ditches, pumps and tide gates	Commissioners	Grant Funding / Tax Revenue	Ongoing

SKAGIT COUNTY DRAINAGE DISTRICT #16

District Profile

Miles of Ditches:	<u> </u>
Value of Ditches:	\$ <u>792,000</u>
Number of Pumps:	2
Value of Pumps:	\$ <u>100,000</u>
Number of Tidegates:	7
Value of Tidegates:	\$ <u>105,000</u>
Value of Area Served:	\$ 40,728,100

Critical Facilities (Owned by District):

Pumps	approximate value: \$ <u>100,000</u>
Tide gates	approximate value: \$ <u>105,000</u>

Outline of Area Served: <u>Hwy 11 on east side Edison slough North side, Samish Bay and</u>

Samish River on West side, field rd. on south

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)			
Type of Event	Date	Total Public Damage	
Flood		None	

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

Flood

Severe storm - Rain 25 year storm event

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

RCW 85.06

Proposed Natural Hazard Mitigation Measures – Due to permitting and fish issues, these mitigation goals were deferred and are hereby re-affirmed for the 2014 – 2019 plan cycle.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Add pump station	Commissioners	Grant funding	Short Term
Add tide gates	Commissioners	Grant funding	Short Term
Enlarge 2 ditches/reservoirs	Commissioners	Grant funding/ Tax Revenue	Short Term
Increase pumping capacity	Commissioners	Grant / Tax revenue	Short term

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

_Skagit Co. Comprehensive Flood Control Management Plan- 1989

SKAGIT COUNTY DRAINAGE DISTRICT #19

District Profile

Miles of Ditches:	50 miles
Value of Ditches:	\$ <u>3.2 million</u>
Number of Pumps:	3
Value of Pumps:	\$200,000
Number of Tide Gates:	18
Value of Tide Gates:	\$ <u>900,000 (at \$50,000 each)</u>
Value of Equipment Owned: Mower/Tractor	\$ <u>83,000</u>
Value of Area Served:	<u>\$560,261,700</u>
Critical Facilities (Owned by District):	

pump stations	_ approximate value: <u>\$200,000</u>
tide gates	approximate value: <u>\$2.4 million</u>
-	

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

Flood			_

Earthquake

Mitigation Measure	Lead Agency	Funding Source	Time Line
Additional pumps on Channel Drive	Commissioners	Grant funding And Budget	Short Term – Due to permit issues, these mitigation goals were deferred and are hereby re-affirmed for the 2014 – 2019 plan cycle.
Increase Ditch Size (Higgins Slough)	Commissioners	Grant funding and Budget	Long Term/Ongoing - Due to permit issues, these mitigation goals were deferred and are hereby re-affirmed for the 2014 – 2019 plan cycle.

Proposed Natural Hazard Mitigation Measures

Service Trends: Increase development on Bayview and increased run-off into district drainage system.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances and Codes:

Washington State RCW 85.06

SKAGIT COUNTY DRAINAGE DISTRICT #21

District Profile

Miles of Ditches:	<u>5 miles</u>
Value of Ditches:	\$ <u>25,000</u>
Value of Area Served:	\$ <u>11,528,900</u>

Outline of Area Served: <u>Beaver Lake, Lake McMurray, Big Lake, Cultus Mountain, Old Day</u> <u>Creek Road, Nookachamps</u>

Current and Anticipated Service Trends: <u>More development/ runoff, Logging</u>

Natural Hazard Event History

NATURAL HAZARD EVENTS (1975-PRESENT)				
Type of Event	Date Total Public Damage			
flood	1979			
	1990			
	1995			
	2006			
	2009			
	2011			

Natural Hazard Vulnerability Analysis Rating

This District is most vulnerable to the following natural hazards - ranked in order:

_Flood	
Land Movement	
Earthquake	

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes

RCW 85.06

Proposed Natural Hazard Mitigation Measures

Mitigation Measure	Lead Agency	Funding Source	Time Line
Clean and Upgrade Ditches	Commissioners	Grant funding	Short Term - Due to permit and fish issues, these mitigation goals were deferred and are hereby re-affirmed for the 2014 – 2019 plan cycle.

Existing Applicable Hazard Mitigation Associated Plans and/or Documents

Skagit County Comprehensive Flood Management Plan- 1989

SKAGIT COUNTY DRAINAGE & IRRIGATION DISTRICT #22

District Profile:

Miles of Ditches:	24 miles
Value of Ditches:	\$240,000
Number of Pumps:	4
Value of Pumps:	\$50,000 each
Value of Area Served:	\$ 33,969,200

Critical Facilities (Owned by District):

Pumps (4); approximate value: \$200,000

Outline of Area Served: Dodge Valley

Current and Anticipated Service Trends:

The district anticipates a gradual increase in surface water drainage from properties located on Pleasant Ridge due to modest but continued development of forested areas.

Natural Hazard Vulnerability Analysis Rating:

This District is most vulnerable to the following natural hazards - ranked in order:

- 1. Severe storm 25 yr. Event (exceeds 1" in 24 hours)
- 2. Flooding (river)
- 3. Earthquake

Recent (2008 – 2013) Natural Hazard Event History:

Skagit County Drainage and Irrigation District facilities were not impacted by nature hazard events during the 2008 – 2013 plan cycle.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

- \neq Revised Code of Washington (RCW) 85.06
- ≠ Skagit County Comprehensive Flood Management Plan 1989 (currently being updated)

Proposed Natural Hazard Mitigation Measures (2008 – 2013):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Continue existing pump and ditch maintenance/repair and cleaning program	Commissioners	District Tax Revenue	Current and Ongoing
Replace pumps and upgrade ditches	Commissioners	Grant funding/Tax Revenue	Short Term

Mitigation Accomplishments (2008 – 2013):

During the 2008 – 2013 plan cycle, the district rebuilt four (4) pumps and five (5) motors and cleaned ditches as part of the ongoing maintenance and repair program.

Due to lack of funding, the district was not able to replace any pumps and no ditches were upgraded.

Proposed Natural Hazar	d Mitigation Measures	(2014 – 2019):
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Mitigation Measure	Lead Agency	Funding Source	Time Line
Continue existing pump maintenance & repair program	Commissioners	District Tax Revenue	Current and Ongoing
Continue existing ditch maintenance & cleaning program	Commissioners	District Tax Revenue	Current and Ongoing
Replace and upgrade pumps	Commissioners	Grant Funding	Short Term
Improve and upgrade ditches	Commissioners	Grant Funding	Short Term

SKAGIT COUNTY DRAINAGE DISTRICT #25

District Profile:

Miles of Ditches: Value of Ditches: Number of Tide gates: Value of Tide gates: Value of Area Served: 1.25 miles \$ 12,500 6 (each 48" in diameter) \$ 400,000 \$ 58,313,250

Outline of Area Served:

Samish River area bounded by Field Road on the north, the Burlington Northern Railroad and State Route #9 on the east, Bradley road on the south, and Farm to Market Road on the west.

Current and Anticipated Service Trends:

The district expects a slow but consistent increase in service needs over the next 10 years.

Natural Hazard Vulnerability Analysis Rating:

The district is most vulnerable to the following natural hazards - ranked in order:

- 1. Flood
- 2. Severe storm 25 year rain event (exceeds 1" in 24 hours)
- 3. Earthquake
- 4. Tsunami

Natural Hazard Event History (2008 – 2013):

The district was not impacted by natural hazard events during the 2008 – 2013 plan cycle.

Existing Applicable Natural Hazard Mitigation Plans Policies, Ordinances, & Codes:

- \neq Revised Code of Washington (RCW) 85.06
- ≠ Skagit County Comprehensive Flood Management Plan 1989 (currently being updated)
- ✓ Skagit County Natural Hazard Mitigation Plan
- ≠ Skagit County Flood Damage Reduction Study

Proposed Natural Hazard Mitigation Measures (2014–2019):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Continue existing ditch and culvert maintenance program	Dike District Commissioners	Budget/Tax Revenue	Current and Ongoing
Coordinate with Skagit County Public Works Department for the installation of a drainage structure under Allen West Road.	Dike District Commissioners	Grant Funding/Skagit County Drainage Utility Revenue	Short Term
Continued Maintenance	Dike District Commissioners	Budget/Tax Revenue	Ongoing

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FIRE DISTRICTS

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Critical Facilities (Owned by District):

1. Fire Station, 15452 Beavermarsh Road	approximate value:	\$	875,000
2. Memorial Station 15271 SR 536	approximate value:	\$	1,100,000
Equipment:			
Apparatus		\$	1,059,500
Contents		\$	400,000
Value of Area Served:		\$4	183,686,418

Outline of Area Served: Fire District #2 is located westerly of the City of Mount Vernon and is bounded on the north by State Route 20 and Ovenell Road; on the east by Pulver Road, the Skagit River, and the City of Mount Vernon; on the south by the Skagit River; and on the west by Best Road.

Current and Anticipated Service Trends: Slow housing growth, increased industrial development with the Bayview Growth Management Area with potential for more development.

Natural Hazard Vulnerability Analysis Rating: This District is most vulnerable to the following natural hazards - ranked in order:

- 1. Earthquake
- 2. Flooding
- 3. Wind

Beyond routine requests for services, Skagit County Fire District #2 facilities and equipment have NOT been impacted by natural hazard events during the 2008-2013 plan cycle.

Natural Hazard Event History:

Since 1990, the district has assisted Skagit County Dike District #1 and Skagit County Dike District #12 in conducting flood-fight operations. Recently, district facilities served as a Command and Operations Center during flood events in 2003 and 2006. Fire District #2 personnel assisted in conducting evacuation notification to persons residing within the district

during the 2003 flood event. *Skagit County Fire District #2 facilities and equipment were not impacted by either of these events.*

During the 2008–2013 plan cycle, Skagit County Fire District #2 has responded a total of 37 times to incidents related to severe weather. Typical incidents involve downed trees and/or power lines and securing residential electrical service poles. During several of these events, Skagit County Fire District #2 opened its facility (on emergency power) to provide a warm shelter and sanitary facilities for those without power, if needed. *Skagit County Fire District #2 facilities and equipment were not impacted by any of these events.*

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

The district has not adopted any natural hazard mitigation policies, ordinances, or codes.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Retrofit Fire Station for Earthquake Protection	Commissioners	Grant funding	Completed
Place existing "above ground" utilities underground	Commissioners	Grant Funding / Other sources as available	Short Term

2008 Proposed Natural Hazard Mitigation Measures:

In 2007, the district applied for federal hazard mitigation grant funding to retrofit the fire station for earthquake protection. This work was completed in 2012. Funding remains unavailable for placing existing above-ground utilities underground. **These proposed mitigation measures remain valid and are re-affirmed for the 2014-2019 plan cycle.**

Additional 2008-2013 Mitigation Actions and Accomplishments:

- 1. Emergency generator system was upgraded to provide emergency power to that portion of the station occupied by Skagit Medic One Skagit Central Valley Ambulance.
- 2. At the present time, the district is planning a project to install a large natural gas/propane fired generator capable of running the entire station and with additional reserve power to provide needed services for extended periods of time.
- 3. Upgraded two-way radio system (base station, mobile radios, and portable radios) to be compatible with all agencies that we interact with.
- 4. Two engines have been re-located to Memorial Station to increase service capabilities and decrease incident response time to certain areas within the district.
- 5. District representatives, in cooperation with other agencies and the Skagit 9-1-1 Center, have been involved in planning for an upgraded emergency public warning system.
- 6. The district has recently offered use of our facility and radios to the Skagit 9-1-1 Center for use as an alternate dispatch facility; the proposal is being researched at this time.

Critical Facilities:

	Edison Station	approximate value:	\$545,000
	Allen Station	approximate value:	\$534,000
	Samish Island Station	approximate value:	\$363,000
Equip	ment:		
	Edison Station Apparatus	approximate value:	\$935,000
	Allen Station Apparatus	approximate value:	\$480,000
	Samish Island Apparatus	approximate value:	\$361,000
Value	of Area Served:	\$448,734,535.00	

Outline of Area Served: Northwest corner of Skagit County. West of Pulver Road, north of Bayview and east of Puget Sound (Samish and Padilla Bays).

Current and Anticipated Service Trends: The district serves a community encompassing agricultural, residential, and light commercial uses and anticipates minimal growth and changes.

Natural Hazard Vulnerability Analysis Rating: The District is most vulnerable to the following natural hazards, ranked in order:

- 1. Severe Storms 4. Wildland Fire
- 2. Flooding
- 5. Earthquake
- 3. Landslides

Natural Hazard Event History: During the 2009 – 2014 plan cycle, the district was inconvenienced but not impacted by several severe storms that caused power outages.

Natural Hazard Mitigation Accomplishments 2003 – 2008: As part of the original plan development, Skagit County Fire District #5 proposed only one mitigation measure ... the relocation of the Allen Station to mitigate flooding problems. In 2005, the district completed construction of the new Allen Station to complete this mitigation action.

Previous Proposed Natural Hazard Mitigation Measures 2008 – 2013:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Construct an auxiliary building to house emergency vehicles to better serve the northerly portion of the district.	Commissioners	District funding or Grant funding	Completed 2009

Proposed Natural Hazard Mitigation Measures 2014 – 2019: None

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Critical Facilities:

Hickson Station on Prairie Road – 4,000 s.f.	approximate value:	\$700,000
Prairie Station on State Route 9 – 3,000 s.f.	approximate value:	\$650,000
Punkin Center Station on State Rte 20 – 5,000 s.f.	approximate value:	\$850,000

Apparatus:

approximate value:	\$739,300
approximate value:	\$458,000
approximate value:	\$162,000
approximate value:	\$613,000
approximate value:	\$390,800
	approximate value: approximate value: approximate value: approximate value: approximate value:

Misc. Equipment:

Total misc. equipment	approximate value:	\$400,000
Approximate Value of Area Served:	\$680,116,302	

Outline of Area Served:

Fire District #8 is located in the north central portion of the county bounded on the west by the District Line Road, on the east by the west end of the Cape Horn Road, on the south by the Skagit River, and on the north by the Whatcom County Line and/or Department of Natural Resource forest lands.

Current and Anticipated Service Trends:

The District is experiencing an average increase of 13% per year primarily from medical alarms, illegal burns and weather related alarms.

Natural Hazard Vulnerability Analysis Rating:

The District is most vulnerable to the following natural hazards – ranked in order:

1. Earthquakes 2. Flooding 3. Severe Storms (wind events)

Natural Hazard Event History:

On Saturday, March 22, 2014 the District Chief and a rescue company from Skagit County Fire District 8, East Battalion, responded to a mutual aid request from Snohomish County Fire District 24, Darrington, along with 25 other Skagit County units form 10 different Skagit fire jurisdictions. There had been a massive mud slide of more than one cubic mile of earth that covered at least one mile of State Highway 530; blocked the Stillaguamish River causing the water to back up at an estimated 2500 cubic feet per second; and, it was later learned had

resulted in 42 fatalities and around 8 severely injured citizens as it buried the community of East Oso under as much as 70 feet of mud and debris. District personnel assisted with initial search and rescue efforts and in the following weeks provided several station standby shifts for Darrington Fire while their folks continued to search the debris field and attend funerals.

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

- 1. The District has written and implemented plans and policy for the protection of mobile assets and the utilization of human resources during these events.
- 2. The District has for many years worked with the Skagit County Public Works Department during flood events by pre-positioning sand and sand bags for use by the public and by assisting in clearing road drainage when possible.

Proposed 2014 – 2019 Natural Hazard Mitigation Measures:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Install emergency generator at the Lyman Station	Commissioners	Grant funding / Budget	Short Term
Survey of District's buildings and upgrade seismic code if necessary	Commissioners	Grant Funding / Budget	Short Term

Mitigation Accomplishments (2008-2013):

The District has annexed of the Town of Lyman into Skagit Fire Protection District #8 for fire and emergency medical services. Fire District #8 houses a pumper and a rescue unit at the Lyman Station. The station is owned by the Town of Lyman and District #8 is responsible for the maintenance, upgrades and utilities for the Lyman Station.

Due to lack of funds, no action was taken to up-grade district buildings to meet the current seismic code. The district has determined this mitigation measure remains valid and has reaffirmed this measure for the 2014 - 2019 plan cycle.

Proposed 2014–2019 Natural Hazard Mitigation Measures:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Survey of District's buildings and upgrade seismic code if necessary	Commissioners	Grant Funding / Budget	Short Term
Up-grade the emergency generator at the Hickson Station	Commissioners	Grant funding / Budget	Short Term
Up-grade or remodel the Prairie Station	Commissioners	Possible Levy / Budget	Long Term
Possible land purchase Prairie Station	Commissioners	Possible Levy / Budget	Long Term

Critical Facilities:

Station #1: 14825 Deception Road	approximate value:	\$750,000
Station #2 : 4214 Wildwood Lane	approximate value:	\$300,000
Equipment:		
3 Type 1 Engines	approximate value:	\$1,200,000
1-Light Rescue units 2-Type 6 Engines	approximate value:	\$500,000
Tender-3000 gallon	approximate value:	\$250,000
PPE and Fire Fighting Equipment	approximate value:	\$700,000
Approximate Value of Area Served:	\$753,000,000	

Outline of Area Served: 15 square miles including SW Fidalgo Island - south of the Anacortes City Limits and west of Gibralter Road.

Current and Anticipated Service Trends: The District anticipates requests for public service to maintain current levels during the 2014 – 2019 plan cycle with a continued potential damage due to minor development within the urban-interface/wildland zone and in unstable land areas.

Natural Hazard Vulnerability Analysis Rating:

This District is most vulnerable to the following natural hazards - ranked in order:

Wildfire; 2. Severe Storms; 3. Large mass land movement;
 4. Earthquake / Tsunami

Natural Hazard Event History:

NATURAL HAZARD EVENTS (1975-PRESENT)			
Type of Event	Date	Total Public Damage	
Wildfire Mt. Erie	Unknown	Unknown	
Earthquake	2/28/01	Unknown	
Wildland Fire	6/21/03	7 homes threatened	
Wind Storm	12/2006	Power/Phones out for 10 days; 3 houses damaged	

<u>NOTE</u>: Skagit County Fire District #11 facilities or equipment have not been damaged due to Natural Hazard events during the 2008 – 2013 plan cycle.

Existing Applicable Hazard Mitigation Associated Plans and/or Documents:

- 1. Fire Suppression Agreement between Skagit County Fire Protection District #11 and Washington State Department of Natural Resources.
- 2. Mutual Aid Agreements with neighboring Fire Districts and/or Departments.

3. Skagit County Fire Protection District #11 commitment to the Skagit County Natural Hazard Mitigation Plan.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Implementing Firewise training for the community	Commissioners	Grant funding / Budget	Long Term
Purchase of wildland fire equipment	Commissioners	Grant Funding / Budget	Short Term
Conduct wildland fire training	Commissioners	Grand Funding / Budget	Short Term
Conduct natural hazard public education through fire district newsletter	Commissioners	Grant Funding / Budget	Short Term

Natural Hazard Mitigation Measures (2008 – 2013):

Mitigation Accomplishments (2008 – 2013):

<u>WILDLAND FIRE TRAINING</u>: During the 2008 – 2013 plan cycle, the district conducted several wildland fire training courses for district personnel utilizing N.W.C.G. (National Wildfire Coordinating Group) curriculum. Courses offered were: S-215; S-130/190; S-212A; and S-131.

<u>NATURAL HAZARD PUBLIC EDUCATION PROGRAM</u>: The district publishes an annual newsletter that is mailed to all residents of the district. A portion of each newsletter is devoted to public education regarding fire prevention, Firewise information, and disaster preparedness information pertaining to natural hazards. Public sign up for MyStates notification system.

<u>OTHER</u>: During the 2003 – 2008 plan cycle, the district purchased and installed an emergency generator at Station 2 for increased service reliability during and following natural hazard events.

Proposed Natural Hazard Mitigation Measures (2014 – 2019):

Mitigation Measure	Lead Agency	Funding Source	Time Line
Implement Firewise training for the community through cooperative grants	Commissioners	Grant Funding / Budget	Long Term
Continue to purchase and update wildland fire equipment	Commissioners	Grant Funding / Budget	Short Term
Continue to advance wildland fire training and certification of district personnel	Commissioners	Grand Funding / Budget	Short Term
Continue natural hazard public education through fire district newsletter and local neighborhood association meetings	Commissioners	Grant Funding / Budget	Short Term

approximate value:

approximate value:

approximate value: \$900,000

approximate value: \$1,000,000

approximate value: \$150,000

\$450,000

\$350,000

Critical Facilities:

- Summit Park Fire Station Station #1
- Hope Island Fire Station Station #2
- Dodge Valley Fire Station Station #3
- Training Center
- Sleeper Quarters

Apparatus and Equipment:

4 pumpers @ \$300,000	approximate value:	\$1,200,000
3 aid/rescue apparatus @\$125,000	approximate value:	\$375,000
1 tender - 3,000-gallon	approximate value:	\$150,000
1 Brush Truck	approximate value:	\$ 80,000
2 Command Rigs	approximate value:	\$100,000
SCBAs, hoses, bunker gear, medical equip etc.	approximate value:	\$200,000
1 85' Aerial	approximate value:	\$175,000
1 Utility Vehicle	approximate value:	\$ 10,000

Approximate Value of Area Served:

\$771,000,000

Outline of Area Served:

Skagit County Fire Protection District #13 was formed April 8, 1958. We are located in Skagit County Washington, about sixty miles north of Seattle, Washington and sixty miles south of British Columbia, Canada. District consists of forty-three square miles, mostly located on bridge access Fidalgo Island between the Northwestern Washington towns of Burlington and Anacortes. Five offshore islands were recently geobased to our district. It has a population of 7,072 that increases dramatically during the day, as the coastal setting is a year-round tourist attraction. Our response area consists of 3,368 households, with 27.6% being under the age of 18 and 24.7% being over 65.

Our Fire District has several major critical infrastructure facilities. The geography includes farmland (the Skagit Valley is a major Washington farming area and food producer for the nation), federal trust lands, forested areas, retirement community, largest Native Indian Tribe in Skagit County, two marinas, Intra-state highway, railroad, two oil refineries (Shell and Tesoro Refineries; Tesoro recently had a catastrophic failure killing seven employees), four chemical plants, fertilizer plant, fish processing plant, a casino, five-story hotel, fireworks distributor, two major pipelines (carrying jet fuel, gasoline and diesel), elementary school (450 students between the ages of 5 to 13), Northwest Indian College, electrical sub-station, water treatment plants, and yacht manufacturer. Normal infrastructure of churches, restaurants, service stations, health clinic, dentist, kindergarten, gravel pits, small manufacturers, auto repair shops, camp

grounds, kennels, stored farm chemicals, golf courses, fishing vessels, senior center and administrative offices are also located in our district.

Our Fire District borders the Skagit River. The Skagit River and its tributaries, which drain over 1.7 million acres, is the third largest watershed system on the west coast. This river system floods catastrophically every three to five years resulting in evacuations and inundations of entire towns and tens of millions of dollars in damage. Between 1996 and 2009 Skagit County has experienced 11 federal disaster declarations.

The air space of our district is in a major training pattern for pilots from nearby Whidbey Naval Air Base. Surrounded on three sides by water, the district service area has limited access presenting unique challenges. These waterways are a major water route for fishing vessels, ferries, tankers, and pleasure vessels traveling locally as well as the Alaska to Seattle route.

Our firefighters respond to residential, commercial, wild land, petrochemical and chemical fires. State Highway 20, (one of only five routes over the Cascade Mountains that connect Western Washington to Eastern Washington), runs directly through our primary response area. This four-lane highway, is heavily traveled by commuters and vacationers headed for destinations in Northwest Washington and in Canada. The area hosts an Annual Tulip Festival during April. This month-long celebration brings in approximately 500,000 visitors. The Swinomish Tribal Indian Community participates in an annual Canoe Journey Celebration, which is expected to draw 2,500 visitors to the Tribal Community of 800 residents.

Burlington Northern Santa Fe Railway runs through our district carrying chemicals and fuel to and from the nearby refineries, including approximately 100 railcars of crude daily from North Dakota.

Our all-hazard Fire District has forty-five NIMS compliant volunteer Firefighters who responded to 774 NFIRS reported calls (highest volunteer call volume in Skagit County) in 2013, including 89 fires and 52 hazardous conditions.

Current and Anticipated Service Trends:

The district anticipates an increase in the number of requests for service, especially for medical aid, during the 2014 - 2019 plan cycle. In fact, as of the end of the 1st Quarter 2014, our emergency responses have increase by 24% over the same period of 2013.

Natural Hazard Vulnerability Analysis Rating:

The district is most vulnerable to the following natural hazards - ranked in order:

1. Severe Storms; 2. Earthquake; 3. Mud Slides; 4. Tidal Flooding; 5. River Flooding;

Natural Hazard Event History:

During the past planning cycle, SCFD#13 has not been directly impacted by natural hazards beyond responding to emergency situations within the district. The district experienced numerous severe storm events and district apparatus and crews responded to more than 75 calls for service related to these severe wind events. The district also responded on several occasions to tidal flooding incidents, and has been providing manpower and assistance to assist at the recent Oso Mud Slide.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

The district has not adopted any natural hazard mitigation policies, ordinances, or codes. The district does maintain a listing of Standard Operating Guidelines.

Proposed Natural Hazard Mitigation Measures 2014 - 2019:

The mitigation measures contained in the table on the following page were proposed by the district during the original plan development in 2003.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Implement an Emergency Evacuation Plan	Fire District #13 & Swinomish Tribe	Grant Funding/Budget	Short Term
Increase training level in water rescue (earthquake, tsunami, etc.)	Fire District #13 & Swinomish Tribe	Grant Funding/Budget	Short Term
Increase training level in Wildland Fire Response	Fire District #13 & DNR	Grant Funding/Budget	Short Term
Increase level in Haz Mat Training due to close vicinity of Refineries	Fire District #13	Grant Funding/Budget	Short Term

Natural Hazard Mitigation Accomplishments 2008 – 2013:

The following mitigation measured were completed by the district within the 2008 – 2013 plan cycle:

- The emergency generator at the Summit Park Station was replaced.
- The district entered into an agreement with the Swinomish Indian Tribal Community to utilize the Tribes fire boat for training and conducting marine fire response and rescue.
- The district increased wildland fire fighting capabilities; nine (9) district personnel are trained to "Red Card" standards and the district was recently awarded a Brush Truck by the Washington State Department of Natural Resources.
- The district has also enhanced its ability to respond to hazardous materials incidents and five
 (5) personnel are trained to the Hazardous materials Technician level.
- The district coordinated with the Anacortes Chapter of the American Red Cross to establish the Summit Park Station as an approved Red Cross Shelter.
- The district has begun delivery of disaster preparedness and *Firewise* information to the residents of Shelter Bay, a gated community of approximately 1,700 people.
- Established a joint Emergency Operating Center with the Swinomish Tribal Indian Community to be jointly manned during emergencies.
- District constructed Sleeping Quarters for firefighters to man the District 24/7/365. Thus becoming the first volunteer fire department in Skagit County that is in compliance with NFPA 1720.

Proposed Natural Hazard Mitigation Measures 2014 - 2019:

The mitigation measures in the table below are proposed for the 2014 – 2019 plan cycle:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Continue existing disaster preparedness	Fire District #13	Grant Funding/Budget	Short Term
and Firewise public education programs			
Develop a listing of individuals with	Fire District #13	Grant Funding/Budget	Short Term
special needs that may need assistance			
during emergency events.			

Continue to coordinate with the Island Chapter of the American Red Cross to enhance existing emergency shelter capabilities at district facilities.	Fire District #13 & American Red Cross	Grant Funding/Budget	Short Term
Develop a volunteer Fire Corps program to augment district personnel.	Fire District #13	Grant Funding/Budget	Short Term
Improve County Wide Communication by installing transmitter/receivers on District #13 property	Fire District #13	Grant Funding/Budget	Short Term
Receive training in oil spill mitigation. Currently maintains an oil boom trailer at our Station 2 which has been mobilized three times during the last year.	Fire District #13 & Swinomish Tribe	Grant Funding/Budget	Short Term
Maintain and store an emergency trainer which is capable of providing cots, food and water for 130 people for 72 hours.	Fire District #13 & Swinomish Tribe	Grant Funding/Budget	Short Term

Critical Facilities:		
Fire Hall	approximate value:	\$500,000
Equipment:		
Apparatus and associated equipment	approximate value:	\$720,000
Approximate Value of Area Served:	\$50,000,000	

Outline of Area Served:

Starting at mile marker #4 on the South Skagit Highway and proceeding to mile marker #15; including all branch roads off of the South Skagit Highway in that area.

Current and Anticipated Service Trends:

The district has experienced very modest growth for the past several years and anticipates this trend will continue through the 2014-2019 plan cycle.

Natural Hazard Vulnerability Analysis Rating:

The district is most vulnerable to the following natural hazards - ranked in order:

1. Severe Storm; 2. Flooding; 3. Landslides

Recent (2014-2019) Natural Hazard Event History:

Due to the location of the district and the surrounding geography, district resources and the residents of district can become isolated due to closures of the South Skagit Highway as a result of flooding, downed trees and power lines, and landslides that typically occur at the western and eastern limits of the district. During the 2014-2018 plan cycle, the district was impacted by the severe storm and flood events as listed below:

No recent events since the winter storm of 2006 that impacted District facilities leaving them without power for several days.

Proposed Natural Hazard Mitigation Measure:

The mitigation measure listed below was identified in 2008 as part of the Skagit County Natural Hazard Mitigation Plan. Due to lack of local funds, no progress has been made towards accomplishing this measure. However, this measure remains valid for Skagit County Fire District #16 and has been re-affirmed for the 2013 – 2018 plan cycle.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Provide emergency power supply for the fire hall	Commissioners	Grant funding	Short Term

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Critical Facilities:

Fire Stations & Office (2 buildings) @ 6310 Guemes Island Road; estimated value: \$314,000

Equipment:

Apparatus; estimated value: **\$400,000** Contents; estimated value: **\$250,000**

Outline of Area Served:

Skagit County Fire District #17 serves the entirety of Guemes Island with an approximate valuation of \$265,545,361.00.

Current and Anticipated Service Trends:

The district anticipates a moderate growth in the number of single family homes on the island and no future commercial/industrial growth.

Natural Hazard Vulnerability Analysis Rating:

The district is most vulnerable to the following natural hazards, ranked in order:

- 1. Severe Storm/Wind
- 2. Tidal Flooding
- 3. Earthquake

Natural Hazard Event History:

During the 2003 – 2008 plan cycle, the district was impacted by several winter storms that caused power outages due to downed trees and power lines in numerous locations on Guemes Island. Significant storms occurred as follows:

- February, 2006
- November, 2006
- December, 2006
- December, 2007

The December, 2006 storm caused a power outage that affected all of Guemes Island for several days and also resulted in a loss of ferry service to the island.

During the 2008 – 2013 plan cycle, the district was not impacted by an significant hazards.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

The district has not adopted any natural hazard mitigation policies, ordinances, or codes.

Proposed Natural Hazard Mitigation Measures:

The mitigation measures listed below were identified in 2003 as part of the original development of the Skagit County Natural Hazard Mitigation Plan. Due to lack of local funds, no progress has been made towards accomplishing these mitigation measures. However, these measures remain valid for Skagit County Fire District #17 and have been re-affirmed for the 2014 - 2019 plan cycle.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Structural reinforcement of existing 3-bay pole building to withstand severe wind & earthquake events	Commissioners	Grant funding	Short Term
Main office building structural reinforcement of existing 2-bay wood building to withstand severe wind & earthquake events	Commissioners	Grant Funding	Short Term
Place existing "above ground" utilities underground within 600' of facilities	Commissioners	Grant Funding	Short Term

HOSPITAL DISTRICTS

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PUBLIC HOSPITAL DISTRICT NO. 1 dba Skagit Valley Hospital

OVERVIEW:

Skagit Valley Hospital in Mount Vernon, WA, strives to be the best regional community hospital in the Northwest, working with our communities to promote health and wellness. We provide a full continuum of care to our community, ranging from outpatient diagnostics and rehabilitation services to surgery and acute care. Our services also include a Family Birth Center, heart and vascular care, orthopedic services, surgery and cancer treatment at our Regional Cancer Care Center. Our Emergency Department is staffed 24 hours a day and features a Level III trauma unit. The hospital has a total of 137 beds and all rooms are private. Skagit Valley Hospital also has clinics in Stanwood and on Camano Island to better serve area residents. Health classes and wellness screenings are continually offered throughout the community.

On July 1, 2007, a 220,000 square foot hospital expansion project opened featuring all private patients' rooms, a new Emergency/Trauma unit, a new Family Birth Center and expanded space for surgical and critical care services.

On July 1, 2010 Skagit Valley Hospital and Skagit Valley Medical Center, Skagit County's largest physician-owned medical clinic, merged to create a comprehensive health care system to ensure greater stability in the region and to better serve patients in Skagit, Island and North Snohomish counties. Skagit Valley Hospital and Skagit Regional Clinics (formerly Skagit Valley Medical Center) offer patients access to outpatient care in Anacortes, Arlington / Smokey Point (Cascade Skagit Health Alliance), Camano Island, Mount Vernon, Oak Harbor, Stanwood and Sedro Woolley.

FACILITIES:

≠ Skagit County

Skagit Valley Hospital

Skagit Valley Hospital in Mount Vernon is licensed for 137 hospital beds and includes a new 220,000 square foot expansion project opened in July, 2007. Key services include the Family Birth Center, advanced diagnostic, heart care and orthopedic services, surgery and cancer care.

Skagit Valley Hospital Regional Cancer Care Center

Skagit Valley Hospital's Regional Cancer Care Center, which opened in December 2006, offers state-of-the-art cancer care including radiation oncology, chemotherapy and complementary therapies on the hospital's Mount Vernon campus. The Mount Vernon facility occupies the entire first floor of a three-story medical building across the street from the hospital emergency room. A second site, located within Cascade Valley Hospital in Arlington (Snohomish County) opened in 2007.

Skagit Valley Kidney Center

The Skagit Valley Kidney Center is a 10,000-square-foot facility located one block north of the Skagit Valley Hospital in Mount Vernon and was constructed in 1998. The facility includes 18 hemodialysis stations in operation from 6 a.m. to midnight Monday through Saturday.

Skagit Regional Clinics – Anacortes Cardiology

Cardiovascular care is offered to patients in Anacortes five days per week.

Skagit Regional Clinics – Anacortes Urology

Urologic care is offered five days per week at our Anacortes office, located at 1213 24th Street, Suite 600, Anacortes. Urologic care includes the diagnosis and treatment of male and female urinary conditions including bladder, kidney and prostate cancer, impotence, kidney stones and other disorders, male and female urinary incontinence and urinary tract infection.

Skagit Regional Clinics – Cardiology

SRC – Cardiology offers comprehensive heart and vascular care including interventional and noninterventional cardiology as well as electrophysiology. Other services include peripheral vascular disease care and intervention, echocardiography, stress testing, lipid clinic, congestive heart failure management, T-Wave Alternan's testing and a mobile echocardiogram service.

Skagit Regional Clinics - Urology

SRC - Urology offers care in Mount Vernon five days per week. Urologic care includes the diagnosis and treatment of male and female urinary conditions including bladder, kidney and prostate cancer, impotence, kidney stones and other disorders, male and female urinary incontinence and urinary tract infection.

Skagit Regional Clinics – Mount Vernon

SRC – Mount Vernon offers a wide range of primary and specialty medical care and services to care for the entire family. Primary care practices include family medicine, internal medicine and pediatrics. Specialty departments include dermatology, gastroenterology, general surgery, neurology, OB/GYN, occupational medicine, optometry, orthopedics, pediatric endocrinology, podiatry, pulmonology, rheumatology, sleep medicine and urgent care.

Skagit Regional Clinics - Riverbend

SRC - Riverbend opens May 5, 2014. Riverbend offers urgent care, pediatrics, dermatology, lab, X-ray and pharmacy services.

Skagit Regional Clinics – Sedro-Woolley

SRC – Sedro-Woolley offers internal medicine, general surgery and optometry. Cardiology is available one day per week at this location. Lab and imaging services are available as is a full service pharmacy which offers the convenience of a drive through to pick up your prescriptions.

≠ Snohomish County

Stanwood Health Clinic

SRC – Stanwood offers family medicine and internal medicine five days per week. Podiatry is available one day per week. Lab services are also available. Located in Stanwood (Snohomish County) the Stanwood Health Clinic opened in April 1997.

Cascade Skagit Health Alliance - Arlington / Smokey Point

Cascade Skagit Health Alliance (formerly Skagit Regional Clinics - Arlington) provides care for the entire family.

≠ Island County

Camano Community Health Clinic

Located on Camano Island (Island County) this not-for-profit clinic opened in October 1999 in response to a need for accessible, affordable, quality health care for the 10,000 residents on the island. The clinic provides primary health care services that include diagnosis and treatment of acute and chronic illness, prevention, disease management, referrals and follow-up for specialty diagnostic treatment and arrangements for inpatient admissions, immunizations, physical examinations and basic laboratory services.

ESTIMATED 2014 ASSET VALUATION:

TOTAL	\$213,392,832
Total Contents of all properties	\$ 63,612,395
Other Owned Buildings and Properties	\$ 12,288,424
Cancer Care Center (buildings & land leased improvements)	\$ 5,005,148
Kidney Center (buildings and land)	\$ 2,446,982
Main Campus (buildings and land)	\$130,039,883

CURRENT AND ANTICIPATED SERVICE TRENDS:

Public Hospital District No. 1 anticipates demand for services will continue to expand for the foreseeable future as the population of Skagit County and the region increases and the population ages. As we move forward at this time with the clinics we see ourselves better to serve Skagit County residence with the added resources.

NATURAL HAZARD VULNERABILITY ANALYSIS RATING:

Public Hospital District No. 1 facilities and infrastructure are most vulnerable to the following natural hazards – ranked in order:

- 1. Earthquake
- 2. Severe Storm (wind & snow)
- 3. Fire
- 4. Flood

RECENT (5-YEAR) NATURAL HAZARD EVENT HISTORY:

November, 2012 – significant snow and ice event: Due to local road and street conditions, much of the hospital staff worked long shifts and the district incurred additional costs to provide transportation for staff unable to travel as well as remove snow from hospital parking lots and sidewalks.

March, 2014 – Oso Mudslide: During the initial response to the Oso Mudslide we received 2 patients via Naval Helicopter and stood up a incident command in our emergency department. After stabilization of the first patient we then transferred him to Harborview Medical Center in

Seattle. The second patient was admitted to our facility and taken to surgery. Patient was discharged on day 2.

<u>NOTE</u>: Public Hospital District #1 facilities were not damaged by this event other than time and supplies for incident clean-up.

EXISTING APPLICABLE NATURAL HAZARD MITIGATION POLICIES, ORDINANCES, AND CODES:

Skagit Valley Hospital is in compliance with the National Fire Protection Association (NFPA) codes and standards as well as the Uniform Building and Electrical Codes. Skagit Valley Hospital is accredidted by Det Norske Veritas (DNV) and the Washington State Department of Health recommendations specifically for hospitals in regards to disaster planning/emergency management. Skagit Valley Hospital ensures all four phases of emergency management (mitigation, preparedness, response, and recovery) are considered and that disaster planning is consistent, timely, hazard focused, and organization wide.

EMERGENCY MANAGEMENT/DISASTER PLANNING:

Skagit Valley Hospital works in cooperation with Skagit County Department of Emergency Management, Region One Healthcare Coalition, Washington State Hospital Association, Skagit County Public Health Department, Skagit County Medical Reserve Corps, and local law enforcement and fire agencies with regards to emergency management and disaster planning.

2008-2013 MITIGATION STRATEGY ACCOMPLISHMENTS:

The following mitigation strategies (listed in table format) are current and ongoing. Policies pertaining to these strategies are in place and they are a standard business practice.

EARTHQUAKE

- An equipment/furniture policy is in place to keep heavy items low or brace the items.
- Hazardous chemicals are stored in locations/containers least likely to spill.
- Seismic switch installed to effect automatic shut-off of MRI equipment.
- Backup power is supplied by emergency generators.
- A listing of critical supplies and vendor agreements are in place.
- Maintain caches of emergency supplies in various locations for use by hospital personnel.
- A disaster plan is in place and exercised on a regular basis.
- Personnel are informed of emergency conditions and proper response procedures when hired.

SEVERE STORM

- Maintain a 4-day supply of food and water.
- Development of a Inclement Weather protocol for staffing of the hospital and clinics.
- Maintain a supply of fuel to support 4-days of emergency generator operation.
- Maintain a contract for snow removal.

FIRE

- The hospital maintains fire insurance coverage.
- Maintain compliance with fire code/regulations.
- Automatic sprinkler systems, smoke detectors, fire resistant walls/doors are installed and maintained.
- Fire monitoring systems are in place and maintained.
- Fire extinguishers are in place; they are maintained annually and checked monthly.
- Fire evacuation routes have been identified and procedures are in place.
- Monthly fire drills are conducted.
- The hospital maintains a no-smoking policy.
- The hospital maintains security for fire/arson prevention.
- The hospital prohibits extension cords.
- Proper air circulation is maintained for equipment to prevent over-heating.
- Flammable liquids are stored properly.

VOLCANIC ACTIVITY

• A procedure is in place to protect all ventilation intakes from volcanic ash.

ALL HAZARD

- Disaster plan is accessible to all staff 24-hours a day via computer and/or hard copies.
- Disaster plan is updated annually; drills and exercises are designed to prepare staff to successfully meet the challenges encountered in a disaster.
- Critical supply and vendor agreements are in effect.
- Fire drills are performed monthly on each shift.
- Maintenance of fire extinguishers and monthly checks are performed.
- Automatic sprinkler system(s), smoke detectors, fire-resistant walls and doors are in place.
- Fire insurance coverage is in compliance with existing fire codes and regulations.
- Equipment for chemical and biological hazards is maintained, inventoried, and inspected for readiness.
- Hazardous chemicals are stored properly; hazardous waste is disposed of incompliance with regulations.
- 96 hours of water and food is available in compliance with DNV standards.
- Security personnel are on duty 24 hours a day.
- All ventilation systems are maintained and inspected by the engineering department.
- Have contracted with a Mass Notification system.
- Participated in Regional drills.
- Ongoing training of the Incident Command structure with Skagit Regional Health Leadership.

PROPOSED 2014 – 2019 MITIGATION STRATEGIES:

Mitigation Measure	Lead Agency	Funding Source	Time Line
Maintain the ongoing mitigation policies and procedures currently in place and listed above.	Hospital Administrator	District Funding	Ongoing
Maintain existing fire insurance coverage.	Hospital Administrator	District Funding	Ongoing
Maintain existing business interruption insurance.	Hospital Administrator	District Funding	Ongoing
Secure non-structural critical equipment with straps/tie-downs to mitigate earthquake damage.	Hospital Administrator	Grant Funding	Short Term
	Hospital Administrator	Grant Funding	Short Term

SKAGIT COUNTY HOSPITAL DISTRICT #2 Island Hospital 1211 24th Street Anacortes, WA 98221

Overview

Island Hospital participated in the initial Skagit County Natural Hazard Mitigation Planning Process in 2003. Island Hospital continues to be proactive in the hazard vulnerability analysis process and plans to continue participation in the county-wide process. The Skagit County Natural Hazard Mitigation Plan (available through the Skagit County Department of Emergency Management) outlines the natural disasters most likely to affect the Skagit County area. This portion of that plan outlines Island Hospital's vulnerability and mitigation strategies.

Asset Profile

Facility/Property	2014 Estimated Value
Building	\$68,769,108
Fixed	\$8,234,832
Land	\$4,708,577
Land Improvements	\$2,121,761
Moveable	\$26,010,698
CIP (construction in process)	\$329,170
Value of Area Served	\$4,718,658,263

Estimated Relative Threat

The Island Hospital Hazard Vulnerability Analysis (HVA), which is reviewed annually by the Emergency Preparedness Committee, rates probability, human impact, property impact, business impact, preparedness, internal response and external response to determine a score of relative risk associated with each type of disaster outlined in the assessment. It should be noted that the greatest risks have the highest scores. After review and any necessary updates, the HVA is presented to the Safety Committee for review.

As indicated in the attached HVA, Island Hospital is most vulnerable to the following natural hazards – ranked in order:

1. Earthquake 2. Snow Fall 3. Severe Wind Storm

Recent (2008 – 2013) Natural or Other Hazard Event History

- January 2010 Noxious Odor (external) Hospital shut incoming air through the air handler off but the kept the exhaust portion of the system running to clear the odor from the building. Patients were moved from second floor rooms to Fidalgo Medical Clinic until problem was resolved.
- <u>March 2011</u>: Domestic Waterline Break a heating coil broke during routine maintenance of the sprinkler system in the Supply Chain Department. Due to the temperature of the water, steam caused additional sprinklers to activate and flood a

portion of that department until the system could be shut off. To prevent this from happening in the future we have added dielectrics.

- October 2011 PSE Transformer: one of three transformers lost one leg that feeds power to the hospital's (IMC) Island Medical Center. This phase of power was lost for approximately 16 hours which affected the air handler, chiller, heating, lights, sporadic outlets and the gas packs on the roof. Repairs were made after hours to ensure minimal disruption to clinic services.
- <u>2012 Winter Snow Storm</u>: Several homes without power. Hospital was able to operate at normal level due to the emergency generator in place. Additional ice melt has been purchased and is kept on site at all times. New contracts for snow removal were established.
- April 2013: An exterior catch basin vault with a single pump was plugged with Sani-Cloth towels and the cord was wrapped around the float. This prevented the unit from draining properly. As a result, the Patient Accounts Department flooded with water resulting in \$64,000 worth of damage. As a result, a dual pump system with a screen around the intake has been installed. In addition to a Lead lag pump system with a 3 point alarm system: 1. Alarm at control box. 2. Alarm in Hallway. 3. Automatic Dialing System.
- October 2013: A progressive loss of water was discovered at the site of the Energy Plant. After red dye was place in the water the leak was discovered in the catch basin. The heating supply side had broken which resulted in replacement of piping. It is suspected that overweight vehicles may have caused this damage. Access to this area has now been blocked off.
- Movember 2013: Widespread telephone outage throughout the San Juan Islands affected our two clinics – Lopez Island Medical Clinic & Orcas Medical Center. The clinics were able to make island to island calls but 911 and long distance were unavailable. The Hospital IT department created two separate generic mailboxes for the clinics on the Intranet. All departments needing to send information were able to do so through this method.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances and Codes

Island Hospital follows the National Fire Protection Association (NFPA) codes and standards as well as uniform building and electric codes. Island Hospital also follows the Washington State Department of Health recommendations specifically for hospitals in regards to disaster planning/emergency management. In doing so, Island Hospital ensures that all four phases of emergency management (mitigation, preparedness, response, and recovery) are considered and that disaster planning is consistent, timely, all-hazard focused and organization wide.

Emergency Management / Disaster Planning

The Emergency Operations Plan outlines Island's preparedness, response and recovery strategies. A copy of that plan is available to staff online in Policy Tech. Island Hospital's Emergency Preparedness Committee, which consists of representation from administration and all other service departments, meets on a bi-monthly basis to do planning for mitigation,

preparedness, response, and recovery. The Safety Committee is updated bi-monthly regarding plan updates, drill and exercise after action plans, regulatory standards and the HVA.

Island Hospital works with local the Emergency Management Department, Public Health, the Region One Hospital Preparedness Committee, the Region One Healthcare Coalition, the Washington State Hospital Association, the Community of Anacortes Emergency Response Committee and other agencies in regards to emergency management/disaster planning.

2008-2013 Completed All-Hazard Mitigation Strategies

The following mitigation strategies outlined in 2008 have been completed. Policies are in place and they are a standard business practice.

- Critical supplies listing and vendor agreements are in place.
- NIMS/HICS training has been done by designated managers and supervisors since 2006.
- A new Emergency Operations Plan was developed in 2013. This plan will be updated annually. Drills/exercises will continue to focus on improvement of plan.
- An automatic lock down system has been installed inpatient care areas of the main hospital building.
- A five to seven day food supply is kept on hand with MOU's in place for emergencies.
- Snow removal equipment has been purchased and the hospital also has contracts with a local landscaper and a bobcat owner to assist with snow removal.
- Fire insurance coverage is in line with fire codes and regulations.
- Automatic sprinkler heads, smoke detectors, fire resistant walls and doors are in place with an annual inspection by outside contractor.
- Annual maintenance of fire extinguishers and monthly checks are in place.
- Monthly fire drills are conducted.
- A tobacco free policy is in effect at Island Hospital.
- A Security Officer is in place to ensure patient and staff safety and to further deter arson and vandalism.
- Extension cords are prohibited.
- Air circulation is provided for copy machines and other office machines.
- Flammable liquids are stored properly.
- Emergency Generators are in place and tested on a monthly basis.
- Fuel supply for 96 hours for the electrical generator is kept on hand.
- A no space heater policy was implemented.
- Regular departmental safety walks are conducted.
- State-wide standardization of Emergency Codes

2008-2013 All Hazard Mitigation Strategies continuing into 2014-2019: The following mitigation strategies were proposed in 2008-2013 and will continue in the 2014-2019 plan.

- Conduct annual hospital update for all employees that include life safety, emergency preparedness, and hospital codes.
 - Lead department: Administration, Emergency Preparedness Committee, Safety Committee, and Clinical Departments
 - Funding: Hospital District Budget
 - Timeline: Current and on-going.

- Conduct annual update and re-certification for the dedicated hospital decontamination team.
 - Lead department: Administration, Emergency Preparedness Committee, Safety Committee, and Clinical Departments
 - Funding: Hospital District Budget
 - Timeline: Current and on-going.
- Participation in one Regional Emergency Preparedness Exercise and one Community Response Exercise on annual basis.
 - Lead department: Administration, Emergency Preparedness Committee, Safety Committee, and Clinical Departments
 - Funding: Hospital District Budget
 - Timeline: Current and on-going
- Continued participation in the Region 1 hospital emergency preparedness committee and the Region 1 Healthcare Coalition.
 - Lead department: Administration, Emergency Preparedness Committee, Safety Committee, and Clinical Departments
 - Funding: Hospital District Budget
 - Timeline: Current and on-going

		HAZAI	RD AND VUL	NERABILITY	ASSESSM RING EVEN	ENT TOOL ITS		ISLANDHOSPI	TAL
		SEVERITY =	(MAGNITUDE -	MITIGATION)					
EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED- NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	RISK	
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources	Community/ Mutual Aid staff and supplies	Relative threat*	
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%	
Hurricane	0	0	0	0	0	0	0	%0	
Tornado	L	1	1	Э	З	3	e	26%	
Severe Windstorms	3	1	2	2	1	٦	٢	44%	
Snow Fall	2	2	7	3	2	2	2	48%	
Blizzard	1	1	1	3	2	2	2	20%	
Ice Storm	2	2	-	2	2	2	2	41%	
Earthquake	3	3	3	3	2	2	7	83%	
Tidal Wave	1	1	1	1	2	2	2	22%	
Temperature Extremes	L	1	1	1	3	3	3	22%	
Drought	٢	٦	1	1	3	3	З	22%	
Flood, External	L	2	-	2	2	2	2	20%	
Wild Fire	2	1	2	2	2	2	2	41%	
Landslide	2	2	2	2	2	2	7	44%	
Dam Inundation	0	0	0	0	0	0	0	%0	
Volcano	1	٢	٢	2	2	2	2	19%	
Epidemic	3	3	0	3	1	1	1	50%	
AVERAGE SCORE	1.50	1.38	1.19	1.88	1.88	1.88	1.88	28%	
*Threat incre	ases with perce	ntage.							
		RISK = PRC	BABILITY * SE	VERITY					
		0.28	0.50	0.56					

Skagit County Hospital District #304 PeaceHealth United General Medical Center 2000 Hospital Drive Sedro-Woolley, WA 98284

<u>Overview</u>

PeaceHealth United General Medical Center has participated in the Skagit County Natural Hazard Mitigation Planning Process since 2003. PeaceHealth United continues to be proactive in the hazard vulnerability analysis process and plans to continue participation in the county-wide process. The Skagit County Natural Hazard Mitigation Plan (available through the Skagit County Department of Emergency Management) outlines the natural disasters most likely to affect the Skagit County area. This portion of that plan outlines PeaceHealth United General Hospital's vulnerability and mitigation strategies.

Asset Profile

Facility/Property	2014 Estimated Value
Auto	\$20,691
Building	\$39,419,198
Fixed	\$538,911
Land	\$5,447,447
Land Improvements	\$767,376
Moveable	\$6,668,830

Estimated Relative Threat

The PeaceHealth United General Medical Center Hazard Vulnerability Analysis (HVA), which is reviewed annually by the Facility Safety Sub-committee, rates probability, human impact, property impact, business impact, preparedness, internal response and external response to determine a score of relative risk associated with each type of disaster outlined in the assessment. It should be noted that the greatest risks have the highest scores. After review and any necessary updates, the HVA is presented to the Quality and Safety Committee for review.

As indicated in the attached HVA, Peace Health United General Medical Center is most vulnerable to the following natural hazards – ranked in order:

Flood

Earthquake

Severe Storm

$1e_s$ Community/ Mutual AidRelativ treat <i>iness</i> ,staff and staff and N/A $0 - 100$ <i>incest</i> $0 - N/A$ $0 - 100$ $0 - 100$ <i>incest</i> $2 = Moderate$ $2 = Moderate$ $2 - 15\%$ $0 - none$ $3 = Low or none$ $3 = Low or none$ $2 - 00\%$ $1 - 2$ $2 - 33\%$ 20% $0 - 0\%$ $0 - 0$ $0 - 0$ $0 - 0\%$ 0% $0 - 0$ $0 - 0$ 0% 0% $0 - 0$ $0 - 0\%$ 0% $0 - 0$ $0 - 0\%$ 0%
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*Threat increases with percentage.

United General Hospital

Recent (5-Year) Natural Hazard Event History

2013 Skagit River Bridge Collapse: United General Hospital was affected by the Skagit River Bridge collapse in which Skagit County Incident Command was activated for the event. No fatalities were reported and victims were taken to local area hospitals including United General Hospital. Preliminary logistics assessment was conducted.

Other: Minor damage to roof top antennas has occurred in the past five years due to severe storms.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances and Codes

PeaceHealth United General Medical Center follows the National Fire Protection Association (NFPA) codes and standards as well as uniform building and electric codes. PeaceHealth United General Medical Center also follows the Joint Commission Emergency Management Standards for Critical Access Hospitals and the Washington State Department of Health recommendations specifically for hospitals in regards to disaster planning/emergency management. In doing so, PeaceHealth United General Medical Center ensures that all four phases of emergency management (mitigation, preparedness, response, and recovery) are considered and that disaster planning is consistent, timely, all-hazard focused and organization wide.

Emergency Management / Disaster Planning

The PeaceHealth United General Medical Center Disaster Plan outlines PeaceHealth United's preparedness, response and recovery strategies. A copy of that plan is available to staff online and in hard copy throughout the hospital. PeaceHealth United General Hospital's Quality and Safety Committee, which consists of physician representation, board representation, management representation and front line staff representation is updated on a quarterly basis by the Facility Safety Sub-committee regarding plan updates, drill and exercise after action plans, Joint Commission standards and the HVA.

PeaceHealth United General Medical Center works with local the Emergency Management Department, Public Health, the Region One Hospital Preparedness Committee, the Region One Healthcare Coalition, the Washington State Hospital Association and other agencies in regards to emergency management/disaster planning.

2008-2013 Completed All-Hazard Mitigation Strategies

The following mitigation strategies outlined in 2008 have been completed. Policies are in place and they are a standard business practice.

- \neq Critical supplies listing and vendor agreements are in place.
- \neq Emergency/Disaster kits are available in each area and updated in 2012.
- ✓ Disaster Plan is updated annually and drills/exercises focus on improving the plan.

- \neq A portable trash pump has been purchased and is on hand.
- Evacuation plans are posted in each department in a location accessible by staff and patients/customers.
- \neq A three day food supply is kept on hand.
- \neq Fuel supply for three days for the electrical generator is kept on hand.
- \neq Snow removal equipment has been purchased by the hospital.
- \neq Fire insurance coverage is in line with fire codes and regulations.
- ✓ Automatic sprinkler heads, smoke detectors, fire resistant walls and doors are in place.
- \neq Annual maintenance of fire extinguishers and monthly checks are in place.
- \neq Monthly fire drills are conducted.
- ✓ A no smoking policy is in effect. PeaceHealth United has become a tobacco free facility since July of 2009.
- ∠ A security contract is in place to deter arson and vandalism and is reviewed every third year.
- \neq Air circulation is provided for copy machines and other office machines.
- \neq Flammable liquids are stored properly.

2008-2013 Carry-Over Mitigation Strategies

The following mitigation strategies were outlined for the 2008-2013 timeframe but have not been completed due to funding restraints and continued focused alliance with PeaceHealth. They remain valid measures for the 2014-2019 timeframe.

- Reinforced walls to endure water pressure, flood walls outside of the building
 - Lead department: Administration, Materials Management, Facilities and Clinical Services
 - Funding: Grant and budget
 - Timeline: Long Term
 - Status: Remains a valid strategy but is dependent upon receiving outside mitigation grant funding
- Installing water tight doors and permanent pumps
 - Lead department: Administration, Materials Management, Facilities and Clinical Services
 - Funding: Grant and budget
 - Timeline: Long Term
 - Status: Remains a valid strategy but is dependent upon receiving outside mitigation grant funding

2014-2019 All Hazard Mitigation Strategies

- Emergency Back-up Power Enhancements (new generator)
 - Lead Department: Facilities
 - Funding: Budget and/or Grant Funding
 - Timeline: Long Term
- Emergency Code and Disaster Overview for New Hires

- o Lead Department: Human Resources and Quality Resources
- Funding: Budget
- Timeline: In place and ongoing
- ▲ Installation of Flood Walls
 - Lead Department: Facilities
 - Funding: Budget and/or Grant Funding
 - Timeline: Long Term
- Secure Equipment and Retrofit Buildings
 - o Lead Department: Administration and Facilities
 - Funding: Grant Funding
 - Timeline: Long Term
- Install storm covers for windows and doors
 - o Lead Department: Facilities
 - o Funding: Grant Funding
 - Timeline: Long Term

HOUSING AUTHORITY

HOUSING AUTHORITY OF SKAGIT COUNTY 1650 Port Drive, Burlington, WA 98233 Melanie Corey, Executive Director

Housing Authority Profile

Estim	ated Value of Land Owned:	
14	undeveloped acres (near Burlington)	\$80,000
Estim	ated Value of Equipment Owned:	\$150,000
Estim	ated Value of Facilities Owned:	
	 Mount Baker Meadows, Mount Vernon 	\$1,096,800
	 La Paloma, Mount Vernon 	\$2,158,200
	 President Apartments, Mount Vernon 	\$1,584,000
	 Burlington Terrace, Burlington 	\$5,998,800
	 Administration Building, Burlington 	\$1,362,900
Total	Estimated Value of Owned Property/Equipment:	\$12,463,700
Estim	ated Value of Other Properties Managed by HASC:	
1.	Raspberry Ridge I, Burlington	\$3,896,800
2.	Raspberry Ridge II, Burlington	\$2,790,100
Total	Estimated Value of Managed Properties:	\$6,686,100

Outline of Area Served:

The Housing Authority of Skagit County serves citizens within the geographic boundaries of Skagit County. Facilities owned and managed by the housing authority are located within the City of Mount Vernon and the City of Burlington. The Housing Authority of Skagit County operates from an office located in the City of Burlington.

Current and Anticipated Service Trends:

It is anticipated that the number of housing units and developments owned and/or managed by the Housing Authority of Skagit County will increase during the 2014 – 2019 plan cycle.

Natural Hazard Event History:

October, 2003 Flood Event:

As a precaution, 51 families were evacuated from their apartments within the Raspberry Ridge I complex located near the City of Burlington. Residents were out of their homes for less than 24 hours; there was no damage to the Raspberry Ridge I complex.

Other impacts:

During the 2003 – 2008 plan cycle, impacts to Housing Authority of Skagit County facilities resulting from natural hazards were limited to:

- 1. Minor roof damage at several locations.
- 2. Storm water drainage problems at the Burlington Terrace facility.

Natural Hazard Vulnerability Analysis Rating:

Facilities owned and managed by the Housing Authority of Skagit County are most vulnerable to the following natural hazards - ranked in order:

- Flood
- Severe Storm
- Earthquake

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

The Housing Authority of Skagit County has not adopted any natural hazard mitigation policies, ordinances, or codes. The housing authority is committed to continuing its participation in the Skagit County Natural Hazard Mitigation Plan throughout the 2014 – 2019 plan cycle.

Proposed 2008 Natural Hazard Mitigation Measures:

As part of the 2014 plan review/update process, the Housing Authority of Skagit County evaluated the original mitigation measures identified in 2008 and shown in table below.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Create evacuation plans for each of the residential buildings for fire and other disasters.	HASC Board	HASC Budget	Short term
This measure has been revised for the 2014 – 2019 plan cycle as shown on the following page.			
Shut off gas lines to reduce fire hazard.	HASC Board	HASC Budget	Short term
This measure is considered an emergency action and has therefore been deleted for the 2014 – 2019 plan cycle.			
Train staff in CPR and First Aid.	HASC Board	HASC Budget	Short term
This measure is current and on-going as shown on the following page.			
Equip staff with cellular phones for better communication.	HASC Board	HASC Budget	Short term
This measure was completed during the 2003 – 2008 plan cycle.			

Proposed 2014 Natural Hazard Mitigation Measures:

1. Continue efforts to develop fire exit plans (in cooperation with local fire agencies) for housing authority facilities with apartments that exit via interior corridors.

This mitigation measure has been modified from its 2008 version. This mitigation measure is current and on-going and remains valid for the 2014 – 2019 plan cycle.

LEAD AGENCY:	Housing Authority of Skagit County Board
FUNDING SOURCE:	Housing Authority of Skagit County Budget
TIME-LINE:	Current and On-Going

2. Continue efforts to train staff in CPR and First Aid.

This mitigation measure is current and on-going and remains valid for the 2014 – 2019 plan cycle.

LEAD AGENCY:	Housing Authority of Skagit County Board
FUNDING SOURCE:	Housing Authority of Skagit County Budget
TIME-LINE:	Current and On-Going

3. Purchase and install two (2) pumps to better manage storm-water drainage at the Burlington Terrace complex.

This mitigation measure was new to the plan for the 2008 – 2013 plan cycle. While the pumps have been installed storm-water drainage remains an issue. Portable pumps are used to drain the flooded parking lot when flooding occurs.

LEAD AGENCY:	Housing Authority of Skagit County Board
FUNDING SOURCE:	Grant funding and/or Housing Authority of Skagit County Budget
TIME-LINE:	Short Term

LIBRARY DISTRICTS

LA CONNER LIBRARY

Property Profile

Critical Facilities:

Library

The Library is a community resource and gathering/meeting place for the community. One of the few areas in La Conner where High Speed Internet is available free to the public, and could be an important hub in an emergency. The library is currently at 614 Morris Street.

Estimated value of structure:\$ 325,400Estimated cost of contents:\$ 92,000Estimated cost of volumes:\$ 695,000

The Library District is raising funds to build a larger facility at 520 Morris Street. Currently there is a thrift shop on the property. That building will be torn down when the new library is built. This library building will be less vulnerable to storm, flooding, and earthquake by design. The proposed design raises the building up 5 feet from ground level to comply with flood regulations and the building will be less vulnerable to earthquakes and storms.

Natural Hazard Vulnerability Analysis Rating:

The library facility at 614 Morris Street and the proposed new building at 520 Morris are most vulnerable to the following natural hazards ranked in order:

- Severe Storm
- Earthquakes
- Flooding of the Skagit River (Flood Zone A)

Natural Hazard Event History:

The La Conner Regional Library facility at 614 Morris Street has not been impacted by a natural hazard event during the past five (5) years. To our knowledge, the building that currently houses the library has not been impacted by a natural hazard event since 1975, possibly longer. The property at 520 Morris Street has not been impacted by a natural hazard event during the past fifteen (15) years, possibly longer.

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

The district has not adopted any natural hazard mitigation policies, ordinances, or codes. The district is committed to continuing its participation in the Skagit County Natural Hazard Mitigation Plan throughout the 2014 – 2019 plan cycle.

Proposed Natural Hazard Mitigation Measures:

The proposed mitigation measures listed below were identified in 2003 as part of the original development of the Skagit County Natural Hazard Mitigation Plan. They apply to the 614 Morris building.

Due to lack of local funds, minimal progress has been made towards accomplishing these mitigation measures. However, these mitigation measures remain valid for the 614 Morris building and have been reaffirmed for the 2014 - 2019 plan cycle; if the district were to remain in its current building. However, the district is planning to build a new building in the next three to five years at 520 Morris Street and sell the 614 Morris Street building. The district anticipates the new structure will be built to withstand the natural hazards of our area.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Structural bracing and shelving	Board of Trustees	Grant funding; Annual Budget; other sources as available	All shelving has been braced and anchored 2009
Protection of water and gas lines	Board of Trustees	Grant funding; Annual Budget; other sources as available	Short Term
Sandbagging and other flood protection measures	Board of Trustees	Grant funding; Annual Budget; other sources as available	Short Term
Seismic Retrofitting of Library Building	Board of Trustees	Grant funding; Annual Budget; other sources as available	Short Term

PORT DISTRICTS

Port of Anacortes

Property Profile: AIRPORT

Land area:116 acresZoning:Airport Zone (10 acres of Residential)Estimated cost of improvements:\$5,836,000Utilities/Improvements include: electricity, water, sanitary sewer, storm sewer, natural gas,
communications, paving, and fencing, fuel station, dewatering system and Super AWOS station.

Critical Facilities: 1. Runway and Taxiway 2. FBO/Terminal Building 3. Fuel Station

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Earthquake 2. Severe Storm 3. Fire 4. Flooding

Property Profile: MARINA

Land area:107 acresZoning:Commercial and Commercial Marine 1Estimated cost of improvements:\$125,000,000Utilities/Improvements include: electricity, water, sanitary sewer, storm sewer, natural gas,communications, fueling, floats, break water, and paving

Critical Facilities: 1. Breakwater 2. T-Dock cargo handling 3. Customs/Marina Office

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Severe Storm 2. Earthquake 3. Tsunami/Seiche 4. Fire

Property Profile: CURTIS WHARF

Land area:2.3 acresZoning:Manufacturing/ShippingEstimated cost of improvements:\$8,345,363Utilities/Improvements include: electricity, concrete/paved/wooden dock, gangway, andberthing facility (including two mooring dolphins structures)

Critical Facilities: 1. Berth and dock for cargo handling/small seafood business

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Earthquake 2. Fire 3. Sever Storm 4. Tsunami/Seiche

Property Profile: PIER I

Land area:14.5 acresZoning:Manufacturing/ShippingEstimated cost of improvements:\$24,990,000Utilities/Improvements include: electricity, water, sanitary sewer, storm sewer, natural gas,communications, wooden/concrete dock, berthing facility, gangway, and paving

Critical Facilities: 1. Berth and dock for cargo handling 2. Port operations and offices 3. Seafood operations

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Fire 2. Earthquake 3. Severe Storm 4. Tsunami/Seiche

Property Profile: PIER II

Land area:13.5 acresZoning:Manufacturing/ShippingEstimated cost of improvements:\$13,640,000Utilities/Improvements include: electricity, water, natural gas, sanitary sewer, storm sewer,
storm water containment and management system, communications and security surveillance
system, concrete/paved dock, berthing facility, paving, and fencing

Critical Facilities: 1. Berth and dock for cargo handling

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Earthquake 2. Severe Storm 3. Tsunami/Seiche

Property Profile: GUEMES CHANNEL PROPERTY

Land area:3.2 acresZoning:Commercial Marine and Manufacturing/ShippingEstimated cost of improvements:\$2,310,000Utilities/Improvements include: electricity, water, sanitary sewer, storm sewer, natural gas,communications and noise monitor, launch ramp, mooring pile, aquatic mitigation habitat andpaving.

Critical Facilities: 1. Barge ramp for cargo handling

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Earthquake 2. Severe Storm 3. Tsunami/Seiche

Property Profile: SHIP HARBOR

Land area:31.28 acresZoning:Commercial MarineEstimated cost of improvements:\$3,160,000Utilities/Improvements include: electricity, water, sanitary sewer, storm sewer, communications, and paving

Natural Hazard Vulnerability Analysis Rating: This property is most vulnerable to the following natural hazards ranked in order:

1. Severe Storm 2. Earthquake

Existing Applicable Natural Hazard Mitigation Policies, Ordinances, and Codes:

- 1. Port of Anacortes Capital Improvement Plan (CIP).
- 2. Winter Storm Plan.
- 3. Limit and closely monitor "hot-work" at all facilities.

Natural Hazard Event History for Above-Listed Facilities (2008 – 2013):

With the exception of minor repairs following severe storm events, the Port was not impacted by natural hazard events during the 2008 – 2013 plan cycle.

Proposed Hazard Mitigation Initiatives (2008 – 2013):

Mitigation Initiative	Lead Dept/Group	Funding Source	Time Line
Educate employees about potential hazards and Emergency Response Plan	Safety Committee	Operating Budget	Current and On-going
Regularly review CIP to include newly identified mitigation projects	Facilities Services Dept	Operating Budget & Capital Budget	Current and On-going
Improve and/or replace Breakwater	Facilities Services Dept	Capital Budget	Long Term
Pier I Replacement Planning	Facilities Services Dept	Capital Budget	Long Term
Cathodic Protection Planning for Curtis Wharf	Facilities Services Dept	Capital Budget	Long Term
Cathodic Protection Planning for B, C, and D-Docks	Facilities Services Dept	Capital Budget	Long Term
North & West Basin Upland Planning	Facilities Services Dept	Capital Budget	Long Term
Install fire sprinkler system at Pier 1 dock, Warehouse 10 and Curtis Wharf	Facilities Services Dept	Capital Budget	Long Term
Educate employees about the Port's Spill Response Program	Operations Dept	Operating Budget	Long Term

<u>NOTE</u>: Funding sources for Capital Budget come from retained earnings, bonding, grants, and taxes.

Mitigation Accomplishments (2008 – 2013):

The Port made significant progress accomplishing some of these mitigation initiatives while continuing to seek/manage funding necessary to complete the remainder of the listed mitigation initiatives.

Proposed Hazard Mitigation Initiatives (2014 – 2019):

The mitigation measures listed above have been reviewed by Port staff; they remain valid and have been re-affirmed for the 2014 – 2019 plan cycle.

SCHOOL DISTRICTS

Anacortes School District #103 2200 M Avenue Anacortes, WA 98221

OVERVIEW:

Anacortes School District is 25 square miles in size and enrolls approximately 2500 students. There are approximately 320 certificated and classified employees in the district. The school district has an excellent reputation and the student population, as a whole, scores high on state assessments and other standardized tests.

LIST OF PROPERTIES OWNED 2014 *Property schedule based on Washington Schools Risk Management Pool Exposure Unit Survey 2014-15

School	Address	Bldg. Value	Equip. Value	Total Value
Anacortes High School	1600 20th St.	23,500,898	35,959,42	240,968,40
Anacortes Middle School	2202 M. Ave.	16,921,258	25,890,14	195,102,72
Fidalgo Elementary School	13590 Gibralter Rd.	8,957,891	1,369,486	10,321,374
Mt. Erie Elementary School	1313 41st St.	6,858,022	10,48,609	7,906,631
Island View Elementary School	2501 J. Ave	9,279,399	1,419,816	10,699,215
Whitney Elementary School	1801 M. Ave	2,362,426	361,770	2,724,196
Maintenance Building	1404 24th St.	580,781	89,132	669,913
Bus Garage	2201 37th St.			
Smiley's Bottom Playfields				
High School Track Facility	1600 20th St.			
High School Football Field	1600 20th St.			
Cap High Sante School Site (AHS Modular)	1600 20th St.	1641,25	0	164,125
Portable at ME	41st St.			
Portables at Whitney (2)	1801 M. Ave			
Portables at HS (2)	1600 20th St.			
Business Personal Property		68,618,801	10,473,765	79,092,566

ESTIMATED RELATIVE THREAT:

The Anacortes School District is most vulnerable to the following natural hazards, ranked in order:

- 1. Severe Storm Event (wind and/or snow); 2. Earthquake;
- 3. Wildland/Urban-Interface Fire

RECENT (5-YEAR) NATURAL HAZARD EVENT HISTORY:

During the 2008-2013 plan cycle, the Anacortes School District has been impacted by natural hazard events as follows:

- A total of 7days of missed school due to severe storms and snow events.
- Damage to district facilities resulting from these events: Less than \$10,000; mostly for minor roof repairs.

EXISTING AND ON-GOING MITIGATION STRATEGIES:

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 a regular basis for familiarity. Facility tours conducted relocating and securing shelving units and equipment to minimize injuries. Identified and labeled utility shut- off valves (water, power, gas) at all buildings.	Conduct comprehensive facility survey of all sites affected. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos. CERT Teams Trained at Bldg. Sites Identified and trained 2 staff members (non- custodial) at each building in emergency valve placement and shut-off procedures	<u>Damage</u> = assess, identify needed resources. Establish counseling for students and staff upon return to school.
Fire	Fire Insurance coverage Comply with Fire Codes and regulations. Automatic sprinkler systems in new facilities.	Evacuate building. Assess situation and determine if students & staff are able to return to building. Inventory all damaged	<u>Damage</u> = assess, identify needed resources and initiate response
Severe Wind	Weather watches are conducted and sites traveled for early detection of storm development. Telephone tree established for early notification of administrators for school closure. Should a storm develop during school hours, students are transported home early.	Tour facility to assess damage. Update employees on conditions.	Damage = assess, identify needed resources and initiate response. Prioritize and schedule both temporary and permanent repairs.
Snow	Weather watches are conducted	Snow removal from walks	Damage = assess,

Hazard	Mitigation & Preparedness	Response	Recovery
	(Protection devices, safeguards, &	(Immediate actions to	(Resources required to
	procedures to reduce effect of the	function at a minimal	restore function or
	hazard)	acceptable level)	longer term recovery)
Storm	and sites traveled for early detection of storm development. Telephone tree established for early notification of administrators for school closure. Should a storm develop during school hours, students are transported home early. Telephone trees activated for staff & some parent trees in place at schools.	and parking lots. Tour facility to assess damage. Update employees on conditions.	identify needed resources and initiate response. Develop communication plan as required

COMPLETED MITIGATION PROJECTS:

Throughout the past several years, the Anacortes School District has been conducting an ongoing earthquake safety project to install seismic shut-off's at the natural gas meters of all district school facilities utilizing natural gas. This project was completed in 2008.

In addition to the above-listed mitigation strategies and activities that are currently in place or recently completed, the Anacortes School District proposes the following mitigation goals pertaining specifically to earthquake mitigation:

1. To provide for and implement a comprehensive non-structural earthquake mitigation program to secure and stabilize furnishings, equipment, and windows in all buildings and facilities owned by the Anacortes School District.

LEAD AGENCY: Anacortes School District Safety Team FUNDING SOURCE: Various grant funding TIME-LINE: Long Term (more than 3 years to complete)

2. To provide for and implement a comprehensive utility safety program to place all aboveground utilities within 300 feet of all school district owned buildings and facilities underground to facilitate emergency egress of students and staff and emergency ingress of emergency response personnel following a damaging earthquake.

LEAD AGENCY: Anacortes School District Safety Team FUNDING SOURCE: Various grant funding TIME-LINE: Long Term (more than 3 years to complete)

NOTES:

- 1. The above-listed mitigation goals pertaining specifically to earthquake mitigation were established in 2003. However, minimal progress has been made towards accomplishing these mitigation goals due to lack of funding. These mitigation measures remain valid and have been re-affirmed for the 2010-14 plan cycle.
- 2. Funding for these mitigation goals is dependent upon the Anacortes School District receiving future federal and/or state hazard mitigation grant funding.
Burlington-Edison School District #100 927 East Fairhaven Avenue Burlington, WA 98233 360-757-3311

AREA SERVED:

The Burlington-Edison School District serves approximately 3,683 students in six separate schools located in and around the communities of Edison and Bow as well as the City of Burlington, Washington.

ASSET PROFILE:

The district has completed an inventory of all equipment, facilities and properties and has considered these in our planning and mitigation strategy development. The estimated value of district-owned assets is \$89,213,767 including buildings (\$81,595,534) and equipment (\$7,618,233). A listing of all equipment, facilities, and properties will be made available to FEMA personnel if it is required to obtain future hazard mitigation grant funding.

ESTIMATED RELATIVE THREAT:

The Burlington-Edison School district is most vulnerable to the following natural hazards, ranked in order:

- 1. Severe Storm
- 2. Flooding
- 3. Earthquake

RECENT (5-YEAR) NATURAL HAZARD EVENT HISTORY:

During the 2014 – 2019 plan cycle, the Burlington-Edison School District has been impacted by natural hazard events as follows:

- A total of 7 days of missed school due to severe storms and snow events.
- There was no damage to district facilities as a result of these events.

EXISTING AND ON-GOING MITIGATION STRATEGIES:

r	1		
Hazard & Effect	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 generators needed at Bay View Elementary and West View Elementary for emergency power. Lead Department: Auxiliary Services Funding Source: Grant Funding Time-line: Short Term – less than 3 years Regular drills performed and recorded at all schools. Earthquake insurance coverage in place. All schools have a limited food supply for students and staff.	Conduct comprehensive facility survey. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos for records and damage evaluation.	Emergency generators needed at Bay View Elementary, West View Elementary and Allen Elementary for emergency back-up power. Prioritize and schedule both temporary and permanent repairs.
Fire	Fire insurance coverage in place. Comply with Fire Codes and regulations per annual inspections. Automatic sprinkler systems. Regular drills performed and recorded at all schools.	Close off damaged section for safety. Evaluate damage with insurance representative.	Relocate employees and salvaged equipment. Prioritize and schedule both temporary and permanent repairs.

	Emergency generators needed at Bay View Elementary and West View Elementary for emergency power. Lead Department: Auxiliary Services Funding Source: Grant Funding Time-line: Short Term – less than	Notify insurance representative. Update employees on conditions.	temporary and permanent repairs. Emergency generators needed at Bay View Elementary, West View Elementary and Allen Elementary for emergency back-up power.
	3 years		
Snow Storm	All schools have a limited food supply for students and staff. School buses have chains available. Emergency routes have	Snow removal from walks and parking lots. Tour facility to assess damage. Update employees on	Prioritize and schedule both temporary and permanent repairs.

PROPOSED MITIGATION MEASURE:

Provide for the purchase and installation of emergency generators (as indicated in the document above) at the Bay View Elementary School, the West View Elementary School, and the Allen Elementary School.

Lead Department: Auxiliary Services Funding Source: Grant Funding Time-line: Short Term (less than 3 years from receiving funding)

<u>NOTE</u>: The need for emergency generators at Bay View Elementary and West View Elementary remains valid and has been re-affirmed for the 2014-2019 plan cycle.

LA CONNER SCHOOL DISTRICT P.O. Box 2103 La Conner, WA 98257

OVERVIEW:

The La Conner School District sits at the heart of the La Conner community, located in the northwestern part of Washington State, situated 55 miles north of Seattle and 75 miles south of Vancouver, B.C. Its boundaries include more than 100 square miles of land surrounded by the Skagit River, the Swinomish Channel, and Padilla and Skagit Bays. Serving approximately 600 students in its three schools on a central campus, the school district has benefited from a long history of incredible community support for levies and bonds. Home of the Swinomish Tribe, La Conner School District and the Tribal Community have created cooperative programs to help students develop the knowledge, skills and attitudes fundamental to lifelong learning, to achieve personal enrichment, and to become responsible contributing individuals in this rapidly changing and evolving society.

ASSET PROFILE:

The La Conner School District is relatively small and its facilities are clustered on a single campus within the incorporated municipality of La Conner. Estimated 2008 values of buildings and equipment are listed below:

Building Value:	\$20,865,396
Equipment Value:	\$ 1,716,596
Total Value:	\$22,581,992

CURRENT AND ANTICIPATED TRENDS:

The La Conner School District has seen a slow but steady increase in its student population for the past several years; this growth rate is expected to continue throughout the 2014-2019 plan cycle.

ESTIMATED RELATIVE THREAT:

The La Conner School District is most vulnerable to the following natural hazards, ranked in order: 1. Severe Storm; 2. Flooding; 3. Earthquake

NOTE: The above-listed ranking matches the ranking performed by the Town of La Conner. Based on the 20/20 scoring matrix and formulas for determining risk rating as described on page 1, Section IV of this plan, the Town of La Conner is most vulnerable to the following natural hazards, ranked in order: 1. Severe Storm; 2. Flooding; 3. Earthquake

RECENT (5-YEAR) NATURAL HAZARD EVENT HISTORY:

During the 2008-2013 plan cycle, the La Conner School District has been impacted by natural hazard events as follows:

- A total of 5 days of missed school due to severe storms/snow events.
- A total of 0 day of missed school due to flooding.
- There was one occasion of water damage to a District facilities resulting from these events which cased a water line break from a deep freeze.

EXISTING APPLICABLE NATURAL HAZARD MITIGATION POLICIES, ORDINANCES, AND CODES:

The La Conner School District performs the following in support of disaster mitigation:

- Maintain and update an Emergency Plan for the District.
- Comply with all applicable Fire Codes.
- Monitor severe weather events to determine need for school closure.
- Identify non-structural earthquake hazards and take corrective action, as needed.
- Staff is familiarized and trained to disable heating and ventilation systems to prevent entry of hazardous materials and other substances.

PROPOSED MITIGATION MEASURES:

In addition to the above-listed mitigation strategies and activities that are currently in place, the La Conner School District proposed the following mitigation measures in 2003. Due to lack of local funding during the 2008-2013 plan cycle, some of these mitigation measures were deferred as noted.

The La Conner School District has determined that these mitigation measures remain valid and are completed or hereby re-affirmed for the 2014-2019 plan cycle.

1. To provide for and implement a comprehensive non-structural earthquake mitigation program to secure and stabilize furnishings, equipment, and windows in all buildings and facilities owned by the La Conner School District.

LEAD AGENCY:	La Conner School District Superintendent
FUNDING SOURCE:	Grant funding
TIME-LINE:	FINISHED

2. To provide for and implement a comprehensive utility safety program to place all aboveground utilities within 300 feet of all school district owned buildings and facilities underground to facilitate emergency egress of students and staff and emergency ingress of emergency response personnel following a damaging earthquake.

LEAD AGENCY:	La Conner School District Superintendent
FUNDING SOURCE:	Grant funding
TIME-LINE:	Short Term (less than 3 years to complete)

3. Provide for the purchase and installation of an emergency generator at the La Conner Middle School.

LEAD AGENCY:	La Conner School District Superintendent
FUNDING SOURCE:	Grant funding
TIME-LINE:	Short Term (less than 3 years to complete)

4. Provide for a storage facility for foods, water and necessary equipment to care for school population for an extended time.

LEAD AGENCY:La Conner School District SuperintendentFUNDING SOURCE:Grant fundingTIME-LINE:FINISHED

FUNDING FOR THESE MITIGATION STRATEGIES AND/OR PROJECTS IS DEPENDENT UPON THE LA CONNER SCHOOL DISTRICT RECEIVING FUTURE FEDERAL AND/OR STATE HAZARD MITIGATION GRANT FUNDING.

Mount Vernon School District 124 East Lawrence Street Mount Vernon, WA 98273

AREA SERVED:

The Mount Vernon School District is located 60 miles north of Seattle in the fertile Skagit Valley. We are a growing and diverse school district that serves 6,230 students attending 9 schools, grades kindergarten - 12. The District is committed to success for all students and provides a wide range of high quality instructional programs and extended learning opportunities for its students.

ASSET PROFILE:

The Mount Vernon School District owns and operates 9 schools, 1 administration building, and 4 other facilities. District assets total approximately \$139,022,058 including building assets of approximately \$127,205,183 and equipment assets of approximately \$11,816,875. The district has considered these assets in our planning and mitigation strategy development.

ESTIMATED RELATIVE THREAT:

The Mount Vernon School District is most vulnerable to the following natural hazards, ranked in order:

- 1. Severe Storm
- 2. Flooding
- 3. Earthquake

RECENT (5-YEAR) NATURAL HAZARD EVENT HISTORY:

During the 2008-2013 plan cycle, the Mount Vernon School District was impacted by natural hazard events as follows:

- A total of 6 days of missed school due to severe storms and snow events.
- Damage to district facilities resulting from these events: \$50,000 (snow removal costs and facility repairs).

Hazard &	Mitigation & Preparedness	Response	Recovery		
Effect	(Protection devices, safeguards, &	(Immediate actions	(Resources required		
	procedures	to function at a	to restore function or		
	to reduce the effect of the hazard)	minimal acceptable	longer term recovery)		
		level)			
Earthquake	Facility upgrades to meet	Institute earthquake	Assessment of status		
	earthquake code standards.	protocol, which	and planning for		
	Lead: Facilities and Maintenance;	includes:	return to normal		

EXISTING AND ON-GOING MITIGATION STRATEGIES:

Hazard &	Mitigation & Preparedness		Response	Recovery
Effect	(Protection devices, safeguards, &	(I	mmediate actions	(Resources required
	procedures		to function at a	to restore function or
	to reduce the effect of the hazard)	m	inimal acceptable	longer term recovery)
			level)	
	Funding: district budget; Timeline:	≠	duck/cover	operations.
	Ongoing	≠	evacuation route	
			check	Communication with
	Comprehensive non-structural	≠	building/utility	community.
	earthquake mitigation program to		check	
	secure and stabilize furnishings,	≠	accountability	Comprehensive
	equipment and windows in all	≠	evacuation (if	assessment for
	buildings and facilities.		necessary)	insurance purposes.
	Lead: District; Funding: grant budget;	≠	establishment of	
	Timeline: Ongoing		ICS and needed	Documentation of
			ICS functions	other impacts
	Emergency generator installed at Mt	≠	communication	(additional hours
	Baker Middle School.		with district	worked, resources
	Lead: District; Funding: grant budget;		support and	utilized).
	Timeline: Short term (less than 3 years)		emergency	Establishment of
	Nous construction months and		providers	Establishment of
	New construction meets code	≠	Rapid	Chucal Incluent Stress
	standards.		Responder	De-Drieting services
	Lead: Facilities; Funding: Capital		updates by	
	Projects, fillenne. Origoing		Dulluling	external resources
	Supplies (materials (furniture			avaliable).
	mitigation offort as part of our fire		response by	
	denartment inspections		emergency	
	Lead' Maintenance & Custodians'		nroviders	
	Funding: District Budget: Timeline:	-	All school district	
	Ongoing	-	nronerties will	
			be assessed for	
	Regular drills both school-based and		down power	
	district wide.		lines, broken	
	Lead: District; Funding: District Budget;		gas or water	
	Timeline: Ongoing		mains or any	
	5 5		, other hazardous	
	Redundant communication system		situations which	
	with Skagit County Department of		affect safety of	
	Emergency Management, district		students, staff	
	leadership team, maintenance team		or visitors	
	and transportation team; weekly	≠	Any school	
	radio system check		facilities with	
	Lead: Maintenance; Funding: District		cameras will be	
	Budget; Timeline: Ongoing		monitored to	
			determine	
	On-going training on ICS and		damage or other	
	various functions of ICS such as		hazardous	
	accountability, search, rescue,		situations.	
	triage, reunification,	≠	Communication	
	communication, etc. in conjunction		Infrastructure	
	with local fire and police		will be assessed	

Hazard & Effect	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce the effect of the hazard) departments. Lead: District; Funding: District Budget; Timeline: Ongoing Accumulation of emergency supplies and materials and storage of this external of each school. Lead: School; Funding: District Budget, Gifts, and Grants; Timeline: Short Term	Response (Immediate actions to function at a minimal acceptable level) by Information services.	Recovery (Resources required to restore function or longer term recovery)
Fire	Comply with fire codes and regular annual inspections by fire department. Lead: Maintenance & Custodians; Funding: District Budget; Timeline: Ongoing Redundant communication system with Skagit County Department of Emergency Management, district leadership team, maintenance team and transportation team. Lead: Maintenance; Funding: District Budget; Timeline: Short Term Regular drills at each school site. Lead: District, Principals; Funding: District Budget; Timeline: Ongoing On-going training on ICS and various functions of ICS such as accountability, search, rescue, triage, reunification, communication, etc. in conjunction with local fire and police departments. Lead: District; Funding: District Budget; Timeline: Ongoing Accumulation of emergency supplies and materials and storage of this external of each school. Lead: Schools; Funding: District Budget/Gifts/Grants; Timeline: Short Term	Institute fire protocol which includes: ≠ alarm ≠ evacuation ≠ accountability ≠ notification of emergency responders and district support ≠ establishment of ICS and needed ICS functions ≠ Rapid Responder updates by building administrators to facilitate response by emergency providers	Assessment of status and planning for return to normal operations. Communication with community. Comprehensive assessment for insurance purposes. Documentation of other impacts (additional hours worked, resources utilized). Establishment of Critical Incident Stress De-briefing services (both district and external resources available).
Severe Wind	Regular drills both school-based and district wide. Lead: District; Funding: District Budget;	Institute shelter in place protocol, which can be	Assessment of status and planning for return to normal

Hazard & Effect	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce the effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
	Timeline: Ongoing On-going training on ICS and various functions of ICS such as accountability, search, rescue, triage, reunification, etc. in conjunction with local fire and police departments. Lead: District; Funding: District Budget; Timeline: Ongoing Redundant communication system with Skagit County Department of Emergency Management, district leadership team, maintenance team and transportation team. Lead: Maintenance; Funding: District Budget; Timeline: Short Term Accumulation of emergency supplies and materials and storage of this external of each school. Lead: Schools; Funding: District Budget, Gifts, and Grants; Timeline: Short Term	modified depending upon the specific circumstances. Establishment of ICS and needed ICS functions, communication with district support and emergency providers. Rapid Responder updates by building administrators to facilitate response by emergency providers All school district properties will be assessed for down power lines, broken gas or water mains or any other hazardous situations which affect safety of students, staff or public.	operations. Communication with community. Comprehensive assessment for insurance purposes. Documentation of other impacts (additional hours worked, resources utilized). Establishment of Critical Incident Stress De-briefing services (both district and external resources available).
Flood	Redundant communication system with Skagit County Department of Emergency Management, district leadership team, maintenance team and transportation team. Lead: Maintenance; Funding: District Budget; Timeline: Short Term On-going training on ICS and various functions of ICS such as accountability, search, rescue, triage, reunification, communication, etc. in conjunction with local fire and police departments. Lead: District; Funding: District Budget: Timeline: Ongoing Accumulation of emergency	Evacuation Accountability Notification of emergency responders and district support establishment of ICS and needed ICS functions Rapid Responder updates by building administrators to facilitate response by emergency providers	Assessment of status and planning for return to normal operations. Communication with community. Comprehensive assessment for insurance purposes. Documentation of other impacts (additional hours worked, resources utilized). Establishment of Critical Incident Stress

Hazard &	Mitigation & Preparedness	Response	Recovery
Effect	procedures	to function at a	to restore function or
	to reduce the effect of the hazard)	minimal acceptable level)	longer term recovery)
	supplies and materials and storage		De-briefing services
	of this external of each school.	Remove as much	(both district and
	Gifts and, Grants; Timeline: Short Term	as possible to high ground storage.	available).
		Construct flood barriers with sandbags or other materials.	
		Shut down appropriate utility systems.	
Snow	Redundant communication system	Snow removal from	Assessment of status
Storm	with Skagit County Department of	walks and parking	and planning for
	leadership team, maintenance team	1015	operations.
	and transportation team.	Tour facility to	
	Lead: Maintenance; Funding: District	assess damage.	Communication with
	Budget; Timeline: Snort Term	on conditions.	community.
	On-going training on ICS and		Comprehensive
	accountability search rescue	Determination	assessment for
	triage, reunification,	closure/schedule	insulance pulposes.
	communication, etc. in conjunction	changes; notify	Documentation of
	with local fire and police	appropriate staff.	other impacts
	departments.	Institute shelter in	
	Timeline: Ongoing	place protocol,	utilized).
	Accumulation of amorgancy	which can be	
	supplies and materials and storage	modified depending	Establishment of Critical Incident Stress
	of this external of each school.	circumstances	De-briefing services
	Lead: Schools; Funding: District Budget,	Establishment of ICS	(both district and
	Gifts and, Grants; Timeline: Short Term	and needed ICS	external resources
		functions,	avallable).
		district support and	
		emergency	
		providers.	
		Rapid Responder	
		updates by building	
		administrators to	
		racilitate response	

Hazard & Effect	Mitigation & Preparedness (Protection devices, safeguards, & procedures to reduce the effect of the hazard)	Response (Immediate actions to function at a minimal acceptable level)	Recovery (Resources required to restore function or longer term recovery)
		providersi	
Volcanic Activity (Mt. Baker)	 <i>Regular drills both school-based and district wide.</i> Lead: District; Funding: District Budget; Timeline: Ongoing <i>Redundant communication system with Skagit County Department of Emergency Management, district leadership team, maintenance team and transportation team.</i> Lead: Maintenance; Funding: District Budget; Timeline: Short Term <i>On-going training on ICS and various functions of ICS such as accountability, search, rescue, triage, reunification, communication, etc. in conjunction with local fire and police departments.</i> Lead: District; Funding: District; Budget; Timeline: Ongoing <i>Accumulation of emergency supplies and materials and storage of this external of each school.</i> Lead: Schools; Funding: District Budget, Gifts, and Grants; Timeline: Short Term 	Institute shelter in place protocol, which can be modified depending upon the specific circumstances. Establishment of ICS and needed ICS functions, communication with district support and emergency providers. Rapid Responder updates by building administrators to facilitate response by emergency providers	Assessment of status and planning for return to normal operations. Communication with community. Comprehensive assessment for insurance purposes. Documentation of other impacts (additional hours worked, resources utilized). Establishment of Critical Incident Stress De-briefing services (both district and external resources available).

MITIGATION ACCOMPLISHMENTS (2008-2013):

The mitigation measures listed above were identified for the Mount Vernon School District in 2008. All measures are current and on-going and will continue throughout the 2014-2019 plan cycle.

PROPOSED MITIGATION MEASURES (2014-2019):

The Mount Vernon School District has determined that the mitigation measures listed above remain valid and are re-affirmed for the 2014 - 2019 plan cycle. In addition, the mitigation measures listed below are proposed for the 2014-2019 plan cycle.

- Provide for and install updated Fire/Emergency systems at District Office Lead: Mount Vernon School District Funding: District Budget Timeline: Short Term (less than 3 years to complete)
- 2. Study and determine feasibility of developing a comprehensive utility safety program to place all above-ground utilities within 300' of all school district owned buildings and facilities underground to facilitate emergency egress of students, staff and emergency response personnel.

Lead: District Funding: to be determined Timeline: to be determined

3. Study and determine feasibility of installing an Emergency generator at Mount Vernon High School.

Lead: District Funding: to be determined Timeline: Short term (less than 3 years to complete)

- Provide and install updated Fire panel at Washington Elementary School Lead: Mount Vernon School District Funding: District Budget Timeline: Short Term (less than 3 years to complete)
- Purchase software which will notify staff when critical pieces of service equipment are not operable (boiler, freezer, cooling and data system) Lead: Mount Vernon School District Funding: District Budget Timeline: Short term (less than 3 years to complete)
- Install panic alarm system in all school facilities which serve students; could be activated during a natural hazard or intentional, manmade or accidental event. Lead: Mount Vernon School District Funding: Grant funding Timeline: Short term (less than 3 years to complete)

7. Install cameras in all school facilities; can be monitored during natural hazard or intentional, manmade or accidental event.

Lead: MVSD Funding: Grant funding Timeline: Short term (less than 3 years to complete)

- 8. Hire security officer for LaVenture Middle School Lead: MVSD Funding: Grant Budget Timeline: Short term (less than 3 years to complete)
- Assess and update emergency preparedness regarding maintenance and operations following Washington Schools Risk Management Pool guidelines. Lead: MVSD
 Funding: District Budget
 Timeline: Short Term (less than 3 years to complete)
- 10. Clear gutters and drains of debris; where problematic areas are known, provide measures such as pumps, sand bags or other devices to prevent flood damage. Monitor all communications from Department of Emergency Management regarding flooding issues as it affects our school facilities which lie within the 100-year flood zone. Timely notification to parents/students/staff/public if schools will be closed due to emergency flood operations (i.e., closure of west side Skagit River Bridge which affects Washington Elementary School). Where determined necessary, shut down utilities to reduce damage to district facilities. Lead: MVSD

Funding: District Budget Timeline: Short Term (less than 3 years to complete)

FUNDING FOR THESE MITIGATION MEASURES IS DEPENDENT UPON THE MOUNT VERNON SCHOOL DISTRICT RECEIVING FUTURE FEDERAL AND/OR STATE HAZARD MITIGATION GRANT FUNDING.

Sedro-Woolley School District 801 Trail Road Sedro-Woolley, WA 98284

AREA SERVED:

The Sedro-Woolley School District is approximately 395 square miles in area serving approximately 4,300 students located within the City of Sedro-Woolley and the surrounding area.

ASSET PROFILE:

The Sedro-Woolley School District owns and operates 11 schools, 1 administration building, and 2 other facilities. District assets total approximately \$72,086,495 including building assets of approximately \$71,236,495 and equipment assets of approximately \$850,000. The district has considered these assets in our planning and mitigation strategy development.

ESTIMATED RELATIVE THREAT:

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

- 1. Severe Storm
- 2. Flooding
- 3. Earthquake

RECENT (5-YEAR) NATURAL HAZARD EVENT HISTORY:

- a. A total of 11 days of missed school due to severe storms and snow events.
- b. A total of 2 days of missed school due to flooding.
- c. Damage to district facilities resulting from these events: \$21,000.

EXISTING AND ON-GOING MITIGATION MEASURES:

Hazard & Effect	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 a regular basis for familiarity. Lead: District & SWEPT Committee; Funding: Budget & Donations; Timeline: Ongoing. Facility tours conducted relocating and securing shelving units and equipment to minimize injuries. Lead: SWEPT & Facilities; Funding: Budget & Donations; Timeline: Ongoing. 	Conduct comprehensive facility survey of all sites affected. Itemize damage, structural, nonstructural, equipment, utility and communications systems. Take photos.	Damage = assess, identify needed resources. Establish counseling for students and staff upon return to school.
Fire	Fire Insurance coverage Comply with Fire Codes and regulations. Automatic sprinkler systems in new facilities. Lead: Facilities; Funding: Budget; Timeline: Ongoing.	Evacuate building. Assess situation and determine if students & staff are able to return to building. Inventory all damaged.	<u>Damage</u> = assess, identify needed resources and initiate response
Severe Wind	Weather watches are conducted and sites traveled for early detection of storm development. Telephone tree established for early notification of administrators for school closure. Should a storm develop during school hours, students are transported home early. Lead: District, Facilities, & Transportation; Funding: Budget; Timeline: Ongoing.	Tour facility to assess damage. Update employees on conditions.	Damage = assess, identify needed resources and initiate response. Prioritize and schedule both temporary and permanent repairs.
Snow Storm	Weather watches are conducted and sites traveled for early detection of storm development. Telephone tree established for early notification of administrators for school closure. Should a storm develop during school hours, students are transported home early. Lead: District & Transportation; Funding: Budget; Timeline: Ongoing.	Snow removal from walks and parking lots. Tour facility to assess damage. Update employees on conditions.	Damage = assess, identify needed resources and initiate response. Develop communication plan as required.
Volcanic Activity (Mt. Baker)	Custodians are familiar with ventilation systems at each site, and are prepared to close systems if needed. Lead: District, Facilities; Funding: Budget; Timeline:	Activate plans for protection of ventilation system.	<u>Damage</u> = assess, identify needed resources and initiate response.

Hazard & Effect	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)
	Ongoing.		

MITIGATION ACCOMPLISHMENTS (2008 – 2013):

The mitigation measures listed above were identified for the Sedro-Woolley School District in 2003. All measures are current and on-going and will continue throughout the 2014 – 2019 plan cycle.

PROPOSED MITIGATION MEASURES (2014 – 2019):

The Sedro-Woolley School District has determined that the mitigation measures listed above remain valid and are re-affirmed for the 2014 - 2019 plan cycle. In addition, the Sedro-Woolley School District proposed the following mitigation strategies pertaining specifically to earthquake mitigation in 2003. Due to a lack of local funding, these mitigation strategies were deferred. The district has determined these mitigation strategies are still valid and are re-affirmed for the 2014 - 2019 plan cycle.

1. To provide for and implement a comprehensive non-structural earthquake mitigation program to secure and stabilize furnishings, equipment, and windows in all buildings and facilities owned by the Sedro-Woolley School District.

LEAD AGENCY: Sedro-Woolley School District Superintendent FUNDING SOURCE: Grant funding TIME-LINE: Short Term (less than 3 years to complete)

 To provide for and implement a comprehensive utility safety program to place all above-ground utilities within 300 feet of all school district owned buildings and facilities underground to facilitate emergency egress of students and staff and emergency ingress of emergency response personnel following a damaging earthquake.

> LEAD AGENCY: Sedro-Woolley School District Superintendent FUNDING SOURCE: Grant funding TIME-LINE: Short Term (less than 3 years to complete)

FUNDING FOR THESE MITIGATION STRATEGIES AND/OR PROJECTS IS DEPENDENT UPON THE SEDRO-WOOLLEY SCHOOL DISTRICT RECEIVING FUTURE FEDERAL AND/OR STATE HAZARD MITIGATION GRANT FUNDING.

UTILITIES

PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY

OVERVIEW AND AREA SERVED

The Public Utility District No. 1 of Skagit County (the District) is the largest community water system and the primary source of potable water in Skagit County. The District's Judy Water System serves some 22,000 water services and approximately 65,000 persons in Skagit County, Washington. The District has the largest service boundaries of any water purveyor in Skagit County, encompassing an existing service area of roughly 290 square miles.

The District currently serves water to the cities of Mount Vernon, Burlington, and Sedro-Woolley as well as the rural villages of Conway, Big Lake, Clear Lake, and Bay View all with the Judy Reservoir System and associated Water Treatment Plant. The District also manages the satellite water systems in Rockport, Marblemount, Alger, parts of FidalgoIsland, Cedargrove, Skagit View Village, a reverse osmosis system on the West shore of Guemes Island, and the Mountain View water system in Mount Vernon. The District serves these areas with over 600-miles of transmission and distribution pipes along with over 30 reservoirs and over 30 pump stations throughout our service areas.

SERVICE TRENDS

The growth and overall economic trends of the areas served by the District are a reflection of the growth and economic trends of Skagit County as a whole. Forecasts of future growth indicate that the population (and therefore water services) will grow at a rate between .5% and 1% for the next 10 years.

INVENTORY OF DISTRICT FACILITIES

For security reasons, the District has not listed the location and valuation of individual facilities. The District has completed an inventory of all facilities and has considered these facilities in our planning and mitigation strategy development process. These facilities are listed in the Water System Plan, and also the Emergency Response Plan provided to the County. This information will be made available to FEMA personnel if it is required to obtain future hazard mitigation grant funding.

APPLICABLE HAZARD MITIGATION PLANS

The District completed a Vulnerability Assessment and Emergency Response Plans per the requirements of the Bioterrorism Preparedness and Response Act of 2002, in December 31, 2003. The District completed an Emergency Response Plan in 2004; this plan is currently being updated in conjunction with cooperation with Skagit County in their review of the Natural Disaster Hazard Mitigation Plan.

RECENT NATURAL HAZARD EVENT HISTORY

The floods of 1990 and 1995 caused or contributed greatly to slides at Gilligan Creek, Monte Vista (Mount Vernon) and Salmon Beach (Fidalgo Island), each requiring District labor, materials and equipment to repair damage and reinstate water supply/service.

Beyond routine requests for services and maintenance, Skagit County Public Utility District #1 infrastructure have NOT been impacted by natural hazard events during the 2008-2013 plan cycle.

NATURAL HAZARD VULNERABILITY ANALYSIS RATING

The District considers itself most vulnerable to the following natural disasters, ranked in order:

- 1. **Flooding**: There is a high probability of flooding events in Skagit County because of the Skagit River. During a flood event, there is some potential for contamination of water if there are submerged broken pipes. Further, the flood could cut off movement of District personnel, leaving them unable to respond to leaks or water outages. The Skagit River Diversion structure and pipeline crossing in Sedro Woolley are also of concern as well as pipelines hanging on other bridge structures.
- 2. Earthquake: The probability of an earthquake is considered moderate (seismic zone 3), but the effect could be devastating. An earthquake could lead to breaks in the distribution and transmission pipelines, resultant failures of water storage tanks, critical pumping and control stations from liquefaction of soils supporting water facility pipelines and facility foundations. Results of this all leading to loss of the water stored for emergency, firefighting, and customer needs. Further, power and communications could be lost in such an event which would also lead to adverse consequences.
- 3. **Severe Storm**: While a more common occurrence, District facilities have proven to be relatively hardened against severe storms. However, power outages could lead to water outages in areas which are dependent on pumping of water. The District has fitted all critical pump stations with connections for emergency generators.
- 4. **Drought**: The District's main source of water is the Judy Reservoir, which is surface water supply, and is dependent on annual rainfall to recharge the reservoir. However, the District completed construction of the Skagit River Diversion Pump Station in 2009 which is able to pump water from the Skagit River to Judy Reservoir.

EXISTING APPLICABLE NATURAL HAZARD MITIGATION POLICIES, ORDINANCES, AND CODES

In addition to meeting local building codes, the main regulations for water systems in the State of Washington are governed by WAC 246-290. This legislation dictates requirements for virtually all District water facilities; including requirements for items such as emergency water storage volumes. Further, the Washington Department of Health must review all new large construction activities to ensure they meet these requirements.

PRIORITIZED NATURAL HAZARD MITIGATION STRATEGIES OR PROJECTS

1. Purchase and install emergency generators for critical pump stations and the district headquarters facility.

LEAD DEPARTMENT:	Engineering
FUNDING SOURCES:	Various grant funding sources
TIME-LINE:	Short Term (less than 3 years)

All critical pump stations have been fit with Generator plugs and cords ready for generator power. Generator project at PUD facility is nearly complete.

2. Purchase/lease or otherwise make arrangements for the emergency use of an appropriate parcel of land outside of the 100-year floodplain of the Skagit River to serve as an alternate equipment storage site and maintenance facility for the district.

<u>NOTE</u>: The District's main office and construction yard are located within the 100-year floodplain of the Skagit River.

LEAD DEPARTMENT:	Engineering
FUNDING SOURCES:	Various grant funding sources
TIME-LINE:	Long Term (greater than 3 years)

This mitigation strategy previously included the elevation of the district offices to reduce vulnerability to flooding. The district no longer considers the elevation of the district offices a viable mitigation strategy due to the costs of such a project. An appropriate alternate mitigation strategy for the district offices has not been identified.

Division St and Dukes Hill properties owned by district are both viable for this purpose, with Division St being designed for it in new reservoir scheduled to be built in 2015

<u>NOTE</u>: The mitigation strategy listed below was listed in the 2003 version of the plan. This strategy is no longer considered valid and has been deleted from the plan.

3. Purchase a large volume water truck (or trailer with tandem dolly) to provide for emergency water distribution during a flood, earthquake, or power-outage event.

LEAD DEPARTMENT:	Engineering
FUNDING SOURCES:	Various grant funding sources
TIME-LINE:	Short Term (less than 3 years)

The District is investigating such a device in the next budget cycle and have been in contact with a local food grade container handler.

Skagit County Sewer District # 1

Sewer District Profile

Outline of Area Served: The district serves the areas of Sunny Slope, Shorewood, Snee-Osh Beach, and Reef Point; all located on Fidalgo Island. The district owns and operates approximately 1 lineal mile of sanitary sewer pipeline that serves 126 households occupying an area of approximately 150 acres.

Critical Facilities Owned by Sewer District and Estimated Value:

To	tal Estimated Value:	\$1,257,787
9.	Sewage Collection Tank	\$ 20,776
8.	Four Grinder Pumps	\$ 83,104
7.	Stationery Generator	\$ 6,735
6.	Generator Shed	\$ 8,310
5.	Portable Onan 20KW Back-up Generator	\$ 15,582
4.	Chilberg Lift Station	\$207,760
3.	McGlinn Lift Station	\$207,760
2.	Main Pumping Station	\$207,760
1.	Sanitary Sewer Pipeline	\$500,000

Current and Anticipated Service Trends: The district is restricted to no more than five more buildable lots. We anticipate over a five year period to be adding the five additional lots.

Natural Hazard Vulnerability Analysis Rating: This Sewer District is most vulnerable to the following natural hazards - ranked in order:

- 1. Severe Storms
- 2. Flooding (high tides and storm surge events)

Between January 1, 2008 and December 31, 2013 Sewer District #1 has been impacted on several separate occasions due to pump failures from power outages caused by severe storms. Costs to the District for monitoring the lift station and use of an emergency generator during these events exceed \$10,000.

These pump failures can cause a divesting effect as the District's sewage is pumped to the Town of La Conner sewage treatment plant via pipelines owned by the Swinomish Indian Tribal Community. Without the District taking action, these pump failures could cause contamination to nearby lands, shorelines, and the waters of Skagit Bay.

Proposed Natural Hazard Mitigation Measures: 2008-2012 the District spent well over \$250,000 in replacing and/or upgrading pumps, electrical panels and general maintenance of sewer system to assure the reliability of system.

Mitigation Measure	Lead Agency	Funding Source	Time Line
Operational Maintenance	Commissioners	Monthly Income	Immediate



SECTION V: APPENDICES

APPENDIX A: FEMA APPROVAL & LOCAL ADOPTION RESOLUTIONS

The following pages contain a copy of FEMA's letter of plan approval and resolutions signed by the various entities listed below that participated in the 2014 plan update process and formally adopted the **Skagit County Natural Hazard Mitigation Plan**.

City of Anacortes	City of Mount Vernon
City of Burlington	City of Sedro-Woolley
Town of Concrete	Samish Indian Nation
Town of Hamilton	Swinomish Indian Tribal Community
Town of La Conner	Upper Skagit Indian Tribe
Town of Lyman	Skagit County

NOTE: Adoption resolutions for participating special purpose districts are maintained by the Skagit County Department of Emergency Management and are not included within this appendix.

U.S. Department of Homeland Security FEMA Region X Federal Regional Center 130 228th Street, SW Bothell, WA 98021-8627



March 18, 2015

Honorable Ken Dahlstedt Honorable Lisa Janicki Honorable Ron Wesen Skagit County Commissioners 1800 Continental Place, Suite 100 Mount Vernon, Washington 98273

Dear Commissioners Dahlstedt, Janicki, and Wesen:

On March 4, 2015, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) approved the *Skagit County Natural Hazard Mitigation Plan* as a multijurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through March 3, 2020:

Skagit County	City of Anacortes	City of Burlington
City of Mount Vernon	City of Sedro-Woolley	Town of Concrete
Town of Hamilton	Town of La Conner	Town of Lyman

Additionally, FEMA has approved the Skagit County Natural Hazards Mitigation Plan as a Tribal Mitigation Plan (44 CFR §201.7) for the following Indian tribal governments:

Samish Indian Nation	Swinomish Indian Tribal	Upper Skagit Indian
	Community	Tribe

The list of approved jurisdictions has been updated to include the jurisdictions in italics, which have recently adopted the Skagit County Natural Hazard Mitigation Plan. To continue eligibility the plan must be reviewed, revised as appropriate, and resubmitted within five years of the original approval date.

Skagit County Commissioners March 18, 2015 Page 2

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact Morgan Mak, Mitigation and Recovery Strategist with Washington Emergency Management Division, at (253) 512-7142, who coordinates and administers these efforts for local entities.

Sincerely,

hurs

Mark Carey, Director Mitigation Division

cc: Morgan Mak, Washington Emergency Management Division

KM:BH

RESOLUTION NO. 1910

A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE CITY OF ANACORTES

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated and has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and the City of Anacortes will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Anacortes City Council recognizes that the adoption of the updated Skagit County Natural Hazards Mitigation Plan is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan, dated October, 2014, is hereby adopted as the official natural hazards mitigation plan for the City of Anacortes

Introduced and passed at a regular meeting of the City Council this _____day of _____, 2015.

City of Anacortes

Laurie Gere, Mayor

Laurie Gere, Mayo

Attest:

Steve Hoglund, Finance Director, City Clerk/Treasurer

Approved As to Form:

1.5/-2-

Bradford E. Furlong, WSBA #12924 City Attorney
A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE CITY OF BURLINGTON.

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated as required every five years and transmitted to FEMA for final approval; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan continues to provide a current framework for natural hazard reduction in the community, and the plan has been reviewed through an extensive public involvement process; and

WHEREAS, the process to update the plan, including formalizing the Program for Public Information was established by City Council Resolution 18-2013 and said plan is in compliance with all procedural requirements for local adoption by the City of Burlington; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and the City of Burlington will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, adoption of the Skagit County Natural Hazards Mitigation Plan is a key component of the Community Rating System program and it is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan is hereby adopted as the official natural hazards mitigation plan for the City of Burlington.

INTRODUCED AND PASSED at a regular meeting of the City Council of the City of Burlington this <u>22nd</u> day of <u>January</u>, 2015.

The City of Burlington

Steve Sexton, Mayo

Sleve Sexion, Mayo

ATTEST:

Crystil Robinson, Finance Director

APPROVED AS TO FORM:

Leif Johnson, Acting City Attorney

Published: 1/26/2015

RESOLUTION NO. 2015-03

A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE TOWN OF CONCRETE.

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was updated in 2014 and approved by the Federal Emergency Management Agency for local adoption; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan continues to provide a current framework for natural hazard reduction in the community and the plan has been reviewed through an extensive public involvement process.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan, dated October, 2014, is hereby adopted as the official natural hazards mitigation plan for the Town of Concrete.

Dated this ______ day of ______, 2015.

Jason Miller, Mayor

Attest:

Andrea Fichter, Clerk- Treasurer

Approved as to form:

David Day, Town Attorney

RESOLUTION NO. 01-15

A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE TOWN OF HAMILTON.

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated as required every five years and transmitted to FEMA for final approval; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan continues to provide a current framework for natural hazard reduction in the community, and the plan has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and the Town of Hamilton will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, adoption of the Skagit County Natural Hazards Mitigation Plan is a key component of the Community Rating System program and it is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan is hereby adopted as the official natural hazards mitigation plan for the Town of Hamilton.

INTRODUCED AND PASSED at a regular meeting of the Town Council of the Town of Hamilton this 10th day of February, 2015.

The Town of Hamilton

TOWN OF LA CONNER



RESOLUTION NO. 509

A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN 2014 UPDATE AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR TOWN OF LA CONNER

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated as required every five (5) years and approved by the Federal Emergency Management Agency for local adoption by La Conner; and

WHEREAS, an environmental review process was completed for the recently updated Skagit County Natural Hazards Mitigation Plan and said plan is in compliance with all procedural requirements; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan continues to provide a current framework for natural hazard reduction in the community, and the plan has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and La Conner will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the La Conner Town Council recognizes that minor changes and corrections may still need to be made to portions of the recently updated plan pertaining to special purpose districts but that expedient adoption of the updated Skagit County Natural Hazards Mitigation Plan is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan, dated October, 2014, is hereby adopted as the official natural hazards mitigation plan for the Town of La Conner

Dated this 10th day of February, 2015.

Ramon Hayes, Mayor

ATTEST

Maria DeGoede, Finance Director

RESOLUTION 2015-1

A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE TOWN OF LYMAN.

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated as required every five years and transmitted to FEMA for final approval; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan continues to provide a current framework for natural hazard reduction in the community, and the plan has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and the Town of Lyman will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, adoption of the Skagit County Natural Hazards Mitigation Plan is a key component of the Community Rating System program and it is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED by the Lyman Town Council that the Skagit County Natural Hazards Mitigation Plan is hereby adopted as the official natural hazards mitigation plan for the Town of Lyman.

INTRODUCED AND PASSED at a regular meeting of the Town Council of the Town of Lyman this 13th day of January, 2015.

The Town of Lyman Debra Heinzman Mavor

RESOLUTION NO. 885

A RESOLUTION ADOPTING THE MOUNT VERNON NATURAL HAZARDS MITIGATION PLAN THAT WILL BE INCORPORATED AS PART OF SKAGIT COUNTY'S NATURAL HAZARD MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE CITY OF MOUNT VERNON

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan that included a section specific to the City of Mount Vernon in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan that includes a section specific to Mount Vernon was recently updated and has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County and Mount Vernon Natural Hazards Mitigation Plans will need to be reviewed and updated on a regular basis and the City of Mount Vernon will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the City of Mount Vernon recognizes that the adoption of the updated Skagit County Natural Hazards Mitigation Plan with Mount Vernon's updated information is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that Mount Vernon's chapter within the Skagit County Natural Hazards Mitigation Plan, attached hereto labeled as **Exhibit A** and incorporated by this reference in its entirety, is hereby adopted as the official natural hazards mitigation plan for the City of Mount Vernon.

Signed in Authentication this ______ day of ______, 2015

Jill Boudreau, Mayor

Attest:

Alicia D. Huschka, Finance Director

Approved as to form:

Ch

Kevin Rogerson, City Attorney

RESOLUTION NO. 909-15

A RESOLUTION ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR THE CITY OF SEDRO-WOOLLEY

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated and has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan continues to provide a current framework for natural hazard reduction in the community, and the plan has been reviewed through an extensive public involvement process; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and the City of Sedro-Woolley will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Sedro-Woolley City Council recognizes that the adoption of the updated Skagit County Natural Hazards Mitigation Plan is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan, dated October, 2014, is hereby adopted as the official natural hazards mitigation plan for the City of Sedro-Woolley.

NOW, THEREFORE, BE IT FURTHER RESOLVED that the City Council authorizes the Mayor to sign the Skagit County Natural Hazards Mitigation Plan on behalf of the City of Sedro-Woolley.

Dated this 11th day of February, 2015.

ATTEST:

Christine Salsellia, Deputy City Clerk Patsy K. Nelson

APPROVED AS TO FORM:

Eron Berg, City Attorney

Exhibit A – Mount Vernon Natural Hazard Mitigation Plan



NG1 Motion: 2015-02-049 Resolution No: 2015-02-034 Date Approved: February 25, 2015 Subject: Skagit County Natural Hazards Mitigation Plan

- WHEREAS, the Samish Indian Nation was federally re-acknowledged by the Assistant Secretary of the Department of the Interior of the United States of America on April 26, 1996; and,
- WHEREAS, the Samish Tribal Council is empowered to act on behalf of the Samish Indian Nation pursuant to Article VI, Section 2, of the Samish Tribal Constitution, approved November 14, 2003, by Resolution of the Samish Tribal Council and adopted and ratified by Vote of the Samish General Council on March 2, 2004 and recognized by the Assistant Secretary for Indian Affairs, David W. Anderson on April 20, 2004; and,
- WHEREAS, the health, safety, welfare and education of the Indian people of the Samish Indian Nation is the responsibility of the Samish Indian Nation Tribal Council; and,
- WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and,
- WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently updated and reviewed through an extensive public involvement process, and approved by the Federal Emergency Management Agency
- WHEREAS, the Samish Indian Nation Tribal Council recognizes that the adoption of the updated Skagit County Natural Hazards Mitigation Plan, with a Samish Indian Nation jurisdictional section, is necessary and in the interest of the tribe and community
- NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan, with the included Samish Indian Nation jurisdictional section, dated October, 2014, is hereby adopted as the official natural hazards mitigation plan for the Samish Indian Nation.

SAMISH TRIBAL COUNCIL

Thomas D. Wooten **Tribal Chairman**

CERTIFICATION

The above resolution was duly adopted by the Samish Tribal Council on a telephone conference held on the 25th day of February 2015, at which time a quorum was present by a vote of:

4_FOR, 0_AGAINST, 0_ABSTAIN.

CERTIFIED BY: (m. mart 10

Dana M. Matthews Tribal Council Secretary

THE SWINOMISH INDIAN TRIBAL COMMUNITY

RESOLUTION NO. 2015-02-030

A Resolution Adopting the Updated Skagit County Natural Hazards Mitigation Plan

WHEREAS, the Swinomish Indian Tribal Community (the "Tribe") is a federally recognized Indian Tribe, organized pursuant to Section 16 of the Indian Reorganization Act of 1934 (25 U.S.C. §476); and

WHEREAS, the Tribe is organized under a constitution and bylaws originally ratified by the Tribe on November 16, 1934, and approved by the Secretary of the Interior on January 27, 1936, and as most recently amended and ratified by the tribe on September 22, 1985 and approved by the Secretary of Interior on October 22, 1985; and

WHEREAS, the Swinomish Indian Senate (the "Senate") is the duly elected governing body of the Swinomish Indian Tribal Community and exercises governmental authority over all lands and waters within the Swinomish Indian Reservation; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan (the "Plan") was originally adopted by the Tribe in 2003 as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000, P.L. 106-390, regulations promulgated thereunder at 44 C.F.R. Part 201, and the Federal Emergency Management Agency ("FEMA") Community Rating System program; and

WHEREAS, the Plan was last updated in 2008 as required and approved by FEMA for local adoption by respective jurisdictions, including the Swinomish Indian Tribal Community; and

WHEREAS, the Plan was most recently updated in 2014 as required and approved by FEMA for local adoption by respective jurisdictions, including the Swinomish Indian Tribal Community; and

WHEREAS, an environmental review process was completed for the recently updated Plan and said Plan is in compliance with all procedural requirements; and

WHEREAS, the Plan continues to provide a current framework for natural hazard reduction in the community, and the Plan has been reviewed through an extensive public involvement process; and

WHEREAS, the Tribe recognizes that expedient adoption of the updated Skagit County Natural Hazards Mitigation Plan is necessary and in the public interest; and

WHEREAS, the Tribe will comply with all applicable Federal statutes and regulations duringSwinomish Indian Tribal CommunityResolution 2015-02-030

1.4

the periods for which grant funding is received, and will amend the plan whenever necessary to reflect changes in Tribal or Federal laws and statutes:

NOW, THEREFORE, BE IT RESOLVED that the Senate hereby adopts the 2014 update of Skagit County Natural Hazards Mitigation Plan as the natural hazards mitigation plan for the Tribe; and

BE IT FURTHER RESOLVED that the Senate hereby authorizes the Senate Chairman or his Designee(s) to sign all documents related to the same as necessary.

Buon Cladoosby, Chairman

Swinomish Indian Senate

CERTIFICATION

As Secretary of the Swinomish Indian Senate, I hereby certify that the foregoing resolution was approved at a Regular Meeting of the Swinomish Indian Senate held on February 10, 2015, at which time a quorum was present and the resolution passed by a vote of *P* FOR, *O* AGAINST, and **<u>6</u>** ABSTENTIONS.

Swinomish Indian Senate



RESOLUTION 2014_045

Re: A Resolution Approving Submittal of the USIT Natural Hazards Mitigation Plan Chapter Update for Inclusion in full to the Skagit County Natural Hazards Mitigation Plan 2014 Update.

WHEREAS, The Upper Skagit Tribal Council is the duly elected governing body of the Upper Skagit Indian Tribe, a federally recognized Indian Tribe re-organized pursuant to section sixteen of the Indian Reorganization Act of 1934; and,

WHEREAS, The Upper Skagit Indian Tribal Council has the jurisdictional authority and responsibility to provide for public safety and general welfare of the Tribal members, employees, visitors and patrons on the Upper Skagit Reservation; and

WHEREAS, The Disaster Mitigation Act requires pre-disaster mitigation planning be conducted by communities prior to becoming eligible for disaster mitigation funding through the Federal Emergency Management Agency; and

WHEREAS, The Upper Skagit Tribal Council has participated in the development of a multi-jurisdictional Natural Hazards Mitigation Plan with governmental jurisdictions within Skagit County to assess the vulnerability of the Tribe in regards to various hazards; and

WHEREAS, The Upper Skagit Indian Tribe has updated for the 2014 process it's Natural Hazards Mitigation Plan Chapter, attached hereto; and

NOW THEREFORE BE IT RESOLVED, the Upper Skagit Indian Tribe approves and authorizes the submittal of the 2014 updated Natural Hazards Mitigation Plan chapter in full for inclusion in the Skagit County Natural Hazards Mitigation Plan 2014 Update.

CERTIFICATION

As Secretary of the Upper Skagit Indian Tribal Council, I hereby certify that the foregoing resolution was approved at a Regular Session of the Upper Skagit Tribal Council held on $\underline{T_{uve}}$ (..., 2014 at which time a quorum was present and the resolution was passed by a vote of $\underline{-4}$ FOR GAINST, and $\underline{-6}$ ABSTENTIONS.

ATTEST:

Tina Talley, Secretary

Upper Skagit Tribal Council

Jennifer RWashington, Chairman Upper Skagit Tribal Council

Upper Skagit Tribal Council Resolution 2014-

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RESOLUTION NO.

ADOPTING THE SKAGIT COUNTY NATURAL HAZARDS MITIGATION PLAN AS THE OFFICIAL NATURAL HAZARDS MITIGATION PLAN FOR SKAGIT COUNTY

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was originally adopted in 2003 (pursuant to Skagit County Resolution # R20030274) as a multi-jurisdictional plan in accordance with the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program, and an updated Skagit County Natural Hazards Mitigation Plan was subsequently adopted in 2009 (pursuant to Skagit County Resolution # R20090138); and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan was recently further updated and has been reviewed through an extensive public involvement process; and

WHEREAS, applicable Skagit County Department of Public Works emergency management staff has reviewed and recommends approval of the updated Skagit County Natural Hazards Mitigation Plan; and

WHEREAS, the Skagit County Natural Hazards Mitigation Plan will need to be reviewed and updated on a regular basis and Skagit County will need to continue to remain an active participant in the review and updating process in order to continue to meet the requirements of the Disaster Mitigation Act of 2000 (44CFR 201.6) and the Federal Emergency Management Agency Community Rating System program; and

WHEREAS, the Skagit County Board of Commissioners recognizes that the adoption of the updated Skagit County Natural Hazards Mitigation Plan is necessary and in the public interest.

NOW, THEREFORE, BE IT RESOLVED that the Skagit County Natural Hazards Mitigation Plan, dated October, 2014, is hereby adopted as the official natural hazards mitigation plan for Skagit County.

day of February **DATED** this . 2015. ATTEST: Clerk of the Board APPROVED AS TO FORM (Resolution Only): Livil Deputy Prosecuting Attorney

BOARD OF COUNTY COMMISSIONERS SKAGIT COUNTY, WASHINGTON

enneth A. Dahlstedt. Chair

Lisa Janicki, Commissioner

Ron Wesen, Commissioner

APPENDIX B: RAMS ASSESSMENT

Washington State Department of Natural Resources

Northwest Region R.A.M.S. Assessment

Skagit County Excerpt

Compartments 29653, 29656, and 29658

Prepared With R.A.M.S. (Risk Assessment and Mitigation Strategies)

Compartment Assessment Ranking

Composite Compartment Assessment Rating

(Regional Ranking)

Rating	Compartment
High	8: 29656
High	11: 31656
High	6: 28653
Mod	14: 37656
Mod	12: 31658
Mod	9: 29658
Mod	3: 15653
Mod	13: 37653
Mod	7: 29653
Low	15: 37658
Low	4: 17658
Low	10: 31653

Compartment 7: 29653 (Part I)

Compartment 7 contains 274558 acres in Fire Management Zone 29. The Compartment experiences 6.00 fires per year, totaling 2 acres. The characteristics of the compartment indicate that: Catastrophic Fire Likely.

Fuels Hazard characteristics are rated: Fuels (flame length produced): 8 + Feet (**High**) Crowning Potential: 3 - 5 (Moderate) Slope Percent: 0 - 20 (Low) Aspect: North (Low) Elevation: 0 - 3500 (High) Protection Capability ratings are: Initial Attack: 21 - 30 minutes (Moderate) Suppression Complexity: Complex (High) Ignition Risk factors include: Population Density - Wildland Urban Interface 1001+ Dwellings/structures Power Lines In Unit **Transmission Lines Distribution Lines** Sub-station **Industrial Operations**

Active timber sale Construction project Debris/slash burning Mining Maintenance/service contracts Recreation Dispersed camping areas, party areas, hunters, water-based, hiking Developed camping areas Off highway vehicle use Flammables Present Powder magazine Gas or oil wells/transmission Gas pumps or storage Other Fireworks, children with matches **Electronic installations** Woodcutting area, power equipment Shooting/target Government operations Incendiary **Cultural Activities** Dump Railroads Railroads are present Transportation System State/Federal highway(s) County road(s) Public Access Road(s) **Commercial Development** Schools Camps, resorts, stables Business, agricultural/ranching

Compartment 7: 29653 (Part II)

Compartment Values are characterized:

Recreation: Developed recreation site within or adjacent to area (**High**) Administrative: High value or numerous administrative sites (**High**) Wildlife/Fisheries: Highly significant habitat. (**High**) Range Use: Range allotment within area, normal/average use (**Moderate**) Watershed: Stream Class PI, I. Important water use/riparian area. Domestic water use. (**High**) Forest/Woodland: Standing timber/woodland on 25% or less of area (**Low**) Plantations: 16 - 30% or less of area in or programmed for plantations (**Moderate**) Private Property: High loss and threat potential due to numbers and placement (**High**) Cultural Resources: Archaeological/historical findings of high significance (**High**) Special Interest Areas: No Special Interest area within or adjacent to the area (**Low**) Visual Resources: Maximum modification dominates. (**Low**) T&E Species: Species present. (**High**) Soils (Erosion): Low significance (EHR < 4). (**Low**) Airshed: High receptor sensitivity (**High**) Vegetation: Potential for sensitive plants. (**Moderate**)

Compartment 8: 29656 (Part I)

Compartment 8 contains 199907 acres in Fire Management Zone 29. The Compartment experiences 10.00 fires per year, totaling 135 acres. The characteristics of the compartment indicate that: Catastrophic Fire Likely.

Fuels Hazard characteristics are rated: Fuels (flame length produced): 8 + Feet (**High**) Crowning Potential: 6 + (**High**) Slope Percent: 21 - 35 (Moderate) Aspect: South (High) Elevation: 0 - 3500 (High) Protection Capability ratings are: Initial Attack: 31+ minutes (High) Suppression Complexity: Complex (High) Ignition Risk factors include: Population Density - Wildland Urban Interface 1001+ Dwellings/structures Power Lines In Unit Sub-station **Distribution Lines Transmission Lines** Industrial Operations Maintenance/service contracts Mining Debris/slash burning Construction project Active timber sale Recreation Dispersed camping areas, party areas, hunters, water-based, hiking Off highway vehicle use

Developed camping areas Flammables Present Gas or oil wells/transmission Powder magazine Gas pumps or storage

Other

Shooting/target Dump Fireworks, children with matches Woodcutting area, power equipment Government operations Incendiary Cultural Activities Electronic installations

Railroads

Railroads are present Transportation System State/Federal highway(s) Public Access Road(s) County road(s) Commercial Development Schools Business, agricultural/ranching Camps, resorts, stables

Compartment 8: 29656 (Part II)

Compartment Values are characterized:

Recreation: Developed recreation site within or adjacent to area (**High**) Administrative: High value or numerous administrative sites (**High**) Wildlife/Fisheries: Highly significant habitat. (**High**) Range Use: Range allotment within area, normal/average use (**Moderate**) Watershed: Stream Class PI, I. Important water use/riparian area. Domestic water use. (**High**) Forest/Woodland: Standing timber/woodland on 26 - 50% of area (**Moderate**) Plantations: 16 - 30% or less of area in or programmed for plantations (**Moderate**) Private Property: High loss and threat potential due to numbers and placement (**High**) Cultural Resources: Minimal archaeological/historical findings, potential for Native American use. (**Moderate**) Special Interest Areas: Area is adjacent to a Special Interest area (**Moderate**) Visual Resources: Partially retain existing character. (**Moderate**)

T&E Species: Species present. (High)

Soils (Erosion): Moderately erodable (EHR 4-12). (**Moderate**) Airshed: High receptor sensitivity (**High**) Vegetation: Potential for sensitive plants. (**Moderate**)

Compartment 9: 29658 (Part I)

Compartment 9 contains 753076 acres in Fire Management Zone 29. The Compartment experiences 5.00 fires per year, totaling 78 acres. The characteristics of the compartment indicate that: Catastrophic Fire Possible.

Fuels Hazard characteristics are rated:
Fuels (flame length produced): 8 + Feet (High)
Crowning Potential: 3 - 5 (Moderate)
Slope Percent: 36 + (High)
Aspect: East, West (Moderate)
Elevation: 3501 - 5000 (Moderate)

Protection Capability ratings are:

Initial Attack: 31+ minutes (**High**) Suppression Complexity: Simple (**Low**) Ignition Risk factors include:

Population Density - Wildland Urban Interface 501-1000 Dwellings/structures Power Lines In Unit **Distribution Lines** Sub-station **Transmission Lines Industrial Operations** Active timber sale Construction project Debris/slash burning Mining Maintenance/service contracts Recreation Dispersed camping areas, party areas, hunters, water-based, hiking Developed camping areas Off highway vehicle use Flammables Present Powder magazine Gas or oil wells/transmission Gas pumps or storage

Other

Fireworks, children with matches Electronic installations Woodcutting area, power equipment Shooting/target Government operations Incendiary **Cultural Activities** Dump Railroads Railroads are present Transportation System State/Federal highway(s) County road(s) Public Access Road(s) **Commercial Development** Schools Camps, resorts, stables Business, agricultural/ranching

Compartment 9: 29658 (Part II)

Compartment Values are characterized:

Recreation: Undeveloped high recreation use (Moderate) Administrative: Administrative sites are present (Moderate) Wildlife/Fisheries: Highly significant habitat. (High) Range Use: Little or no range use (Low) Watershed: Stream Class PI, I. Important water use/riparian area. Domestic water use. (High) Forest/Woodland: Standing timber/woodland on 51+% of area (High) Plantations: 31+% or less of area in or programmed for plantations (High) Private Property: Threat to structures and property (Moderate) Cultural Resources: Minimal archaeological/historical findings, potential for Native American use. (Moderate) Special Interest Areas: A majority of the area is classified as Special Interest area (High) Visual Resources: Preserve and retain existing character. (High) T&E Species: Species present. (High) Soils (Erosion): Moderately erodable (EHR 4-12). (Moderate) Airshed: Low receptor sensitivity (Low) Vegetation: Plant occurrences of significance (**High**)

HAZUS: SKAGIT 50 YEAR FLOOD EVENT

Hazus-MH: Flood Event Report

Region Name:	Skagit
Flood Scenario:	Complete_50
Print Date:	Thursday, March 27, 2014

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social

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Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Washington

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,710 square miles and contains 4,143 census blocks. The region contains over 39 thousand households and has a total population of 102,979 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 46,356 buildings in the region with a total building replacement value (excluding contents) of 8,549 million dollars (2006 dollars). Approximately 91.29% of the buildings (and 71.58% of the building value) are associated with residential housing.

General Building Stock

Hazus estimates that there are 46,356 buildings in the region which have an aggregate total replacement value of 8,549 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Occupancy	Exposure (\$1000)	Percent of Total
Residential	6,119,267	71.6%
Commercial	1,242,357	14.5%
Industrial	332,752	3.9%
Agricultural	138,828	1.6%
Religion	116,406	1.4%
Government	78,311	0.9%
Education	521,463	6.1%
Total	8,549,384	100.00%

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure (\$1000)	Percent of Total
Residential	1,723,732	61.7%
Commercial	622,864	22.3%
Industrial	135,561	4.9%
Agricultural	114,010	4.1%
Religion	40,716	1.5%
Government	34,128	1.2%
Education	121,456	4.3%
Total	2,792,467	100.00%

Table 2 Building Exposure by Occupancy Type for the Scenario

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 280 beds. There are 62 schools, 39 fire stations, 9 police stations and 1 emergency operation center.
Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Skagit
Scenario Name:	Complete_50
Return Period Analyzed:	50
Analysis Options Analyzed:	No What-Ifs

General Building Stock Damage

Hazus estimates that about 2,351 buildings will be at least moderately damaged. This is over 27% of the total number of buildings in the scenario. There are an estimated 275 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

	1-10	D	11-	20	21-3	30	31-4	10	41-5	50	Substar	ntially
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	1	11.11	6	66.67	2	22.22	0	0.00	0	0.00	0	0.00
Commercial	2	3.92	13	25.49	12	23.53	1	1.96	4	7.84	19	37.25
Education	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	3	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	3	42.86	1	14.29	3	42.86
Religion	0	0.00	1	33.33	0	0.00	0	0.00	0	0.00	2	66.67
Residential	0	0.00	166	7.28	898	39.37	339	14.86	627	27.49	251	11.00
Total	4		189		912		343		632		275	

Table 3: Expected Building Damage by Occupancy

Table 4: Expected Building Damage by Building Type

Building	1-10)	11-2	0	21-3	0	31-4	0	41-	50	Substa	ntially
Туре	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1	5.88	3	17.65	3	17.65	2	11.76	0	0.00	8	47.06
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	1	0.64	155	99.36
Masonry	0	0.00	6	40.00	4	26.67	0	0.00	0	0.00	5	33.33
Steel	0	0.00	5	41.67	2	16.67	1	8.33	1	8.33	3	25.00
Wood	0	0.00	168	7.90	896	42.14	339	15.95	625	29.40	98	4.61

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 280 hospital beds available for use. On the day of the scenario flood event, the model estimates that 280 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities					
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use			
Fire Stations	39	6	0	5			
Hospitals	3	0	0	0			
Police Stations	9	3	0	3			
Schools	62	16	0	15			

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 134,102 tons of debris will be generated. Of the total amount, Finishes comprises 38% of the total, Structure comprises 36% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 5,364 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 6,366 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 15,830 people (out of a total population of 102,979) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 826.82 million dollars, which represents 29.61 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 820.58 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 39.54% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Los	S					
	Building	197.76	85.20	21.42	23.04	327.41
	Content	128.65	209.17	46.83	87.34	471.99
	Inventory	0.00	7.41	8.52	5.24	21.17
	Subtotal	326.41	301.79	76.76	115.61	820.58
Business Int	terruption					
	Income	0.03	1.03	0.00	0.42	1.47
	Relocation	0.33	0.29	0.00	0.19	0.81
	Rental Income	0.08	0.20	0.00	0.01	0.29
	Wage	0.08	1.17	0.00	2.42	3.68
	Subtotal	0.52	2.69	0.01	3.03	6.25
ALL	Total	326.93	304.48	76.77	118.64	826.82

Appendix A: County Listing for the Region

Washington - Skagit

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)				
	Population	Residential	Non-Residential	Total		
Washington						
Skagit	102,979	6,119,267	2,430,117	8,549,384		
Total	102,979	6,119,267	2,430,117	8,549,384		
Total Study Region	102,979	6,119,267	2,430,117	8,549,384		

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HAZUS: SKAGIT 100 YEAR FLOOD EVENT

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Hazus-MH: Flood Event Report

Region Name:	Skagit
Flood Scenario:	complete_100
Print Date:	Tuesday, April 15, 2014

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Washington

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,710 square miles and contains 4,143 census blocks. The region contains over 39 thousand households and has a total population of 102,979 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 46,356 buildings in the region with a total building replacement value (excluding contents) of 8,549 million dollars (2006 dollars). Approximately 91.29% of the buildings (and 71.58% of the building value) are associated with residential housing.

General Building Stock

Hazus estimates that there are 46,356 buildings in the region which have an aggregate total replacement value of 8,549 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Occupancy	Exposure (\$1000)	Percent of Total
Residential	6,119,267	71.6%
Commercial	1,242,357	14.5%
Industrial	332,752	3.9%
Agricultural	138,828	1.6%
Religion	116,406	1.4%
Government	78,311	0.9%
Education	521,463	6.1%
Total	8,549,384	100.00%

 Table 1

 Building Exposure by Occupancy Type for the Study Region

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	1,761,403	62.1%
Commercial	626,972	22.1%
Industrial	137,912	4.9%
Agricultural	115,995	4.1%
Religion	39,742	1.4%
Government	34,670	1.2%
Education	121,456	4.3%
Total	2,838,150	100.00%

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 280 beds. There are 62 schools, 39 fire stations, 9 police stations and 1 emergency operation center. Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Skagit
Scenario Name:	complete_100
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 2,864 buildings will be at least moderately damaged. This is over 28% of the total number of buildings in the scenario. There are an estimated 361 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	Count	(%)	Count	(%)								
Agriculture	1	6.25	7	43.75	6	37.50	0	0.00	1	6.25	1	6.25
Commercial	2	3.77	10	18.87	15	28.30	6	11.32	6	11.32	14	26.42
Education	2	66.67	1	33.33	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	1	16.67	0	0.00	1	16.67	1	16.67	3	50.00
Religion	0	0.00	2	66.67	0	0.00	0	0.00	0	0.00	1	33.33
Residential	0	0.00	180	6.46	1,050	37.66	418	14.99	798	28.62	342	12.27
Total	5		201		1,071		425		806		361	

Table 3: Expected Building Damage by Occupancy

Table 4: Expected Building Damage by Building Type

Building	1-10		11-20		21-30		31-40		41-50		Substantially	
Туре	Count	(%)	Count	(%)								
Concrete	2	11.11	3	16.67	4	22.22	4	22.22	0	0.00	5	27.78
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	1	0.57	173	99.43
Masonry	1	5.56	3	16.67	7	38.89	2	11.11	2	11.11	3	16.67
Steel	0	0.00	4	40.00	4	40.00	0	0.00	1	10.00	1	10.00
Wood	0	0.00	183	7.00	1,049	40.10	417	15.94	796	30.43	171	6.54

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 280 hospital beds available for use. On the day of the scenario flood event, the model estimates that 280 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities						
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use				
Fire Stations	39	8	0	6				
Hospitals	3	0	0	0				
Police Stations	9	3	0	3				
Schools	62	17	0	17				

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 177,569 tons of debris will be generated. Of the total amount, Finishes comprises 37% of the total, Structure comprises 37% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 7,103 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 6,946 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 17,267 people (out of a total population of 102,979) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 1,056.24 million dollars, which represents 37.22 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 1,048.74 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 39.63% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Area	Residential	Commercial	Industrial	Others	Total
<u>S</u>					
Building	251.65	109.03	25.50	30.05	416.22
Content	166.34	267.25	54.80	118.11	606.50
Inventory	0.00	9.00	10.03	6.99	26.02
Subtotal	417.99	385.28	90.33	155.15	1,048.74
erruption					
Income	0.03	1.27	0.00	0.46	1.76
Relocation	0.37	0.37	0.00	0.21	0.95
Rental Income	0.10	0.23	0.00	0.00	0.34
Wage	0.08	1.47	0.01	2.90	4.45
Subtotal	0.59	3.34	0.01	3.57	7.50
Total	418.57	388.62	90.34	158.72	1,056.24
	Area S Building Content Inventory Subtotal erruption Income Relocation Rental Income Wage Subtotal Total	AreaResidentialSBuildingContent166.34Inventory0.00Subtotal417.99erruptionIncome0.03Relocation0.37Rental Income0.10Wage0.08Subtotal0.59Total418.57	Area Residential Commercial S Building 251.65 109.03 Content 166.34 267.25 Inventory 0.00 9.00 Subtotal 417.99 385.28 erruption Income 0.03 1.27 Relocation 0.37 0.37 Rental Income 0.10 0.23 Wage 0.08 1.47 Subtotal 0.59 3.34 Total 418.57 388.62	Area Residential Commercial Industrial S Building 251.65 109.03 25.50 Content 166.34 267.25 54.80 Inventory 0.00 9.00 10.03 Subtotal 417.99 385.28 90.33 erruption Income 0.03 1.27 0.00 Relocation 0.37 0.37 0.00 Wage 0.10 0.23 0.00 Wage 0.08 1.47 0.01 Subtotal 0.59 3.34 0.01 Total 418.57 388.62 90.34	AreaResidentialCommercialIndustrialOthersSBuilding251.65109.0325.5030.05Content166.34267.2554.80118.11Inventory0.009.0010.036.99Subtotal417.99385.2890.33155.15erruptionIncome0.031.270.000.46Relocation0.370.370.000.21Rental Income0.100.230.000.00Wage0.081.470.012.90Subtotal0.593.340.013.57Total418.57388.6290.34158.72

Appendix A: County Listing for the Region

Washington - Skagit

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)					
	Population	Population Residential Non-Residential		Total			
Washington							
Skagit	102,979	6,119,267	2,430,117	8,549,384			
Total	102,979	6,119,267	2,430,117	8,549,384			
Total Study Region	102,979	6,119,267	2,430,117	8,549,384			

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HAZUS: SKAGIT 500 YEAR FLOOD EVENT

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Hazus-MH: Flood Event Report

Region Name:	Skagit
Flood Scenario:	complete_500
Print Date:	Tuesday, April 15, 2014

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Washington

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,710 square miles and contains 4,143 census blocks. The region contains over 39 thousand households and has a total population of 102,979 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 46,356 buildings in the region with a total building replacement value (excluding contents) of 8,549 million dollars (2006 dollars). Approximately 91.29% of the buildings (and 71.58% of the building value) are associated with residential housing.

General Building Stock

Hazus estimates that there are 46,356 buildings in the region which have an aggregate total replacement value of 8,549 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Occupancy	Exposure (\$1000)	Percent of Total
Residential	6,119,267	71.6%
Commercial	1,242,357	14.5%
Industrial	332,752	3.9%
Agricultural	138,828	1.6%
Religion	116,406	1.4%
Government	78,311	0.9%
Education	521,463	6.1%
Total	8,549,384	100.00%

 Table 1

 Building Exposure by Occupancy Type for the Study Region

Table 2	
Building Exposure by Occupancy T	ype for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	1,860,443	62.8%
Commercial	637,318	21.5%
Industrial	140,741	4.8%
Agricultural	116,227	3.9%
Religion	42,031	1.4%
Government	35,495	1.2%
Education	129,063	4.4%
Total	2,961,318	100.00%

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 280 beds. There are 62 schools, 39 fire stations, 9 police stations and 1 emergency operation center. Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Skagit
Scenario Name:	complete_500
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 3,711 buildings will be at least moderately damaged. This is over 31% of the total number of buildings in the scenario. There are an estimated 412 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	Count	(%)	Count	(%)								
Agriculture	1	5.56	6	33.33	8	44.44	3	16.67	0	0.00	0	0.00
Commercial	1	1.89	12	22.64	15	28.30	9	16.98	9	16.98	7	13.21
Education	2	66.67	1	33.33	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	2	66.67	0	0.00	1	33.33	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	1	12.50	0	0.00	2	25.00	5	62.50
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	206	5.67	1,247	34.35	538	14.82	1,239	34.13	400	11.02
Total	4		227		1,271		551		1,250		412	

Table 3: Expected Building Damage by Occupancy

Table 4: Expected Building Damage by Building Type

Building	1-10		11-20		21-30		31-40		41-50	Substantially		
Туре	Count	(%)	Count	(%)								
Concrete	2	12.50	3	18.75	3	18.75	2	12.50	4	25.00	2	12.50
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	1	0.41	240	99.59
Masonry	1	4.35	3	13.04	7	30.43	2	8.70	9	39.13	1	4.35
Steel	0	0.00	3	21.43	5	35.71	2	14.29	3	21.43	1	7.14
Wood	0	0.00	207	6.12	1,244	36.77	539	15.93	1,232	36.42	161	4.76

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 280 hospital beds available for use. On the day of the scenario flood event, the model estimates that 173 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

			# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use	
Fire Stations	39	8	0	7	
Hospitals	3	1	0	1	
Police Stations	9	3	0	3	
Schools	62	19	0	19	

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 239,404 tons of debris will be generated. Of the total amount, Finishes comprises 34% of the total, Structure comprises 39% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 9,576 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 7,656 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 19,406 people (out of a total population of 102,979) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 1,274.37 million dollars, which represents 43.03 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 1,266.24 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 41.99% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Los	<u>ss</u>					
	Building	321.18	120.01	31.46	41.70	514.34
	Content	213.24	294.17	66.61	146.59	720.61
	Inventory	0.00	9.87	12.00	9.42	31.28
	Subtotal	534.42	424.05	110.07	197.70	1,266.24
Business In	terruption					
	Income	0.04	1.31	0.00	0.51	1.86
	Relocation	0.47	0.41	0.00	0.23	1.10
	Rental Income	0.13	0.25	0.00	0.01	0.38
	Wage	0.10	1.57	0.01	3.12	4.79
	Subtotal	0.73	3.53	0.02	3.86	8.14
ALL	Total	535.16	427.58	110.08	201.56	1,274.37

Appendix A: County Listing for the Region

Washington - Skagit

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)					
	Population	Residential	Non-Residential	Total			
Washington							
Skagit	102,979	6,119,267	2,430,117	8,549,384			
Total	102,979	6,119,267	2,430,117	8,549,384			
Total Study Region	102,979	6,119,267	2,430,117	8,549,384			

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HAZUS DEVILS MOUNTAIN FAULT 7.4 EQ

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Hazus-MH: Earthquake Event Report

Region Name:	Skagit_EQ_Prob
Earthquake Scenario:	Devils 74M
Print Date:	June 06, 2014

Totals only reflect data for those census tracts/blocks included in the user's study region.

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

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Appendix A: County Listing for the Region

Appendix B: Regional Population and Building Value Data

General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Washington

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,749.94 square miles and contains 27 census tracts. There are over 45 thousand households in the region which has a total population of 116,901 people (2002 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 54 thousand buildings in the region with a total building replacement value (excluding contents) of 10,207 (millions of dollars). Approximately 93.00 % of the buildings (and 75.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 4,310 and 974 (millions of dollars), respectively.

Building Inventory

Hazus estimates that there are 54 thousand buildings in the region which have an aggregate total replacement value of 10,207 (millions of dollars). Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 79% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 280 beds. There are 62 schools, 39 fire stations, 9 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 17 dams identified within the region. Of these, 4 of the dams are classified as 'high hazard'. The inventory also includes 58 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 5,284.00 (millions of dollars). This inventory includes over 320 kilometers of highways, 212 bridges, 9,351 kilometers of pipes.

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	212	2,363.10
	Segments	63	1,625.70
	Tunnels	0	0.00
		Subtotal	3,988.90
Railways	Bridges	1	0.10
	Facilities	2	5.30
	Segments	41	129.60
	Tunnels	0	0.00
		Subtotal	135.10
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	0.00
Bus	Facilities	1	1.20
		Subtotal	1.20
Ferry	Facilities	3	4.00
-		Subtotal	4.00
Port	Facilities	23	45.90
		Subtotal	45.90
Airport	Facilities	2	21.30
	Runways	3	113.90
		Subtotal	135.20
		Total	4,310.30

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	93.50
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	93.50
Waste Water	Distribution Lines	NA	56.10
	Facilities	5	366.30
	Pipelines	0	0.00
		Subtotal	422.40
Natural Gas	Distribution Lines	NA	37.40
	Facilities	2	2.40
	Pipelines	0	0.00
		Subtotal	39.80
Oil Systems	Facilities	4	0.40
	Pipelines	0	0.00
		Subtotal	0.40
Electrical Power	Facilities	5	605.00
		Subtotal	605.00
Communication	Facilities	4	0.40
		Subtotal	0.40
		Total	1,161.60

Table 2: Utility System Lifeline Inventory

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Devils 74M
Type of Earthquake	User-defined
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	7.40
Depth (km) *	NA
Rupture Length (km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Note: For shallow crustal earthquakes in the western U.S. (strike-slip, normal, reverse), Hazus uses the latest Next Generation Attenuation (NGA) functions for Historic Epicenter, Fault and Arbitrary scenarios based on specific fault source geometry and earthquake scenario depth is not used.

Building Damage

Hazus estimates that about 14,392 buildings will be at least moderately damaged. This is over 26.00 % of the buildings in the region. There are an estimated 1,451 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	101	0.52	86	0.42	73	0.83	47	1.13	23	1.61
Commercial	493	2.56	555	2.68	788	8.93	474	11.51	214	14.78
Education	17	0.09	14	0.07	16	0.18	11	0.26	5	0.38
Government	31	0.16	19	0.09	22	0.25	15	0.36	7	0.49
Industrial	196	1.02	174	0.84	258	2.92	157	3.81	69	4.73
Other Residential	3,347	17.38	4,086	19.72	3,080	34.90	2,369	57.56	891	61.40
Religion	45	0.23	42	0.21	46	0.52	29	0.70	13	0.87
Single Family	15,025	78.04	15,739	75.98	4,544	51.48	1,015	24.66	228	15.74
Total	19,254		20,715		8,826		4,115		1,451	

Table 3: Expected Building Damage by Occupancy

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	17,053	88.57	18911	91.29	5,368	60.82	1,330	32.31	314	21.63
Steel	190	0.99	183	0.88	434	4.92	324	7.87	87	6.03
Concrete	187	0.97	266	1.28	385	4.36	244	5.93	116	8.02
Precast	146	0.76	141	0.68	281	3.18	171	4.15	71	4.92
RM	610	3.17	430	2.08	594	6.73	283	6.89	95	6.57
URM	26	0.13	36	0.17	102	1.15	149	3.62	148	10.21
МН	1,043	5.42	748	3.61	1,663	18.84	1,615	39.24	618	42.62
Total	19,254		20,715		8,826		4,115		1,451	

*Note:

RM	Reinforced Masonry
URM	Unreinforced Masonry
MH	Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 280 hospital beds available for use. On the day of the earthquake, the model estimates that only 52 hospital beds (19.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 60.00% of the beds will be back in service. By 30 days, 85.00% will be operational.

		# Facilities				
Classification	Total	At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1		
Hospitals	3	1	0	0		
Schools	62	26	0	9		
EOCs	1	0	0	0		
PoliceStations	9	0	0	2		
FireStations	39	0	0	14		

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

				Number of Location	ons_			
System	Component	Locations/	With at Least	With Complete	With Fun	With Functionality > 50 %		
		Segments	Mod. Damage	Damage	After Day 1	After Day 7		
Highway	Segments	63	0	0	63	63		
	Bridges	212	25	3	187	195		
	Tunnels	0	0	0	0	0		
Railways	Segments	41	0	0	41	41		
	Bridges	1	0	0	1	1		
	Tunnels	0	0	0	0	0		
	Facilities	2	1	0	1	2		
Light Rail	Segments	0	0	0	0	0		
	Bridges	0	0	0	0	0		
	Tunnels	0	0	0	0	0		
	Facilities	0	0	0	0	0		
Bus	Facilities	1	0	0	1	1		
Ferry	Facilities	3	0	0	3	3		
Port	Facilities	23	11	0	23	23		
Airport	Facilities	2	1	0	2	2		
	Runways	3	0	0	3	3		

Table 6: Expected Damage to the Transportation Systems

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

(# of Locations								
System	Total # With at Least		With Complete	with Functionality > 50 %					
		Moderate Damage	Damage	After Day 1	After Day 7				
Potable Water	0	0	0	0	0				
Waste Water	5	5	0	0	3				
Natural Gas	2	1	0	0	2				
Oil Systems	4	4	0	0	0				
Electrical Power	5	3	0	2	5				
Communication	4	4	0	1	4				

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	4,676	0	0
Waste Water	2,805	0	0
Natural Gas	1,870	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of	Number of Households without Service				
	Households	At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	45,558	0	0	0	0	0
Electric Power		14,427	9,394	4,482	1,210	19

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.52 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 32.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 20,880 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 1,293 households to be displaced due to the earthquake. Of these, 869 people (out of a total population of 116,901) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

 Severity Level 1: 	Injuries will require medical attention but hospitalization is not needed.
 Severity Level 2: 	Injuries will require hospitalization but are not considered life-threatening
 Severity Level 3: 	Injuries will require hospitalization and can become life threatening if not
	promptly treated.
 Severity Level 4: 	Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	6	2	0	1
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	6	2	0	1
	Industrial	6	2	0	1
	Other-Residential	182	42	4	8
	Single Family	98	15	1	2
	Total	298	63	6	12
2 PM	Commercial	382	108	18	34
	Commuting	1	2	3	0
	Educational	405	117	19	37
	Hotels	1	0	0	0
	Industrial	45	12	2	4
	Other-Residential	38	9	1	2
	Single Family	22	3	0	0
	Total	895	251	42	78
5 PM	Commercial	284	80	13	25
	Commuting	34	47	77	15
	Educational	45	13	2	4
	Hotels	2	1	0	0
	Industrial	28	8	1	2
	Other-Residential	68	16	2	3
	Single Family	38	6	0	1
	Total	498	170	96	50

Table 10: Casualty Estimates

Economic Loss

The total economic loss estimated for the earthquake is 2,370.51 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 1,624.53 (millions of dollars); 19 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 46 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

	(Millions of dollars)							
Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total	
Income Loss	es							
	Wage	0.00	5.91	56.96	2.27	9.89	75.02	
	Capital-Related	0.00	2.53	45.82	1.37	3.15	52.86	
	Rental	7.72	17.66	25.53	0.69	3.21	54.81	
	Relocation	27.97	17.45	42.98	3.31	36.38	128.09	
	Subtotal	35.69	43.55	171.28	7.63	52.64	310.78	
Capital Stoc	Losses							
	Structural	57.84	34.81	58.95	11.32	45.22	208.14	
	Non_Structural	272.20	158.36	176.43	37.73	132.68	777.39	
	Content	104.42	35.84	86.61	24.09	67.33	318.29	
	Inventory	0.00	0.00	2.61	5.46	1.86	9.93	
	Subtotal	434.45	229.01	324.61	78.60	247.08	1,313.75	
	Total	470.14	272.56	495.88	86.23	299.72	1,624.53	

Table 11: Building-Related Economic Loss Estimates

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1,625.74	\$72.12	4.44
	Bridges	2,363.14	\$362.83	15.35
	Tunnels	0.00	\$0.00	0.00
	Subtotal	3988.90	434.90	
Railways	Segments	129.61	\$6.48	5.00
	Bridges	0.13	\$0.02	18.88
	Tunnels	0.00	\$0.00	0.00
	Facilities	5.33	\$2.28	42.79
	Subtotal	135.10	8.80	
Light Rail	Segments	0.00	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Bus	Facilities	1.20	\$0.41	34.36
	Subtotal	1.20	0.40	
Ferry	Facilities	3.99	\$1.19	29.90
	Subtotal	4.00	1.20	
Port	Facilities	45.93	\$17.08	37.18
	Subtotal	45.90	17.10	
Airport	Facilities	21.30	\$4.62	21.68
	Runways	113.89	\$1.63	1.43
	Subtotal	135.20	6.30	
	Total	4310.30	468.70	

Table 12: Transportation System Economic Losses

(Millions of dollars)

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Lines	93.50	\$0.00	0.00
	Subtotal	93.51	\$0.00	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	366.30	\$146.30	39.94
	Distribution Lines	56.10	\$0.00	0.00
	Subtotal	422.41	\$146.30	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	2.40	\$0.62	25.67
	Distribution Lines	37.40	\$0.00	0.00
	Subtotal	39.80	\$0.62	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	0.40	\$0.16	35.86
	Subtotal	0.44	\$0.16	
Electrical Power	Facilities	605.00	\$130.07	21.50
	Subtotal	605.00	\$130.07	
Communication	Facilities	0.40	\$0.16	35.86
	Subtotal	0.44	\$0.16	
	Total	1,161.60	\$277.30	

Table 14. Indirect Economic Impact with outside aid (Employment as # of people and Income in millions of \$)

LOSS	Total	%

Appendix A: County Listing for the Region

Skagit,WA

Appendix B: Regional Population and Building Value Data

	tate County Name	Population	Building Value (millions of dollars)		
State			Residential	Non-Residential	Total
Washington					
	Skagit	116,901	7,695	2,511	10,207
Total State		116,901	7,695	2,511	10,207
Total Region		116,901	7,695	2,511	10,207

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